SEASONAL DIETARY OVERLAP BETWEEN HARTEBEEST AND ROAN ANTELOPE IN BURKINA FASO, WEST AFRICA

By

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CHAPTER I

INTRODUCTION

This thesis is composed of 2 manuscripts written in formats suitable for submission to selected scientific journals. Each manuscript is complete without supporting materials. The order of arrangement for each manuscript is text, literature cited, tables, and figures. Chapter II, "A Punch-card Identification Key for West African Plant Epidermii," is written in the format of The Botanical Review. Chapter III, "Seasonal Dietary Separation Between Hartebeest and Roan Antelope in Burkina Faso, West Africa," is written in the format of the Journal of Wildlife Management.

History of the Nazinga Project

The Nazinga Project (Projet Pilote pour l'Utilisation Rationelle de la Faune a Nazinga) provided an excellent opportunity for ecological research in West Africa. The Project sought to provide a sustainable harvest of protein from wild animals rather than domesticated cattle or sheep (Lungren 1975). Because wild ruminants are better adapted to the West African environment than are domestic species, the Project attempted to harvest a maximum sustained yield (MSY) from each common ungulate species (Spinage 1983a, b). Of 9 antelope found in Nazinga, 5 were considered target species: roan (Hippotragus equinus), hartebeest (Alcelaphus buselaphus), bushbuck (Tragelaphus scriptus), oribi (Ourebia

ourebi), and Grimm's duiker (Sylvicapra grimmia). Warthog (Phacochoerus aethiopicus) were also harvested.

The Project was a cooperative endeavor between the Government of Burkina Faso (formerly Upper Volta) and the African Wildlife Husbandry Development Association (AWHDA); the latter was a non-profit Canadian organization funded by private donations and the Canadian International Development Agency (CIDA). The Burkinabé Government provided personnel for co-direction, anti-poaching, and public relations. Research was done by free-lance ecologists and university students from Burkina Faso, France, Holland, the United Kingdom, and the United States. Ranch development was begun by Clark Lungren (the son of a Canadian missionary) and the Upper Volta Government in 1979. It included construction of offices, a garage-workshop, and housing with water and electricity for Project personnel. Vehicles also were purchased. The 2 principal rivers were dammed to provide several permanent water sources; roads were built; and kob (Kobus kob) were reintroduced onto the ranch.

Ongoing projects included annual mammal transect surveys (since 1981), weather monitoring, and vegetation mapping (abundance and distribution of herbaceous and woody plants). Studies also focused on impacts of grazing and fire, or diet and habitat preferences of principal herbivores. Managers monitored populations of the most profitable target species in relation to their carrying capacity, identified their habitat requirements, and conducted annual harvests.

History of this Study

Spinage (1982) postulated that food limited some ungulate populations at the Nazinga Game Ranch. Thus, to meet the Project's goal of maximizing meat production, research was necessary to assess forage availability and selection. Descriptions of hartebeest and roan antelope diets, when compared to available foods, can provide an idea of preferred and avoided foods (Petrides 1975). Vegetation studies can monitor use of important foods, and management schemes could increase forages that are considered to be limiting; e.g., by regulating fire regimes to favor preferred plant species or by using dams to increase the availability of water and riparian vegetation throughout year.

Dietary studies at Nazinga began in 1982. Lewicki (1982) attempted to observe feeding behavior of captive and free-roaming animals, collect fecal and rumen/stomach contents (with Wageningen Agric. Univ. in the Netherlands doing analyses), and perform feeding trials of tame animals. Unfortunately, his tour of duty with the Peace Corps at Nazinga ended before those goals were realized.

Dietary research was passed on to M. O'Donoghue, who initially carried out field observations, feeding trials, and fecal analysis (O'Donoghue 1983). Attempts were made to tame hartebeest and roan antelope. Some progress was made, but many antelope subsequently died due to their condition when captured or problems that occurred after they had been in captivity (i.e., intraspecific fighting, illness, and animal-fence interactions). These problems could have been overcome with time, effort, and experience, but this was determined to be too time consuming and costly. Direct observations of free-roaming animals

also proved ineffective due to the extreme wariness of these heavily poached animals and 3-meter grasses present at the end of the rainy season. For these reasons, microhistological fecal analysis was initiated for diet determinations.

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CHAPTER II

A PUNCH-CARD IDENTIFICATION KEY FOR WEST AFRICAN PLANT EPIDERMII[1]

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I. Abstract

A punch-card key was developed for identifying West African plants based on histologic features of their epidermii. Creation of this key was necessary to conduct a study of the diets of hartebeest (Alcelaphus buselaphus) and roan antelope (Hippotragus equinus) through fecal analysis. Little or no research has been published that describes the epidermal structure of African dicotyledons or West African grasses. Unlike a dichotomous key, this key allows using histological characteristics in a sequence appropriate to each fragment under observation. This is important because fecal cuticular fragments, especially smaller ones, exhibit (or lack) any combination of characteristics. I have included over 230 West African plant species and 46 identifying characteristics, although the key can be readily modified to include different species assemblages or more characteristics as required for other study sites. In light of recent interest in West African ecosystems, this key should benefit not only scientists performing dietary fecal analysis, but anyone needing to identify plants in the non-flowering stage.

II. Introduction

The histology of plant cuticles has been used for taxonomic classifications (Solereder 1908, Prat 1932, Stace 1965), herbivore diet determinations through fecal analysis (Storr 1961, Stewart and Stewart 1970, Leslie et al. 1984), ground litter and mulch composition quantification (Cavender and Hansen 1970), and the identification of grasses in the vegetative state (Davies 1959). Before results can be

obtained for any of these objectives, a complete reference collection of plant cuticles must be made from every plant species having the potential to occur in study samples. From these histologic specimens, detailed descriptions are made of all the characteristics observed on each plant species. A compilation of these descriptions reveals which characteristics are useful in making identifications; i.e., they occur in a limited number of species, are easily identified, or occur in unique combinations. This compilation is essential as a basis for accurate identifications, as evidenced by the publication of several keys (Stewart 1965, Scotcher 1977, Dabo et al. 1986).

During my investigation of hartebeest and roan antelope diets (Schuette 1991, Chapter III), it became clear that little information was available on the cuticular characteristics of West African plants (Geerling 1979, Scotcher 1979). This necessitated the development of my own guide to the histologic characteristics of West African grass and browse species. Originally, I attempted to devise a dichotomous key for the identification of plant fragments found in fecal samples. However, selection of the order in which identifying characteristics were listed was problematic, because fragments in fecal material range from 1 cell to hundreds of cells; smaller fragments have fewer identifying characters. For this reason, regardless of which characteristics are chosen for initial separation of plant species in a dichotomous key, many cuticular fragments recovered from fecal pellets lack those characteristics. This shortcoming of dichotomous keys forces the investigator to follow both routes through the key when paired characteristics are not observed on an unknown fragment. Each such

occurrence increases both the time required for identifications and the potential for incorrect conclusions.

An alternative to a traditional dichotomous key allows the investigator to employ characteristics in a sequence appropriate to each fragment under observation; readily distinguished and/or uncommon characters are used for identification first. This method, commonly known as a punch-card identification system, has been used to identify timber (Clarke 1938), pollen grains (Faegri and Iversen 1950), plant families (Hall and Johnston 1955) and species (Dunkley 1939, Hall and Johnston 1953, Gwynne and Ndawula-Senyimba 1971). This process of identification reduces the time required to identify plants accurately, either by microscopic analysis or vegetative morphology (Gwynne and Ndawula-Senyimba 1971). Considering recent emphasis on the ecosystem of the Sahel by the International Union for the Conservation of Nature and Natural Resources (IUCN) (IUCN 1990), this key should prove useful to future studies in the region.

III. Study Site

This study was conducted on the Nazinga Game Ranch, located between Pô and Léo along the southern border of Burkina Faso; most field specimens were collected from the Taga, Talanga, and Boudjero regions of the Ranch (Fig. 1). The Ranch encompassed approximately 940 km^2 of uninhabited and relatively undisturbed Sudan savanna between 270 and 326 m above mean sea level. Tropical ferruginous soils varied from gravely/rocky to silty/clayey; clay content usually increased with depth. In some areas, soils had been indurated on the surface and were

composed of ironstone and rocky outcrops of laterite, quartz, and precambrian granite (Buckle et al. 1983).

Dominant woody species of the savanna (the dominant vegetation type on the Ranch) included: Acacia spp., Afzelia africana, Combretum spp., Detarium microcarpum, Gardenia spp., Piliostigma thorningii, Pteleopsis suberosa, Terminalia spp., and Vitellaria paradoxa. Grass cover was dominated by Andropogon ascinoides, A. gayanus bisquamulatus, Aristida kerstingii, Hyparrhenia involucrata, Laudetiopsis kerstingii, and Schizachyrium sanguineum. Riparian areas were the second most common vegetation type and were composed mainly of Albizia chevalieri, Anogeissus leiocarpus, Daniellia oliveri, Khaya senegalensis, Mitragyna inermis, Andropogon gayanus gayanus, Hyparrhenia involucrata, Pennisetum subangustum, Sporobolus pyramidalis, and Vetiveria nigritana (Boxtel and Lokhorst 1988).

The Ranch received an average annual rainfall of 876 mm from 1982 through 1987. June through September accounted for >76% of that total (unpubl. data, Research Section of Nazinga), and no precipitation was recorded for December or January. Daytime high temperatures ranged from 18.1 to 45.5 C with an average daily maximum temperature of 34.1 C. March and April had the highest daily temperatures ($\bar{x}$ = 38.5); August had the lowest ($\bar{x}$ = 29.4)(Johnson 1982). Night-time temperatures occasionally fell as low as 7 C in December and January (Lungren 1975). For my purposes, the year was divided into 3 seasons of equal duration (Fig. 2). The rainy season (Jun-Sep) usually ended abruptly and was followed by the cool dry season (Oct-Jan). Widespread fires signaled the start of the hot dry season (Feb-May), which was followed by the return of the rains.

Common herbivores on the Ranch included: elephant (Loxodonta africana), buffalo (Syncerus caffer), roan antelope, hartebeest, waterbuck (Kobus defassa), reedbuck (Redunca redunca), bushbuck (Tragelaphus scriptus), warthog (Phacochoerus aethiopicus), oribi (Ourebia ourebi), and Grimm's duiker (Sylvacarpa gimmia) (O'Donoghue 1987). Natural predators were limited mainly to the small carnivores, including genets (Genette spp.), African civet (Viverra civetta), mongeese (Herpestes spp., Atilax spp. and Ichneumia spp.), jackal (Canis adustus), and several wild cats (Felis spp.). Occasional sightings of lion (Panthera leo), leopard (Panthera pardus), and spotted hyena (Crocuta crocuta) were made (Frame 1990). More than 260 avian species have been identified on the Ranch to date (O'Donoghue, pers. commun.).

IV. Methods

A histologic reference collection of plant leaf cuticles was developed from mature specimens in the Nazinga herbarium, which were identified according to Hutchinson and Danziel (1972), Innes and Clayton (1977), and Geerling (1982). A second reference collection included examples of immature leaves from most plant species on the Ranch; it was completed in 3 stages. During the first stage, leaves from dicotyledons were collected from the field in their early phenological stages. In the second stage, for each species of perennial bunch-grass, 10 individual plants were marked with wire stakes after being identified during the flowering season. These plants were subsequently sampled following the January fires. If regrowth was not present at that time, they were sampled after the rains in June. The third stage required planting annual grass seeds from herbarium specimens (or field specimens if no

herbarium specimens were available) in individual pots, watering them, and collecting the fifth leaf that appeared (to ensure a large enough sample to mount). Further plant samples were collected, as needed, to ensure accurate identification of plant species that were frequently encountered in the field.

Microscope slide preparation followed a method modified from Stewart (1967). Non-margin sections from the distal third of each leaf (Stace 1965) were removed and boiled in 10% nitric acid until separation of epidermal layers was achieved (3-10 minutes). These fragments were transferred to 40 ml beakers of water for temporary storage. Cuticle preparation required using a camels-hair brush to remove adhering mesophyll (performed under a dissecting microscope). The clean cuticles were placed on a microscope slide; glycerin or Hoyer's solution (Johnson et al. 1983) was used as a mounting medium. After a coverslip was added, fingernail polish was used to seal its edges. Whenever possible, both abaxial and adaxial sides of the leaf were mounted on the same slide; the abaxial side of some species was impossible to obtain intact due to total fragmentation during sample preparation. Microphotographs of the reference collection were taken with a Zeiss photo-microscope III using a blue conversion filter.

Systematic descriptions of grass leaves were made following Stewart (1965). I identified and described the following:

Silica Bodies: (description); Length= ; Width= ; Frequency

Macro Hairs: (description)

Micro Hairs: (description); Length= ; Basal= ; Distal=

Prickle Hairs: (description); Length= ; L base= ; W base=

Papillae: (description)

Stomata: (description); Length= ; Width=

Long Cells: (description); cell wall h= ; A= ; Length= ; Width=

Systematic descriptions of non-grass species were made following Stace (1965). I identified and described the following:

Cell Walls: (description)

Cells: (description); Length= ; Width=

Stomata: (description); Length= ; Width= ; Prevalence...

Trichomes: (description); Length= ; Width=

Trichome Base Cells: (description)

Striations: (description)

Other Structures: (description); Length= ; Width=

Comments: (description)

In an attempt to identify non-leafy material, slides were prepared from stems, culms, inflorescences, seeds, and flowers of selected plant species. Descriptions of these samples are not presented here due to difficulties in distinguishing these to species (Davies 1959).

V. Key Features

After examining all specimens in the histologic reference collections, and >20,000 cuticular fragments found in fecal samples, I chose 46 characteristics to be used to identify grass (Table 1) and non-grass (Table 2) cuticular fragments. Stace (1965:58) stated that intraspecific variation in the features of cuticular structures was

usually a function "of size, frequency, and degree rather than the actual anatomy or organization of the particular structures." This implies that the histologic characteristics used in this grass key may be placed in the following order of decreasing taxonomic importance: (1) type and location of silica bodies; (2) presence and type of papillae; (3) stomatal shape and location; (4) presence of macro-, micro-, prickle hairs and intercostal hooks; and (5) type of cell wall undulations. Characteristics used to identify non-grass species may be ranked in a similar manner: (1) type of trichomes; (2) accessory cell arrangement, both for stomata and for trichomes; (3) presence of papillae or striations; (4) stomatal shape and thickenings; and (5) shape of cell wall undulations. Size and frequency information describing cuticular structures are generally of limited value in differentiating plant species (unless they represent extremes in appearance), but were included in the key and descriptions in order to verify identifications.

Every card (15.6 mm x 10.2 mm) in the key corresponded to a different plant species. The perimeter of the card, 3 mm from the margin, had 46 perforations (3 mm in diameter) spaced 6 mm apart (see Fig. 3). Each perforation was assigned to a different cuticular characteristic (Tables 1 and 2). If a plant species had a given characteristic, the specific area between the perforation and the margin of the card was removed. A summary of which perforations were connected to the margin is given for the 78 grass species (Appendix A) and 153 non-grass species (Appendix B). The final step to making the key required printing grass species' descriptions (Appendix C) and non-grass species' descriptions (Appendix D) on their corresponding species card,

which allowed immediate access to characteristics that did not fit into the 46-hole system.

VI. Summary

I have presented a key to the histologic characteristics of 78 grass and 153 non-grass plant epidermii from West Africa. Although created for identifying cuticular fragments recovered from fecal samples of hartebeest and roan antelope, it should aid anyone that needs to identify plants in the non-flowering stage. Although this key, combined with the species descriptions, provides a good starting point for identifying cuticular fragments, a reference collection, preferably accompanied by photomicrographs of all samples, is essential to verify identifications.

VII. Acknowledgments

I would like to thank the Ministry of Environment and Tourism in Burkina Faso for granting me permission to carry out this study in their country. Dr. George W. Frame, Director of Research at the Nazinga Game Ranch, provided enormous logistical support. Mark O'Donoghue was invaluable in getting me started on the right track, and Dr. David M. Leslie, Jr. enthusiastically, and patiently, supported this long-distance study. Following my return to the United States, Dr. Jonathan A. Jenks provided plenty of criticism on every aspect of my study, helping to crystallize ideas before they left our office.

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Table 1. List of grass key perforations with their corresponding features.

Structure	Feature	Description	Perforation Number
Silica cells	shape	dumbbell	1
		nodular	2
		saddle	3
		cross	4
	length[a]	<8	5
		>8	6
	appearance	elongate	7
		compact	8
	shape of ends	concave	9
		convex	10
		squared	11
		pointed	12
	arrangement	sparse	13
		continuous	14
	arrangement of rows	≤3 together	15
		>3 together	16
	silica body/short cell width ratio	<1	17
		>1	18
	silica body-short cell association	grouped	19
		alternate	20
	intercostal silica bodies	present	21
Papillae	interstomatal	present	22
	multiple papillae/cell	present	23
Micro hairs		present	24
Prickle hairs		present	25
	base shape	round	26
		oval	27
Intercostal hooks		present	28
Macro hairs		present	29

Table 1. Continued.

Structure	Feature	Description	Perforation Number
Long cells	inflated	present	30
	undulation size	deep	31
		shallow	32
	undulation shape	V	33
		'omega'	34
	undulation regularity	irregular	35
Stomata	stomatal/ long cell width ratio	<1	36
		>1	37
	long cell/ stomatal length ratio	<1.5	38
		>1.5	39
	arrangement of rows	≤3 together	40
		>3 together	41
	shape	domed	42
		parallel	43
		peaked	44
	length	<12	45
		>12	46

[a]Each unit of measurement was based on a 1 cm micrometer, divided into 100 segments, located in the ocular of a 430x microscope. Actual units = 2.3 um.

Table 2. List of non-grass key perforations with their corresponding features.

Structure	Feature	Description	Perforation Number
Cells	shape	irregular	1
		round	2
		square	3
		elongate	4
	wall shape	straight	5
		curved	6
		undulate	7
	length[a]	<10	8
		>25	9
Stomata	thickening	polar	10
		T-piece	11
		mouth	12
		ledge	13
		peripheral	14
	length	<10	15
		>10	16
	accessory cells	anomocytic	17
		paracytic	18
		tetracytic	19
		other	20
	abundance	numerous	21
Trichome base cells	arrangement	actinocytic	22
		anomocytic	23
		cyclocytic	24
		hexacytic	25
		other	26
Trichomes	abundance	numerous	27
	type	1 cell	28
		multicelled	29
		branching	30
		bag	31
		club	32
		stellate	33
		2-point	34

Table 2. Continued.

Structure	Feature	Description	Perforation Number
Trichomes	appearance	hollow	35
		internally segmented	36
		curved	37
		straight	38
		strong	39
		fragile	40
		smooth	41
		rough	42
Striations		present	43
Papillae		present	44
Leaf sides	appearance	both different	45
Loaf cells		present	46

[a]Each unit of measurement was based on a 1 cm micrometer, divided into 100 segments, located in the ocular of a 430x microscope. Actual units = 2.3 um

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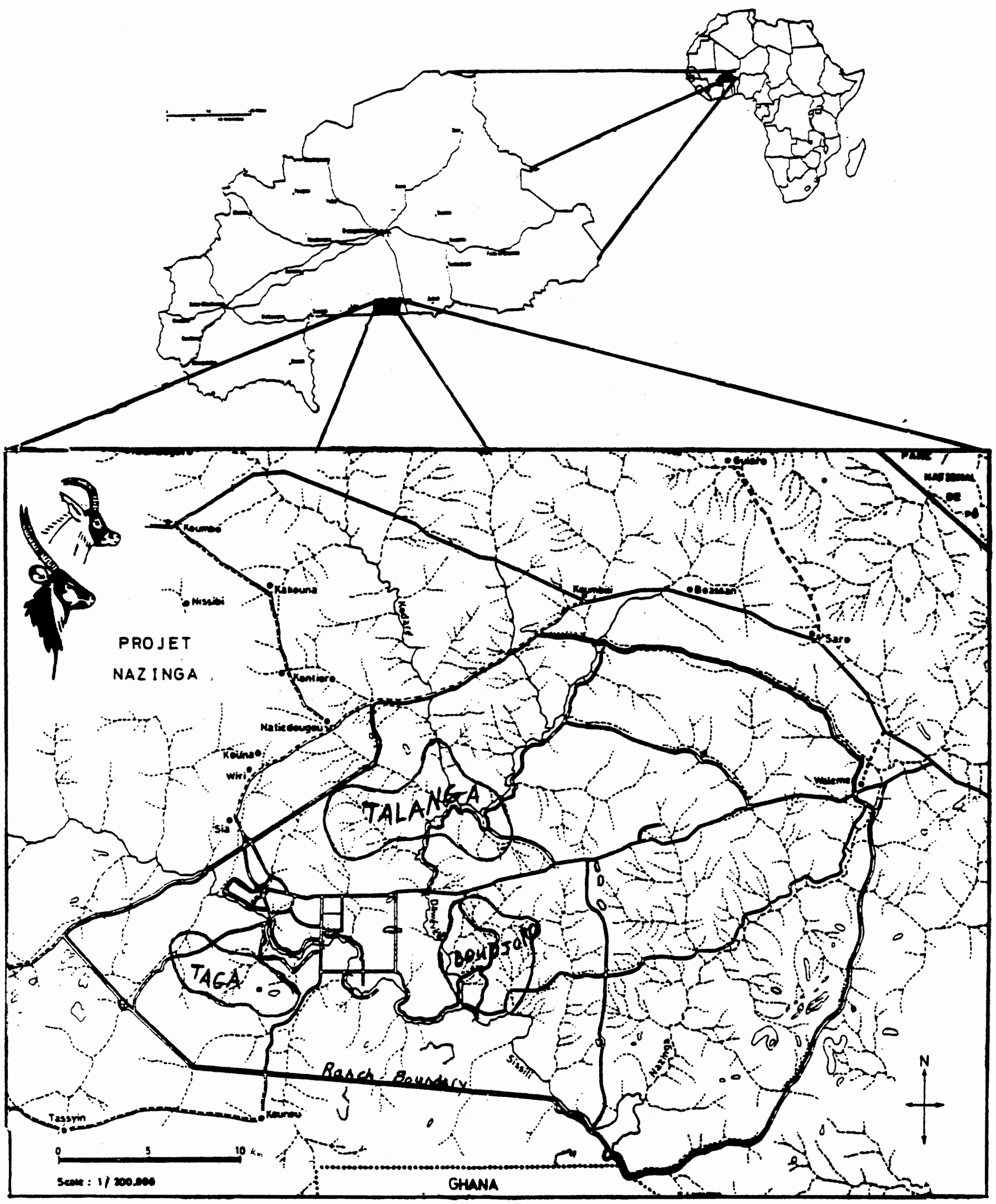
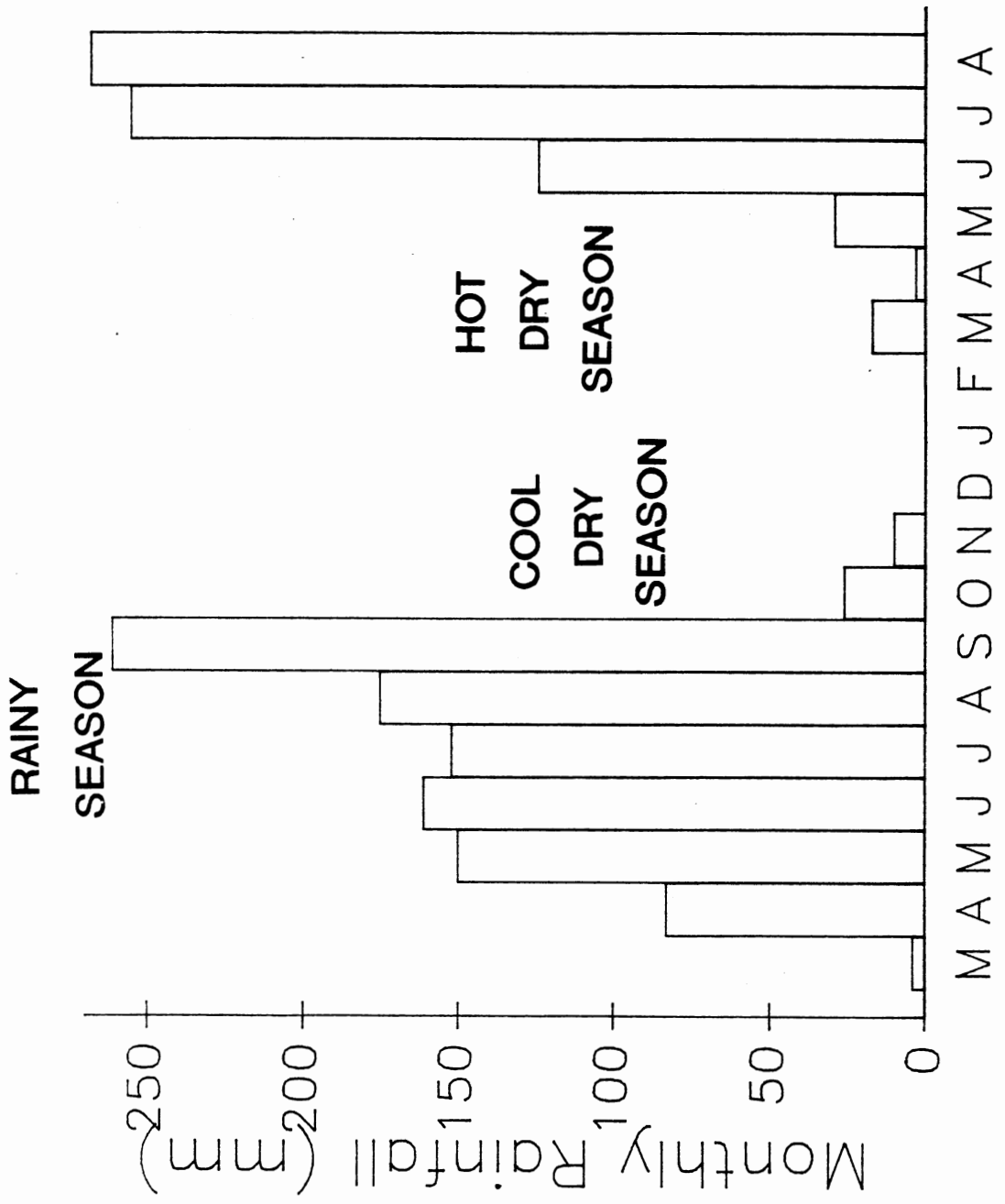
Fig. 1. Location of the Nazinga Game Ranch, Burkina Faso, West Africa.

Fig. 2. Monthly rainfall totals recorded at the Nazinga Game Ranch Research Station, Burkina Faso, March 1986-April 1987.

Fig. 3. Example of a species card for the grass key.


PROJET
NAZINGA
TALANGA
TAGA
Ranch Boundary
N
0
5
10
Scale : 1/ 200.000
GHANA


Monthly Rainfall (mm)
250
200
150
100
50
0
M A M J J A S O N D J F M A M J J A
RAINY SEASON
COOL DRY SEASON
HOT DRY SEASON

Andropogon gayanus bisquamulatus

Abaxial Surface

Silica Bodies: single costal rows of short slightly irreg. dumbell-shaped s.b., distal ends slightly concave-slightly convex, short-med width central portion
-in groups of 1-6, separated by s.c. wider than s.b.
-Length 8 Width 4-6

Macro Hairs: fairly long single cell hairs arising in costal rows, bases of 3 irreg. roundish cells, slightly elevated
-Length 375 Width

Micro Hairs: frequent in intercostal zones, small square-roundish bases, proximal cell rather cylindrical (slightly inflated in middle), distal cell about same size (?) tapering slightly to blunt pt.-very fragile (may be shriveled in slide)
-Length 21 L_b 11 L_d 10

Prickle Hairs: in costal rows between s.b., sometimes widely-spaced, oval bases, med-very long triang. barbs
-*may be fairly freq. intercostal hooks, sm. roundish bases, short triang barbs*
-Length 28-35 L_b 9-14 W_b 6

Papillae: small fairly thick-walled globulose-finger like in small cells between stomata, often slightly overlapping stomata

Stomata: med-domed, sometimes rather triang., single intercostal rows, closely spaced in rows, occasionally double staggered rows
-Length 10-11 Width 6-8

Long Cells: parallel in rows, elongated, shallow u-shaped und. (h=3, a=1)
-Length 25-30 Width 5-7

Adaxial Surface

Silica Bodies: same as abax, in groups of 2-6
-Length 5-6 Width 5

Macro Hairs: none seen
-Length Width

Micro Hairs: none seen
-Length L_b L_d

Prickle Hairs: Costal rows with s.b., oval bases, and med-very long narrow barbs, tapering to point
-Length 60-90 L_b 10-11 W_b 6-7
-fairly frequent intercostal hooks, oval bases, short triang. barbs
-Length 15-20 L_b 5-8 W_b 4-6

Papillae: none seen
-*may be several sm. roundish papillae on many l.c.*

Stomata: same as abax, rows wider spaced
-Length 9-10 Width 7-8

Long Cells: parallel in rows, rect. to squarish, shallow u-shaped und. (h=3, a=1)
-Length 14-27 Width 10

CHAPTER III

SEASONAL DIETARY SEPARATION BETWEEN HARTEBEEST AND ROAN ANTELOPE IN BURKINA FASO, WEST AFRICA

Abstract: Diets of hartebeest (Alcelaphus buselaphus) and roan antelope (Hippotragus equinus) were investigated at the Nazinga Game Ranch in southern Burkina Faso, West Africa. Microhistological fecal analysis indicated that dietary overlap was highest during the rainy ($\bar{x}$ = 73.7%) and cool dry seasons ($\bar{x}$ = 68.2%) and lowest during the hot dry season ($\bar{x}$ = 48.2%), particularly during the last month of the hot dry season (x = 31.5%). As the hot dry season progressed and food became less available, hartebeest maintained a high rate of grass consumption, and roan antelope switched from being predominantly grazers (>95% grass) to mixed feeders (<50% grass). I propose that hartebeest are forced to be more selective than roan antelope through the hot dry season and search for fresh perennial grass regrowth. Results support (1) the premise that greater dietary separation occurs during periods of limited resource availability and (2) the use of the terms "concentrate/mixed /bulk" feeder vs. the "browser/grazer" dichotomy.

J. WILDL. MANAGE. 00(0):000-000

Key words: antelope, Burkina Faso, competition, diets, fecal analysis, game ranch, West Africa.

Game ranching is not new to Africa (Dasmann 1964, Parker and Graham 1971, Skinner 1989), although most earlier efforts have been in either East or South Africa. Project Nazinga (Projet Pilote pour l'Utilization Rationelle de la Faune a Nazinga) is a prototype game ranching effort for West Africa (Spinage 1983). If successful, Nazinga will demonstrate the feasibility of funding local conservation activities through marketing meat from harvested wild animals. Because limited data were available for West African ecosystems, basic natural history information was needed on important target species in order to maximize animal production.

I investigated seasonal diets of hartebeest and roan antelope, the 2 largest antelope on the Ranch. My objectives were to determine if interspecific competition for food limited hartebeest and roan antelope populations and to specify habitat management schemes to increase the carrying capacity of the Ranch. I hypothesized that (1) both antelope species would increase browse consumption when quality grass was less abundant and (2) dietary overlap between these 2 sympatric antelope would be minimized during times of limited resource availability.

This study was financed by the United States Peace Corps, Huntley Street, the Canadian International Development Association (CIDA), the Association de Developpement de l'Elevage de la Faune Africaine (ADEFA), and the Oklahoma Cooperative Fish and Wildlife Research Unit (U.S. Fish and Wildl. Serv., Okla. Dep. Wildl. Conserv., Okla. State Univ., and Wildl. Manage. Inst., cooperating). I would like to thank the Ministry of Environment and Tourism in Burkina Faso for granting me permission to carry out this study in their country. Dr. George W. Frame, Director of Research at the Nazinga Game Ranch, helped me overcome the logistical

hurdles of this multinational investigation. Mark O'Donoghue, who initiated the fecal analysis studies at Nazinga, provided invaluable investigative support while I was in-country. Awia Zibaré not only guided the fieldwork, but also my approaches to everyday situations. Dr. David M. Leslie, Jr. enthusiastically, and patiently, supported this long-distance study. Dr. Jonathan A. Jenks provided unending advice and assistance on all aspects of this study.

STUDY AREA

This study was conducted on the Nazinga Game Ranch, located between Pô and Léo along the southern border of Burkina Faso; my field efforts were concentrated in the Taga, Talanga, and Boudjero regions of the Ranch (Fig. 1). The Ranch encompassed approximately 940 km^2 of uninhabited and relatively undisturbed Sudan savanna between 270 and 326 m above mean sea level. Tropical ferruginous soils varied from gravely/rocky to silty/clayey; clay content usually increased with depth. In some areas, soils had been indurated on the surface and were composed of ironstone and rocky outcrops of laterite, quartz, and precambrian granite (Buckle et al. 1983).

Dominant woody species of the savanna, which was the most common vegetation type, included: Acacia spp., Afzelia africana, Combretum spp., Detarium microcarpum, Gardenia spp., Piliostigma thorningii, Pteleopsis suberosa, Terminalia spp., and Vitellaria paradoxa. Grass cover was dominated by Andropogon ascinodis, A. gayanus bisquamulatus, Aristida kerstingii, Hyparrhenia involucrata, Laudetiopsis kerstingii, and Schizachyrium sanguineum. Riparian areas were the second most common vegetation type and composed mainly of Albizia chevalieri,

Anogeissus leiocarpus, Daniellia oliveri, Khaya senegalensis, Mitragyna inermis, Andropogon gayanus gayanus, Hyparrhenia involucrata, Pennisetum subangustum, Sporobolus pyramidalis, and Vetiveria nigritana (Boxtel and Lokhorst 1988).

The Ranch received an average annual rainfall of 876 mm from 1982 through 1987. June through September accounted for >76% of that total (unpubl. data, Research Section of Nazinga), and no precipitation was recorded for December or January. Daytime high temperatures ranged from 18.1 to 45.5 C with an average daily maximum temperature of 34.1 C. March and April had the highest daily temperatures ($\bar{x}$ = 38.5); August had the lowest ($\bar{x}$ = 29.4) (Johnson 1982). Night-time temperatures occasionally fell as low as 7 C in December and January (Lungren 1975). I divided the year into 3 climatic periods of equal duration (Fig. 2). The rainy season (Jun-Sep) ended abruptly and was followed by the cool dry season (Oct-Jan). Widespread fires signaled the start of the hot dry season (Feb-May), which ended with the return of the rains.

Common Ranch herbivores included elephant (Loxodonta africana), buffalo (Syncerus caffer), roan antelope, hartebeest, waterbuck (Kobus defassa), reedbuck (Redunca redunca), bushbuck (Tragelaphus scriptus), warthog (Phacochoerus aethiopicus), oribi (Ourebia ourebi), and Grimm's duiker (Sylvacarpa gimmia) (O'Donoghue 1987). Natural predators were limited to the small carnivores, including genets (Genette spp.), African civet (Viverra civetta), mongeese (Herpestes spp., Atilax spp. and Ichneumia spp.), jackal (Canis adustus), and several wild cats (Felis spp.). Occasional sightings of lion (Panthera leo), leopard (Panthera pardus), and spotted hyena (Crocuta crocuta) were made (Frame

1990). More than 260 avian species have been identified to date (O'Donoghue, pers. commun.).

METHODS

Microhistology

Fifteen fecal samples/month were collected for each ungulate from May 1986 through June 1987. Samples were collected throughout the month, or during road searches at the end of the month if <15 samples had been found. A sample comprised 20-50 pellets of fresh, intact feces from 1 fecal group. Identification of feces was made by the shape of the pellets and nearby hoofprints (Spinage 1986).

Four pellets were randomly selected from each pellet group. The outer covering of each pellet was removed because the dried mucus prevented the epidermal fragments from separating completely. Approximately 0.1 grams of the remaining fecal material was placed in a 30-ml test tube containing 10 ml of 10% nitric acid solution (Stewart 1967, Field 1972, Geerling 1979). Test tubes were placed in a boiling-water bath until the mesophyll was dissolved, as indicated by the fragments sinking to the bottom of the test tube. Test tubes were allowed to cool and the supernatent decanted. Fragments were washed once by filling the test tubes with water, shaking them, allowing the fragments to resettle, and decanting the supernatent. Bleach was then added to the test tubes, which were agitated and set aside for 24 hours, after which the bleach was decanted. If fragments were not completely bleached (determined visually), the bleach process was repeated; otherwise they were washed with water once and placed in 20-ml vials of

water until analysis (≤4 years latter). These preparations were done under a hood because bleach reacts violently with nitric acid and produces chlorine gas.

To obtain a sample for analysis, I agitated a vial and randomly collected fragments with an eyedropper. Two drops were individually placed on a microscope slide; a second slide was prepared from the same vial. Excess water was absorbed from each of the 4 drops using a cloth towel. Glycerin or Hoyer's solution (Johnson et al. 1983) was used as a mounting medium. After a 22 x 22 mm coverslip was added to each area, fingernail polish was used to seal the edges of the coverslip. Bausch and Lomb 100X/430X and Biolam 120X/600X microscopes were used for fecal analysis; sampling was done under 100X and fragment identification under 430X. The Biolam microscope was used for comparing unknown fragments with the reference collection.

Grass vs. Non-grass.--Point intercept frequencies were used to quantify the grass non-grass ratio of individual fecal samples (Stewart 1967, Casebeer and Koss 1970). A group of 5 points (located in the microscope ocular) was systematically placed over each coverslip by traversing it horizontally. One field of view separated sampling fields, both vertically and horizontally. Exactly 100 fragment 'hits' were recorded for each fecal sample (25 from each of the 4 coverslip areas), which resulted in a monthly sample size of 1,500 fragments for each antelope species. This procedure reduced the bias of differential fragmentation and identification between grasses and non-grasses. Ratios derived from all identified fragments would over-estimate the non-grass component (Stewart 1967, Johnson et al. 1983) (i.e.,

dicotyledons are usually more identifiable to species with fewer cells than are monocotyledons).

Plant Species Composition.--Fragment counts were used to quantify species composition of grasses and non-grasses in individual fecal samples (Stewart and Stewart 1970, Melton 1978, Stevens et al. 1987). Fragments were defined as possessing at least 2 identifying structures (Field 1972, Scotcher et al. 1978) and were located by systematically traversing each coverslip in alternate vertical rows to avoid fragment duplication. Fragment identification procedures were outlined in Schuette (1991, Chapter II). After 15 grass and 15 non-grass fragments were recorded from the first slide, the second slide was analyzed to provide a total of 30 grass and 30 non-grass fragments for each fecal sample. If a sample contained <5% non-grass species, or when diets included items that reduced fragment clarity (i.e., salt lick use or consumption of burnt vegetation), <30 grass or non-grass fragments may have been recorded.

Data Analyses

Grass vs. Non-grass.--I tested for monthly differences in the consumption of grasses between hartebeest and roan antelope with a 2-sample t-test. Monthly differences in grass consumption by each antelope species over the 14-month study period were tested using a 1-way ANOVA. Tukey's multiple range test (Steel and Torrie 1980) on ranked values (Conover and Iman 1981) was used to ascertain which monthly diets contained less grass than others.

Plant Species Composition.--The percentage of each grass species in individual pellet groups was determined by adjusting the percentage that a grass species contributed to the total grass component (as determined by fragment counts) by the percentage of grass in that sample (as determined by point intercept frequencies). The percentage of each non-grass species in individual diets was determined in the same manner. Monthly "composite diets" were determined for hartebeest and roan antelope by totaling each plant species percent composition in individual fecal samples across the 15 monthly samples and dividing this by 15. By doing this for every plant species viewed in the fecal samples, a monthly sample size of 450 grass fragments and 450 non-grass fragments was obtained for each antelope species. The following formulas summarize this 2-step process:

$$\%Mp = [\sum_{i=1}^{15} \sum_{p=1}^{n} (\%M_i)(\#M_{i,p})/(\#M_{i,T})]/15 \text{ and}$$

$$\%Dp = [\sum_{i=1}^{15} \sum_{p=1}^{n} (\%D_i)(\#D_{i,p})/(\#D_{i,T})]/15,$$

where

$\%M_i$ = percentage of grasses in fecal sample i;

$\%D_i$ = percentage of browse species in fecal sample i;

$\#M_{i,p}$ = number of grass fragments in sample i identified as plant species p;

$\#D_{i,p}$ = number of browse fragments in sample i identified as plant species p;

$\#M_{i,T}$ = total number of grass fragments identified in sample i;

$\#D_{i,T}$ = total number of browse fragments identified in sample i;

%Mp = percent component of one month's composite sample by grass species p; and

%Dp = percent component of one month's composite sample by browse species p.

This procedure was repeated for every plant species identified in the fecal samples. Note that whenever $\%M_i$ (or $\%D_i$) was >5%, $\#M_{i,T}$ (or $\#D_{i,T}$) equaled 30 in that sample. If $\%M_i$ (or $\%D_i$) was <5%, $\#M_{i,T}$ (or $\#D_{i,T}$) may have been <30.

Numerous approaches have been used to assess dietary overlap (Greig-Smith 1964, Horn 1966, Gauch 1973, Hansen et al. 1973, Stroup and Stubbendieck 1983); I selected 2. The first was straight-forward and could range from 0 to 1 (identical diets) (Hurlbert 1978)

$$CI = \sum_{i=1}^{n} \min(P_{R,i}, P_{H,i}),$$

where

$P_{R,i}$ = % plant species i from roan antelope fecal samples;

$P_{H,i}$ = % plant species i from hartebeest fecal samples; and

$\min(P_{R,i}, P_{H,i})$ = equals the lesser of the 2 quantities $P_{R,i}$ and $P_{H,i}$.

The second emphasized major differences in important dietary components and could range from 0 (identical diets) to 1 (Goodall 1973):

$$ED = \sum_{i=1}^{n} (P_{R,i} - P_{H,i})^2.$$

Stewart (1967) suggested that dietary information based on fragment counts should also be presented on a frequency basis due to differential fragmentation of plant species, plant parts, and phenological stages. I therefore recorded the number of diets, out of the 15 collected monthly, that contained a certain plant species (Hanson and Graybill 1956, Stewart 1967, Scotcher 1979). After completing slide analysis, plant fragments were placed into "forage categories."

RESULTS

Grass vs. Non-grass

During the rainy season, both hartebeest and roan antelope ate >95% grass (Table 1 , Fig. 3). With the exception of May 1986 for hartebeest and October 1986 for roan, dry season grass consumption never exceeded 95%. Although composite diets for hartebeest never contained <80% grass, 6 of 10 dry season roan diets contained <80% grass. Hartebeest consumed significantly less grass during the cool dry season than during other times of the year. Roan antelope had greater fluctuations in the grass component of their diet than did hartebeest; significant peaks in browse consumption occurred both at the end of the cool dry season and the hot dry season (Table 2).

Plant Species Composition

After analyzing 418 fecal samples, I concluded that the typical forage classifications (Anthony and Smith 1977, Leslie et al. 1984) (i.e., grass, browse, forb, etc.) were not appropriate for my study, mainly due to the predominance of grasses in the diets throughout the

year. I defined 8 forage categories, based on plant taxonomy, physiognomy, and histology (Table 3).

Grasses consumed by hartebeest and roan antelope during the rainy season were dominated by short Andropogon species (mostly A. ascinodis) (Appendix E) and Hyparrhenia species (Table 4 , Fig. 4). Increased use of grass culms and inflorescences occurred during the flowering season of the grasses and was followed by peak use of tall Andropogon species in October or November (Table 5) (matched by the reduction of all other grass leaves to <10% of the diet) (Appendix F). Diets after fires in December and January were very similar to those of the rainy season, although culms and Jasminium kerstingii occurred in greater quantities than in the rainy season. As the hot dry season progressed, hartebeest ate >50% grass leaves; roan antelope ate <15% grass leaves (Table 6). Roan antelope shifted from perennial grass regrowth to mostly legumes (Appendix G). The return of the rains in June coincided with a reduction in culms and legumes in both diets, but Jasminium kerstingii increased from <2% for both antelope in May 1987 to 13% and 20% for hartebeest and roan antelope, respectively, in June 1987.

Dietary Overlap

Overlap indices suggested a high similarity between hartebeest and roan antelope diets at the plant species level during the rainy season (Fig. 5). Diets steadily became more dissimilar as the dry season progressed; overlap at the end of the hot dry season was less than half the levels recorded during the rainy season.

DISCUSSION

Grass vs. Non-grass

Hartebeest and roan antelope consumed grass when it was fresh and plentiful during the rainy season. As grasses reached senescence, both antelope species increased their consumption of non-grasses. After grasses dried out, fires removed the old growth and created conditions conducive for regrowth of perennial grasses. Because this grass regrowth was initially fresh and abundant, both antelope increased consumption of grasses, although grasses did not comprise as large a percentage of roan diets as they did hartebeest diets.

As the hot dry season progressed, roan antelope increased their consumption of browse. This may have been because grass regrowth became less abundant and drier, and browse species (primarily legumes) developed buds and young leaves and sprouts (Johnson 1982). Browse species also tend to have more protein (Brinckman and Leeuw 1975), calcium, and phosphorous (Toutain 1974) than grass during the dry season. Given this pattern, it is difficult to explain why hartebeest, the smaller of the 2 antelope species, maintained their levels of grass consumption (Gwynne and Bell 1968).

Standard errors on levels of grass consumption suggested that diets of both antelope were less variable in the rainy season than the rest of the year. This may reflect differences in phenology and availability rather than selection. Localized rain and fire produced a mosaic of phenological stages (potentially separated by >1 month) on the Ranch, which was reflected in diets because fecal samples were collected from 3 separate areas (and likely different herds of animals).

Plant Species Composition

During the rainy season, diets of hartebeest and roan antelope were mostly a function of the abundance of the different grasses. The increase in culm material and decrease in leaf material in September diets (the month that grasses put out their reproductive shoots) supports this observation. Increased use of tall Andropogon species in October (to the near exclusion of most other grass material except culms) cannot be explained simply by changes in abundance. Perhaps a better explanation would be availability. Tall Andropogon species have a low reproductive shoot/vegetative shoot ratio. For the animals, this means that there are fewer stalks to physically inhibit the use of tall Andropogon species leaves than there are for short Andropogon species. Combined with this, vegetative shoots tend not to senesce as early as reproductive shoots, which makes them more palatable.

Fires in November and December caused a decrease in the consumption of tall Andropogon species, which was not due to availability because they did produce regrowth. Consumption of short Andropogon species increased. Eight to 12 weeks after the fires, both antelope switched from short Andropogon species back to tall Andropogon species. Sen and Macey (1965) showed that crude protein levels for A. gayanus (a tall Andropogon) in Ghana were higher in 8-12 week old fresh material than fresh 4-, 16-, and 24-week old material. This peak in crude protein after the 4th week differs from the general trend of decreasing crude protein with age Sen and Macey found in other grasses and suggests that the dietary shift by antelope may be due to changes in forage quality.

Research is needed to analyze crude protein levels in short Andropogon species found on the Ranch over this same time span.

The final 2 months of the hot dry season caused regrowth of perennial grasses to wither and become less abundant. Although hartebeest were able to maintain high levels of grass consumption during the hot dry season, they increased consumption of low-quality culm material, suggesting dietary stress (Gwynne and Bell 1968). Roan antelope replaced consumption of grass-leaf regrowth with consumption of browse species, especially legumes that produced fresh leaves and started flowering in March and April, while most other browse species were still dormant (Johnson 1982). The notable decrease of browse in both antelope diets (except Jasminium kerstingii, a member of the olive family) when the rains returned in June suggested that browse was not a preferred forage but one of necessity.

Jasminium kerstingii was an important constituent of both hartebeest and roan antelope diets at 2 separate times of the year: 1 month after fires moved through the area and immediately after the rains returned. Although it was locally abundant, it never made up >2% of the rainy-season cover in any of the vegetation types found on the Ranch (Boxtel and Lokhorst 1988). Field observations confirmed that these patches were heavily utilized, which suggested that this species was highly preferred.

Interspecific Competition

Although the best examples of interspecific competition come from small animals observed and manipulated under laboratory conditions (Gause 1934; Park 1948, 1954, 1962; Neill 1975), several attempts have

been made to verify the existence of competition under natural conditions and in large mammals (Hanson and Reid 1975, Hudson 1976, Singer 1979, Schwartz and Ellis 1981, Leslie 1982, McInnis and Vavra 1987). Considerable research has been conducted on ungulates in East and South Africa (Lamprey 1963, Bell 1971, Sinclair and Norton-Griffiths 1982, McNaughton 1985, Sinclair 1985); the possibility of niche overlap, a prerequisite to interspecific competition, is high among the rich and varied ungulate fauna (Jarman and Sinclair 1979). For competition to occur, Pianka (1976) stated that both populations must be at or near their carrying capacity. Anthony and Smith (1977) agreed that competition below carrying capacity is a transient, not a directional, force whose significance is difficult to interpret.

At the Nazinga Game Ranch, sympatric populations of hartebeest and roan antelope were not at carrying capacity and likely had not been for some time due to human predation (Frame and Herbison Frame 1990). Measures of competition may indicate earlier, rather than current, conflicts (Sale 1974), demonstrating that evolutionary divergence is unaffected by the relatively recent impact of man (Owen-Smith 1988). O'Donoghue (1986) estimated that there were 3X as many roan antelope (n = 2,172) as hartebeest (n = 753) at Nazinga. They commonly occurred in mixed herds, were comparable in stature (although roan were about 50% heavier than hartebeest), and both considered to be mainly grazers (Lamprey 1963). These factors, combined with the high levels of dietary overlap (Fig. 5), indicated the potential for interspecific competition (Wilson 1975) for food.

There was no shortage of food during the rainy and cool dry seasons, so competition was unlikely to be a factor (Colwell and Futuyma

1978). Reduced dietary overlap during the hot dry season indicated that these 2 antelope species have developed different feeding strategies to cope with this season of limited food availability.

It has been stated that, to foster coexistence, species will diverge greatest in times of limited resources (Colwell and Futuyma 1971, Sale 1974), although contradictions have been recorded (Schwartz and Ellis 1981, Leslie et al. 1987, Jenkins and Wright 1987, Schoener 1982). Bell (1971:90) hypothesized that "if two species of different size have the same food supply (all other parameters being equal), the larger species will displace a smaller one" due to different energy requirements and digestive efficiencies. This implies that roan antelope have a competitive advantage due to their greater size. Somewhat contrary to this idea, Bell (1971:91) also stated the "smaller species...can afford to be more selective than the larger one and can maintain itself on a food supply so sparse that the rate of intake would not satisfy the larger animal." This implies that hartebeest, because of their small size, should select plants of higher nutritive value and digestibility than roan and specialize on younger growth, greener parts, greener species, shorter sward, and more seeds (Gwynne and Bell 1968).

Because browse tends to be more nutritious (Dean 1980) and more widely dispersed than grasses, selectivity is generally associated with browsing animals. Hoffman (1968), however, emphasised the digestibility aspect of forage selection. Rather than the classic "grazer/browser" classifications, he suggested "bulk-and-roughage-", "intermediate-", and "concentrate-" feeder, based on the alimentary/digestive tract anatomy and body size of ungulates (Hoffman and Stewart 1972). Bulk-and-roughage feeders consume forage that is plentiful, regardless of its

digestibility. Concentrate feeders select quality forage, regardless of its availability.

At Nazinga, browse was more plentiful than grass regrowth at the end of the dry season, especially in years when the rainy season was delayed, as was the case during this study. Although browse contains greater quantities of important nutrients, it also tends to have more secondary compounds, which can reduce digestibility (Mould and Robbins 1982). This suggests that roan antelope, although consuming browse during the hot dry season, tend to be bulk-and-roughage feeders and capable of making the most of an abundant, but not very palatable, forage. Hartebeest tend to be concentrate feeders and select grass that may contain fewer nutrients but are more digestible than browse. The wider muzzle, apparently less-nimble lips, and 50% more species-rich diets of roan antelope compared to hartebeest suggest that roan antelope have adapted to non-selectively stripping leaves from twigs. Hartebeest are capable of grazing the widely-spaced, short tufts of perennial grass regrowth, which they likely are forced to rely upon due to direct competition with the larger roan antelope during the end of the hot dry season.

MANAGEMENT IMPLICATIONS

Dietary divergence by hartebeest and roan during the season of greatest limitation (Feb-May) indicates that any attempt to increase both populations at Nazinga must have 2 goals. For hartebeest, efforts must be directed at providing a steady supply of fresh, perennial grass regrowth throughout the dry season. Information is needed on effects different fire regimes have on quality and quantity of grass regrowth

and browse production. Fire also may induce gradual shifts in grass community structures and create more areas with species capable of providing regrowth than presently occur on the Ranch. As a secondary tool, serious consideration should be given to "prescribed grazing" practices with cattle, which may provide a less destructive method of regulating the supply of grass regrowth.

The second goal would emphasize the creation of watering holes accessible to the whole Ranch throughout the dry season. This would not only provide drinking water but also would create riparian areas in which most leguminous species eaten by roan antelope are found.

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Table 1. Average grass component (%) of monthly fecal samples from hartebeest and roan antelope at the Nazinga Game Ranch, Burkina Faso, 1986-87.

	Hartebeest		Roan Antelope		P-value	
Month	Percent	SE	Percent	SE	t-test	Tukey
May	96.7	1.51	93.8	1.53	0.236	0.995
Jun	98.0	0.70	96.4	1.37	0.369	1.000
Jul	98.7	0.71	96.9	0.64	0.116	0.835
Aug	97.7	0.75	98.7	0.57	0.224	1.000
Sep	95.4	1.61	97.6	0.57	0.219	1.000
Oct	90.3	1.48	95.9	0.70	0.006	0.993
Nov	91.2	3.10	78.3	5.92	0.020	1.000
Dec	82.8	3.61	83.5	2.41	0.881	1.000
Jan	80.5	3.28	78.4	3.40	0.533	1.000
Feb	93.7	3.10	80.9	5.73	0.074	0.747
Mar	93.1	3.63	76.7	3.92	0.020	0.000
Apr	90.4	4.37	65.4	5.39	0.001	0.000
May	93.7	3.68	49.1	6.84	0.000	0.000
Jun	85.1	4.04	76.2[a]	4.86	0.246	0.983

[a] Due to heavy rains, only 13 fecal samples were collected for roan antelope in June, 1987.

Table 2. Matrix of p-values from Tukey's HSD comparison of the ranked percentage of grasses found in hartebeest and roan antelope diets from the Nazinga Game Ranch, Burkina Faso, 1986-1987.

	Rainy Season					Cool Dry Season				Hot Dry Season				
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Hartebeest														
May	-													
Jun	-	-												
Jul	-	-	-											
Aug	-	-	-	-										
Sep	-	-	-	-	-									
Oct	*	*	***	*	-	-								
Nov	-	-	*	-	-	-	-							
Dec	*	**	***	**	-	-	-	-						
Jan	***	***	***	***	*	-	-	-	-					
Feb	-	-	-	-	-	-	-	-	*	-				
Mar	-	-	-	-	-	-	-	*	**	-	-			
Apr	-	-	-	-	-	-	-	-	*	-	-	-		
May	-	-	-	-	-	-	-	*	**	-	-	-	-	
Jun	-	-	**	-	-	-	-	-	-	-	-	-	-	-
Roan Antelope														
May	-													
Jun	-	-												
Jul	-	-	-											
Aug	-	-	-	-										
Sep	-	-	-	-	-									
Oct	-	-	-	-	-	-								
Nov	-	-	-	***	**	-	-							
Dec	*	**	**	***	***	*	-	-						
Jan	**	**	***	***	***	**	-	-	-					
Feb	-	-	-	***	*	-	-	-	-	-				
Mar	***	***	***	***	***	***	-	-	-	-	-			
Apr	***	***	***	***	***	***	-	-	-	-	-	-		
May	***	***	***	***	***	***	***	*	-	***	-	-	-	
Jun[a]	**	***	***	***	***	**	-	-	-	-	-	-	-	-

- p > 0.05
* p < 0.05
** p < 0.01
*** p < 0.001

[a] Due to heavy rains, only 13 fecal samples were collected for roan antelope in June, 1987.

Table 3. Descriptions of the 8 forage categories used to describe diets of hartebeest and roan antelope at the Nazinga Game Ranch, Burkina Faso, 1986-1987.

Forage Category	Description
Grass	Exhibit silica bodies
Tall *Andropogon* spp.	All perennial bunchgrasses Inflorescences >3 meters tall Exhibit multiple papillae
Short *Andropogon* spp.	Perennials and annuals Inflorescences <3 meters tall
Hyparrhenia spp.	Perennials and annuals Very large papillae Very large stomata
Culms	Silica-suberose couplets No papillae
Miscellaneous leaves	Both identified and unidentified
Non-grass	No silica bodies
Legumes	Abaxial side with papillae Adaxial side featureless
Jasminium kerstingii	Segmented trichomes Heavy striations
Miscellaneous leaves	Both identified and unidentified leaves and stems

Table 4. Average composition (%, S.E.) and frequency of occurrence for 8 forage catagories identified in monthly composite rainy-season fecal samples from hartebeest and roan antelope at the Nazinga Game Ranch, Burkina Faso, 1986-87.

	Month																											
	May[a]						June						July						August						September			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses:																														
Andropogon																														
Tall spp.	22	4.4	15	19	3.0	14	17	3.2	15	14	2.7	15	17	3.2	15	18	3.5	13	33	5.4	15	35	5.4	13	15	3.8	12	29	5.7	15
Andropogon																														
Short spp.	30	5.0	14	41	4.2	15	47	5.7	15	58	5.3	15	48	5.3	15	42	6.4	14	30	6.2	13	26	4.5	14	10	3.3	9	5	2.5	5
Hyparrhenia																														
spp.	15	3.3	12	13	3.5	13	16	3.0	13	11	2.2	13	20	4.6	14	22	5.1	12	16	3.3	13	23	3.9	15	8	1.8	11	9	4.5	8
Culms	17	5.4	13	13	2.8	13	4	0.8	14	7	2.5	10	8	1.8	13	11	3.2	12	11	3.0	12	11	2.2	14	53	5.3	15	48	5.9	14
Other leaves	13	2.1	14	8	2.2	11	14	3.6	12	7	2.0	10	5	2.4	7	3	1.9	5	6	2.6	10	4	1.4	7	9	3.6	9	7	2.0	10
Non-grasses:																														
Legumes	1	0.9	1	0	0.1	3	0	0.1	3	0	0.1	3	1	0.4	2	2	0.7	9	0	0.2	3	0	0.2	2	0	0.1	1	0	0.2	3
Jasminium																														
kerstingii	2	0.7	6	5	1.5	10	1	0.6	6	3	1.4	11	0	0.2	3	0	0.1	5	0	0.0	0	0	0.1	1	0	0.0	1	0	0.1	2
Other spp.	1	0.4	7	1	0.5	8	1	0.3	6	0	0.2	6	0	0.1	7	1	0.3	11	2	0.8	7	1	0.4	8	4	1.6	14	2	0.6	10

[a] Because of the early rains in 1986, May diets resemble rainy season diets more the they resemble hot dry season diets.

Table 5. Average composition (%, S.E.) and frequency of occurrence for 8 forage catagories identified in monthly composite cool dry season fecal samples from hartebeest and roan antelope at the Nazinga Game Ranch, Burkina Faso, 1986-87.

	Month																					
	October						November						December						January			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses:																								
Andropogon																								
Tall spp.	47	4.5	14	66	5.4	15	57	6.6	14	37	7.0	14	21	3.4	14	13	4.1	14	11	2.3	13	8	2.2	12
Andropogon																								
Short spp.	7	1.7	11	3	1.2	5	2	1.1	5	4	2.4	5	19	4.7	14	34	4.9	14	44	4.7	15	45	3.8	15
Hyparrhenia																								
spp.	3	0.8	8	3	1.1	7	0	0.0	0	3	1.2	5	5	1.5	10	4	1.0	8	3	1.3	6	4	1.0	12
Culms	26	4.5	13	21	3.2	14	24	3.9	13	41	7.0	14	27	4.7	14	28	4.6	14	17	2.9	14	16	1.9	14
Other leaves	8	6.2	7	4	2.1	5	7	5.1	7	1	0.5	4	10	6.5	6	6	1.9	12	5	1.5	11	6	3.4	5
Non-grasses:																								
Legumes	2	0.7	12	2	0.4	13	2	0.8	12	3	1.0	9	3	1.0	10	2	0.5	14	5	1.2	13	4	1.2	14
Jasminium																								
kerstingii	3	0.8	10	0	0.2	4	3	1.3	7	4	1.5	11	10	2.3	13	7	1.3	13	11	2.7	13	15	2.9	13
Other spp.	4	0.8	14	2	0.5	11	3	1.2	12	8	2.3	15	3	1.0	9	6	1.0	13	3	0.9	10	1	0.5	6

Table 6. Average composition (%, S.E.) and frequency of occurrence for 8 forage catagories identified in monthly composite hot dry season fecal samples from hartebeest and roan antelope at the Nazinga Game Ranch, Burkina Faso, 1986-87.

	Month																											
	February						March						April						May						June[a]			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan[b]		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses:																														
Andropogon Tall spp.	19	6.1	12	36	6.0	14	34	5.2	15	35	5.8	14	29	5.6	12	19	4.1	13	27	5.7	15	7	2.6	12	36	5.8	14	29	5.1	12
Andropogon Short spp.	46	6.3	14	18	4.6	13	20	4.3	13	4	1.2	9	9	2.6	10	3	1.0	8	20	3.8	13	5	3.4	8	24	6.9	14	24	4.8	12
Hyparrhenia spp.	5	1.8	9	12	6.3	10	13	2.2	14	3	2.2	3	6	1.7	9	2	1.0	8	6	1.5	11	2	1.2	4	8	2.0	11	10	2.6	11
Culms	20	4.9	14	18	3.4	14	19	5.3	12	31	5.3	14	38	6.2	14	35	4.8	14	32	4.8	14	33	6.6	14	10	2.3	14	10	2.3	12
Other leaves	4	1.2	10	3	1.7	6	7	2.4	7	2	1.2	6	8	3.5	9	8	5.0	6	9	2.3	10	2	2.3	2	7	3.5	7	2	1.2	4
Non-grasses:																														
Legumes	1	0.8	5	2	0.6	9	4	2.0	5	13	2.5	14	5	2.4	6	18	3.7	13	4	2.5	5	31	4.2	14	1	0.2	9	2	1.3	8
Jasminium kerstingii	4	2.0	6	6	2.6	10	0	0.3	1	3	0.7	13	1	1.0	2	3	0.9	9	0	0.0	2	2	0.9	10	13	4.0	11	20	4.8	10
Other spp.	1	0.5	9	5	1.5	13	3	1.6	9	8	1.7	14	3	1.5	10	11	2.4	15	3	1.2	11	17	4.0	14	1	0.3	9	3	0.7	12

[a] Because of the delay in the return of the rains in 1987, June diets have been included with the dry season diets, although they were more transitional.

[b] Due to heavy rains in late June, only 13 fecal samples were collected for roan antelope in June, 1987.

LIST OF FIGURES

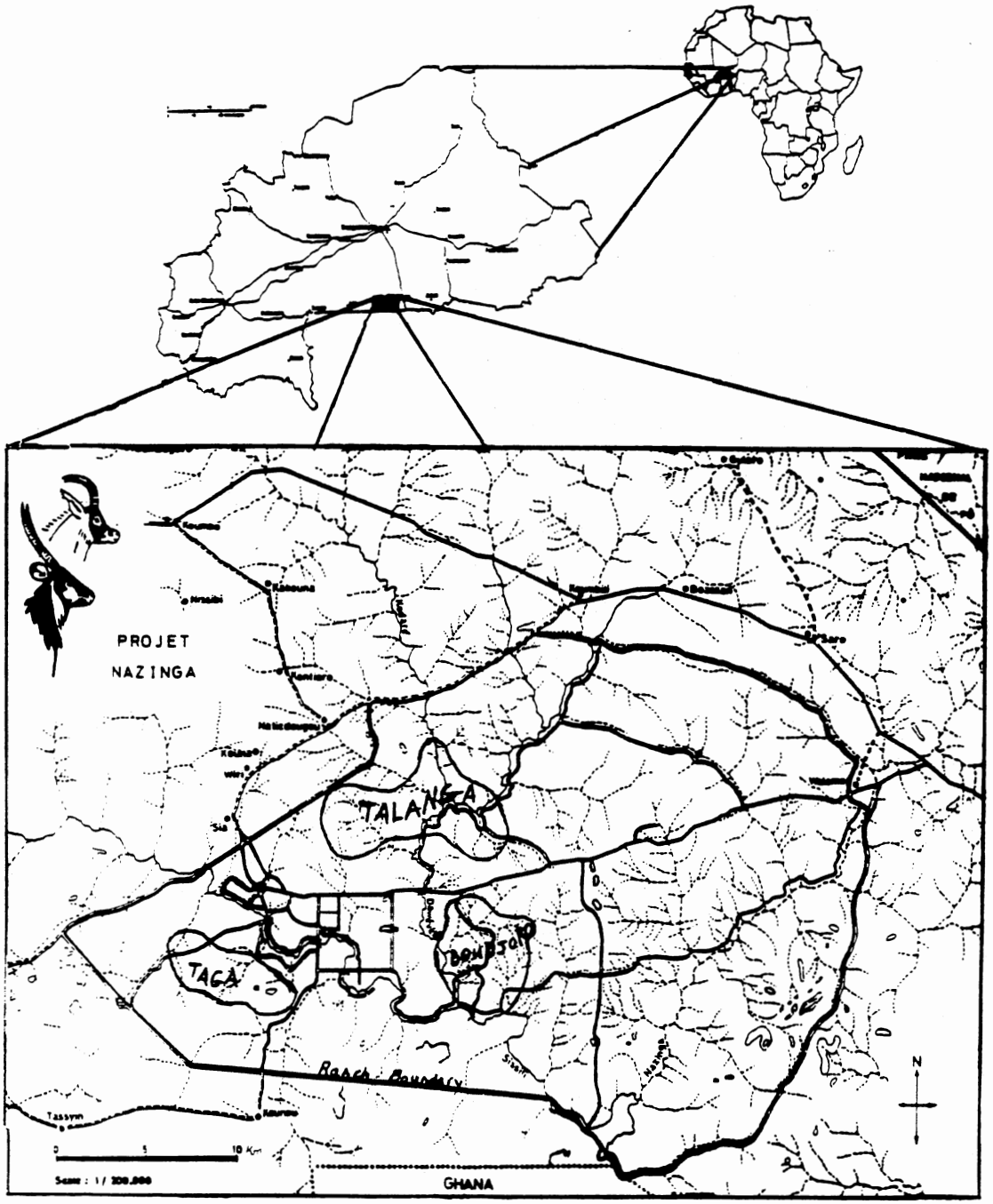
Fig. 1. Location of the Nazinga Game Ranch, Burkina Faso, West Africa.

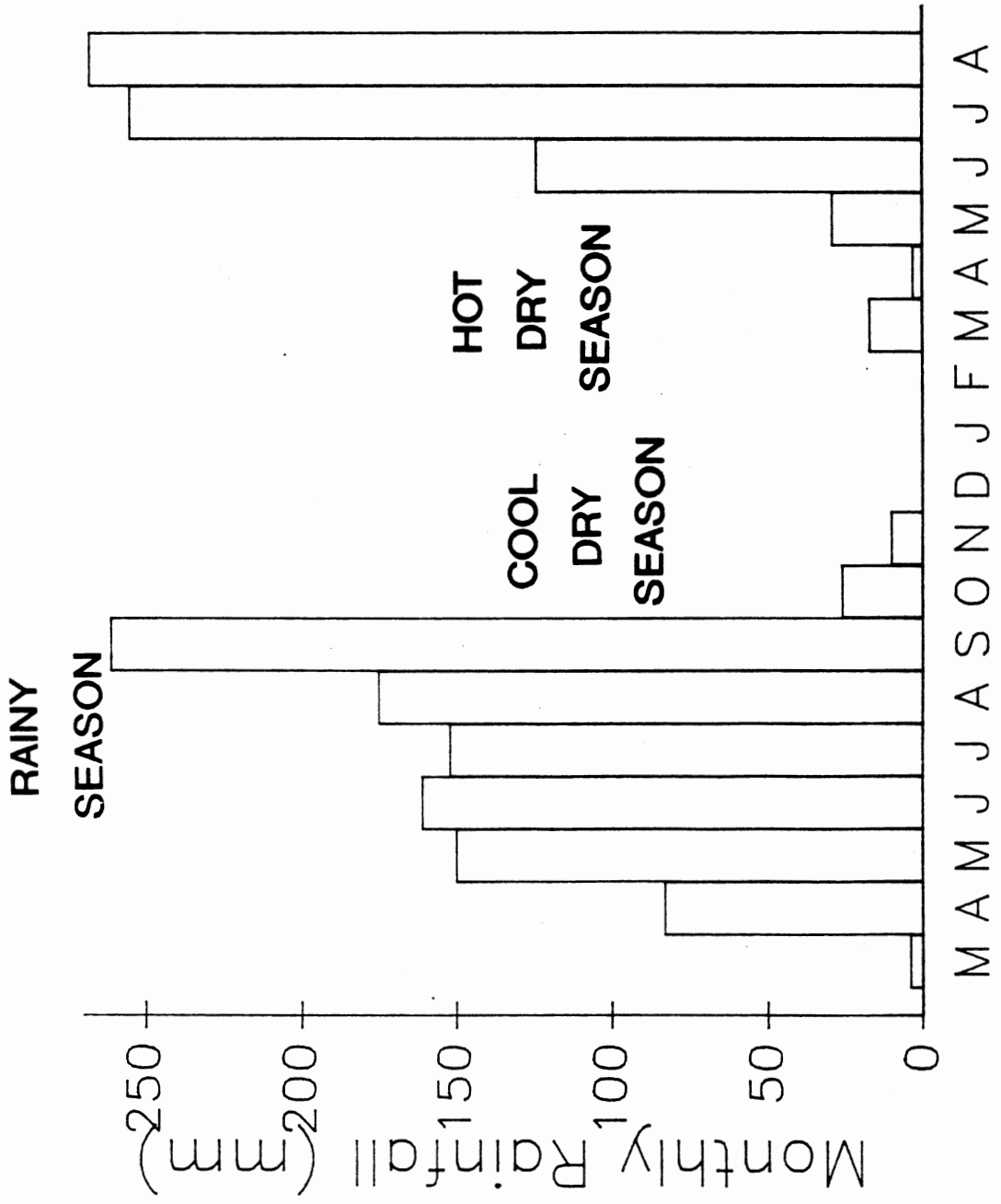
Fig. 2. Monthly rainfall totals recorded at the Nazinga Game Ranch Research Station, Burkina Faso, March 1986-April 1987.

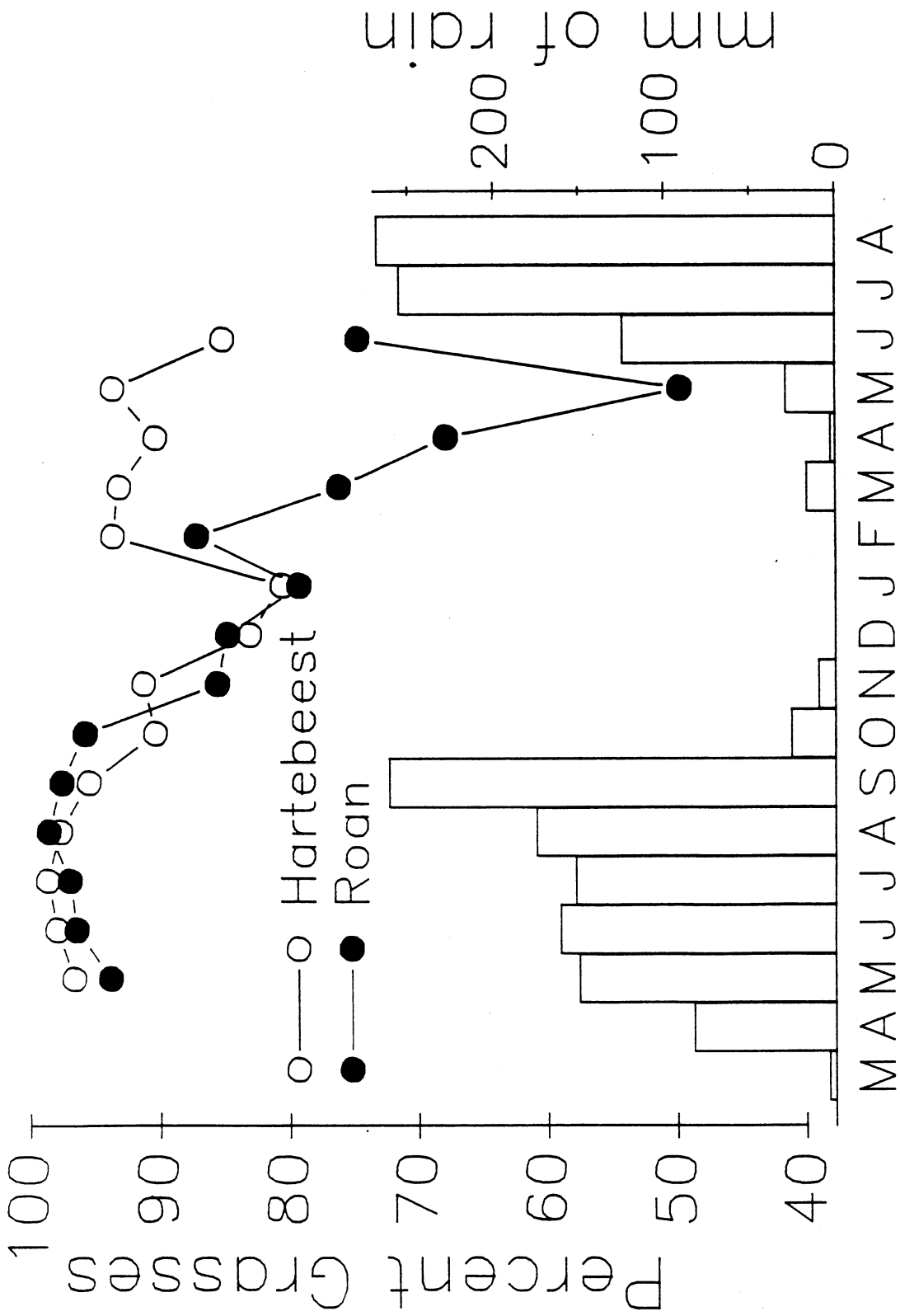
Fig. 3. Average monthly grass component (%) of fecal samples from hartebeest and roan antelope compared to monthly rainfall totals at the Nazinga Game Ranch, Burkina Faso, (March 1986-April 1987).

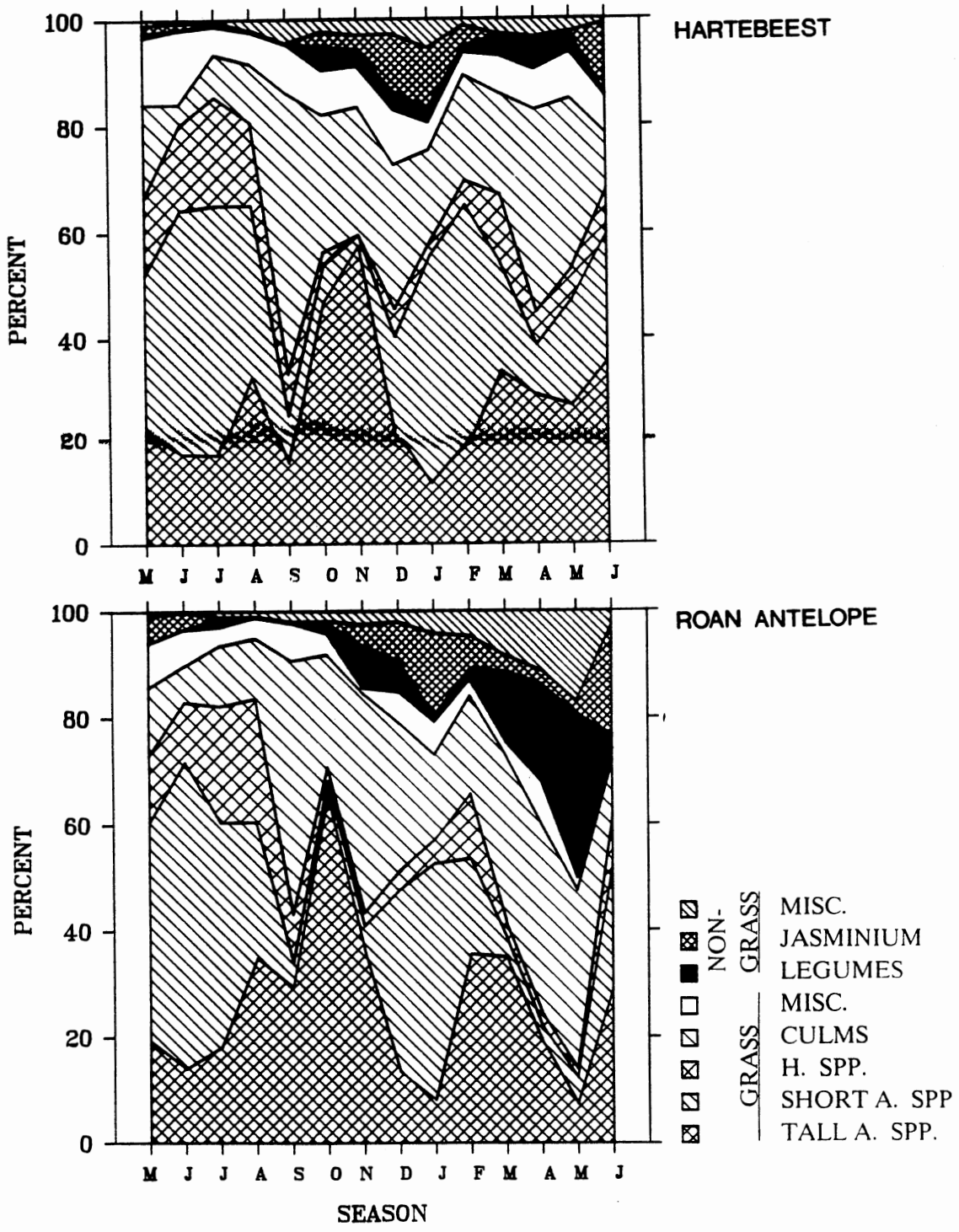
Fig. 4. Average composition (%) of 8 forage categories identified in monthly fecal samples from hartebeest and roan antelope at the Nazinga Game Ranch, Burkina Faso, 1986-87.

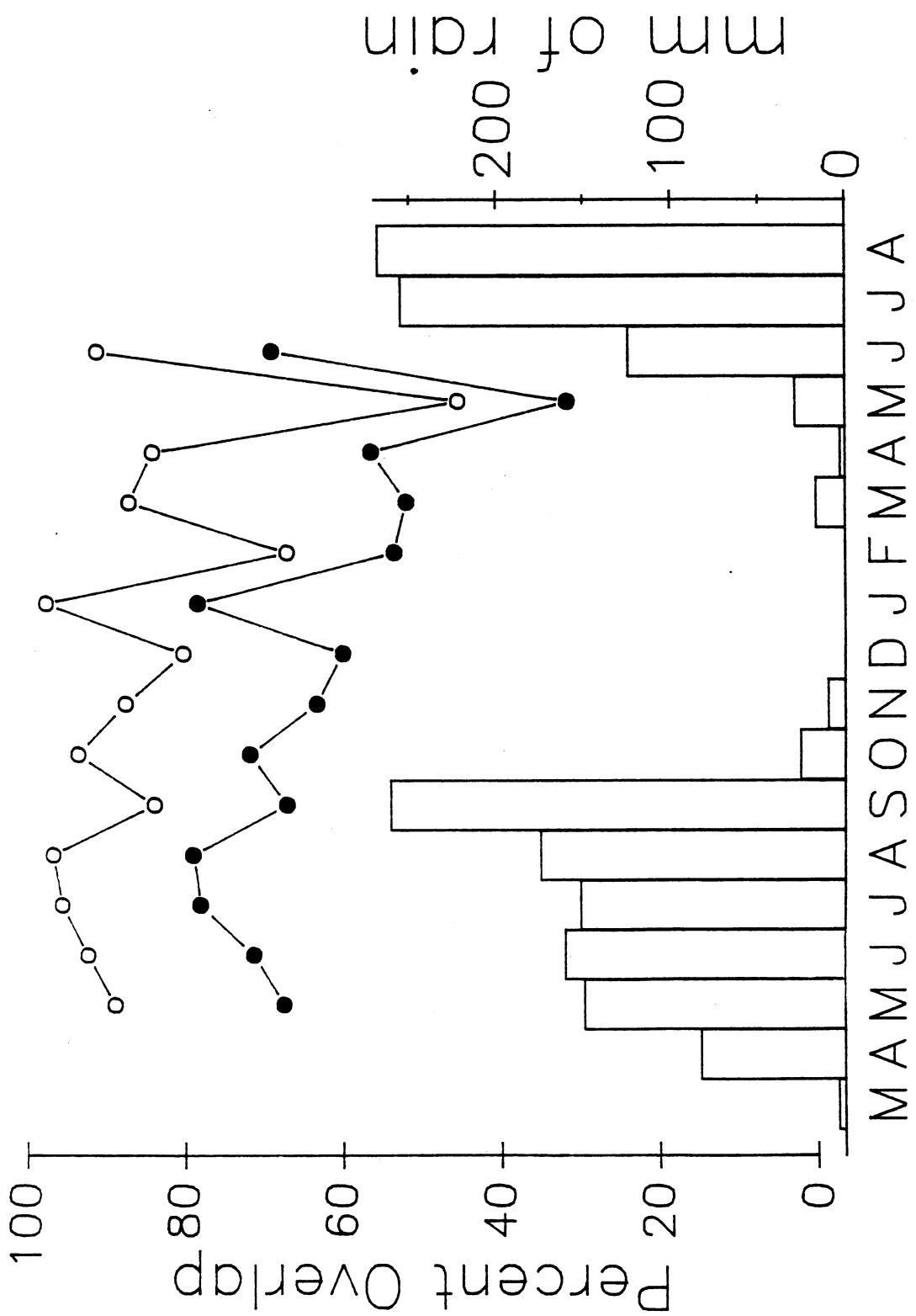
Fig. 5. Average monthly dietary overlap (%) between hartebeest and roan antelope at the Nazinga Game Ranch, Burkina Faso, 1986-87. Open circles indicate results using the formula for "ED"; solid circles indicate results using the formula for "CI"; see text for further explanation.


PROJET
NAZINGA
TALANGA
TAGA
DOMBSO
GHANA
N


Monthly Rainfall (mm)
250
200
150
100
50
0
M A M J J A S O N D J F M A M J J A
RAINY SEASON
COOL DRY SEASON
HOT DRY SEASON


Percent Grasses
100
90
80
70
60
50
40
o—o Hartebeest
●—● Roan
mm of rain
200
100
0
MAMJJASONDJFMAMJJA


HARTEBEEST
ROAN ANTELOPE
PERCENT
PERCENT
100
80
60
40
20
0
M J J A S O N D J F M A M J
SEASON
NON-GRASS
MISC.
JASMINIUM
LEGUMES
GRASS
MISC.
CULMS
H. SPP.
SHORT A. SPP
TALL A. SPP.


mm of rain
200
100
0
Percent Overlap
100
80
60
40
20
0
MAMJJASONDJFMAMJJA

APPENDIXES

APPENDIX A

DIRECTIONS FOR PREPARING A CARD KEY

TO GRASS EPIDERMAL FRAGMENTS

Perforation Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Andropogoneae																																														
Anadelphia afzeliana	x	-	-	x	-	x	x	x	x	x	-	-	x	-	x	-	-	-	-	x	x	x	-	x	x	-	x	x	-	-	-	x	-	-	-	-	-	x	x	x	-	-	-	x	x	-
Andropogon africanus	x	-	-	-	-	x	x	-	x	x	-	-	-	x	x	-	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	x	-	x	x	x	-	-	x	-	x	x
Andropogon ascinoides	x	-	-	-	-	x	-	x	x	x	-	-	-	x	x	-	-	-	-	x	-	x	-	x	x	x	x	x	x	-	x	-	x	-	-	-	-	x	x	x	-	-	-	x	x	-
Andropogon fastigiatus	x	-	-	-	x	-	x	-	x	x	-	-	x	-	x	-	-	-	x	-	-	x	-	x	x	-	x	-	-	-	-	x	-	-	-	-	-	-	x	x	-	-	x	-	x	-
Andropogon gayanus bisquamulatus	x	-	-	-	x	-	-	x	x	x	-	-	-	x	x	-	-	x	x	-	-	x	x	x	x	x	x	x	x	-	-	x	-	-	-	-	-	x	-	x	-	-	-	x	x	-
Andropogon gayanus gayanus	x	x	-	x	x	x	x	-	-	x	x	-	-	x	x	-	-	-	-	x	-	x	x	x	x	-	x	x	x	-	-	x	-	-	-	-	x	x	x	x	-	x	-	x	x	-
Andropogon gayanus squamulatus	x	x	-	-	-	x	x	x	x	x	x	x	x	-	x	-	-	-	x	-	-	x	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	x	x	x	-	-	x	-	x	-
Andropogon pseudapricus	x	-	-	-	-	x	x	-	x	-	-	x	-	x	x	-	-	-	-	x	-	x	x	x	-	x	x	-	-	-	-	x	-	-	-	-	-	x	x	x	-	-	-	x	x	-
Andropogon schirensis	x	-	-	-	x	x	x	-	x	-	x	-	-	x	x	-	-	-	-	x	-	x	-	x	x	-	x	x	x	-	-	x	-	-	x	-	-	-	x	x	-	-	x	x	-	x
Andropogon tectorum	x	x	-	-	x	-	x	x	x	x	-	-	-	x	x	-	-	-	x	-	-	x	x	x	x	-	x	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	x	-	x	-
Chasmopodium caudatum	x	x	-	x	-	x	x	x	x	-	-	-	x	-	x	-	-	-	-	x	x	-	-	x	x	-	x	x	x	-	-	-	-	-	-	-	-	x	x	x	-	-	x	x	-	x
Cymbopogon giganteus giganteus	x	-	-	-	x	-	x	x	x	-	-	-	x	-	x	-	-	-	-	x	x	-	-	x	-	-	-	x	-	-	-	x	-	x	-	-	-	x	-	-	x	x	-	-	x	x
Elionurus elegans	x	-	-	-	x	-	-	x	x	-	x	-	x	-	x	-	-	-	-	x	-	-	-	-	-	-	-	x	x	-	-	x	-	-	-	-	-	-	x	x	-	-	x	x	-	x
Elionurus pobequinii	x	-	-	-	x	-	-	x	x	x	x	-	x	-	-	x	-	-	-	x	-	-	-	x	-	-	-	x	x	-	-	x	-	-	-	x	-	x	x	-	x	-	x	-	-	x
Euclasta condylotricha	x	x	-	-	x	x	x	x	x	-	x	-	x	-	x	-	-	-	-	x	-	x	-	x	x	-	x	x	x	-	-	x	-	-	-	-	x	-	x	x	-	-	-	-	x	-
Hackelochloa granularis	x	x	-	x	x	x	x	x	x	-	x	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	-	-	x	-	-	-	-	-	x	x	-	-	x	-	x	-	x	x	-	x
Hyparrhenia glabriuscula	x	-	-	-	-	x	-	x	x	-	-	-	-	x	x	-	x	-	-	x	-	x	-	x	x	-	x	x	x	-	-	x	-	-	-	-	-	-	x	x	-	-	x	x	-	x
Hyparrhenia involucrata breviseta	x	x	-	x	-	x	x	-	x	-	x	-	-	x	x	x	-	-	-	x	-	x	-	x	-	-	-	x	x	-	-	-	-	x	-	x	-	-	x	x	x	-	x	-	-	x
Hyparrhenia smithiana	x	-	-	-	-	x	x	x	x	x	x	-	-	x	x	-	-	-	x	-	-	x	-	x	x	-	x	x	x	-	-	x	-	-	-	-	x	-	x	x	-	x	-	x	x	-
Hyparrhenia subplumosa	x	x	-	x	-	x	x	x	x	x	-	x	x	x	x	-	-	-	-	x	x	x	-	x	x	-	x	x	x	-	-	x	-	-	-	x	-	-	x	x	-	-	x	x	-	x
Hyparthelia dissoluta	x	x	-	-	-	x	x	-	x	-	x	-	-	x	x	-	x	-	x	-	-	x	-	x	x	x	x	x	x	-	-	x	-	-	-	-	-	-	x	x	-	-	x	-	-	x
Monocymbium ceresiiforme	x	x	-	x	-	x	x	x	x	-	x	-	-	x	x	-	-	-	-	x	x	-	-	x	x	-	x	x	-	-	-	x	-	-	-	-	-	x	x	x	x	-	x	x	-	x
Schizachyrium brevifolium	x	-	-	x	-	x	x	-	x	x	x	-	-	x	x	-	-	-	x	x	x	-	-	x	-	-	-	-	-	-	x	-	-	x	x	x	-	x	x	x	x	-	-	x	x	-
Schizachyrium nodulosum	x	x	-	-	-	x	x	x	x	x	x	-	-	x	x	x	-	-	-	x	-	x	-	x	x	-	x	-	-	-	-	x	-	-	-	x	-	x	x	x	-	-	x	x	x	-
Schizachyrium ruderale	x	-	-	-	-	x	x	x	x	x	-	-	x	x	x	-	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	x	-	x	-	-	x	x	-	-	-	x	x	x
Schizachyrium sanquineum	x	-	-	-	-	x	x	x	x	x	x	-	x	x	x	-	x	-	x	x	-	x	-	x	x	-	x	x	x	-	-	-	-	-	-	-	-	-	x	x	-	-	x	x	-	x
Schizachyrium schweinfurthii	x	-	-	x	-	x	x	x	x	x	-	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	x	x	x	-	-	x	-	x	x
Sorghastrum bipennatum	x	-	-	x	-	x	x	-	x	x	-	-	x	x	x	-	-	-	x	x	x	x	-	x	x	-	x	x	-	-	x	-	-	x	-	-	-	-	x	x	-	x	-	x	x	-
Vetiveria nigritana	x	-	-	x	x	-	-	x	x	-	-	-	x	-	x	x	-	-	-	x	x	-	-	-	-	-	-	-	-	-	x	-	-	x	-	x	-	x	x	x	-	-	x	-	x	-
Aristideae																																														
Aristida kerstingii	x	x	-	-	-	x	x	-	-	x	-	-	-	x	x	x	-	-	-	x	-	-	-	x	-	-	-	-	-	-	x	-	-	x	-	-	-	x	x	x	-	-	-	-	x	-
Arundinelleae																																														
Loudatia simplex	x	x	-	-	-	x	x	-	x	x	-	-	x	-	x	x	-	-	-	x	-	-	-	x	x	-	x	x	x	-	x	-	-	-	-	x	-	x	x	x	-	-	x	-	-	x
Loudatia togoensis	x	-	-	-	-	x	x	-	-	x	-	-	-	x	x	x	-	-	-	x	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	x	x	-	-	x	x	-	x
Chlorideae																																														
Chloris pilosa	-	-	x	-	x	-	-	x	-	-	-	-	-	x	x	-	-	-	x	-	-	x	x	-	x	x	x	-	x	-	x	-	-	-	-	-	-	x	x	x	x	-	-	x	x	-
Chrysochloa hindsii	-	-	x	-	x	-	-	x	-	-	-	-	-	x	x	-	-	-	-	x	-	x	x	-	-	-	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	-	-	x	-
Ctenium newtonii	x	-	-	-	-	x	x	-	-	x	-	-	x	x	x	x	-	-	-	x	-	-	-	x	x	-	x	x	-	-	-	-	-	-	-	-	-	x	x	x	-	-	x	-	x	-
Microchloa indica	-	-	x	-	x	-	-	x	-	-	-	-	-	x	x	-	-	-	-	x	-	x	x	x	x	-	x	-	-	-	x	-	-	-	-	x	-	x	x	x	-	-	-	x	x	-
Schoenefeldia gracilis	-	-	x	-	x	-	-	x	-	-	-	-	-	x	x	x	-	-	-	x	-	x	x	x	x	-	x	-	-	-	x	-	-	-	x	-	x	x	-	x	-	-	-	-	x	-
Danthonieae																																														
Elyptrophorus spicatus	x	x	-	-	x	x	x	-	-	-	x	-	-	x	x	-	-	-	-	x	-	-	-	x	-	-	x	-	-	-	-	x	-	-	-	-	x	x	x	x	-	-	-	-	-	x

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Eragrostideae																																														
Dactyloctenium aegyptium	-	-	x	-	x	-	-	x	-	-	-	-	-	x	x	-	-	-	-	x	-	x	x	x	x	-	x	-	-	-	-	x	-	-	-	-	-	x	-	x	x	-	-	-	x	x
Eleusine indica	-	-	x	-	x	-	-	x	-	-	-	-	x	-	x	x	-	-	-	x	-	-	-	x	-	x	x	x	-	-	x	x	-	-	-	-	-	x	x	x	-	x	-	x	x	x
Eragrostis aspera	-	-	x	-	x	-	-	x	-	-	-	-	x	-	x	-	-	-	-	x	x	-	-	x	x	-	x	-	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-	x	-
Eragrostis atrovirens	x	-	x	-	x	-	-	x	-	-	-	-	x	-	x	-	-	-	-	x	x	-	-	x	x	-	x	-	x	-	-	x	-	-	-	-	-	x	x	x	-	-	-	-	x	-
Eragrostis ciliaris	-	-	x	-	x	-	x	x	-	-	-	-	x	-	x	-	-	-	-	x	x	-	-	x	-	x	x	-	-	-	-	x	-	-	-	-	-	-	x	x	-	-	-	-	x	-
Eragrostis indica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Eragrostis pilosa	x	-	x	-	x	-	x	x	x	-	-	-	x	-	x	x	-	-	-	x	-	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	x	x	x	x	-	-	-	-	x	-
Eragrostis tremula	-	-	x	x	x	-	-	x	-	-	-	x	x	-	x	x	-	-	-	x	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-	-	x	-	x	-	-	-	-	x	-
Eragrostis turgida	-	-	x	-	x	-	-	x	-	-	-	-	x	-	x	x	-	-	-	x	x	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-	x	-
Eragrostis welwitschii	x	-	x	-	x	-	x	x	x	-	x	-	x	-	x	x	-	-	-	x	x	-	-	x	x	-	x	-	-	-	-	x	-	-	-	-	-	x	x	x	-	-	-	-	x	-
Leptochloa caerulescens	x	-	-	x	x	-	-	x	x	-	x	-	x	-	x	-	-	-	-	x	-	x	x	x	x	x	x	-	-	-	x	-	-	-	-	-	-	x	-	x	-	-	-	-	x	-
Oryzeae																																														
Oryza longistaminata	-	-	x	x	x	-	-	x	-	-	-	-	-	x	x	-	-	-	-	x	-	x	x	x	x	x	x	-	-	-	x	-	-	-	-	-	-	x	x	-	-	-	-	-	x	-
Paniceae																																														
Acrocerus amplectens	x	-	-	x	x	x	x	x	x	-	-	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	x	-	-	-	-	-	-	-	x	-	-	x	x	x	x	-	x	-	-	x
Beckeropsis uniseta	x	x	-	x	x	x	x	-	x	-	x	-	-	x	x	-	-	-	-	x	x	-	-	x	x	-	x	x	-	-	-	x	-	-	-	x	-	x	x	x	-	-	-	x	x	-
Brachiaria deflexa	x	-	-	x	x	-	-	x	x	-	-	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	x	x	x	-	-	-	-	-	-	-	-	x	x	-	x	-	-	-	x	-
Brachiaria distichophylla	x	x	-	x	x	x	x	x	x	-	-	-	x	x	x	-	-	-	-	x	x	-	-	x	-	-	x	x	x	-	-	-	-	-	x	-	-	-	x	x	x	-	-	-	-	x
Brachiaria jubata	x	-	-	x	x	-	-	x	x	-	x	-	-	x	x	x	-	-	-	x	-	x	-	x	-	-	x	x	x	-	-	-	-	-	-	-	-	-	x	-	x	-	x	-	x	-
Brachiaria lata	x	x	-	x	-	x	x	x	x	x	x	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	x	x	x	-	-	-	-	-	x	-	-	-	x	x	x	-	-	-	x	x
Brachiaria stigmatosa	x	-	-	x	x	-	-	x	x	-	-	-	x	-	x	-	-	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	x	-	-	x	x	x	-	-	x	-	x
Digitaria argillacea	x	-	-	x	x	x	-	x	x	-	x	-	-	x	x	x	-	-	x	-	-	-	-	x	x	x	-	x	x	-	-	-	-	-	-	-	-	x	x	x	x	-	-	x	-	x
Digitaria horizontalis	x	-	-	-	x	-	x	x	x	x	-	-	x	-	x	-	-	-	-	x	-	-	-	x	x	-	x	x	-	-	-	x	-	-	-	-	-	x	x	x	-	-	-	-	-	x
Echinochloa colona	x	x	-	-	-	x	-	x	-	x	-	-	-	x	x	-	-	-	-	x	-	x	x	x	-	-	x	-	-	-	-	x	-	-	-	-	-	x	x	x	x	-	-	-	-	x
Panicum fluviicola	x	-	-	x	x	-	-	x	x	-	x	-	x	-	-	x	-	-	-	x	-	-	-	x	x	-	x	-	x	-	-	x	-	-	-	-	-	x	-	x	-	x	-	-	x	-
Panicum pansum	x	-	-	x	x	x	-	x	x	-	-	-	-	x	x	-	-	-	x	-	-	-	-	x	x	x	-	x	x	-	x	-	-	-	-	-	-	-	x	x	-	-	-	-	x	x
Panicum phragmitoides	x	-	-	-	x	-	-	x	x	-	-	-	x	x	x	-	-	-	x	x	-	-	-	x	-	x	x	x	-	-	-	-	-	-	-	-	-	x	x	x	x	x	-	x	-	x
Panicum subalbidum	x	x	-	x	x	x	x	x	x	x	-	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	x	-	-	x	-	x	-	-	-	-	-	-	x	x	-	-	x	-	-	x
Panicum walense	x	-	-	x	x	-	-	x	x	-	-	-	x	-	x	-	-	-	x	x	x	-	-	x	x	x	x	-	-	-	-	-	-	x	-	-	x	-	x	x	x	-	-	-	x	x
Paspalum scrobiculatum	x	x	-	x	x	x	-	x	-	x	-	-	x	-	x	-	-	-	x	x	x	-	-	x	-	x	x	x	-	-	-	x	-	-	-	-	-	x	x	-	x	-	-	x	x	x
Pennisetum atrichum	x	x	-	x	x	x	-	x	x	-	-	-	-	x	x	x	-	-	x	-	-	-	-	x	x	x	-	x	-	-	-	-	x	-	-	-	-	-	x	x	x	-	x	x	-	x
Pennisetum pedicellatum	x	x	-	x	-	x	-	x	x	-	x	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	x	x	x	-	-	-	-	-	-	-	-	-	x	x	x	-	-	x	-	x
Pennisetum polystachium	x	x	-	-	x	x	x	x	x	-	x	-	-	x	x	-	-	-	-	x	-	-	-	x	x	-	x	x	-	-	-	x	x	-	-	-	-	-	x	x	-	-	-	x	-	x
Pennisetum subangustum	x	x	-	-	x	x	x	-	-	-	x	-	-	x	x	-	-	-	-	x	-	-	-	x	-	-	x	x	-	-	-	-	-	-	-	x	-	-	x	-	x	-	x	x	-	x
Sacciolepis micrococca	x	x	-	x	x	x	x	-	-	-	x	-	-	x	x	x	-	-	-	x	x	-	-	x	-	-	x	-	-	-	-	-	-	x	-	-	-	-	x	x	x	-	-	-	-	x
Setaria anceps	x	-	-	-	x	x	x	x	x	x	x	-	x	-	x	-	-	-	x	-	-	-	-	x	-	x	-	x	-	-	-	x	-	-	-	-	-	x	x	x	-	-	x	-	-	x
Setaria pallide-fusca	x	-	-	x	-	x	x	x	x	x	-	-	-	x	x	-	-	-	-	x	x	-	-	x	-	-	x	-	-	-	-	x	-	-	-	-	-	-	x	x	-	-	x	-	-	x
Setaria verticellata	x	-	-	x	x	x	x	x	x	x	x	-	-	x	x	-	-	-	-	x	-	-	-	x	-	-	x	-	x	-	-	-	-	-	-	-	-	-	x	-	x	-	-	x	x	-
Sporoboleae																																														
Sporobolus festivus	-	-	x	-	x	-	-	x	-	-	-	-	x	-	-	x	-	-	-	x	x	-	-	-	x	-	x	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	x	-	-	x
Sporobolus microprotus	-	-	x	x	x	-	-	x	-	-	-	-	-	x	x	x	-	-	-	x	x	-	-	-	-	-	-	-	-	-	x	x	-	-	-	-	-	x	x	x	-	-	-	-	x	-
Sporobolus pyramidalis	-	-	x	-	x	-	-	x	-	-	-	-	-	x	-	x	-	-	-	x	x	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	x	-	-	x	-	-	x
Sporobolus subangustum	x	x	-	x	x	x	x	x	x	-	-	-	x	-	x	-	-	-	-	x	x	-	-	-	x	-	x	x	-	-	-	x	-	-	-	x	-	-	x	x	-	-	-	x	-	x

APPENDIX B

DIRECTIONS FOR PREPARING A CARD KEY

TO NON-GRASS EPIDERMAL FRAGMENTS

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Acanthaceae																																														
Lepidagathis anobrya	-	-	-	-	x	-	-	-	x	-	-	-	-	-	x	x	-	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
Lepidagathis heulelotiana	-	-	-	-	x	x	-	-	-	-	-	-	-	-	x	-	-	-	-	x	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
Amoranthaceae																																														
Pandianka heudelotii	-	x	-	-	x	-	x	-	x	-	-	-	-	-	x	x	x	-	-	-	x	x	-	-	-	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anacardiaceae																																														
Lannea acida	-	-	x	-	x	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Lannea egegria	-	-	x	-	x	-	x	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-	-	-	x	x	-	-	-	x	-	-	-	x	-	x	-	-	x	x	-	x	-
Lannea humilis	-	-	-	-	x	-	-	-	-	-	-	-	-	-	x	x	x	-	x	x	x	x	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Lannea microcarpa	-	x	-	-	x	-	x	-	-	-	-	-	-	-	x	x	x	-	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Lannea velutina	-	-	-	-	x	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	x	x	-	-	-	x	-	-	-	x	-	x	-	-	-	x	-	-	-
Orozoa insignis	-	x	x	-	x	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	-	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Annonaceae																																														
Annona senegalensis	-	-	-	-	x	-	-	x	-	-	-	x	-	-	x	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexabolus monopetalus	-	x	-	-	-	-	x	x	-	-	-	x	-	-	x	-	x	-	x	x	-	x	x	-	-	-	-	-	x	-	-	-	-	-	x	-	-	x	-	-	-	-	-	-	-	-
Uvaria chamae	-	x	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apocynaceae																																														
Saba senegalensis	-	-	x	-	-	-	x	x	-	-	-	-	-	-	x	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Balanitaceae																																														
Balenites aegyptica	-	-	-	-	x	x	-	x	-	-	-	-	-	-	-	x	-	-	-	x	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bignoniaceae																																														
Stereospermum kunthianum	-	x	x	-	x	-	x	x	x	-	-	-	-	-	x	x	x	-	-	-	-	x	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bombaceae																																														
Adansonia digitata	-	-	-	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	x	x	x	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Bombax costatum	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	x	x	-	-	-	x	x	-	-	-	-	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Burseraceae																																														
Commiphora africana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesalpinoideae																																														
Afzelia africana	x	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Burkea africana	-	-	x	x	x	-	-	x	-	-	-	-	-	-	x	x	-	x	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Cassia arereh	-	x	x	-	-	-	x	x	-	-	-	-	-	-	x	-	x	-	-	-	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Cassia mimosoides	-	x	-	-	x	-	x	-	x	-	-	-	-	-	x	-	-	x	-	-	x	x	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cassia nigricans	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cassia sieberana	-	-	x	-	x	-	-	x	-	-	-	-	-	x	x	-	x	-	-	-	-	x	x	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Cassia singueana	-	-	x	-	x	-	-	x	x	-	-	-	-	-	x	x	x	-	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Daniellia oliveri	x	-	-	-	x	-	x	-	x	-	x	-	-	x	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Detarium microcarpum	x	-	x	-	x	-	x	-	-	-	-	-	-	-	x	x	-	-	-	-	-	x	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
Isoberlinia doka	-	x	x	-	x	-	x	x	-	-	-	-	-	-	-	x	-	x	-	-	x	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Isoberlinia tomentosa	-	x	x	-	x	-	-	x	-	-	-	-	-	-	x	x	-	x	-	-	x	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Piliostigma thonningii	x	x	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	x	x	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	x	-
Swartzia madagascariensis	-	x	-	-	x	-	-	x	-	-	-	x	-	-	x	x	x	-	-	-	x	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Tamarindus indica	x	-	-	-	x	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Perforation Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Capparaceae																																														
Cadaba farinosa	-	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Capparis fascicularis	-	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	x	-	-	x	x	-	-	-	x	x	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-
Capparis tomentosa	-	-	-	-	-	-	x	x	-	-	-	-	-	-	x	x	x	-	-	x	-	x	-	-	-	-	-	x	x	-	x	-	-	-	x	-	-	-	-	-	-	-	-	x	-	-
Crateva adansonii	-	x	x	-	x	-	x	-	-	-	-	-	-	x	x	x	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Maerua angolense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caryophyllaceae																																														
Polycarpea eriantha	-	-	-	x	x	x	-	-	x	-	-	-	-	-	x	x	x	-	-	-	x	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Celastraceae																																														
Maytenus senegalensis	-	x	-	-	x	-	x	-	-	-	-	-	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysobalanaceae																																														
Maranthas polyandra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cochlospermaceae																																														
Cochlospermum planthoni	x	x	-	-	x	-	x	x	-	-	-	-	-	-	x	-	x	-	-	-	x	x	-	-	-	x	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	x	-
Cochlospermum tinctorium	x	x	-	-	x	-	x	x	-	-	-	-	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Combretaceae																																														
Anogeissus leiocarpus	x	x	-	-	-	-	x	x	-	-	-	-	-	-	x	-	x	-	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Combretum collinum binderanum	x	-	-	-	-	-	x	x	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Combretum collinum hypopilinum	x	x	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	x	-	-	x	x	x	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Combretum glutinosum	x	-	-	-	-	-	x	x	-	-	-	x	-	-	-	x	x	-	-	-	x	x	x	-	-	-	-	x	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Combretum micranthum	x	-	-	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	-	x	x	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Combretum nigricanus	x	x	-	-	x	x	x	x	-	-	-	-	-	-	x	x	-	-	-	x	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Combretum paniculatum	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	x	x	-	-	-	x	-	x	-	-	-	-	x	x	-	-	x	-	-	-	-	x	-	-	-	-	-	x	-	x	-
Pteleopsis suberosa	-	x	-	-	x	-	-	x	-	-	-	-	-	-	-	x	x	-	-	-	x	x	x	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terminalia avicennoides	x	-	x	-	x	-	x	x	-	-	-	-	-	-	x	-	x	-	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Terminalia laxiflora	-	-	x	-	x	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terminalia macroptera	x	-	x	-	x	-	x	x	-	-	-	-	-	-	x	x	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terminelia mollis	-	x	-	x	x	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	x	x	x	-	-	x	-	x	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commelinaceae																																														
Ancilema setiferum	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	x	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compositae																																														
Sonshus spp.	x	-	-	-	-	-	x	x	-	-	-	-	-	-	x	-	x	-	-	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Convulvulaceae																																														
Ipomaca aquatica	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	x	-	x	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Meremia kentrocaulos	-	x	-	-	-	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Dioscoreaceae																																														
Dioscorea dumetorum	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	x	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Ebenaceae																																														
Diospyros mespiliformis	x	-	x	-	x	-	x	-	-	-	-	-	-	-	x	-	-	-	-	x	x	x	x	-	-	-	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	x	-

Perforation Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Euphorbiaceae																																														
<u>Antidesma</u> <u>venosum</u>	-	-	x	x	-	-	x	x	x	-	-	-	-	-	x	x	x	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Bridelia</u> <u>ferruginea</u>	-	x	-	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	-	x	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
<u>Bridelia</u> <u>scleroneura</u>	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
<u>Croton</u> <u>nigritanus</u>	x	-	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	x	x	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Hymenocandia</u> <u>acida</u>	x	-	x	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	-	-	-	-	-	-	x	-	x	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Phyllanthus</u> spp.	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
<u>Sapium</u> <u>grahamii</u>	x	-	-	-	-	-	x	x	-	-	-	-	-	-	x	-	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Socurinega</u> <u>virosa</u>	-	-	x	-	x	-	-	x	-	-	-	-	-	-	x	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Flacouraceae																																														
<u>Flacourtia</u> <u>indica</u>	x	-	-	-	-	-	x	x	-	-	-	-	-	-	x	x	-	x	x	-	x	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
<u>Oncoba</u> <u>spinosa</u>	-	-	x	-	-	-	x	-	-	-	-	-	-	-	x	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Guttiferae																																														
<u>Garcinia</u> <u>livingstonei</u>	-	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
<u>Psorospermum</u> <u>senegalense</u>	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Labiatae																																														
<u>Tinnea</u> <u>barteri</u>	x	x	-	-	x	-	x	-	-	-	-	-	-	-	x	x	x	-	-	-	-	-	x	-	-	-	-	-	x	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-
Liliaceae																																														
<u>Asparagus</u> <u>flagellaris</u>	-	-	x	x	x	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Asparagus</u> <u>schroederi</u>	-	-	x	x	x	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loganiaceae																																														
<u>Strychnos</u> <u>innocua</u>	x	-	x	-	x	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	x	-	-	-	-	x	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	x	-	-	x	-
<u>Strychnos</u> <u>spinosu</u>	-	x	x	-	x	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	x	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Loranthaceae																																														
<u>Tapianthus</u> <u>belvisii</u>	x	-	-	-	x	-	-	-	x	-	-	-	-	-	-	x	-	x	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
<u>Tapianthus</u> <u>dondoneifolius</u>	x	-	x	-	x	-	-	-	x	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Malvaceae																																														
<u>Hibiscus</u> <u>asper</u>	x	x	x	-	x	-	x	-	x	-	-	-	-	-	x	x	-	x	-	-	x	x	-	-	-	-	-	-	x	-	-	-	x	-	-	x	-	-	-	-	-	-	-	-	x	-
<u>Wissadula</u> <u>amlissima</u>	-	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	x	x	-	-	-	-	x	-	-	x	-	-	-	x	-	-	-	-	x	x	-	x	-	-	-	x	-
Meliaceae																																														
<u>Khaya</u> <u>senegalensis</u>	x	-	-	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	x	x	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
<u>Pseudocerela</u> <u>kotschyi</u>	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-
<u>Trichilia</u> <u>emetica</u>	x	x	x	-	x	-	x	x	-	-	-	-	-	-	-	x	x	x	-	-	x	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Mimosoideae																																														
<u>Acacia</u> <u>albida</u>	-	x	-	-	x	-	-	-	-	-	-	x	-	-	x	-	x	x	x	-	x	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Acacia</u> <u>dudgeoni</u>	x	-	x	x	-	-	x	-	-	-	-	-	-	-	x	-	x	x	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
<u>Acacia</u> <u>gourmaensis</u>	-	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
<u>Acacia</u> <u>polyacantha</u>	x	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
<u>Acacia</u> <u>sieberana</u>	x	x	x	-	x	-	x	x	x	-	-	-	-	-	x	x	-	x	-	x	x	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Albizia</u> <u>chevalieri</u>	x	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
<u>Dichrostachys</u> <u>cinera</u>	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	x	-	-	x	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Entada</u> <u>africana</u>	-	-	x	-	x	-	-	x	x	-	-	-	-	-	x	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
<u>Mimosa</u> <u>pigra</u>	-	-	-	x	x	-	-	x	x	-	-	-	-	-	x	-	-	x	-	-	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-

Species	Perforation Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Mimosoideae (cont.)																																														
Parkia biglobosa	x	x	-	-	-	-	x	x	-	-	-	-	-	-	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
Prosopsis africana	-	x	-	-	x	-	-	x	-	-	-	-	-	-	x	-	-	x	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moraceae																																													
Ficus glumosa	x	-	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Ficus ingens	x	x	x	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Ficus platyphylla	x	-	-	-	x	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Ficus sur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Myrtaceae																																													
Syzygium guineense	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
Olacaceae																																													
Ximenia americana	x	-	x	-	x	-	x	x	-	-	-	-	-	-	x	-	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oleaceae																																													
Jasminium kerstingii	x	-	x	-	x	-	-	-	-	-	-	-	-	-	x	x	x	-	-	x	-	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	x	-	-	-
Opiliaceae																																													
Opilia celtidifolia	-	-	x	-	x	-	-	x	-	-	-	-	-	-	x	x	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Papilionideae																																													
Cajanus kerstingii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crotalaria goreensis	x	-	-	-	-	-	x	-	x	-	-	-	-	-	-	x	x	-	-	x	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crotalaria ononoides	x	-	-	-	x	-	-	-	x	-	-	-	-	-	x	-	x	-	-	x	-	x	-	-	-	-	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	x	-	x	-
Desmodium velutinum	x	-	-	-	-	-	x	x	-	-	-	-	-	-	x	x	-	x	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indigofera bracteolata	-	-	x	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	x	x	-	-	-	-	-	-	-	-	x	-	-
Indigofera dendroides	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	x	x	-	-	-	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-
Lonchocarpus laxiflora	-	x	x	-	x	-	-	-	-	-	-	-	-	-	x	x	x	x	-	-	x	x	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Pericopsis laxiflora	-	x	x	-	x	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-	x	-	-	-	-	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	x	-
Pterocarpus erinaceus	-	-	x	-	x	-	x	-	-	-	-	-	-	-	x	x	-	x	x	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Sesbania bispinosa	x	-	-	-	x	-	x	-	x	-	-	-	-	-	x	x	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Tephrosia bracteolata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Tephrosia elegans	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Xeroderris stuhlmannii	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-	-
Polygalaceae																																													
Securidaca longepedunculata	-	x	x	-	x	-	-	-	-	-	-	-	-	-	x	x	x	-	-	x	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Rhamnaceae																																													
Ziziphus abyssinica	-	x	x	-	x	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	x	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Ziziphus mucronata	-	x	-	-	x	-	-	x	-	-	-	-	-	-	x	x	x	-	-	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Rosaceae																																													
Parinari curatellifolia	-	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Rubiaceae																																													
Borreria filifolia	-	-	-	x	x	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Borreria octoden	x	-	x	-	-	-	x	-	x	-	-	-	-	-	-	x	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Borreria scabra	x	-	x	-	x	-	x	-	x	-	-	-	-	-	x	x	x	-	x	-	x	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-	-
Borreria stachydea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Perforation Number																																												
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Rubiaceae (cont.)																																														
Borreria verticilata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boscia salicifolia	x	-	-	-	-	-	x	x	-	-	-	-	-	-	x	-	-	-	-	x	-	x	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Canthia cornelia	x	x	-	-	x	-	x	x	-	-	-	-	-	-	x	x	-	x	-	-	x	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Crossopteryx febrifuga	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	x	-	x	-	-	x	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Fadogia cienkowskii	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	x	-	x	-	-	x	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Feretia apodonthera	-	x	x	-	x	-	-	-	-	-	-	-	-	-	x	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Gardenia aqualla	-	x	-	-	x	-	-	-	-	-	-	-	-	-	x	x	-	x	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Gardenia erubescens	x	-	x	-	-	-	x	x	-	-	-	-	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Gardenia ternifolia	-	x	x	-	x	x	-	x	-	-	-	-	-	-	x	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Mitragyna inermis	-	-	x	-	x	-	-	-	-	-	-	-	-	-	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Pavetta cinereifolia	-	-	x	-	x	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Pavetta oblongfolia	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	x	x	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rytigynia senegalensis	x	-	-	-	x	-	x	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Sarcocephalus latifolius	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	x	-	x	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Sapindaceae																																														
Allophyllus cobbe	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	x	-	-	x	-	-	x	-	-	-	-	-	-	x	x	-	-	-
Paulinia pinnata	x	-	x	-	-	x	x	x	-	-	-	-	-	-	x	-	x	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zanha golungensis	x	-	-	-	-	-	x	-	-	-	-	-	-	-	x	x	-	-	-	x	x	x	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Sapotaceae																																														
Vitellaria paradoxa	x	-	x	-	-	-	x	x	-	-	-	-	-	-	x	x	-	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Simaroubaceae																																														
Quassia undulata	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	x	-	x	-	x	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	x	-	-	x	-	x	-
Sterculiaceae																																														
Cola laurifolia	x	-	x	-	x	-	-	x	-	-	-	-	-	-	x	-	x	-	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Sterculia setigera	-	-	x	-	x	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	-	-	x	-	-	x	-	x	x	x	-	x	-	x	x	x	-	-	-	-	-	x	-
Tiliaceae																																														
Grewia barteri	-	x	-	-	x	-	x	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	x	-	-	-	-	-	x	-	-	x	x	-	x	-	x	-	-	x	-	-	x	-	-	-
Grewia cissoides	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-	-	x	x	-	-	-	x	-	x	-	-	-	-	-	x	-
Grewia lasiodiscus	-	-	-	x	x	x	-	x	-	-	-	-	-	-	x	-	-	-	-	-	x	x	x	-	-	-	-	-	x	-	x	-	x	-	-	-	x	-	x	-	-	-	-	-	x	-
Grewia venasta	x	-	x	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	x	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-
Triumfetta lepidota	-	x	-	-	x	x	-	-	-	-	-	-	-	-	-	x	x	-	x	x	-	x	-	-	-	x	-	-	x	-	-	-	x	-	-	-	x	x	x	-	-	-	x	x	-	-
Verbinaceae																																														
Vitex doniana	x	-	-	-	-	x	-	-	-	-	-	-	x	-	x	x	x	-	-	-	x	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-
Vitaceae																																														
Cissus populnea	x	-	-	-	x	x	x	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	-	-	x	-	x	x	-	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-
Cissus zechiana	x	-	-	-	x	-	x	-	-	-	-	-	-	-	x	-	-	-	-	x	x	-	-	-	-	-	-	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX C

DESCRIPTIONS OF

GRASS EPIDERMAL FRAGMENTS

Family: Andropogoneae

Anedelphia afzeliana

Abaxial surface:
Silica Bodies: most irregular dumbbell shaped, ends slightly concave to slightly convex, narrowness of center med-narrow
-sparse scattered cross-shaped s.b. between rows of dumbbell shaped.
-dumbbell shaped costal in 1 or 2 rows, rather widely spaced, separated in rows by s.c., occasional p.h.
-Length 8-11 Width 3-6 dumbbell shaped
-Length 4.5 Width 4.5 cross-shaped
-Frequency
Macro Hairs: none seen
Micro Hairs: widely scattered not present on some samples intercostal hairs, 2-celled tapered to a point, basal cell fairly straight (slightly inflated) distal cell 1.5-2 X longer, tapering to a point.
-Length 15-20 Basal 6-7 Distal ,10-13
-small cylindrical basal structure
Prickle Hairs: Coastal rows less frequent than adax., slightly tapered oval bases, rather short-medium hooked barbs
-Length 12-17 L base 9-12 W base 5-7
-fairly frequent intercostal hooks, rounded rectangular bases, barbs short and tapered to point
-Length 11-15 L base 8-9 W base 5-7
Papillae: Globulous papillae located on very long cells between stomata, intercostal, alternate with stomata, slightly larger than stomata, thick-walled may appear as bulges only
Stomata: stomata in intercostal single rows between silica bodies, med-domed, triangular
-Length 10-11 Width 8
Long Cells: Med-walled, slight undulation (wl=4-5; ampl.=2), in rows, parallel, cell ends straight
-Length 33-50 Width 5-8

Adaxial surface:
Silica Bodies: same as abax, often in pairs (1-4) separated by short cell, in double or single rows, groups separated by 1 s.c. (1 s.c. paired with) 1 p.h., 1 s.c.
Macro Hairs: none seen
Micro Hairs: none seen
Prickle Hairs: coastal-alternating with single or pairs of silica bodies, separated by short cells. Elongated oval bases, fairly short barb, triangular tapered to a point
-Base L= 11-14 Length 15-20 Width 4-6 (-9)
-frequent intercostal hooks next to costal zones
-L=8-10 L base 4-6 W base 6-8
-rounded rectangular base, short triangular barb
Papillae: none seen
Stomata: very sparse in intercostal zones
-L=13 W=8
Long Cells: parallel in rows, strong u-shaped irregular undulations (wl=3.5-5 ampl=2-3)
-Length 38-68 Width 5-7

Andropogon africanus

Abaxial Surface
Silica Bodies: Coastal, in single (occasionally 2 or 3), dumbbell shaped, slightly irregular, distal ends slightly concave-slightly convex, rather elongated med-narrow central portions
-separated in rows by 1 or 2 short cells slightly shorter than s.b.
-Length 9-13 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: frequent intercostal, widely spaced rows between stomata and silica bodies, 2-celled, proximal cell cylindrical + cigar-shaped, distal cell about same length, rather triangular, tapering rapidly to point
-Length 15-20 L_b 9 L_d 9
-bases square
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: low-med domed (may be + triangular) in single, sometimes double-3 staggered intercostal rows
-Length 11-13 Width 7
-alternate with epidermal long cells
Long Cells: Parallel, in rows, 1-2 rows between silica body rows and stomatal rows, small irregular -u-shaped undulations (=3.5, ampl=1-2)
-Length 25-35-60 Width 6-8
-interstomatal l.c. slightly wider than stomata

Adaxial Surface
Silica Bodies: Same as abax, rows more widely spaced, separated in rows by 1 or 2 short cells (slightly shorter than s.b.), or 1 s.c., 1 p.h., 1s.c.
-Length 11-12 Width 6
Macro Hairs: none seen
-Length Width
Micro Hairs: same as abaxial, but sparser may not be apparent
-Length Width L_b L_d
Prickle Hairs: widely spaced prickle hairs in coastal rows, between 2 s.c., oval bases, barb perp. to row at times, med. length tapering to point may not be apparent
-Length 17-26 L_b 11-13 W_b 7-9
-[fairly] infrequent intercostal hooks, irregular rectangular bases, elongated triangular barbs may not be present
-Length 15-21 L_b 12 W_b 7
Papillae: none seen
Stomata: same as abax, but sparser. 1 or 2 intercostal rows
-Length Width
Long Cells: " " "
-Length 33-55 Width 8-11

Andropogon africanus

Abaxial Surface
Silica Bodies: single costal rows of dumbbells, distal ends rounded + sometimes with indented ends, central portion quite long and narrow
-separated by 1-3 quite long s.c.s
-Length 12-13 Width 5
Macro Hairs: none seen

Family: Andropogoneae

-Length Width
Micro Hairs: frequent in intercostal zones, square bases, prox. cell cylindrical to slightly cigar-shaped, distal cell about same length, tapering very slightly to a very blunt point
-Length 16 L_b 9 L_d 7
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: low-med domed may be slightly triangular, in single-triple (1 staggered) intercostal rows (staggered).
-Length 11-13 Width 7-9
Long Cells: parallel in rows, roughly rectangular, fairly shallow u-shaped undulations (=3.5, a=2), no-slight narrowing lateral to stomata
-Length 30-60 Width 5-8

Adaxial Surface
Silica Bodies: single costal rows, like abax
-separated in rows by 1 s.c.
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: like abax, but mostly in single, sometimes 2 rows
-Length Width
Long Cells: parallel in rows, rectangular, shallow, u-shaped undulations (h=5.5 a=1)
-Length 35-60 Width 12-16

Andropogon ascinoides

Abaxial Surface
Silica Bodies: single or double costal rows of slightly irreg. short dumbbells, distal ends concave, central portions med-narrow and short
-separated in rows by 1 s.c., sometimes 1 s.c., 1 prickle hair, 1 s.c.
-Length 8-11 Width 4-5
Macro Hairs: long, arising in costal rows, single cell, base slightly elevated, composed of several irreg. rounded cells in rough rings around basal cell. -may not be present.
-Length Width
Micro Hairs: quite frequent between stomata and s.b. rows, 2-celled, proximal cell tapering outwards towards distal cell from rounded base, distal cell half ? as long, rather triangular, tapering rapidly to a point.
-Length 18 L_b 11-12 L_d 6-7
Prickle Hairs: in costal s.b. rows, between 2 s.c., oval bases, very short barbs. regrowth with no p.h.
-may be sm. intercostal hooks, rounded bases, small triangular barbs.
-Length 7 L_b 6 W_b 5
Papillae: thin-walled, Globulous papillae, in interstomatal long cells, alternate with stomata, often slightly overlapping stomata.
Stomata: in single or double (staggered arrangement) intercostal rows, low-domed-triangular shaped, alternate with long cells
-Length 9-10 Width 6
Long Cells: parallel in rows, fairly strong u-v-shaped undulations (h=2 a=1)
-Length 21-40 Width 4-6

Adaxial Surface
Silica Bodies: single or double costal rows of irreg-shaped dumbbells, short length, distal ends mostly convex (few slightly concave), short med. width central portions.
-Length 7-8 Width 4-5
-separated in rows by s.c., p.h., s.c.
Macro Hairs: same as abax
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: in costal rows with s.b., each 2-3 s.b. broadly oval bases, fairly long barbs.
-Length 11-22 L_b 4-6 W_b 6-8
Papillae: none seen
regr.-fairly large Globulous papillae seen between some stomata.
Stomata: same as abax, single rows, widely separated.
-Length Width
Long Cells: same as abax, more strongly undulated (h=2.5, a=1)
-Length 20-35 Width 6-10
-may be inflated rect. or + hexagonal.

Andropogon fastigiatus

Abaxial Surface
Silica Bodies: costal single or double rows of slightly irreg. dumbbell shaped s.b. distal ends slightly concave to broadly convex, rather (med-) long, narrow central portion
-in groups of 2 or 3, separated by 1 s.c., or 1 s.c., 1 p.h., 1 s.c.
-Length 6-8 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: rather frequent between s.b. and stomatal rows, 2-sided, proximal cell, tapering slightly outward and narrow, distal cell tapering to blunt point about same lengths
-base-irreg. squared
-Length 17 L_b 7.5 L_d 9.5
Prickle Hairs: in costal s.b. rows between 2 s.c., oval bases, short-med triang. barbs
-Length 12 L_b 6-7 W_b 5-6
Papillae: med-walled, rather small c-shaped in intercostal stomatal rows, alternate with stomata (long cells)
Stomata: low-med domed, in intercostal single rows
-Length 10-11 Width 6
Long Cells: parallel in rows, slight u-shaped und.
-Length 25-44 Width 4-5

Adaxial Surface
Silica Bodies: same as abax, in single or double costal rows, widely separated, in groups of 2-3 separated by s.c., p.h.
-Length 7-12 Width 5

Family: Andropogoneae

Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: fairly frequent in costal rows, rounded rect. bases, long narrow pointed barbs
-Length 35-40 L_b 9 W_b 5
-fairly freq. intercostal hooks, oval-squarish bases, fairly long narrow barbs
-Length 11-21 L_b 3-5 W_b 6
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: same as abax (h=3, a=1.5)
-Length (25-)45-55 Width 5-7

Andropogon gayanus bisquamulatus

Abaxial Surface

Silica Bodies: single costal rows of short slightly irreg. dumbbell shaped s.b., distal ends slightly concave-slightly convex, short-med width central portion
-in groups of 1-6, separated by s.c. wider than s.b.
-Length 8 Width 4-6
Macro Hairs: fairly long single cell hairs arising in costal rows, bases of 3 irreg. rounded cells, slightly elevated
-Length 375 Width
Micro Hairs: frequent in intercostal zones, small square-rounded bases, proximal cell rather cylindrical (slightly inflated in middle), distal cell about same size (?) tapering slightly to blunt pt.-very fragile (may be shriveled in slide)
-Length 21 L_b 11 L_d 10
Prickle Hairs: in costal rows between s.b., sometimes widely-spaced, oval bases, med-very long triang. barbs
-may be fairly freq. intercostal hooks, sm. rounded bases, short triang barbs
-Length 28-35 L_b 9-14 W_b 6
Papillae: small fairly thick-walled globulous-finger like in small cells between stomata, often slightly overlapping stomata
Stomata: med-domed, sometimes rather triang., single intercostal rows, closely spaced in rows, occasionally double staggered rows
-Length 10-11 Width 6-8
Long Cells: parallel in rows, elongated, shallow u-shaped und. (h=3, a=1)
-Length 25-30 Width 5-7

Adaxial Surface

Silica Bodies: same as abax, in groups of 2-6
-Length 5-6 Width 5
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: costal rows with s.b., oval bases, and med-very long narrow barbs, tapering to point
-Length 60-90 L_b 10-11 W_b 6-7
-fairly frequent intercostal hooks, oval bases, short triang. barbs
-Length 15-20 L_b 5-8 W_b 4-6
Papillae: none seen
-may be several sm. rounded papillae on many l.c.
Stomata: same as abax, rows wider spaced
-Length 9-10 Width 7-8
Long Cells: parallel in rows, rect. to squared, shallow u-shaped und. (h=3, a=1)
-Length 14-27 Width 10

Andropogon gayanus gayanus

Abaxial Surface

Silica Bodies: single costal rows of fairly reg. dumbbell shaped occasionally nodular s.b., distal ends mostly convex, rather squared, central portion med-fairly long length, narrow
-separated by 1 s.c. in regular spacing-s.c. slightly wider or same width as s.b.
-1 cross-shaped and 1 slightly nodular s.b. seen
-Length 8-9 Width 4-5
Macro Hairs: scattered intercostally, long single cell, arising from elevated multi-celled base if irreg. rounded cells roughly in rings.
-Length 410 Width
Micro Hairs: rather frequent in intercostal zones, rounded bases, proximal cell cylindrical-tapering outwards distal cell about same length, tapering only slightly-med to a (very) blunt point
-Length 22 L_b 10 L_d 12
Prickle Hairs: in costal rows of irreg.-spaced s.b.
-tapered oval base,[fairly short]-quite long pointed barb
-Length 21-42 L_b 10 W_b 6
-rather infrequent intercostal hooks, rounded bases, short pointed barb
-Length 10-12 L_b 6 W_b 5
Papillae: fairly thin-walled c-shaped papillae on interstomatal long cells~ 1/2 width stomata
-often 2 present, [also often small papillae-like structures on many l.c.'s] may not be present
Stomata: med-low-domed rather triang. in intercostal single or double rows, alternate with long cells (occasionally up to 3 rows, one staggered with another)
-Length 10-12 Width 7-8
Long Cells: parallel in rows, rect., very shallow v-shaped und (h=5, a=1)
-Length 25-31 Width 5-6
-interstomatal l.c. slightly narrower than stomata

Adaxial Surface

Silica Bodies: same as abax-occasionally nodular, rows wider spaced
-Length 5-8 Width 4-5
Macro Hairs: same as abax
-Length 680 Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: fairly frequent in costal rows, bases rounded tapered rect. , barbs fairly short -very long pointed
-Length 16 L_b 8 W_b 6
-fairly freq. intercostal hooks, rounded

Family: Andropogoneae

square bases, barbs short-med triang. tapering to points
-Length 9-19 L_b 4-7 W_b 4-7
Papillae:several small round papillae on interstomatal and surrounding l.c.'s
-may not be apparent
Stomata: like abax, but very sparse, in single intercostal rows, widely spaced in rows med-high domed
-Length 8-10 Width 8-9
Long Cells: parallel in rows, rect.-squared, shallow u-shaped und. (h=3, a=1)
-Length 11-20 Width 9-10
-some l.c.'s with very little und.
-interstomatal l.c. narrower than stomata

Andropogon gayanus squalulatus

Abaxial Surface
Silica Bodies: 1*-2 costal rows of irreg. dumbbell shaped s.b., occasionally nodular, distal ends rounded triang-square, indented, central portion med length, med-narrow width
-unevenly spaced, some adjacent, others with short s.c. or p.h. between them
-Length 8-12 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: frequent in costal rows, tapered oval bases, long barbs tapering to points
-Length 25-65 L_b 7-10 W_b 4-6
Papillae: conspicuous Globulous papillae on interstomatal l.c., often overlapping stomata slightly, ~2/3-3/4 width of stomata
Stomata: in single intercostal rows, low-med domed, rounded
-Length 9-10 Width 5-6
Long Cells:-Length Width

Adaxial Surface
Silica Bodies: like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: like abax
-also, occasional intercostal hooks, irreg. rounded bases, fairly long pointed barbs
-Length 18-30 L_b W_b
Papillae: apparently like abax--also may be small papillae-like structures on many l.c.
Stomata:-Length Width
Long Cells: parallel in rows, rect. deep, wide u-shaped und.
-Length Width

Andropogon pseudapricus

Abaxial Surface
Silica Bodies: single costal rows of reg. dumbbell shaped s.b., distal ends mostly convex with central indentations, central portion rather long and narrow with central thickening
-very evenly spaced with butterfly-shaped s.c.between each
-Length 9-13 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: present, rather frequent between s.b. and stomatal rows, 2-celled, prox. cell cigar-shaped, slight central thickening, distal cell about same length, tapering slightly to blunt point
-base rounded rect., small
-Length 18 L_b 9-13 L_d 9
Prickle Hairs: none seen
-Length L_b W_b
Papillae: Globulous interstomatal papillae on long cells, ~2/3-same width as stomata, fairly thick-walled
Stomata: low-domed intercostal single rows, may be slightly triang.
-Length 9-10 Width 5-6
Long Cells: parallel in rows, rect., med-shallow u-shaped und. (h=2.5, a=1
-Length 31-46(-65) Width 4-6

Adaxial Surface
Silica Bodies: same as abax, but rows widely spaced, may be adjacent rows
-Length 9-12 Width 5
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: fairly frequent in costal rows, bases rounded tapered rect. , med-very long barbs tapered to point
-Length 25-116 L_b 8 W_b 4-5
-rather frequent intercostal hooks, bases rounded, oval or squared, rather short, hooked, pointed barbs
-Length=8-15 L_b 5-6 W_b 5-6
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: parallel in rows, rect-inflated rect., fairly deep u-shaped und. (h=25-30, a=2)
-Length 30-50 Width 10-15

Andropogon schirensis

Abaxial Surface
Silica Bodies: single, costal rows of mostly irreg. shaped dumbbells, distal ends mostly straight-slightly concave, central portion med-fairly long length and narrow
-evenly spaced with 1 s.c. separating each, s.c.'s squared, same width as s.b., s.c. quite short
-Length 8-9 Width 5
Macro Hairs: most costally arising, multi-celled elevated base cells rounded, small and irreg., hair single cell, very long
-Length 850 Width
Micro Hairs: occasional-fairly frequent in intercostal zones between stomata and s.b. rows, bases small and rounded, prox. cell tapering slightly inward-cigar shaped, distal cell about 2/3 length, tapering rapidly to point
-Length 15 L_b 9 L_d 6
Prickle Hairs: on some samples fairly freq. costal p.h. with fairly long pointed barbs

Family: Andropogoneae

-40
-hooks with rect. bases in between costal and stomatal rows, bases between long cells-very frequent, short pointed barbs
-Length 8-11 L_b 3 W_b 4-5
Papillae: globular-larger c-shaped papillae on interstomatal long cell, about same width-larger as stomata, thick-walled
Stomata: single rows, occasionally double staggered rows of intercostal, very low-domed, triang. stomata
-Length 12-16 Width 8-10
Long Cells: parallel, in rows, rect, shallow irreg. u-shaped und (h=2, a=.75)
-Length 20-45 Width 5-8

Adaxial Surface
Silica Bodies: same as abax, but rows wider spaced
-Length 8-11 Width 6-7
Macro Hairs: fairly freq. in costal rows, bases of several-many rather large rounded irreg. cells, elevated, hair 1-celled, fairly short, tapering to point
-Length 150 Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: fairly freq. in costal rows, oval bases, fairly short barbs, tapering to a point
-Length 14-19 L_b 4-7 W_b 3-4
-freq. intercostal hooks, bases rounded irreg., barbs short, tapering to long point.
-Length 12-22 L_b 3-5 W_b 5-6
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: in rows, roughly parallel, broadly rect.-hexagonal-irreg. shape, fairly deep, u-shaped und. (h=3, A=2)
-Length 16-42 Width 15-25

Andropogon tectorum

Abaxial Surface
Silica Bodies: single costal rows of irreg. dumbbells, distal ends concave-slightly convex, central portion med length, narrow, rather small size, some nodular
-arrangement in groups of 2-5, with 1 s.c. between each, 1s.c., 1 p.h., 1 s.c. between each group
-Length 6-8 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: occasional in intercostal zones, basal cell cylindrical, no distal cells seen, rounded base
-Length L_b 10 L_d
Prickle Hairs: freq.-very freq. in costal zones, oval bases, long barbs tapered to points
-Length 36-60 L_b 10-12 W_b 4-5
-on some samples very freq. in intercostal zones, like costal, bases irreg. rounded
Papillae: long finger-like papillae on interstomatal long cells usually overlapping much of stomata, about 1/2 width of stomata
-many l.c.'s with several small papillae-like structures
Stomata: in double or single intercostal rows, low-med domed
-Length 9-10 Width 5-6
Long Cells: parallel in rows, rect., deep wide und. (h=4, a=2)
-Length 20-25(?) Width 4-6

Adaxial Surface
Silica Bodies: same as abax,
-Length 6-8 Width 3-4
-some costal rows with very widely scattered small dumbbells only
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly frequent in intercostal zones, small rect. base, prox. cell cigar shaped, distal cell (possibly shriveled) 2/3 length, tapering to rather blunt point
-Length 15 L_b 9 L_d 6
Prickle Hairs: frequent in costal zones, elongated oval base, squared at 1 end , long barb tapering to point
-Length 25-50-76 L_b 15 W_b 5-6
-also frequent in intercostal zones, like costal, bases irreg. rounded
Papillae: several small papillae-like structures on many l.c.
Stomata: none seen
-Length Width
Long Cells: parallel in rows, rect., deep wide und., u-shaped (h=4, a=2)
-Length 18-32 Width 5-6

Chasmopodium caudatum

Abaxial Surface
Silica Bodies: single or double costal rows of dumbbells, distal ends concave, central portions short and narrow-med width
-arranged singly or in pairs, fairly widely separated by short s.c.'s, 1 s.c., 1p.h., 1 s.c., a few nodular,may be some very closely spaced rows
-Length 9-11 Width 6
-scattered intercostal cross-shaped s.b. between l.c., may not be present
-Length 6 Width 7
Macro Hairs: fairly frequent intercostally-difficult to tell base structure and position, since bases on side, each composed of several large columnar cells, rounded irreg., and single celled long hair tapering to point, base
-Length 565 Width
Micro Hairs: fairly freq. in intercostal zones, irreg. oval bases, prox. cell barrel-shaped, very short, [no distal cells seen, distal cell+ longer tapering to blunt point
-Length L_b L_d
Prickle Hairs: freq. in costal rows, broadly oval bases, very short barbs, tapering rapidly to fine points
-Length 20 L_b 15 W_b 12
-frequent hooks in intercostal rows, squared bases, very short triang. barbs or like costal
-Length 8-12 L_b 8-9 W_b 9-11
Papillae: none seen ?
Stomata: in single or double staggered intercostal rows, low-med domed, rather-

Family: Andropogoneae

strongly triang., alternate with long cells without papillae
-Length 14-18 Width 10-11
Long Cells: interstomatal l.c. narrower than stomata
-parallel in rows, rect., med u-shaped und. (h=4, a=2.5)
-Length 27-50 Width 7-10

Adaxial Surface
Silica Bodies: like abax but very widely spaced
-Length Width
Macro Hairs: like abax
-Length Width
Micro Hairs: fairly freq. in intercostal zones, like abax
-Length L_b L_d
Prickle Hairs: like abax, in costal rows and in intercostal zones
-Length L_b W_b
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: like abax
-Length Width

Elionurus elegens

Abaxial Surface
Silica Bodies: none seen (?), possibly some costally
-Length Width
Macro Hairs: seen infreq., arising costally, basal cells (on side) elevated, several columnar irreg., single cell for hair, long and thin, tapering to point
-Length 340 Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: freq. intercostal hooks, bases irreg. rect., barbs rather short elongated triangles, tapering to points
-Length 11-13 L_b 3-6 W_b 6-8
Papillae: none seen
Stomata: in single or double-3 intercostal rows, low-domed, rather triangular
-Length 14-16 Width 8-10
Long Cells: parallel in rows, slightly inflated-rect., very shallow u-shaped und. (h=4, a=1)
-Length 37-80 Width 9-11

Adaxial Surface
Silica Bodies: very widely spaced dumbbells in costal zones, rows 2-3, distal ends slightly concave-straight, central portions med. thickness, rather short
-Length 6 Width 5
-several irreg. dumbbell/cross-shaped s.b. seen
Macro Hairs: none seen
-Length Width
Micro Hairs: rather freq. in intercostal zones, elongated oval bases, prox. cell slightly cigar shaped, distal ends too shriveled to see
-Length 15 L_b L_d
Prickle Hairs: freq. intercostal hooks, oval-irreg. oval bases, short elongated triang. barbs, tapering to point
-Length 6-9 L_b 3-4 W_b 6-8
Papillae: none seen
Stomata: * in widely spaced intercostal rows (#), separated by long l.c.'s in rows, low-med domed
-Length 16-17 Width 10-12
Long Cells: parallel in rows, rect., pronounced -shaped und. (h=4, a=4)
-Length 60-140 Width 10-15
-many long

Cymbopogon giganteus

Abaxial Surface
Silica Bodies: single or double costal rows of rather irreg. dumbbells, distal ends concave, central portions rather thick, med. length
-Length 6-7 Width 5
very freq. intercostal may be infreq. in regrowth irreg. linear s.b., staggered arrangement between l.c.'s
-paired with rect. s.c.
-Length 1 Width 5
-costal s.b. fairly closely and unevenly spaced in row, separated by 1 or 2 s.c., approx. same width as s.b.
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in intercostal zones, prox. cell cylindrical
-slightly inflated, distal cell 1/2-2/3 length, rather triangular, tapering rapidly to point, base oval
-Length 15 L_b 8.5 L_d 6.5
Prickle Hairs: rather freq. intercostal hooks, bases oval, very short triang. barb
-Length 6-7 L_b 4-5 W_b 5
Papillae: none seen
Stomata: usually 6-8 rows, often staggered in pairs, intercostal, of high-med domed (sometimes slightly triang.) stomata, separated by l.c.'s
-Length 10-14 Width 8-11
Long Cells: parallel in rows, rect., med-shallow u-shaped- -shaped und. (h=2, a=1)
-Length 20-44 Width 6-8

Adaxial Surface
Silica Bodies: intercostal s.b. like abax, but sparser, single-2 costal rows of dumbbells, distal ends indented-convex, central portions rather short and thick
-separated in rows by s.c. (1 or 2) wider than s.b.
-Length 8-9 Width 5-6
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax, sparse
-Length L_b L_d
Prickle Hairs: freq. intercostal hooks, bases irreg. oval, very short triang. barbs
-Length 6-8 L_b 5-6 W_b 7-9
Papillae: none seen
Stomata: single intercostal rows, like abax
-Length 14-16 Width 10-11
Long Cells: parallel in rows, rect.-inflated-hexagonal, fairly deep u-shaped und. (h=5, a=2)
-Length 25-45 Width 10-12

Family: Andropogoneae

Elionurus hirtifolius

Abaxial Surface

Silica Bodies: irreg. linear silica bodies in costal (?) zones, very widely spaced, between l.c.
-Length 2 Width 6
Macro Hairs: none seen
-Length Width
Micro Hairs: few seen outside of costal (?) zone, basal cells cyl., no distal cells seen, bases oval
-Length L_b 8-10 L_d
Prickle Hairs: infreq. intercostal hooks, rect.-squared bases, barbs fairly short, triang.
-Length 12 L_b 5 W_b 6
Papillae: none seen
Stomata: med-high domed, triang.
-Length 14-15 Width 8-10
Long Cells: rect. or inflated rect., shallow u-shaped und (h=2.5-3, a=1-1.5)
-Length 25-55 Width 10-13

Adaxial Surface

Silica Bodies: irreg. dumbbells, irreg. and occasional nodular s.b. in costal zones in several rows, distal ends mostly convex, central portions med. thickness (some thin, smaller irreg. s.b. with very thick central portions)
-Length 4-10 Width 4-6
-very variable
-scattered irreg. intercostal s.b.
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. in intercostal zones, oval bases, prox. cell cyl., distal cells (difficult to see) tapering to rather blunt points
-Length 40-45 L_b 15-20 L_d
Prickle Hairs: freq. costal p.h., bases ovals squared at one end, points very short blunt-triang.
-Length 10-13 L_b 8-11 W_b 5-6
-fairly freq. intercostal hooks like abax
Papillae: none seen
Stomata: like abax, but larger
-Length 15-25 Width 10-15
Long Cells: rect., fairly deep u-und. (h=3-4, a=4-5)
-Length 45-95 Width 10-15

Elionurus pobequinii

Abaxial Surface

Silica Bodies: in bands of 4+ costal rows-very widely spaced dumbbells, distal ends concave-slightly convex and mostly short, central portions short and thick, many paired with squared s.c. with or without silica, some squared s.b.
-widely spaced in rows
-Length 5 Width 4-5 (sq.)
Macro Hairs: occasional in intercostal zones, foot cell irreg. rounded rect. structure of basal cells difficult to see
-in intercostal zones, single celled microhairs or very small macrohairs, bases rounded rect., difficult to see basal structure, hair single cell, tapering to point
-Length 30-60
-many irreg. rounded cells likely not elevated (?), hair single cell, broken
-Length 105(445-475) Width
Micro Hairs: scattered in intercostal zone, basal cell cyl., distal cell often longer than prox., tapering to very blunt point
-Length L_b 8-12-14 L_d 10-12-14
Prickle Hairs: freq. intercostal hooks, bases rect., very short triang. barbs tapering to rather blunt point-med triang. barbs tapering to points
-Length 6 L_b 5-6 W_b 6-7
Papillae: none seen
Stomata: in 4+ intercostal rows, low-med domed
-Length 16-20 Width 10-15
Long Cells: rounded-rounded rect., quite variable in size, no und seen
-Length 17-36 Width 10-16
-interstomatal l.c. wider, often considerably, than stomata

Adaxial Surface

Silica Bodies: ? in bands of ~6 costal rows-very widely spaced, "smashed-in" dumbbells or , distal ends mostly slightly convex, central portions short and thick, many , with 1 side bigger than other, each paired with linear s.c., separated by l.c.'s in row, spaced fairly evenly
-Length 3-4-6 Width 6
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: widely spaced, low-med domed triang.
-Length Width
Long Cells: parallel in rows, rect, deep u-shaped und (h=5, a=6)
-Length 35-95 Width 15-17

Euclasta condylotricha

Abaxial Surface

Silica Bodies: single costal rows of dumbbells, most single and paired with a prickle hair, distal ends concave-squared, central portion short-med and very narrow (occasionally nodular)
-Length 6-10 Width 3-4
Macro Hairs: rather freq. in intercostal zones, base elevated, multi-celled, rough rings of irreg. shaped cells, hair single celled and long
-Length 535 Width
Micro Hairs: occasional, usually in stomatal rows, arising between l.c.'s with papillae, or may be paired with p.h. or between l.c.'s, base small and round, prox. cell tapering outward to max. width at 2/3 its length, distal cell not seen may not be seen
-Length L_b 16 L_d
Prickle Hairs: in costal rows, some single, some paired with s.b. or each other, irreg.

Family: Andropogoneae

oval bases, very short pointed barbs
-Length 9-11 L_b 8-10 W_b 3-4
-freq. intercostal hooks, round bases, very short pointed barbs
-Length 5-6 L_b 5-6 W_b 4
Papillae: thick-walled Globulous papillae on interstomatal long cells, same width-larger width than stomata
Stomata: med-low domed in single-4 intercostal rows, small size, sometimes rather triang.
-Length 8-9 Width 5-7
Long Cells: parallel in rows, elongated rect. fairly shallow u-shaped und. (h=3, a=1)
-Length 25-48 Width 3-5

Adaxial Surface
Silica Bodies: same as abax
-Length 7-8 Width 5
Macro Hairs: same as abax, no complete hairs seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: same as abax
-also, occasional in costal rows, larger p.h., bases elongated tapered ovals , strong elongated triang. barb
-Length 35 L_b 17 W_b 8
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: parallel in rows, rect., pronounced u-shaped und. (h=3, a=2)
-Length 35-65 Width 5-8

Hackelochloa granularis

Abaxial Surface
Silica Bodies: scattered-quite freq. intercostal cross-shaped or irreg.-shaped s.b., each paired with 1 linear s.c.
-Length 4-6 Width 8-10
-double or single costal rows of mostly dumbbells (few nodular, few cross-shaped), distal ends mostly straight or indented, central portions med. length and width, rounded-rounded rect., overall ends arranged in rows closely and quite evenly spaced, separated by short s.c.'s
-Length 6-12 Width 5-6
Macro Hairs: fairly freq. in intercostal zones, bases multi-celled, long, tapering to point
-Length 390 Width
Micro Hairs: fairly freq. in intercostal zones, base irreg. rounded-oval, prox. cell cyl., distal cell 1.5-2X as long, first tapering slightly outwards, then tapering rapidly to a rather blunt point
-Length 24 L_b 7-9 L_d 15
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: in many intercostal rows (occasionally staggered), low-med. domed, often "peaked", separated in rows by long single l.c.'s
-Length 16-17 Width 10-13
Long Cells: roughly parallel in rows, rect.-elongated irreg, irreg, u-shaped und (h=3.5, a=2)
-Length 25-65 Width 9-10
-interstomatal l.c.'s often wider than stomata

Adaxial Surface
Silica Bodies: same as abax., wider spaced, intercostal s.b. less freq.
-Length Width
Macro Hairs: same as abax, less freq
-Length 320 Width
Micro Hairs: freq. intercostally, basal cell short and cyl. or tapering slightly outwards, distal cell ~2X as long, first tapering outwards, then inwards to a blunt point
-Length 18 L_b 6 L_d 12
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: same as abax, but wider spaced and slightly smaller (?)
-Length Width
Long Cells: roughly parallel in rows, rect.-(sometimes inflated), fairly deep irreg. u--shaped und (h=5, a=3)
-Length 26-59 Width 10-20

Hyparrhenia glabriuscula

Abaxial Surface
Silica Bodies: single or double costal rows of closely-spaced dumbbells (very little space small narrow s.c.'s between s.b.), distal ends concave, central portions narrow, extremely short
-others with central portions med length and width, regrowth like
-Length 9-11 Width 7-8
Macro Hairs: none seen, but some bases possibly present
-freq. on regrowth, costal or intercostal
-Length 230-250 Width
Micro Hairs: very freq. in intercostal zones, bases irreg., basal cell cyl., slightly thicker in center, distal cell ~1/2 X, tapering to blunt point
-Length 18-24 L_b 12 L_d 6
Prickle Hairs: occasional in costal rows, oval bases, fairly short triang. barbs tapering to point
-Length 12-13 L_b 7-8 W_b 4-5
-very freq. or less intercostal hooks, squared bases, short pointed barbs
-Length 8-10 L_b 5-6 W_b 5
Papillae: none seen, possibly very thin-walled, low papillae on interstomatal long cells
Stomata: double or single intercostal rows, triang. low-med domed, with fairly short long cells separating stomata
-Length 13-14 Width 7-9
Long Cells: rect-slightly inflated, in rows (parallel), slight u-shaped und. (h=2-2.5, a=1)
-Length 29-38 Width 4-6
-interstomatal l.c.'s sometimes slightly wider than stomata

Adaxial Surface
Silica Bodies: same as abax
-separated in rows by 1 or 2 s.c., p.h. more

Family: Andropogoneae

freq.
-Length 7-10 Width 8-9
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: more freq. than abax in costal rows, otherwise same as abax
-Length L_b W_b
Papillae: none seen
Stomata: low-domed, fairly triang.
-Length 11-12 Width 7-8
Long Cells: in rough rows of rect-squared cells, broad u-shaped und. (h=3.5, a=2)
-Length 30-45 Width 10-13

Hyparrhenia involucrata

Abaxial Surface

Silica Bodies: single-6+ costal rows of dumbbell shaped s.b., distal ends mostly concave, some deeply, almost cross-shaped, central portions med. length, quite narrow, ends quite squared
-separated in rows by 1 s.c., or 1 l.c.
-Length 8-12 Width 5
Macro Hairs: frequent, arising intercostally, multi-celled elevated base, cells irreg. and variable in size, in roughly concentric rings
-Length 300 Width
Micro Hairs: Frequent in intercostal zones, bases small and rounded, prox. cell cyl. or slightly cigar-shaped, distal cell tapering rapidly to blunt point, about half length
-Length 15 L_b 10 L_d 5
Prickle Hairs: freq. in intercostal zones, hooks, with rounded bases, very short triang. rather blunt? barbs
-Length 5 L_b 5 W_b 4-5
Papillae: rather thick-walled Globulous papillae on long cells between stomata, often wider than stomata
Stomata: in 2-4 interstomatal rows, elongated and very low-domed
-Length 16-18 Width 5-7
Long Cells: parallel in rows, roughly rect., to u-shaped und., interstomatal l.c.'s wider than stomata (h=3.5, a=1.5)
-Length 35-60 Width 4-7

Adaxial Surface

Silica Bodies: in 1-4 costal zones, like abax, many ends straight to slightly convex, rows widely spaced, some rows with close spacing of s.b. like abax, others widely spaced
-Length 8-11 Width 5-6
Macro Hairs: arising intercostally, less freq. than on abax., same base structure
-Length Width
Micro Hairs: fairly infreq. in intercostal zones, like abax.
-Length L_b L_d
Prickle Hairs: none seen
-some samples with freq intercostal hooks like abax. each paired with s.c.
-Length L_b W_b
Papillae: none seen
Stomata: like abax., but very widely spaced
-Length 15-18 Width 7-9
Long Cells: parallel in rows, uneven sized inflated rect.-hexagonal med. -shaped und. (h=5, a=2-3)
-Length 25-75 Width 12-21

Hyparrhenia rufa

Abaxial Surface

Silica Bodies:1-4 costal rows of dumbbells, distal ends squared, central portions very narrow and long regrowth-central portions slightly wider
-fairly evenly spaced by squared s.c., slightly narrower than s.b.
-Length 12-16 Width 5-6
Macro Hairs: fairly freq. in intercostal zones, multi-celled elevated bases
-Length 430-520 Width
Micro Hairs: fairly freq. in intercostal zones, small rounded bases, prox. cell cyl.-cigar shaped, distal cell 1 1/3 X L, tapering slowly to point
-Length 30 L_b 13 L_d 17
Prickle Hairs: occasional in costal rows, bases elongated ovals, barbs fairly high, tapering to short narrow points
-Length 20-25 L_b 11-15 W_b 4-6
-occasional intercostal hooks, oval bases, fairly short pointed barbs-barbs longer-30
-Length 15-20 L_b 10-11 W_b 5-6
Papillae: thin walled bulges on interstomatal l.c., often not apparent
Stomata: in single or double intercostal rows, low-domed, often quite triang.
-Length 15-16 Width 7-8
Long Cells: elongated irreg. rect., walls with fairly shallow u-shaped und. (h=3-4, a=1.5-2)
-Length 50-75 Width 10
-interstomatal l.c. very narrow

Adaxial Surface

Silica Bodies: like abax, but rows wider spaced
-Length Width
Macro Hairs: fairly freq. in intercostal zones, like abax
-Length Width
Micro Hairs: occasional in intercostal zones, bases small rounded, prox. cell like abax, no distal cells seen
-Length L_b L_d
Prickle Hairs: regular in costal rows, bases rect., barbs fairly short pointed.
-Length 14-17 L_b 7-8 W_b 3-5
-occasional intercostal hooks, like abax, but bases squared
Papillae: like abax
Stomata: like abax but sparser
-Length Width
Long Cells: fairly large irreg. rect., little und. noted shallow u-und.
-Length 40-65 Width 10-20
-interstomatal l.c. like abax

Hyparrhenia smithiana

Abaxial Surface

Silica Bodies: mostly single-2-3 costal rows of irreg. dumbbells, distal ends squared, slightly indented-convex, central portions med. length, narrow

Family: Andropogoneae

-arranged in groups of 1-3, separated by 1 s.c. or 1 s.c., 1p.h., 1s.c., s.c.'s small, slightly narrower than s.b.
-Length 8-13 Width 5-7
Macro Hairs: fairly frequent in intercostal zones, multi-celled elevated bases, cells variable size, rounded irreg., long single cell hair
-Length 440+ Width
Micro Hairs: freq. in intercostal zones, bases small and rounded, prox. cell cigar-shaped, distal cell likely shriveled some, tapering to slightly blunt tip-point
-Length 16-20 L_b 9.5-10 L_d 6.5-10
Prickle Hairs: in costal rows between s.b., broadly oval bases with short pointed barbs-short-med triang.
-Length 15-20 L_b 9-10 W_b 6-7
-intercostally, between stomatal rows, irreg. squared-round bases, infreq. on regrowth very short pointed barbs
-Length 8-10 L_b 5-7 W_b 6
Papillae: fairly thin-walled Globulous papillae on long cells in between stomata, slightly narrower than l.c. -may only appear as bulges in wall in interstomatal l.c.
Stomata: low-med.-high domed triang. in single or double intercostal rows
-Length 8-10 Width 8
Long Cells: roughly parallel in rows, rect., narrowing slightly lateral to stomata, interstomatal l.c. narrower than stomata. very small u-shaped und. (h=2, a=1)
-Length 30-55 Width 5-6

Adaxial Surface

Silica Bodies: like abax, may be 'smashed' or poorly developed
-Length Width
Macro Hairs: less freq. tan on abax., same
-Length 540 Width
Micro Hairs: freq., long and thin, in intercostal zones, small rounded bases, prox. cell cigar-cyl. shaped, distal cell tapering to rather blunt point, very variable
-Length 17-34 L_b 11-17 L_d 6-17
Prickle Hairs: in costal rows between s.b. groups, larger than abax. but same shape, may be infreq. with long pointed barbs
-Length 15-25 L_b 13-17 W_b 7-8
-freq. intercostal hooks, rect. bases, pointed barbs
-Length 11-13 L_b 4-5 W_b 8
Papillae: none seen, like abax
Stomata: same as abax, wider spaced in single rows
-Length Width
Long Cells: parallel in rows, slightly inflated, prominent u-shaped und. (h=3, a=1.5)
-Length 7-11 Width 35-60

Hyparrhenia subplumosa

Abaxial Surface

Silica Bodies: single, occasionally double-3 costal rows of dumbbells (occasionally nodular), distal ends rounded convex-concave, often with small points, central portions med. length and narrow
-fairly evenly spaced, separated by small s.c.- some rows more widely spaced with l.c.'s and p.h.
-Length 10-14 Width 6-7
-sparse intercostal cross-shaped s.b. (only one seen)
Macro Hairs: fairly freq. arising intercostally, multi-celled elevated bases of rather small mostly rounded cells, long single-celled hairs
-Length 620 Width
Micro Hairs: very freq. and prominent in intercostal zones, small rounded bases, basal cells rather cigar-shaped, widest about 2/3 dist. to tip, distal cell tapering to fairly blunt point 1/2-2/3 length
-Length 20-25 L_b 10-15 L_d 7-8
Prickle Hairs: rather freq. in some costal rows, oval bases, short pointed barbs may not be present
-Length 16-18 L_b 10-12 W_b 6-7
-freq. intercostal hooks, irreg. bases, pointed barbs, short blunt
-Length 12-16 L_b 5-8 W_b 6-8
Papillae: fairly thick-walled Globulous papillae on interstomatal l.c., slightly wider-slightly narrower than stomata
Stomata: in single or double (some staggered intercostal rows, low-domed rather triang.
-Length 14-16 Width 7-8
Long Cells: parallel in rows, rect., small u-shaped und. (h=2, a=1)
-Length 30-50 Width 5-8
-interstomatal l.c. often wider than-same width as stomata

Adaxial Surface

Silica Bodies: single costal rows (occasionally double) of irreg. dumbbells, distal ends straight, central portion med. length and rather narrow width, may be very widely spaced and irreg.
-separated by 1-2 short s.c.'s, occasional p.h.'s in some rows.
-Length 11-14 Width 8
Macro Hairs: less freq. than abax., multi-celled elevated bases, intercostal, basal cells irreg., difficult to see structures
-Length Width
Micro Hairs: none seen
-like abax
-Length L_b L_d
Prickle Hairs: occasional in costal rows (possibly macro hairs), not seen on some specimens, several squared basal cells around rect. base, long barb tapering to point
-Length 105 L_b 18 W_b 8
-quite freq. intercostal hooks, bases irreg. rect., barbs relatively long and triang., pointed (esp. on edges of veins), very short, blunt, triang.
-length 15-20 L_b 6-8 W_b 8-10
Papillae: none seen
Stomata: single intercostal rows, like abax but widely spaced, often separated by 2+ l.c.
-Length 20-25 Width 10-15
Long Cells: parallel in rows, rect.-hex., small u-shaped und. (h=5, a=2)
-Length 35-65 Width 10-25

Family: Andropogoneae

Hyperthelia disoluta

Abaxial Surface

Silica Bodies: single costal rows of dumbbells (some nodular), distal ends squared with concave ends, central portions med. length and narrow
-unevenly spaced with short cells in between some s.b. only, some p.h.
-Length 9-13 Width 5-6
Macro Hairs: freq, intercostally, bases multi-celled irreg. squared cells, mostly same size in ring around basal cell, elevated
-Length 680 Width
Micro Hairs: freq. in I.Z., small round bases, prox. cell strongly cigar-shaped-cyl., distal cell considerably narrower and 2/3X, rather cyl. with blunt rounded end
-Length 35 L_b 21 L_d 14
Prickle Hairs: intercostal hooks with squared bases quite freq., short triang. barbs
-Length 35 L_b 5-6 W_b 4-5
-occasional in costal rows, elongated oval bases , long barbs tapering to points
-costal and intercostal not as well developed
-Length 40-85 L_b 7-12 W_b 5
Papillae: very large Globulous papillae on interstomatal l.c.'s, overlapping stomata
Stomata: double or single intercostal rows of low-domed stomata-very low domed
-Length 14-16 Width 8
Long Cells: parallel in rows, rect, small u-shaped und. (h=2, a=1)
-Length 35-70 Width 5-6

Adaxial Surface

Silica Bodies: same as abax but rows sparser
-occasional cross-shaped s.b. intercostally near costal rows (or small dumbbells)
-Length Width
Macro Hairs: more freq. than abax, like abax.
-Length 700 Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: fairly freq. costally, bases elongated ovals with 1 squared end, barbs very long, tapering to point
-Length 10-12 L_b 105-110 W_b 7-8
-freq. intercostal hooks, bases squared, barbs elongated triang.-very short triang., tapering to point
-Length 6-11 L_b 4-5 W_b 4-5
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: in rough rows, rect.-irreg. hex, broad u-shaped und (h=3, a=1.5)
-Length 25-40 Width 8-16

Imperata cylindrica

Abaxial Surface

Silica Bodies: 1-2 costal rows of dumbbells, distal ends straight-indented, central portions short, med. width
-some very compact
-widely spaced in rows by squared s.c., l.c.
-Length 5-6 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. in intercostal zones, small squared bases, prox. cell cigar-barrel shaped, dist. cell ~same Length + shorter, narrower, tapering to blunt point
-Length 25-30 L_b 12-15 L_d 10-13
Prickle Hairs: quite freq. intercostal hooks, bases squared, barbs very short, blunt (difficult to see)
-Length L_b 3-4 W_b 4-5
Papillae: none seen
Stomata: 1-2 intercostal rows, med-domed rounded, quite closely spaced by short l.c.
-Length 10-12 Width 8-10
Long Cells: rect., walls with med. u-shaped und. (h=3-4, a=1.5-2)
-Length 25-55 Width 6-9
-interstomatal l.c. usually wider than stomata

Adaxial Surface

Silica Bodies: like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: fairly freq. intercostal hooks, bases rounded rect., barbs strong triang. tapering to point
-Length 15-20 L_b 8-10 W_b 5-7
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: like abax
-Length Width

Monocymbium ceresiiforme

Abaxial Surface

Silica Bodies: 1-2 costal rows of dumbbells, distal ends with straight-slightly concave ends, central portion med. length and slightly narrow width
-separated by 1 s.c. (occasionally nodular)
-Length 8-11 Width 5-6
-fairly freq. smaller cross-shaped or irreg. dumbbells scattered intercostally-may not be present
Macro Hairs: none seen
-Length Width
Micro Hairs: occasional in intercostal zones, difficult to see structures, small rounded bases, prox. cell cyl., distal cell tapering to point, ~same length
-Length 18 L_b 13 L_d
Prickle Hairs: hooks with oval-squarish bases and short triang. barbs scattered through intercostal zones
-Length 11-17 L_b 7-11 W_b 7-9
-some costal rows with freq. p.h., oval bases, barbs med. length, pointed
-Length 20 L_b 11-13 W_b 6-8
Papillae: none seen
Stomata: 2-several rows of intercostal low-domed rather triang. stomata-med-domed rounded
-Length 14-16 Width 10
Long Cells: irreg. rows, mostly rect., slight waves for und. (h=4-6, a=1-1.5), some with small u-shaped und.
-Length Width 7-10

Family: Andropogoneae

Adaxial Surface
Silica Bodies: same as abax., in 1-3 costal rows, freq p.h.'s in rows, many paired with p.h.'s
-Length 10-15 Width 6-7
Macro Hairs: occasional intercostally, very diff. to see structure, elevated base of many cells
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: freq. 3 types
--same as abax
--in costal rows, freq, large oval bases, strong elongated triang. barbs tapering to points
-Length 23-43 L_b 17-27 W_b 10-11
--in intercostal rows, rounded square bases, strong elongated triang. barbs tapering to points, may not be seen
-Length 30-47 L_b 14-17 W_b 13-15
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: rough rows, rect.-irreg. squared, broad u-shaped und. (h=5, a=4)
-Length 35-50 Width 13-17

Rhytachne triarastada

Abaxial Surface
Silica Bodies: none seen
-Length Width
Macro Hairs: see microhairs
-Length Width
Micro Hairs: --may be macrohairs, very freq. 1-celled, base rounded, tapering
-Length 50-70
--also appear to be regular 2-cell (?) m.h., small rounded bases, tapering to blunt points
-Length 16 L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: many papillae-like structures, one on almost each l.c., many with blunt points
Stomata: low-domed, rounded
-Length 15-20 Width 7-9
Long Cells: inflated rect., med. u-shaped und. (h=2-3, a=1-2)
-Length 30-50 Width 8-11

Adaxial Surface
Silica Bodies: scattered linear s.b. (?)
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: rect., walls with reg. u-shaped und., fairly deep (h=4-5, a=2-4)
-Length 80-120 Width 7-12

Rottboellia exalta

Abaxial Surface
Silica Bodies: 1-4 costal rows of small variable dumbbells, distal ends mostly indented, central portion rather short and narrow
-separated by 1 or 2 s.c. or occasional l.c. in some rows
-Length 6-10 (in uneven rows smaller, 6-8) Width 4-5
-some rows evenly and closely spaced, others more spread out
Macro Hairs: none seen
-Length Width
Micro Hairs: freq, in I.Z., small rounded bases, basal cell cylindrical, no distal cells seen
-Length L_b 8-12 L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: in 1-2-5 rows, low-med. triang. domed
-Length 10-12-14 Width 6-8
Long Cells: parallel in rows, rect., wide med. u-shaped und. (h=2-4, a=1-2)
-Length 30-45 Width 5-8

Adaxial Surface
Silica Bodies: 1-2 costal rows of small dumbbells, same as abax, singly or in pairs, many paired with p.h.
-Length 5-7 Width 4
-widely spaced in rows, most separated by s.c., p.h.'s
Macro Hairs: present intercostally, multi-celled, elevated bases, basal cells irreg. rounded, single-celled hairs tapering rapidly to point
-Length 130-195 Width
Micro Hairs: rather freq. in intercostal zones, small rounded bases, prox. cells short and cyl.-slightly tapered inward-cyl., distal cell broader than prox., very blunt point, + longer-same length
-Length 20 L_b 7-9 L_d
Prickle Hairs: in costal rows, many paired with silica bodies-base shape char. tapering outward with short barb
-Length 13-20 L_b 11-16 W_b 6-7
-fairly freq. intercostal hooks, rounded bases, very short barbs
-Length 4-6 L_b 4-6 W_b 4-5
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: parallel in rows, elongated narrow rect., sometimes irreg., deep u or v-shaped und. (h=3, a=2)
-Length 20-55 Width 4-7

Schizachyrium brevifolium

Abaxial Surface
Silica Bodies: single costal rows of dumbbells, distal ends rounded and concave-straight, very narrow med. length central portions
-arranged in closely-spaced rows, some with short cells between, some paired -s..c. mostly very small
-Length 8-11 Width 6-7

Family: Andropogoneae

-irreg. shaped s.b. scattered-infreq. through intercostal zones
-Length 3-4 Width 6
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in intercostal zones, small rounded bases, prox. cells cyl., dist. cells rather cyl., longer than prox., blunt end, but end may be shriveled
-Length 11 L_b 5 L_d 6
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2-4 staggered intercostal rows of med.-domed, often peaked strongly-but may be very rounded
-Length 9-11 Width 9-19
Long Cells: irreg. rows of roughly rect. l.c., with very irreg. large u- shaped und. (h=6-7, a=4-5), interstomatal l.c. wider than stomata
-Length 20-55 Width 6-10

Adaxial Surface

Silica Bodies: same as abax, many irreg.
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small round bases, prox. cell cyl.-slightly cigar-shaped, no distal cells seen, some costal
-Length L_b 8 L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: same as abax, none seen on some samples
-Length Width
Long Cells: same as abax
-Length Width

Schizachyrium nodulosum

Abaxial Surface

Silica Bodies: 1-4 costal rows of dumbbells, distal ends rounded with straight-slightly convex ends, central portions narrow and med.-long length, few nodular
-separated in rows by 1-2 s.c.'s, fairly evenly spaced
-Length 9-12 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: very freq. in I.Z., very small rounded bases, prox. cell initially tapering outward, then cyl., distal cells tapering to points, ~ same length as prox.
-Length L_b 10-11 L_d
Prickle Hairs: none seen, in some costal rows (only one on slide), bases elongated ovals, barbs fairly short triang. tapering to points
-Length 15-16 L_b 11-12 W_b 4-5
Papillae: (very thin-walled Globulous papillae, usually smaller than l.c., on same interstomatal l.c. ???) not apparent
Stomata: 1-2 intercostal rows of rounded low-med. domed, separated by 1 l.c., may be rather triang. or peaked
-Length 8-10 Width 5-8
Long Cells: parallel in rows, rect., small u-shaped und. (h= , a=1), interstomatal l.c. wider than stomata
-Length 25-45 Width 4-6

Adaxial Surface

Silica Bodies: single costal rows of dumbbells, distal ends rounded with flat-convex ends, central portions med. length and narrow width
-arranged in rows fairly evenly spaced with 1 s.c. or 1 s.c., 1 p.h., 1 s.c. between
-Length 9-14 Width 5-7
Macro Hairs: none seen
-Length Width
Micro Hairs: not seen on some specimens, fairly freq. in intercostal zones, small irreg. bases, prox. cell cyl., distal cells same size+, shriveled,
-Length L_b 6 L_d
Prickle Hairs: fairly freq. in costal rows, bases , barbs triang., rather short-fairly heavy tapering to points
-Length 16-22 L_b 12-13 W_b 7-8
-freq. intercostal hooks, small rect. bases, short triang. barb, tapered to a point
-Length 10 L_b 3 W_b 3-4
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: parallel in rows, rect. or slightly inflated, irreg. u-shaped und. (h=4-5, a=3)
-Length 30-60 Width 11-15

Schizachyrium platyphyllum

Abaxial Surface

Silica Bodies: single costal rows of dumbbells, distal ends angular with straight ends, central portions med. length, narrow-med. width
-fairly evenly spaced in rows by 1 or 2 small s.c.
-Length 7-10 Width 5-6
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. in intercostal zones, very small rounded bases, prox. cell short cyl., distal cells appear to be ~same length, but no structure seen
-Length L_b 4-5 L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 2-3 staggered rows of med.-domed rounded-± triang. (sometimes peaked)
-Length 12-15 Width 8-10
Long Cells: elongated rect., very conspicuous irreg.-u shaped und. (h=4, a=2-3)
-Length 35-40 Width 7-10

Adaxial Surface

Silica Bodies: like abax, may be slightly larger
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: occasional in intercostal zones, like abax.
-Length L_b L_d

Family: Andropogoneae

Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: like abax
-Length 30-65 Width 10-15

Schizachyrium ruderale

Abaxial Surface

Silica Bodies: single costal rows of irreg. dumbbells, distal ends mostly indented and rounded, central portions short-med., med.-narrow width
-separated by 1 small narrow s.c. in row, sometimes l.c.
-Length 9-12 Width 7
Macro Hairs: none seen
-Length Width
Micro Hairs: rather freq. in intercostal zones, small rounded bases, prox. cell slightly inward-tapering, distal cell 2/3x, triang., tapering to point
-Length 15 L_b 9 L_d 6
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-3 intercostal rows, low-med. domed strongly triang.
-Length 11-13 Width 7-10
Long Cells: in roughly parallel rows, elongated rect., slightly wider than stomata in stomatal rows, med. u- shaped und. (h=3, a=2-2.5)
-Length 25-65 Width 7-10

Adaxial Surface

Silica Bodies: like abax, 1-2 costal rows of dumbbells, distal ends rounded and indented of fairly straight, central portions med. length and narrow width
-separated by 1 s.c. in rows, or l.c.'s, p.h.'s
-Length 11-12 Width 7
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: freq, costally, bases oval , short triang. barbs, tapering rapidly to points
-Length 19-25 L_b 16-20 W_b 8-10
-fairly freq. intercostally, rect. bases, short elongated triang. barbs, tapering to points
-Length 9-11 L_b 3-4 W_b 7-8
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: parallel in rows, rect., with fairly deep und. u- shaped (h=5, a=3.5)
-Length 30-70 Width 14-18

Schizachyrium sanguineum

Abaxial Surface

Silica Bodies: 1-2 costal rows of dumbbells, distal ends rounded rect. fairly straight-convex, central portions narrow, med. length
-singly or in groups, separated in rows by narrow (smaller than s.b.) s.c. or 1 s.c., 1 p.h., 1 s.c.
-Length 10-13 Width 5-7
Macro Hairs: present intercostally, multi-celled elevated bases, irreg. rounded cells, single cell hair, long tapering to point, may be absent
-Length 430+(broken) Width
Micro Hairs: freq. in intercostal zones, small rounded bases, prox. cell tapering slightly inwards-cigar shaped, distal cell ~1 1/3 x, tapering to point, may be rather blunt
-Length 22 L_b 9 L_d 13
Prickle Hairs: in costal rows, long oval bases , fairly short triang. barbs
-Length 12-20 L_b 10-15 W_b 7
-freq-infreq. intercostally, irreg. squared bases , short elongated triang.-pointed barbs
-Length 9-14 L_b 6-9 W_b 6-7
Papillae: med. walled Globulous papillae on each interstomatal l.c., slightly narrower than l.c., may be very thin-walled and inconspicuous-not present
Stomata: 1-2 intercostal rows, low-med. domed, rather triang.
-Length 12-16 Width 8-10
Long Cells: parallel in rows, elongated rect., med. u-shaped und. (h=3.5-4, a=2)
-Length 35-55 Width 6-8

Adaxial Surface

Silica Bodies: 1-3 costal rows of dumbbells, distal ends rounded-like abax, slightly indented-slightly convex, central portions narrow, med. length
-arranged in groups-4, separated by 1 s.c., or 1 s.c., 1 p.h., 1 s.c.
-Length 12-17 Width 6-8
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: in costal rows, elongated tapered oval bases , fairly short barbs, elongated triang., pointed
-Length 23-36 L_b 18-26 W_b 9-11
-fairly freq. in intercostal zones, square bases, short triang. barbs tapering to a point-may not be present
-Length 10-13 L_b 10-12 W_b 6-9
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: parallel in rows, elongated rect., deep u- shaped und. (h=7, a=5)
-Length 65-105 Width 15-16

Schizachyrium schweinfurthii

Abaxial Surface

Silica Bodies: 1-2 costal rows of dumbbells, distal ends rounded rect.-rounded, slightly indented-slightly convex, central portion short-long, fairly narrow
-arranged quite closely spaced in rows, separated by 1 narrow s.c. or 2 s.c. , rows closely spaced
-Length 9-13 Width 5-7-8

Family: Andropogoneae

-scattered intercostal cross-shaped and irreg. s.b., some dumbbells, quite common-infreq.
-Length Width 7
Macro Hairs: none seen
-Length Width
Micro Hairs: quite freq. intercostally, bases circular, about same width as prox. cell, prox. cell cyl, distal cell tapering to blunt point x2/3-same length
-Length 15 L_b 5-9 L_d 5-6
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2 intercostal rows, low-domed slightly triangular-med. domed rounded
-Length 9-13 Width 6-7
Long Cells: parallel in rows, elongated rect., small u-shaped und. (h=2, a=1)
-very noticeable u- und. (h=3-4, a=2)
-Length 25-50 Width 5

Adaxial Surface

Silica Bodies: in costal rows, like abax., but with numerous p.h. in rows, may be very infreq.
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen, occasional on some specimens, prox. cell like abax, no distal cells seen
-Length L_b L_d
Prickle Hairs: very freq.-very infreq. in costal rows, bases broadly oval and slightly squared , fairly short elongated triang. bases, tapering to point
-Length 17-22 L_b 10-12 W_b 7-8
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: roughly parallel in rows, rect-squared-hex., rather deep-very deep u-shaped und. (h=4.5-6, a=3)
-Length 20-50 Width 18-25

Sorgastrum bipennatum

Abaxial Surface

Silica Bodies: 1-3 costal rows of dumbbells, distal ends rounded and mostly convex-indented, central portions med.-very narrow, med.-rather long length
-arranged singly or in groups of 3 or 4, separated in rows by 1 s.c. or 1 s.c., 1 p.h., 1 s.c.
-Length 10-15 Width 5-7
-also occasional cross-shaped or small irreg. dumbbells outside costal zones, none seen
Macro Hairs: none seen
-Length Width
Micro Hairs: very freq. intercostally, small rounded rect. bases, prox. cell tapered slightly inward-cyl, distal cell about same length, may bulge a bit at first, then tapering to point (often appears unicellular)
-Length 15 L_b L_d
Prickle Hairs: in costal rows, oval bases, fairly short barbs, elongated triang. tapering to point
-Length 12-16 L_b 9-10 W_b 5-7
-infrequent intercostal hooks, squared bases, very short pointed barbs-not seen
-Length 4 L_b 3 W_b 4
Papillae: med. walled c-shaped papillae on each interstomatal l.c., usually narrower than l.c.
Stomata: single or double staggered intercostal rows, med. domed, slightly triang.
-Length 10-11 Width 7-10
Long Cells: interstomatal l.c.'s may be wider, usually ~same as stomata, roughly parallel in rows, elongated rect., med-rather deep u-shaped und. (h=3.5, a=2)
-Length 30-55 Width 6-7

Adaxial Surface

Silica Bodies: same as abax in rows, rows wider spaced, fewer p.h. in rows
-also same for intercostal s.b.
-Length Width
Macro Hairs: none seen, 1 seen, fairly short, tapering rapidly to point
-Length 70 Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: same as abax, but less freq. in rows
Length L_b W_b
Papillae: same as abax, none seen
Stomata: same as abax, but rows wider spaced
-Length Width
Long Cells: roughly parallel in rows, rect.-squared-slightly inflated, u-shaped med. und. (h=3.5, a=1.5-2)
-Length 20-50 Width 9-20

Vetiveria nigritana

Abaxial Surface

Silica Bodies: cross-shaped s.b. scattered through both costal (1-4 rows) and intercostal zones, each paired with a linear s.c. , may be almost very short dumbbells
-Length 5 Width 5-6
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: none seen
Length L_b W_b
Papillae: none seen
Stomata: double intercostal (sometimes 3 with 2 staggered) rows, rather widely spaced, low-domed, slightly triang.
-Length 10-12 Width 5-6
Long Cells: parallel in rows-rect., deep u-shaped und. (h=3-3.5, a=3), l.c. in stomatal rows wider than stomata, und. smaller
-Length 20-35 Width 6-7

Adaxial Surface

Silica Bodies: same as abax, but sparser
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen, barrel shaped (wider towards distal ends) prox. cells seen on some specimens in intercostal zones, sparse
-Length 7-10 L_b L_d

Family: Andropogoneae

Prickle Hairs: none seen, very freq. intercostal hooks, basal structure diff. to see (rounded rect.) barbs "fat" rounded triang., tapering to rounded points
Length 10-15 L_b W_b
Papillae: none seen
Stomata: like abax., but sparser
-Length 12-16 Width 7-8
Long Cells: parallel in rows, rect., med. u-shaped und. (h=4, a=3-3.5)
-Length 25-80 Width 8-10

Family: Aristadeae

Aristida adscensionis

Abaxial Surface
Silica Bodies: 1-2 costal rows of dumbbells, distal ends rounded and convex, central portions very long and very narrow
-Length 10-15 Width 3-4
-some rows spaced by rect. s.c., quite narrow, others also with p.h.
Macro Hairs: none seen
-Length Width
Micro Hairs: quite freq. in intercostal zones, bases small oval, prox. cell long cyl., distal cells all shriveled
-Length L_b 9-12 L_d
Prickle Hairs: freq. in some costal rows, bases elongated rounded rect., barbs fairly short, triang., tapering to points
-Length 13-20 L_b 9-14 W_b 5-6
Papillae: none seen
Stomata: single intercostal rows of mostly low(-med.) domed rounded
-Length 10 Width 6-7
Long Cells: elongated rect., deep u- und. (h= 3-4, a=2)
-Length 35-45 Width 5
-interstomatal l.c. ~same width as stomata

Adaxial Surface
Silica Bodies: like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: intercostal characters very diff. to see
-Length L_b L_d
Prickle Hairs: like abax
-Length L_b W_b
Papillae:
Stomata:
-Length Width
Long Cells:
-Length Width

Aristida kerstingii

Abaxial Surface
Silica Bodies: 1-4 costal rows in wide bands of dumbbells, distal ends mostly round and convex, , central portions long-very long and narrow, occasionally nodular, arranged fairly evenly spaced in rows, separated by 1 s.c.-narrow, rect.
-Length 9-13 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in I.Z. between stomatal and costal rows, base small and rounded, prox. cell cyl., tapering slightly outwards or cigar-shaped, distal cell ~1.5x, tapering to point distally
-Length 23 L_b 9 L_d 14
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2 staggered intercostal rows, rather low-domed, rounded-± triang., separated by long narrow l.c.'s
-Length 8-10 Width 6-7
Long Cells: roughly parallel in rows, elongated rect., deep u- und. (h=3, a=2)
-Length 25-65 Width 4-5

Adaxial Surface
Silica Bodies: bands of up to 5+ rows of dumbbells, same as abax except some separated by 1 s.c., 1 p.h., 1 s.c.
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: same as abax
-Length 23-26 L_b 9-11 L_d 15
Prickle Hairs: in costal rows, very variable in size, often alternate with s.b., long oval bases, strong triang. barbs, tapering to points, barbs on edges of costal bands at right angles to vein
-Length 11-28 L_b 9-19 W_b 5-8
Papillae: none seen
Stomata: like abax., but 2-4 (staggered in pairs) intercostal rows, smaller
-Length 7-8 Width 4-5
Long Cells: parallel in rows, rect., slight u-shaped und., like abax
-Length Width

Family: Arundinelleae

Loudetia flavida

Abaxial Surface
Silica Bodies: 1-6 rows of dumbbells, distal ends rounded and convex, central portions long and narrow
-separated in rows by s.c.(~same width as s.b.), p.h.
-Length 9-15 Width 5-6
Macro Hairs: occasional intercostally, basal cells irreg. in concentric circles
-Length 495 Width
Micro Hairs: fairly freq. intercostally, bases small oval, prox. cell cyl., distal cell ~ same length-1 1/2 x length, narrow and tapering to long points
-Length 20-25 L_b 7-12 L_d 13
Prickle Hairs: freq. in costal rows, bases elongated rounded rect., barbs strong triang., tapering to long sharp points
-Length 30-40 L_b 12-20 W_b 5-7
-fairly freq. intercostal hooks, bases irreg. rounded, short pointed barbs
-Length 8-12 L_b W_b
Papillae: bulges in interstomatal l.c. seen-papillae?
Stomata: 1-2 intercostal rows of med. domed rounded

Family: Arundinelleae

-Length 12-14 Width 9-10
Long Cells: elongated rect., rather deep u-und. (h=4, a=2-3)
-interstomatal l.c. ~same width as stomata
-Length 40-70 Width 7-9

Adaxial Surface

Silica Bodies: 1-4 bands of fairly small sparse dumbbells, distal ends mostly rounded rect. (variable), central portion med. length and width
-spaced widely in rows by rect. s.c. (~same width as s.b.), and p.h.
-Length 7-9 Width 5-6
Macro Hairs: freq. intercostally, little basal structure noticeable, hairs fairly narrow
-Length 150-200 Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: like abax, intercostal hooks very freq. (some costal like intercostal hooks)
-Length L_b W_b
Papillae: like abax
Stomata: like abax (some low-domed
-Length Width
Long Cells: narrow elongated rect.-almost squared, med. u-und. (h=2-3, a=1-2)
interstomatal l.c. same width-$\pm$ wider than stomata
-Length 25-55 Width 6-12

Loudetia simplex

Abaxial Surface

Silica Bodies: bands 1-4 rows wide of dumbbells, occasionally slightly nodular, distal ends rounded, slightly concave-slightly convex, central portions very narrow and long
-separated in rows by 1 s.c. (fairly long), or l.c., or occasionally 1 s.c., 1 p.h., 1 s.c.
-Length 9-13 Width 4-5
Macro Hairs: freq. intercostally, elevated multi-celled bases of irreg. squared cells, single cell tapering to point-none seen, freq. on regrowth
-Length 320 Width
Micro Hairs: freq. in intercostal zones between costal and stomatal rows, small rect. bases, basal cell tapering outward, distal cell ~1 1/2x length, tapering to point
-Length L_b 8-9 L_d 13
Prickle Hairs: occasionally in costal rows, oval bases, short strong triang. barbs, tapering to point, none seen
-Length 14-20 L_b 8-13 W_b 5-7
-also fairly numerous hooks in intercostal zones, round bases, short pointed barbs
-Length 7-8 L_b 4 W_b 4
Papillae: none seen
Stomata: in 2-3 intercostal rows, very ? low domed, slightly triang.
-Length 14-17 Width 6
Long Cells: parallel in rows, elongated rect., l.c. between stomata wider than stomata, deep-med. u-shaped und. (h=2, a=3)
-Length 25-60 Width 5-6

Adaxial Surface

Silica Bodies: bands of 1-4 rows of dumbbells, distal ends slightly concave-slightly convex, central portion narrow, med.-long length
-separated in rows by 1 s.c. or 1 s.c., 1 p.h., 1 s.c.
-Length 9-12 Width 4-5
Macro Hairs: rather freq. intercostally, like abax-none seen
-Length 450 Width
Micro Hairs: same as abax
-Length L_b L_d
Prickle Hairs: in costal rows, oval bases, short barbs, same as abax costally and intercostally
-Length L_b W_b
Papillae: none seen
Stomata: same as abax, low domed
-Length 12-14 Width 7-8
Long Cells: irreg.-inflated rect., very slight waviness of cell walls-low u-und.
-Length 20-45 Width 9-10

Loudetia togoensis

Abaxial Surface

Silica Bodies: 1-4 costal rows of dumbbells, distal ends rounded and convex, central portion very narrow, med.-long length
-separated in rows by 1 s.c.-irreg., narrower than s.b.
-Length 8-12 Width 4
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in intercostal zones, small rounded bases, prox. cell tapering outwards, distal cell about same length, tapering to rather blunt point
-Length 22 L_b 10-11 L_d 11-12
Prickle Hairs: none seen, fairly freq. intercostal hooks-small, triang. pointed, little basal structure seen, paired with s.c.
-Length 5-6 L_b W_b
Papillae: none seen
Stomata: 1-2 (sometimes staggered) intercostal rows, low-med. domed, fairly triang.
-Length 13-14 Width 7-9
Long Cells: parallel in rows, elongated rect., med. u-shaped und. (h=3.5, a=2)
-Length 30-50 Width 6-7

Adaxial Surface

Silica Bodies: single (occasionally double) costal rows of dumbbells, some irreg. shaped, distal ends , slightly concave-slightly convex, central portion med. length, very narrow
-separated in rows by 1 s.c. or 1 s.c, 1 p.h., 1 s.c.
-Length 6-9 Width 5-6
Macro Hairs: none seen, occasional very thick hairs in interstomatal zones, tapering to points
-Length 200 Width
Micro Hairs: same as abax but less freq.
-Length L_b L_d
Prickle Hairs: in costal rows, long oval bases, short-med. barbs, elongated triang., tapering to point
-Length 13-17 L_b 7-11 W_b 5-6
-freq. intercostal hooks, rect. bases, short triang. barbs tapering to points, each paired

Family: Arundinelleae

with s.c.
-Length 4-7 L_b 3-5 W_b 4-5
Papillae: none seen
Stomata: 2 rows in intercostal zones, low-domed
-Length 10-12 Width 6-7
Long Cells: parallel in rows, elongated rect., shallow-med. u-shaped und. (h=3, a=1)
-Length 15-40 Width 7-11

Loudetiopsis kerstingii

Abaxial Surface ?
Silica Bodies: 1-4 costal rows of dumbbells, distal ends rounded and convex, central portion (med.) long and very narrow
-spaced by rect. narrow s.c.
-Length 9-14 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: occasional in intercostal zones, small oval bases, prox. cell cigar-shaped, no distal cells seen
-Length L_b 11 L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2 rows of very low-domed ± triang.
-Length 12-15 Width 7-8
Long Cells: elongated rect., med. u-und. (h= , a=1.5-2)
-interstomatal l.c. wider than stomata
-Length 20-45 Width 5-7

Adaxial Surface
Silica Bodies: like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. like abax
-Length L_b 11-15 L_d
Prickle Hairs: fairly freq. in costal rows, bases rounded elongated rect., barbs fairly short triang., tapering to points
-Length 15-19 L_b 10-13 W_b 5-6
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: like abax (?)
-Length Width

Family: Chlorideae

Chloris pilosa

Abaxial Surface
Silica Bodies: 1-3 costal rows of saddle-shaped s.b., separated in rows by 1 s.c. often wider than s.b. or 1 s.c., 1 p.h., 1 s.c. in groups of 2-4-8
-Length 4 Width 5
Macro Hairs: occasional intercostally, base diff. to see on slide, single-celled hair tapering to point-none seen
-Length 335 Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: in costal rows, roundly oval bases with short pointed barbs-larger than s.b., fairly short strong triang. barbs tapering to points
-Length 11-16 L_b 9-12 W_b 6-7
Papillae: rather thick-walled Globulous papillae (sometimes 2) of varying size on l.c. between stomata,very prominent, also on other l.c.'s
Stomata: 2-4 intercostal rows (adjacent staggered), small med.-domed, sometimes rather triang.,low-domed rounded
-Length 8-10 Width 6-7
Long Cells: roughly parallel in rows, elongated rect., irreg. med.-deep u-shaped und. (h=3, a=1.5-2)
-Length 15-40 Width 4-5

Adaxial Surface
Silica Bodies: same as abax, less freq.
-Length Width
Macro Hairs: present intercostally, multi-celled bases diff. to see on slide, very thick and long hairs, none seen
-Length 1050+ Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: in costal ? rows, elongated oval bases, short barbs
-Length 16-21 L_b 12-15 W_b 5-8
-fairly freq. intercostal hooks, rect. bases, short pointed barbs, very variable in shape and size but mostly smaller than costal
Papillae: none seen
Stomata: infreq. in single interstomatal rows, like abax
-Length Width
Long Cells: like abax
-Length Width

Chrysochloa hindsii

Abaxial Surface ?
Silica Bodies: single costal rows of saddle-shaped -circular s.b., separated in rows by 1 s.c. irreg. rect. ~ same width as s.b. or l.c.
-Length 3-4 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: occasional intercostal hooks, rounded bases, short pointed barbs
-Length 5 L_b 4 W_b 4
Papillae: none seen
Stomata: double intercostal rows, low-med. domed
-Length 9-11 Width 5-6
Long Cells: parallel in rows, elongated rect., fairly deep, wide u-shaped und. (h=3, a=2)
-Length 25+ ? Width 5

Adaxial Surface
Silica Bodies: 1-2-many rows of costal saddle-shaped s.b., most separated in rows by s.c., some not, like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: like abax

Family: Chlorideae

-Length L_b W_b
Papillae: very freq., rather small Globulous med.-walled papillae on both interstomatal and other l.c.'s
Stomata: like abax, but less freq.
-Length Width
Long Cells: like abax
-Length 15-25+ Width 5-6

Ctenium newtonii

Abaxial Surface

Silica Bodies: 1-4 rows of dumbbells, ends rounded and convex, central portions med. width, long-very long, arranged in rows separated by rather long-fairly short 1 s.c. or 1 s.c., 1 p.h., 1 s.c.
-Length 10-17 Width 4-7
Macro Hairs: none seen
-Length Width
Micro Hairs: present intercostally, small oval bases, prox. cell tapering outwards, distal cell small with blunt tip 1/2-2/3 length ,
-Length 17 L_b 11 L_d 6
-also single-celled m.h.? instead of like , fairly freq.
-Length 5-7 L_b L_d
Prickle Hairs: fairly freq. in costal rows, elongated oval bases, rather short-med. triang. barbs tapering to points
-Length 15-17-24 L_b 9-12 W_b 4
fairly freq. intercostal hooks, each paired with s.c., small rect. bases, rather elongated-short triang. barbs tapering to points
-Length 9-11 L_b 2-3 W_b 4-5
Papillae: none seen
Stomata: double intercostal rows, low-domed, slightly triang.
-Length 10-12 Width 5-7
Long Cells: parallel in rows, elongated rect., med. u-shaped und (h=4, a=2)
-Length 25-55 Width 4-5

Adaxial Surface

Silica Bodies: same as abax but often separated in rows by 1 s.c., 1 p.h., 1 s.c.
-Length Width
Macro Hairs: present intercostally (?), elevated multi-celled bases, single long hair tapering to point, ?
-Length 760 Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: in costal rows, slightly tapered oval bases , short barbs, same size as abax
-Length L_b W_b
-same as abax with intercostal hooks but bases rounded
Papillae: none seen
Stomata: same as abax
-Length Width
Long Cells: parallel in rows, elongated rect., med. rather wide u-shaped und.
-Length Width

Ctenium spp.

Abaxial Surface

Silica Bodies: bands of 3-4 dumbbells, distal ends indented, mostly slightly convex, rounded, central portion med. width, long
-arranged in rows separated by 2.c., occasionally 1 s.c., 1 p.h., 1 s.c.
-Length 11-16 Width 5-6
-occasional cross-shaped s.b. in intercostal zones adjacent to costal rows, each paired with linear s.c.
-Length 5-6 Width 5-6
Macro Hairs: freq. intercostally, elevated multi-celled bases, hairs tapering to point
-Length 700 Width
Micro Hairs: possibly infreq. in intercostal zones, small rounded bases, very short blunt tip hairs
-Length 8-9 L_b L_d
Prickle Hairs: freq. in costal rows, elongated oval bases, rather short barbs, tapering to point
-Length 15-21 L_b 8-12 W_b 5-7
-fairly freq. intercostal hooks, oval bases, elongated triang. barbs tapering to points, each paired with s.c.
-Length 9-10 L_b 4-7 W_b 3-4
Papillae: none seen
Stomata: double intercostal rows, low-domed, slightly triang.
-Length 8-10 Width 4-5
Long Cells: parallel in rows, elongated rect., med. u-v shaped rather wide und. (h=3, a=2)
-Length 25-50 Width 4-5

Adaxial Surface

Silica Bodies: same as abax, distal ends convex in single-4 costal rows, often separated by 1 s.c., 1 p.h., 1 s.c.
-Length 12-14 Width 6
Macro Hairs: freq. intercostally, multi-celled elevated bases, single cell hairs can be quite variable in length
-Length 240-750+ Width
Micro Hairs: same as abax
-Length L_b L_d
Prickle Hairs: in costal rows, very large relative to s.b., oval bases, short barbs, strong triang., tapering to point
-Length 21-31 L_b 12-15 W_b 7-11
-freq. intercostal hooks adjacent to costal rows, like abax
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: same as abax
-Length Width

Microchloa indica

Abaxial Surface

Silica Bodies: single costal rows of saddle-shaped s.b., relatively evenly spaced by 1 rather long s.c. between
-Length 4-5 Width 5-6
Macro Hairs: none seen
-Length Width
Micro Hairs: possibly(either m.h. or p.h.) fairly freq. intercostally, little structure seen, small rounded bases and short protrusions, possibly pointed bluntly
-Length L_b L_d

Family: Chlorideae

Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2-3 staggered intercostal rows, med.-low domed, often with peaked ? subsidiary cells
-Length 9-10 Width 6-8
Long Cells: parallel in rows, rect., med.-deep u-shaped und (h=2.5-3, a=2), interstomatal l.c. ± wider than stomata
-Length 25-50 Width 6

Adaxial Surface

Silica Bodies: single costal rows of variously shaped s.b., crosses*, saddle-shaped, dumbbells, fairly evenly spaced separated by 1 s.c., only saddle-shaped seen
-Length 4-7 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: occasional in costal rows, oval bases tapered at one end, very ? elongated triang. barbs tapering to points
-Length 17 L_b 6 W_b 4
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: ?
-Length Width

Schoenfeldia gracilis

Abaxial Surface

Silica Bodies: bands of 2-4 rows of saddle-cube shaped s.b., rather evenly spaced in rows by 1 s.c., ± narrower than s.b.
-Length 4-5 Width 5-7
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally in rows, only one cell seen, tapering strongly outward from very small round base to form club-shaped m.h. (see adax)
-Length 8-11 L_b L_d
Prickle Hairs: occasional in some costal rows, irreg. oval bases tapered on one end, short-med. triang. barb tapering to point
-Length 13-17 L_b 8-11 W_b 5-6
Papillae: often rather thin-walled Globulous papillae on interstomatal l.c.'s, quite variable in size, sometimes slightly overlapping stomata, may be quite thick-walled and on other l.c. occasionally
Stomata: 2-3 staggered intercostal rows of fairly small low-med. domed stomata
-Length 8-9 Width 5-6
Long Cells: parallel in rows, elongated rect., deep irreg. u-shaped und. (h=3.5, a=2.5)
-Length 10-20 Width 4
-l.c. sometimes slightly narrower than stomata in rows

Adaxial Surface

Silica Bodies: same as abax except slightly larger, bands may be many rows
-Length 5-8 Width 6-7
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax, distal cell may be cap
-Length 4 L_b L_d
Prickle Hairs: in costal rows, elongated oval bases, elongated triang. barbs, tapering to points
-Length 23-25 L_b 10-15 W_b 6
Papillae: sometimes rather thin-walled Globulous papillae on interstomatal l.c.'s, usually rather small in size
Stomata: same as abax
-Length 6-7 Width 6
Long Cells: parallel in rows, rect., like abax, und. may be less
-Length Width

Tripogon minimus

Abaxial Surface

Silica Bodies: single costal rows of saddle-shaped s.b., spaced in rows by rect. s.c. narrower than s.b.
-Length 4-5 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in intercostal zones, small round bases, hair Globulous 2-celled but sometimes diff. to see separation between cells
-Length 7 L_b 3 L_d 4
Prickle Hairs: fairly freq. in some costal rows, elongated tapered oval bases, barbs fairly short triang., pointed
-Length 17-21 L_b 13-18 W_b 4-6
Papillae: none seen
Stomata: 1-2 intercostal rows of small low(-med.) domed rounded stomata
-Length 5-7 Width 5
Long Cells: elongated rect., very small u-und. (h=1-2, a=1)
-interstomatal l.c. ± narrower than stomata
-Length 15-25 Width 3-4

Adaxial Surface

Silica Bodies: like abax, in bands of up to 4 rows
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: like abax
-Length Width

Family: Danthonieae

Elytrophorus spicatus

Abaxial Surface

Silica Bodies: 1-2 costal rows of dumbbell and nodular s.b., distal ends mostly straight, squared
-closely spaced in rows separated by short 1 s.c.
-Length (4-)6-12 Width 5-7
Macro Hairs: none seen

Family: Danthonieae

-Length Width
Micro Hairs: quite freq. intercostally but little structure seen, prox. cell cyl.
-Length 5-9 L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 2-4 (staggered) intercostal rows, rounded low-med. domed, often irreg.
-Length 15-17 Width 9-10
Long Cells: roughly parallel in rows, inflated rect., very few apparent und., l.c. in stomatal rows narrower than stomata
-Length Width

Adaxial Surface
Silica Bodies: same as abax except some separated in rows by p.h.
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: in costal rows, elongated oval bases with hooked short barbs at right angles to row , quite large
-Length 32-35 L_b 23-25 W_b ~7-8
-also occasional intercostal hooks, square bases, barbs pointed
-Length 25-35 L_b 15-25 W_b 10-15
Papillae: none seen
Stomata: same as abax
-Length Width
Long Cells: roughly parallel in rows, tapered elongated inflated rect., little und. apparent, interstomatal l.c.'s narrower than stomata, same as abax
-Length Width

Family: Eragrostideae

Dactyloctenium aegyptium

Abaxial Surface
Silica Bodies: 1-2-3 costal rows of saddle shaped s.b. rather evenly spaced in rows separated by rect. 1 s.c., same width as s.b.
-Length 4-5 Width 5
Macro Hairs: none seen
-Length Width
Micro Hairs: apparently-none seen (?-diff. to see) fairly freq. intercostally, rather large (rel.) round bases, prox. cell tapering slightly outwards to cyl.
-Length L_b 25-30 L_d
Prickle Hairs: probably (?-diff. to see) fairly freq. intercostal hooks, oval bases, small triang. barbs tapering to points, none seen
-Length 6-7 L_b 3-4 W_b 5
Papillae: very freq. med-walled Globulous papillae, often wider than cell, on many l.c.
Stomata: 1-4 intercostal rows (some staggered) of rounded low(-med.) domed stomata
-Length 10-13 Width 7-9
Long Cells: (diff. to see) roughly rect.-inflated rect., very slight und.
-Length 15-25 Width 6-7

Adaxial Surface
Silica Bodies: like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: like abax
-Length L_b W_b
Papillae: none seen
Stomata: none seen
-Length Width
Long Cells: like abax
-Length Width

Eleusine indica

Abaxial Surface
Silica Bodies: bands of 1-3 (-4) costal rows of saddle-shaped-cresent-irreg. s.b., rather widely separated in rows by long s.c.
-Length 2-4 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: (possibly m.h.) fairly freq. in intercostal zones between stomatal rows, rounded bases, triang. barbs (tapering to blunt point, diff. to see
-Length 7-8 L_b 3-4 W_b 4
Papillae: none seen
Stomata: double intercostal rows of med.-high* domed often triang. stomata
-Length 11-13 Width 7-10
Long Cells: parallel in rows, rect., deep-med.-shallow u-shaped und. (h=3.5, a=1.5-3)
-Length 15-55 Width 8-10

Adaxial Surface
Silica Bodies: like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: fairly freq. intercostal hooks, bases oval-rounded rect., barbs fairly short triang. tapering to points
-Length 13-15 L_b 9-10 W_b 6-8
Papillae: none seen
Stomata: med domed rounded
-Length 10-13 Width 8
Long Cells: elongated rect, shallow u-und.
-Length Width

Eragrostis aspera

Abaxial Surface
Silica Bodies: 1-3 costal rows of saddle-shaped s.b., widely spaced in rows with 1 long s.c., or 1 s.c., 1 p.h., 1 s.c., each paired with s.c., sometimes not obvious
-Length 3-5 Width 4
-occasionally some s.b. deposited between intercostal l.c.'s-quite freq.
Macro Hairs: none seen
-Length Width
Micro Hairs: quite freq. in intercostal zones between stomatal rows, small rounded bases, pro. cell tapering outwards, distal cell

Family: Eragrostideae

slightly-2/3 length shorter, wider with very blunt end-club-shaped
-Length 17-18-20 L_b 9-10-12 L_d 8
Prickle Hairs: in costal rows, slightly tapered oval bases, short pointed barbs
-Length 14-20 L_b 9-15 W_b 6-8
Papillae: none seen
Stomata: 2-3 staggered intercostal rows, low-med. domed-rounded, separated by fairly long l.c.'s
-Length 10 Width 5-7
Long Cells: parallel in rows, elongated rect., med. u-shaped und. (h=3, a=2)
-Length 30-45 Width 7-8
-interstomatal l.c. ~ same width as stomata

Adaxial Surface
Silica Bodies: may be very widely spaced bands of 1-4 rows of saddle-shaped s.b., singly or in smaller groups of many (10+) separated in rows by 1 s.c., or 1 s.c, 1 p.h., 1 s.c., same size as abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: same as abax, longer barbs in costal rows
-Length 13-22 L_b 9-15 W_b 6-9
Papillae: none seen
Stomata: 2-3 (staggered) intercostal rows of low-med. domed sometimes triang. stomata, same size as abax
-Length Width
Long Cells: parallel in rows, elongated rect., med. u-shaped und., same size as abax
-Length Width

Eragrostis atrovirens

Abaxial Surface ?
Silica Bodies: bands of 1-3 rows of saddle-shaped s.b., widely spaced in rows separated in rows by long s.c., or s.c., p.h., s.c.,
-Length 4-6 Width 4-5
-occasional small dumbbells
Macro Hairs: occasional intercostally, elevated multi-celled bases, single celled hairs-none seen, present on regrowth
-Length Width
Micro Hairs: none seen, like abax, but infreq.-freq. on regrowth
-Length L_b L_d
Prickle Hairs: in costal rows, , oval bases, short barbs-elongated triang. tapering to point, none seen-present on regrowth
-Length 16-19 L_b 10-14 W_b 5-8
Papillae: none seen
Stomata: 2 intercostal rows, low-domed,rounded
-Length 10-11 Width 7-8
Long Cells: parallel in rows, elongated rect., rather small u-shaped und. (h=2, a=1-1.5)
-Length 25-35 Width 6-7

Adaxial Surface
Silica Bodies: scattered costal and intercostal cresent-shaped s.b., each paired with s.c., in regrowth some almost saddle-shaped
-Length 2-4 Width 4-5
-also some cube-saddle shaped costal bodies
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally in rows adjacent to stomatal rows, round bases, prox. cell tapering outwards with prox. bulge-cyl., distal cell 1.5x, tapering to rather blunt point, regrowth prox. cell tapering outwards, dist. cell ~same length, tapering to point
-Length 23-24 L_b 9-10 L_d 14
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: single? intercostal rows of low-med. domed rounded stomata
-Length 10-12 Width 8-10
Long Cells: parallel in rows, rect., med. u-v shaped und. (h=2.5, a=1.5-2)
-Length 30-60 Width 7-8

Eragrostis ciliaris

Abaxial Surface
Silica Bodies: scattered costal 1-3 rows (and intercostal?) saddle-shaped-linear-irreg. s.b., each paired with a linear s.c.- sometimes not apparent, widely spaced in rows
-Length 3-4 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, small oval bases, prox. cell tapering outwards, distal cells 1/3-1/2 length blunt (club-shaped, blunt points)
-Length L_b 12-14-17 L_d 6-8
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: in single (?) intercostal rows, rounded, med-low domed, widely spaced in rows
-Length 9-11 Width 5
Long Cells: parallel in rows, elongated rect., fairly shallow u-shaped und. (h=2-2.5, a=1)
-Length 30-55 Width 4-5

Adaxial Surface
Silica Bodies: freq.-occasional in 1-3 costal rows, small dumbbells, distal ends squared and concave, central portions short and mad width, rather widely spaced in rows in small groups or between p.h.'s
-Length 6-8 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax, fairly freq. in costal(?) rows along with p.h.'s, prox. cell tapering outwards with distal bulge, small oval bases
-Length L_b 14-18 L_d
Prickle Hairs: fairly freq. in costal rows, bases , heavy short triang. barbs tapering to points or squared, barbs short pointed, also in intercostal zones
-Length 12-16 L_b 9-13 W_b 5-6
Papillae: none seen
Stomata: in double intercostal rows, like abax
-Length Width
Long Cells: like abax
-Length Width

Family: Eragrostideae

Eragrostis pilosa

Abaxial Surface

Silica Bodies: bands of 2-9 costal rows, saddle-shaped-linear irreg., each paired with a rect. s.c., widely spaced in rows, short dumbbells, distal ends concave, central portions med. width, short length
-Length 2-5 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small oval bases, prox. cell tapering outwards slightly, distal cell ~1 1/3-1 1/2 x, rather cyl. with blunt end
-Length 17-18 L_b 7-9 L_d 10
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2 rows (intercostal) of med-low domed rounded
-Length 9-11 Width 5-7
Long Cells: parallel in rows, elongated rect., med. u-shaped und. (h=2.5, a=2), interstomatal l.c. sometimes slightly narrower than stomata
-Length 25-50 Width 5-7

Adaxial Surface

Silica Bodies: scattered (1-2 rows ?) costal small dumbbells, distal ends irreg., indented, central portions med. width and length
-Length 4-6 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in p.h. (costal?) rows, small rounded bases, prox. cell cyl., distal cell possibly short, dome shape
-Length 9 L_b 7-8 L_d
Prickle Hairs: very freq., scattered costally (more freq.) and intercostally, squared irreg.-oval bases, thick triang. barbs (short), tapering to point
-Length 8-15 L_b 5-10 W_b 4-6
Papillae: none seen
Stomata: 2(?)-3 intercostal rows, low-domed
-Length 7-8 Width 4-5
Long Cells: (diff. to see) elongated rect., small u-shaped und. (h=2, a=1)
-Length 15-35 Width 3-4

Eragrostis spp.

Abaxial Surface

Silica Bodies: occasional in 1-2 costal rows between p.h.'s, small dumbbells or cross-shaped, distal ends concave squared, central portions thick and short
-Length 6-9 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen, infreq. in intercostal zones, single-celled small oval bases, blunt ends
-Length 10-20 L_b L_d
Prickle Hairs: freq. in costal rows, oval bases sometimes tapered, short barbs, heavy triang. tapering to point-very short pointed
-Length 19-22 L_b 12-16 W_b 6-10
Papillae: none seen
Stomata: rows of 2-3 interstomatal, low-(med.) domed
-Length 9-11 Width 6-9
Long Cells: parallel in rows, roughly rect., inflated rect., small-med. u-shaped und. (h=3, a=1.5), interstomatal l.c. often wider than stomata
-Length 30-60 Width 5-8

Adaxial Surface

Silica Bodies: costal dumbells-cross-saddle shaped, 1-2 rows, occasionally paired with p.h.'s, fairly infreq., size like abax, distal ends slightly concave-slightly convex, central portions med. width, rather short
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small oval bases, prox. cell tapering outwards, distal cell about same length, club-shaped
-Length 12-15 L_b W_b
Prickle Hairs: fairly freq. costally, same as abax., occasional intercostal hooks, oval-rect. bases, triang. barbs tapering to points
-Length 11-15 L_b 7-11 W_b 5
Papillae: none seen
Stomata: 2-4 intercostal rows, like abax
-Length Width
Long Cells: like abax
-Length Width

Eragrostis tremula

Abaxial Surface

Silica Bodies: bands of 2-10 rows, costal, crescent-saddle-cross shaped with pointed corners-irreg. linear, spaced fairly widely in rows, each paired with a s.c., appears to be ~4 minor costal zones between each major zone, fewer s.b. in minor zones
-Length 2-3 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2 (sometimes staggered) intercostal rows, low-med. domed, sometimes slightly triang.
-Length 9-11 Width 5-8
Long Cells: parallel in rows, rect., med.-deep u-shaped und. (h=2.5, a=3)
-Length 10-45 Width 6-8

Adaxial Surface

Silica Bodies: widely spaced saddle shaped, squared or rect. s.b. in costal rows (1-4 rows)
-Length 3 Width 3
Macro Hairs: occasional intercostally, multi-celled elevated bases, single cell long hairs, none seen
-Length 460++ Width
Micro Hairs: occasional in costal (?) rows, small round bases, prox. cell tapering

Family: Eragrostideae

outwards, distal cell very small(??)
-Length L_b L_d
Prickle Hairs: regular in costal rows, oval bases, short pointed barbs
-Length 9-11 L_b 6-10 W_b 4-6
Papillae: none seen
Stomata: like abax, possibly slightly small
-Length Width
Long Cells: ?, interstomatal l.c. much wider than stomata
-Length Width

Eragrositis turgida

Abaxial Surface

Silica Bodies: scattered through costal bands (up to 8) and intercostal zones, crescent-saddle-linear-irreg., in costal rows, each paired with short cell
-Length 2-6 Width 4-6
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally adjacent to costal rows, club-shaped, prox. cell tapering outward
-Length 16 L_b 8-9 L_d 7-8
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1-2 intercostal rows of low-med. domed sometimes slightly triang. stomata
-Length 10-12 Width 7-8
Long Cells: parallel in rows, rect., med. u-shaped und. (h=3-3.5, a=2-2.5)
-Length 20-45 Width 8-9

Adaxial Surface

Silica Bodies: 1-2 costal rows of irreg. dumbbells (distal ends indented, central portion med. width and short), crosses-some cube-saddle shaped, arranged in rows, separated by s.c.'s, occasional p.h. and 2 s.c.
-Length 4-8 Width 3-5
Macro Hairs: present intercostally, multi-celled elevated bases
-Length 515 Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: freq. in costal rows, round bases, short small triang. barbs, tapering to point
-Length 9-11 L_b 6-8 W_b 6-8
Papillae: none seen
Stomata: in double intercostal rows, rows fairly widely spaced, low-domed slightly triang.
-Length 8-10 Width 6-7
Long Cells: parallel in rows, elongated rect., shallow u-shaped und.
-Length Width

Eragrostis welwitschii

Abaxial Surface

Silica Bodies: small dumbbells, distal ends squared, indented, central portions med. length and width, scattered crescent-shaped-irreg.-linear s.b. in costal zones, each paired with linear s.c. (up to 7 rows in costal bands, also occasional intercostally) also irreg. costal saddle-shaped, double #### dumbbells
-Length 2-7 Width 3-6
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, club-shaped, small oval bases, prox. cell tapering slightly outward, distal cell club shaped-blunt-pointed and slightly longer
-Length 18 L_b 8 L_d 10
Prickle Hairs: none seen, occasional in costal rows, bases , barbs fairly short and pointed
-Length 18-20 L_b 10-15 W_b 6-7
Papillae: none seen
Stomata: 1-2 intercostal rows of low-domed slightly triang.-rounded stomata
-Length 9-11 Width 6-7
Long Cells: parallel in rows, elongated rect., shallow-med. u-shaped und. (h=2, a=2)
-Length 20-50 Width 6

Adaxial Surface

Silica Bodies: occasional costal dumbbells or irreg. shaped s.b., distal ends mostly concave, central portions med. length and width
-Length 6-8 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small size, small oval bases, prox. cell cyl.-tapering slightly outwards, distal cells slightly shorter, $\pm$ same length, blunt ends
-Length L_b L_d
Prickle Hairs: very freq. in costal zones, tapered oval bases, barbs triang. short, often at right angles to veins , tapering to points
-Length 10-15 L_b 8-10 W_b 4-5
-freq. intercostal hooks, ~smaller
Papillae: none seen
Stomata: 1-2 rows of med.-low domed slightly triang.
-Length 8-10 Width 6-8
Long Cells: ? elongated rect., shallow u-und.
-Length Width

Leptochloa caerulescens

Abaxial Surface

Silica Bodies: in 1-3 costal rows, cross-shaped, short dumbbells with indented squared distal ends short, med. width central portions, fairly widely separated in rows with many prickle hairs
-Length 6 Width 4
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, relatively large round bases, tapering inward to cyl. prox. cell, distal cell ~1/2 length, blunt ended
-Length 14 L_b 9 L_d 5
Prickle Hairs: very freq. in costal rows, rounded to oval bases, short triang. barbs, tapering to points
-Length 8-14 L_b 7-8 W_b 5-6
Papillae: 1-2(-3) small thick walled Globulous papillae on interstomatal l.c.'s (occasional

Family: Eragrostideae

on other l.c.'s also)
Stomata: double intercostal rows of low-med. domed slightly triang., small size
-Length 7 Width 5-6
Long Cells: rect. (diff. to see), irreg. rather deep u-shaped und. (h=4, a=2)
-Length 10-20+? Width 4

Adaxial Surface

Silica Bodies: in 1-3 costal rows, dumbbells with indented ends-cross shaped, in small groups or singly, fairly widely spaced in rows, same size as abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: in costal rows, oval-rounded bases, short barbs-like abax
-parallel to costal rows, rows of hooks, squared-rounded bases, short triang. barbs, tapering to point
-Length 4-6 L_b 3-5 W_b 4
Papillae: ? like abax
Stomata: like abax
-Length Width
Long Cells: ? elongated irreg., shallow u-und.
-Length Width

Family: Oryzeae

Leersia hexandra

Abaxial Surface

Silica Bodies: single costal rows of crosses, some almost hour-glass shaped, spaced in rows by short s.c., ~ same width as s.b.
-Length 4-6 Width 5-7
Macro Hairs: none seen
-Length Width
Micro Hairs: present intercostally, oval bases, prox. cell cyl., distal cell first widening, then tapering to point., ~1 1/2 x length
-Length 13-14 L_b 5-6 L_d 8
Prickle Hairs: freq. in costal rows, large oval bases, short pointed barbs. (infreq. on regrowth)
-Length 25-26 L_b 20-21 W_b 9-10
-fairly freq. intercostal hooks, irreg. squared bases, fairly short pointed barbs
Papillae: rather thin-walled Globulous papillae on most interstomatal l.c. (less freq. on regrowth)
Stomata: single intercostal rows of rounded med.-domed stomata, often irreg.
-Length 8-11 Width 6-7
Long Cells: elong. rect., irreg. med.-shallow u-und. (h=3, a=1-2)
-Length 20-45 Width 5-6
-interstomatal l.c. ~same width as stomata

Adaxial Surface

Silica Bodies: 1-2 rows, like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: like abax
-Length L_b W_b
Papillae: like abax, but present on fewer interstomatal and other l.c. (not apparent on regrowth)
Stomata: like abax
-Length Width
Long Cells: like abax
-Length Width

Oryza barthii (regrowth)

Abaxial Surface

Silica Bodies: single costal rows of hourglass shaped s.b.-some ~ crosses which may look unconnected, no obvious s.c. between s.b.
-Length 3-4 Width 5-7
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. in intercostal zones, small rect. bases, prox. cell cyl., distal cell widening first then tapering to blunt point, ~ same or ± longer length
-Length 12-15 L_b 6-7 L_d 6-9
Prickle Hairs: none seen
-Length L_b W_b
Papillae: fairly small Globulous papillae on some l.c.
Stomata: single intercostal rows of med. domed often irreg., ± triang. stomata
-Length 10-12 Width 7-9
Long Cells: elong. rect., shallow u-und (h=4, a=1-2)
-Length 25-40? Width 5-7
-interstomatal l.c. same length*-± wider than stomata

Adaxial Surface

Silica Bodies: like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: like abax
Stomata: like abax
-Length Width
Long Cells: like abax
-Length Width

Oryza longistaminata

Abaxial Surface

Silica Bodies: in double adjacent rows in costal zones ,hourglass-squared (connected) shaped, rather closely and evenly spaced in rows, appears to be alternate major and minor costal rows, only major with s.b.'s
-Length 3 Width 2
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. adjacent to costal rows, small oval bases, prox. cell rather cigar shaped, distal cell about same length, first tapering outwards, then inwards to point
-Length L_b 15 (may be distorted) L_d
Prickle Hairs: in major costal rows, very large round-oval bases, short pointed barbs

Family: Oryzeae

-Length 22-30 L_b 13-22 W_b 10-14
-also structures like p.h.'s in minor costal rows, round-oval bases, no barbs seen
-Length 5-11 W_b 5-7
Papillae: very freq. on most l.c.'s, very small rounded papillae
-also freq. larger Globulous papillae on interstomatal l.c.'s
Stomata: 2-3 adjacent staggered rows with 2-3 (between minor and major costal rows) in each intercostal zone, low-med. domed, slightly triang., with teeth
-Length 9-10 Width 5
Long Cells: rect. in parallel rows, deep u-shaped und. (h=2.5, a=2)
-Length 20-50 Width 6

Adaxial Surface

Silica Bodies: like abax (no minor costal rows seen)
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: like abax in costal rows, but less freq.
-Length L_b W_b
Papillae: like abax
Stomata: like abax
-Length Width
Long Cells: like abax
-Length Width

Family: Paniceae

Acrocerus amplectens

Abaxial Surface

Silica Bodies: 1-2 costal rows of irreg. dumbbells, distal ends mostly indented, central portions short-med. length, med. width, closely spaced in rows, fairly evenly by short s.c. ~ same width as s.b.
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, especially between stomatal rows, small oval bases, prox. cell tapering slightly outwards-cyl., distal cell slightly longer, tapering to blunt point
-Length 19 L_b 8 L_d 11
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 2(-4 staggered) intercostal rows, low domed, triang.
-Length 14-17 Width 8-10
Long Cells: roughly parallel in rows, rect., irreg. u-shaped und. (h=4, a=2)
-Length 20-45 Width 6

Adaxial Surface

Silica Bodies: same as abax
-Length Width
Macro Hairs: (?) arising intercostally, multi-celled elevated bases, rather short thick hairs tapering to points
-Length 85 Width
Micro Hairs: same as abax
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 2(-4 staggered) intercostal rows of low domed stomata, same size as abax (slightly smaller?)
-Length Width
Long Cells: roughly parallel in rows, rect., wide med. u-shaped und. (h=4, a=2)
-Length 15-35 Width 4-6

Beckeropsis uniseta

Abaxial Surface

Silica Bodies: single costal rows of dumbbells with indented ends-straight and short-med, very narrow-narrow central portions, rather closely and evenly spaced in row, each separated by 1 s.c. (few nodular seen)
-Length 7-10 Width 5-8
-scattered infreq. intercostal cross (-very short dumbbell) s.b. none seen
-Length 4-5 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, small rounded bases, prox. cell tapering outwards slightly, distal cell about same length, tapering to fairly blunt points
-Length 15-20 L_b L_d
-regrowth same but wider
Prickle Hairs: fairly freq. intercostal hooks, squared bases, short triang. barbs tapering to points
-Length 5-6 L_b 4 W_b 4
Papillae: none seen
Stomata: single intercostal rows of low-domed, rather triang. stomata
-Length 8-9 Width 6-8
Long Cells: parallel in rows, elong. rect., interstomatal l.c. wider than stomata, irreg. u-shaped med.-shallow und (h=2, a=1-1.5)
-Length 15-35 Width 5

Adaxial Surface

Silica Bodies: like abax and occasional nodular s.b. in costal rows
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: like abax, but infreq., very freq. in costal rows, bases elongated tapered ovals, barbs strong triang. tapering to point
-Length 33-37 L_b 25 W_b 7-8
Papillae: none seen
Stomata: single or double intercostal rows, same as abax
-Length Width
Long Cells: same as abax
-Length Width

Brachiaria deflexa

Abaxial Surface

Silica Bodies: 1-2 costal rows of short dumbbells (indented-convex distal ends,

Family: Paniceae

rather short and narrow central portions) closely and evenly spaced in rows, separated by 1 s.c.
-Length 5-7 Width 4
-widely scattered intercostal cross-shaped or irreg. s.b., none seen
-Length 3 Width 3-4
Macro Hairs: very freq. intercostally, little basal structure seen, short single-cell hairs tapering to point
-Length 35-55 Width
Micro Hairs: fairly freq. intercostally, small round bases, prox. cell tapering outwards-cigar shaped, distal cell about same size-slightly shorter, tapering to rather blunt point
-Length 12-17 L_b 6-9 L_d 6-8
Prickle Hairs: fairly freq. intercostal hooks, oval-rather rect. bases, short triang. barbs tapering to point
-Length 5-8 L_b 2-4 W_b 4
Papillae: none seen
Stomata: many (4-9) intercostal rows of low-domed, slightly triang. stomata
-Length 8-11 Width 6-7
Long Cells: parallel in rows, elongated rect., med. u-shaped und. (h=3, a=2)
-Length 15-35 Width 5

Adaxial Surface
Silica Bodies: single costal rows of small dumbbells (mostly indented ends, short very narrow central portions), few (cross-shaped or) nodular, rather closely and evenly spaced in rows, separated by 1 s.c.
-Length 4-6 Width 3
-scattered irreg. cross-shaped s.b. in intercostal zones-none seen, size like abax
Macro Hairs: like abax, but longer
-Length 70-80 Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: like abax
-Length L_b W_b
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: parallel in rows, elongated rect., rather deep u-shaped und., size like abax
-Length Width

Brachiaria distichophylla

Abaxial Surface
Silica Bodies: single costal rows of dumbbells, distal ends indented, very narrow-narrow short central portions, occasionally nodular. ± evenly spaced in rows by s.c. slightly longer than s.b.
-Length 6-10 Width 4-5
-scattered infreq. cross-shaped s.b. in intercostal zones, none seen
Macro Hairs: none seen-freq. intercostally, bases surrounded by few irreg. rounded cells
-Length 60-120 Width
Micro Hairs: freq. intercostally, small oval bases, prox. cell cyl.-slightly cigar-shaped or tapering outward, distal cells not seen (possibly tapering outward, distal cells not seen (possibly tapering to rather blunt point
-Length L_b 14-16 L_d 8
Prickle Hairs: freq. intercostal hooks, short pointed triang. barbs, squared bases
-Length 6-10 L_b 5-6 W_b 5-6
Papillae: none seen
Stomata: 2-5 intercostal rows, low-domed
-Length 13-15 Width 7-8
Long Cells: parallel in rows, rect., irreg. med. u-shaped und. (h=4-5, a=1-2)
-Length 35-55 Width 7-9

Adaxial Surface
Silica Bodies: single costal rows of short dumbbell
(distal ends indented, very narrow short central portions)-cross shaped s.b., unevenly spaced in rows, size same as abax
-Length Width
Macro Hairs: present intercostally, multi-celled elevated bases, single celled hairs
-Length 285 Width
Micro Hairs: none seen, infreq., like abax
-Length L_b L_d
Prickle Hairs: same as abax
-Length L_b W_b
Papillae: none seen
Stomata: double intercostal rows of low-domed stomata, sometimes widely separated in rows (by l.c., p.h., l.c.), same size as abax
-Length Width
Long Cells: parallel in rows, rect, irreg. med. u-shaped und. (h=2-3, a=2)
-Length 20-40 Width 7-9

Brachiaria jubata

Abaxial Surface
Silica Bodies: single-many costal rows of mostly short dumbbells (some almost cross-shaped), very variable, distal ends slightly indented-straight, central portions very short-med., mostly quite wide-very narrow, spaced quite evenly and closely in rows by s.c. wider than s.b.
-Length 5-8 Width 3-4
Macro Hairs: freq. intercostally, multi-celled elevated bases, single cell hairs tapering to point, very freq. on regrowth
-Length 180-300 Width
Micro Hairs: fairly freq. intercostally, small rounded bases, prox. cell tapering outwards slightly, distal first tapering outwards, then inwards to ± blunt points
-Length 17-21 L_b L_d
Prickle Hairs: very freq. intercostal hooks, rect. bases, short pointed barbs, present, but not very freq. on regrowth
-Length 4-8 L_b 3 W_b 5
Papillae: none seen
Stomata: 3-8 (double staggered) intercostal rows, low domed, often rather triang. (low-med. domed on regrowth)
-Length 11-12 Width 7-9
Long Cells: parallel in rows, rect., med. closely spaced u-shaped und. (h=3, a=2)
-Length 25-50 Width 8

Adaxial Surface
Silica Bodies: same as abax., also some intercostal s.b., crosses and short dumbbell-

Family: Paniceae

irreg., very variable
-Length 3-4 Width 3-4
Macro Hairs: like abax, but less freq. and longer
-Length 320 Width
-on regrowth freq. costal hairs, tapering fairly rapidly to points
-Length 80-100
Micro Hairs: none seen, infreq., like abax
-Length L_b L_d
Prickle Hairs: freq. in intercostal zones (hooks), rounded-squared bases, short triang. pointed barbs, size like abax, barbs longer, up to 20
-Length L_b W_b
Papillae: none seen
Stomata: many intercostal rows, low-domed, size like abax
-Length Width
Long Cells: parallel in rows, rect., irreg. med. u-shaped und. (h=3, a=2)
-Length 15-35 Width 8

Brachiaria lata

Abaxial Surface

Silica Bodies: single costal rows of mostly nodular (some dumbbells, esp. on regrowth, few single nodules) s.b., distal ends slightly indented-slightly convex and squared, fairly evenly spaced in rows, separated by s.c. ± same length
-Length 9-14 Width 4
-infreq. cross-shaped intercostal s.b.- none seen
Macro Hairs: present intercostally, elevated multi-celled bases, no complete hairs seen absent on regrowth
-Length ~100 Width
Micro Hairs: freq. intercostally, small round bases, prox. cell tapering outwards slightly, dist. cell ~ same length, tapering to blunt point-very wide on regrowth
-Length L_b 9-12 L_d
Prickle Hairs: fairly freq. intercostal hooks, rect. bases, short pointed barbs-absent on regrowth
-Length 8-11 L_b (2-)5 W_b 4-5
Papillae: none seen
Stomata: 2-4 intercostal rows, rather triangular low-med. domed
-Length 11-14 Width 8-10
Long Cells: parallel in rows, rect., fairly wide med. irreg, u-shaped und. (h=2-3, a=2)
-Length 25-40 Width 7

Adaxial Surface

Silica Bodies: single costal rows of mostly nodular s.b. some dumbbells, distal ends mostly squared and indented-(some convex), unevenly spaced in small groups (adjacent within groups)
-Length 6-12 Width 4-5
-scattered small dumbbells, cross-shaped and irreg. s.b. in intercostal zones-none seen
Macro Hairs: present intercostally, elevated multi-celled bases, single celled, tapering to point, absent on regrowth
-Length 100 Width
Micro Hairs: like abax, infreq. on regrowth
-Length L_b L_d
Prickle Hairs: intercostal hooks like abax-infreq. on regrowth
-occasional costal p.h.'s-none seen, elongated oval bases elongated triang. barbs tapering to points
-Length 17-21 L_b 14 W_b 5-6
Papillae: none seen
Stomata: 2-3 (?) intercostal rows low-med. domed
-Length 9-10 Width 6-8
Long Cells: like abax
-Length 15-35 Width 9

Brachiaria stigmatosa

Abaxial Surface

Silica Bodies: scattered freq. intercostally, very irreg. linear (sometimes branched, "K" or "Y" shaped)
-Length 2-3 Width 4-8
-in costal rows (1-3) often irreg. dumbbells along with other irreg. s.b.-very short and variable in shape-undeveloped in second sample
-Length 5-6 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 2-7+ intercostal rows of very low domed triang.
-Length 16-21 Width 7-8
Long Cells: large, parallel in rows, rect. med. irreg. u-shaped und (h=2.5, a=1-2)
-Length 30-65 Width 7-10
-interstomatal l.c. wider than stomata

Adaxial Surface

Silica Bodies: irreg. linear s.b. scattered intercostally, also costal s.b., same as abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: parallel in rows, rect., like abax
-Length Width

Digitaria lecardii (argillacea)

Abaxial Surface

Silica Bodies: 1-4 rows (costal) of irreg. dumbbells, distal ends mostly indented-straight, central portions short-med., med. width, arranged in rows in small groups of 1-6, spaced in groups by s.c.'s, p.h.'s between groups
-Length 4-9 Width 4-5
-some nearly cross-shaped
Macro Hairs: fairly freq. intercostally, multi-celled elevated bases, long single-

Family: Paniceae

celled hairs
-Length 850 Width
Micro Hairs: freq. intercostally, small rounded bases, prox, cell rather thin and cyl., distal cell (diff. to see) about same length, tapering to rather blunt point
-Length 22 L_b 11 L_d 11
Prickle Hairs: fairly freq. in costal rows- very freq., squared oval bases, short triang. pointed barbs, some at right angles to veins
-Length 12-19 L_b 9-14 W_b 3-6
-fairly freq. intercostal hooks, short triang. pointed barbs
-Length 6-9 L_b 4-5 W_b 4-5
Papillae: none seen
Stomata: 2-3 (-4 staggered) intercostal rows, med.-low domed, occasionally slightly triang.- peaked
-Length 13-15 Width 7-10
Long Cells: slightly inflated rect.-hex. in parallel rows, occasional irreg. u-shaped waves, but overall little und. (diff. to see)
-Length 20-45 Width 10-12

Adaxial Surface
Silica Bodies: 1-2 costal rows of small dumbbells, distal ends indented-straight, central portions med. length, fairly narrow-med. width
-Length 4-5 Width 3-4
Macro Hairs: fairly freq. intercostally, multi-celled elevated bases, fairly short single celled hairs tapering to points
-Length 270 Width
Micro Hairs: fairly freq. intercostally, small rounded bases, prox. cell cyl., distal cell usually slightly longer, tapering to point
-Length 18-22 L_b 9-10 L_d 9-12
Prickle Hairs: like abax, but costal p.h.'s less freq., and intercostal hooks more freq. (with rect. bases)
-Length L_b W_b
Papillae: none seen
Stomata: double intercostal rows, same as abax
-Length Width
Long Cells: parallel in rows, rect., med. u-shaped und. (h=2, a=2-3)
-Length 35-55 Width 7-8

Digitaria horizontalis

Abaxial Surface
Silica Bodies: single costal rows of dumbbells, distal ends slightly concave-slightly convex, central portion med. length and width, fairly evenly and widely spaced in row
-Length 5-7 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small rounded bases, prox. cell cigar shaped, distal cell about same length, tapering to rather blunt point
-Length 20-22 L_b 10-11 L_d 10-11
Prickle Hairs: fairly freq, on margins of costal zones, barbs at right angles to veins, none seen
-Length 10-12 L_b 6-8 W_b 7-8
-fairly freq. intercostal hooks, squared bases, triang. barbs tapering to points, absent
-Length 9-13 L_b 4-5 W_b 4-5
Papillae: none seen
Stomata: 2-3 intercostal rows of med.-low domed sometimes slightly triang. stomata
-Length 12-14 Width 7-10
Long Cells: roughly parallel in rows, irreg.-inflated-rect. shaped, slight u-shaped waves, interstomatal l.c. wider than stomata
-Length 15-45 Width 6-11

Adaxial Surface
Silica Bodies: same as abax (more evenly spaced in row?)
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, small rounded bases, prox. cell cigar-shaped (usually bulge towards distal end), distal cell 1/2-3/4 size, tapering to point
-Length L_b L_d
Prickle Hairs: costal hairs like abax, some with barbs parallel to veins and in costal rows-infreq.
-Length 14-23 L_b 11-17 W_b 10
-freq. intercostal hooks, squared bases, triang. pointed barbs, none seen
-Length 12-16 L_b 5-9 W_b 5
Papillae: none seen
Stomata: like infreq.
-Length Width
Long Cells: in parallel rows, mostly slightly inflated rect.-hex., small u-shaped waves (h=3, a=1)
-Length 20-40 Width 10-12

Echinochloa colona

Abaxial Surface
Silica Bodies: single costal rows of nodular s.b., distal ends convex, mostly dumbbells, distal ends convex, central portion short and narrow
-Length 9-12 Width 3-4
-separated in rows by single s.c -evenly spaced
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small rounded bases, prox. cell usually tapering outwards (or), distal cell 2x-1 1/3x length, tapering to rather blunt point (?)
-Length 16-22 L_b 6-8 L_d 8-11
Prickle Hairs: none seen
-Length L_b W_b
Papillae: very conspicuous med.-walled globulous-c shaped papillae on many long cells
Stomata: 2-3(-4 staggered)-many intercostal rows, low(-med.) domed
-Length 13-17 Width 9-10
Long Cells: in rough rows, mostly irreg. inflated rect., irreg. u-shaped shallow waves
-Length Width

Adaxial Surface
Silica Bodies: same as abax (occasional dumbbells), like abax

Family: Paniceae

-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small rounded bases, prox. cell usually tapering outwards, distal cell (diff. to see)-about same length, tapering to rather blunt point, like abax
-Length 16-20 L_b 8-11 L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: same as abax
Stomata: like abax
-Length Width
Long Cells: like abax, but und. deeper u-shaped
-Length Width

Panicum fluviicola

Abaxial Surface

Silica Bodies: ? very infreq., widely spaced rows costal (4-5 costal rows) small dumbbell-cross or squared s.b.
-Length 3-5 Width 4
Macro Hairs: none seen, freq. intercostally, little basal structure, long thin hairs
-Length 150-200 Width
Micro Hairs: freq. intercostally, relatively large rect. bases, prox. cell cyl., distal cell 1 1/2-1 3/4x, tapering to blunt point
-Length 17-18 L_b 6-7 L_d 10-11
Prickle Hairs: freq. in costal rows, rather large rounded rect. bases, short pointed barbs
-Length 10-25 L_b 8-21 W_b 6-10
Papillae: none seen
Stomata: (1-)2(-3 staggered) intercostal rows, med.(-high) domed rounded
-Length 8-10 Width 7-9
Long Cells: parallel in rows, rect., shallow u-shaped und. (h=2-2.5, a=1)
-Length 7-30 Width 5-7

Adaxial Surface

Silica Bodies: squared-irreg.-linear-short dumbbells, s.b. scattered costally (1-5 rows) and intercostally-fairly freq.-infreq., each paired with s.c.
-Length 2-5 Width 3-5
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, small rounded-rather large rect. bases, prox. cell rather small, cyl.-slightly tapering outwards-like abax
-Length L_b 5-7 L_d
Prickle Hairs: like abax in costal rows, also freq. intercostal hooks, rect. bases pointed triang. barbs-intercostal hooks like abax
-Length 7-9 L_b 3-5 W_b 5
Papillae: none seen
Stomata: 2-3 interstomatal rows of low-med. domed rounded
-Length 10-14 Width 7-8
Long Cells: roughly parallel in rows, irreg. rect., med. u-shaped und. (h=3-3.5, a=2.5)
-Length 15-40 Width 7-10

Panicum pansum

Abaxial Surface

Silica Bodies: 1-3 costal rows of dumbbell-cross shaped (distal ends mostly indented, central portions fairly short, med.-narrow width), spaced in small groups in row, separated by s.c. or p.h.
-Length 6-9 Width 4-6
Macro Hairs: fairly freq. intercostally, elevated multi-celled bases, long single-celled hairs
-Length 900 Width
Micro Hairs: fairly freq. intercostally, fairly small round bases, prox. cell cyl., distal cell about same length and tapering to rather blunt point
-Length 15-18 L_b L_d
Prickle Hairs: freq. in costal rows, rounded rect. bases, short pointed barbs
-Length 10-25 L_b 9-17 W_b 7-11
-freq. intercostal (many adjacent to costal rows) hooks, rect.-irreg. bases, short pointed barbs
-Length 8-10 L_b 5-7 W_b 7-8
Papillae: none seen
Stomata: double intercostal rows of med.-low domed, rounded-±triang. stomata
-Length 11-15 Width 7-10
Long Cells: parallel in rows, rect., fairly deep-med. u-shaped und. (h=2-4, a=1-2)
-Length 30-65 Width 7-8

Adaxial Surface

Silica Bodies: 1-2 costal rows of short dumbbells (distal ends indented, central portions short and narrow) or some crosses, arranged in rows separated by s.c.'s, fairly closely spaced but uneven, small dumbbells, distal ends convex, central portion short narrow, closely spaced in rows, same size as abax
-scattered intercostal linear s.b., esp. adjacent to costal rows
-Length Width
Macro Hairs: freq. intercostally, multi-celled elevated bases, single celled hairs tapering to points
-Length 460 Width
Micro Hairs: same as abax
-Length L_b L_d
Prickle Hairs: same as abax-fewer costal p.h.'s-very few
-Length L_b W_b
Papillae: none seen
Stomata: double costal rows, low-domed rounded, same size as abax
-Length Width
Long Cells: parallel in rows, elong. rect., deep, fairly wide u- shaped und., same size as abax
-Length Width

Panicum phragmitoides

Abaxial Surface

Silica Bodies: single costal rows of very short dumbbells or squared s.b., distal ends mostly slightly convex, central portion very short, wide
-Length 2-5 Width 3-4

Family: Paniceae

Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally in rows between stomatal rows, small rounded bases, prox. cell cyl., distal cell longer, tapering to blunt point
-Length 21 L_b 9 L_d 12
Prickle Hairs: none seen, many unpaired s.c., but also few with small intercostal hooks, irreg. bases, short pointed barbs
-Length L_b W_b
Papillae: none seen
Stomata: 2(-3-4 staggered) interstomatal rows of med.-low domed rather triang. stomata-low domed rounded on regrowth
-Length 12-13 Width 7-9
Long Cells: roughly in rows, irreg. rect., med. u-shaped und. (h=2.5-3, a=2)
-Length 15-50 Width 7-8

Adaxial Surface
Silica Bodies: like abax, up to 3 costal rows of dumbbells (distal ends mostly indented, central portion short and narrow-med.) and occasional crosses (few nodular), arranged in rows singly or small groups, separated by s.c., some p.h., some directly paired with p.h.
-Length 5-12 Width 4-5
Macro Hairs: fairly freq. costally or on edges of costal zones, multi-celled elevated bases, long single celled hairs, none seen
-Length 930+ Width
Micro Hairs: same as abax (?)?
-Length L_b L_d
Prickle Hairs: very freq. in costal rows, oval bases, short-very short triang. barbs, tapering to point
-Length 9-28 L_b 8-18 W_b 5-9
-freq. intercostal (many on edge of costal rows) hooks, rect.-irreg. bases, short pointed barbs
-Length 7-9 L_b 5-8 W_b 6-8
Papillae: none seen
Stomata: same as abax-some strongly peaked
-Length Width
Long Cells: rect., fine u-und.
-Length Width

Panicum subalbidum

Abaxial Surface
Silica Bodies: single costal rows of dumbbells (few nodular-crosses), distal ends indented-slightly convex, central portions med. length, very narrow-narrow, arranged in rows fairly evenly spaced by 1 s.c.
-Length 7-10 Width 3-6
-scattered intercostal irreg. linear-crosses, not seen
-Length 1-2 Width 5-8
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, round bases, prox. cell rather short and tapering outwards-slightly barrel-shaped, no distal cells seen
-Length L_b 6-8 L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: double intercostal rows, low-very low domed, rather triang.
-Length 14-17 Width 8-10
Long Cells: rect.-inflated rect. in rows, med.-shallow u-shaped undulations (wide waves) (h=5, a=2-3)
-Length 40-80 Width 8-10

Adaxial Surface
Silica Bodies: single costal rows of dumbbells, often irreg., mostly with indented of straight distal ends, med. length, narrow central portions, or nodular s.b., arranged same as abax, same size as abax, scattered irreg. crosses intercostally, none seen
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: fairly freq. intercostal hooks, square-rect. bases, short pointed barbs
-Length 7-10 L_b 6-8 W_b 4-6
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: like abax
-Length Width

Panicum walense

Abaxial Surface
Silica Bodies: single costal rows of roughly dumbbell shaped s.b.-rect., distal ends convex-straight or indented, wide, med. length-short central portion -very variable shape, unevenly spaced in rows by s.c., p.h.
-Length 4-6(-7) Width 3-4(-5)
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, rather large round bases, basal cell cyl., distal cells not seen
-Length L_b 7-10 L_d
Prickle Hairs: occasional in costal rows, oval bases, short triang. barbs tapering to point ?
-Length 13 L_b 10 W_b 5
Papillae: none seen
Stomata: 2(-4) interstomatal rows, low-med. domed, rounded
-Length 11-15 Width 7-10
Long Cells: parallel in rows, elongated rect., med. -u shaped und. (h=3-4, a=2)
-Length 30-75 Width 7
-interstomatal l.c.'s often narrower than stomata

Adaxial Surface
Silica Bodies: single costal rows of widely spaced short dumbbells, distal ends mostly straight-indented, central portions wide and very short (some almost cross-shaped)
-Length 4-5 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: present intercostally, same as abax
-Length L_b L_d

Family: Paniceae

Prickle Hairs: fairly freq. in costal rows, oval bases , fairly short triang. barbs, tapering to point
-Length 11-13 L_b 5-8 W_b 5-6
Papillae: none seen
Stomata: 2-4 intercostal rows of med.-low domed stomata, rounded
-Length 9-11 Width 8-10
Long Cells: parallel in rows, rect. rather shallow u-shaped und.
-Length 25-40 Width 7-9

Paspalum scrobiculatum

Abaxial Surface

Silica Bodies: single-double costal rows of very irreg. and variable dumbbells (distal ends irreg,-convex rounded, central portions short and narrow-very narrow) or nodular s.b., arranged unevenly in row, separated by s.c., l.c.
-Length 7-13 Width 5-6
-occasional cross-shaped s.b. in intercostal zones
-Length and Width 5-6
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, rather squared small bases, basal cell with prominent basal bulge, then narrowing somewhat, distal cell (?) small and much shorter with blunt end
-Length 13-15 L_b 10 L_d 3
Prickle Hairs: fairly freq.-infreq. intercostal hooks, bases rounded-irreg. oval, barbs triang. short, and tapering to points
-Length 9-12 L_b 6-8 W_b 6-8
Papillae: none seen
Stomata: many (10+) rows of med.-low domed slightly triang. stomata
-Length 11-13 Width 8-13
Long Cells: in rough rows, irreg. sometimes slightly inflated rect., small, u-shaped und.
-Length 20-40 Width 9-12

Adaxial Surface

Silica Bodies: irreg. linear or y-shaped s.b. scattered intercostally-costally irreg., and cross-shaped s.b. like abax
-Length 2-5 Width 4-6
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small round-squared bases, prox. cell with basal bulge, no distal cells seen
-Length 8-10 L_b L_d
Prickle Hairs: like abax
-Length L_b W_b
Papillae: none seen
Stomata: many intercostal rows, same as abax
-Length Width
Long Cells: parallel in rows, rect., small-med. u-shaped und. (h=3.5, a=1.5)
-Length 30-65 Width 6-8

Pennisetum atrichum

Abaxial Surface

Silica Bodies: 1-4 costal rows of very irreg. dumbbells (often deeply indented ? distal ends, short narrow central portions), some nodular and some crosses, arranged fairly closely in groups, p.h.'s between
-Length 7-13 Width 4-6
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, small oval bases, prox. cell cyl., distal cell 1 1/3- 1 1/2 x, tapering outward first then inwards to point at distal end
-Length 25-33 L_b 9-15 L_d 15-19
Prickle Hairs: in costal rows, oval bases, very short triang. barbs tapering to blunt point-none seen
-Length 9-14 L_b 9-13 W_b 5-7
-freq. intercostal hooks, irreg. bases, short pointed barbs
-Length 10-13 L_b 9-11 W_b 6-10
Papillae: none seen
Stomata: 1-5 intercostal rows of low-med. domed mostly indented triang.
-Length 20-28 Width 12-21
Long Cells: rather large irreg. rect., sometimes inflated, med. v-u shaped und. (not prominent) (h=3.5-5, a=2)
-Length 50-80 Width 12-15

Adaxial Surface

Silica Bodies: same as abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: same as abax
-Length L_b L_d
Prickle Hairs: freq. in costal rows, rather large oval bases, tapered on one side, short triang. barbs tapering to points.
-Length 17-33 L_b 13-25 W_b 6-10
-intercostally same as abax
Papillae: none seen
Stomata: like abax but not as freq.
-Length Width
Long Cells: large inflated rect.-hex., faint v-u shaped med. und. (h=3.5, a=2)
-Length Width

Pennisetum pedicellatum

Abaxial Surface

Silica Bodies: single costal rows of mostly irreg. nodular s.b., distal ends squared, mostly slightly indented, many dumbbells (some rows of mostly dumbbells), rather evenly spaced in rows, occasional intercostal crosses or irreg. shaped s.b.-none seen
-Length 8-16 Width 3-6
Macro Hairs: quite freq. in intercostal zones or edges of costal rows, multi-celled elevated bases noticeably causing bulges in the leaf epi., single-celled hair tapering to point, none seen
-Length 450 Width
Micro Hairs: fairly freq. intercostally, small squared-irreg. bases, prox. cell cyl.-tapering slightly outwards, distal cell 1 1/2-2x length, knife shaped
-Length 40-43 L_b 16 L_d 24-27
Prickle Hairs: fairly freq. intercostal hooks, squared-irreg. bases, pointed barbs
-Length 8-13 L_b 6-10 W_b 6-9

Family: Paniceae

Papillae: none seen
Stomata: 1-5 intercoatal rows of med.-low domed triang. peaked
-Length 14-18 Width 12-14
Long Cells: roughly in rows, irreg. rect. or inflated rect., med u-shaped und. (h=3.5, a=1.5)
-Length 30-80 Width 11-15

Adaxial Surface
Silica Bodies: like abax, but separated in small groups by p.h.
-Length Width
Macro Hairs: like abax
-Length 550+ Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: freq. in costal rows, bases ovals tapered on one end, short triang. barbs tapering to points
-Length 22-28 L_b 17-25 W_b 5-7
-intercostal hooks like abax
Papillae: none seen
Stomata: same as abax in 1-3 intercostal rows-less freq.
-Length 18-23 Width 10-12
Long Cells: roughly parallel in rows, very large rect.-hex. med. u-shaped und. (h=3.5, a=1.5)
-Length 30-80 Width 15-20

Pennisetum polystachion

Abaxial Surface
Silica Bodies: 1-3 costal rows of mostly nodular s.b., also many dumbbells, small size, distal ends squared and mostly slightly concave, spaced rather evenly in rows
-Length 6-11 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, small oval bases, basal cell tapering outwards slightly, distal cell knife-shaped, 1 1/3-2 x length
-Length 29-33 L_b 12-15 L_d 19-22
Prickle Hairs: fairly freq. intercostal hooks, rect.-irreg. bases, short pointed barbs
-Length 10-13 L_b 4-9 W_b 6-9
-in some costal rows
-Length 21-33
Papillae: none seen
Stomata: 1-3 intercostal rows, med.(-low) domed peaked
-Length 18-22 Width 15-18
Long Cells: parallel in rough rows, roughly rect.-hex. or slightly inflated rect., med.-shallow v-shaped und. (h=2.5, a=1-1.5)
-Length 40-75 Width 15-20

Adaxial Surface
Silica Bodies: 1-3 costal rows, like abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax, bases quite prominent ?
-Length L_b L_d
Prickle Hairs: fairly freq. intercostal hooks, squared bases, short triang. barbs, tapering to rather blunt points
-Length 9-12 L_b 7-8 W_b 7-8
-like abax in costal rows
Papillae: none seen
Stomata: same as abax
-Length Width
Long Cells: parallel in rows, inflated rect.-hex., rather shallow u-shaped und., large size (h=3.5-4, a=)
-Length 35-140 Width 19-24

Pennisetum subangustum

Abaxial Surface
Silica Bodies: 1-3 costal rows of dumbbells and nodular s.b., distal ends squared, mostly straight ends, central portions of dumbbells rather long and narrow, fairly evenly spaced in rows by s.c., some s.b. adjacent
-Length 7-11 Width 3
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, relatively large rounded-irreg. rect. bases, prox. cell tapering slightly outwards, distal cell 1 1/2x, knife-shaped
-Length 30 L_b 12 L_d 18
Prickle Hairs: fairly freq-freq intercostal hooks rounded squared bases, short pointed barbs
-Length 9-11 L_b 7-10 W_b 7-10
Papillae: none seen
Stomata: in 4-6 intercostal rows, low-domed triang. peaked
-Length 16-21 Width 9-14
Long Cells: in rough rows, rect. and slightly inflated rect., med. u-shaped und. (h=5, a=1.5-2)
-Length 55-75 Width 9-16

Adaxial Surface
Silica Bodies: single costal rows, dumbbells and nodular, distal ends mostly convex, some slightly concave, central portions med. length and narrow, arranged in small groups, separated by p.h.'s
-Length 8-11(-14 nodular) Width 3-7
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, irreg. bases, prox. cell cyl.-tapering slightly outwards, distal cell knife shaped, 1 1/2-2x length
-Length 25 L_b 9-10 L_d 16
Prickle Hairs: freq. in costal rows, long oval bases tapered on one end, short triang. barbs tapering to points
-Length 19-38 L_b 18-30 W_b
-same as abax intercostally
Papillae: none seen
Stomata: like abax but with 1-2 intercostal rows
-Length Width
Long Cells: parallel in rows, rect. or slightly inflated rect., shallow u-shaped und. (h=5, a=1.5-2)
-Length 45-90 Width 17-20

Sacciolepis africana

Family: Paniceae

Abaxial Surface

Silica Bodies: single costal rows of quite irreg. nodular s.b., distal ends mostly straight, arranged unevenly in rows by l.c., or adjacent
-Length 9-12 Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. in intercostal zones, bases small rounded, prox. cell tapering slightly outwards, distal cell ± shorter tapering to point
-Length L_b 11-12 L_d 6-7
Prickle Hairs: none seen
-Length L_b W_b
Papillae: on most l.c., conspicuous Globulous papillae
Stomata: in many rows, round low domed
-Length 10-15 Width 7-8
Long Cells: elongated ± inflated rect., little und. noted
-Length 15-30 Width 5-6

Adaxial Surface
(like abax?)

Silica Bodies:
-Length Width
Macro Hairs:
-Length Width
Micro Hairs:
-Length L_b L_d
Prickle Hairs:
-Length L_b W_b
Papillae:
Stomata:
-Length Width
Long Cells:
-Length Width

Sacclolepis micrococca

Abaxial Surface

Silica Bodies: in costal bands of (2-)-4-9 rows, nodular (often 4 nodes) and some irreg. dumbbells, elongated, distal ends squared
-Length 6-19 Width 3-4
-freq. intercostal very irreg. and crosses linear, branched s.b., few seen
-Length 2-6 Width 3-6
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in intercostal zones, small round bases, prox. cell tapering slightly outwards, distal cell slightly shorter, tapering inwards to point
-Length 14 L_b 6-8 L_d 6
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: in 2(-3-4 staggered occasionally) intercostal rows, low-med. domed rounded
-Length 12-15 Width 7-9
Long Cells: very long and narrow slightly inflated rect. (usually s.b. or m.h. between l.c. ends), med.-shallow u-shaped
-Length 60-100 Width 4-6

Adaxial Surface

Silica Bodies: only occasional irreg. dumbbells seen costally, but diff. to see through veins
-intercostally same as abax, but much less freq.
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: present intercostally, like abax but division between 2 cells diff. to see
-Length 13-17 L_b L_d
Prickle Hairs: present costally (?), broad oval bases, short triang. barbs tapering to points
-Length 11 L_b 6-7 W_b 7
Papillae: none seen
Stomata: like abax
-Length Width
Long Cells: like abax, may be slightly smaller
-Length Width

Setaria anceps

Abaxial Surface

Silica Bodies: 1-3 costal rows like adax but no p.h. or m.h. in rows, fairly evenly spaced
-Length 6-12 Width 4-6
Macro Hairs: none seen
-Length Width
Micro Hairs: like adax intercostally but distal cell more pointed
-Length L_b L_d
Prickle Hairs: occasional intercostal hooks, oval bases, short blunt barbs none seen
-Length 7 L_b W_b 10
Papillae: none seen
Stomata: 3-4 intercostal rows, low domed, like adax
-Length Width
Long Cells: like adax
-Length 40-90 Width 20-30

Adaxial Surface

Silica Bodies: 1-2(-3) costal rows of mostly dumbbells, distal ends squarish-concave-convex and rather straight, central portions fairly narrow and short, some squared s.b. between pairs of other s.b., arranged in small groups
-Length 6-9 Width 3-5
-in regrowth many s.b. not developed, rather rect.
Macro Hairs: none seen regrowth occasional in intercostal zones, multi-celled basal structures
-Length 725 Width
Micro Hairs: freq. intercostally, small oval bases, prox. cell slightly barrel-shaped, distal cell tapering to blunt tip
-Length 16-23 L_b 9-10 L_d 7-14
-in costal rows micro-hair like structures freq., small oval bases, 1-2 celled (?) tapering to point
-Length 16-23
Prickle Hairs: freq. in some costal rows, oval bases, short triang. barbs tapering to points, none seen/present in regrowth
-Length 11-15 L_b 8-13 W_b 4-6
Papillae: none seen
Stomata: 2-3 intercostal rows of med.-low domed rounded stomata
-Length 15-20(-23) Width 9-15

Family: Paniceae

Long Cells: roughly in rows, hex.-inflated rect., large size, interstomatal l.c. wider than stomata, very small u-shaped-little noticeable und.
-Length 20-70 Width 15-22

Setaria pallide-fusca

Abaxial Surface

Silica Bodies: 1-2 costal rows of dumbbells, distal ends rounded and mostly convex-some indented, central portions med. length and narrow, spaced rather evenly in rows
-Length 10-15 Width 4-5
-occasional intercostal crosses or short dumbbells, esp. adjacent to costal rows, none seen
-Length 8-11 Width 6-8
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. intercostally, small oval bases, prox cell tapering slightly outwards, distal cell >2x may be ~ same length, tapering to rather blunt point?
-Length 28-31 L_b 8-11 L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 2-3 intercostal rows of low-med. domed rounded stomata
-Length 17-20 Width 10-15
Long Cells: roughly in rows, rather hex., ledge little noticeable und. of walls
-Length 35-95 Width 20-30

Adaxial Surface

Silica Bodies: like abax in single costal rows, usually separated in rows by p.h., m.h. and s.c.'s
-Length Width
Macro Hairs: fairly freq. intercostally, multi-celled elevated bases, wide single celled hairs, none seen
-Length 800+ Width
Micro Hairs: present costally and intercostally, intercostal same as abax,
-costally small oval bases, prox. cell first tapering outwards, then cyl., distal cell ~2/3 x, knife shaped
-Length L_b L_d
Prickle Hairs: fairly freq. costally, oval bases, rather short triang. barbs tapering to points
-Length 20-25 L_b 10-15 W_b 7-10
-occasional intercostally, irreg. squared bases, short pointed barbs, none seen
-Length 16 L_b 8 W_b 9
Papillae: none seen
Stomata: same as abax
-Length Width
Long Cells: large, like abax
-Length Width

Setaria verticillata

Abaxial Surface

Silica Bodies: in bands of 1-3 costal rows, mostly dumbbells, distal ends squared with slightly indented (-convex) ends, central portions rather narrow, med. length, fairly evenly spaced in rows
-Length 6-10 Width 3-4
-occasional cross-shaped, esp on outside costal rows
Macro Hairs: fairly freq. intercostally, multi-celled elevated bases causing bulge in epidermis, single celled hairs tapering to points
-Length 250 Width
Micro Hairs: fairly freq. intercostally, small rounded bases, prox. cell cyl.-slightly tapering outwards, distal cell (diff. to find) longer, tapering to blunt point
-Length 22 L_b 8-9 L_d 14
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 4-8 intercostal rows of med. domed triang. stomata
-Length 9-11 Width 7-10
Long Cells: roughly in rows, inflated rect.-rect., med. u-shaped und. (h=3, a=1.5)
-Length 30-55 Width 7-10

Adaxial Surface

Silica Bodies: single costal rows of dumbbells, same as abax but separated in rows by p.h. into small groups
-Length Width
Macro Hairs: same as abax
-Length Width
Micro Hairs: same as abax, intercostally, fairly freq. in costal rows also, small oval bases, prox. cell tapering outwards, no distal cells seen
-Length L_b 8-9 L_d
Prickle Hairs: in costal rows, very elongated oval bases, very short triang. barb tapering to point
-Length 16-23 L_b 13-20 W_b 5-7
Papillae: none seen
Stomata: same as abax
-Length Width
Long Cells: mostly inflated rect., little und. of cell wall seen
-Length 25-65 Width 8-14

Family: Sporoboleae

Sporobolus festivus

Abaxial Surface

Silica Bodies: in wide costal bands of (usually 6) rows, mostly saddle shaped-irreg. squared, small s.b., rather evenly spaced in rows by l.c.'s
-Length 3-5 Width 3-5
-in intercostal (?) rows either side of costal rows with p.h.'s
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen-fairly freq. intercostal Globulous m.h.
-Length 5-6 L_b L_d
Prickle Hairs: in rows on outside of costal bands, not well developed, oval bases, short triang. barbs tapering to point at right angles to row, none seen
-Length 5-7 L_b 5-7 W_b 5
Papillae: none seen

Family: Sporoboleae

Stomata: single intercostal rows, low-domed(-med.), rows adjacent to costal rows or intercostal o.p. rows on either side
-Length 12-14 Width 6-7
Long Cells: (long cells adjacent to costal rows), parallel in rows, elongated rect., thick walled, fairly deep u-v shaped und. (h=2.5, a=1.5-2.5)
-Length 15-40 Width 5

Adaxial Surface
Silica Bodies: 1-3 costal rows of mostly dumbbells, distal ends slightly concave-convex, squared, central portions med. width and length, spaced in rows fairly evenly by s.c., some p.h. ? like abax
-Length 4-8 Width 4-5
-some saddle-shaped
Macro Hairs: none seen
-Length Width
Micro Hairs: none seen
-Length L_b L_d
Prickle Hairs: present in costal rows, irreg. oval bases, pointed barbs like rose thorns
-Length 9-13 L_b 7-13 W_b 5-6
Papillae: none seen
Stomata: 1-2 intercostal rows, same as abax
-Length Width
Long Cells: ? like abax
-Length Width

Sporobolus microprotus

Abaxial Surface
Silica Bodies: bands of 2-8 costal rows, saddle-crescent shaped, fairly evenly spaced in rows by s.c.
-Length 2-5 Width 3-5
-scattered crescent shaped or irreg. s.b. in intercostal zones
-Length 2-4 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: freq. in intercostal rows between stomatal rows, single-celled-2, small oval bases, Globulous hair
-Length 9-10 L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 2-3 intercostal rows, low-med. domed rounded
-Length 10-12 Width 6-7
Long Cells: roughly in rows rect., rather shallow-quite deep u-shaped und. (h=2.5, a=1)
-Length 15-40 Width 5-7

Adaxial Surface
Silica Bodies: 1(-3) costal rows of dumbbell-close to being cross shaped, distal ends often deeply indented, central portion med. width, very short.? like abax
-Length 4-6(-7) Width 3-4
Macro Hairs: none seen
-Length Width
Micro Hairs: like abax but infreq.
-Length L_b L_d
Prickle Hairs: occasional in costal rows, oval bases, very short triang. bases with blunt points? none seen
-Length 7-13 L_b 7-10 W_b 4-5
Papillae: appear to be many small Globulous papillae on many l.c., but may be mesophyll remaining
Stomata: double intercostal rows, same as abax
-Length Width
Long Cells: same as abax, rough rows, rect., med.-fairly wide u-shaped und.
-Length Width

Sporobolus pyramidalis

Abaxial Surface
Silica Bodies: costal rows (5-10) and freq. intercostal saddle-kidney-crescent s.b., paired with s.c.
-Length 3-7 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: microhair or p.h.-like structures intercostally, appear to be 2-celled, (may be single-celled with base line)
-Length 5-7 L_b L_d
Prickle Hairs: none seen
-Length L_b W_b
Papillae: none seen
Stomata: 1 (-2 staggered) interstomatal rows, low domed triang.
-Length 12-14 Width 7-9
Long Cells: (describing l.c.'s in rows adjacent to costal rows) rect in rows, slight waviness in cell wall
-Length 35-55 Width 5-6

Adaxial Surface
Silica Bodies: same as abax but less freq. and mostly dumbbells ? in costal rows, along with saddle-shaped s.b.
-Length 5-9 Width 3-4
Macro Hairs: ??
-Length Width
Micro Hairs: like abax
-Length L_b L_d
Prickle Hairs: fairly freq. in costal rows, and at borders of costal rows, oval-rect. bases, short triang. barbs tapering to points
-Length L_b 4-9 W_b 3-5
Papillae: none seen
Stomata: 2(-1) intercostal rows, low domed triang.
-Length 10-11 Width 6-8
Long Cells: parallel in rows, rect., small u-shaped und. (h=3.5, a=1)
-Length 15-40 Width 4-6

Sporobolus subangustum

Abaxial Surface
Silica Bodies: 1(-3) costal rows of nodular and some dumbbell shaped s.b., distal ends slightly indented, central portions narrow, med. length, fairly widely spaced
-Length 7-14 Width (2-)3-4
-sparse intercostal cross-shaped s.b., esp. adjacent to costal rows
-Length 4-5 Width 4-5
Macro Hairs: none seen
-Length Width
Micro Hairs: fairly freq. intercostally, irreg. oval bases, prox. cell cyl., distal

Family: Sporoboleae

cell ~1 1/2x tapering to point after first widening slightly
-Length 31-36 L_b 12-16 L_d
Prickle Hairs: freq. in costal rows, large size, tapered oval bases , short thick pointed barbs, some at right angles to nerve
-Length 17-29 L_b 12-21 W_b 4-7
-occasional intercostal hooks, broad rounded or squared bases, short pointed barbs
-Length 14-18 L_b 9-12 W_b 7-8
Papillae: none seen
Stomata: 1-3 intercostal rows of low-domed peaked
-Length 15-17 Width 8-10
Long Cells: in rows, mostly inflated rect., shallow u-shaped waves, interstomatal l.c. often wider than stomata (h=3, a=1)
-Length 40-80 Width 12-15

Adaxial Surface

Silica Bodies: 1-2 costal rows of nodular and dumbbell shaped s.b., often paired adjacent to each other, distal ends indented, central portions narrow-med. length, scattered intercostal cross-shaped or irreg. s.b., same size as abax
-Length Width
Macro Hairs: none seen
-Length Width
Micro Hairs: same as abax
-Length L_b L_d
Prickle Hairs: same as abax, intercostally, no costal p.h.
-Length L_b W_b
Papillae: none seen
Stomata: same as abax-more triang. low domed, but in 2-5 intercostal rows
-Length Width
Long Cells: in rows, rect. or slightly inflated rect., interstomatal l.c. wider than stomata, med. u-shaped und.
-Length Width

APPENDIX D

DESCRIPTIONS OF

NON-GRASS EPIDERMAL FRAGMENTS

Family: Acanthaceae

Lepidagathis anobrya

Abaxial surface:
Cell Walls: straight; irregular; easily visible; occasionally doubled
Cells:
-Length 10-30 -Width 10-15
Stomata: diallelocytic
-Length 8-14 -Width 4-7
-Prevalence...numerous (1-2)
Hairs: none seen
-Length -Width
Hair Base Cells: none seen
Striations: none seen
Other Structures: loaf cells
-Length 30-100 -Width 9-12
Comments:

Adaxial surface:
Cell Walls: like abaxial surface
Cells:
-length 10-20 -width
Stomata: like abaxial surface
-length 7-12 -width 4-6
-prevalence...moderate (1-4)
Hairs: none seen
Hair Base Cells: none seen
Striations: none seen
Other Structures: loaf cells; numerous (1-2 rows of cells between); aligned
-length 23-200 -width 10-25
Comments:

Lepidagathis heulelotiana

Abaxial surface:
Cell Walls: straight; irregular; easily visible
Cells: most are altered by stomata or loaf cells
-Length 10-20 -Width (d) 5-10
Stomata: diallelocytic
-Length 7-10 -Width 4-7
-prevalence...numerous (1-2)
Hairs: 1 cell; apparently hollow; scarce (1 seen)
-Length 345 -Width 7
Hair Base Cells: actinocytic; d=8-10
Striations: none seen
Other Structures: loaf cells; not ordered
-Length 15-30 (105) Width 5-9 (30)
Comments:

Adaxial surface:
Cell Walls: same as abaxial surface
Cells: same as abaxial surface
-Length -Width
Stomata: same as abaxial surface
-Length 6-11 -Width 3-6
-Prevalence
Hairs: same as abaxial surface; moderate
-Length 60-600 -Width 10-18
Hair Base Cells: same as abaxial surface; 4 basal cells in addition to others; rounded
Striations:
Other Structures: like abaxial surface; numerous (0-2)
-Length 15-60 -Width 8-11
Comments:

Family: Amoranthaceae

Pandianka heudelotii

Abaxial surface:
Cell Walls: moderately undulate; irregular; poorly visible
Cells: d=5-25
-Length -Width
Stomata: anomocytic??
-Length 10 -Width 8
-Prevalence... moderate-numerous
Hairs: 1-4 segments; enlarged at nodes
-Length 50-200 -Width 5-15
-Prevalence...
Hair Base Cells: actinocytic?
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; rounded; poorly visible; thin cutin; stained darkly
Cells: d=15-35
-Length -Width
Stomata: like abaxial surface
-Length 11 -Width 7
-Prevalence...moderate (2-3)
Hairs: 1-6 segments
-Length 70-275 -Width 5-50
-Prevalence... sparse
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Anacardiaceae

Lannea acida

Abaxial surface:
Cell Walls: straight; 4-7 sided; moderately visible; thin cutin
Cells:
-Length 5-18 -Width 5-10
Stomata: anomocytic
-Length 9-12 -Width 5-8
-Prevalence... numerous (1-4)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: at junctions of cell walls the cutin creates a round spot (d=1)
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface; very clear
Cells: d=7-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Lannea velutina

Abaxial surface:
Cell Walls: straight-curved; irregular-rectangular; poorly visible
Cells: d=5-25
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1-cell; usually with mercury-bulb base; only on veins
-Length 40-135 -Width 10
-Prevalence... moderate-dense
Hair Base Cells: actinocytic?...difficult to see
Striations: radially from hair bases
Other Structures: stellate hairs 3-6 (6); rough edges; sparse
-Length 55-135 -Width 6-8
Comments: veins numerous

Adaxial surface:
Cell Walls: like abaxial surface
Cells: like abaxial surface
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abaxial surface
-Length -Width
-Prevalence... moderate
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: like abaxial surface
-Length -Width
Comments:

Family: Anacardiaceae

Lannea egeqria

Abaxial surface:
Cell Walls: straight; pent-hexagonal; easily visible
Cells:
-Length 9-19 -Width 7-18
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: bulbous base; usually "accordion-like" belt with 2 bulges half-way up (sometimes 2 groups)
-Length 91-300 -Width 16-19
-Prevalence... moderate
Hair Base Cells: anomocytic
Striations: irregular over whole
Other Structures: circles; sparse; d=8
-Length -Width
Comments: hairs tend to be on ridges (sags)

Adaxial surface:
Cell Walls: somewhat undulate; "hexagonal"; nearly invisible
Cells: d=7-9
-Length -Width
Stomata: cyclocytic; 6-cell; d=9
-Length -Width
-Prevalence... sparse
Hairs: like abaxial surface; sometimes rough-edged
-Length 77-280 -Width 13-20
-Prevalence... moderate-numerous
Hair Base Cells: none seen
Striations: none seen
Other Structures: odd elongate structures; not prevalent; length=30, width=8
-stellate hairs; sparse; 6-haired
-Length 50-85 -Width 8
Comments: much mesophyll

Lannea humilis

Abaxial surface:
Cell Walls: straight-walled; irregular; easily visible
Cells:
-Length 9-15 -Width 5-10
Stomata: anomocytic; stomatal ridge; not on veins
-Length 10-12 -Width 6-8
-Prevalence... numerous (2-3)
Hairs: 1-cell; peg-foot; all on small "veins"
-Length 110-350 -Width 7-10
-Prevalence... moderate-numerous
Hair Base Cells: actinocytic or on veins
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: 5-7 sided; exceptionally visible
Cells:
-Length 13-22 -Width 7-14
Stomata: tetracytic, anomocytic or somewhat cyclocytic; 4 cells
-Length 13-19 -Width 9-10
-Prevalence...sparse
Hairs: like abaxial surface; double-tapered, worm-like
-Length 60-130 -Width 5-6
-Prevalence... sparse
Hair Base Cells: 1 cell around peg hole; actinocytic around this cell
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: very ordered veins 1-3 cells wide

Lannea microcarpa

Abaxial surface:
Cell Walls: straight-slightly undulate; somewhat rounded; moderately visible
Cells: d=5-15
-Length -Width
Stomata: anomocytic
-Length 9-14 -Width 9
-Prevalence... numerous (2-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface; walls doubled
Cells:
-Length 7-20 -Width 5-15
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic
Striations: radiating from hair base cells, erratic between hairs
Other Structures: none seen
-Length -Width
Comments:

Orozoa insignis

Abaxial surface:
Cell Walls: slightly undulate; somewhat round; faint
Cells: d=7
-Length -Width
Stomata: none distinguished
-Length -Width
-Prevalence...
Hairs: 1-cell; loosely sickle-shaped; straight ones length=30-60
-Length 50-80 -Width 3-4
-Prevalence... numerous on veins, others sparse
Hair Base Cells: anomocytic
Striations: ordered in lines; not easily visible over entire
Other Structures: club hairs; 3-4 celled; more on veins; peg foot
-Length 25-35 -Width 10-20
Comments:

Adaxial surface:
Cell Walls: straight; somewhat squared; mostly covered by hair
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1-cell; slightly bulbous at base; slowly tapering to a point; straight
-Length 43-260 -Width 3-5
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: thick covering of hair

Family: Annonaceae

Annona senegalensis

Abaxial surface:
Cell Walls: straight walled; irregular; easily seen
Cells:
-Length 7-15 -Width 4-8
Stomata: anomocytic-tetracytic; stomatal ridge :zigzagged"
-Length 8-10 -Width 4-6
-Prevalence... numerous (1-4)
Hairs: small veins connecting hairs
-Length 60-140 -Width 4-6
-Prevalence... sparce-moderate
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: apparently 2-layered...1 layer cells d=4-17

Adaxial surface:
Cell Walls: like abaxial surface
Cells:
-Length 5-10 -Width 4-7
Stomata: none seen

Family: Annonaceae

-Length -Width
-Prevalence...
Hairs: 1-cell; flexible
-Length 85-100 -Width 5-6
-Prevalence... sparse
Hair Base Cells: peg foot
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abaxial surface

Uvaria chamae

Abaxial surface: ??
Cell Walls: slightly undulate; irregularly round; easily seen
Cells: d=5-8
-Length -Width
Stomata: anomocytic-tetracytic; square
-Length 6-7 -Width 5
-Prevalence... moderate (2-4)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: only one side presented

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Family: Apocynaceae

Saba senegalensis

Abaxial surface:
Cell Walls: irregular-squared; slightly-moderately undulate
Cells: with 0-7 round structures inside d=1-2
-Length 7-16 -Width 5-9
Stomata: anomocytic; circular structure at center d=2
-Length 5-8 -Width 6
-Prevalence... numerous (1)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly undulate; irregular; easily visible
Cells:
-Length 4-11 -Width 2-6
Stomata: like abaxial surface
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Balanitaceae

Balenites aegyptica

Abaxial surface: ??
Cell Walls: straight-curved; irregular; easily visible
Cells: d=2-5
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1-cell; apparently hollow; no veins seen
-Length 50-170 -Width 5-7
-Prevalence... sparse
Hair Base Cells: cyclocytic; 6-9 cells
Striations: none seen
Other Structures: many holes cyclocytic, potentially lost hairs d=5-6, potentially stomata (5-8 cells between)
-Length -Width
Comments: two photos apparently the same

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Family: Bignoniaceae

Stereospermum kunthianum

Abaxial surface:
Cell Walls: rounded; easily visible
Cells: d=4-13
-Length -Width
Stomata: anomocytic
-Length 6-12 -Width 3-6
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: actinocytic, round 3-d spoked-wheel structures; d=12-16; occasional
-occasional round thickenings of cell walls d=1
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight-moderately undulate; square-rounded; highly visible
Cells:
-Length 7-27 -Width 7-15
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: occasional lines of extra-thick cutin walls
-Length -Width
Comments:

Family: Bombaceae

Adansonia digitata

Abaxial surface:
Cell Walls: straight-curved; irregular-undulate; poorly visible (faint)
Cells:
-Length 6-23 -Width 4-12
Stomata: anomocytic; highly cutinized around edges
-Length 9-16 -Width 7-14
-Prevalence... numerous (1-4)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: balls d=16-21, frequent
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface; apparently 2-layers
Cells:
-Length 6-25 -Width 5-17
Stomata: none seen
-Length -Width
-Prevalence...

Family: Bombaceae

Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic; middle d=10-15; numerous
Striations: "flaps" located encircling hair bases and randomly other places
Other Structures: like abaxial surface
-Length -Width
Comments:

Bombax costatum

Abaxial surface:
Cell Walls: straight-slightly undulate; irregular; moderately visible
Cells:
-Length 7-23 -Width 5-12
Stomata: anomocytic; highly cutinized around edges
-Length 11-17 -Width 7-9
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: encircling stomata, sometimes radiating from them, not too prevalent
Other Structures: club hairs; actinocytic
-Length 24-34 -Width 12-14
Comments: occasional lines of extra-thick cell walls

Adaxial surface:
Cell Walls: like abaxial surface; heavily cutinized (double-walled)
Cells:
-Length 10-25 -Width 10-20
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic, middle d=10-15; numerous
Striations: like abaxial surface
Other Structures: like abaxial surface
-Length -Width
Comments: like abaxial surface

Family: Burseraceae

Commiphora africana

Abaxial surface:
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, tapered entire length, expanded base, coarse, tending towards veins
-Length 320-650 -Width 25-35
-Prevalence... sparse
Hair Base Cells: thickened cutin with pockmarks
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: none seen
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax.
-Length 260-520 -Width 17-30
-Prevalence...
Hair Base Cells: like abax.
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Capparaceae

Cadaba farinosa

Abaxial surface:
Cell Walls: moderately undulate; irregular, highly visible
Cells:
-Length 7-18 -Width 5-13
Stomata: anomocytic
-Length 6-9 -Width 5
-Prevalence... numerous (2-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: circular structure with radial striations d=8-12; 1-4 per field
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface; poorly visible (due to striations)
Cells: like abaxial surface
-Length -Width
Stomata: like abaxial surface
-Length -Width
-Prevalence... (2-4)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: heavy, radiating from circular structures, branching like rivers otherwise
Other Structures: d=5-12
-Length -Width
Comments:

Capparis fascicularis

Abaxial surface:
Cell Walls: slightly-moderately undulate; irregular, 0-7 peaks; moderately visible
Cells: d=5-20
-Length -Width
Stomata: anomocytic
-Length 4-6 -Width 3-4
-Prevalence... moderate
Hairs: 1-cell, apparently hollow, somewhat doudle-tapered
-Length 70-110 -Width 7-10
-Prevalence... sparse
Hair Base Cells: ~7 radially oriented, sometimes highly visible
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly-moderately undulate; irregular, 3-6 peaks
Cells: d=5-10
-Length -Width
Stomata: like abaxial surface
-Length 7-8 -Width 4
-Prevalence... mod.
Hairs: like abaxial surface
-Length 70-120 -Width 7-10
-Prevalence... mod.
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Capparis tomentosa

Abaxial surface: ??
Cell Walls: slightly undulate; irregular; moderately visible
Cells:
-Length 5-15 -Width 4-7
Stomata: anomocytic; often associated with mesophyll
-Length 4-8 -Width 4
-Prevalence... moderate (5-10)
Hairs: 1-cell (2?), apparently hollow
-Length 80-210 -Width 6-8
-Prevalence... moderate
Hair Base Cells: somewhat actinocytic
Striations: none seen
Other Structures: oddly spaced pappillae prevalent, diameter = 2-3
-Length -Width
Comments:

Adaxial surface:

Family: Capparaceae

Cell Walls: straight-undulate, like abaxial surface
Cells: diameter = 7-20
-Length -Width
Stomata: like abaxial surface
-Length -Width
-Prevalence...
Hairs: like abaxial surface
-Length -Width
-Prevalence...
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Crateva adansonii

Abaxial surface:
Cell Walls: straight; squared; poor-moderate visible
Cells:
-Length 9-20 -Width 7-13
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: heavy-flowing with ebbs here and there
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly undulate; irregular-rounded; poorly visible
Cells: diameter = 10-15?
-Length -Width
Stomata: anomocytic??, peripheral beaded thickening
-Length 4-7 -Width 9-15
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: heavy-radiating from stomata, erratic elsewhere, more like noise
Other Structures: none seen
-Length -Width
Comments:

Maerua angolense

Abaxial surface:
Cell Walls: moderate-highly undulate; irregular; poorly visible
Cells: diameter = 10-20
-Length -Width
Stomata: anomocytic
-Length 7-11 -Width 3-5
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface
Cells: like abaxial surface
-Length -Width
Stomata: anomocytic? difficult to see
-Length 4? -Width 3?
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Caryophyllaceae

Polycarpea eriantha

Abaxial surface:
Cell Walls: slightly undulate; elongate-irregular; thick walled
Cells: possible venous cells prominent/ other cells
-Length 31-57/19-40 -Width 10-23/9-27
Stomata: anomocytic
-Length 8-12 -Width 5-8
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: rooted in middle of cell (towards one end)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight/slightly undulate; elongate/irregular; poorly visible (faint)
Cells: like abaxial surface
-Length 40-86/25-50 -Width 18-33/13-38
Stomata: like abaxial surface
-Length -Width
-Prevalence...
Hairs: 1-cell
-Length 15-70 -Width 10
-Prevalence... sparse (2 seen)
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Celastraceae

Maytenus senegalensis

Abaxial surface: ?
Cell Walls: straight; rounded-irregular; poorly visible (2 layers)
Cells: diameter = 5-14
-Length -Width
Stomata: paracytic ?, possibly anomocytic with extra thick outer stomatal walls
-Length 10-13 -Width 9-13
-Prevalence... numerous (2-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: occasional lines of extra-thick cell walls

Adaxial surface:
Cell Walls: like abaxial surface
Cells: like abaxial surface
-Length -Width
Stomata: like abaxial surface
-Length 10-12 -Width 7-11
-Prevalence... (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abaxial surface

Family: Cochlospermaceae

Cochlospermum planthoni

Abaxial surface:
Cell Walls: slightly undulate; irregular; moderately visible
Cells:
-Length 5-13 -Width 2-9
Stomata: anomocytic
-Length 10 -Width 6
-Prevalence... numerous (1-3)
Hairs: 1-cell, tending towards veins
-Length 34-215 -Width 5-6
-Prevalence... sparce-moderate
Hair Base Cells: actinocytic-venous
Striations: none seen
Other Structures: flat-topped hairs, black
-Length 15-27 -Width 1
Comments: occasional lines of extra thick cell walls

Adaxial surface:

Family: Cochlospermaceae

Cell Walls: straight; rounded; easily visible
Cells: diameter = 5-18
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abaxial surface
-Length 50-90 -Width 5-6
-Prevalence... (4 seen)
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abaxial surface

Cochlospermum tinctorium

Abaxial surface:
Cell Walls: slightly undulate; irregular; poorly visible
Cells:
-Length 6-12 -Width 3-6
Stomata: anomocytic
-Length 7-12 -Width 5-8
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: occasional lines of extra thick cell walls

Adaxial surface:
Cell Walls: straight; rounded; moderately visible
Cells: diameter = 7-20
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abaxial surface

Family: Combretaceae

Anogeissus leiocarpus

Abaxial surface:
Cell Walls: moderately undulate; irregular 3-8 peaks
Cells: diameter = 3-5
-Length -Width
Stomata: anomocytic
-Length 6-7 -Width 4
-Prevalence... moderate-heavy
Hairs: 1-cell, tapering entire length, more on veins
-Length 35-130 -Width 4-6
-Prevalence... sparse
Hair Base Cells: 5-7 radially oriented
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly undulate; slightly irregular (0-6 peaks); highly visible
Cells: diameter = 5-10
-Length -Width
Stomata: like abaxial surface
-Length 7 -Width 4
-Prevalence... sparse
Hairs: like abaxial surface
-Length 25-160 -Width 2-5
-Prevalence... moderate-heavy
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Combretum collinum hypopilinum

Abaxial surface:
Cell Walls: slightly undulate; somewhat round (0-5); moderately visible
Cells: diameter = 5-10
-Length -Width
Stomata: paracytic?; diameter = 10?
-Length -Width
-Prevalence... sparse?
Hairs: 1-cell, tapering entire length
-Length 25-70 -Width 2-3
-Prevalence... sparse (none on veins)
Hair Base Cells: 5 radially oriented
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface
Cells: like abaxial surface
-Length -Width
Stomata: anomocytic
-Length 5-8 -Width 5-6
-Prevalence... moderate-dense (1-3+)
Hairs: like abaxial surface; thick cutin prevalent on circular peg-feet, erratic
-Length 60-100 -Width 2-5
-Prevalence... dense
Hair Base Cells: not distinguishable
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Combretum glutinosum

Abaxial surface:
Cell Walls: slightly undulate; irregular; moderately visible
Cells: diameter = 5-10
-Length -Width
Stomata: anomocytic, zigzag stomatal ridge
-Length 10-15 -Width 6-10
-Prevalence... dense (1-3)
Hairs: 1-cell
-Length 30-60 -Width 4-5
-Prevalence... sparce-moderate, erratic
Hair Base Cells: anomocytic-actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: distinct veins

Adaxial surface:
Cell Walls: like abaxial surface; double walled
Cells:
-Length 8-16 -Width 4-12
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abaxial surface; bulbous base
-Length 50-90 -Width 7-8
-Prevalence... sparse
Hair Base Cells: actinocytic; frequent
Striations: radiating from hair bases like folds from buttons on a pillow, elsewhere like erratic wrinkles
Other Structures: none seen
-Length -Width
Comments: cell walls with occasional beads of extra thick cutin

Combretum paniculatum

Abaxial surface:
Cell Walls: slightly undulate; irregular; difficult to see (thin, much mesophyll)
Cells: diameter = 5-10
-Length -Width
Stomata: anomocytic
-Length 9-13 -Width 7-10
-Prevalence... numerous (1-3)
Hairs: 1 cell; slightly curved
-Length 90-180 -Width 8
-Prevalence...
Hair Base Cells: anomocytic
Striations: radiating from larger stomata and hairs
Other Structures: multi-celled (5) club hairs; sparse
-Length 35-55 -Width 15
Comments:

Adaxial surface:

Family: Combretaceae

Cell Walls: like abaxial surface
Cells: like abaxial surface
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abaxial surface
-Length -Width
-Prevalence...
Hair Base Cells: like abaxial surface
Striations: more prominent than abaxial surface
Other Structures: like abaxial surface
-Length -Width
Comments:

Combretum micranthum

Abaxial surface:
Cell Walls: straight; irregular; easily visible; double thick
Cells: diameter = 4-14
-Length -Width
Stomata: anomocytic
-Length 9-15 -Width 6-10
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: limited to erratic wrinkles here and there
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface
Cells: diameter = 8-16
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic; numerous
Striations: slightly radiating from hair bases
Other Structures: very faint bag hairs; diameter = 20
-Length -Width
Comments:

Combretum collinum binderanum

Abaxial surface:
Cell Walls: moderate-highly undulate; highly irregular; difficult-moderately visible
Cells: diameter = 3-10
-Length -Width
Stomata: actinocytic (5-7)
-Length 10 -Width 5
-Prevalence... moderate
Hairs: 1-cell, very bulbous (-15)
-Length 60-300 -Width 5-8
-Prevalence... moderate equally on veins
Hair Base Cells: not differentiated
Striations: none seen
Other Structures: moderate covering of doughnuts, diameter = 7-8, possibly peg feet
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface; highly visible
Cells: like abaxial surface
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abaxial surface, bulbous (-20)
-Length 90-300 -Width 9-10
-Prevalence... slight-moderate
Hair Base Cells: less undulate with some radial striations, diameter = 6
Striations: on hair base cells
Other Structures: sparse covering of doughnuts with radial striations, diameter = 6
-Length -Width
Comments:

Combretum nigricanus

Abaxial surface:
Cell Walls: slightly undulate; irregular; poorly visible (faint, variable)
Cells:
-Length 4-12 -Width 3-7
Stomata: cyclocytic?
-Length 5-11 -Width 4-6
-Prevalence... numerous (2-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: bag hairs, diameter = 23-30, moderate numbers
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight-curved; rounded; easily visible
Cells: diameter = 5-14
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: clumps of subcellular objects in all cells
-Length -Width
Comments:

Pteleopsis suberosa

Abaxial surface:
Cell Walls: straight; rounded; moderately visible
Cells: diameter = 5-11
-Length -Width
Stomata: anomocytic
-Length 11-16 -Width 7-9
-Prevalence... numerous (1-2)
Hairs: 1 cell
-Length 27-105 -Width 4-6
-Prevalence... sparce-moderate
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abaxial surface; patches where not visible (faint)
Cells: diameter = 4-12
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abaxial surface
-Length 50-130 -Width 4-6
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Terminalia avicennoides

Abaxial surface:
Cell Walls: straight; "squared"; covered by hair
Cells: diameter = 5-8
-Length -Width
Stomata: anomocytic?; accessory cells difficult to distinguish
-Length 8-10 -Width 6-8
-Prevalence... moderate
Hairs: 1 cell; tending off from veins
-Length 30-140 -Width 4-5
-Prevalence... moderate-numerous
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: very messy slide, mesophyll and hair

Family: Combretaceae

Adaxial surface:
Cell Walls: squared-irregular; easily visible; occasional areas of a second cell layer (mesophyll)
Cells:
-Length 5-13 -Width 3-10
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: like abaxial surface, moderate numbers
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abaxial surface

Terminalia laxiflora

Abaxial surface:
Cell Walls: straight; 5-6 sided; occasionally visible; mostly venous cells visible due to thinness of cuticle
Cells: diameter = 5-10
-Length -Width
Stomata: anomocytic; clumped in areas of no veins (thin cuticle)
-Length 6-10 -Width 4-8
-Prevalence... (0-1)
Hairs: 1 cell; slightly wider at base
-Length 80-180 -Width 8
-Prevalence... sparce-moderate
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: 4-6 sided; highly visible
Cells: like abaxial surface
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs:
-Length 50-150 -Width 5-8
-Prevalence... sparse
Hair Base Cells: actinocytic (4-6 cells)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Terminalia macroptera

Abaxial surface:
Cell Walls: straight-slightly undulate; irregular; easily seen
Cells:
-Length 3-10 -Width 5-14
Stomata:
-Length 4-8 -Width 7-12
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; squared
Cells:
-Length 5-15 -Width 3-10
Stomata: anomocytic
-Length 4-8 -Width 4-8
-Prevalence... moderate (2-5)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Terminelia mollis

Abaxial surface:
Cell Walls: straight; rounded; mod. vis.
Cells: d=5-9
-Length -Width
Stomata: anomocytic, clustered
-Length 5-10 -Width 3-5
-Prevalence... Dense (0-1)
Hairs: 1 cell, like worms
-Length 350 -Width 8
-Prevalence... mod.
Hair Base Cells: venous
Striations: none seen
Other Structures: nucleus? visible in most cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight-slightly und.; rounded-elongate; easily vis.; THICK
Cells:
-Length 7-16 -Width 5-12
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: bag, d=8-10
-Length -Width
-Prevalence... sparse-mod.
Hair Base Cells: anomocytic-actinocytic
Striations: none seen
Other Structures: like abax.
-Length -Width
Comments:

Family: Commelinaceae

Ancilema setiferum

Abaxial surface:
Cell Walls: slightly undulate; highly cutinized; difficult to distinguish due to cutinization
Cells: diameter = 12-30
-Length -Width
Stomata: anomocytic; aligned in same direction (generally)
-Length 14-16 -Width 8
-Prevalence... numerous (1-2)
Hairs: 2-cell
-Length 35-340 -Width 11-60
-Prevalence...
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: cells somewhat ordered

Adaxial surface:
Cell Walls: like abaxial surface
Cells: diameter = 10-25
-Length -Width
Stomata: like abaxial surface
-Length -Width
-Prevalence... (1 seen)
Hairs: like abaxial surface
-Length 40-600 -Width 20-60
-Prevalence...
Hair Base Cells: like abaxial surface
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abaxial surface

Family: Compositae

Sonshus spp.

Abaxial surface:
Cell Walls: highly undulate; irregular (4-8); highly visible
Cells: diameter = 5-30
-Length -Width
Stomata: anomocytic; sunken?
-Length 8-9 -Width 6
-Prevalence... sparse
Hairs: 4-6 segments; indented at nodes, no more on veins
-Length 40-140 -Width 10-30
-Prevalence... moderate
Hair Base Cells: anomocytic-actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: poorly visible due to clutter of mesophyll
Cells: diameter = 3-15
-Length -Width
Stomata: none seen
-Length -Width

Family: Compositae

-Prevalence...
Hairs: like abaxial surface
-Length -Width
-Prevalence...
Hair Base Cells: anomocytic?
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

152 slide ruined

Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

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Abaxial surface:
Cell Walls: highly und.; irr. (5-10); slightly-moderately visible
Cells: d=5-40
-Length -Width
Stomata: anomocytic; diamond shaped
-Length 9 -Width 6
-Prevalence... sparse
Hairs: 2 segments; slightly more on veins; first segment with bumps; first/second
-Length 40-300/10-60 -Width 5-30/5-10
-Prevalence...
Hair Base Cells: actinocytic; highly visible; (6-10)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; moderately visible
Cells: like abax
-Length -Width
Stomata: anomocytic?
-Length 7? -Width 5-6?
-Prevalence... sparse
Hairs: like abax
-Length 85-310/10-80 -Width 15-30/5-10
-Prevalence... mod.
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Convulvuluceae

Ipomaca aquatica

Abaxial surface: ?
Cell Walls: N/A
Cells: occasional bag cells; d=12-17; dark cells irr.
-Length 2-15 -Width 1-10
Stomata:
-Length 8-12 -Width 4-6
-Prevalence... Dense
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: encircling stomata; radiating from bag hairs
Other Structures: bag hairs; d=14-20; sparse
-Length -Width
Comments: unique slide; mostly stomata, separated by dark cells; with occasional bag cells

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: paracytic
-Length -Width
-Prevalence... numerous
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: like abax
Other Structures: like abax
-Length -Width
Comments: like abax but less stomata and dark cells are light with visible cell walls

Meremia kentrocaulos

Abaxial surface:
Cell Walls: slightly und.; very difficult to see
Cells: unable to determine
-Length -Width
Stomata: paracytic; can only see accessory cells
-Length 8-9 -Width 6
-Prevalence... [0-70=distance between acc. cells]
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: wagon wheels; inner circle d=7; outer ring d=17; 15-20 spokes; no relation to veins; 1-3/field; =bag hairs
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; rounded
Cells: d=7-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: irr., like ravines leading to veins, prevalent
Other Structures: like abax; sparse
-Length -Width
Comments:

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Abaxial surface:
Cell Walls: slightly und.; somewhat round; difficult to find due to hair covering
Cells: d=10-20
-Length -Width
Stomata:
-Length 12 -Width 8
-Prevalence... numerous
Hairs: 1 cell?; expanded base; possibly 1 or 2 cells; like sweat band;
-Length 410 -Width 8
-Prevalence... dense
Hair Base Cells: undifferentiated
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; easily visible
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax; highly expanded base; longitudinally striated
-Length 80-800 -Width 5-25
-Prevalence... mod.-heavy

Family: Convulvuluceae

Hair Base Cells:
undifferentiated-radially elongated in larger hairs; 15-25 cells
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Dioscoreaceae

Dioscorea dumetorum

Abaxial surface:
Cell Walls: moderately und.; somewhat elongated; irr.; easily visible
Cells: d=5-20
-Length -Width
Stomata:anomocytic-actinocytic
-Length 10 -Width 7
-Prevalence... mod.
Hairs: 1 cell; slightly enlarged base; sleeved insertion; slowly bent; not more on veins
-Length 160-220 -Width 5-6
-Prevalence... sparse
Hair Base Cells: anomocytic-actinocytic
Striations: slight longitudinal; sometimes continuing beyond cell walls
Other Structures: frequent bases to fallen hairs
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; slight-moderately und.
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: see "other structures"
Striations: like abax
Other Structures: apparent hair bases; actinocytic-anomocytic; d=15-20; with 3-4 central cells; collar-like; sparse
-Length -Width
Comments: occasionally thickened cell walls; d=3

Family: Eberaceae

Diospyros mespiliformis

Abaxial surface:
Cell Walls: slightly und.; irr.; easily visible
Cells: d=5-10
-Length -Width
Stomata: cyclocytic
-Length 10 -Width 8-10
-Prevalence... dense (0-3)
Hairs: 1 cell; 2 points, attached in middle straight; no relation to veins
-Length 50-80/70-130 -Width 6-7
-Prevalence... sparse
Hair Base Cells: anomocytic; large "central cell"; d=12
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: squared; slightly und. when out of focus, otherwise straight (somewhat)
Cells: d=3-11
-Length -Width
Stomata: none seen
-Length -Width
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Euphorbiaceae

Antidesma venosum

Abaxial surface:
Cell Walls: moderately und.; usually elongate; easily visible
Cells:
-Length 7-35 -Width 4-20
Stomata: anomocytic-paracytic
-Length 6-14 -Width 5-8
-Prevalence...
Hairs: 1 cell
-Length 50-150 -Width 7-10
-Prevalence... sparse
Hair Base Cells: on veins
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: d=10-20
-Length up to 45 -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Bridelia ferruginea

Abaxial surface:
Cell Walls: straight; rounded; easily visible
Cells: d=4-15
-Length -Width
Stomata: anomocytic
-Length 7-12 -Width 5-7
-Prevalence... numerous (1-2)
Hairs: 1 cell; tapered entire length; tending towards veins
-Length 70-185 -Width 6-8
-Prevalence... sparse-mod.
Hair Base Cells: cyclocytic?
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; 4-6 sided
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic; sparse
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Croton nigritanus

Abaxial surface: ?
Cell Walls: straight; irr.; moderately visible
Cells:
-Length 7-15 -Width 5-10
Stomata: tetracytic
-Length 9 -Width 5
-Prevalence... sparse (2-30)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic; sparse-mod.
Striations: none seen
Other Structures: 25% of cells with doughnuts; d=4; grouped
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells:
-Length 6-14 -Width 3-8
Stomata:
-Length 5-7 -Width 4-6
-Prevalence... numerous (1-2)
Hairs: 28 hairs; d of whole=200; like starburst
-Length -Width
-Prevalence... 1 seen on vein

Family: Euphorbiaceae

Hair Base Cells: like abax
Striations: none seen
Other Structures: like abax; in 10% of cells; not grouped; d=3
-Length -Width
Comments:

Hymenocandia acida

Abaxial surface:
Cell Walls: straight; squared; moderately visible
Cells:
-Length -Width 6-13
Stomata: anomocytic; somewhat clumped
-Length 8-11 -Width 6
-Prevalence...
Hairs: 1 cell; only on main vein
-Length 45-60 -Width 5-10
-Prevalence...
Hair Base Cells: venous
Striations: none seen
Other Structures: numerous "lily pads" = bag hairs; somewhat transparent; d=28-85
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; irr.
Cells: d=3-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: 2 photos of abax

Phyllanthus spp.

Abaxial surface:
Cell Walls: slightly und.; irr.; highly visible
Cells: d=5-25
-Length -Width
Stomata: anomocytic
-Length 6 -Width 3
-Prevalence... sparse
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: nucleus visible in all cells
-Length -Width
Comments: some extra-thick walls

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Sapium grahamii

Abaxial surface:
Cell Walls: slightly und.; irr.; highly visible
Cells: d=5-15
-Length -Width
Stomata: anomocytic
-Length 8-10 -Width 5-6
-Prevalence... dense (0-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: occasional long lines of extra-thick walls

Adaxial surface:
Cell Walls: like abax; easily visible
Cells:
-Length 6-20 -Width 4-10
Stomata: paracytic
-Length 6-9 -Width 4-6
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax

Securinega virosa

Abaxial surface:
Cell Walls: straight; squared; moderately visible; thin double walls
Cells:
-Length 7-17 -Width 4-9
Stomata: tetracytic
-Length 7-9 -Width 4-5
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: slight, erratic
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; easily visible
Cells:
-Length 6-22 -Width 5-14
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: like abax
Other Structures: none seen
-Length -Width
Comments:

Family: Flacourtiaceae

Flacourtia indica

Abaxial surface:
Cell Walls: slightly und.; irr.; moderately visible; very thick
Cells: d=4-12
-Length -Width
Stomata: paracytic-tetracytic; with inner circle
-Length 7-11 -Width 7
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: d=5-18
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell; only on veins; hook-shaped
-Length 25-40 -Width 5
-Prevalence... sparse
Hair Base Cells: venous
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Oncoba spinosa

Abaxial surface:
Cell Walls: slightly undulate; many somewhat rectangular; highly visible
Cells: several size categories
-Length 20/12/5 -Width 10/7/5
Stomata: somewhat paracytic
-Length 8-12 -Width 6-7
-Prevalence... dense (1-2)
Hairs: none seen

Family: Flacourtiaceae

-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: occasional long lines of thickened cell walls; many square cells (3x7) with thickened walls

Adaxial surface:
Cell Walls: irr.; easily visible; a lot of mesophyll in places
Cells: like abax; smaller cells seem darker
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: fine, alligned-erratic
Other Structures: none seen
-Length -Width
Comments: like abax; fibrous veins

Family: Guttiferae

Garcinia livingstonei

Abaxial surface:
Cell Walls: slightly und.; many resembling beads on a string; moderately visible; somewhat rectangular
Cells:
-Length 10-15 -Width 5-7
Stomata: paracytic-each is like in a box; shaped like butterflies; 11-12 square
-Length -Width
-Prevalence... dense (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; slightly-moderately visible
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Psorospermum senegalense

Abaxial surface:
Cell Walls: mod. undulations; irr.; slightly-moderately visible
Cells: d=5-10
-Length -Width
Stomata: anomocytic
-Length 9-10 -Width 7-8
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: moderate numbers
Striations:
Other Structures: volcano-like structure with cells, somewhat actinocytic with 1 cell circling the base, d=7, center hole d=3, possibly hair base
-Length -Width
Comments: boring

Adaxial surface:
Cell Walls: like abax; highly visible
Cells: d=10-15; some rectangular
-Length 5 -Width 15
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: sparse
Striations: none seen
Other Structures: like abax
-Length -Width
Comments: like abax

Family: Labiatae

Tinnea barteri

Abaxial surface:
Cell Walls: mod. undulations; irr.; easily visible
Cells: d=5-25
-Length -Width
Stomata: anomocytic
-Length 10 -Width 8
-Prevalence... sparse/clumped
Hairs: 3-4 segments; proximal segments shorter; swollen at base, some bent to full circles, more on veins
-Length 35-315 -Width 15-20
-Prevalence...
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; rounded; easily visible
Cells: d=10-25
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax, 2-9 segments
-Length 25-240 -Width 15-20
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: transparent "lily pads" =bag hairs?; d=50-50; mod. numbers
-Length -Width
Comments:

Family: Cesalpinoideae

Afzelia africana

Abaxial surface:
Cell Walls: slightly und.; irr.; highly visible; thick
Cells:
-Length 5-20 -Width 5-10
Stomata: paracytic
-Length 8 -Width 5-7
-Prevalence... numerous (0-1)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: very clean slide

Adaxial surface:
Cell Walls: like abax; irr.-squared
Cells:
-Length 7-20 -Width 7-11
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax

Burkea africana

Abaxial surface:
Cell Walls: straight; elongate; easily visible
Cells:
-Length 7-15 -Width 4-8
Stomata: paracytic
-Length 7-11 -Width 5-7
-Prevalence... numerous (0-1)
Hairs: 1 cell, hollow, like porcupine quill

Family: Cesalpinoideae

-Length 155 -Width 6
-Prevalence... 1 seen
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; irr.
Cells:
-Length 7-20 -Width 3-10
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: nucleus visible in venous cells, d=1
-Length -Width
Comments:

Burkea africana

Abaxial surface:
Cell Walls: straight; squared; easily visible
Cells:
-Length 5-20 -Width 5-10
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, straight, rough edges
-Length 60-100 -Width 3-4
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; moderately visible
Cells: like abax
-Length -Width
Stomata: paracytic
-Length 8 -Width 5-6
-Prevalence... numerous (2-3)
Hairs: like abax
-Length -Width
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Cassia arereh

Abaxial surface:
Cell Walls: slightly und.; square-round; moderately visible
Cells: d=5-10
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, tapering entire length, equal number on veins
-Length 30-70 -Width 4-5
-Prevalence... sparse
Hair Base Cells: anomocytic (6-8 cells)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: occasional long lines of extra thick cell walls

Adaxial surface:
Cell Walls: like abax; somewhat round
Cells: d=3-10
-Length -Width
Stomata: anomocytic
-Length -Width
-Prevalence...
Hairs: like abax
-Length 25-80 -Width 2-5
-Prevalence... mod.
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Cassia mimosoides

Abaxial surface:
Cell Walls: slightly und.; generally rounded; poorly visible
Cells: d=5-20
-Length -Width
Stomata: paracytic?
-Length 6-8 -Width 2-4
-Prevalence... dense
Hairs: 1 cell, very bulbous base, straight, on vein
-Length 75 -Width 5
-Prevalence... only 1 seen
Hair Base Cells: actinocytic? (6-10)
Striations: none seen
Other Structures: nucleus easily seen in cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; most easily visible
Cells:
-Length 10-35 -Width 10-15
Stomata: paracytic??, apparently in sunken areas of missing cells with much extra space
-Length 6-8 -Width 5
-Prevalence... mod. (1-2)
Hairs: like abax
-Length 30 -Width 10
-Prevalence...
Hair Base Cells: venous
Striations: none seen
Other Structures: nucleus not seen; "water spots" instead; also abstract dark structures (~15mu), scattered randomly between cells
-Length -Width
Comments:

Cassia nigricans

Abaxial surface:
Cell Walls: slightly und.; irr.; poorly visible
Cells: d=10-20
-Length -Width
Stomata: paracytic?
-Length 8-10 -Width 4-6
-Prevalence... numerous (1-2)
Hairs: 1 cell, sickle-shaped
-Length 40-115 -Width 5-7
-Prevalence... mod.
Hair Base Cells: anomocytic?
Striations: none seen
Other Structures: nucleus easily seen in cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: like abax
-Length -Width
-Prevalence... (2-3)
Hairs: like abax
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Cassia sieberana

Abaxial surface:
Cell Walls: straight; squared; poorly-moderately visible; cutin not heavy
Cells: not very ordered or in pairs
-Length -Width 4-11
Stomata: anomocytic, peripheral and stomatal thickening
-Length 5-9 -Width 3-5
-Prevalence...
Hairs: 1 cell, rough edge, straight
-Length 35-90 -Width 7
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; easily

Family: Cesalpinoideae

visible; heavy cutin
Cells: somewhat ordered, apparently in pairs
-Length -Width 4-11
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax, sickle shaped
-Length 35-90 -Width 7
-Prevalence...
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Cassia sinqueana

Abaxial surface:
Cell Walls: straight; squared; moderately visible
Cells:
-Length 8-29 -Width 6-16
Stomata: anomocytic
-Length 8-11 -Width 5-7
-Prevalence...
Hairs: 1 cell, curved, rough edged
-Length 125-235 -Width 8-11
-Prevalence... sparse
Hair Base Cells: actinocytic
Striations: 60% of cells with wrinkles on top, especially cells by stomata, the rest clear
Other Structures: nucleus visible in most cells, d=2-6
-Length -Width
Comments: occasional long lines of extra-thick cell walls

Adaxial surface:
Cell Walls: like abax; easily visible
Cells:
-Length 5-21 -Width 4-16
Stomata: like abax
-Length 8-11 -Width 5-7
-Prevalence...
Hairs: like abax; edges not rough
-Length 125-235 -Width 8-11
-Prevalence... sparse
Hair Base Cells: like abax
Striations: none seen
Other Structures: like abax
-Length -Width
Comments: like abax

Daniellia oliveri

abaxial surface:
Cell Walls: straight-slightly und.; irr.; highly visible
Cells:
-Length 6-20 -Width 5-11
Stomata: paracytic, peripheral t-thickening,
-Length 10-15 -Width 6-10
-Prevalence... dense (0-1)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: round cells, mostly on veins, d=7
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells:
-Length 10-30 -Width 6-16
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: like abax
-Length -Width
Comments: some cells all black inside, like air bubbles; fine matting within cells

Detarium microcarpum

Abaxial surface:
Cell Walls: straight-slightly und.; irr.;-square; barely visible, mostly not visible (faint, many papillae)
Cells:
-Length 11 -Width 5-9
Stomata:
-Length 6-11 -Width 4-8
-Prevalence... mod.
Hairs: 1 cell, hollow
-Length 35-110 -Width 4-5
-Prevalence... sparse
Hair Base Cells: actinocytic-cyclocytic with many (~20) small cells in each of 3 rows
Striations: none seen
Other Structures: many papillae (40% coverage), d=5, not many on veins
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; barely visible; no papillae
Cells:
-Length 6-14 -Width 5-8
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 26-145 -Width 3-5
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Isoberlinia doka

Abaxial surface:
Cell Walls: slightly und.; round-square-rectangular; moderately visible; highly cutinized
Cells:
-Length 3-10 -Width 3
Stomata: paracytic, large accessory cells; with acc. cells l=12, w=10
-Length 10 -Width 5
-Prevalence... very numerous
Hairs: 1 cell, tapered distal 1/3
-Length 40-55 -Width 5-7
-Prevalence... very sparse
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: like abax
-Length -Width
-Prevalence... mod.
Hairs: like abax
-Length -Width
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Isoberlinia tomentosa

Abaxial surface:
Cell Walls: straight; round-rectangular; easily visible; heavily cutinized
Cells:
-Length 3-7 -Width 3
Stomata: paracytic, large accessory cells
-Length 5-10 -Width 4-5
-Prevalence... dense (more area with stomata than other cells)
Hairs: 1 cell, fragile
-Length 40-135 -Width 2-3
-Prevalence... mod.
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: nucleus? visible in cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: like abax
-Length 12 -Width 7
-Prevalence... sparse

Family: Cesalpinoideae

Hairs: like abax
-Length 60-160 -Width
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Piliostigma thonningii

Abaxial surface: ??
Cell Walls: straight; rounded; moderately visible; thin
Cells:
-Length 5-10 -Width 5-8
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell?, very fragile, highly transparent, potentially divided, mostly broken
-Length 15-70 -Width 4
-Prevalence... quite sparse
Hair Base Cells: actinocytic (5-9)
Striations: none seen
Other Structures: nucleus visible in some cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: irr.; difficult to see, only veins are prevalent, much noise
Cells: d=5-10
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 5 segments, somewhat fragile, mostly whole
-Length 60-250 (470) -Width 6-8
-Prevalence... mod.-dense
Hair Base Cells: indistinguishable
Striations: none seen
Other Structures: papilloid objects, irregularly clumped
-Length 25 -Width 4
Comments:

Swartzia madagascariensis

Abaxial surface:
Cell Walls: straight; rounded; easily visible
Cells: d=4-8
-Length -Width
Stomata: anomocytic, stomatal ridge, occasionally like cats eye
-Length 9-14 -Width 6-8
-Prevalence... numerous (2-3)
Hairs: 1 cell
-Length 90-200 -Width 6-7
-Prevalence...
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax, highly visible
Cells: d=6-20
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Tamarindus indica

Abaxial surface:
Cell Walls: straight-slightly und.; barely visible (faint, much mesophyll)
Cells:
-Length 10-17 -Width 5-11
Stomata: paracytic
-Length 5-7 -Width 3-5
-Prevalence... mod.
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; slight-mod. und
Cells:
-Length 10-19 -Width 5-14
Stomata: like abax
-Length -Width
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Mimosoideae

Acacia albida

Abaxial surface:
Cell Walls: straight, rounded; poorly visible (faint)
Cells:
-Length 8-18 -Width 7-12
Stomata: paracytic ??; most sedimented over; like abax
-Length -Width
-Prevalence... mod.-numerous (2-5)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: areas in cell walls with extra cutin spots, d=2-3
-Length -Width
Comments: very messy slide, frequent long lines of extra thick cell walls

Adaxial surface:
Cell Walls: like abax
Cells:
-Length 7-15 -Width 6-12
Stomata: like abax
-Length 5-8 -Width 5-6
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Acacia dudgeoni

Abaxial surface:
Cell Walls: mod. und.; irr.; easily visible
Cells: d=5-15
-Length -Width
Stomata: "paracytic", easily visible
-Length 5-7 -Width 3-6
-Prevalence... mod.-dense (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: papillae on >50% of normal cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly und.; elongate-square
Cells: d=5-15
-Length -Width
Stomata: anomocytic
-Length 7 -Width 3
-Prevalence... rare
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Mimosoideae

Acacia gourmaensis

Abaxial surface:
Cell Walls: slightly und.; somewhat squared; easily visible
Cells: d=5-15
-Length -Width
Stomata: "paracytic", poorly visible
-Length 6-8 -Width 5
-Prevalence... mod. (2-4)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: papillae on <50 % of normal cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells:
-Length 10-25 -Width 5-15
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: ordered

Acacia polyacantha

Abaxial surface:
Cell Walls: Moderately und.; irr.; poorly visible
Cells: d=5-15
-Length -Width
Stomata: "paracytic", poorly visible
-Length 6-8 -Width 4-5
-Prevalence... mod.-dense (1-4)
Hairs: 1 cell, straight
-Length 45 -Width 3
-Prevalence... sparse (1 seen on vein or leaf margin)
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: some papillae present-difficult to see
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; squared; moderately visible
Cells: d=5-10
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 45-65 -Width 3-5
-Prevalence... 3 seen
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Acacia sieberana

Abaxial surface:
Cell Walls: straight-slightly und.; irr.; easily visible
Cells:
-Length 10-17 -Width 5-12
Stomata: paracytic
-Length 9-13 -Width 4-7
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: ordered

Adaxial surface:
Cell Walls: straight; square-rounded
Cells:
-Length 10-30 -Width 4-15
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: ordered

Albizia chevalieri

Abaxial surface:
Cell Walls: slightly-mod. und.; irr.; poorly-mod. vis.
Cells:
-Length 10-15 -Width 5-10
Stomata: paracytic
-Length 6-8 -Width 3-5
-Prevalence... numerous (0-2)
Hairs: slightly bent
-Length 35-140 -Width 4-6
-Prevalence...
Hair Base Cells: actinocytic slight lines of cell walls radiating outward like 5-6 spokes
Striations: none seen
Other Structures: occasional papillae, d=5-6, clumped
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly und.; 4 sided; highly vis.
Cells:
-Length 10-20 -Width 6-10
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, straight, aligned
-Length 47-110 -Width
-Prevalence... mod.
Hair Base Cells: like abax., spokes more prevalent
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Dichrostachys cinera

Abaxial surface:
Cell Walls: highly und.; irr.; easily visible
Cells: d=10-20
-Length -Width
Stomata: paracytic, 1 usually much smaller, more dense by veins and margins
-Length 6-9 -Width 5-6
-Prevalence... (1-5)
Hairs: 1 cell, slightly bulbous at base
-Length 65-135 -Width 10
-Prevalence... sparse (5 seen)
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; mod-highly visible; mod.-highly und.
Cells: like abax
-Length -Width
Stomata: paracytic-anomocytic, not on veins; easily seen
-Length 7-8 -Width 5-6
-Prevalence... dense (2)
Hairs: like abax, grouped
-Length 50-165 -Width 7-10
-Prevalence... sparse (near margins)
Hair Base Cells: actinocytic (4)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Entada africana

Abaxial surface:
Cell Walls: straight; irr.; easily seen
Cells:
-Length 8-23 -Width 4-12
Stomata: paracytic
-Length 4-9 -Width 3-5
-Prevalence... numerous (1-3)

Family: Mimosoideae

Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: 2 stomatal associative cells heavily cutinized or striated above

Adaxial surface:
Cell Walls: like abax; 4-6 sides
Cells:
-Length 13-30 -Width 10-20
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Mimosa pigra

Abaxial surface:
Cell Walls: straight; elongate together; moderately visible (thin)
Cells:
-Length 8-17 -Width 4-10
Stomata: paracytic, 1 cell larger than other, aligned with other cells
-Length 6-7 -Width 4-5
-Prevalence...
Hairs: 1 cell, occasionally hooked at base, like needles
-Length 110-190 -Width 2-3
-Prevalence... sparse-mod.
Hair Base Cells: anomocytic-actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; (meso)
Cells:
-Length 9-30 -Width 5-8
Stomata:
-Length 5-6 -Width 3-4
-Prevalence...
Hairs: like abax
-Length 65-165 -Width 2-3
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Parkia biglobosa

Abaxial surface:
Cell Walls: slightly und.; irr.; easily visible
Cells: d=3-10
-Length -Width
Stomata: paracytic, not on veins, highly visible
-Length 10-12 -Width 5-7
-Prevalence... dense (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; rounded; thick
Cells: d=3-14
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: nucleus visible in venous cells, d=2-3; occasional small papillae on larger cells giving appearance of und. cell wall, d=1-2
-Length -Width
Comments: much mesophyll

Prosopsis africana

Abaxial surface: ?
Cell Walls: straight; rounded; easily visible
Cells: d=4-12
-Length -Width
Stomata: paracytic, 1 cell usually larger than other, guard cells clear, rest green
-Length 8-9 -Width 6-7
-Prevalence... numerous (2-3)
Hairs: 1 cell, rough edged
-Length 55-65 -Width 4
-Prevalence... sparse
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: nucleus seen in all cells, d=1
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: like abax
-Length -Width
-Prevalence...
Hairs: like abax
-Length 65-105 -Width 4-5
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Family: Papilionideae

Cajanus kerstingii

Abaxial surface: ?
Cell Walls: none seen
Cells: none seen
-Length -Width
Stomata: n.s
-Length -Width
-Prevalence...
Hairs: 1 cell, stout, tapering to a point during distal 1/3
-Length 40-80 -Width 4-5
-Prevalence... dense
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: thick, semi-ordered covering of succulent hairs

Adaxial surface:
Cell Walls: none seen
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 100-150 -Width 4-5
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax

Crotalaria goreensis

Abaxial surface:
Cell Walls: slight-moderately und.; irr.; moderately visible; apparently double or extra-thick in places
Cells: d=10-50
-Length -Width
Stomata: anomocytic
-Length 12-15 -Width 5-6
-Prevalence...
Hairs: 1 cell, somewhat narrowed at base, tapering entire length, more on veins
-Length 125 -Width 11
-Prevalence... only 1 seen
Hair Base Cells: anomocytic?
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:

Family: Papilionideae

Cell Walls: like abax;
moderately und.
Cells: d=15-50
-Length -Width
Stomata: anisocytic
-Length 10 -Width 6
-Prevalence...
Hairs: like abax
-Length 80-210 -Width 9-10
-Prevalence... mod.
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Crotalaria ononoides

Abaxial surface:
Cell Walls: straight; irr.;
poorly visible (thin)
Cells: d=10-30
-Length -Width
Stomata: anomocytic?
-Length 5-6 -Width 4-5
-Prevalence...
Hairs: 1 cell
-Length 200-420+ -Width 10-13
-Prevalence... mod.
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like fillers between
stomatal associative cells
-Length 30-50 -Width 25-35
Stomata: anisocytic-helicocytic
-Length 7-10 -Width 7-9
-Prevalence...
Hairs: attached 1/5 from 1 end
-Length 250 -Width 14
-Prevalence... 1 seen
Hair Base Cells: ?
Striations: faint, erratic
Other Structures: none seen
Comments:

Desmodium spp.

Abaxial surface:
Cell Walls: slightly-mod. und.;
irr.; poorly visible
Cells: d=3-10
-Length -Width
Stomata: paricytic?
-Length 7 -Width 5
-Prevalence... mod.
Hairs: 1 cell, succulent,
somewhat ordered
-Length 60-300 -Width 3-5
-Prevalence... numerous
Hair Base Cells: actinocytic?
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; slightly
visible due to thin cutin
Cells: like abax
-Length -Width
Stomata: like abax
-Length -Width
-Prevalence...
Hairs: like abax; disordered
-Length 60-150 -Width 3-7
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Desmodium velutinum

Abaxial surface: ?
Cell Walls: slightly-mod. und.;
irr.; clearly visible
Cells: d=5-20
-Length -Width
Stomata: paracytic
-Length 10 -Width 5
-Prevalence... mod.
Hairs: 1 cell, straight,
thicker on veins, sometimes
hooked at end, collared base
-Length 45-330 -Width 7-19
-Prevalence... mod.
Hair Base Cells: actinocytic
(14-20)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface: ???
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Indigofera bracteolata

Abaxial surface: ?
Cell Walls: straight; 5-sided;
poorly visible due to thin
cuticle
Cells: d=10-15?
-Length -Width
Stomata: accessory cells not
visible
-Length 4 -Width 3
-Prevalence... sparse
Hairs: 2 sided, attached in
middle with oval cell (l=15-
30,w=7), apparently hollow
-Length 15/35-70/170 -Width
4-13
-Prevalence...
Hair Base Cells: actinocytic?
Striations: none seen
Other Structures: papillae on
most cells, d=4
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: like abax
-Length 6 -Width 4
-Prevalence...
Hairs: like abax
-Length 15/30-140/250 -Width
5-25
-Prevalence...
Hair Base Cells: actinocytic
(8-22)
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Indigofera dendroides

Abaxial surface: ?
Cell Walls: slightly und.;
irr.; poorly visible
Cells: d=5-10
-Length -Width
Stomata: anomocytic
-Length 6 -Width 3
-Prevalence... mod.
Hairs: 1 segment, attached in
middle
-Length 30-50/60-110 -Width
5-10
-Prevalence...
Hair Base Cells: anomocytic
Striations: none seen
Other Structures: many
pockmarks...may be mesophyll
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: like abax
-Length -Width
-Prevalence...
Hairs: like abax
-Length 40-100/60-140 -Width 5-
20
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Lonchocarpus laxiflora

Family: Papilionideae

Abaxial surface:
Cell Walls: straight; rounded; easily visible
Cells: d=5-15
-Length -Width
Stomata: anomocytic-paracytic, somewhat grouped
-Length 7-11 -Width 4-6
-Prevalence... numerous (0-1)
Hairs: 2 cell, first like a collar
-Length 60-80 -Width 6
-Prevalence... sparse
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: papillae, mostly on smaller cells, d=d of cell
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; 4-5 sided; highly visible
Cells: d=7-20
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 60-90 -Width 5
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Pericopsis laxiflora

Abaxial surface:
Cell Walls: straight; squared; easily visible
Cells: d=5-10
-Length -Width
Stomata: paracytic, strung together, cells between heavily cutinized
-Length 7-10 -Width 5-8
-Prevalence...
Hairs: 1 cell
-Length 45-180 -Width 5-6
-Prevalence... sparse
Hair Base Cells: actinocytic (6-10)
Striations: none seen
Other Structures: 1 2 sided hair seen, but this many be from a different sample
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; squared-rounded
Cells: d=4-12
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Pterocarpus erinaceus

Abaxial surface:
Cell Walls: straight; squared; mod. visible
Cells:
-Length 5-15 -Width 5-10
Stomata: paracytic-tetracytic
-Length 7-13 5-6 -Width
-Prevalence... numerous (0-2)
Hairs: 1 cell, like daggers with rough blades
-Length 40-160 -Width 5-9
-Prevalence... mod.
Hair Base Cells: actinocytic (8-12)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: veins "frequent"

Adaxial surface:
Cell Walls: slightly visible; somewhat in rows; easily visible
Cells: d=10-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax

Pterocarpus erinaceus

Abaxial surface:
Cell Walls: slightly-mod. und.; irr.; mod. visible
Cells: d=7-15
-Length -Width
Stomata: paracytic
-Length 10-14 -Width 6-8
-Prevalence... numerous (1-2)
Hairs: 1 cell, somewhat bulbous at base, sturdy appearance
-Length 35-170 -Width 7-10
-Prevalence... sparse-mod.
Hair Base Cells: actinocytic (8-12)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: veins "frequent"

Adaxial surface:
Cell Walls: like abax; slightly und.
Cells: d=10-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax

Sesbania bispinosa

Abaxial surface:
Cell Walls: straight-slightly und.; irr.; poorly visible (thin); several layers
Cells: d=20-40
-Length -Width
Stomata: anomocytic, not clearly defined
-Length 6?-18 -Width 3?-8
-Prevalence... numerous (0-1)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: thin, covering all, erratic
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells:
-Length 20-45 -Width 12-22
Stomata: like abax
-Length -Width
-Prevalence... mod. (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: like abax
Other Structures: none seen
Comments:

Tephrosia bracteolata

bad slide
Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width

Family: Papilionideae

Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Tephrosia elegans

Abaxial surface:
Cell Walls: straight; squared slightly; poorly visible due to thin cuticle
Cells:
-Length 10-20 -Width 10-15
Stomata: paracytic?
-Length 7-9 -Width 4-6
-Prevalence... mod.
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic, mod. numbers
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: d=5-15
-Length -Width
Stomata: like abax
-Length 6-9 -Width 5-6
-Prevalence... mod. (2-4)
Hairs: 1 cell, succulent
-Length 90-295 -Width 6-8
-Prevalence... numerous
Hair Base Cells: actinocytic?
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Xeroderris stuhlmannii

Abaxial surface:
Cell Walls: s.n.
Cells: none seen
-Length -Width
Stomata: numerous
-Length 13 -Width 8
-Prevalence...
Hairs: 1 cell
-Length 40-115 -Width 5
-Prevalence... mod.
Hair Base Cells: none seen
Striations: none seen
Other Structures: almost completely covered by papillae, d=3-10
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; 5-7 sided; easily seen; main walls sandwiched between 2 uniform layers of more wall...very thick
Cells:
-Length 10-30 -Width 7-14
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 9-140 -Width 8-9
-Prevalence... sparse
Hair Base Cells: actinocytic, mod. numbers
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Liliaceae

Asparagus flagellaris

Abaxial surface:
Cell Walls: straight; rectangular; mod. vis.
Cells:
-Length 120 -Width 4-6
Stomata: aligned with cells
-Length 7-9 -Width 5-6
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: generally resembling striated muscle

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Asparagus schroederi

Abaxial surface:
Cell Walls: straight; rectangular; mod. vis.
Cells:
-Length 120 -Width 4-6
Stomata: aligned with cells
-Length 5-6 -Width 7-9
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: generally resembling striated muscle

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Strychnos innocua

Abaxial surface:
Cell Walls: straight; irr.-squared; easily vis.
Cells:
-Length 10-22 -Width 5-8
Stomata: hexacytic
-Length 11-17 -Width 6-8
-Prevalence... dense (1-2)
Hairs: 1 cell, rough edges, hollow but separated inside, extreme base enlarged on veins
-Length 100-160 -Width 9
-Prevalence...
Hair Base Cells: venous
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: none seen

Adaxial surface:
Cell Walls: like abax; 4-6 sided
Cells: d=5-18
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 65-110 -Width 9-10
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Loganiaceae

Family: Loganiaceae

Strychnos spinosu

Abaxial surface:
Cell Walls: straight; squared-rounded; mod. vis.
Cells:
-Length 10-25 -Width 7-13
Stomata: tetracytic
-Length 10-14 -Width 6-8
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: encircling stomata, not always prevalent
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; greatly thickened; easily vis.
Cells:
-Length 10-25 -Width 7-15
Stomata: like abax
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Tapianthus belvisii

Abaxial surface:
Cell Walls: straight; irr.; mod. vis. (mesophyll)
Cells:
-Length 17-37 -Width 10-18
Stomata: paracytic
-Length 9-21 -Width 5-6 (9-11)
-Prevalence... numerous (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: extending out perpendicularly from larger stomata
Other Structures: none seen
-Length -Width
Comments: occasional long lines of extra thick cell walls

Adaxial surface:
Cell Walls: like abax; easily vis.; doubled
Cells: like abax
-Length -Width
Stomata: like abax; paracytic-tetracytic
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: like abax
Other Structures: none seen
-Length -Width
Comments:

Tapianthus dondoneifolius

Abaxial surface:
Cell Walls: straight; squared-irr.; easily vis.
Cells:
-Length 15-32 -Width 7-21
Stomata: paracytic
-Length 15-24 -Width 9-15
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: prevalent, usually flowing perpendicular to stomata
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; mod. vis. (mesophyll)
Cells:
-Length 13-30 -Width 9-18
Stomata: like abax
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: not as prevalent as abax, but still there
Other Structures: none seen
-Length -Width
Comments:

Family: Malvacaea

Hibiscus asper

Abaxial surface:
Cell Walls: slightly und.; irr.; mod. vis.
Cells: d=10-30
-Length -Width
Stomata: paracytic; very small, thin accessory cells apparently with larger cell (difficult to see)
-Length 10 -Width 5
-Prevalence... numerous
Hairs: stellate, 1-8 hairs (4); somewhat more on veins
-Length 70-130 -Width 7-25
-Prevalence... mod.
Hair Base Cells: somewhat actinocytic (4-8)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight-slightly und.; 5-8 sides; rounded-elongate; apparently double walls
Cells: none seen
-Length -Width
Stomata: like abax
-Length -Width
-Prevalence...
Hairs: like abax, 2-4 hairs (4)
-Length 30-95 -Width 6-10
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Wissadula amlissima

Abaxial surface:
Cell Walls: slightly und.; uniform; highly vis.
Cells:
-Length 10 -Width 5
Stomata: possibly hemiparicytic, difficult to see
-Length $6^{?}$ -Width $3^{?}$
-Prevalence... possibly numerous
Hairs: stellate, 8 hairs, bulbous base, tapering entire length, straight, more on veins
-Length 15-25 -Width 2-4
-Prevalence... numerous
Hair Base Cells: apparently all venous
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: none seen
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs:
-Length 35-60 -Width 2-4
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Meliaceae

Khaya senegalensis

Abaxial surface:
Cell Walls: straight; irr.;

Family: Meliaceae

easily vis.
Cells:
-Length 2-15 -Width 1-8
Stomata: anomocytic-cyclocytic-actinocytic, poorly vis.
-Length 6-11 -Width 5-8
-Prevalence... numerous
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: flow around stomata
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells:
-Length 7-18 -Width 5-12
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: cyclocytic-actinocytic, sparse, with 2 rows of cells
Striations: faint, flowing in streams, many areas where not vis.
Other Structures: none seen
-Length -Width
Comments:

Pseudocerela kotschyi

Abaxial surface:
Cell Walls: none seen (possibly straight)
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1-6 segments, final segment sometimes branched, many more on veins
-Length 50-300 -Width 3-13
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: pock-marks, d=3-5, elliptic-circular, connected by lines
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight, squared, easily seen
Cells: d=5-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 30-150 -Width 7-10
-Prevalence...
Hair Base Cells: anomocytic
Striations: prevalent, radiating from hair bases
Other Structures: none seen
-Length -Width
Comments:

Trichilia emetica

Abaxial surface:
Cell Walls: straight-slightly und.; irr.-square-round.; mod. vis.
Cells:
-Length 5-15 -Width 4-8
Stomata: anomocytic-paracytic?
-Length 14-19 -Width 8-12
-Prevalence... numerous
Hairs: 1 cell, rough edges, on veins
-Length 55-170 -Width 7-9
-Prevalence... sparse
Hair Base Cells: venous
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; poorly vis.; wide
Cells: d=5-16
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: difficult to see due to "heaviness", very thick cuticle

Family: Moraceae

Ficus glumosa

Abaxial surface:
Cell Walls: straight; irr.; poorly vis. (striations, faint)
Cells:
-Length 10-20 -Width 5-15
Stomata:
-Length 6-8 -Width 4-6
-Prevalence... mod. ?
Hairs: 1 cell, tending towards veins, hollow
-Length 30-265 -Width 5-7
-Prevalence... sparse
Hair Base Cells: actinocytic
Striations: radiating from hairs and some stomata "not flowing"
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; easily vis.; heavily cutinized
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 30-115 -Width 7-10
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: apparent double layer of cells

Ficus ingens

Abaxial surface:
Cell Walls: straight; round-irr.; poor-mod. vis. (mesophyll)
Cells:
-Length 3-9 -Width 2-7
Stomata: most anomocytic, larger "cyclocytic"
-Length 6-22 -Width 5-9
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: faint, radiating from stomata and bag hairs
Other Structures: bag hairs, d=15-30
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; 4-6 sided
Cells: d=11-17
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Ficus platyphylla

Abaxial surface:
Cell Walls: straight; irr.; barely vis. (clutter!)
Cells:
-Length 10-20 -Width 5-15
Stomata:
-Length 8-10 -Width 5-6
-Prevalence... sparse

Family: Moraceae

Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: funnel shaped holes ???, d=14-18, inner d=2-3, mod.-sparse numbers
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; poorly vis. (mesophyll)
Cells: d=7-20
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, like thorns
-Length 15-27 -Width 6
-Prevalence... sparse-mod.
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: like abax, numerous (1-5)
-Length -Width
Comments:

Ficus sur

bad slide
Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Family: Myrtaceae

Syzygium guineense

Abaxial surface:
Cell Walls: slightly und.; irr.; mod.-highly vis.
Cells: d=5-10
-Length -Width
Stomata: anomocytic-paracytic??; apparent circle in middle of stomata, d=2-4, usually elongate
-Length 7-9 -Width 5-6
-Prevalence... dense (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: potentially actinocytic with 6-8 cells (2 seen)
Striations: none seen
Other Structures: potential papillae on peninsulas
-Length -Width
Comments:

Adaxial surface:
Cell Walls: mod. und.; irr.; mod. vis. (much mesophyll)
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: like abax
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Family: Olacaceae

Ximenia americana

Abaxial surface:
Cell Walls: straight-slightly und.; irr.; mod.-easily vis.
Cells:
-Length 6-22 -Width 4-10
Stomata: tetracytic-hexacytic, not stained
-Length 6-10 -Width 4-6
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; easily vis.; irr.-squared
Cells: like abax
-Length -Width
Stomata: like abax
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Oleaceae

Jasminium kerstingii

Abaxial surface:
Cell Walls: straight; irr. (3-6 sides); easily seen
Cells: d=8-15
-Length -Width
Stomata: cyclocytic-anomocytic
-Length 8-12 -Width 6-9
-Prevalence... mod. (3-6)
Hairs: 1-5 segments, larger hairs curved
-Length 30-100 -Width 7-11
-Prevalence...
Hair Base Cells: (paracytic)-cyclocytic
Striations: blanket of brook trout type striations radiating from larger hairs
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: like abax
-Length 8-12 -Width 6-8
-Prevalence... mod. (3-6)
Hairs: 1-3 segments (mostly 2), like abax
-Length 30-125 -Width 7-10
-Prevalence... mod.
Hair Base Cells: like abax
Striations: non-continuous lines radiating from stomatal hairs
Other Structures: none seen
-Length -Width
Comments:

Family: Opileaceae

Opilia celtidifolia

Abaxial surface:
Cell Walls: straight; squared; easily seen
Cells:
-Length 6-16 -Width 3-6
Stomata: tetracytic(-hexacytic?)
-Length 9-11 -Width 6-8
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen

Family: Opileaceae

-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells:
-Length 7-17 -Width 4-10
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Polygalaceae

Securidaea longepedunculata

Abaxial surface:
Cell Walls: straight; square-rounded; easily seen
Cells: d=5-10
-Length -Width
Stomata: anomocytic (6)(-cyclocytic?)
-Length 8-13 -Width 6-8
-Prevalence... mod. 1-3
Hairs: 1 cell, apparently hollow
-Length 25-130 -Width 3-8
-Prevalence... mod. (-sparse)
Hair Base Cells: anomocytic-actinocytic
Striations: none seen
Other Structures: papillae vis. on 50% of cells, d=3-6
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; squared
Cells:
-Length 7-20 -Width 7-19
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 13-60 -Width 4-5
-Prevalence... sparse
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: like abax
-Length -Width
Comments:

Family: Rhamnaceae

Ziziphus abyssinica

Abaxial surface:
Cell Walls: straight; rounded; difficult to see (messy-hairs/mesophyll)
Cells: d=5-10
-Length -Width
Stomata: anomocytic?
-Length 6-9 -Width 6-8
-Prevalence... numerous?
Hairs: 1 cell, tending towards veins, apparently hollow, not ordered
-Length 15-285 -Width 3-8
-Prevalence... mod.-dense
Hair Base Cells: actinocytic-anomocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; 4-6 sided; easily seen
Cells: d=7-14
-Length -Width
Stomata: anomocytic
-Length 14 -Width 7
-Prevalence... sparse (1 seen)
Hairs: like abax
-Length 27-335 -Width 5-9
-Prevalence... sparse-mod.
Hair Base Cells: like abax
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Ziziphus mucronata

Abaxial surface:
Cell Walls: straight; rounded; easily seen
Cells: d=4-10
-Length -Width
Stomata: anomocytic
-Length 8-12 -Width 6-9
-Prevalence... numerous (0-2)
Hairs: 1 cell, hollow
-Length 40-215 -Width 4-16
-Prevalence... sparse
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: nucleus vis. somewhat in most cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; mod. vis. (mesophyll, 2 layers)
Cells: d=6-16
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: nucleus highly vis., d=1-2
-Length -Width
Comments:

Family: Rosaceae

Parimari curatellifolia

Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; 4-7 sided; mod. vis. (2 layers, mesophyll
Cells: d=3-11
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic, mod. numbers
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Family: Rubiaceae

Borreria filifolia

Abaxial surface: ?
Cell Walls: straight; elongate like grass; mod. vis.; double walls; aligned
Cells:
-Length 20-60 -Width 13-18
Stomata: fringed edge, inside apparently undifferentiated
-Length 15-25 -Width 10-15
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: faint, random, mottled
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...

Family: Rubiaceae

Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Borreria octoden

Abaxial surface:
Cell Walls: slightly und.; irr.-square; mod.-easily vis. (double walls)
Cells: squared; irr. d=10-30
-Length 15-40 -Width 8-17
Stomata: tetracytic?
-Length 10-15 -Width 12-22
-Prevalence... numerous (1)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: most of area with regimented cells, others highly random, both grouped

Adaxial surface:
Cell Walls: none seen
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like a cutin layer only

Borreria scabra

Abaxial surface:
Cell Walls: slightly und.; irr.; difficult to see (thin)
Cells: d=10-30
-Length -Width
Stomata: anomocytic-tetracytic, clustered in areas of striations
-Length 9-13 -Width 4-7
-Prevalence... numerous
Hairs: hollow, wide, star shaped base
-Length 23-260 -Width 7-45
-Prevalence...
Hair Base Cells: actinocytic (6-10)
Striations: occasional "roads" of striations
Other Structures: papillae d=3-6
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; 5-6 sided; easily vis.; heavily cutinized (double walls)
Cells: d=15-35
-Length -Width
Stomata: like abax
-Length 12-21 -Width 7-15
-Prevalence...
Hairs: like abax
-Length 50-100 -Width 26-35
-Prevalence... sparse-mod.
Hair Base Cells: like abax
Striations: like abax
Other Structures: like abax
-Length -Width
Comments:

Borreria stachydea

Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Borreria verticilata

Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Boscia salicifolia

Abaxial surface:
Cell Walls: slight-mod. und.; irr.; mod.-easily vis.
Cells:
-Length 4-15 -Width 3-8
Stomata: cyclocytic-actinocytic
-Length 7-8 -Width 3-4
-Prevalence... mod. (4-7)
Hairs: 1 cell, hollow
-Length 5-95 -Width 10-20
-Prevalence... sparse-mod.
Hair Base Cells: cyclocytic-actinocytic
Striations: radiating from hairs, not highly noticeable
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax.
Cells: like abax.
-Length -Width
Stomata: like abax.
-Length -Width
-Prevalence...
Hairs: like abax.
-Length -Width
-Prevalence... mod.
Hair Base Cells: like abax.
Striations: like abax.
Other Structures: none seen
-Length -Width
Comments:

Canthia cornelia

Abaxial surface:
Cell Walls: slightly und.; irr.; poor-mod. vis.
Cells: d=5-10
-Length -Width
Stomata: paracytic
-Length 8 -Width 6
-Prevalence... numerous
Hairs: 1 cell, straight-slightly curved, no veins seen
-Length 230-410 -Width 10-17
-Prevalence... sparse-mod.
Hair Base Cells: anomocytic-

Family: Rubiaceae

slightly actinocytic, thicker cutin
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; rounded; easily vis.
Cells: d=4-14
-Length -Width
Stomata: like abax
-Length 14 -Width 5
-Prevalence... sparse (1 seen)
Hairs: like abax, longitudinal striations, hollow, rough edges
-Length 75-390 -Width 12-14
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Crossopteryx febrifuga

Abaxial surface:
Cell Walls: straight; rounded; easily vis.
Cells: d=5-15
-Length -Width
Stomata: paracytic
-Length 12-15 -Width 8
-Prevalence... numerous (0-2)
Hairs: 1 cell, on veins only
-Length 55-130 -Width 6-12
-Prevalence... sparse
Hair Base Cells: venous
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: occasional lines of thicker cutin

Adaxial surface:
Cell Walls: like abax
Cells: d=5-20
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax

Fadogia cienkowskii

Abaxial surface:
Cell Walls: slightly und.; irr.?; poorly vis. (much mesophyll)
Cells: d=5-10
-Length -Width
Stomata: paracytic?
-Length 7-10 -Width 3-5
-Prevalence... dense
Hairs: 1 cell, only on veins, slowly hooked
-Length 220-275 -Width 13-17
-Prevalence... sparse
Hair Base Cells: ?
Striations: highly prevalent, erratic, dense, radiating from hair bases
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; squared; poorly vis. (striations)
Cells: d=8-13
-Length -Width
Stomata: ??, not covered by striations
-Length 11-14 -Width 6-7
-Prevalence... mod.-sparse
Hairs: 1 cell, tending towards veins
-Length 100-125 -Width 20
-Prevalence...
Hair Base Cells: ?
Striations: like abax
Other Structures: none seen
-Length -Width
Comments:

Feretia apodonthera

Abaxial surface:
Cell Walls: straight; squared; easily vis.
Cells:
-Length 7-20 -Width 5-15
Stomata: paracytic?
-Length 9-13 -Width 6
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: sporadic, erratic, prevalent near veins, flowing past stomata
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; squared-rounded
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: like abax
Other Structures: none seen
-Length -Width
Comments:

Gardenia aqualla

Abaxial surface:
Cell Walls: straight; rounded; heavily cutinized; messy, globular
Cells: d=7-15
-Length -Width
Stomata: paracytic?, located in pockets of less cutinized cells
-Length 8-13 -Width 7-9
-Prevalence...
Hairs: 1 cell, tending towards veins
-Length 85-180 -Width 8-18
-Prevalence... mod.
Hair Base Cells: ?
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; sometimes 3 layers of cells seen, not globular
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax, dagger like, hollow, not tending toward veins
-Length 50-150 -Width 10-25
-Prevalence...
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: lines of cutinization encircling other cells

Gardenia erubescens

Abaxial surface:
Cell Walls: slightly und.; irr.; poorly vis. (striations)
Cells:
-Length 7-15 -Width 4-12?
Stomata: paracytic, appearance of clams
-Length 4-10 -Width 5-8
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: prominent, like a mountain range, thick, aligned
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; squared (mesophyll)

Family: Rubiaceae

Cells: d=5-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: frequent long lines of extra thick cell walls encircling 4-15 other cells

Gardenia ternifolia

Abaxial surface:
Cell Walls: straight; rounded-square; vis.
Cells:
-Length 8-22 -Width 3-10
Stomata: paracytic?
-Length 8-12 -Width 4-6
-Prevalence... dense (1-2)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: normally radiating from stomata only a short distance
Other Structures: none seen
-Length -Width
Comments: occasional long lines of extra-thick cell walls

Adaxial surface:
Cell Walls: like abax; poor-mod. vis. (mesophyll, diffuse walls)
Cells: d=7-20
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax

Mitragyna inermis

Abaxial surface:
Cell Walls: straight; varying (square); mod. vis.
Cells: d=8-25
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: small irr. wrinkles, not aligned
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; mostly not vis. (thin)
Cells: d=10-15?
-Length -Width
Stomata: numerous
-Length 8-15 -Width 5-10
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Morelia senegalensis

Abaxial surface:
Cell Walls: straight-slightly und.; irr.; poorly vis. (mesophyll)
Cells:
-Length 5-15 -Width 4-10
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: over whole, difficult to see (mesophyll), random, slight
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; easily vis.
Cells:
-Length 5-17 -Width 4-12
Stomata: paracytic?
-Length 7-9 -Width 5-6
-Prevalence... numerous (1-4)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Pavetta cinereifolia

Abaxial surface:
Cell Walls: straight; squared; easily vis.
Cells:
-Length 10-20 -Width 5-15
Stomata: paracytic?, located in pockets of less cutinized cells
-Length 7-10 -Width 5-7
-Prevalence...
Hairs: 1 cell, widened at base but peg foot vis. below, hollow, especially on veins
-Length 30-115 -Width 9-25
-Prevalence... mod.-dense
Hair Base Cells: anomocytic
Striations: a few "cuts" radiating from hairs and irregularly placed otherwise, more like slight wrinkles
Other Structures: none seen
-Length -Width
Comments: occasional lines of thicker cutin

Adaxial surface:
Cell Walls: like abax
Cells: like abax
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax
-Length 30-115 -Width 9-25
-Prevalence... mod.
Hair Base Cells: like abax
Striations: like abax
Other Structures: none seen
-Length -Width
Comments: like abax

Pavetta oblongfolia

Abaxial surface:
Cell Walls: straight; irr.; easily vis.; multiple walls
Cells:
-Length 8-25 -Width 5-15
Stomata: anomocytic
-Length 8-13 -Width 6-9
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax
Cells: d=8-23
-Length -Width
Stomata: actinocytic
-Length 20 -Width 10
-Prevalence... 1 seen
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: occasional long lines of extra thick cell walls

Family: Rubiaceae

Rytigynia senegalensis

Abaxial surface:
Cell Walls: straight; irr.; not much noise
Cells:
-Length 7-19 -Width 5-12
Stomata:
-Length 10-14 -Width 6-8
-Prevalence... sparse
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: faint, over whole, radiating perpendicular to stomata
Other Structures: nucleus plainly vis. in all normal cells
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax; much noise (cuticular striations?) especially radiating from stomata
Cells: d=5-10
-Length -Width
Stomata: anomocytic-paracytic
-Length 10-13 -Width 5-7
-Prevalence... mod. (1-8)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: (see cell walls)
Other Structures: like abax
-Length -Width
Comments:

Sarcocephalus latifolius

Abaxial surface:
Cell Walls: slightly-mod. und.; irr.; walls not doubled; difficult to see (faint, striations)
Cells:
-Length 6-16 -Width 5-10
Stomata: ??
-Length 9 -Width 5-6
-Prevalence... mod.-numerous
Hairs: with very rough, "raspy" surface on veins mostly
-Length 10-15 -Width 5-7
-Prevalence... rare-sparse
Hair Base Cells: ?
Striations: usually flowing around stomata, sometimes perpendicular to them, radiating from hairs
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly und.; irr.; walls doubled, confusing (2 layers)
Cells: d=10-20
-Length -Width
Stomata: paracytic
-Length 11-13 -Width 5-7
-Prevalence... rare
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: erratic near stomata, flowing over whole, occasionally radiating from 1 spot for unknown reasons
Other Structures: none seen
-Length -Width
Comments:

Family: Supinaceae

Allophyllus cobbe

Abaxial surface: ?
Cell Walls: slightly und.; irr.; difficult to see (striations)
Cells: d=5-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, on veins, rough baggy cover, hollow
-Length 100-740 -Width 8-25
-Prevalence... sparse-mod.
Hair Base Cells: venous
Striations: covered by erratic striations
Other Structures: multi-cellular club hair with stalk d~5, ~5 cells for stalk like mushrooms or embryos, on veins; also specks (potentially the nucleus) visible in cells
-Length 25-45 -Width 15-18
Comments:

Adaxial surface:
Cell Walls: slightly und?; irr?; hard to see (spots, general noise)
Cells: d=5-10?
-Length -Width
Stomata:
-Length 2-6 -Width 2-4
-Prevalence...
Hairs: like abax.
-Length 45-777 -Width 4-23
-Prevalence...
Hair Base Cells: like abax.
Striations: not noticeable
Other Structures: like abax.
-Length -Width
Comments:

Zanha golungensis

Abaxial surface:
Cell Walls: slight-mod. und.; mod. vis. (much debris); irr.
Cells:
-Length 6-23 -Width 5-12
Stomata: anomocytic
-Length 5-13 -Width 3-7
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: bag hairs, d=11-14, actinocytic, sparse-mod.
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly und.; irr.; mod.-highly vis.
Cells: d=10-25
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: nucleus apparently somewhat apparent in normal cells
-Length -Width
Comments:

Family: Sapotaceae

Vitellaria paradoxa

Abaxial surface:
Cell Walls: slightly und.; irr.; easily vis.
Cells:
-Length 5-14 -Width 3-7
Stomata: paracytic?
-Length 8-12 -Width 6-7
-Prevalence... dense (0-1)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: flowing past, over, and eddying by stomata, mod. vis.
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax.; squared-irr.
Cells:
-Length 7-15 -Width 4-10
Stomata: concentrated in 1 area, highly vis. dots in four corners d=2
-Length 10 -Width 7-9
-Prevalence...

Family: Sapotaceae

Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: actinocytic, sparse
Striations: flowing over whole
Other Structures: none seen
-Length -Width
Comments:

Family: Simaroubaceae

Quassia undulata

Abaxial surface:
Cell Walls: straight; 4-7 sided; clearly vis.
Cells: d=5-15
-Length -Width
Stomata: paracytic-cyclocytic?, thicker cutin obstructs cells here, irr. line encompassing stomata
-Length 10-15 -Width 7-10
-Prevalence... numerous (1-3)
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: slight, tending to circle stomata
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: rounded; dots where cell walls meet, d=1-2
Cells: like abax.
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: somewhat straight, wandering
Other Structures: possible very faint bag hairs growing from larger cells, d=10-23
-Length -Width
Comments:

Family: Sterculiaceae

Cola laurifolia

Abaxial surface:
Cell Walls: straight; squared-irr.; easily vis.
Cells: d=3-9
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: scar-like structures with heavily cutinized, smaller cells surrounding, cyclocytic, d=5-15, numerous
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax.
Cells:
-Length 5-13 -Width 4-9
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: like abax., d=10-15
-Length -Width
Comments:

Sterculia setigera

Abaxial surface:
Cell Walls: straight-curved; 4-6 sided; very difficult to see due to lack of cutin
Cells: d=5-10
-Length -Width
Stomata: ?, difficult to see
-Length 10-12 -Width 7
-Prevalence... numerous-dense
Hairs: stellate (1-8), only on veins, attached to each other above base (@5-20)
-Length 70-140 -Width 10
-Prevalence... mod.-dense
Hair Base Cells: venous
Striations: none seen
Other Structures: strange hair-like structure apparently hollow, fragile, leaving a circular mark where attached, sparse
-Length 8-20/60-100 -Width 8-20/23-30
Comments: veins numerous

Adaxial surface:
Cell Walls: like abax., somewhat difficult to see
Cells: like abax.
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax., (1-6)
-Length 50-155 -Width 6-10
-Prevalence... mod.
Hair Base Cells: like abax.
Striations: none seen
Other Structures: like abax.
-Length -Width
Comments: like abax.

Family: Tiliaceae

Grewia barteri

Abaxial surface:
Cell Walls: straight, rounded; mod. vis.
Cells: d=5-15
-Length -Width
Stomata: too much striation
-Length 7 -Width 4
-Prevalence... sparse?
Hairs: stellate (1-4), somewhat hollow, tending towards veins
-Length 70-315 -Width 6-9
-Prevalence...
Hair Base Cells: anomocytic
Striations: radiating from hairs, becoming random between, following veins, heavy
Other Structures: club hairs, sparse
-Length 20-30 -Width 9-12
Comments:

Adaxial surface:
Cell Walls: potentially und.; very difficult to see; slide with much piles of stuff...may be mesophyll
Cells: ?
-Length -Width
Stomata: paracytic
-Length 6-7 -Width 5
-Prevalence... numerous
Hairs: like abax., not tending towards veins
-Length 40-320 -Width 3-12
-Prevalence... mod.-dense
Hair Base Cells: ?
Striations: none seen
Other Structures: like abax., mod.
-Length 15-25 -Width 5-9
Comments:

Grewia cissoides

Abaxial surface:
Cell Walls: none seen
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: stellate (8); bulbous base; tapering entire length
-Length 40-130 -Width 3-7
-Prevalence... dense
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: more densely hairy than WIAM adax 8

Adaxial surface:
Cell Walls: straight; irr.;

Family: Tiliaceae

seen on half of specimen, other half only a cutin layer, might be mesophyll; poorly vis.
Cells:
-Length 9-18 -Width 7-12
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: club hairs, mod.
-Length 15-20 -Width 10-15
Comments:

Grewia lasiodiscus

Abaxial surface:
Cell Walls: straight-curved; elongate; veins easily seen, but normal cells are almost invisible and much noise is present
Cells:
-Length 5-15 -Width 5
Stomata: very difficult to see
-Length 7 -Width 4
-Prevalence... numerous
Hairs: stellate (1-6)(4); star-like, with longitudinal striations
-Length 15-95 -Width 2-9
-Prevalence...
Hair Base Cells: actinocytic, with nucleus vis., d=12-16
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax., not much noise
Cells:
-Length 5-13 -Width 3-8
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax., (4-7)(5), no longitudinal striations
-Length 25-145 -Width 4-13
-Prevalence... mod.
Hair Base Cells: none seen
Striations: none seen
Other Structures: very faint bag hairs, d=20, anomocytic, base d=5, mod. numbers
-Length -Width
Comments:

Grewia venasta

Abaxial surface:
Cell Walls: straight-curved; 4-6 sides; poor-mod. vis. (much noise)
Cells: d=5-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: stellate, (1-12)(8), difficult to distinguish
-Length 25-55 -Width 2-5
-Prevalence... mod.
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: many apparent depressions, actinocytic (10-18), possibly hair bases
-Length -Width
Comments:

Adaxial surface:
Cell Walls: slightly und.; irr.; hairs too dense to see well
Cells: d=5-10
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax., (4-8), tending away from veins
-Length 25-40 -Width 1-3
-Prevalence... dense
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: like abax.
-Length -Width
Comments:

Triumfetta lepidota

Abaxial surface:
Cell Walls: straight-curved; somewhat round; poor-mod. vis. (much noise)
Cells: d=5-15
-Length -Width
Stomata: anomocytic, difficult to see
-Length 12 -Width 7
-Prevalence... mod.
Hairs: stellate (1-7), wide circular base d=15-40
-Length 35-110 -Width 5-10
-Prevalence... sparse-mod.
Hair Base Cells: too messy to see, others without hairs actinocytic with 6-10 accessory cells, mod. numbers
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: many veins

Adaxial surface:
Cell Walls: poorly vis. (much noise), somewhat double-walled
Cells: d=5-10
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax. (1-8)(8)
-Length 45-300 -Width 6-14
-Prevalence... mod.-dense
Hair Base Cells: messy, others like abax. with 6-16 accessory cells
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: like abax.

Family: Verbinaceae

Vitex doniana

Abaxial surface:
Cell Walls: rounded; irr.; mod. vis.; thick walls
Cells: d=4-22
-Length -Width
Stomata: anomocytic, somewhat grouped
-Length 8-12 -Width 4-8
-Prevalence... numerous
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: bag hairs mod., d=10-25
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax.; dots at intersections of cell walls d=1
Cells: d=5-15
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: none seen
-Length -Width
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: like abax., d=25, sparse; areas of thicker, potentially mesophyll, d=20-50
-Length -Width
Comments:

Family: Vitaceae

Cissus populnea

Abaxial surface:
Cell Walls: rounded-slightly und.; irr.; poorly vis. (striations)
Cells: d=5-13
-Length -Width
Stomata: ?
-Length 10-13 -Width 7-11
-Prevalence... mod.-numerous
Hairs: none seen
-Length -Width
-Prevalence...

Family: Vitaceae

Hair Base Cells: none seen
Striations: not defined, going from 1 stomata to another and over whole
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax.; straight
Cells: d=10-23
-Length -Width
Stomata: only near veins
-Length 12-17 -Width 8-13
-Prevalence... mod.
Hairs: stellate (16)
-Length 40-70 -Width 5-6
-Prevalence... only one seen, on vein
Hair Base Cells: none seen
Striations: heavy, over whole
Other Structures: none seen
-Length -Width
Comments:

bad slide

Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

CIsp

Abaxial surface:
Cell Walls: none seen
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, double tapered
-Length 300-430 -Width 10
-Prevalence... numerous
Hair Base Cells: none seen
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: mod. covering of disordered, tape like cells

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Cissus zechiana

Abaxial surface:
Cell Walls: straight-slightly und.; irr.; poorly vis.; thin cutin
Cells: d=5-10
-Length -Width
Stomata: anomocytic
-Length 7-8 -Width 4-5
-Prevalence... numerous (0-2)
Hairs: 2-5 cells, tending towards veins
-Length 30-190 -Width 13-42
-Prevalence... mod.-dense
Hair Base Cells: none seen
Striations: none seen
Other Structures: club hairs?, 5 seen
-Length 39 -Width 45
Comments: no marks on cutin

Adaxial surface:
Cell Walls: none seen (potentially straight walls, rounded, mod. vis., d=15-20)(mesophyll?)
Cells: none seen
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 2 cells (-3??), variable
-Length 60-95 -Width 20-37
-Prevalence... mod.
Hair Base Cells: none seen
Striations: none seen
Other Structures: like abax., 1 seen
-Length 75 -Width 50
Comments: like abax.

??

Abaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width
Comments:

#57

Abaxial surface:
Cell Walls: mod. und.; irr.; highly vis.
Cells: most modified
-Length 10-40 -Width 5-15
Stomata: complex and confusing, d=10-16
-Length -Width
-Prevalence...
Hairs: 2-3 cells, only on veins, distal segments longer, base thimble shaped
-Length 145-295 -Width 20-30
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: striated longitudinally, ends rounded; circular origin d=11-14, cross over whole, appearance of a bud, actinocytic
-Length 35-85 -Width 10-15
Comments:

Adaxial surface:
Cell Walls:
Cells:
-Length -Width
Stomata:
-Length -Width
-Prevalence...
Hairs:
-Length -Width
-Prevalence...
Hair Base Cells:
Striations:
Other Structures:
-Length -Width

Family: Vitaceae

Comments:

#113

Abaxial surface:
Cell Walls: mod. und.; irr.; mod. vis.
Cells: d=5-30
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: 1 cell, mercury bulb base, straight
-Length 190-350 -Width 10-17
-Prevalence... mod.
Hair Base Cells: actinocytic (8-12)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

Adaxial surface:
Cell Walls: like abax.; slightly-mod. und.; walls doubled
Cells:
-Length 9-35 -Width 9-24
Stomata: anomocytic
-Length 11 -Width 7
-Prevalence... mod.-sparse
Hairs: like abax.
-Length 90-300 -Width 15-30
-Prevalence...
Hair Base Cells: like abax.
Striations: none seen
Other Structures: none seen
-Length -Width
Comments:

#144

Abaxial surface:
Cell Walls: mod. und.; irr. (0-10); highly vis.
Cells: d=10-70
-Length -Width
Stomata: paracytic, d=15
-Length -Width
-Prevalence... numerous
Hairs: 2-3 segments, swollen at second node
-Length 85-300 -Width 25-35
-Prevalence...
Hair Base Cells: none seen
Striations: none seen
Other Structures: striated longitudinally, rounded ends; also appearance of a bud, cross over whole, d=15, circular origin d=7
-Length 35-140 -Width 10-15
Comments: other structures diagnostic

Adaxial surface:
Cell Walls: like abax.
Cells: like abax.
-Length -Width
Stomata: like abax., d=20
-Length -Width
-Prevalence... mod.
Hairs: 2 segments, like abax., not more on veins
-Length 30-60/90-130 -Width 30/15-20
-Prevalence... sparse
Hair Base Cells: none seen
Striations: none seen
Other Structures: like abax.
-Length -Width
Comments: like abax.

#148

Abaxial surface:
Cell Walls: slightly und.; irr.; poorly-mod. vis.; double-triple irregularly
Cells: d=10-30
-Length -Width
Stomata: anomocytic
-Length 9-18 -Width 5-9
-Prevalence... numerous (1-2)
Hairs: 1 cell
-Length 45-380 -Width 8-38
-Prevalence... mod.
Hair Base Cells: actinocytic
Striations: none seen
Other Structures: papillae? or just wrinkled cell surface, irr.
-Length -Width
Comments:

Adaxial surface:
Cell Walls: straight; 5-6 sided; easily vis.
Cells: d=20-40
-Length -Width
Stomata: like abax.
-Length 14-19 -Width 9-11
-Prevalence... mod. (1-5)
Hairs: like abax., apparently hollow
-Length 50-465 -Width 15-28
-Prevalence...
Hair Base Cells: like abax.
Striations: occasional encircling stomata
Other Structures: club hairs, wrinkled, grouped
-Length 8-15 -Width 7-8
Comments:

#180

Abaxial surface:
Cell Walls: mod. und.; irr.; mod. vis.; apparently double walled
Cells: d=5-25
-Length -Width
Stomata: anomocytic, difficult to see
-Length 8 -Width 6
-Prevalence... sparse?
Hairs: 1 cell, tapering entire length, all on veins
-Length 200-350 -Width 10-12
-Prevalence...
Hair Base Cells: actinocytic (7-12)
Striations: none seen
Other Structures: none seen
-Length -Width
Comments: veins abundant

Adaxial surface:
Cell Walls: like abax.
Cells: like abax.
-Length -Width
Stomata: none seen
-Length -Width
-Prevalence...
Hairs: like abax.
-Length 130-430 -Width 6-10
-Prevalence...
Hair Base Cells: like abax.
Striations: none seen
Other Structures:
-Length -Width
Comments: like abax.

APPENDIX E

AVERAGE COMPOSITION (%, S.E.) AND FREQUENCY OF OCCURRENCE FOR IMPORTANT FORAGES FOUND IN MONTHLY COMPOSITE RAINY SEASON FECAL SAMPLES FROM HARTEBEEST AND ROAN ANTELOPE AT THE NAZINGA GAME RANCH, BURKINA FASO, 1986-1987

	Month																											
	May[a]						June						July						August						September			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses:																														
Andropogon gayanus bisquamulatus	15	4.1	12	14	3.1	12	15	3.5	13	13	2.6	15	17	3.4	14	18	3.5	13	30	4.3	15	35	5.3	13	15	3.8	12	29	5.7	15
A. g. gayanus	7	2.8	6	6	2.1	6	2	1.2	3	1	0.6	2	1	0.7	1	0	0.0	0	1	1.1	1	0	0.2	1	0	0.0	0	0	0.0	0
A. tectorum	0	0.4	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	1	1.1	2	0	0.0	0	0	0.0	0	0	0.0	0
Other[b]	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	1	-	-	0	-	-	0	-	-	0	-	-
Total Tall A. spp.	22	4.4	15	19	3.0	14	17	3.2	15	14	2.7	15	17	3.2	15	18	3.5	13	33	5.4	15	35	5.4	13	15	3.8	12	29	5.7	15
A. ascinoides	11	2.5	12	21	3.8	14	21	2.9	14	32	5.2	14	29	3.0	15	23	4.1	13	10	3.5	9	13	2.9	12	6	2.1	8	4	2.2	4
A. spp.	15	5.0	8	19	4.8	9	23	5.5	10	20	4.5	10	19	4.5	10	19	4.5	10	19	4.9	10	13	3.8	10	2	1.2	4	1	0.8	2
Other	4	-	-	1	-	-	3	-	-	6	-	-	0	-	-	0	-	-	1	-	-	0	-	-	2	-	-	0	-	-
Total Short A. spp.	30	5.0	14	41	4.2	15	47	5.7	15	58	5.3	15	48	5.3	15	42	6.4	14	30	6.2	13	26	4.5	14	10	3.3	9	5	2.5	5
Hyparrhenia dissoluta	1	0.7	1	1	0.9	2	1	0.6	1	1	0.9	1	7	4.0	6	0	0.2	1	2	1.4	3	3	1.3	5	2	1.0	4	2	1.6	2
H. involucrata	5	1.2	9	1	0.5	3	6	2.1	8	1	0.8	2	5	2.0	6	7	3.9	6	4	2.8	4	5	2.8	5	1	0.5	3	4	4.2	1
H. subplumosa	3	1.8	3	6	3.1	6	5	1.7	6	2	1.0	6	4	1.6	4	8	2.9	7	5	2.3	4	11	3.2	9	4	1.6	6	2	1.6	2
Other	6	-	-	5	-	-	4	-	-	7	-	-	4	-	-	7	-	-	5	-	-	4	-	-	1	-	-	1	-	-
Total H. spp.	15	3.3	12	13	3.5	13	16	3.0	13	11	2.2	13	20	4.6	14	22	5.1	12	16	3.3	13	23	3.9	15	8	1.8	11	9	4.5	8

	Month																											
	May						June						July						August						September			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses (cont.):																														
Culm a	2	1.3	2	1	0.7	3	1	0.7	1	0	0.3	2	0	0.2	1	2	1.2	3	1	0.7	1	0	0.3	2	6	2.9	6	5	2.1	7
Culm b	0	0.3	2	0	0.0	0	0	0.0	0	1	0.5	2	0	0.2	1	0	0.4	1	2	1.5	2	1	0.7	3	7	2.4	7	7	2.8	8
Culm c	0	0.0	0	0	0.4	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.2	1	2	0.6	5	1	0.5	3	5	3.8	6	2	1.1	5
Culm d	0	0.3	2	1	0.9	2	0	0.3	2	2	0.6	5	3	1.5	4	1	0.9	1	2	0.9	7	1	0.7	3	6	2.0	10	3	1.1	7
Culm e	2	1.9	2	0	0.0	0	0	0.0	0	1	0.6	1	1	0.5	3	0	0.4	1	0	0.0	0	0	0.4	1	1	0.5	2	1	0.4	5
Culm f	0	0.2	1	0	0.2	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.2	1	0	0.0	0	0	0.0	0	0	0.0	0
Culm g	0	0.3	1	1	0.6	1	0	0.0	0	1	0.6	1	0	0.4	1	1	0.9	2	1	0.7	2	0	0.2	1	9	4.1	6	8	3.1	7
Culm h	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0
Culm i	2	1.0	4	3	2.1	4	1	0.5	4	0	0.2	1	0	0.0	0	3	3.0	2	0	0.0	0	0	0.4	1	8	6.3	2	8	4.5	4
Other	11	-	-	7	-	-	2	-	-	2	-	-	4	-	-	4	-	-	3	-	-	8	-	-	11	-	-	14	-	-
Total Culms	17	5.4	13	13	2.8	13	4	0.8	14	7	2.5	10	8	1.8	13	11	3.2	12	11	3.0	12	11	2.2	14	53	5.3	15	48	5.9	14
Leaf a	1	0.9	1	0	0.0	0	0	0.0	0	0	0.0	0	1	0.7	1	0	0.0	0	0	0.2	1	0	0.4	1	0	0.0	0	0	0.0	0
Leaf b	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0
Other	12	-	-	8	-	-	14	-	-	7	-	-	4	-	-	3	-	-	6	-	-	4	-	-	9	-	-	7	-	-
Total Leaves	13	2.1	14	8	2.2	11	14	3.6	12	7	2.0	10	5	2.4	7	3	1.9	5	6	2.6	10	4	1.4	7	9	3.6	9	7	2.0	10

	Month																											
	May						June						July						August						September			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Non-grasses:																														
Lonchocarpus laxiflorus	0	0.0	0	0	0.0	1	0	0.0	1	0	0.0	0	1	0.4	2	1	0.4	3	0	0.2	2	0	0.1	1	0	0.0	0	0	0.0	0
Legume a	0	0.0	0	0	0.0	0	0	0.0	1	0	0.1	1	0	0.0	0	1	0.7	5	0	0.0	1	0	0.0	0	0	0.1	1	0	0.1	1
Other	1	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Total Legumes	1	0.9	1	0	0.1	3	0	0.1	3	0	0.1	3	1	0.4	2	2	0.7	9	0	0.2	3	0	0.2	2	0	0.1	1	0	0.2	3
Total Jasminium kerstingii	2	0.7	6	5	1.5	10	1	0.6	6	3	1.4	11	0	0.2	3	0	0.1	5	0	0.0	0	0	0.1	1	0	0.0	1	0	0.1	2
Total Other Non-grass	1	-	-	1	-	-	1	-	-	0	-	-	0	-	-	1	-	-	2	-	-	1	-	-	4	-	-	2	-	-

[a] Because of the early rains in 1986, May diets have been included with the rainy season diets. [b] All "other" catagories are comprised of various plant species, both identified and unidentified, which never contribute >5% to any composite diet in any month.

APPENDIX F

AVERAGE COMPOSITION (%, S.E.) AND FREQUENCY OF OCCURRENCE FOR IMPORTANT FORAGES FOUND IN MONTHLY COMPOSITE COOL DRY SEASON FECAL SAMPLES FROM HARTEBEEST AND ROAN ANTELOPE AT THE NAZINGA GAME RANCH, BURKINA FASO, 1986-1987

	Month																					
	October						November						December						January			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses:																								
Andropogon gayanus bisquamulatus	46	4.6	14	66	5.4	15	33	6.7	14	20	3.7	13	20	3.4	14	10	2.1	14	10	2.1	14	7	1.7	13
A. g. gayanus	0	0.4	1	0	0.0	0	24	5.6	12	16	7.7	7	1	0.6	4	3	2.5	3	1	0.5	2	1	1.0	2
A. tectorum	0	0.0	0	0	0.0	0	0	0.2	1	1	0.7	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0
Other[a]	1	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Total Tall *A.* spp.	47	4.5	14	66	5.4	15	57	6.6	14	37	7.0	14	21	3.4	14	13	4.1	14	11	2.3	13	8	2.2	12
A. ascinoides	3	1.3	7	2	1.1	4	1	0.4	2	1	1.1	2	5	1.4	10	16	3.6	12	26	5.7	15	25	3.8	15
A. spp.	3	1.6	5	1	0.5	2	1	0.8	4	2	1.4	4	14	4.3	10	18	4.1	10	17	3.9	10	19	4.1	10
Other	1	-	-	0	-	-	0	-	-	1	-	-	0	-	-	0	-	-	1	-	-	1	-	-
Total Short *A.* spp.	7	1.7	11	3	1.2	5	2	1.1	5	4	2.4	5	19	4.7	14	34	4.9	14	44	4.7	15	45	3.8	15
Hyparrhenia dissoluta	0	0.2	1	0	0.0	0	0	0.0	0	0	0.2	1	0	0.2	1	0	0.0	0	0	0.0	0	0	0.0	0
H. involucrata	0	0.0	0	0	0.2	1	0	0.0	0	0	0.0	0	0	0.2	1	0	0.0	0	0	0.0	0	0	0.2	1
H. subplumosa	1	0.7	3	1	0.4	3	0	0.0	0	1	0.7	3	0	0.0	0	1	0.8	3	3	1.3	6	1	0.4	4
Other	2	-	-	2	-	-	0	-	-	2	-	-	5	-	-	3	-	-	0	-	-	3	-	-
Total *H.* spp.	3	0.8	8	3	1.1	7	0	0.0	0	3	1.2	5	5	1.5	10	4	1.0	8	3	1.3	6	4	1.0	12

	Month																					
	October						November						December						January			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses (cont.):																								
Culm a	2	1.1	4	3	1.5	3	1	0.7	2	6	3.2	6	4	2.3	3	2	1.3	3	1	1.1	1	0	0.3	1
Culm b	2	1.5	4	0	0.2	1	0	0.0	0	0	0.0	0	0	0.4	1	0	0.0	0	0	0.0	0	0	0.0	0
Culm c	1	0.6	1	1	1.1	1	0	0.0	0	0	0.2	1	0	0.0	0	0	0.0	0	2	1.8	1	0	0.1	1
Culm d	4	1.3	8	4	1.7	7	9	3.0	10	9	3.9	11	2	1.3	4	5	1.7	8	2	0.7	5	3	1.0	9
Culm e	1	0.3	3	1	0.5	2	1	0.4	4	3	1.0	8	8	3.3	8	3	1.4	6	1	0.6	1	1	0.5	5
Culm f	1	0.5	2	0	0.2	1	0	0.0	0	1	0.8	1	0	0.2	1	1	0.8	4	0	0.4	1	1	0.9	1
Culm g	4	1.6	6	3	1.0	6	3	1.8	3	5	2.3	7	3	1.6	5	2	1.5	2	2	1.1	4	0	0.2	2
Culm h	2	0.7	4	1	0.9	3	1	0.6	4	5	2.0	6	2	1.1	5	3	1.4	5	3	1.1	5	3	1.4	5
Culm i	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0
Other	9	-	-	8	-	-	9	-	-	12	-	-	8	-	-	12	-	-	6	-	-	8	-	-
Total Culms	26	4.5	13	21	3.2	14	24	3.9	13	41	7.0	14	27	4.7	14	28	4.6	14	17	2.9	14	16	1.9	14
Leaf a	0	0.0	0	0	0.0	0	0	0.4	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.2	1
Leaf b	6	6.3	1	0	0.0	0	5	5.1	1	0	0.0	0	6	6.3	1	0	0.0	0	0	0.0	0	0	0.0	0
Other	2	-	-	4	-	-	2	-	-	1	-	-	4	-	-	6	-	-	5	-	-	6	-	-
Total Leaves	8	6.2	7	4	2.1	5	7	5.1	7	1	0.5	4	10	6.5	6	6	1.9	12	5	1.5	11	6	3.4	5

	Month																					
	October						November						December						January			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Non-grasses:																								
Lonchocarpus laxiflorus	1	0.5	6	1	0.2	5	1	0.5	4	2	0.6	10	0	0.2	5	2	0.4	10	1	0.3	5	0	0.2	3
Legume a	1	0.3	8	1	0.4	4	0	0.2	6	1	0.4	7	1	0.4	7	1	0.4	7	1	0.6	7	0	0.2	3
Other	0	-	-	0	-	-	1	-	-	0	-	-	2	-	-	0	-	-	3	-	-	4	-	-
Total Legumes	2	0.7	12	2	0.4	13	2	0.8	12	3	1.0	9	3	1.0	10	2	0.5	14	5	1.2	13	4	1,2	14
Total *Jasminium kerstingii*	3	0.8	10	0	0.2	4	3	1.3	7	4	1.5	11	10	2.3	13	7	1.3	13	11	2.7	13	15	2.9	13
Total Other Non-grass	4	0.8	14	2	0.5	11	3	1.2	12	8	2.3	15	3	1.0	9	6	1.0	13	3	0.9	10	1	0.5	6

[a] All "other" catagories are comprised of various plant species, both identified and unidentified, which never contribute >5% to any composite diet in any month.

APPENDIX G

AVERAGE COMPOSITION (%, S.E.) AND FREQUENCY OF OCCURRENCE FOR IMPORTANT FORAGES FOUND IN MONTHLY COMPOSITE HOT DRY SEASON FECAL SAMPLES FROM HARTEBEEST AND ROAN ANTELOPE AT THE NAZINGA GAME RANCH, BURKINA FASO, 1986-1987

	Month																											
	February						March						April						May						June[a]			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan[b]		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses:																														
Andropogon gayanus bisquamulatus	14	4.7	11	33	6.1	13	33	5.3	15	29	5.5	13	29	5.6	12	19	4.1	12	20	3.0	14	7	2.6	12	27	5.1	14	23	5.3	11
A. g. gayanus	5	4.9	3	2	1.2	4	1	0.5	3	1	0.6	5	0	0.2	1	0	0.2	1	7	6.4	4	0	0.0	0	8	3.9	5	2	1.4	2
A. tectorum	0	0.0	0	0	0.0	0	0	0.0	0	5	5.1	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.4	1	0	0.0	0
Other[c]	0	-	-	1	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	1	-	-	4	-	-
Total Tall *A.* spp.	19	6.1	12	36	6.0	14	34	5.2	15	35	5.8	14	29	5.6	12	19	4.1	13	27	5.7	15	7	2.6	12	36	5.8	14	29	5.1	12
A. ascinoides	23	4.0	13	10	3.3	11	8	1.9	12	2	1.1	4	3	0.9	8	1	0.6	4	7	2.3	10	1	0.4	2	15	7.5	12	6	1.9	10
A. spp.	23	5.5	10	7	2.7	9	12	4.0	8	2	0.6	7	6	2.2	7	2	0.8	6	11	3.2	10	4	3.0	8	9	2.2	10	11	3.1	8
Other	0	-	-	1	-	-	0	-	-	0	-	-	0	-	-	0	-	-	2	-	-	0	-	-	0	-	-	7	-	-
Total Short *A.* spp.	46	6.3	14	18	4.6	13	20	4.3	13	4	1.2	9	9	2.6	10	3	1.0	8	20	3.8	13	5	3.4	8	24	6.9	14	24	4.8	12
Hyparrhenia disoluta	0	0.0	0	7	6.5	1	0	0.2	1	0	0.0	0	0	0.0	0	1	0.4	2	0	0.0	0	0	0.0	0	1	0.5	1	2	1.2	5
H. involucrata	0	0.0	0	0	0.0	0	0	0.2	1	0	0.0	0	0	0.0	0	0	0.3	2	0	0.0	0	0	0.0	0	1	0.5	2	0	0.0	0
H. subplumosa	2	0.9	5	4	1.5	6	6	1.7	9	2	1.4	3	3	1.3	5	0	0.4	2	4	1.5	7	1	0.8	2	4	1.7	7	2	0.9	4
Other	3	-	-	1	-	-	7	-	-	1	-	-	3	-	-	1	-	-	2	-	-	1	-	-	2	-	-	6	-	-
Total *H.* spp.	5	1.8	9	12	6.3	10	13	2.2	14	3	2.2	3	6	1.7	9	2	1.0	8	6	1.5	11	2	1.2	4	8	2.0	11	10	2.6	11

	Month																											
	February						March						April						May						June[a]			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan[b]		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Grasses (cont.):																														
Culm a	1	0.7	1	2	1.6	1	5	3.7	2	2	2.1	2	8	5.2	4	4	2.1	3	6	4.1	2	11	6.3	3	0	0.3	2	1	1.3	1
Culm b	5	5.1	2	1	0.7	1	0	0.2	1	0	0.1	1	0	0.0	0	0	0.0	0	1	0.5	2	0	0.0	0	0	0.2	1	0	0.2	1
Culm c	0	0.0	0	0	0.0	0	0	0.2	1	0	0.0	0	0	0.0	0	0	0.2	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0
Culm d	1	0.5	3	3	0.7	9	4	1.3	8	3	1.3	7	4	1.5	7	3	1.0	7	5	1.4	8	2	0.8	6	3	0.9	9	1	0.5	4
Culm e	2	1.1	4	1	0.8	2	2	1.5	2	1	0.4	2	2	0.8	4	2	1.4	3	1	0.5	3	1	0.3	4	0	0.2	1	0	0.2	1
Culm f	0	0.2	1	0	0.2	1	0	0.2	1	1	0.5	5	2	1.1	3	6	1.9	8	1	0.3	2	10	3.8	10	0	0.2	1	1	0.6	1
Culm g	1	0.4	3	1	0.7	1	0	0.4	1	1	0.5	4	3	1.3	6	5	2.4	5	2	1.4	3	0	0.2	2	0	0.0	0	0	0.2	2
Culm h	2	1.1	4	4	1.6	6	2	0.8	5	5	3.6	5	5	2.2	7	2	1.0	3	5	1.6	7	0	0.0	1	0	0.0	0	0	0.0	0
Culm i	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0
Other	8	-	-	6	-	-	6	-	-	18	-	-	14	-	-	13	-	-	11	-	-	9	-	-	7	-	-	7	-	-
Total Culms	20	4.9	14	18	3.4	14	19	5.3	12	31	5.3	14	38	6.2	14	35	4.8	14	32	4.8	14	33	6.6	14	10	2.3	14	10	2.3	12
Leaf a	0	0.0	0	0	0.0	0	0	0.0	0	0	0.2	1	0	0.2	1	2	2.4	1	5	2.0	7	0	0.0	0	0	0.2	1	0	0.0	0
Leaf b	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	4	3.6	1	5	4.5	1	0	0.0	0	2	2.3	1	0	0.0	0	0	0.0	0
Other	4	-	-	3	-	-	7	-	-	2	-	-	4	-	-	1	-	-	4	-	-	0	-	-	7	-	-	2	-	-
Total Leaves	4	1.2	10	3	1.7	6	7	2.4	7	2	1.2	6	8	3.5	9	8	5.0	6	9	2.3	10	2	2.3	2	7	3.5	7	2	1.2	4

	Month																											
	February						March						April						May						June[a]			
	Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan			Hartebeest			Roan[b]		
Taxon	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n	x	SE	n
Non-grasses:																														
Lonchocarpus laxiflorus	0	0.3	3	1	0.3	6	1	0.6	4	3	0.7	12	0	0.3	3	3	0.8	9	0	0.0	2	10	2.1	10	0	0.1	6	0	0.2	1
Legume a	0	0.1	3	1	0.4	8	1	0.9	2	5	1.9	9	1	0.6	3	7	2.1	10	0	0.3	2	7	2.3	11	0	0.1	2	1	1.0	5
Other	1	-	-	0	-	-	2	-	-	5	-	-	4	-	-	8	-	-	4	-	-	14	-	-	1	-	-	1	-	-
Total Legumes	1	0.8	5	2	0.6	9	4	2.0	5	13	2.5	14	5	2.4	6	18	3.7	13	4	2.5	5	31	4.2	14	1	0.2	9	2	1.3	8
Total *Jasminium kerstingii*	4	2.0	6	6	2.6	10	0	0.3	1	3	0.7	13	1	1.0	2	3	0.9	9	0	0.0	2	2	0.9	10	13	4.0	11	20	4.8	10
Total Other Non-grass	1	0.5	9	5	1.5	13	3	1.6	9	8	1.7	14	3	1.5	10	11	2.4	15	3	1.2	11	17	4.0	14	1	0.3	9	3	0.7	12

[a] Because of the delay in the return of the rains in 1987, June diets have been included with the dry season diets, although they were more transitional.

[b] Due to heavey rains, only 13 fecal samples were collected for roan antelope in June, 1987.

[c] All "other" catagories are comprised of various plant species, both identified and unidentified, which never contribute >5% to any composite diet in any month.

VITA

James Randolph Schuette

Candidate for the Degree of

Master of Science

Thesis: SEASONAL DIETARY OVERLAP BETWEEN HARTEBEEST AND ROAN ANTELOPE IN BURKINA FASO, WEST AFRICA

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