The gall midges (Diptera: Cecidomyiidae) of *Acacia* spp. (Mimosaceae) in Kenya

Raymond J. Gagné
Systematic Entomology Laboratory, PSI
Agricultural Research Service, USDA
c/o U. S. National Museum NHB 168
Washington, D. C. 20560 U.S.A.

and

Jennifer Marohasy
Alan Fletcher Research Station, Queensland Dept. of Lands
27 Magazine St., Sherwood 4075
Queensland, Australia

Abstract

Twenty-eight new species of plant-feeding Cecidomyiidae are described from galls taken on five species of *Acacia* in Kenya. The new species are placed in seven genera, four of them new. The new taxa, to be attributed to Gagné, are as follows, in bold face: in **Acacidiplosis**: **ananas**, **cespitosa**, **conica**, **crispa**, **echinata**, **erupta**, **hamata**, **imbricata**, **ramosa**, **rugosa**, **spinosa**, **undulata**, and **verticillata**; in **Aposchizomyia**: **acuta**, **brevis**, **crenata**, **longa**, **striata**, and **turnouri**; *Asphondylia* **napiformis**; in **Athidiplosis**: **bullata** and **walteri**; in *Contarinia*: **carolinae**, **hongoi**, and **plicata**; **Kimadiplosis diversa**; in Lopesia: **niloticae** and **armata**. The larvae, pupae, and the host-specific galls of these species generally offer the best characters for species discrimination. Galls of several additional species of gall midges from Acacia spp. in Kenya are described, but the gall makers are left unnamed for lack of suitable specimens. *Collula acaciae* (Kieffer 1912) is shown to be a junior homonym of *Collula acaciae* (Kieffer 1909) and is renamed *kiefferi*. Gall midges from acacias in Africa, India, and Australia are reviewed. *Cecidomyia acaciaelongifoliae* Skuse (1890) from Australia is newly combined in *Dasineura*. Two of the new species, *Acacidiplosis spinosa* and *Aposchizomyia acuta*, inhibit flowering of *Acacia nilotica* and are potential biological control agents of their host in Australia.

Introduction

Twenty-eight new species of gall midges are described from acacia galls found in Kenya. These species are a small part of the great number that must occur on acacias and a further indication of our poor knowledge of the Afrotropical gall midge fauna; the number is almost one-fifth that of gall midges so far described from the Afrotropical Region (Harris 1980).

This study is part of a survey of acacia-feeding insects that might be used to control *Acacia nilotica* (L.) Willd. ex Del., or prickly acacia, in Australia. This plant, native to central Asia and Africa, was introduced from India and Pakistan into Australia during the 1890's to the 1920's as a shade and fodder plant for the treeless Mitchell grass plains (Vitelli 1992). It is now a pest, rapidly expanding its range in eastern and northern Australia and gradually restricting native perennial grasses.

In 1987, a three-year program based in Kenya was initiated by the Queensland Department of Lands to find, test, and send to Australia potential biological control agents. Results of the initial survey are summarized in an unpublished report by one of us (JM) to the Australian Wool Corporation and include records of 88 kinds of insects found on acacias in Kenya. At least two of the gall midges, *Acacidiplosis spinosa* and *Aposchizomyia acuta*, found on *A. nilotica* appear to be potentially good biocontrol agents. They directly affect seed production and should help limit the host plant's invasiveness.

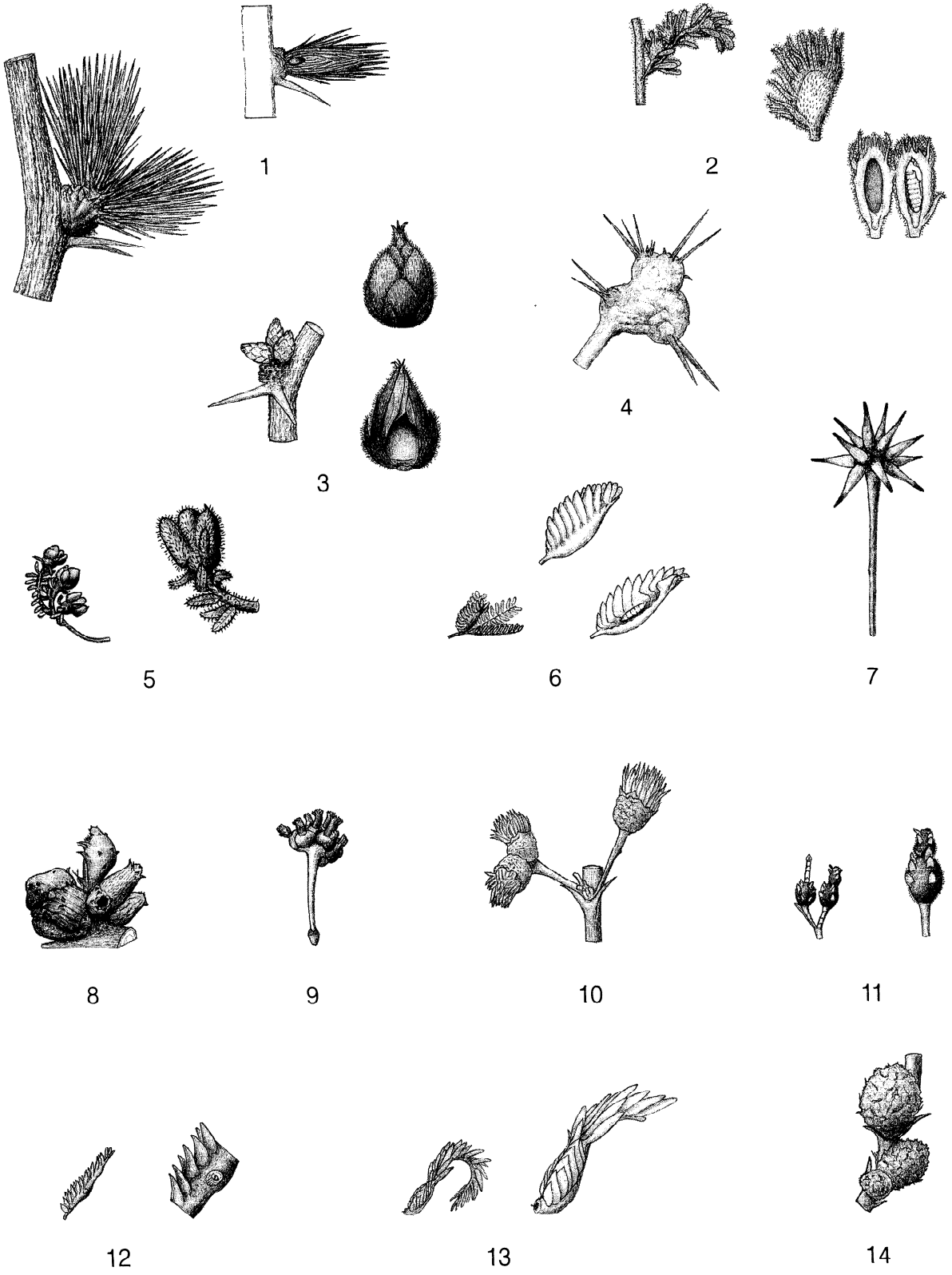
Table 1. Numbers of plant-feeding cecidomyiid species found on acacias in Kenya during this study, arranged by cecidomyiid genus and host. Numbers followed by an asterisk designate species left unnamed.

	Acacia spp.						
	nilotica	drepanolobium	tortilis	mellifera	senegal	reficiens	hockii
Acacidiplosis	2	1	10, 1*	–	–	–	–
Aposchizomyia	1, 1*	4	1, 2*	–	–	1*	–
Asphondylia	1*	–	1*	1	–	1*	1*
Athidiplosis	–	–	–	1	1	–	–
Contarinia	–	2	–	–	1	–	–
Kimadiplosis	–	–	1	–	–	–	–
Lopesia	1	–	1	–	–	–	–
unknown genus	–	–	1*	–	–	–	–

Much of this survey was done at Malili Ranch, in the Kapiti Plains savannah southeast of Nairobi, where *A. nilotica* grows in mixed stands with *Acacia gerrardi* Benth., *Acacia seyal* Del., and *Acacia drepanolobium* Harms ex Sjöstedt. In other parts of Kenya where additional collections were made, *A. nilotica* is often found growing with *Acacia tortilis* (Forssk.) Hayne, *Acacia senegal* (L.) Willd., *Acacia hockii* De Wild., and *Acacia brevispica* Harms. A great diversity of galls was found on *A. nilotica*, *A. drepanolobium*, and *A. tortilis*, and a few galls were found on four other acacia species. Interestingly, despite extensive searching, no galls were found on *A. gerrardi*, *A. brevispica*, or *A. seyal*, although galls attributable to gall midges have been found on *A. seyal* in Ethiopia and Senegal (Monod 1968). The galls are quite distinct among hosts, and various genera of gall midges are found predominantly on particular species of acacia.

Only two cecidomyiids were previously described from acacia in Africa, from leaf galls on *Acacia vera* Willd. [illegitimate name, =*A. nilotica* (Ross 1979)] in Egypt. Both gall midge species were named *Collula acaciae* (Kieffer), but the junior homonym is renamed *Collula kiefferi* Gagné. We found neither of these species among the specimens from Kenya. Three other African acacia galls have been noted and attributed to undetermined Cecidomyiidae: a biconvex leaflet gall on *Acacia verek* Guill. et Perr. [illegitimate name, =*A. senegal* (Ross 1979)] and an imbricated bud gall on an *Acacia* sp., both collected from Eritrea (now in Ethiopia) (Stefani Perez 1907); and a spiny stem gall on *Acacia arabica* (Lam.) Willd. from German East Africa (now mainland Tanzania) (Rübsaamen 1910). Houard (1922, 1923) listed and illustrated these galls as well as others possibly caused by gall midges on various other African acacias. Monod (1968) subsequently listed and illustrated galls from African acacias made by various unknown agents, several of them evidently or probably cecidomyiids. The galls he illustrated that are similar to some we found are noted under various species described below.

Figures 1-8. Figures 1-7, Galls of *Acacia nilotica*. 1-2, *Acacidiplosis spinosa*: 1, cluster on floral buds and one gall in section (1x); 2, cluster on leaf (1x) and individual galls, one opened to show interior with pupa (3x). 3, *Acacidiplosis imbricata*, cluster (1x) and individual galls, one in section (3x). 4, *Aposchizomyia acuta* (1x). 5, *Aposchizomyia* sp., cluster (1x) and part of cluster (3x). 6, *Lopesia niloticae*, cluster (1x), and galls in side view and section (2x). 7, *Asphondylia* sp., cluster (1x). **Figures 8-14,** Galls of *Acacia drepanolobium*. 8, *Acacidiplosis rugosa* (1x). 9, *Aposchizomyia brevis*, (1x). 10, *Aposchizomyia turnouri* (1x). 11, *Aposchizomyia crenata*, cluster (1x) and one leaf (2x). 12, *Aposchizomyia longa*, leaf (1x) and part of leaf (3x). 13, *Contarinia plicata*, leaf (1x) and part of leaf (2x). 14, *Contarinia hongoi* (1x).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The plant-feeding gall midges described here from Kenya all belong to the supertribe Cecidomyiidi and are restricted to acacia. Some may be related to species known from acacias in India, but none is related to the two known Australian species from acacia, which belong to the supertribe Lasiopteridi.

None of the seven species of Cecidomyiidae known from acacias outside Africa was found in Kenya during this study. They are as follows, in alphabetical order:

Asphondylia trichocecidarum Mani from India is discussed under *Asphondylia napiformis*.

Cecidomyia acaciaelongifoliae Skuse (1890) from Australia is placed for the first time in the genus *Dasineura* (NEW COMBINATION). It does not belong in *Cecidomyia*, formerly used as a catch-all genus but now restricted to Northern Hemisphere species whose larvae feed on resin in conifers. This species makes a gall similar to that of *Dasineura dielsi* Rübsaamen, and Skuse's description, which notes the presence of 14 antennal flagellomeres and the fact that R5 joins the costa anterior to the wing apex, indicates that this species belongs to the supertribe Lasiopteridi. Galls on *Acacia longifolia* are modified, aggregated flowers, 12-18 mm long. Each cylindrical gall is tubelike, coalesced with other galls at its base but free beyond, and opened at its apex, which is filled inside with white hair.

Contarinia bivalviae (Rao) and *Contarinia ramachandrani* (Mani), both from India, are discussed under *Contarinia carolinae*.

Dasineura dielsi Rübsaamen (1916), was described from adults of both sexes reared from tubular flower galls on *Acacia cyclopis* Benth. in Victoria, Australia. The galls resemble somewhat those of *D. acaciaelongifoliae*, but the individual tubes forming the galls of *D. dielsi* are only 10-12 mm long and have apical, recurved, corniculate extensions. The wing and genitalia of both sexes illustrated by Rübsaamen fit the broad concept of *Dasineura* now in general use. We found no galls made by this or any other genus of the supertribe Lasiopteridi in Kenya.

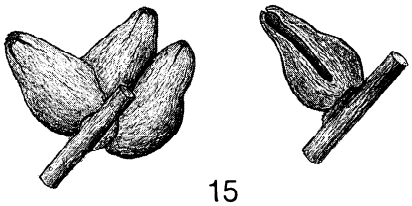
Schizomyia acaciae Mani and *Schizomyia orientalis* Grover, both from India, are discussed under *Aposchizomyia*.

Methods

Surveying, collecting, and rearing in Kenya were done by J. Marohasy; the taxonomic study was done by R. J. Gagné. Galls were collected to obtain larval instars and pupae and some galls were kept in containers until adults emerged. Specimens were killed and stored in 70% ethanol. Some larvae and adults were mounted for microscopic study in Canada balsam, using the method outlined in Gagné (1989). Most of the specimens of the new species are deposited in the National Museum of Natural History (USNM) in Washington, D.C.; specimens of the commoner species are deposited in the Kenya National Museum, Nairobi, and The Natural History Museum in London; examples of galls are deposited in the Kenya Forestry Research Institute Reference Collection, Muguga, Kenya, the National Herbarium, Nairobi, the Alan Fletcher Research Station, Queensland Dept. of Lands, and the USNM. In the following descriptions, anatomical terminology of the adult stage follows McAlpine et al. (1981) and that of the larval stage follows Gagné (1989). The new genera and species are to be attributed to Gagné.

Genera and species are treated in alphabetical order. All specimens unless otherwise stated were collected in Kenya by J. Marohasy. Abbreviations used are: USNM for National Museum of Natural History, Washington, D.C.; BMNH for The Natural History Museum, London; and standard abbreviations for distances and points of the compass. Paratypes of the new species are pinned or slide-mounted specimens; "material examined" are specimens in alcohol that have been determined to species, but not mounted for study.

Figures 15-31. Figures 15-27, Galls of *Acacia tortilis*. 15, *Acacidiplosis conica*, cluster and section (1x). 16, *Acacidiplosis cespitosa* (1x). 17, *Acacidiplosis ramosa* (1x). 18, *Acacidiplosis crispa*, cluster and section (1x). 19, *Acacidiplosis ananas*, cluster and section (1x). 20, *Acacidiplosis echinata* (1x). 21, *Acacidiplosis verticillata* (1x). 22, *Acacidiplosis undulata*, on stem (1x) and detail of exterior and section (3x). 23, *Acacidiplosis erupta*, cluster (1x) and detail of gall (3x). 24, *Acacidiplosis hamata*, entire gall (1x) and section (2x). 25, *Aposchizomyia* sp. (1x). 26, Cecidomyiid, (1x and 2x). 27, *Aposchizomyia striata*, leaf (1x) and galls in section (2x). **Figures 28-29,** Galls of *Acacia senegal*. 28, *Athidiplosis bullata* (1x). 29, *Contarinia carolinae*, cluster (1x) and cluster and two separated leaflets (2x). **Figures 30-31,** Galls of *Acacia mellifera*. 30, *Athidiplosis walteri*, entire and in section (1x). 31, *Asphondylia napiformis* (1x).



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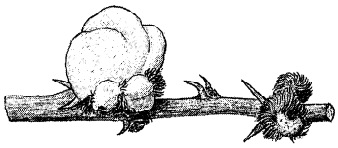

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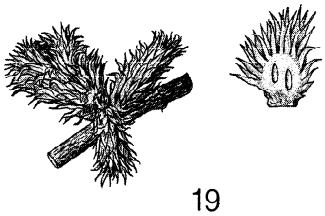

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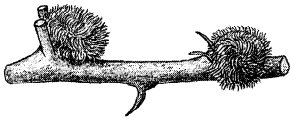

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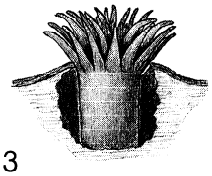

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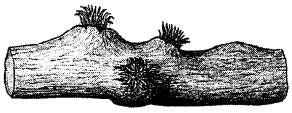

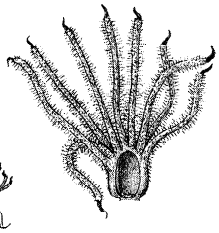

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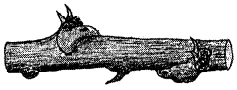

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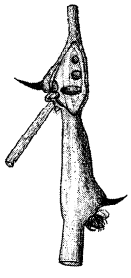

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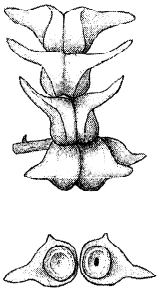

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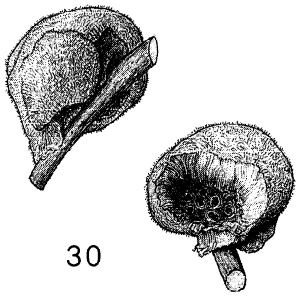

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Keys to Genera of Gall-Forming Cecidomyiids on Acacias in Africa

Key to third instars (that of *Collula* unknown):

1. Spatula absent 2
   Spatula present 4

2. Body ovoid (Fig. 137); terminal papillae not apparent (Fig. 138) ..... *Contarinia* in part
   Body fusiform (Figs. 118, 159); terminal papillae apparent 3

3. Dorsal, pleural, and terminal papillae with setae (Fig. 160) ..... *Lopesia*
   Dorsal, pleural, and terminal papillae without setae (Fig. 119) ..... *Athidiplosis*

4. Spatula lobes diverging laterally (Fig. 152); terminal segment divided into two conical processes (Fig. 153) ..... *Kimadiplosis*
   Spatula lobes directed anteriorly (as in Fig. 98); terminal segment convex, undivided (as in Fig. 97) 5

5. Terminal segment with 8 terminal papillae, one pair corniform and recurved (Fig. 147) ..... *Contarinia* in part
   Terminal segment with 6 or fewer papillae; if some corniform, then not recurved (as in Fig. 58) 6

6. Spatula with 4 teeth and surrounded by extensive sclerotization (Fig. 114) ..... *Asphondylia*
   Spatula with only 1 or 2 teeth and not surrounded by sclerotization (as in Figs. 49, 98) 7

7. Spatula long and narrow, more than 3 times as long as wide (Fig. 98) ..... *Aposchizomyia*
   Spatula short and broad, less than twice as long as wide (as in Fig. 49) ..... *Acacidiplosis*

Key to adults (that of *Kimadiplosis* unknown):

1. Tarsal claws toothed, strongly curved near basal third (Fig. 164) 2
   Tarsal claws simple, curved beyond midlength (Fig. 39) 3

2. Female antennal flagellomeres without distinct neck; ovipositor as long as remainder of abdomen; male unknown ..... *Collula*
   Female antennal flagellomeres with neck; ovipositor much shorter than remainder of abdomen ..... *Lopesia*

3. Male antennal flagellomeres cylindrical (as in Fig. 86); female seventh abdominal sternite 1 1/2 times as long as seventh tergite 4
   Male antennal flagellomeres binodal (as in Fig. 33); female seventh abdominal sternite no longer than seventh tergite 5

4. Palpus four segmented; base of ovipositor without dorsal pair of lobes; male with parameres (Fig. 93) ..... *Aposchizomyia*
   Palpus three segmented; base of ovipositor with dorsal pair of lobes; male without parameres ..... *Asphondylia*

5. Male antennal flagellomeres each with 3 circumfila (Fig. 121); female cerci separate, large, bilaterally flattened, completely setulose (Fig. 127) ..... *Athidiplosis*
   Male antennal flagellomeres each with 2 circumfila (as in Fig. 34); female cerci closely approximated mesally, tiny, dorsoventrally flattened, mostly asetulose (as in Fig. 44) 6

6. Palpus one to three segmented; male seventh tergite with complete row of posterior setae; female cerci approximately as long as wide (Fig. 47) ..... *Acacidiplosis*
   Palpus four segmented; male seventh tergite with posterior setae only laterally; female cerci more than twice as long as wide (Fig. 134) ..... *Contarinia*

Key to Plant-Feeding Cecidomyiidae on Acacias in Kenya

This key is based on the galls found during our study. Galls are mostly species specific and usually last a long time on a tree, so lend themselves well to identifying the gall makers. Larvae and pupae that may be found associated with the galls should be compared to the descriptions and figures in this paper to confirm an identification.

1. Galls on *Acacia nilotica* 2
   Galls on other species of *Acacia* 9

2. Galls on pedicels, stems, or stem ends 3
   Galls on leaves 7

3. Galls on pedicels 4
   Galls on stems or stem ends 5

4. Clustered conical swellings (Fig. 7) ..... *Asphondylia* sp.
   Spiny galls (see Figs. 1-2) ... *Acacidiplosis spinosa*

5. Budlike galls covered with overlapping, enlarged scales and resembling an artichoke (Fig. 3) ..... *Acacidiplosis imbricata*

Galls otherwise 6

6. Irregular, globular, smooth swelling, with scattered spines or leaves, usually at stem end (Fig. 4) ... *Aposchizomyia acuta*
Spiny gall on stem or stem end (Fig. 1) ..... *Acacidiplosis spinosa*

7. Rachis slightly swollen, both rows of leaflets cupped together to form an elongate larval chamber (Fig. 6) ..... *Lopesia niloticae*
Rachis not swollen, leaflets otherwise modified .. 8

8. Swellings of any part of leaf, usually with many pliant spines at apex of gall (Fig. 2) ..... *Acacidiplosis spinosa*
Swellings of leaflets, without spines (Fig. 5) ..... *Aposchizomyia* sp.

9. On *Acacia tortilis* 10
On other species of *Acacia* 25

10. Galls on leaves 11
Galls on pedicels or stems 14

11. Two rows of leaflets forming between them an elongate larval chamber (as in Fig. 6) ... *Lopesia armata* and inquiline *Kimadiplosis diversa*
Gall otherwise, larvae inside leaf tissue 12

12. Swollen rachis or leaflets (as in Figs. 11-12) ..... *Aposchizomyia* spp.
Ovoid, sessile or stemmed outgrowths of rachis or leaflets 13

13. Galls growing from rachis between two ranks of appressed leaflets (Fig. 27) ..... *Aposchizomyia striata*
Galls growing directly from leaflets or base of leaflets (Fig. 26) ..... cecidomyiid, p. 00

14. Galls smooth, not hairy, bristly, or scaly 15
Galls at least partly hairy, bristly, or scaly 17

15. Clustered, conical swellings on pedicel (as in Fig. 7) ..... *Asphondylia* sp.
On stems 16

16. Simple, low, convex swellings (Fig. 25) ..... *Acacidiplosis* sp.
Complex, conical growths (Fig. 15) ..... *Acacidiplosis conica*

17. Gall covered at least partly with hairs or bristles 18
Gall covered with scales or leafy growths 21

18. Gall covered with short, straight, bristly hairs 19
Gall covered with elongate, wavy hairs 20

19. Gall evenly conical, uniformly covered with short, appressed hairs (Fig. 20) ..... *Acacidiplosis echinata*
Gall irregularly spheroid, with patches of bristly hairs (Fig. 16) ..... *Acacidiplosis cespitosa*

20. Gall conical, longer than wide (Fig. 18) ..... *Acacidiplosis crispa*
Gall spheroid, shorter than wide (Fig. 21) ..... *Acacidiplosis verticillata*

21. Galls with leafy stems or tendrils 22
Galls partially or completely covered with imbricated scales 23

22. Gall a foreshortened stem covered with leaves and branches (Fig. 17) ..... *Acacidiplosis ramosa*
Gall with tendril-like growths growing from surface (Fig. 24) ..... *Acacidiplosis hamata*

23. Gall erupting from beneath branch surface, most of gall hidden (Fig. 23) ..... *Acacidiplosis erupta*
Galls forming on surface of branch 24

24. Gall covered with bristly green scales, enclosing several larval cells (Fig. 19) ..... *Acacidiplosis ananas*
Gall covered with wavy orange scales, enclosing a single larval cell (Fig. 22) ..... *Acacidiplosis undulata*

25. On *Acacia drepanolobium* 26
On other species of *Acacia* 32

26. Galls on pedicels or stems 27
Galls on leaves 30

27. Galls on stems 28
Galls on pedicels 29

28. Gall irregularly conical, often splitting at apex (Fig. 8) ..... *Acacidiplosis rugosa*
Gall spherical, entire (Fig. 14) ..... *Contarinia hongoi*

29. Several galls aggregated on pedicel, each with flower rudiments at apex (Fig. 9) ..... *Aposchizomyia brevis*
Pedicel a single gall with crown of leafy scales (Fig. 10) ..... *Aposchizomyia turnouri*

30. Leaflets remaining folded to form simple tube, rachis with some swelling but larva free in tube (Fig. 13) ..... *Contarinia plicata*
Rachis or leaflets swollen, larval cells in plant tissue 31

31. Rachis swollen, leaflets short but not swollen (Fig. 12) ..... *Aposchizomyia longa*

Swelling encompassing both rachis and leaflets, only tip of leaflets showing (Fig. 11) ..... *Aposchizomyia crenata*

32. On *Acacia mellifera* 33
On other species of *Acacia* 34

33. Spherical stem gall, thickly covered with fine hairs (Fig. 30) ..... *Athidiplosis walteri*
Conical pedicel gall, mostly smooth (Fig. 31) ..... *Asphondylia napiformis*

34. On *Acacia senegal* 35
On other species of *Acacia* 36

35. Simple stem swelling (Fig. 28) ..... *Athidiplosis bullata*
Coalesced pairs of leaflets (Fig. 29) ..... *Contarinia carolinae*

36. On *Acacia hockii*, clustered, conical swellings on pedicel (as in Fig. 7) ..... *Asphondylia* sp.
On *Acacia reficiens* 37

37. Clustered, conical swellings on pedicel (as in Fig. 7) ..... *Asphondylia* sp.
Swollen leaflets (as in Fig. 11) ..... *Aposchizomyia* sp.

Descriptions

Acacidiplosis Gagné, new genus

Adult. Head: Eyes large, connate, eye bridge 15-20 facets long; facets hexagonal, closely adjacent throughout. Occiput without dorsal protuberance, acute to convex at apex. Frons with 8-24 setae. Labella elongate-hemispherical, rounded at apex, sometimes connate mesally, each with 4-10 lateral setae. Palpus with 1-3 segments, may be variable in size and number within a species. Antenna with first and second flagellomeres not connate, and with apex of twelfth flagellomere budded off and articulated in male but rarely in female. Male flagellomeres (Fig. 34) binodal with one circumfilum on each node; internodes and necks no longer and usually shorter than preceding nodes; circumfilar bases all on approximately same horizontal plane, the loops barely surpassing base of next node. Female flagellomeres successively shorter, nodes constricted beyond basal setae (Figs. 32, 35).

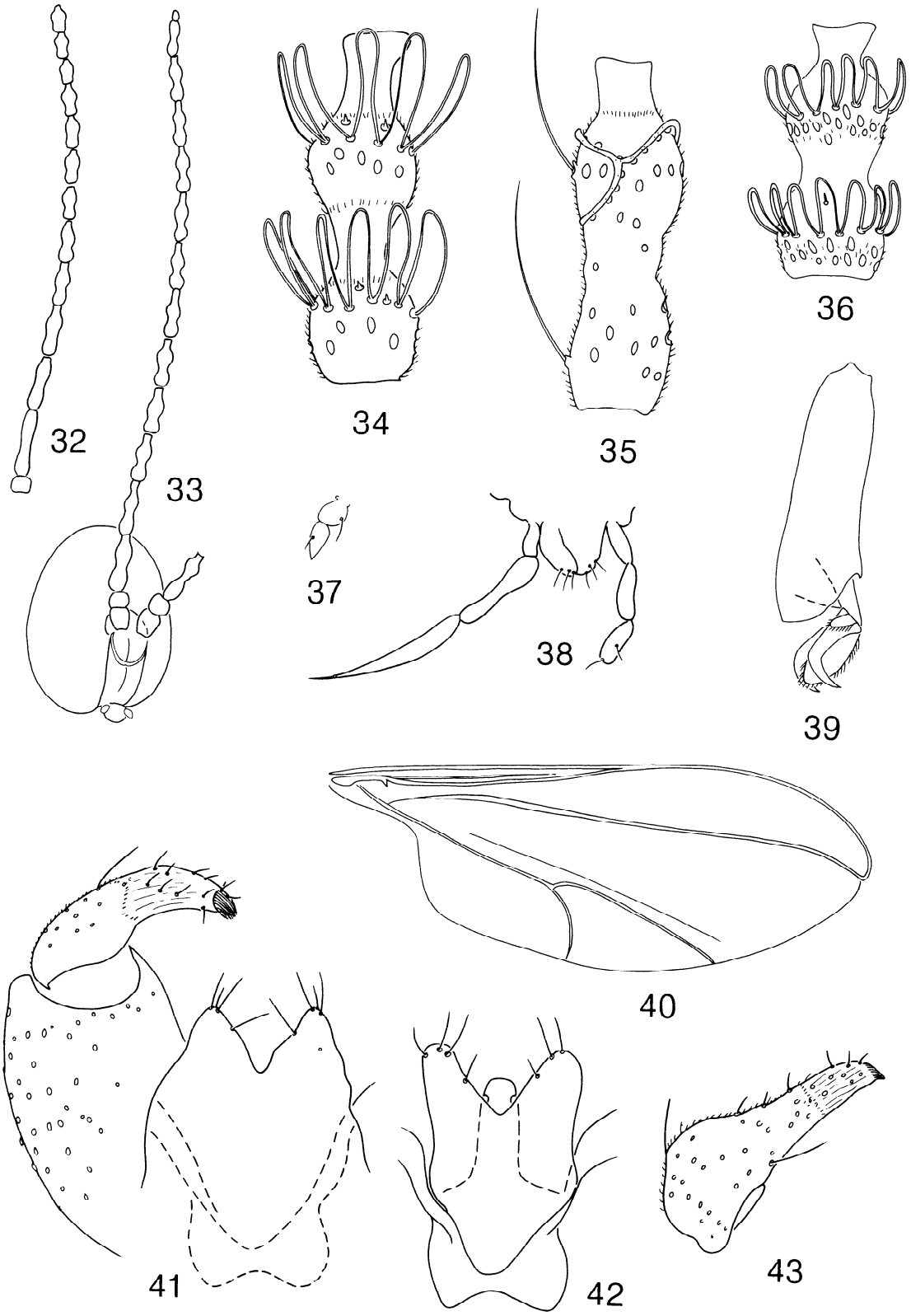
Thorax: Scutum with 2 lateral and 2 dorsocentral rows of setae and many scales. Mesanepisternum covered with scales on dorsal two thirds. Mesepimeron with over 20 setae. Wing (Fig. 40): length, 2.6-4.3 mm in males, 3.5-4.5 mm in females; R5 thickened near junction with Rs, curved apically to join C posterior to wing apex; Rs situated closer to arculus than to apex of R1; Cu forked; M3+4 present. Tarsal claws untoothed, curved beyond midlength; empodia almost reaching bend in claws (Fig. 39).

Male abdomen (Figs. 41-43): First through seventh tergites entire, rectangular, with: two to four uninterrupted, posterior rows of setae and a discrete group of setae on each side except on seventh tergite on which the lateral and posterior groups merge; scattered setiform scales covering tergites elsewhere; and pair of trichoid sensilla on anterior margin. Eighth tergite sclerotized only anteriorly, with or without posterior setae, and with anterior pair of trichoid sensilla. Cerci short, triangular, with several posterior setae. Hypoproct thick, bilobed, with several apical setae. Aedeagus cylindrical, tapering slightly to apex, shorter than hypoproct. Gonocoxite robust, unlobed. Gonostylus broad at base, tapered beyond to narrow apical tooth, with many setae, setulae reduced to base to nearly covering, surface striate where not setulose.

Female abdomen (Figs. 44-47): First through seventh tergites as for male; eighth tergite shorter and narrower than preceding, sclerotized only on anterior half, with many scattered setae on posterior unsclerotized portion, and with anterior pair of trichoid sensilla. Ovipositor protrusible, distal half about 2½ times as long as seventh tergite; cerci short-ovoid, superficially connate, each with at least three pairs of thickened, sensory setae and several other short to long setae, surface glabrous, without setulae; hypoproct short, entire, with several setae, surface glabrous, without setulae.

Pupa. Cephalic sclerite unmodified in one species (*A. rugosa*, Figs. 64-65)); otherwise prominent, either domed (Figs. 66-67) or biconical (Figs. 68-84). Cephalic pair of setae present or absent; when present situated laterally or apically on conical processes.

Figures 32-43, *Acacidiplosis* spp. 32-35, *A. spinosa*: 32, female antenna from pedicel to apex; 33, male head, one antenna incomplete; 34, male third flagellomere; 35, female third flagellomere. 36, *A. rugosa*, male third flagellomere. 37-38, *A. ananas*: 37, palpus; 38, mouthparts. 39-43, *A. spinosa*: 39, fifth tarsomere; 40, wing; 41, gonopod and cerci; 42, hypoproct and aedeagus; 43, gonostylus drawn in flat plane.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Antennal horns not prominent, pointed anteroventrally. Prothoracic spiracle short, one to three times as long as wide. Abdominal segments without dorsal spines.

Larva. Third instar (Fig. 48): Body shape elongate, broadest anteriorly, gradually narrowing posteriorly. Integument mostly rugose. Antenna less than twice as long as wide. Spatula broad, the shaft more or less quadrate, with one or two anterior teeth. Papillar pattern as for Cecidomyiidi (Gagné 1989) except that lateral papillae reduced in number in some species, terminal papillae reduced to three pairs, and, in 2 species, thoracic sternal and ventral papillae setose. Four anal setae present, the mesal pair occasionally close to terminal papillae.

Second instar: Body shape ovoid. Integument smooth except for horizontal rows of tiny spicules, especially ventrally. Spatula present and wedgeshaped in two species, absent in remainder. Papillae as for third instar.

First instar: Body shape ovoid. Only prothoracic and eighth abdominal segment spiracles present. Integument smooth except for horizontal rows of tiny spicules, especially ventrally. Papillae as for other instars.

Type species. *Acacidiplosis spinosa* Gagné.

Etymology. *Acacidiplosis* combines *Acacia*, the host of this genus, and "diplosis." This suffix is commonly used for genera of the supertribe Cecidomyiidi and means "double," referring to the binodal male flagellomeres.

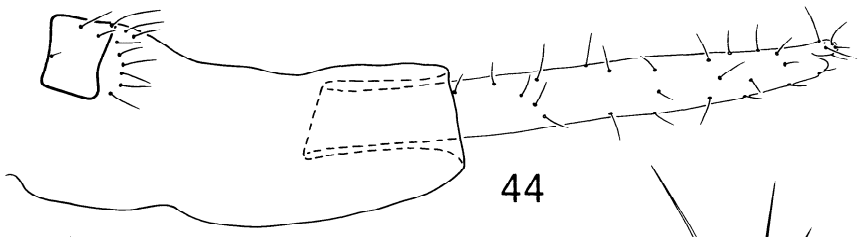
Remarks. *Acacidiplosis* contains 13 species, all new to science. Another possible new species is left unnamed (see *Acacidiplosis* sp.) because it is known only from first instars and its gall is not specific enough to distinguish readily. Two species occur on *Acacia nilotica*, one on *Acacia drepanolobium*, and 11 on *Acacia tortilis*.

Acacidiplosis belongs to the tribe Cecidomyiini. Unique characters of the tribe, which the new genus shares, are the elongate, protrusible ovipositor that tapers to the very tiny, dorsoventrally flattened, closely adjacent cerci, and the short, bilobed male hypoproct that is about as long as the tapering aedeagus. This genus has only three pairs of papillae on the terminal segment of the larvae, having apparently lost the pair of corniform and recurved papillae found in most other Cecidomyiini. In one species group of *Acacidiplosis*, two of the three remaining pairs are corniform instead of setulose.

Acacidiplosis can be separated from other genera of this tribe by the following combination of characters: the adult palpus has three, two, or one segment, reduced from the primitive number of four for the tribe; the apex of the twelfth flagellomere of the male and occasionally the female, is budded off into a short pseudosegment; female flagellomeres become successively shorter from base of antenna to apex; the male hypoproct is very thick, unlike the thin, dorsoventrally flattened hypoproct found in most cecidomyiids; the gonostylus tapers gradually from the wide base to the toothed apex and has many short setae; the ovipositor is long and attenuate; the cerci are short, small, dorsoventrally flattened, almost completely fused mesally, with setae of varying length but without setulae; pupation occurs in the gall and, presumably correlated with this, the pupa has lost the dorsal abdominal spines found in most genera whose larvae burrow in the soil; the larval spatula is reduced to a broad shaft of varying length with one or two elongate, pointed, apical teeth; and the larval terminal papillae are reduced to three pairs. Each of these characters can be found in at least one other genus of Cecidomyiidi, but their combination here is unique.

Three developments of special note in some species of *Acacidiplosis* are: the modified pupal cephalic sclerite of all except *A. rugosa* (see Figs. 64-71); the presence of setae on the sternal and ventral papillae of the larvae of *A. undulata* and *A. erupta* (Fig. 50); and the presence of a sternal spatula in second instars of *A. crispa* and *A. ananas* (Fig. 56). The pupal cephalic sclerite is apparently used by most species in this genus as a wedge or cutter in forcing egress from the gall. In most cecidomyiids whose pupae force their way out of the galls, the bases of the antennae are commonly the cutting instruments (see *Aposchizomyia*,

Figures 44-56. 44-48, *Acacidiplosis spinosa*: 44, female abdomen, eighth segment to apex (lateral); 45, cerci (dorsolateral); 46, cerci and hypoproct (ventral); 47, apex of ovipositor and cerci (dorsal); 48, outline of third instar. **Figures 49-55,** *Acacidiplosis* spp., third instar spatulas with associated papillae (a, sternal papilla; b, lateral papillae (shown only on right side of some figures); c, ventral papilla (shown only on 49, 50, and 55): 49, *A. spinosa*; 50, *A. undulata*; 51, *A. rugosa*; 52, *A. conica*; 53, *A. echinata*; 54, *A. cespitosa*; 55, *A. ananas*. **Fig. 56,** *Acacidiplosis ananas*, second instar spatula.



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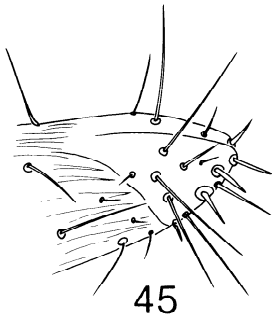

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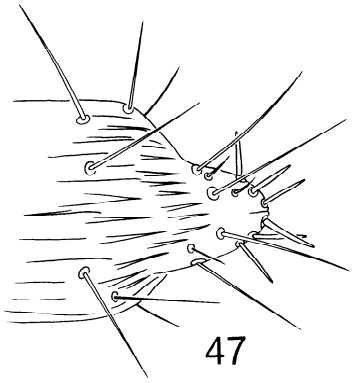

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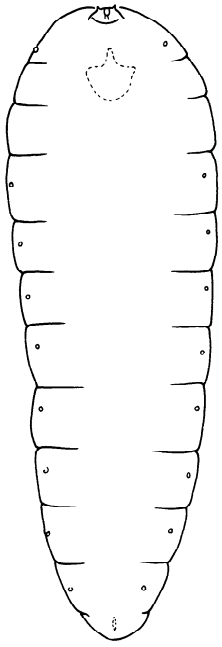

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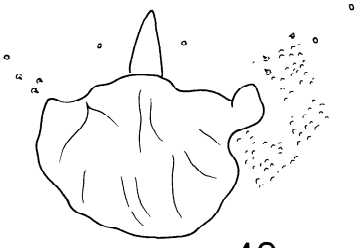

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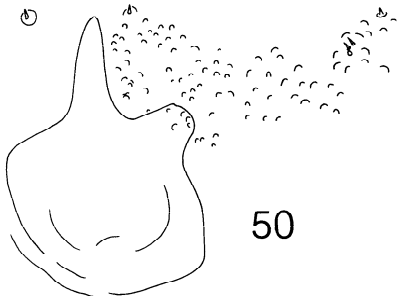

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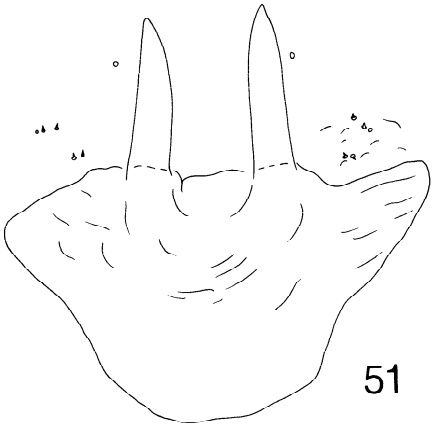

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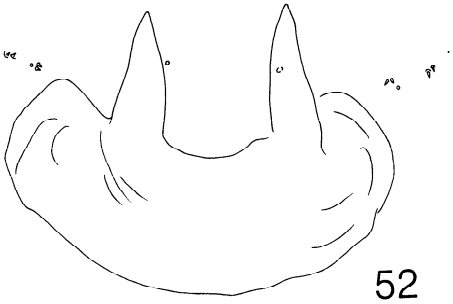

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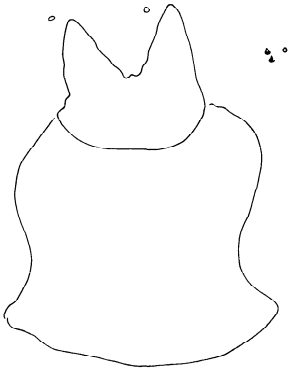

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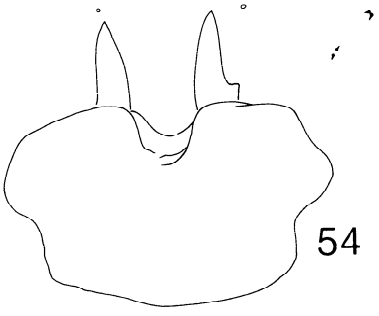

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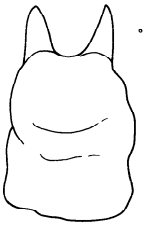

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Figs. 100-105). This modification of the cephalic sclerite for the same purpose is a striking example of convergence. The presence in *A. undulata* and *A. erupta* of setae on the sternal and ventral larval papillae is another example of convergence, in this case with some genera of the tribe Asphondyliini (see *Asphondylia*, Fig. 114). The presence of a spatula in the second instar arises also in other, unrelated cecidomyiids, e.g., *Caryomyia* of the Cecidomyiidi and *Celticecis* of the Lasiopteridi (Gagné 1983). All cecidomyiids that have this feature form complex galls, so it is apparently derived.

The adult stage of the various species of *Acacidiplosis* is remarkably uniform, differing only in a few details, but distinctive characters of the pupal and larval stages serve effectively to separate and group species. The species of *Acacidiplosis* described here fall into six distinct groups (Table 2), according to a number of characters, chiefly involving the pupal cephalic sclerite, the shape of the larval spatula, and the number and setation of larval papillae. The characters and their polarities are as follows:

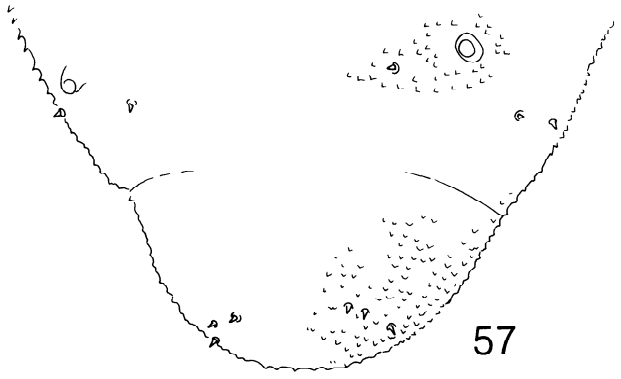
1. Palpus usually with three segments (0), two segments (1), or one segment (2). Four segments are basic for the family and tribe; three is the most found in this genus.
2. Male antennal circumfilar loops attaining next node (0) as in almost all species of the tribe, or circumfila shorter, the loops not reaching next node (1).
3. Male eighth tergite with several posterior rows of setae (0), with one complete row of setae (1), or with none to two setae on each posterolateral corner (2). Loss of setae is correlated with desclerotization of the eighth tergite and both are reductions that, once lost, presumably do not return.
4. Gonostylus with basal two-thirds covered with setulae (0), with basal fourth covered with setulae (1), without setulae (2). Once reduced in extent, the setulae presumably do not recover.
5. Pupal cephalic sclerite not swollen (0) as in all other species in the tribe, swollen (1), or biconical (2).
6. Pupal cephalic setae present (0) as in all other known species in the tribe, or absent (1).
7. Pupal prothoracic spiracles more than twice as long as wide (0) or stubby and no longer than wide (1). The spiracles are uniformly long in pupae that pupate in the soil, the primitive pupation site of Cecidomyiidae.
8. Spatula with two anterior teeth (0) as in almost all members of the tribe, or one (1).
9. Shaft of spatula longer than broad (0) or shorter than broad (1). The shortened spatula is an obvious reduction from the elongate form of almost all members of the tribe and all of those that pupate in the soil.
10. Second instar with spatula absent (0) or present (1). The second instar spatula is present only in a few of the gall-making Cecidomyiini.
11. Larval sternal and ventral papillae without setae (0) or with setae (1). Setae on these papillae are found in this tribe only within this genus.
12. Larval lateral papillae arranged as two triplets, two of each triplet with setae, the other without (0); only the two setose papillae of mesal triplet present (1); only the two setose papillae of both triplets present (2); or with one triplet lost (1'). Lateral papillae become reduced only in gall makers that pupate in the galls, a derived habit.
13. The six larval terminal papillae of second and third instars with setae of equal length (0), with one pair of setae shortened (1), with one pair lost (2), or with two pairs of papillae corniform (1'). The primitive number of terminal papillae in the family and the Cecidomyiini is eight.

These 13 characters serve to cluster the 14 species into six groups, but do not lend themselves to making a convincing phylogenetic tree. The derived states of eight of the characters, 1, 3, 4, 6, 7, 8, 12, and 13, reflect losses that could have come about more than once in this genus. The modified cephalic sclerite of the pupa, character 5, unique to *Acacidiplosis*, probably only developed once and is presumably irreversible. There is a cline from *A. rugosa* on *Acacia drepanolobium* with no modification, to the *A. conica* group on *Acacia tortilis* with a swollen sclerite not yet developed into a cone, to the coneshaped sclerite shared by the *A. spinosa* group on *Acacia nilotica* and the *A. crispa*, *A. echinata*, and *A. undulata* groups on *Acacia tortilis*. The confidence level in any further speculation is low because our sample is based only on species found on three *Acacia* species in Kenya. The genus certainly occurs on other acacias and possibly also on other Fabaceae, if not other plant families, so these 14 species are doubtless only a small part of the total number of *Acacidiplosis* spp.

Acacidiplosis ananas Gagné, new species

Adult. Wing length, male, 3.1-3.4 mm (n=2); female, 3.5-3.7 mm (n=5). Head as in Fig. 33, palpus with 2-3 segments (Figs. 37-38), on some specimens very plas-

Figures 57-63, *Acacidiplosis* spp., eighth and terminal abdominal segments of third instars (a, terminal papillae; b, anal papillae; all dorsal except 61 caudoventral): 57, *A. spinosa*; 58, *A. undulata*; 59, *A. rugosa*; 60, *A. verticillata*; 61, *A. conica*; 62, *A. ananas*; 63, *A. cespitosa*.



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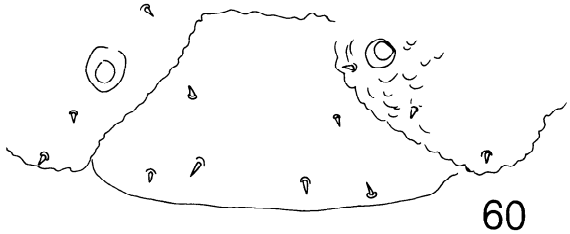

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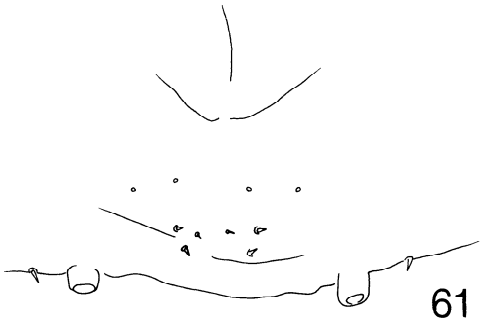

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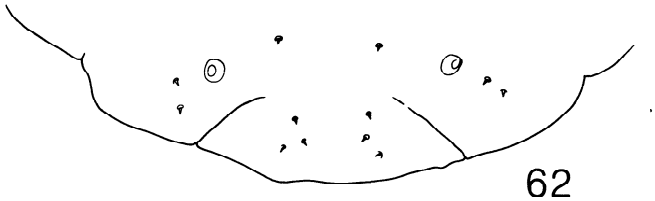

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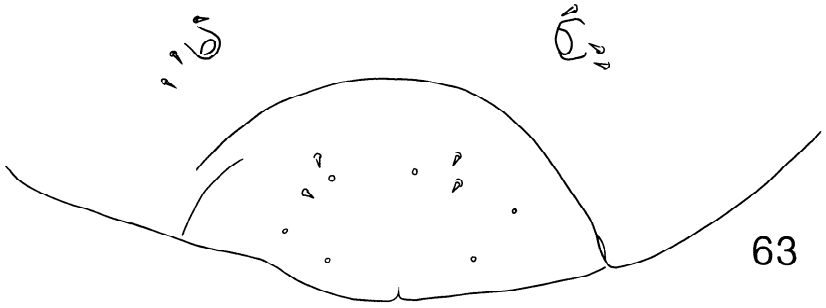

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Table 2. *Acacidiplosis* species grouped by shared, derived characters and host. The character states are discussed in the text. A number followed by an apostrophe indicates a separate morphocline from the same number without the apostrophe. The thicker horizontal lines through the table separate the species groups.

Characters

Acacidiplosis spp.	1	2	3	4	5	6	7	8	9	10	11	12	13	
A. rugosa	1	1	2	0	0	0	0	0	1	–	0	1	1	Acacia drepanolobium
A. spinosa	2	0	1	0	2	1	1	1	1	0	0	2	0	Acacia nilotica
A. imbricata	–	–	–	–	2	1	1	1	1	0	0	2	0	
A. conica	1	0	2	1	1	1	0	0	1	–	0	1	1	Acacia tortilis
A. cespitosa	1	0	2	1	1	1	0	0	1	0	0	2	1	
A. ramosa	1	0	2	1	1	1	0	0	1	0	0	2	1	
A. crispa	1	0	2	1	2	0	1	–	–	1	0	0	0	
A. ananas	1	0	2	0	2	0	1	0	0	1	0	0	0	
A. echinata	0	0	2	2	2	0	1	0	0	0	0	0	0	
A. verticillata	0	0	2	2	2	0	1	0	0	0	0	0	0	
A. undulata	–	–	–	–	2	1	1	1	1	0	1	2′	1′	
A. erupta	1	0	0	1	2	1	1	1	1	0	1	2′	1′	
A. hamata	–	–	–	–	2	1	1′	1	1	–	1	2′	1′	
A. sp.	–	–	–	–	–	–	–	–	–	–	0	2′	–′	

tic, elongate. Male eighth tergite with 1-2 setae on each posterolateral corner. Gonostylus setulose on basal half to two-thirds.

Pupa. (Figs. 74-75). Cephalic sclerite biconical, the cones smooth, acutely pointed. Cephalic setae prominent, situated basolaterally on each cone. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar: Spatula (Fig. 55) with 2 teeth, the shaft longer than wide. Lateral papillae in 2 groups, both triplets, on each side of spatula, 2 of each group with seta, 1 without seta. Sternal and ventral papillae with setae. All 6 terminal papillae (Fig. 62) with setae of approximately equal size.

Second instar: With short, triangular spatula (Fig. 56).

Holotype. Male, from *Acacia tortilis*, Voi, Kenya, 19-II-1991, J. Marohasy, deposited in USNM.

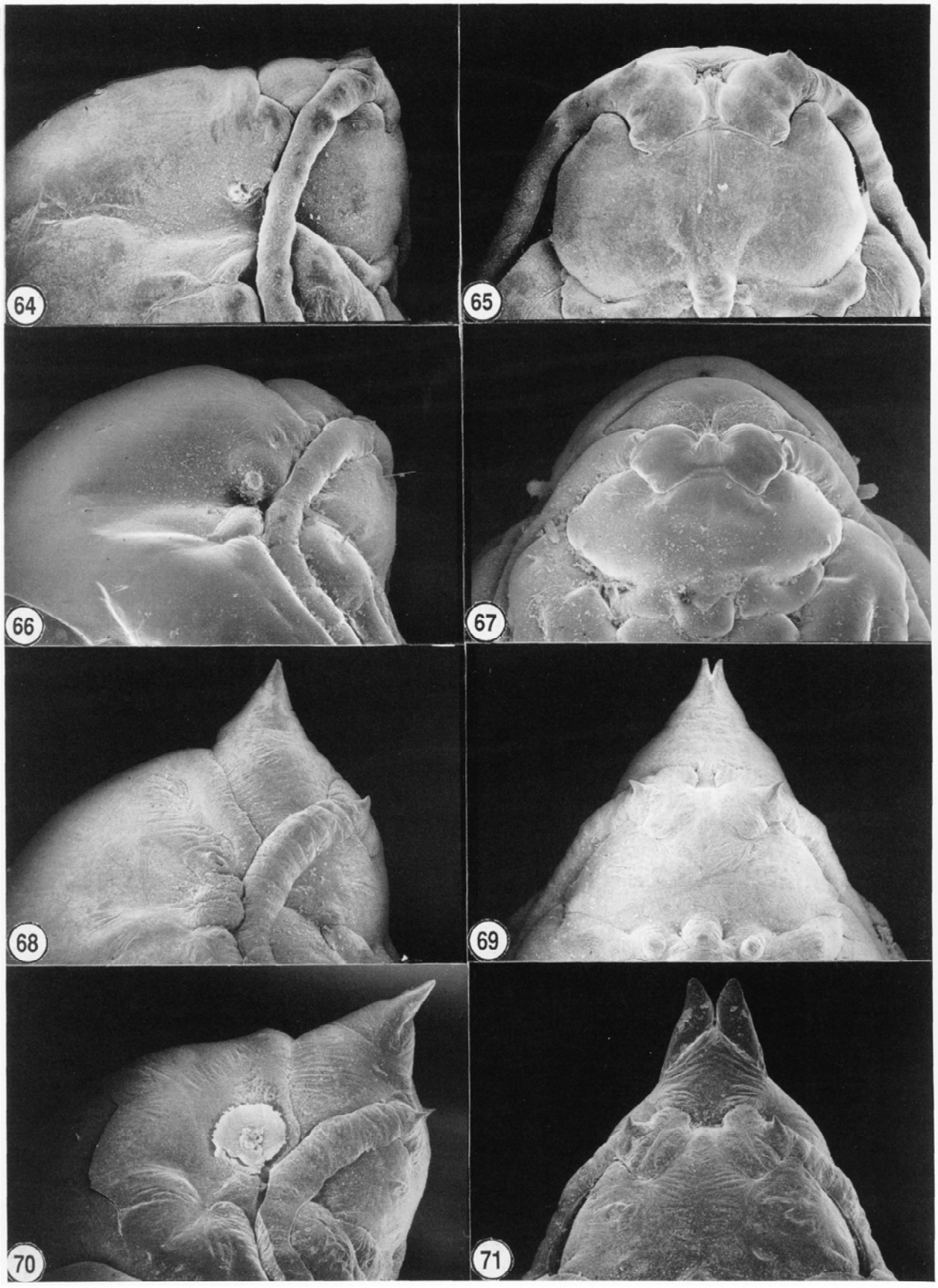
Paratypes (all from *Acacia tortilis*). Maktau, nr. Voi: pupa, 20-VI-91; male, 2 females, pupa, 2 pupal exuviae, 23-X-1991; and 7 second instars and third instar, 24-X-1991. Voi: male, 24-X-91; 3 females, 19-II-91. 15 km W Voi: 7 second instars, 4-VII-1991. 10 km E Voi: 6 third instars, 19-I-1992. Tsavo East National Park: 5 third instars, 21-VI-91.

Other material examined (all from *Acacia tortilis*). Kima, near Sultan Hamid: second and third instars, 18-XII-1991. Maktau, near Voi, galls, 3-VII-91. 15 mi W Voi: galls, 4-VI-1991. 10 km E Voi: 6 third instars and galls, 19-I-1992.

Etymology. The name *ananas*, a noun in apposition, is Latin for pineapple and refers to the general resemblance of the gall to a pineapple.

Gall (Fig. 19). Galls develop from stem nodes of *Acacia tortilis*, from either vegetative or floral primor-

Figures 64-71, Pupal heads of *Acacidiplosis* spp. (lateral view on left, ventral view on right). 64-65, *A. rugosa*. 66-67, *A. ramosa*. 68-69, *A. spinosa*. 70-71, *A. imbricata*.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dial tissue. Mature galls are covered with broad, green, apically pointed scales. Each gall contains several ovoid cells.

Remarks. See *A. crispa.*

Acacidiplosis cespitosa Gagné, new species

Adult (male only). Wing length, male, 3.6 mm. Palpus with two segments. Male eighth tergite without setae on posterior margin. Gonostylus setulose on basal fourth.

Pupa. As for *ramosa* (Figs. 66-67).

Larva. Third instar: spatula (Fig. 54) with 2 teeth, the shaft wider than long. Sternal and ventral papillae without setae. Lateral papillae in 2 groups, both couplets, on each side of the spatula, all with setae. Four terminal papillae with setae, 2 without (Fig. 63).

Second instar: Without spatula.

First instar: Unknown.

Holotype. Male, from *A. tortilis*, Yatta, Kenya, 27-XI-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Yatta: 2 pupae, 27-XI-1991. Emali: 2 pupae, 10 third instars, 2-VII-1991. 22 km S Sultan Hamid: 6 second instars, 10-V-1991.

Other material examined (all from *Acacia tortilis*). Yatta: galls, 27-XI-1991. Emali: 8 pupae, 2-VII-1991; galls, 10-V-1991. 22 km S Sultan Hamid: galls, 10-V-1991.

Etymology. The name *cespitosa* is an adjective meaning tufted, referring to the tufts of short hair found irregularly on the otherwise smooth gall.

Gall (Fig. 16). Galls develop from stem nodes of *Acacia tortilis*. Young galls are covered with short hair. Larger, mature galls are variably covered with patches of these hairs. Each gall contains one to several ovoid cells.

Remarks. See *A. conica.*

Acacidiplosis conica Gagné, new species

Adult. Wing length, male, 4.1-4.3 mm (n=4); female, 4.3-4.5 mm (n=4). Palpus with 2 or 3 segments. Male eighth tergite without posterior setae. Gonostylus setulose on basal fourth.

Pupa. As for *ramosa* (Figs. 66-67).

Larva. Third instar: Spatula (Fig. 52) with 2 teeth, the shaft wider than long. Lateral papillae in 2 groups on each side of the spatula, the mesal group a triplet, 2 with setae, 1 without, the lateral group a couplet, both with setae. Sternal and ventral papillae without setae. Terminal papillae all with setae, those of 1 pair smaller than remaining 2 pairs (Fig. 61).

Second instar: Unknown.

Holotype. Male, from *A. tortilis*, Yatta, Kenya, 27-XI-91, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Yatta: 3 males, 2 females, 4 pupae, third instar, 7-V-91; 2 females, 27-XI-1991. Tsavo East National Park: 4 third instars, XII-1991. 22 km S Sultan Hamid: 3 first instars, 10-V-1991.

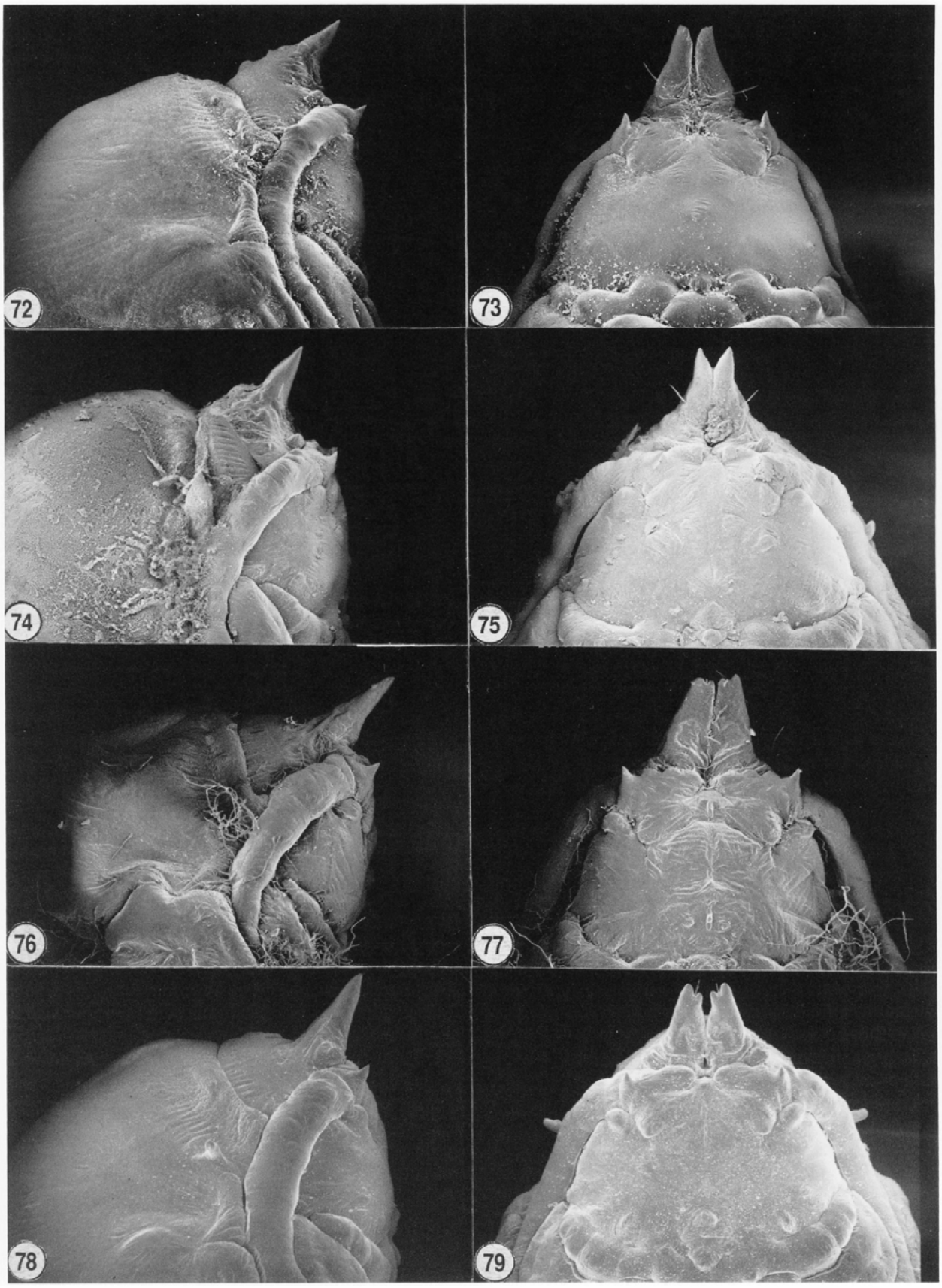
Other material examined (all from *Acacia tortilis*). Yatta: galls, 27-XI-1991. Sultan Hamid: galls, first instars, 10-V-1991. Tsavo East National Park, E. Voi: pupa, 1-XII-1990. Voi: galls, 19-II-1991. Maktau, nr. Voi: galls, X-1991. 15 km W Voi: first instars, 4-VII-1991. Southern base of Ngong Hills: pupa, 3-XII-1991.

Etymology. The name *conica* is an adjective meaning conical, referring to the general shape of the gall.

Gall (Fig. 15). The conical galls develop from stem nodes of *Acacia tortilis*, apparently from floral primordial tissue. When mature, the galls usually split longitudinally at their apex. Each gall contains one to several ovoid cells.

Remarks. This species forms a natural group with *A. cespitosa* and *A. ramosa*. All three species have a conspicuously domed pupal cephalic sclerite, but not the strong, conical modification found in most other species of the genus. They also share most of the suite of characters itemized in Table 1, except that *A. conica*

Figures 72-79, Pupal heads of *Acacidiplosis* spp. (lateral view on left, ventral view on right). 72-73, *A. crispa*. 74-75, *A. ananas*. 76-77, *A. echinata*. 78-79, *A. verticillata*.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has one fewer papilla on each side of the spatula. I cannot find differences between *A. cespitosa* and *A. ramosa*, but their galls are distinct.

An undescribed species of *Asynapta* was collected from galls of *A. conica* taken 54 km W Athi River Township, 23-X-1991. The same species was reared also from galls of *A. erupta*. It presumably feeds on fungi in decaying plant tissue.

Acacidiplosis crispa Gagné, new species

Adult. Wing length, male, 2.9-3.3 mm (n=5); female, 3.9-4.2 mm (n=5). Palpus with 2 segments. Male eighth tergite with 0-2 setae on posterolateral corners. Gonostylus setulose at base.

Pupa (Figs. 72-73). Cephalic sclerite biconical, the cones serrate mesoapically. Cephalic setae prominent, situated basolaterally on each cone. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar: Unknown.

Second instar: Spatula (as in Fig. 56) with short, triangular spatula. Lateral papillae in 2 groups, both triplets, on each side of spatula, 2 of each group with seta, 1 without seta. Sternal and ventral papillae with setae. All 6 terminal papillae with setae of approximately equal size.

Holotype. Male, from *A. tortilis*, Kima, near Sultan Hamid, Kenya, 5-III-1992, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Kima, near Sultan Hamid: 11 second instars, 18-XII-1991; 5 males, 5 females, and 7 pupal exuviae, 5-III-92. Yatta: 7 second instars, 16-XI-1991; 6 second instars, 27-XI-91.

Other material examined (all from *Acacia tortilis*). Kima, near Sultan Hamid: male, 12 females, 12 pupae, 4 pupal exuviae, galls, 5-III-92. Yatta-Kitui: galls, I-1990. Yatta: galls, 27-XI-1991.

Etymology. The name *crispa* is an adjective meaning curled, referring to the whorled hairs covering the gall.

Gall (Fig. 18). Galls develop from stem nodes of *Acacia tortilis*. They are thickly covered with long, whorled, bristly hairs. Each gall contains several ovoid cells.

Remarks. This species is most similar to *A. ananas*, and these two share some similarities with *A. echinata* and *A. verticillata*. The pupae of all have a pair of cephalic setae, but those of *A. crispa* and *A. ananas* are placed basolaterally on the cephalic horns, while those of *A. echinata* and *A. verticillata* are apical. In frontal view the horns of *crispa* are serrate and wider than in *A. ananas*. The setulae of the gonostylus are less extensive in *A. crispa* than in *A. ananas* and absent in the other two species. The adult palpus is two segmented and the second instar has a spatula in *A. crispa* and *A. ananas*, while the palpus is three segmented and the second instar has no spatula in *A. echinata* and *A. verticillata*. The galls made by these species all occur on nodes of *Acacia tortilis*, but the galls of *A. ananas* are leafy while those of the other three species are hairy.

Acacidiplosis echinata Gagné, new species

Adult (only male known). Wing length, male, 2.8 mm. Palpus with 3 segments. Male eighth tergite with 0-2 setae on each side at posterolateral corners. Gonostylus setulose only at base.

Pupa. (Figs. 76-77). Cephalic sclerite biconical, the cones ventrodorsally flattened, wide, and notched apically. Cephalic setae situated apically. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar: Spatula (Fig. 53) with 2 closely set anterior teeth and shaft longer than wide. Lateral papillae in 2 groups, both triplets, on each side of spatula, 2 of each group with setae, 1 without. Sternal and ventral papillae without setae. All 6 terminal papillae with setae of approximately equal size.

Second instar: Without spatula.

Holotype. Male, from *A. tortilis*, Makindu, Kenya, 27-IV-1992, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Voi: third instar, XII-91. Yatta, near Thika: pupa, 8-III-1991. Tsavo East National Park: 4 second instars, XII-1990.

Other material examined (all from *Acacia tortilis*). 30 km W Marigat: gall, 28-V-1991. 25 km E Namanga: 2 second instars and gall, 22-X-1991. base of cliff face, near Baringo Town, Lake Baringo: gall, 7-II-1992.

Emali, near Sultan Hamid: 2 incomplete pupal exuviae, 27-IV-1992.

Etymology. The name *echinata* is an adjective meaning bristly, refering to the covering of the gall.

Gall (Fig. 20). Galls develop from stem nodes of *Acacia tortilis*. They are conical and densely covered with short, straight, bristly hairs. Each gall contains a single larval cell.

Remarks. See *A. crispa*.

Acacidiplosis erupta Gagné, new species

Adult. Wing length, male, 3.6 mm; female, 4.1-4.3 mm (n=4). Palpus with 2 segments. Male eighth tergite with several rows of posterior setae. Gonostylus setulose on basal fourth.

Pupa (Fig. 84). Cephalic sclerite biconical, the cones smooth, acutely pointed. Cephalic setae absent. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar: Spatula with one tooth, the shaft about as wide as long. Lateral papillae in one group, a triplet, on each side of spatula, 2 with setae, 1 without. Sternal and ventral papillae with setae. Setae of terminal segment irregular, 1 pair setose, the remaining two corniform.

Second instar: Without spatula.

Holotype. Male, from *Acacia tortilis*, Tsavo East National Park, Kenya, 2-XII-1990, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). 5 km NW Voi: first instar and 2 second instars, 20-01-1992. Tsavo East National Park: 4 females, 2-xii-1990; pupa, second instar, 3 third instars, 2-XII-91. Yatta: 6 third instars, 27-XI-1991.

Other material examined (all from *Acacia tortilis*). Voi: galls, 19-II-1991 and X-1991. Yatta: galls, 27-XI-91.

Etymology. The name *erupta* is an adjective meaning broken out, referring to the gall that erupts through a split in the bark.

Gall (Fig. 23). Galls develop within stems of *Acacia tortilis* and are initially apparent only as simple swellings. Sometime prior to adult emergence, the galls erupt through the bark. The cylindrical, mature galls are smooth laterally and covered apically with many short, acutely pointed scales. Each gall contains a single larval cell.

Remarks. See *A. undulata*. An undescribed species of *Asynapta* was collected from galls of *A. erupta* taken at Voi, 24-X-1991. It is the same species that was reared from galls of *Acacidiplosis conica* and is presumably associated with fungi in decaying gall tissue.

Acacidiplosis hamata Gagné, new species

Adult. Unknown.

Pupa (Figs. 82-83). Cephalic sclerite greatly swollen with a mesal, biconical process, the cones short. Cephalic setae absent. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar: Spatula as for *A. undulata* (Fig. 50), with one tooth, the shaft about as wide as long. Lateral papillae in one group, a triplet, on each side of spatula, 2 papillae with setae, 1 without. Sternal and ventral papillae without setae. Setae of terminal segment not visible in preparation.

Second instar: Unknown.

Holotype. Pupa, from *Acacia tortilis*, cliff base, Baringo Town, Lake Baringo, Kenya, 7-II-1992, J. Marohasy, deposited in USNM.

Paratypes (from *Acacia tortilis*). Two third instar larvae, same data as holotype.

Other material examined (from *Acacia tortilis*). Galls, same data as holotype.

Etymology. The name *hamata* is an adjective meaning hooked, referring to the characteristic shape of the ends of the tendril-like growths surrounding the gall.

Gall (Fig. 24). Galls develop from stem nodes of *Acacia tortilis*. They are short and cylindrical and bear a crown of many, elongate, tendril-like extensions. The apex of each tendril is bent, simulating a hook. Each gall contains a single larval cell.

Remarks. See *A. undulata*.

Acacidiplosis imbricata Gagné, new species

Adult. Unknown.

Pupa (Figs. 70-71). Cephalic sclerite biconical, the cones dorsoventrally flattened, slightly serrate mesally. Cephalic setae absent. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third and second instars: as for *A. spinosa*.

Holotype. Third instar, from *Acacia nilotica*, Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109, 2-X-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia nilotica*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 2 pupae, 2 third instars, 19-IX-1991; 4 second and 4 third instars, 2-X-1991. Leonard's Farm, 40 km SE Nairobi, Rt A109 at Machakos turnoff: 5 third instars, 14-X-1991. 48 km NW Mtito Andei: 7 third instars, 24-X-1991.

Other material examined (all from *Acacia nilotica*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: galls, 2-X-1991; second instars, 14-X-1991; third instar, 2 second instars, and galls, 1991-IX-91. Voi: first instars, 31-V-1991. 6 km N Voi: galls, 31-V-1991. 48 km NW Mtito Andei: 4 second instars, 24-X-1991. Kilungu Ranch, ca 80 km SE Nairobi, Rt A109: pupa, 10-XI-1991.

Etymology. The name *imbricata* is an adjective meaning imbricate, referring to the overlapping scales forming the exterior of the gall.

Gall (Fig. 3). Galls develop from stem nodes of *Acacia nilotica*. They resemble artichokes, covered as they are by wide, imbricated scales. Each gall contains a single larval cell.

Remarks. See *A. spinosa*.

Acacidiplosis ramosa Gagné, new species

Adult (male only). Wing length, male, 3.1-3.3 mm (n=3). Palpus with 2 segments. Male eighth tergite without posterior setae. Gonostylus setulose on basal fourth.

Pupa (Figs. 66-67). Cephalic sclerite swollen, domed. Cephalic setae absent. Prothoracic spiracle about twice as long as wide.

Larva. Third instar: Spatula with 2 teeth, the shaft wider than long. Sternal and ventral papillae without setae. Lateral papillae in 2 groups, both couplets, on each side of the spatula, all with setae. Two pairs of terminal papillae with setae, 1 without or with very short setae.

Second instar: Without spatula.

Holotype. Pupa, from *Acacia tortilis*, southern base of Ngong Hills, Kenya, 3-XII-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Kajiado: 2 males, 24-III-1992. Yatta: 2 pupae, 7 second instars, 2 third instars, 16-XII-91.

Other material examined (from *Acacia tortilis*). Yatta: galls, 16-XII-91.

Etymology. The name *ramosa* is an adjective meaning branched, referring to the many branches growing from the gall.

Gall (Fig. 17). Galls are woody, foreshortened stems of *Acacia tortilis* bearing many branches and leaves. Each gall contains a single larval cell.

Remarks. See *A. conica*.

Acacidiplosis rugosa Gagné, new species

Adult. Wing length, male, 3.5-3.6 mm (n=2); female, 3.6-4.2 mm (n=5). Palpus with 1 segment. Male third flagellomere (Fig. 36): circumfilar loops short, not reaching next distal node; internode and neck very short. Male eighth tergite without posterior setae. Gonostylus almost completely setulose.

Pupa (Figs. 64-65). Cephalic sclerite not swollen. Cephalic setae present, short. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar: Spatula (Fig. 51) with 2 long teeth, the shaft wider than long. Lateral papillae in two groups, one triplet and one couplet on each side of spatula, 1 papilla of triplet without seta, all other lateral papillae with seta. Sternal and ventral papil-

lae without setae. Terminal papillae (Fig. 59) with setae, 1 pair shorter than remaining 2.

Second instar. Unknown.

Holotype. Male, from *Acacia drepanolobium*, southern base of Ngong Hills, Kenya, 3-XII-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia drepanolobium*). Southern base of Ngong Hills: male, 5 females, 3 pupae, 5 third instars, 3-XII-1991. Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 5 third instars, 18-VI-91; female, 6-I-1992.

Other material examined (all from *Acacia drepanolobium*). Southern base of Ngong Hills: 6 pupae, galls, 3-XII-1991. Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: galls, 18-VI-1991 and VII-1991. Athi River Township: galls, 23-X-1991.

Etymology. The name *rugosa* is a Latin adjective meaning rough, referring to the gall's texture.

Gall (Fig. 8). Clusters of galls develop from the stem nodes of *Acacia drepanolobium*. They are irregularly conical and occasionally have scaly outgrowths bearing branches or leaves. Some mature galls split longitudinally. Each gall contains several ovoid larval cells.

Remarks. This species is the only *Acacidiplosis* known from *Acacia drepanolobium* and the only one without a modified pupal cephalic sclerite. This species is distinctive also for the short circumfilar loops of the male antenna.

Acacidiplosis spinosa Gagné, new species

Adult. Wing length, male, 3.4-3.7 mm (n=5); female, 3.6-4.0 mm (n=5). Male head as in Fig. 33, male third flagellomere as in Fig. 34, female antenna as in Fig. 32, female third flagellomere in Fig. 35. Palpus with 1 segment, sometimes with a second segment budding off at apex. Wing as in Fig. 40. Fifth tarsomere as in Fig. 39. Male eighth tergite with uninterrupted posterior row of seta. Genitalia as in Figs. 41-43, gonostylus setulose on basal half to two-thirds. Ovipositor as in Figs. 44-47.

Pupa (Figs. 68-69). Cephalic sclerite biconical, the cones short, evenly tapered. Cephalic setae absent. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar, Figs. 48-49, 57: Spatula with one tooth, shaft about as long as wide, irregularly and variably sclerotized. Lateral papillae in one group, a triplet, 2 papillae with seta, 1 without. Sternal and ventral papillae without setae. Terminal papillae with setae, all 6 of approximately equal length.

Second instar: Without spatula.

Holotype. Male, from *Acacia nilotica*, pipeline trees, Kilungu Ranch, ca. 80 km SE Nairobi, Rt A109, Kenya, 03-XI-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia nilotica*). Kilungu Ranch, ca. 80 km SE Nairobi, Rt A109: 2 male, 2 female, 3-XI-1991; 4 pupae, 13-II-1991. Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 2 pupae, 5 second and 5 third instars, 4males, 4 females, from spiny stem galls, XI-1990; 1 pupa, 2 third instars, 12-I-1991. Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: first instar, 2 third instars, I-1991; 5 third instars, 18-XII-1991; 5 males, 6-I-1992; 2 males, 2 females, 10-I-1992.

Other material examined (all from *Acacia nilotica*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 4males, 7 females, pupa, third instar, XI-1990; 2 males, 2 females, 13-XI-1990 (BMNH); young galls on flower primordium, 6-I-1991; galls on leaf, 24-I-1991; galls on leaf and stem, 29-I-1991; stem galls, 1-VIII-1991; pupae, second and third instars, 29-X-1991; 5 pupae from leaf galls, 18-XII-1991; stem galls and pupal exuviae, 6-I-1992; 2 males, 4 females, 10-I-1992. Malindi: first instars, galls, 21-VI-1991. 21 km E Moktau, near Voi: galls, VI-1990. Voi: galls, VI-1991. Kilungu Ranch, ca. 80 km SE Nairobi, Rt A109: 10 pupae and galls, 13-II-1991; 6 males, 3-XI-1991.

Etymology. The name *spinosa* is an adjective referring to the prominent stem spines caused by this species.

Gall (Figs. 1-2). The conspicuous, woody, spiny galls (Fig. 1) are usually positioned at the stem node or on pedicels, having developed from either vegetative or floral primordia. Rarely, spiny galls can be seen developing from the internodal section of a stem, indicating the midge is capable of galling lateral meristem. This species is also capable of forming leaf galls (Fig. 2) that are variable in form and position but usually have soft, pliant spines at the gall apex. Each

gall contains a single larval cell, but galls can occur in large clusters (Fig. 1).

Remarks. This species is very similar to *A. imbricata*, which is known only from pupae and larvae. Larvae of the two species are identical, but the pupal cephalic horns are narrower and more evenly conical in *A. spinosa*. They are the only species of *Acacidiplosis* known to occur on *Acacia nilotica*. The galls formed by the two species are quite distinct.

These two species, the *spinosa* group, have conical pupal cephalic horns, as do the *crispa*, *echinata*, and *undulata* species groups, but the horns are more evenly tapered and less flattened in the *spinosa* group than elsewhere. Larvae of the *spinosa* group differ from these other two groups in having only three papillae on each side of the spatula. The adult of *A. spinosa* is distinct in *Acacidiplosis* for its one-segmented palpus and single, complete row of posterior setae on the male eighth tergite. The *A. crispa* group has lost all or most of the posterior eighth tergite setae, and the one species of the *A. undulata* group for which the male is known has several rows. Both the *A. crispa* and *A. undulata* groups have a two or three segmented palpus, unlike the *spinosa* group, which usually has one.

In addition to the Kenya localities reported above, Monod (1968) illustrated galls collected at Thika.

Acacidiplosis undulata Gagné, new species

Adult. Unknown.

Pupa (Figs. 80-81). Cephalic sclerite biconical, the cones smooth, short. Cephalic setae absent. Prothoracic spiracle reduced to stub, barely longer than wide.

Larva. Third instar: Spatula (Fig. 50) with one tooth, the shaft about as wide as long. Lateral papillae in one group, a triplet, on each side of spatula, 2 papillae with setae, 1 without. Sternal and ventral papillae without setae. Setae of terminal segment (Fig. 58) irregular, 1 pair setose, the remaining two pairs corniform, 1 pair slightly larger than the other.

Second instar: Without spatula.

Holotype. Male, from *Acacia tortilis*, Yatta, Kenya, 16-XII-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Yatta: 3 pupae, third instar, 4 second instars, 16-XII-1991. Kima, near Sultan Hamid: 3 third instars, 18-XII-1991.

Other material examined (from *Acacia tortilis*). Galls, same data as holotype.

Etymology. The name *undulata* is an adjective meaning wavy, referring to the shape of the leaves forming the outside surface of the gall.

Gall (Fig. 22). These tiny, oval galls are situated at the stem nodes of *Acacia tortilis* and covered with thin, wavy, and pointed scales. Galls contain a single larval cell.

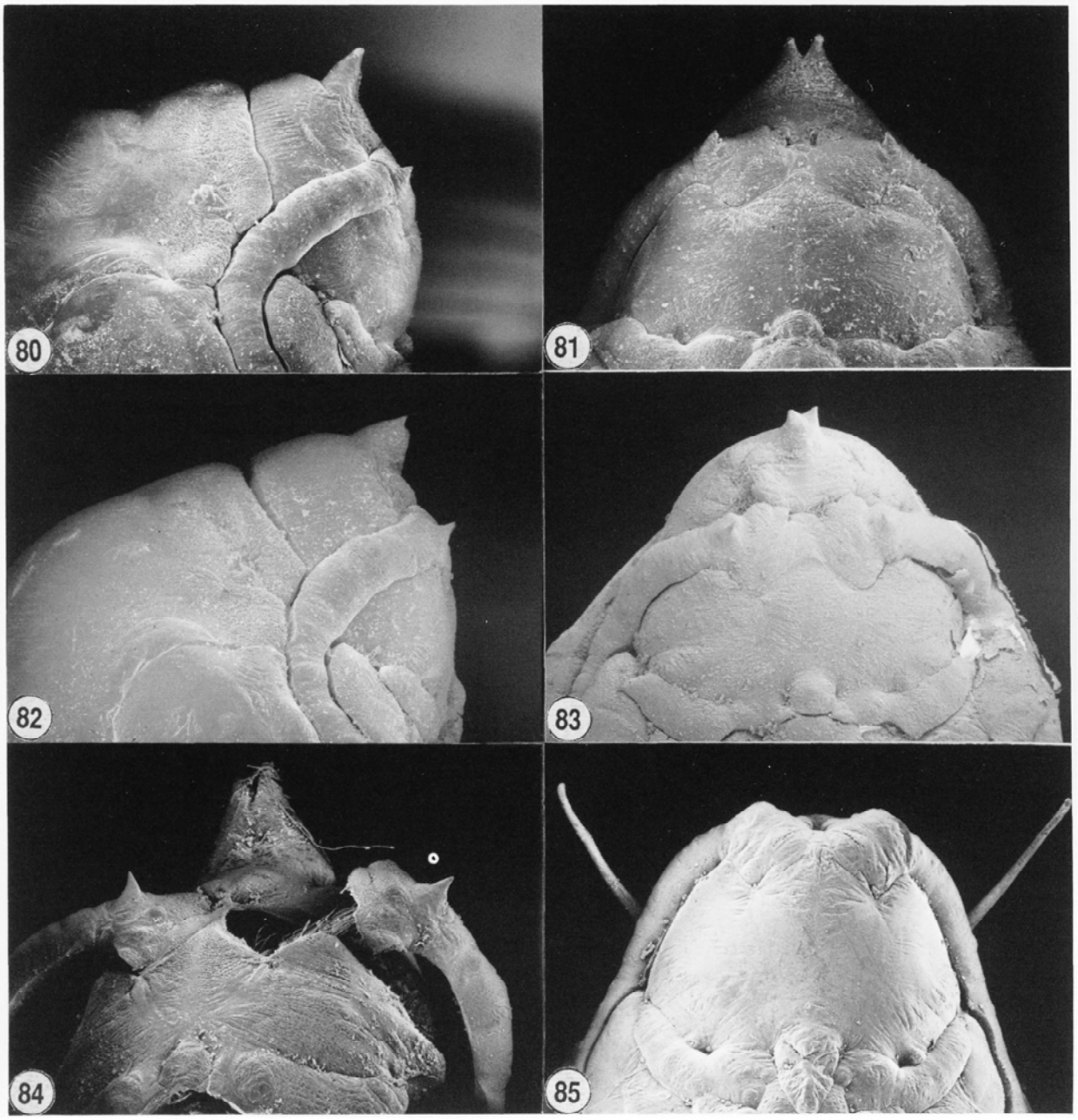
Remarks. Three species, *A. undulata*, *A. erupta*, and *A. hamata*, and one other, unnamed species, form a group that share one or more larval characters. All four species have only three papillae on each side of the spatula, and all except the unnamed species have setose sternal and ventral thoracic larval papillae and corniform terminal papillae. Only a first instar is available for the unnamed species: its terminal papillae, while setose in the first instar, might be corniform in other instars. Adults are known only for *A. hamata*. The male eighth tergite is distinct in *Acacidiplosis* in having several rows of posterior setae. Pupae are known for all except the unnamed species. All have conical cephalic sclerites but both the antennal and cephalic horns of *A. erupta* are longer than those of *A. undulata* and *A. hamata*. The last species has very short cephalic horns. The three species whose third instars are known all have a spatula with one tooth, as does *A. spinosa*, but this character state could be separately derived in the two groups.

Acacidiplosis verticillata Gagné, new species

Adult (only male known). Wing length, male, 2.6-3.0 mm (n=2). Palpus with 3 segments. Male eighth tergite with no setae on posterior margin. Gonostylus without setulae.

Pupa (Figs. 78-79). Cephalic sclerite biconical, the cones ventrodorsally flattened and wide and notched apically. Cephalic setae situated apically. Prothoracic spiracle about twice as long as wide.

Larva. Third instar: Spatula with 2, not widely separated teeth, and shaft longer than wide. Lateral



Figures 80-85. 80-84, Pupal heads of *Acacidiplosis* spp. 80-81, *A. undulata* (lateral on left, dorsal on right); 82-83, *A. hamata* (lateral on left, dorsal on right); 84, *A. erupta* (dorsal). **Figure 85,** Pupal head of *Lopesia niloticae* (dorsal).

papillae in 2 groups, both triplets, on each side of spatula, 2 papillae of each group with setae, 1 without. Sternal and ventral papillae without setae. All 6 terminal papillae (Fig. 60) with setae of approximately equal size.

Second instar: Without spatula.

Holotype. Male, from *Acacia tortilis*, 54 km E Athi River Township, Kenya, 22-X-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Voi: 2 pupae, XII-1990. 5 km N Voi: third instar, 20-I-1992. Taveta Rd, 10 km E Voi: pupa, 2 third instars, 19-II-1992. Kiserian-Magadi Rd: male, 27-III-1992. Yatta: 4 third and 4 second instars, 27-XI-1991.

Other material examined (all from *Acacia tortilis*). 51.4 km W Athi River Township: galls, 23-X-91. Voi: 5 second instars, galls, 6-VI-91; 2 second instars and galls, 19-I-1992.

Etymology. The name *verticillata* is an adjective meaning whorled, referring to the pattern made by the bristles covering the gall.

Gall (Fig. 21). Galls develop from stem nodes of *Acacia tortilis*. They are globular and covered with hairs that form a whorl. Each gall has a single larval cell.

Remarks. See *A. crispa*.

Acacidiplosis sp.

Larva. First instar: Lateral papillae in 1 group of 3, 2 papillae with setae, 1 without, on each side of center line. Terminal segment with 6 papillae, all with setae of approximately same size.

Material examined (all from *Acacia tortilis*). Cecidomyiidae: Yatta, first instars and galls, 24-X-1991, 27-XI-1991, and 16-XII-1991; 48 km NW Mtito Andei, first instars, 24-X-1991. Agromyzidae: Yatta, larva, 7-V-1991; Voi, larva, 22-II-91; 5 km NW Voi, larvae, 20-I-1992; Mwatate Rd., Voi, larvae, 19-I-1992.

Gall (Fig. 25). This is a stem swelling on *Acacia tortilis* that appears above or below a node. Early instar larvae of an *Acacidiplosis* were retrieved from these galls, as well as larvae of Agromyzidae. Both insects may form a somewhat similar gall. The agromyzid might possibly be *Melanagromyza acaciae* Spencer, which was reared from young, green thorns of *Acacia drepanolobium* (Spencer 1990). Spencer 1963 quoted from the collector's notes that eggs of *M. acaciae* are laid at the tip of young thorns and larvae tunnel into the swollen bases of the thorns.

Remarks. This species of *Acacidiplosis* is known only from the first instar larva, so is left unnamed. See remarks under *A. undulata*.

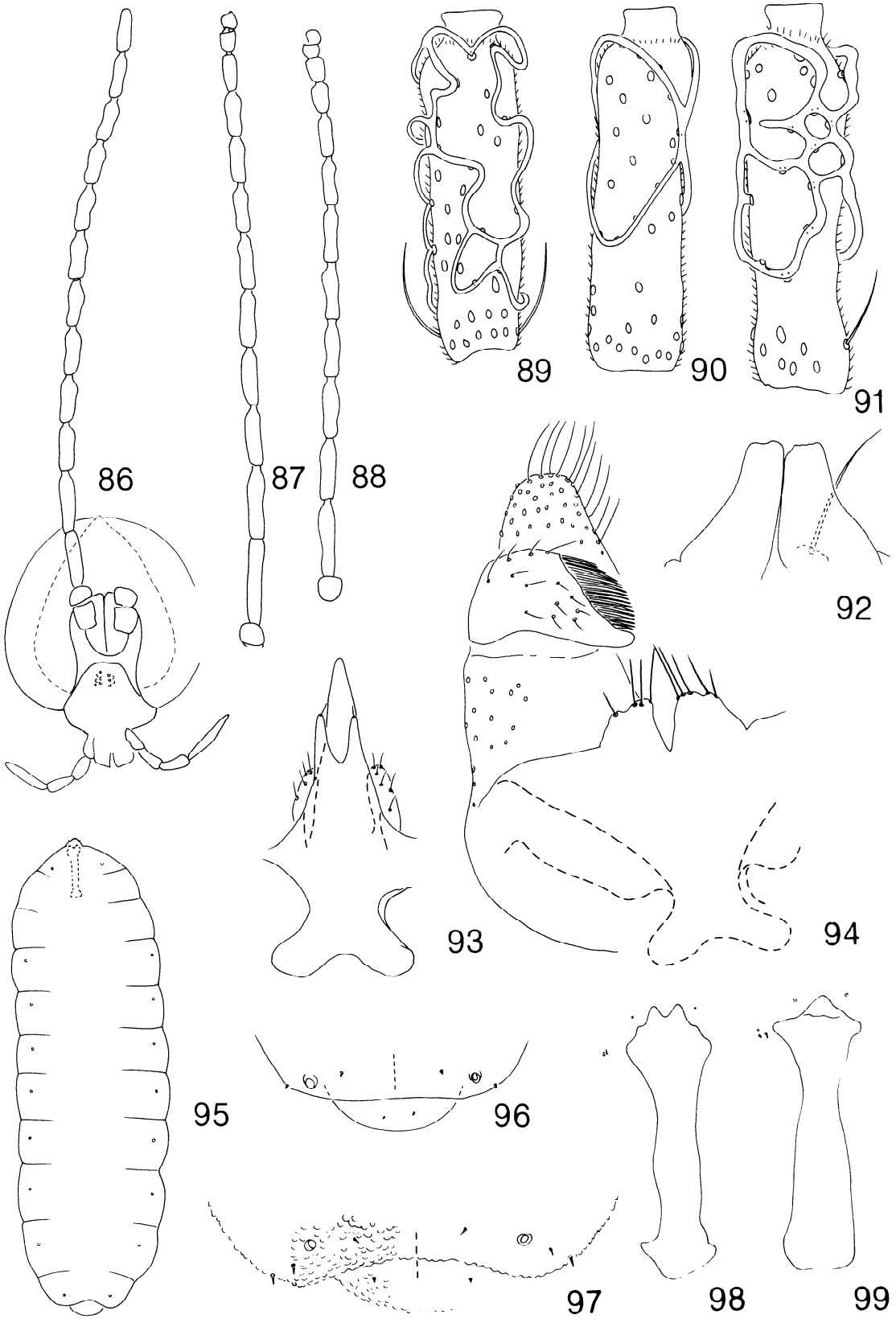
Aposchizomyia Gagné, new genus

Adult. Head (Fig. 86): Eyes large, connate, eye bridge about 10 facets long; facets hexagonal, closely adjacent throughout. Occiput without dorsal protuberance, acute at apex. Frons with 10-20 setae. Labella hemispherical, each with 6-10 lateral setae. Palpus with 4 segments. Antenna with first and second flagellomeres partially connate. Male flagellomeres (Fig. 89) cylindrical with short necks; circumfila gynecoid, anastomozing. Female flagellomeres (Figs. 90-91) cylindrical with short necks; nodes successively and gradually shorter, the last two or three abruptly so; circumfila simple to anastomozing.

Thorax: Scutum with 2 lateral and 2 dorsocentral rows of setae. Mesanepisternum covered with scales on dorsal two thirds. Mesepimeron with over 40 setae. Wing length, 1.7-3.1 mm; R5 curved apically to join C posterior to wing apex; Rs visible only as slight spur; Cu forked; M3+4 present. First tarsomeres without spurs. Tarsal claws untoothed, curved beyond midlength; empodia nearly reaching bend in claws.

Male abdomen (Figs. 93-95): First through sixth tergites entire, rectangular, each with one uninterrupted, posterior row of setae, a group of setae on each side, scattered setiform scales covering remainder of tergite, and a pair of trichoid sensilla on anterior margin. Seventh tergite as long as sixth, with 2-3 rows of posterior setae continuous with the lateral groups of setae; otherwise as for preceding tergites. Eighth tergite sclerotized only anteriorly, bare except for anterior pair of trichoid sensilla. Cerci short, rounded, with several posterior setae. Hypoproct narrow, with 2 triangular lobes, each tipped with 1 seta. Aedeagus longer than hypoproct, tapering gradually from base

Figures 86-99, *Aposchizomyia* spp. 86-87, *A. acuta*: 86, male head; 87, female antenna from pedicel to apex. 88, *A. turnouri*, female antenna from pedicel to apex. 89-90, *A. acuta*: 89, male third flagellomere; 90, female third flagellomere. 91-92, *A. turnouri*: 91, female third flagellomere; 92, pupal antennal horns and cephalic seta. 93-98, *A. acuta*: 93, hypoproct, parameres, and aedeagus; 94, male genitalia (dorsal); 95, third instar (dorsal); 96, eighth and terminal larval segments, second instar (dorsal); 97, same, third instar; 98, spatula and sternal and lateral (left side only) papillae. 99, *A. turnouri*, spatula and sternal and lateral (left side only) papillae.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to pointed apex. Parameres short, setose. Gonocoxite greatly produced apicoventrally. Gonostylus short, broad, and flattened, setose and completely setulose, the dorsal corner produced apicad of the tooth; tooth made up of separate denticles covering most of apical margin.

Female abdomen (Figs. 110-112): First through seventh tergites as for male. Eighth tergite long, well sclerotized, notched laterally, with anterior pair of trichoid sensilla and a few scattered setae posteriorly; eighth segment beyond sclerite without dorsal lobe. Seventh sternite very large, more than 3 times length of preceding sternite and more than 1 1/2 times as long as seventh tergite. Ovipositor: elongate, protrusible, the distal half aciculate, about twice length seventh sternite; cerci almost completely fused mesally.

Pupa. (Figs. 100-109). Antennal horns prominent, dorsoventrally flattened. Cephalic pair of setae elongate. Frons without horns, with prominent pair of setae. Prothoracic spiracle moderately long. Abdominal segments covered dorsally with tiny spicules, without spines.

Larva. Third instar (Fig. 95): Elongate, cylindrical, rounded at ends. Integument mostly rugose. Antenna less than twice as long as wide. Spatula long, robust, with one or two elongate anterior teeth (Figs. 100-101). Papillar pattern typical of supertribe Cecidomyiidi (Gagné 1989) except for losses in lateral and terminal papillae. Lateral papillae reduced to one triplet on each side of spatula, two papillae of each triplet with setae, one longer than the other, and the third papilla without seta. Eighth abdominal segment simple, unlobed, dorsal papillae lying between and not posteriad of spiracles. Terminal segment convex, papillae reduced to one pair with short setae (Fig. 97).

Second instar: As for third instar except without spatula and integument smooth (Fig. 96).

First instar: As for second instar except only prothoracic and eighth abdominal spiracles present.

Type species. *Aposchizomyia acuta* Gagné.

Etymology. *Aposchizomyia* combines the prefix "apo", meaning out of, with *Schizomyia*, the name of a related genus and a suitable suffix to identify a genus as belonging to the subtribe Schizomyiina.

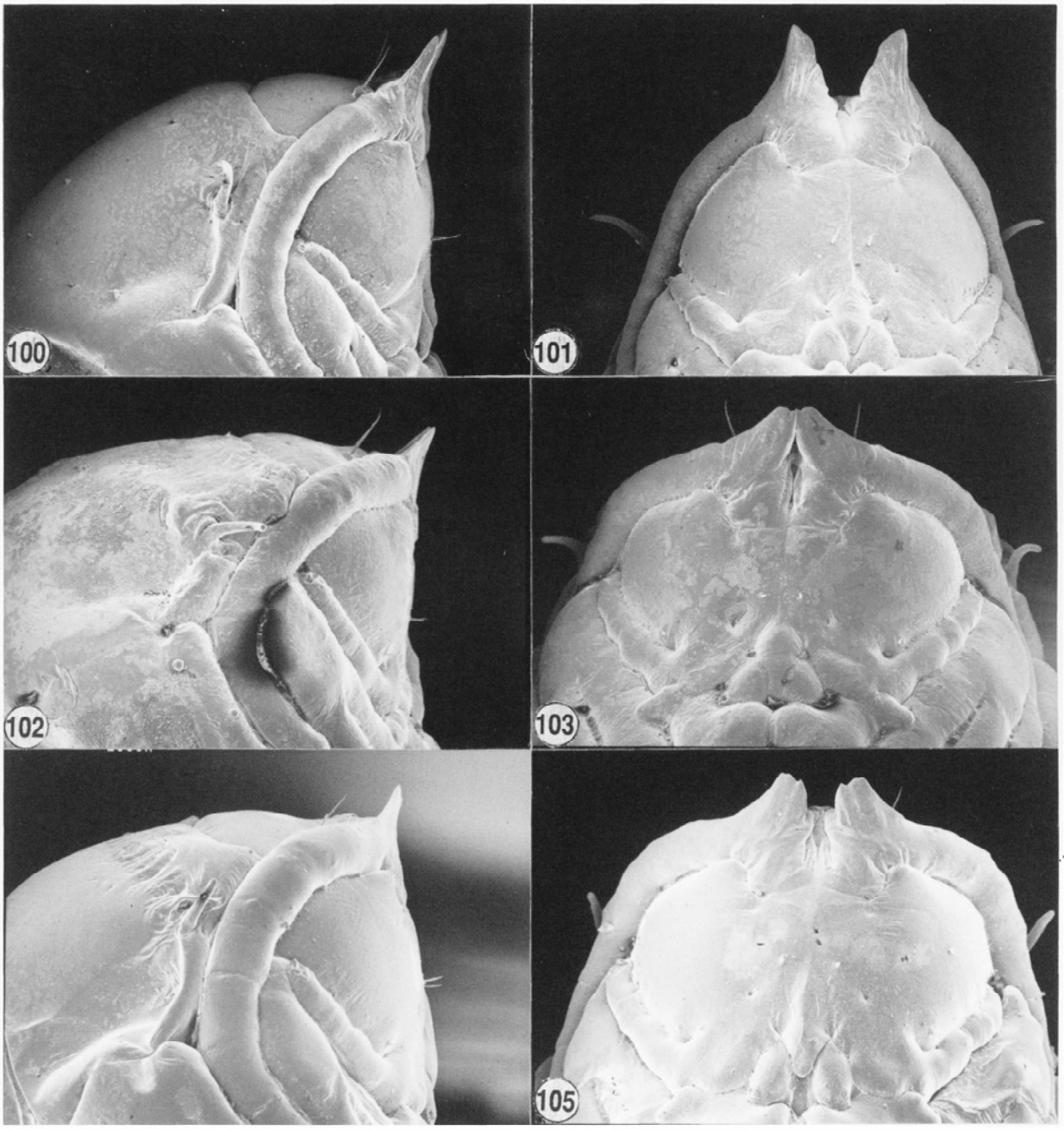
Remarks. This genus contains the six species described below and other, unnamed species without specimens sufficient for a description (p. 35). Adults and larvae of *Aposchizomyia* are mostly indistinguishable to species, so species discrimination relies almost entirely on the galls and the shape of the pupal antennal horns.

Aposchizomyia belongs to the tribe Asphondyliini because of its characteristically large female seventh sternite and laterally notched eighth tergite, the ventrally lenghtened gonocoxite, and the short, flat, broad gonostylus. It belongs to the subtribe Schizomyiina because of the lack of an apical spur on the first tarsomere, the presence of parameres flanking the aedeagus, and the unfused denticles of the gonostylus. A more detailed review of these groups is given in Gagné (in press).

The new genus is distinct among Schizomyiina for the partially separated female cerci, the lack of spines on the dorsum of the pupal abdomen, and, in the larva, the presence of only three lateral papillae on each side of the spatula, the simple eighth abdominal segment, and the simple, convex terminal segment with only one pair of papillae.

This is the only genus of the subtribe Schizomyiina without dorsal spines on the pupal abdomen. This is evidently a derived character because Cecidomyiidi that pupate in the ground, as well as other Schizomyiina that pupate in the ground or in galls, have dorsal abdominal spines (Möhn 1961). *Parasphondylia* Kieffer and *Tetrasphondylia* Kieffer are two African genera of this subtribe for which pupae are still unknown, but they otherwise differ from the new genus. *Parasphondylia*, known from the female of one species, *P. variicornis* Kieffer, caught in flight in Shimoni, Kenya, has a prominent dorsal lobe at the base of the abdomen (Kieffer 1913b, 1913c). *Tetrasphondylia* is known from the male and female of *T. terminaliae* (Tavares) that were reared from galls on a species of *Terminalia* (Combretaceae) in Mozambique. This species has the tarsal claws much longer than the empodia (Kieffer 1913a, 1913c; Tavares 1908).

Schizomyia acaciae Mani and *Schizomyia orientalis* Grover, both from *Acacia leucophloea* Willd. in India, may belong to *Aposchizomyia*. The first was described from a female reared from globular leaf galls near Tanjore, Madras (Mani 1934). The gall is the result of the fusion of two separate leaflets on the same side of the pinna and is covered with brown tomentum. The description of the female in Mani 1934 is not comparable to those of *Aposchizomyia*, but the fact that *S. acaciae* pupates in the galls indicates that it may belong to this genus. The second species, *S. orientalis*, was described from a male and a female reared from globular, hard, green, tomentose, deciduous leaflet galls on *Acacia leucophloea* taken in



Figures 100-105, Pupal heads of *Aposchizomyia* spp. (lateral view on left, ventral view on right). 100-101, *A. acuta*. 102-103, *A. brevis*. 104-105, *A. crenata*.

Allahabad, India (Grover 1966). The antenna and genitalia drawn in Grover 1966 could pass for those of *Aposchizomyia*, but the smaller tooth of the male gonostylus differs from the species described here. Pupae and larvae are needed to determine whether this species belongs to *Aposchizomyia*.

Aposchizomyia acuta Gagné, new species

Adult. Wing length, male, 2.3-2.5 mm (n=5); female, 2.1-3.1 mm (n=5). Male head as in Fig. 86; male third flagellomere as in Fig. 89; female antenna as in Fig. 89; female antenna and third flagellomere (Figs. 87, 90) with circumfila simple, not wavy. Male genitalia as in Figs. 93-94.

Pupa (Figs. 100-101). Antennal horns in frontal view separate, triangular, fluted mesally, pointed apically.

Larva. Third instar (Figs. 95-97): Spatula with 2 anterior teeth.

Second instar (Fig. 96): Without spatula and integument smooth; otherwise as for third instar.

Holotype. Male, from *Acacia nilotica*, Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109, Kenya, XI-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia nilotica*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: third instar and 2 pupae, 19-IV-1991; 4 males, 5 females, 2 pupae, and 3 third instars, XI-1991. Malindi: 2 females, VI-1991. Kilungu Ranch, ca. 80 km SE Nairobi, Rt A109: 2 males, 2 females, 19-XI-1991.

Other material examined (all from *Acacia nilotica*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 6 pupae, 6 second instars, first instar, 19-IV-1991; 20 males, and 20 females, 6 third instars, 19-IV-1991. Kilungu Ranch, ca. 80 km SE Nairobi, Rt A109: 4 males, 6 females, 19-XI-1991. Voi: galls, X-1991.

Etymology. The name *acuta* is an adjective referring to the acutely pointed pupal antennal horns of this species.

Gall (Fig. 4). The gall is a large, amorphous swelling on *Acacia nilotica*, usually at the ends of stems and sometimes with spines or leaves growing from the surface. Larvae live in individual ovoid cells.

Remarks. This species is distinct from other species of *Aposchizomyia* in having two anterior teeth on the spatula and for the characteristic shape of the pupal antennal horns.

Aposchizomyia brevis Gagné, new species

Adult. Unknown.

Pupa (Figs. 102-103)--Antennal horns in frontal view short, adjacent, slightly serrate apically.

Larva. Third instar: Spatula with 1 anterior tooth.

Holotype. Pupa, from *Acacia drepanolobium*, southern base of Ngong Hills, Kenya, 8-I-1992, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia drepanolobium*). Southern base of Ngong Hills: third instar, pupa, 8-I-1992. Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 3 third instars, 6-I-1992. Kima, near Sultan Hamid: 6 third instars, 18-XII-1991.

Other material examined (all from *Acacia drepanolobium*). Southern base of Ngong Hills: 2 pupae, galls, 3-XII-1991; galls, 3-XI-1991; 2 pupae and galls, 8-I-1992. Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: galls, 6-I-1992. Kima, near Sultan Hamid: galls, 18-XII-1991.

Etymology. The name *brevis* is an adjective referring to the short pupal antennal horns of this species.

Gall (Fig. 9). The spherical galls usually occur on the pedicels of *Acacia drepanolobium*. Flower rudiments grow from the apex of the galls, indicating that the galls have developed from inflorescences. Galls may occur singly or clumped and are occasionally fused in clusters. Each gall contains a single larva.

Remarks. This species differs from other species of *Aposchizomyia* by its characteristic antennal horns.

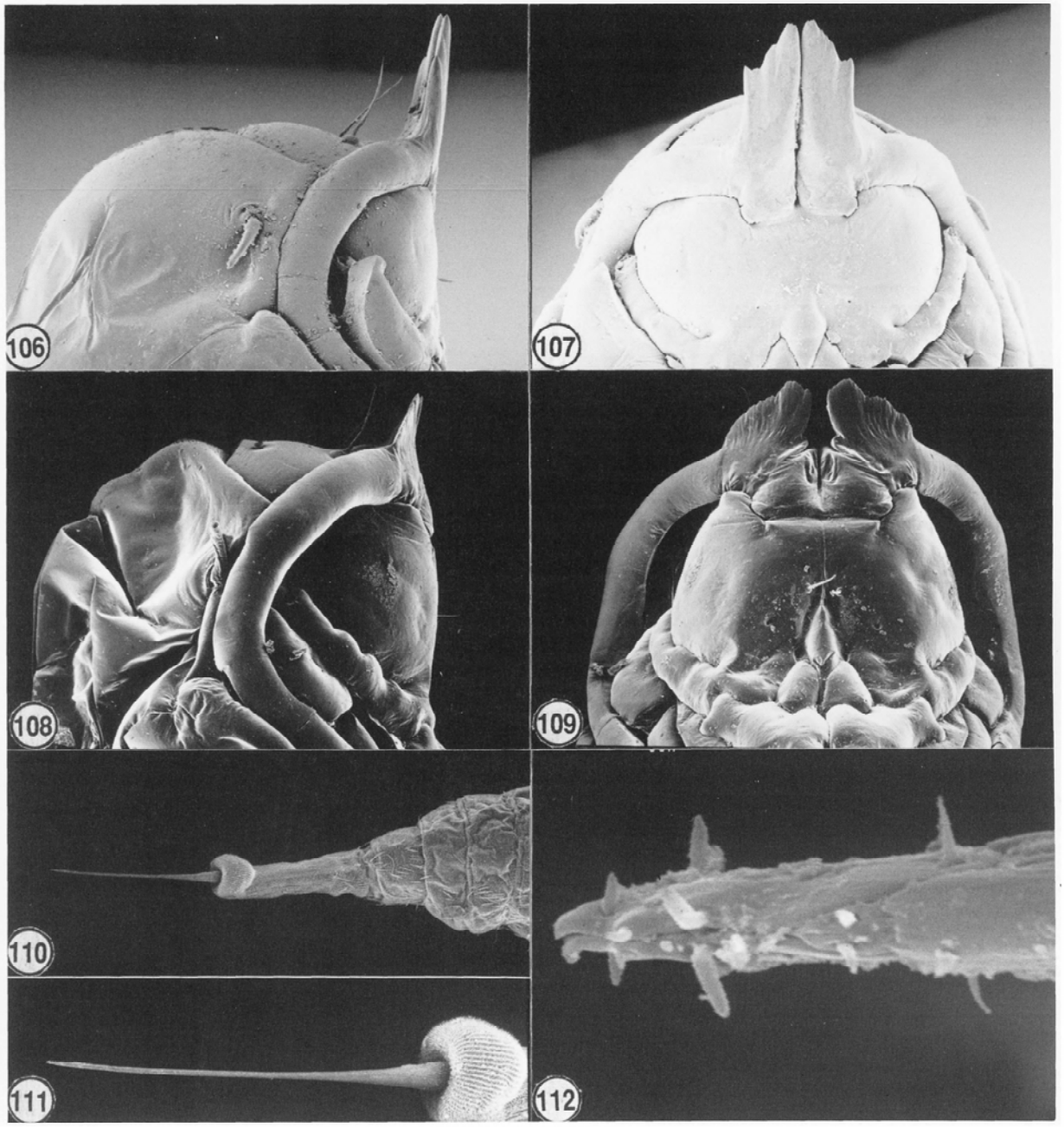
Aposchizomyia crenata Gagné, new species

Adult. Wing length, male, 1.7-1.9 mm (n=5), female, 2.3-2.5 mm (n=5). Female antenna as for *A. acuta*.

Pupa (Figs. 104-105). Antennal horns in frontal view short, separated, fluted, wide, and serrate apically.

Larva. Third instar: Spatula with 1 anterior tooth.

Holotype. Pupa, from *Acacia drepanolobium*, Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109, Kenya, 13-IV-1992, J. Marohasy, deposited in USNM.



Figures 106-112, *Aposchizomyia* spp. 106-109, Pupal heads (lateral view on left, ventral view on right): 106-107, *A. longa*; 108-109, *A. striata*. 110-112, Female postabdomen with ovipositor exserted, *A. longa*: 110, abdomen from fifth segment to apex; 111, ovipositor from apex of eighth segment; 112, apex of ovipositor.

Paratypes (all from *Acacia drepanolobium*). Five pupae, third instar, same data as holotype. Southern base of Ngong Hills: third instar, 14-IV-1992.

Other material examined (all from *Acacia drepanolobium*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: pupa, 13-IV-1992; pupa and galls, 5-III-1992; galls, X-1991. Southern base of Ngong Hills: 2 pupae, galls, 14-IV-1992. Also, 27 males and 31

females, 13 to 14-X-1991, from Malili Ranch, which could be either this species or *A. longa*.

Etymology. The name *crenata* is an adjective referring to the crenate pupal antennal horns of this species.

Gall (Fig. 11). This is a large swelling of the pinna of *Acacia drepanolobium* that encompasses the bases of the leaflets. Larvae live individually in cells in the swollen pinna.

Remarks. This species is distinctive for the shape of its pupal antennal horns. It and *A. longa* both make galls on leaf pinnae of *Acacia drepanolobium*, occasionally on the same stem. Although galls and pupae of the two species are distinct, adults reared from mixed series of both galls from the same tree stem look alike and cannot be separated. We have larvae from typical galls of *A. crenata* but none from those of *A. longa*, so do not know whether or how the two species differ in that stage. While the gall of *A. crenata* envelops the bases of the leaflets and is more or less globular with only the tips of the leaflets showing, the gall of *A. longa* involves mainly the pinna, leaving the two rows of leaflets entire but unsplayed. Pupae from the two kinds of galls are very distinct in the shape of their antennal horns: those of *A. crenata* are relatively short, those of *A. longa* extremely long. Both sexes can be retrieved from both kinds of pupae, and the pupal antennal horns are either short or long, with no intermediates, so the length of the horns is not a sex difference or due to variation. Monod (1968) illustrated galls from *Acacia drepanolobium* from Tanzania that resemble somewhat galls of *A. crenata*.

Aposchizomyia longa Gagné, new species

Adult. Wing length, male, 1.7-1.9 mm (n=5); female, 2.3-2.5 mm (n=5). Female antenna as for *A. acuta*.

Pupa (Figs. 106-107). Antennal horns in frontal view extremely long, parallel sided, adjacent, serrate apically.

Larva. Unknown.

Holotype. Pupa, from *Acacia drepanolobium*, Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109, Kenya, 13-IV-1992, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia drepanolobium*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 3 pupae, 2 pupal exuviae, 3 larvae, 13-IV-1992; pupa, X-1991.

Other material examined (all from *Acacia drepanolobium*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: pupae, galls, 5-III-1992; pupae, galls, X-1991. Also, 27 males and 31 females, 13 to 14-X-1991, from Malili Ranch, could be either *A. crenata* or *A. longa*.

Etymology. The name *longa* is an adjective referring to the elongate pupal antennal horns of this species.

Gall (Fig. 12). Galls are swellings of the pinna of *Acacia drepanolobium* that do not encompass the leaflets, which are flattened and decumbent.

Remarks. This species is distinctive for the shape of its pupal antennal horns. See remarks under *A. crenata*.

Aposchizomyia striata Gagné, new species

Adult. Wing length, male, 2.3-2.5 mm (n=5); female, 2.1-3.1 mm (n=5). Female antenna as for *A. acuta*.

Pupa (Figs. 108-109). Antennal horns in frontal view elongate, separated, finely fluted, minutely serrate apically.

Larva. Third instar: Spatula with 1 anterior tooth.

Holotype. Pupa, from *Acacia tortilis*, Yatta, Kenya, 16-XII-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia tortilis*). Yatta: pupa, 4 third instars, 16-XII-1991; 2 males and 2 females, 19-III-1991. Kima, near Sultan Hamid: 3 males, 4 females, 26-III-1992; female, 18-XII-1992. Maktau, near Voi: 3 first instars, 2-VII-1991.

Other material examined (all from *Acacia tortilis*). Pupa, 3 third instars, and galls, same data as holotype; Kima, near Sultan Hamid: galls, 18-XII-1992. Maktau, near Voi: galls, 2-VII-1991.

Etymology. The name *striata* is an adjective referring to the furrowed surface of the pupal antennal horns of this species.

Gall (Fig. 27). Infested leaves consist of elongate and adaxially appressed leaflets of *Acacia tortilis* that enclose on the pinna between them a series of ovoid, complex galls growing from the pinna, each with a single larva.

Remarks. This species is distinctive for its pupal antennal horns.

Aposchizomyia turnouri Gagné, new species

Adult (female only). Wing length, female, 2.2 mm (n=2). Female antenna (Figs. 88, 91) with the 2 last segments equally short and the circumfila anastomozing.

Pupa (Fig. 92). Antennal horns in frontal view adjacent, almost parallel sided, tapering only slightly to blunt apices.

Larva. Third instar: Spatula (Fig. 99) with one anterior tooth.

Holotype. Female, from *Acacia drepanolobium*, southern base of Ngong Hills, Kenya, 27-III-1992, J. Marohasy, deposited in USNM.

Paratypes. Female, female pupa, 1 pupal exuviae, third instar larva, same data as holotype.

Other material examined. Galls, same data as holotype. Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: galls, 2-I-92; first instars and galls, 6-I-1992.

Etymology. This species is named to honor Mr. J. W. Turnour of Toowong, Brisbane, Australia.

Gall (Fig. 10). Galls occur on pedicels of *Acacia drepanolobium* and appear to develop from floral primordia. They have a globular, woody base and an apical crown of scales.

Remarks. The female (the male is unknown) differs from all other *Aposchizomyia* species for its shorter distal antennal flagellomeres and its anastomozing circumfila. The pupa differs from all other species by its characteristic antennal horns.

Aposchizomyia spp.

Aposchizomyia larvae that may represent additional new species were taken from leaf galls on *Acacia nilotica*, *Acacia reficiens*, and *Acacia tortilis*. These galls are generally similar to those of *A crenata* or *A. longa* on *Acacia drepanolobium* (Figs. 11-12). Greatly swollen and occasionally partly fused leaflet galls (Fig. 5) were found once on *Acacia nilotica* at Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109, 29-X-1991. Leaflet galls found on *Acacia reficiens* along the Marigat Town to Baringo Town Road, near Lake Baringo, 7-II-1991, are similar to those shown for *A. crenata* (Fig. 11). Two kinds of leaflet galls were found on *Acacia tortilis*. One is generally similar to those made by *A. longa* on *Acacia drepanolobium* (Fig. 12), the pinna being more greatly swollen than the leaflets. This gall was found twice, once at Voi, 19-I-1992, and once at the southern base of Ngong Hills, 3-XII-1991. The other kind of gall on *Acacia tortilis* resembles that made by *A. crenata* on *Acacia drepanolobium* (Fig. 11), the leaflet largely swollen with only its unmodified tip sticking out of the end of the gall. This was found at the southern base of Ngong Hills, 8-I-1992.

Asphondylia Loew

Asphondylia Loew 1850: 21. Type species, *Cecidomyia sarothamni* Loew, by original designation.

This genus is cosmopolitan with some 260 described species that mostly form galls in flowers and fruit of many families of plants. All form galls but feed on the mycelium of a symbiotic fungus.

Asphondylia napiformis Gagné, new species

Adult and pupa. Unknown.

Larva. Third instar: Body broad, widest at thorax (Fig. 113). Spatula and associated papillae as in Fig. 114; only 3 lateral papillae present on each side of spatula; terminal segment (Fig. 115) with only 4 papillae, each with tiny seta.

First instar (Fig. 116): Spiracles present only on prothorax and eighth abdominal segment. Lateral papillae as for third instar; terminal segment (Fig. 117) with 4 pairs of papillae, one elongate, corniform,

dorsally pointed, the remaining 3 pairs with short, tiny setae.

Holotype. Third instar, collected from leaf galls of *Acacia mellifera*, Taveta Rd., ca 10 km from Voi, Kenya, 19-I-1992, J. Marohasy, deposited in USNM.

Paratype. First instar, from *Acacia mellifera*, southern base of Ngong Hills, 3-XII-1991.

Additional material. Galls, same data as holotype and paratype.

Etymology. The name *napiformis* is an adjective made from the Latin napus and formis, meaning turnip shaped, in reference to the shape of the gall.

Gall (Fig. 31). Galls are turnip-shaped growths at the base of leaves of *Acacia mellifera*. Each has a single larval cell with fleshy invaginations.

Remarks. Many *Asphondylia* spp. have a similarly shaped larva and wide, four-pronged spatula. The new species is distinctive for its three, instead of four or five, lateral papillae on each side of the spatula and two, instead of three or four, pairs of terminal papillae in the third instar. All the terminal papillae are setiform in this species; the corniform pair found in many species is lost.

One other species of this genus, *Asphondylia trichocecidarum* Mani (1934), is known from *Acacia leucophloea* Willd. in southern India. It is responsible for fuzzy, globular to pyriform, leaflet galls. Because it is known only from a male, *A. trichocecidarum* is not comparable to *A. napiformis*.

Asphondylia sp.

Gall (Fig. 7). Galls are conical and found in clusters on pedicels of *Acacia nilotica*, *Acacia hockii*, *Acacia reficiens* and *Acacia tortilis*. Each gall contains a single larva.

Remarks. Only first instars were obtained from these galls. These larvae belong to *Asphondylia*, but first instars of this genus are indistinct to species. All generally resemble those of *Asphondylia napiformis* (Fig. 116). It is not possible determine if the gall is made by the same species of *Asphondylia* on all four hosts.

Material examined (all collected in Kenya by J. Marohasy). On *Acacia nilotica*, Malindi: galls and first instars, 18-I-1992; galls, 20-II-1991. On *Acacia hockii*, Taveta Rd., 10 km from Voi: first instars and galls, 19-I-1992. On *Acacia reficiens*, Marigat Town to Baringo Town Rd., Lake Baringo: galls, 17-II-1992. On *Acacia tortilis*: Taveta Rd., 10 km E Voi: first instars and galls, 19-I-1992.

Athidiplosis Gagné, new genus

Adult. Head: Eyes large, about 15 facets long at vertex, connate; facets hexagonal, closely adjacent. Vertex of occiput with elongate dorsal protuberance. Frons with 5-7 setae and some scales on each side. Labella hemispherical, acute at very apex, each with about 20 lateral setae. Palpus with 4 segments. Antenna with first and second flagellomeres connate; twelfth flagellomere with a bud present at apex but without articulation (Fig. 123). Male flagellomeres (Fig. 121) binodal with one circumfilum on basal node, two on distal; nodes and necks short; circumfilar loops not reaching next distal circumfilum; bases of circumfila not all on same plane. Female flagellomeres (Fig. 123) successively shorter, first through sixth flagellomeres slightly constricted beyond basal setae.

Thorax: Mesanepisternum with 15-25 scales dorsally. Mesepimeron with 8-12 setae. Wing (Fig. 125): R5 curved apically, joining C posterior to wing apex; Rs weak, oblique, situated closer to arculus than to apex of R1; Cu forked; M3+4 present. Tarsal claws (Fig. 124) curved beyond midlength, untoothed; empodia reaching bend in claws.

Male abdomen (Figs. 128-129): First through sixth tergites entire, rectangular, with single, uninterrupted, posterior row of setae, several lateral setae on each side near midlength, scattered scales elsewhere, and pair of trichoid sensilla on anterior margin. Seventh tergite unsclerotized along caudal margin, with 1-4 caudolateral setae and 0-2 lateral setae, usually no scales, but with anterior pair of trichoid sensilla. Eighth tergite sclerotized only basally, without setae other than anterior pair of trichoid sensilla. Cerci convex to triangular apically, with several posteroventral setae. Hypoproct divided caudally into 2 long, widely separated, narrow lobes, each with three setae apically. Aedeagus much longer than hypoproct, cylindrical, blunt tipped. Gonocoxite with rounded mesobasal lobe, cylindrical beyond. Gonostylus cylindrical, setulose at very base, striate beyond.

Female abdomen (Figs. 126-127): First through seventh tergites as for male first through sixth. Eighth tergite short, broad, bare except for basal pair of trichoid sensilla. Ovipositor short, protrusible, about 1 1/2 times as long as seventh tergite; cerci elongate-ovoid, setose, completely setulose, with 2 long, sensory setae subapically; hypoproct short, entire.

Pupa. Head damaged and anatomy unclear on available specimens. Prothoracic spiracle short, about twice as long as wide. Second through seventh abdominal segments with mesoventral spines.

Larva. Third instar (Fig. 118): Elongate-ovoid. Integument smooth except for anteroventral rows of spicules on most segments. Antenna about twice as long as wide. Spatula absent. Full complement of papillae basic for supertribe present (Gagné 1989); dorsal and pleural papillae on mamelons, without setae. Lateral papillae with two groups of three on each side, two of each triplet with short setae, the other without seta. Terminal segment (Fig. 119) with at least four papillae, but possibly eight occur and are obscured on available specimens.

Second instar: As for third instar, except mamelons beneath pleural and dorsal papillae more prominent. Terminal segment (Fig. 120) with eight papillae, all without setae.

First instar: As for second but spiracles present only on prothorax and eighth abdominal segment.

Type species. *Athidiplosis walteri* Gagné.

Etymology. *Athidiplosis* is formed from Athi, the name of a river in Kenya where this genus was found, and "diplosis," a common ending for generic names in the supertribe Cecidomyiidi.

Remarks. This genus belongs to the supertribe Cecidomyiidi. It is erected for two species that do not fit in any other known genus. Unique characters of *Athidiplosis* are the shape of the male genitalia and the lack in the larva of a spatula and of setae on the dorsal, pleural, and terminal papillae. The twelfth flagellomere has a distinct bud at its tip, but it is not articulated. The shape of the tarsal claws, the cylindrical, blunt-tipped aedeagus, and the narrow, elongate, widely separated lobes of the hypoproct recall the Holarctic genus *Harmandia* (see Gagné and Payne 1992), but the gonocoxites of the two genera are quite different, as are larval and other characters.

Athidiplosis bullata Gagné, new species

Adult. Male and female antennae as for *A. walteri*. Wing length: male, 3.0 mm; female, 2.5 mm. Male genitalia (Fig. 129): cerci acute apically, lobes of hypoproct each as wide as aedeagus; aedeagus longer than hypoproct, shorter than gonocoxite. Female postabdomen and cerci as for *A. walteri* (Figs. 126-127).

Larva. Third instar unknown; second instar as for *A. walteri* (Fig. 120).

Holotype. Male, collected from stem swellings of *Acacia senegal*, Kima, near Sultan Hamid, Kenya, 25-III-1992, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia senegal*). Kima, near Sultan Hamid: male, female, 2 pupae, 25-III-1992. Emali: pupa, 27-IV-1992. Malindi: first instar, second instar, 16-I-1991.

Other material examined (all from *Acacia senegal*). Kima, near Sultan Hamid: galls, 25-III-1992. Malindi: galls, 16-I-1991. Emali: galls, 2-VII-1991. Maktau: galls, 23-X-1991. Associated with the Emali male pupa were two second instars of a *Clinodiplosis* sp. and a third instar of a species of an undetermined genus of Lasiopteridi.

Etymology. The name *bullata* is an adjective meaning swollen, referring to the shape of the galls.

Gall (Fig. 28). This gall is a cambial stem swelling of *Acacia senegal*, often beneath a lenticel or thorn. Galls have one or more ovoid cells under the bark. The gall resembles that of *Acacidiplosis* sp. on *Acacia tortilis*.

Remarks. Larvae of a *Clinodiplosis* sp., which may be a scavenger, were found in one of the galls. For further remarks, see under *A. walteri*.

Athidiplosis walteri Gagné, new species

Adult. Male third antennal flagellomere as in Fig. 121. Female third and twelfth flagellomeres as in Figs. 123-124. Wing (Fig. 125) length: male, 3.1-3.2 mm (n=5); female, 2.4-2.7 mm (n=4). Male genitalia (Fig. 128): cerci rounded apically, lobes of hypoproct narrower than aedeagus; aedeagus much longer than

hypoproct, approximately as long as gonocoxite. Female postabdomen and cerci as in Figs. 126-127.

Larva. Third instar as in Figs. 118-119. Second instar as in Fig. 120.

Holotype. Male, from *Acacia mellifera*, Yatta, Kenya, 5-III-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia mellifera*). Yatta: 2 males, 4 females, 4 third and 4 second instars, 5-III-1991. 25 km E Namanga: male, 23-X-91. 85 km E Athi River Township: 2 males, 22-X-91. Taita Hills, near Voi: 8 second instars, 3-VII-1991.

Other material examined (all from *Acacia mellifera*). Taita Hills, near Voi: galls, VI-1991 and 3-VII-91.

Etymology. This species is named to honor Dr. G. H. Walter, Entomology Department, University of Queensland, Brisbane, Australia.

Gall (Fig. 30). Galls develop from stem nodes of *Acacia mellifera*. The woody base of the galls is densely covered with soft hairs. Each gall contains several ovoid larval cells.

Remarks. The male, female, and second instar resemble those of *A. bullata* except in details of the male genitalia. The third instar of *A. bullata* is unknown. *A. walteri* occurs on *Acacia mellifera* and *A. bullata* occurs on *Acacia senegal*, and their galls are very different.

Collula Strand

Collinia Kieffer 1912: 232. Type species, *Collinia acaciae* Kieffer 1912, by original designation (=*Collula kiefferi* Gagné).

Collula Strand 1926: 49, as new name for *Collinia* Kieffer, preoccupied by Cépede 1910 in Protista. Type species, *Collinia acaciae* Kieffer 1912, automatically (=*Collula kiefferi* Gagné).

Remarks. *Collula* belongs to the supertribe Cecidomyiidi. The original description was very general and not illustrated, but the most useful character for present identification are the toothed tarsal claws that are almost right angled, which probably means that they are bent near their basal third. The empodia are reportedly rudimentary, but that is a subjective term: they could be short and still almost reach the bend in basally angled claws, in which case they might resemble those of *Lopesia* (Fig. 164). The other characters of *Collula* could fit *Lopesia* (see below), except that the long ovipositor, described as long as or longer than the abdomen is much longer than occurs in known *Lopesia*.

This genus contains two Egyptian species from *Acacia nilotica* that have not previously been distinguished in the literature and have been treated as one (Barnes 1951). The earlier-named species was described as *Perrisia? acaciae* in Kieffer 1909, the other as *Collinia acaciae* following the description of *Collinia* in Kieffer 1912. The type of the earlier name is the gall described and illustrated by Frauenfeld (1859), while the type of the later name is a female collected from the same host as the other, but from an unspecified gall. After 1909 Kieffer never mentionned his earlier-named species, evidently not considering it valid. The earlier name has erroneously been listed as the type-species of *Collinia* and *Collula* (Skuhravá 1986). Details are given below.

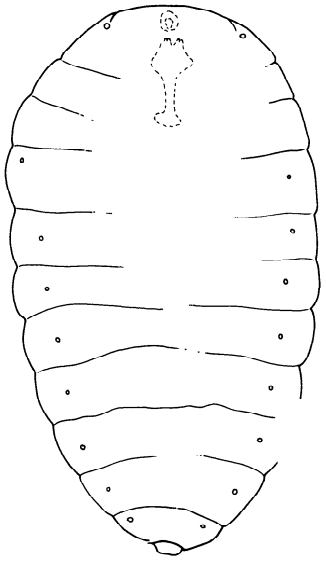
Collula acaciae (Kieffer)

acaciae Kieffer 1909: 1 (*Perrisia*); Houard 1922: 338 (*Collinia*); Skuhravá 1986: 235.

Types. Galls described by Frauenfeld (1859) from *Acacia vera* [illegitimate name for *Acacia nilotica* (Ross 1979)] in Cairo, Egypt, possibly deposited in Naturhistorisches Museum, Vienna, Austria.

Gall. The gall was described and illustrated by Frauenfeld (1859). The illustrations were reprinted by Houard (1909, 1922). It is made up of a globular mass of folded leaves with thick, recurved leaflets. Published illustrations show a gall generally similar in exterior appearance to that of *Aposchizomyia striata*

Figures 113-120. 113-117, *Asphondylia napiformis*: 113, third instar (dorsal); 114, spatula and associated papillae; 115, eighth and terminal larval segments, third instar (dorsal); 116, first instar (lateral); 117, eighth and terminal larval segments, first instar (lateral). **Figures 118-120**, *Athidiplosis walteri*: 118, third instar (dorsal); 119, eighth and terminal larval segments, third instar (dorsal); 120, seventh to terminal larval segments, second instar (dorsal).



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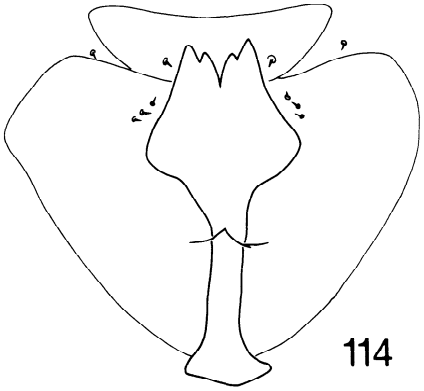

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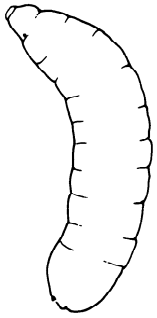

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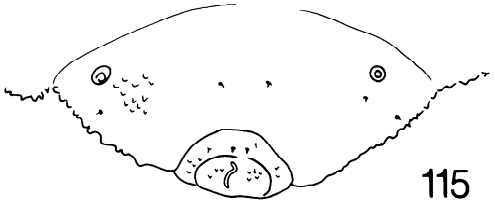

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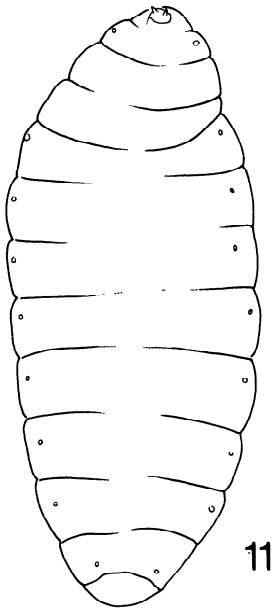

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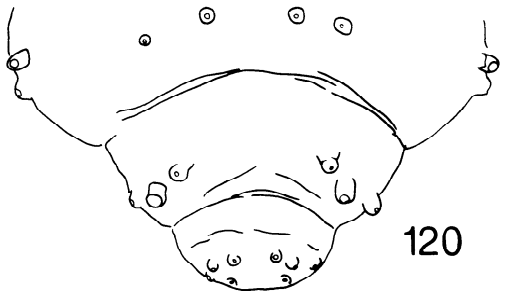

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on *Acacia tortilis*, but we did not see such galls on *Acacia nilotica* in the course of this work.

Remarks. Kieffer (1909) described *C. acaciae* by indication. His full text was: "*Acacia vera* Wild. Déformation des folioles. Egypte (Frauenfeld 1850 [sic!, for 1859]). *Perrisia? acaciae* n. sp." A species is validly described if named before 1931 with a description of its work. "Deformation of the leaflets" does not seem adequate for this, but the reference to Frauenfeld (1859) is indication that Kieffer was naming Frauenfeld's gall. Although this species name is valid, Kieffer evidently did not consider it so because he did not list it in his comprehensive monograph (Kieffer 1913c) or elsewhere subsequently. We do not know whether *C. acaciae* belongs to *Collula*, and it might belong to *Aposchizomyia*.

Collula kiefferi Gagné, new name

acaciae Kieffer 1912: 232 (*Collinia*), junior secondary homonym of *Perrisia acaciae* Kieffer 1909.

Type. Female, from unspecified galls on *Acacia vera* [illegitimate name for *Acacia nilotica* (Ross 1979)] in Egypt, deposited in The Natural History Museum, London (Kieffer 1912). K. M. Harris, formerly of the International Institute of Entomology could not find this specimen in the Natural History Museum collection. G. McGavin searched but did not find it in the Hope Entomological Collections at Oxford University where much of the Collins collection is kept.

Gall. Undescribed.

Remarks. If the gallmaker of *C. acaciae* does not belong to *Collula*, *C. kiefferi* would revert to its former name. See remarks under genus for identification of this species.

Contarinia Rondani

Contarinia Rondani 1860: 289. Type species, *Tipula loti* DeGeer, by original designation.

Contarinia is a very large, broadly defined genus of Cecidomyiidi with about 300 known species. Three new species are described here that have untoothed tarsal claws that are curved beyond midlength, an elongate ovipositor with greatly reduced, dorsoventrally flattened, and closely juxtaposed cerci, with gonopods that are mesolaterally articulated, and with one pair of the larval terminal papillae corniform, unless, as in one of the new species, the terminal papillae are secondarily reduced. In this genus, the male flagellomeres usually have only two circumfila, as do the present species. The new species are distinct from one another and have no apparent close relationship.

Contarinia carolinae Gagné, new species

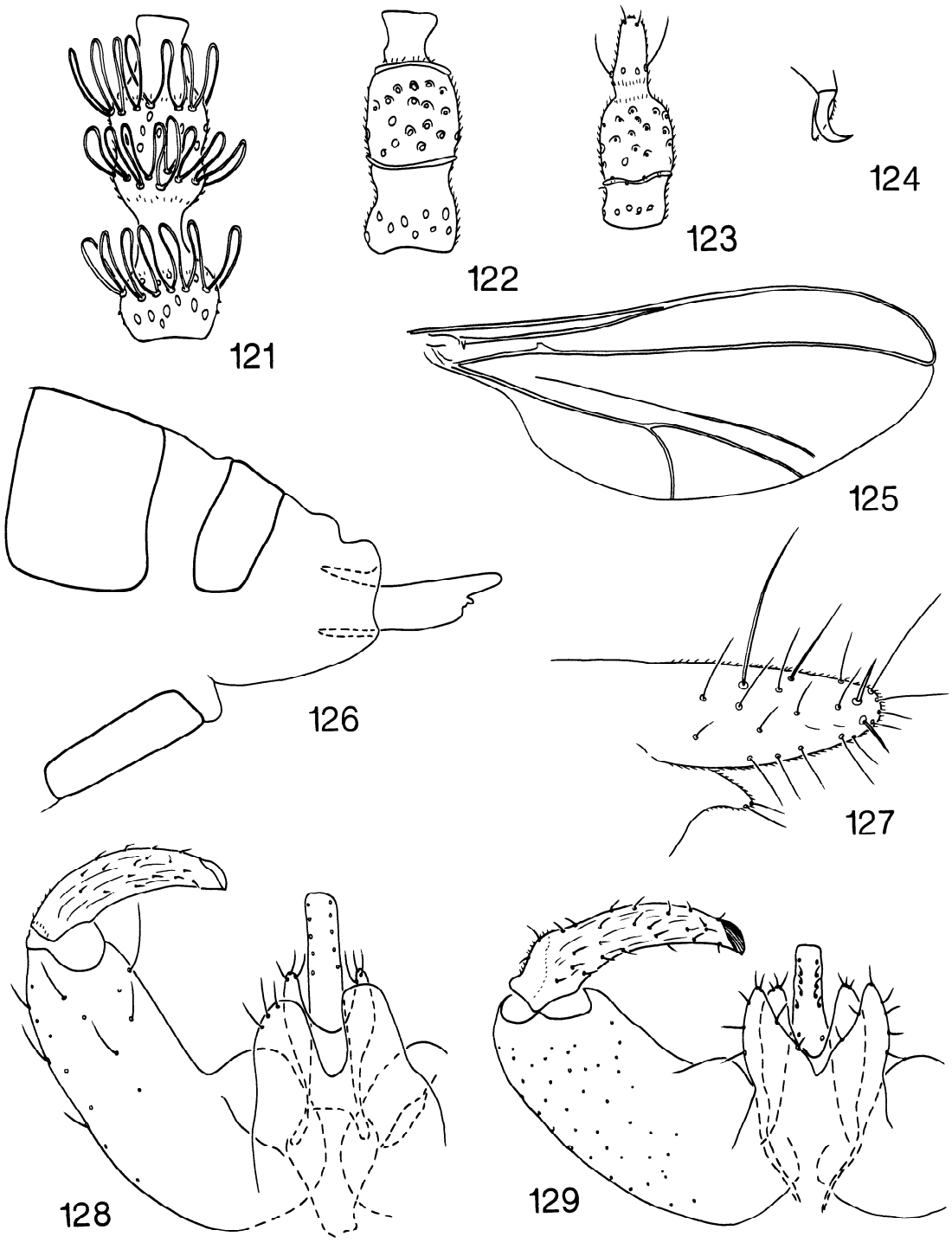
Adult. Head: Eyes 9-10 facets long at vertex, connate; facets circular, closely adjacent. Vertex of occiput narrowed but without dorsal protuberance. Frons with 4-6 setae per side. Labella short, hemispherical, each with 5-8 lateral setae. Palpus 4 segmented. Male antennal flagellomeres (Fig. 130) binodal, with 2 circumfila. Female third antennal flagellomere as in Fig. 131.

Thorax: Mesanepisternum with 1-5 scales dorsally. Mesepimeron with 9-12 setae. Wing (Fig.) length: male, 1.5-1.7 mm (n=5); female, 1.7-1.9 mm (n=5). R5 slightly curved, joining C near wing apex. Empodia as long as claws.

Male abdomen (Fig. 135): First through seventh tergites entire, short and broad, with single, uninterrupted, posterior row of setae, several lateral setae on each side near midlength, scattered scales elsewhere, and pair of trichoid sensilla on anterior margin. Eighth tergite sclerotized only basally, its only vestiture the anterior pair of trichoid sensilla. Cerci triangular, with several posterior setae. Hypoproct divided caudally into 2 rounded lobes, each with a long apical seta. Aedeagus tapering abruptly from base to acute apex, as long as hypoproct. Gonostylus with scattered setae, no setulae, striated from base to apex.

Female abdomen (Figs. 133-134): First through seventh tergites as for male. Eighth tergite square, with several short setae at apex. Ovipositor greatly

Figures 121-129. 121-128, *Athidiplosis walteri*: 121, male third flagellomere; 122, female third flagellomere; 123, female twelfth flagellomere; 124, tarsal claw and empodium; 125, wing; 126, female abdomen, seventh segment to apex (lateral); 127, detail, female cercus and hypoproct (lateral); 128, male genitalia (dorsal). **Figure 129,** *Athidiplosis bullata*, male genitalia (dorsal).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tapered to apex; cerci elongate, setose at base and apex, covered with patches of fine striations.

Pupa (Fig. 136). Body ovoid, dorsoventrally flattened. Head simple, without armature. Prothoracic spiracles short, about twice as long as wide. Dorsum of abdomen evenly spiculose, without spines. Posterior segment with 1 rounded medial and 2 pointed lateral processes.

Larva (Fig. 137). **Third instar**: Short, broad, dorsoventrally flattened. Integument minutely spiculose. Antenna about twice as long as wide. Spatula absent. Papillae reduced in size and number. Lateral and terminal papillae not apparent. Terminal segment (Fig. 138) greatly reduced, anus subterminal.

Holotype. Male, from *Acacia senegal*, Kima, near Sultan Hamid, Kenya, 25-III-1992, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia senegal*). Kima, near Sultan Hamid: 4 males, 5 females, 2 pupal exuviae, 25-III-1992; 16 larvae, 3 to 5-III-1992.

Other material examined (all from *Acacia senegal*). Kima, near Sultan Hamid: galls, first instars, 18-XII-1991; galls, pupae, third instars, 5-III-1992.

Gall (Fig. 29). An opposite pair of leaflets of *Acacia senegal* leaves are appressed at midlength to form the two halves of a larval cell. A single leaf may have several galls.

Etymology. This species is named to honor Miss Caroline Marohasy of Brisbane, Australia.

Remarks. This species is distinct from all other known *Contarinia* in the shape and setation of the female cerci and the lack of a spatula and both lateral and terminal papillae. Pupation occurs in the gall.

Two Indian species of *Contarinia* form acacia leaf galls analogous to those made by *C. carolinae*. *Contarinia bivalviae* (Rao 1950) forms a gall on *Acacia catechu* Willd., and *Contarinia ramachandrani* (Mani 1953) forms a gall on *Acacia suma* Buch.-Ham (=*Acacia ferruginea* DC). Meyer (1987) has good photographs of the galls of each of these species. The gall of *C. bivalviae* is made up of one greatly swollen leaflet and one that is barely modified; that of *C. ramachandrani* is externally more like that of *C. carolinae* except that the two leaves are not equally swollen. Internally, these galls are different from that of *C. carolinae*, one leaflet forming a cylinder that fits tightly into a deep receptacle formed by the other. Rohfritsch (1974) and Meyer (1987) show yet another gall from *Acacia ferruginea* in India, also evidently made by a species of *Contarinia*, that is much longer and more attenuate than that of *C. ramachandrani*. Both named Indian species of *Contarinia* from *Acacia* are known from the adult stage only (both sexes of *C. bivalviae*, only the male of *C. ramachandrani*) and were not described in enough detail to determine their relationship to *C. carolinae*. The ovipositor of *C. bivalviae*, as drawn by Rao (1950), does appear much shorter and less aciculate than that of *C. carolinae*.

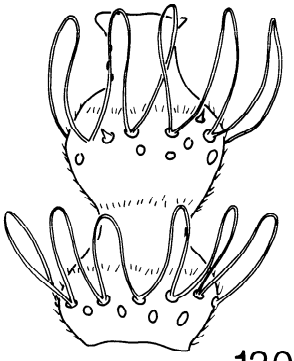
Contarinia hongoi Gagné, new species

Adult. Head: Eyes about 10 facets long at vertex, connate; facets circular, closely adjacent. Vertex of occiput narrowed, with short dorsal protuberance. Frons with 6-9 setae per side. Labella short, hemispherical, each with 5-8 lateral setae. Palpus 4 segmented. Male third antennal flagellomere (Fig. 141) bindal, with 2 circumfila. Female third antennal flagellomere as in Fig. 142.

Thorax: Mesanepisternum with more than 50 scales covering dorsal half. Mesepimeron with 10-15 setae. Wing length: male, 2.5-2.7 mm (n=5); female, 2.9-3.0 mm (n=5). R5 slightly curved, joining C near wing apex. Empodia as long as claws.

Male abdomen (Fig. 143): First through sixth tergites entire, rectangular, with single, uninterrupted, posterior row of setae, several lateral setae on each side near midlength, covered with scales, and pair of trichoid sensilla on anterior margin. Seventh tergite unsclerotized posteromesally, with group of posterolateral setae on each side, otherwise covered with setae, and with anterior pair of trichoid sensilla. Eighth tergite sclerotized only basally, the only vestiture several lateral scales and the anterior pair of

Figures 130-140. 130-138, *Contarinia carolinae*: 130, male third flagellomere; 131, female third flagellomere; 132, wing; 133, female abdomen, seventh segment to apex (lateral); 134, detail, female cercus (lateral); 135, male genitalia (dorsal); 136, pupa (ventral); 137, third instar (dorsal); 138, eighth and terminal segments, third instar (dorsal). **Figures 139-140,** *Contarinia hongoi*: 139, female abdomen, seventh segment to apex (lateral); 140, detail, female cercus (lateral).



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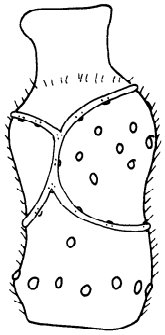

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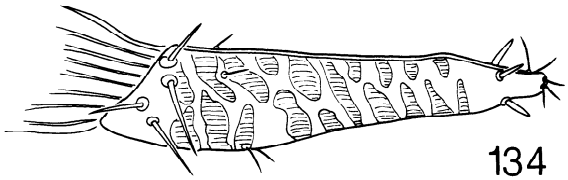

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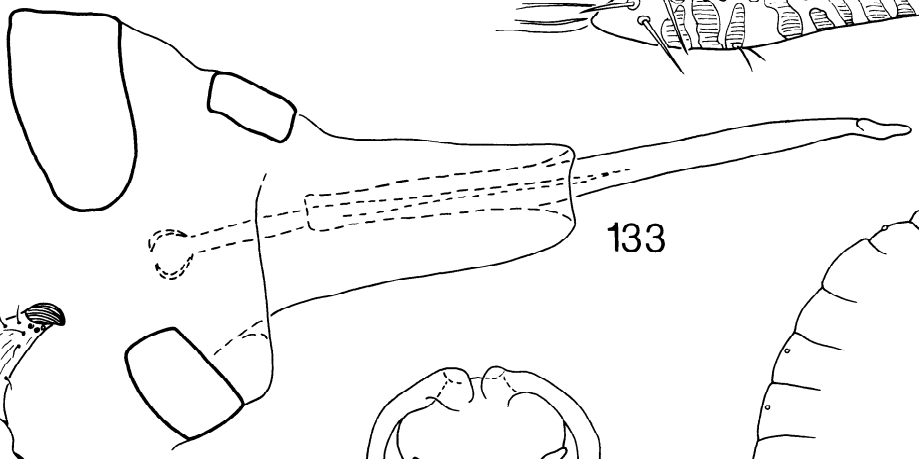

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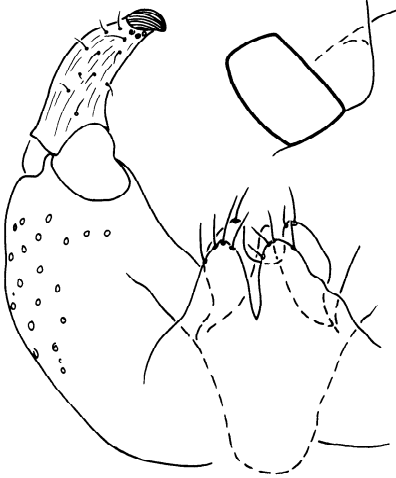

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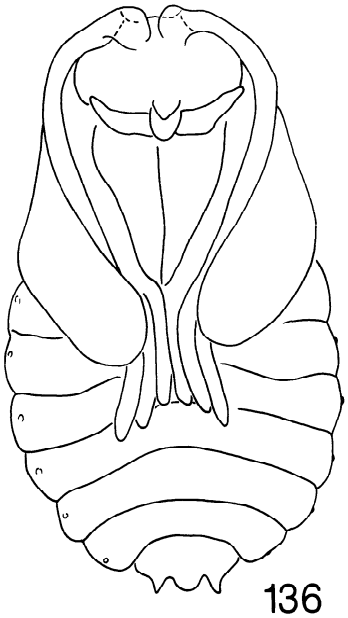

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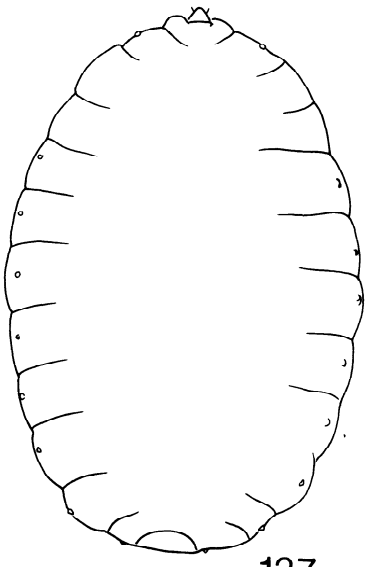

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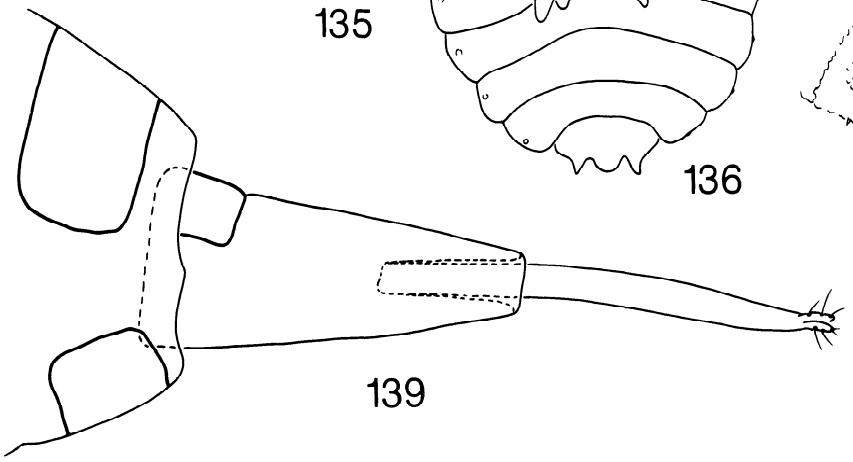

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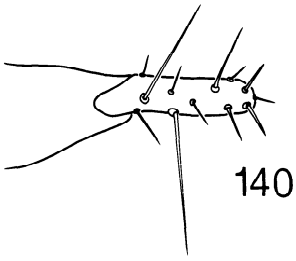

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trichoid sensilla. Cerci broadly rounded, with several posterior setae. Hypoproct divided caudally into 2 rounded lobes, each with 3-4 apical setae. Aedeagus as long as hypoproct, cylindrical, slightly recurved dorsally, rounded at apex. Gonostylus with many short setae, setulose on basal half, striated beyond.

Female abdomen (Figs. 139-140): First through seventh tergites as for male. Eighth tergite square, bare except for anterior pair of trichoid sensilla. Ovipositor moderately elongate, slightly less than 4 times length of seventh tergite, evenly tapered to dorsoventrally flattened, closely appressed cerci; cerci broadly rounded apically, setose, glabrous, setulae completely lacking.

Pupa (Fig. 144-145). Head with angular, slightly pigmented antennal horns, otherwise unarmed. Prothoracic spiracles and vertical setae elongate. Face with four pairs of papillae, one of each with seta, the other bare. Second to seventh abdominal segments with several rows of anterodorsal spines. Terminal segment broadly rounded.

Larva. Third instar: Body cylindrical as for *Contarinia plicata* (Fig. 150). Integument rugose. Antenna about twice as long as wide. Spatula with long shaft and broad anterior lobe (Fig. 146). All papillae basic to *Contarinia* present, although setae short. Terminal segment (Fig. 147) with pair of recurved corniform papillae and three pairs of setiform papillae, two pairs of these with setae longer than the remaining pair.

Holotype. Male, from *Acacia drepanolobium*, emerged from soil 22-IV-1992, southern base of Ngong Hills, Kenya, 14-IV-1992, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia drepanolobium*). Southern base of Ngong Hills: 4 males, 5 females, 4 pupal exuviae, 8 third instars, 14-IV-1992. 9.6 km W Athi River Township: 4 second instars, 19-XI-1991. Yatta: 4 third instars, 27-XI-1991.

Other material examined (all from *Acacia drepanolobium*). Southern base of Ngong Hills: galls, female, pupae, second and third instars, 14-IV-92. Kapiti Plains: galls, third instars, 13-IV-92. 9.6 km W Athi River Township: second instars, pupa, 19-XI-91. Yatta: galls, third instars, 27 to 29-XI-1991.

Etymology. This species is named to honor Mr. David Hongo of the Entomology Section, Kenya Forestry Research Institute, Muguga, Kenya, in recognition of his help in the study of acacia insects in Kenya.

Gall (Fig. 14). The globular galls occur at the stem nodes. Each gall contains several ovoid larval cells.

Remarks. Full-grown larvae usually can be found curled in half in their cells. Pupation takes place in the ground. The larval spatula has a single broad tooth at the anterior end of the spatula. The male has a somewhat thickened hypoproct and a robust aedeagus.

Contarinia plicata Gagné, new species

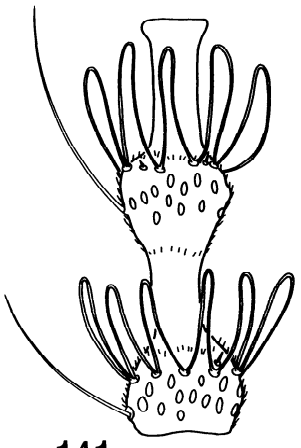
Adult and pupa. Unknown.

Larva. Third instar (Fig. 150): Body cylindrical. Integument generally smooth except for the rows of minute spicules anteroventrally on the abdominal segments. Antenna about twice as long as wide. Spatula (Fig. 149) with long shaft and 2 wide, rounded anterior lobes. All papillae basic to *Contarinia* present, although setae short. Terminal segment (Fig. 148) with pair of recurved corniform papillae and three pairs of setiform papillae, two pairs of these with setae longer than the remaining pair.

Holotype. Last instar, ex leaf galls of *Acacia drepanolobium*, Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109, Kenya, 18-XII-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia drepanolobium*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: 11 last instars (one retrieved from cocoon in soil), 18-XII-1991. Kima, near Sultan Hamid: last instar, retrieved from cocoon in soil, 12-XII-1991.

Figures 141-150. 141-147, *Contarinia hongoi*: 141, male third flagellomere; 142, female third flagellomere; 142, male genitalia (dorsal); 144, pupal head (lateral); 145, pupal head (ventral); 146, spatula and associated papillae; 147, third instar eighth and terminal segments (dorsal). Figures 148-150, *Contarinia plicata*: 148, third instar eighth and terminal segments (dorsal); 149, spatula with associated papillae; 150, third instar (dorsal).



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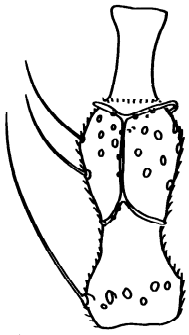

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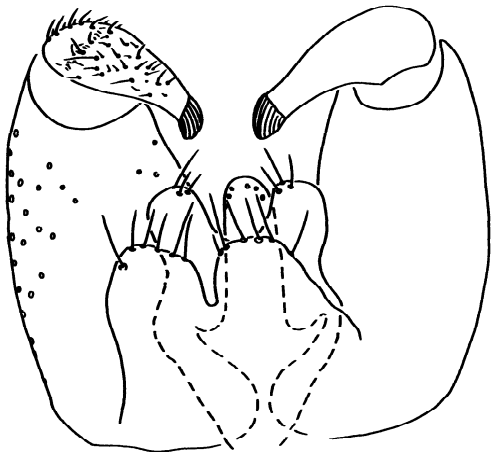

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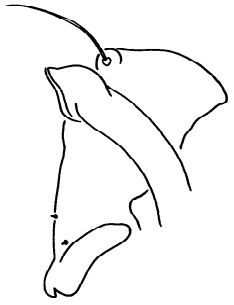

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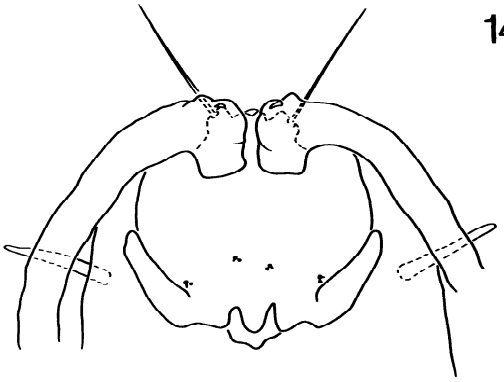

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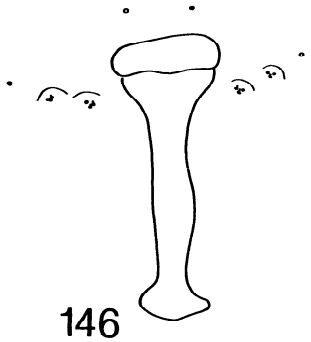

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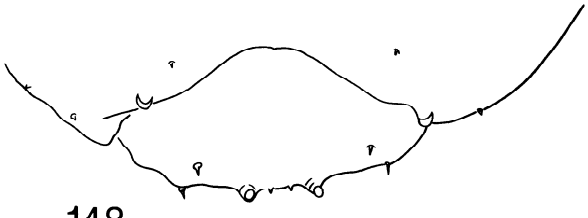

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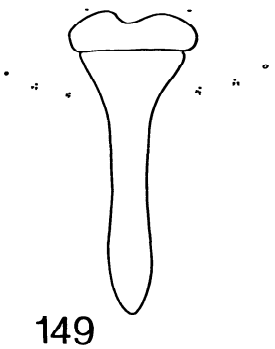

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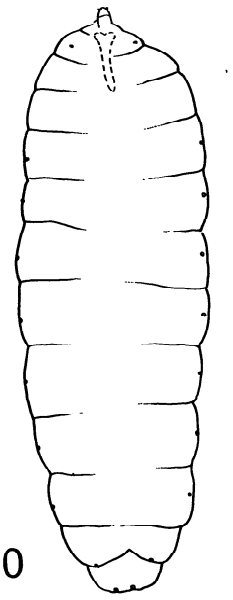

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Other material examined (all from *Acacia drepanolobium*). Malili Ranch, Kapiti Plains, ca 70 km SE Nairobi, Rt A109: galls and larvae, 18-XII-1991. Yatta: galls and larvae, 16-XII-1991.

Gall (Fig. 13). This gall is formed below of the slightly swollen pinna and above by the two rows of normal leaflets that form a tube surrounding a larva.

Etymology. The name *plicata* is an adjective meaning folded, referring to the unopened leaflets forming the gall.

Remarks. Full-grown larvae drop to the ground to pupate. This species forms a gall on *Acacia drepanolobium* that is generally similar to those formed by *Lopesia niloticae* on *Acacia nilotica* and *Lopesia armata* on *Acacia tortilis*. The figures of the larva will separate *C. plicata* from the other two species and from other species of *Contarinia*.

Kimadiplosis Gagné, new genus

Adult and pupa. Unknown.

Larva. Third instar (Fig. 151): Integument rugose. Antenna about three times as long as wide. Spatula (Fig. 152) with short but broad shaft, divided anteriorly into two diverging lobes. Full complement of papillae basic for supertribe present (Gagné 1989); two papillae of each triplet of lateral papillae with short setae, the remaining papilla without; all papillae, except for laterals, without setae. Terminal segment (Fig. 153) with a pair of conical caudal processes.

Second instar: As for third instar but without spatula.

Type species. *Kimadiplosis diversa* Gagné.

Etymology. *Kimadiplosis* combines Kima, the name of the type locality in Kenya, and "diplosis." The suffix is commonly used for genera of the supertribe Cecidomyiidi and means "double," referring to the binodal male flagellomeres characteristically found in this supertribe.

Remarks. This genus is based on the larval stage only. It is unusual to do this, but we do not expect in the near future to obtain more larvae to rear adults and wish to make this report as comprehensive as possible. The larva is distinctive and can be found again because its host and site of feeding are known. Elsewhere in a comprehensive study of cecidomyiid larvae (Mamaev and Krivosheina 1965), new genera based on larvae were described to good effect. The larva of *Kimadiplosis* differs from all known genera of Cecidomyiidi by its distinctively shaped spatula, the setaless papillae (except for some of the lateral papillae), and the two conical processes of the terminal segment.

Kimadiplosis diversa Gagné, new species

Larva. Third instar (Fig. 151): Integument rugose. Antenna about three times as long as wide. Spatula and associated papillae as in Fig. 152. Terminal segment as in Fig. 153.

Second instar: As for third instar but without spatula. Sensoria of pleural and dorsal papillae when seen in side view are slightly pointed, but shorter than wide.

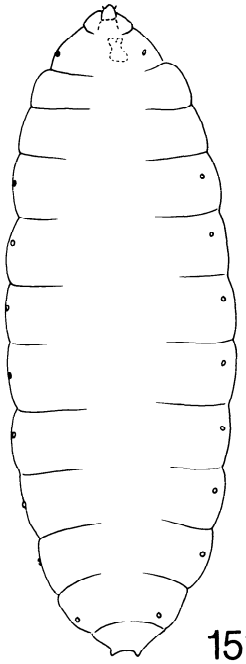
Holotype. Third instar, from *Acacia tortilis*, Kima, near Sultan Hamid, Kenya, 18-XII-1992, J. Marohasy, deposited in USNM.

Paratypes. Four third and 4 second instars, same data as holotype.

Other material examined. Galls and larvae, same data as holotype.

Etymology. The name *diversa* is an adjective meaning divergent, referring to the diverging anterior lobes of the spatula.

Figures 151-160. 151-153, *Kimadiplosis diversa*: 151, third instar (dorsal); 152, spatula and associated papillae; 153, third instar eighth and terminal segments (dorsal). Figures 154-158, *Lopesia armata*: 154, third instar (dorsal); 155, third instar eighth and terminal segments (dorsal); 156, second instar (dorsal); 157, second instar head and prothorax (dorsal); 158, second instar eighth and terminal segments (dorsal). **Figures 159-160,** *Lopesia niloticae*: 159, third instar (dorsal); 160, third instar eighth and terminal segments (dorsal).



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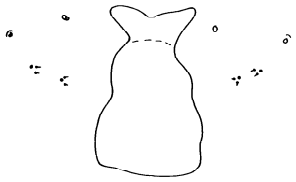

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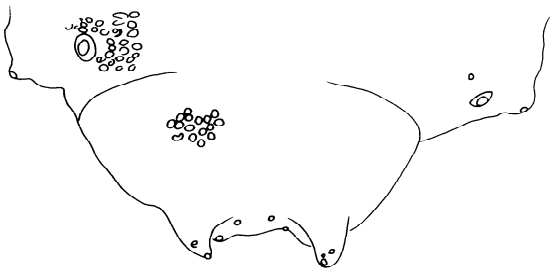

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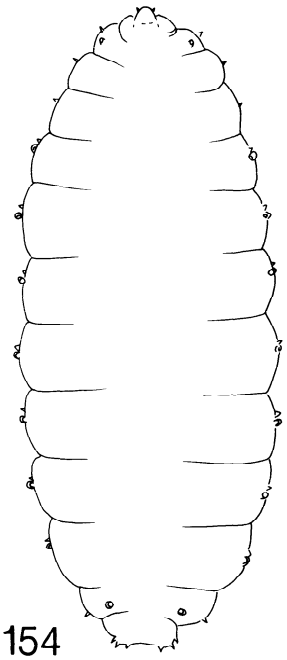

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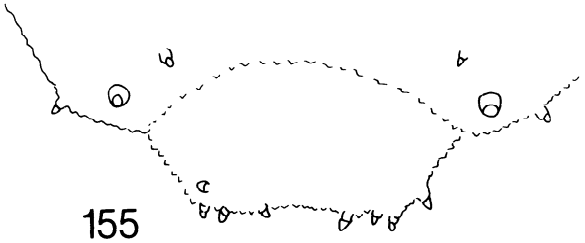

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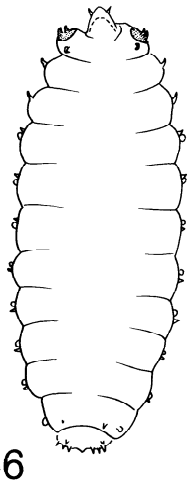

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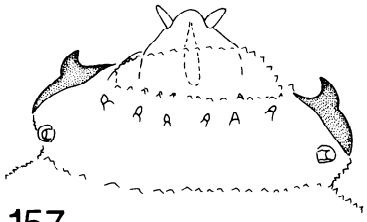

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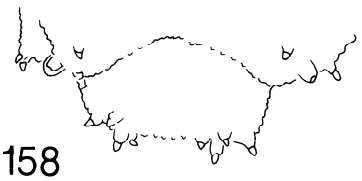

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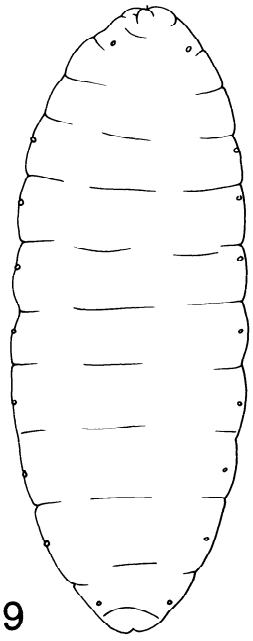

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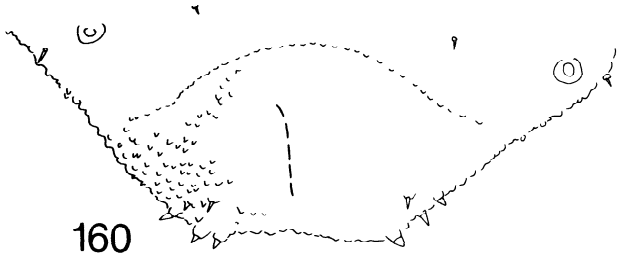

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Gall. Larvae were found on *Acacia tortilis* in simple leaf roll galls presumably formed by the more commonly found *Lopesia armata*. The galls are similar to those made by *Lopesia niloticae* on *Acacia nilotica* (Fig. 6). No more than one larva of *K. diversa* was found in any gall, but larvae of both species were occasionally found together.

Lopesia Rübsaamen

Lopesia Rübsaamen 1908: 29. Type species, *Lopesia brasiliensis* Rübsaamen, by monotypy.

Lopesia is a genus of Cecidomyiidi characterized by the following combination of characters: a bend is present in R_5 at its juncture with Rs (Fig. 163); Rs is situated near the midlength of R_1; an extra tooth is present on the tarsal claws (Fig. 164); the female postabdomen (Figs. 166-167) is short and its cerci has many short, sensory setae; and the setae of the larval terminal papillae are short and mostly corniform, each on a terminal projection (Fig. 160). This genus was previously known from one African and one South American species. The African species is *Lopesia parinarii* Tavares (1908), reared in Mozambique from pedicelled lenticular leaf galls on *Parinarium mobola* (Rosaceae); the South American species is *Lopesia brasiliensis* Rübsaamen (1908) reared in Brazil from fuzzy, spherical leaf galls on *Ossaea* (Melastomataceae).

Two species from acacia galls generally fit Rübsaamen's (1908) and Tavares' (1908) descriptions of *Lopesia*. The tarsal claws of *L. parinarii* illustrated in Tavares (1908) appear to be evenly bowed from base to apex rather than strongly bent at the basal third, which is the case with the new species. It is possible the claws of *L. parinarii* were not drawn flat because claws of the new species can also appear bowed if not posed flat on the slide. Tavares (1908) did not note nor his figure show an additional small tooth on the claws, but it is possible that tooth went unseen because it is very tiny in this and related genera (Gagné, in press).

The two new species described here each form leaf rolls on different species of acacia. The male and pupa are known for only one of the species, the females of both species are essentially similar, but the larvae are distinct.

Lopesia armata Gagné, new species

Adult (female only). As for *L. niloticae*, except wing length 2.6-2.8 mm (n=4).

Pupa. Unknown.

Larva. Third instar (Fig. 154): Integument minutely rugose. Antenna about twice as long as wide. Spatula absent. Full complement of papillae basic for supertribe present (Gagné 1989); dorsal and pleural papillae short and broad, situated on short lobes; terminal segment (Fig. 155) with eight short papillae situated on lobes, all corniform, about as wide as long.

Second instar (Fig. 156): Integument rugose. Otherwise generally as for third instar except the antennae about three times as long as wide and the two pairs of pleural papillae of the first thoracic segment enlarged and pointed, together with surrounding area sclerotized and pigmented (Fig. 157). Terminal segment as in Fig. 158.

Holotype. Third instar, collected from leaf rolls of *Acacia tortilis*, Kima, near Sultan Hamid, Kenya, 18-XII-1992, J. Marohasy, deposited in USNM.

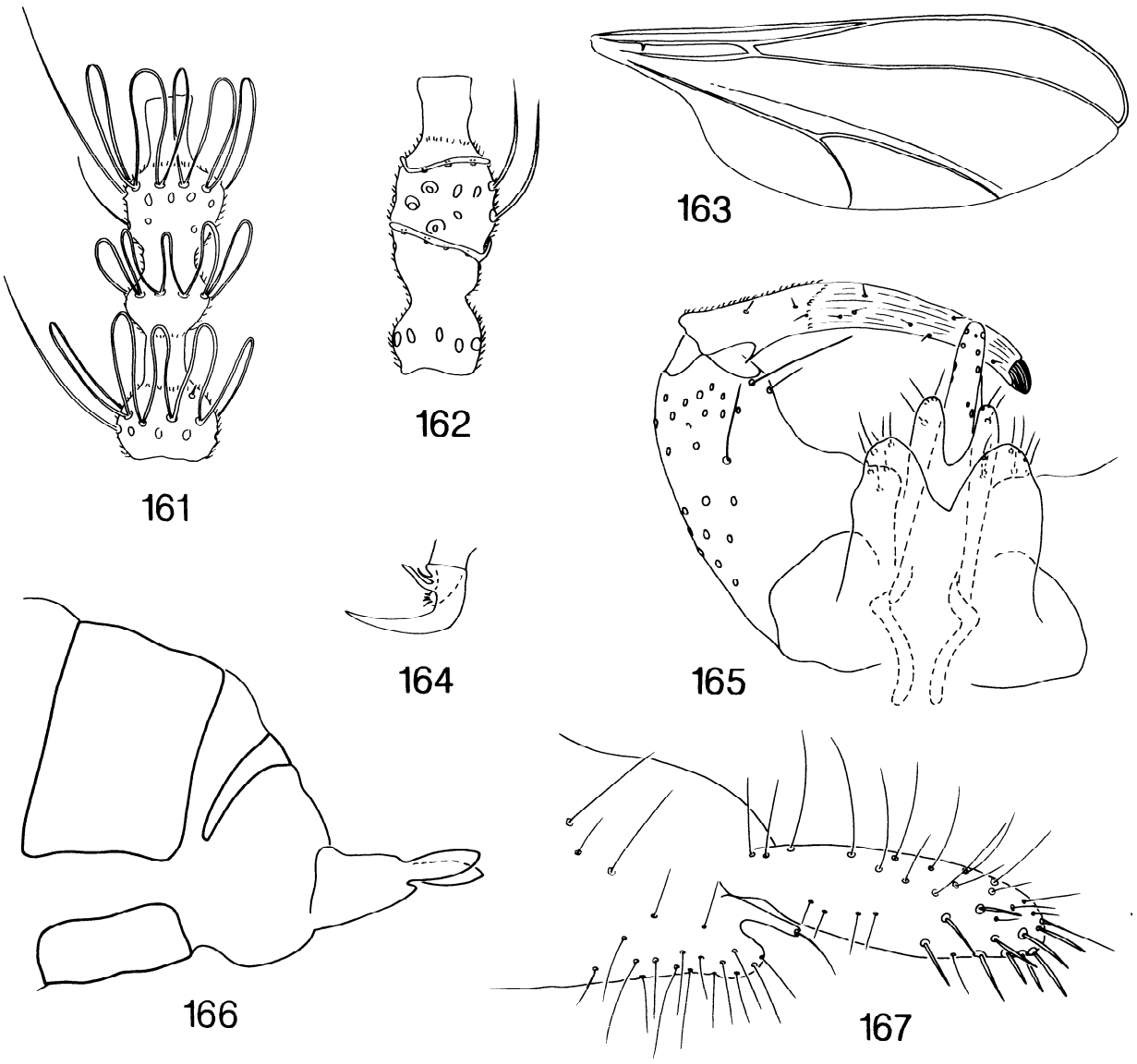
Paratypes (all from *Acacia tortilis*). Kima, near Sultan Hamid: female, 4 third and 6 second instars, 18-XII-1992; 3 second instars, 10-V-91. Kajiado: 2 females, 24-III-1992. Southern base of Ngong Hills: 5 third instars, 3-XII-91. Yatta: 7 third and 5 second instars, 7-V-91; female, 19-III-1992.

Other material examined (all from *Acacia tortilis*). Kima, near Sultan Hamid: galls and larvae, 18-XII-1992. Southern base of Ngong Hills: galls and larvae, 3-XII-91.

Etymology. The name *armata* is an adjective meaning armed, referring to the strongly sclerotized anterolateral angles of the second instar.

Gall . Galls are simple leaf rolls on *Acacia tortilis* similar to those made by *Lopesia niloticae* on *Acacia nilotica* (Fig. 6). Each roll contains one larva in a channel formed by the appressed rows of leaflets. Usually one larva is found in each gall. This species was found at one site in association with the apparently inquilinous *Kimadiplosis diversa*.

Remarks. See *L. nilotica*.



Figures 161-167, *Lopesia niloticae*: 161, male third flagellomere; 162, female third flagellomere; 163, wing; 164, tarsal claw and empodium; 165, male genitalia (dorsal); 166, female abdomen, seventh segment to cerci (lateral); 167, detail, apex of ovipositor (lateral).

Lopesia niloticae Gagné, new species

Adult. Head: Eyes about 9 facets long at vertex, connate; facets hexagonal, closely adjacent. Vertex of occiput with dorsal protuberance. Frons with 2-6 setae per side. Labella short, acutely triangular in frontal view, each with 5-8 lateral setae. Palpus 3 segmented. Male antennal flagellomeres (Fig. 161): each with three circumfila, their loops not attaining the following circumfilum; the distal node of each flagellomere constricted near middle. Female antenna (Fig. 162): flagellomeres becoming successively shorter in length from base to apex; first through sixth flagellomeres constricted beyond basal series of setae.

Thorax: Mesanepisternum with 0-10 scales dorsally. Mesepimeron with 10-20 setae. Wing (Fig. 163) length: male, 2.4-2.7 mm (n=5); female, 2.5-3.1 mm (n=3); R5 curved apically, joining C posterior to wing

apex; Rs weak, oblique, situated approximately midway between arculus and apex of R1; M3+4 present. Tarsal claws (Fig. 164) bent at basal third, twice toothed, the lower tooth finer than the upper; empodia not quite reaching bend in claws.

Male abdomen (Fig. 165): First through sixth tergites entire, rectangular, with single, uninterrupted, posterior row of setae, several lateral setae on each side near midlength, scattered scales, and pair of trichoid sensilla on anterior margin. Seventh tergite unsclerotized posteromesally, posterior setae present only laterally, the sclerite bare elsewhere except for anterior pair of trichoid sensilla. Eighth tergite sclerotized only anteriorly, without setae other than anterior pair of trichoid sensilla. Cerci broadly rounded, with several posteroventral setae. Hypoproct divided caudally into 2 long, narrow lobes, each with several apicoventral setae. Aedeagus as long as gonocoxite, gradually tapered to rounded apex. Gonocoxite with right-angled mesobasal lobe. Gonostylus elongate, cylindrical, barely tapered from base to apex, setulose on basal two-fifths, striated beyond.

Female abdomen (Figs. 166-167): First through seventh tergites as for male first through sixth. Eighth tergite very short, barely sclerotized, bare except for anterior pair of trichoid sensilla and scattered setae along posterior margin. Ovipositor abruptly tapered, barely protrusible; cerci elongate-ovoid, completely setulose and covered with setae, several on posteroventral surface thick walled; hypoproct elongate, undivided.

Pupa (Fig. 85). Base of antennae rounded, unmodified. Cephalic sclerite with pair of short, inconspicuous setae. Face smooth, without horns. Prothoracic spiracles elongate, linear. Abdominal tergites with prominent anterodorsal spines.

Larva. Third instar (Figs. 159): Integument minutely rugose. Antenna about twice as long as wide. Spatula absent. Full complement of papillae basic for supertribe present (Gagné 1989); terminal segment (Figs. 160) with eight, short, setose, papillae; setae of one pair thin and pointed, setae of remaining pairs wider, less pointed.

Second instar: Integument smooth except for anteroventral locomotory spicules on each segment. Otherwise as for third instar.

Holotype. Male, from *Acacia nilotica*, Malili Ranch, Kapiti Plains, ca. 70 km SE Nairobi, Rt. A109, Kenya, 23-V-1991, J. Marohasy, deposited in USNM.

Paratypes (all from *Acacia nilotica*). Malili Ranch, Kapiti Plains, ca. 70 km SE Nairobi, Rt. A109: 2 males, female, 3-V-91; male, 2 pupal exuviae, 23-V-91; male, 29-X-91; male, female, X-91; male, 18-XII-1991; 3 pupae, 6-I-1992. Voi: female, 23-X-91; 4 second instars, 6-VI-91. Leonard's Farm, 40 km SE Nairobi, Rt. A109, at Machakos Turnoff: female, 1 pupal exuviae, 2 second and 2 third instars, 14-X-1991. Maktau, near Voi: pupa, 1 second and 1 third instar, 23-X-1991.

Other material examined (all from *Acacia nilotica*). Malili Ranch, Kapiti Plains, ca. 70 km SE Nairobi, Rt. A109: galls, 10-IV-91; second instars, 3-V-1991; second instars, 1-VIII-1991; galls and second and third instars, 2-X-91; galls and second instars, 14-X-91; galls and 2 pupae, 18-XII-1991; 1 pupal exuviae and second instars, 6-I-1992; galls and first instars, 14-II-1992; and galls and third instars, 5-III-1992.

Etymology. The name *niloticae* is the genitive of the host name.

Gall (Fig. 6). This species forms simple leaf rolls on *Acacia nilotica*. The leaflets on both sides of a rachis form a channel containing a single larva. There is little apparent hypertrophy associated with the gall. Usually one larva is found in each gall.

Remarks. *Lopesia nilotica* and *L. armata* differ in larval characters, especially in the second instar. The second instar of *L. armata* has prominent, darkly pigmented, and sclerotized "shoulders" not present in that of *L. niloticae*. The larval papillae of *L. armata* are generally more prominent, larger, and more rounded than in *L. nilotica*. The pupa and male of *L. armata* are unknown, but the female of both species is similar. Both species form similar galls, *L. niloticae* on *Acacia nilotica*, *L. armata* on *Acacia tortilis*, and their galls resemble those made by *Contarinia plicata* on *Acacia drepanolobium*.

Undetermined genus and species

Material examined (all from Kenya and collected by J. Marohasy). Yatta: third instars, prepupa, and galls 14-III-1992; galls, 19-III-1992; Kima, near Sultan Hamid: galls, 18-XII-1991.

Gall (Fig. 26). Cylindrical or ovoid galls develop from leaflets or pinnae, and are sometimes stalked. Their surface is generally smooth except for a variable number of long hairs.

Remarks. The larvae and prepupa retrieved from some of the galls are parasitized and too distorted for proper study. They are left undescribed but represent another, possibly new genus.

Acknowledgments

We gratefully acknowledge the following individuals for their help in this project. D. Hongo of the Kenya Forestry Research Institute assisted with the collection of galls in Kenya. Microscopic slide preparations and SEM photographs were done by N. Malikul, the pencil drawings of galls in figures 1-31 were done by E. P. Roberts, and the line drawings were inked and tables executed by S. Grupp. K. M. Harris kindly loaned materials from the Natural History Museum in London and he and G. McGavin searched the collections in their care in vain for the type of *Collula acaciae*. K. M. Harris, C. Labandeira, A. L. Norrbom, R. W. Poole, J. Yukawa, and an anonymous reviewer kindly reviewed the ms before publication. Costs of the work in Kenya, the illustrations, and most of the publication costs were borne by the Australian Wool Corporation and the Queensland Department of Lands.

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