Studies in Cyperaceae in southern Africa 36: *Cyperus marginatus*, a complex of three entities

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*Cyperus marginatus* Thunberg sensu lato is shown to comprise three distinct entities, each probably worthy of individual specific ranking, but status is as yet indecisive. Pending confirmation of correct names (an historical search for synonyms and types is required), the entities are herein named: Entity 1 (typical) *C. marginatus* Thunb. sensu stricto, Entity 2 (perhaps equaling *C. blandus* Kunth?), Entity 3 (perhaps equaling *C. fonticola* Kunth?). A description of each entity is given, together with illustrations, brief notes on present knowledge of distribution and selected citations of the herbarium specimens studied. Morphologically, Entity 3 shows similarity with *Cyperus textilis* Thunb. rather than with the other two Entities.

**Keywords** *Cyperus marginatus*: heterogeneous; preliminary survey; southern Africa.

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**Introduction**

*Cyperus marginatus* Thunberg, as the species is presently interpreted, is a widespread taxon reported for all areas of southern Africa except Botswana (Retief 1993: 103). It is well represented in Namibia (Podlech 1967, 165: 16 and C.J. Ward pers. comm. 1998), Ridley (1884: 136) recorded it for Angola. On the eastern side of the subcontinent there are, to our knowledge, no cited records for Mozambique, Zimbabwe, Zambia or Malawi, but Haines and Lye (1983: 264) include the species for Kenya where it is 'only known from the Marsabit district'. Plants of the northern provinces of South Africa are described as 'tusssocky perennial herbs' of 'temporary wet habitats' (Retief & Herman 1997: 55); in Natal, however, they are frequently rooted in shallow, permanently flowing water, often among rocks (Gordon-Gray 1995: 65).

Clarke (1908: 98) placed *C. marginatus* in subgenus *Pycnostachys*, section *Textiles* of his conception of *Cyperus L.*, together with *C. alternifolius* L. from Madagascar and its allies *C. flabeliformis* Rothr. (sic) illegitimate at species level = *C. involucratus* Rothr. (Kükenthal 1900: 63), *C. sexangularis* Nees and *C. textilis* Thunb. The last three species are all southern African and morphologically very alike. It is the length and number of the inflorescence bracts that differentiate this trio from *C. marginatus* and the other southern African representatives of section *Textiles*, namely *C. clavatus* L.f. and *C. prolifer* Lam. Collectively, the section is characterised by reduction of the leaf blades to short outgrowths or they may be entirely lacking, the inflorescence bracts, or culms, or both these sets of organs, providing the essential photosynthetic products.

Field observation of plants regularly named *C. marginatus* led one of us (CJW) to seriously assess the morphological variation within this taxon and to relate this to known distribution. Preliminary findings have disclosed what must be interpreted as three distinct entities, each of which, at the present stage of knowledge, appears worthy of independent specific status but full confirmation must await further field study. Awareness of these differing entities is not novel. Early pioneers in Cyperaceae, for example, Nees (1835), Kunth (1837), Steudel (1855) and Boeckeler (1867/8), while accepting Thunberg's *C. marginatus*, established and/or maintained other epithets; mostly at specific rank, to accommodate variants. Among these names are *C. blandus* Kunth, *C. fonticola* Kunth and *C. prionodes* Steud. With lapse of time, these associated taxa have generally come to be treated as synonyms, or varieties, of Thunberg's species under the broad appellation of *C. marginatus* sensu lato. There is the typical entity, the type of which represents Thunberg's concept of his taxon, although the underground organs that are important in identification are lacking. Variety *blandus* (Kunth) Kükenthal represents a second entity that is more eastern in distribution. Surprisingly perhaps, it is also present in the Orange River mouth area where the Northern Cape Province and Namibia adjoin (the boundary line between South Africa and Namibia being, as yet, not fully settled politically). The third entity is predominantly western in subcontinental southern Africa. It has not yet been named nor clearly circumscribed. It is represented by some early gatherings from the Cape Province, for example, Zeyher 1753. Clarke (1893: 174) gives the locality of Zeyher 1753 (K) as 'Calvinia Division, Lospers Flats. 3000-4000 ft.', whereas the KIRS sheet of this number, which is complete with underground organs present, carries the information 'In salis ad Springbokkuli (Namaqualand)'. Despite the apparent locality difference, both are the same entity. Welwitsch 6839 from Angola is certainly Entity 3, as Ridley's (1884: 136) comment so decisively confirms: 'The old leaf sheaths at the base of the stem break up by decay, leaving only the black wiry fibro-vascular bundles in a tuft. The culms are more than three feet in height'. Attention must be paid to nomenclature, to trace as far as possible all the early names applicable to *C. marginatus* in its widest sense. This, together with typification, has not been possible for us. The purpose of this preliminary paper is merely to draw attention to the breadth of the 'species' as it is mostly now interpreted and to circumscribe the three distinct entities we recognise within it. We give some information on the distribution of these (maps are not reliably informative, as yet) and cite herbarium specimens we have been able to confirm.

**The Entities**

**Entity 1. Cyperus marginatus** Thunberg sensu stricto

*Cyperus marginatus* Thunberg Prodomus plantarum capensis, Part 1: 18 (1794); Thunb.: 100 (1823); Nees: 134 (1835); Boeck.: 571 (1867/68).

Type: *Thunberg Herbarium, Bot. Mus. Upsala no 1455 (NU, photograph; UPS) 'e Cap. b Spei. Thunberg'.

Note: the type consists of two culms, each bearing a compact,
Figure 1 Cyperus marginatus Thunb. s.l. Whole plants: A, Entity 2 (Basel 67, NU); B, Entity 1 (CJ Ward 12414, NU); C, Entity 3 (CJ Ward 12033, NU); D, Entity 3, rooted ramet established from proliferating inflorescence of mature parent (CJ & JD Ward 36, NU: note sten- derness of culms and commencement of caespitose, bearded rhizome). Scale bar = 30 mm.
head-like inflorescence of several apparently sessile spikelets with bracts not clearly surpassing these. Basal organs are absent.

Herb, perennial. Rhizome horizontally elongate, uniseriate, 6–8 mm in diameter when dry, with thin, persistent (?) cortex; scale leaves deltoid, mostly not overlapping, soon disintegrating. Roots numerous, spongy in life. Culms 460–600(–1500) x 2.0–2.5(–4.0) mm long and wide, solitary, closely adjoined or (rarely) spaced at intervals of 10–15 mm along rhizome, erect, terete, nodeless, compressible to fairly firm, tough, glabrous, pithy internally. Leaves reduced mostly to basal sheaths surrounding culms, lower (outer) short with long sloping mouth and no lamina, upper (inner) progressively longer up to 100 mm with slightly sloping to truncate mouth and stiff, glabrous, acute lamina (15–320–30) x 2(3–4) mm long and wide; ligule lacking, position marked by fine transverse line. Inflorescence pseudolateral, but appearing terminal at maturity, a compact head of sessile to subsessile digitately arranged spikelets accompanied, or not, by 1–3(–7) smaller heads on rays up to 10–26 mm long. Bracts 2–3, lowest at first continuing line of culm, later all radiating to slightly surpass inflorescence, occasionally shorter, (5–) 9–20(–50) x 2.0–2.5 mm long and wide, third (uppermost) bract weakly developed. Spikelets digitately clustered in groups of (2–) 5–8(–10), markedly flattened, ovate in outline when young, lengthening to lanceolate and disintegrating basally, (10–)12–18(–20) x 2–3 (–4) mm long and wide. Glumes closely overlapping, narrowly deltoid in outline when flattened (2.5–)2.7–2.9(–3.0) x 1.5–2.3 mm long and wide (in greatest dimension) keel 3-nerved, yellow, flanks usually dark brown, shining, margined by narrow yellow line or sometimes mid brown, dull, apex acute. Stamens 3, anthers 1.3–1.6 mm long, connective minutely apiculate. Style 3-branched, fully developed branches exceeding unbranched portion in length, papillose not obvious, older style branches almost smooth. Nutlet trigonous 0.9–1.05 x 0.4–0.5 mm long and wide, ovoid-elliptic in outline, beaked, bright shining mid-brown, surface plicate-plicate; often shed with glumes with filaments attached. Figures 1B (whole plant), 2B (rhizome); 3B (inflorescence); 4A, B (nutlet and its surface topography).

Habitat
C. marginatus s.s. favours open wetland areas adjacent to distribution lines carrying fresh or very mildly saline, mostly moving, waters (highest recorded salinity 0.5 parts per thousand). Rhizomes are generally rooted in damp rocky clay soils or in silt and sand (alluvium of old watercourses), not in water. In the Orange River mouth area they favour estuarine grassland, or well-drained estuarine banks.

Distribution
The distribution is imperfectly known. Information critically assessed up to the present time shows absence from KwaZulu/ Natal: presence in the Free State, northern and eastern Cape and Namibia. Records for the remainder of South Africa, Swaziland and Lesotho require careful checking: field assessment is badly needed.

Selected citations of material studied
—2217 (Windhoek): farm Bodenhauen am weissen Nossob (–BC), Seydel 18"2 (WIND).
—2816 (Oranjemund): Orange River, upper estuary, west (–CB), CJ Ward 12441 (–CB), CJ Ward 12459 (–CB); mid estuary near right overall bank (–CB), CJ Ward 12461 (all BOL, K, NU, UDW); near Oranjemund Golf Course (–CB), CJ Ward 12494, 13893 (NU, UDW).
—2824 (Kimberley): Newlands, banks of Harts River (–AD), Wilson KMG 122 (K).
—2825 (Boehof): Dealsville - Kimberley Road, 3 km west of Dealsville (–DA), CJ Ward 13761 (NU, UDW).
—2926 (Bloemfontein): Rheensier spruit and Baines Vlei (–AA).

Figure 2 Cyperus marginatus Thunb. s.l. Rhizomes: A. Entity 2, note bladeless uppermost leaf sheath (top right) (Basel 67, NU); B. Entity 1, note short blade to leaf sheath (top right) (CJ Ward 12414, NU); C. Entity 3, rhizome sectioned: note close approximation of culm bases and persistent fibres from decayed leaf sheaths (CJ Ward 12433, NU). Enlargements from plants illustrated in Figure 1. Scale bar = 12 mm.

Potts s.n. BLFU 14 (NU).
—2927 (Masera): near Tweespruit (–AA), Armour Rik 10 (NU).
—3119 (Calvinia): Northern Cape. Calvinia distr., ca. 16 km ex Calvinia on Loeriesfontein Road (–BC), CJ Ward 13972 (NU, UDW).

Variation
—2728 (Frankfort): Free State, east Goedheid area. 9 km south of Cornelia on old main Villiers-Warden road (–BD), CJ Ward 12483 (NU, UDW).
The above gathering is almost certainly *C. marginatus* *s.s.*. It probably represents a robust expression of the entity in its well-developed inflorescences (a central head usually accompanied by two or three rays and unusually elongate bracts). The leaf laminae are also longer than in most specimens. There are other collections from northern parts of the Eastern Cape (for example, Barkly East district) that suggest long bracts and fairly well-developed leaf laminae are not exceptional. This needs confirmation from further field study.

*Ward 12414 (NU)* provides an example of some of the variability that is often expressed within Entity 1 in the branching of the inflorescence (Figures 1B and 3B). In *Ward 12493* (above) the ray length exceeds that of any ray present in Figures 1B and 3B. Occasional specimens of Entity 1 show evidence of proliferation by means of shoot development from meristematic buds within the inflorescence. In the Orange River mouth area occasional plants carry glumes mid brown in colour with a dull surface, contrasting with others that are more typical. Glume colour variation within Entity 1 needs further assessment to determine the total range and any possible distributional and microhabitat relationships.

**Entity 2**

In herbaria Entity 2 is often segregated as *C. marginatus* var. *blandus* (Kunth) Kükenthal. Kunth (1837: 36) established *C. blandus* as distinct from Thunberg’s entity, basing it on an unnumbered Drège specimen without locality. This type must still be incontrovertibly established. Kükenthal (1936: 189) reduced Kunth’s species to varietal level and cited among other representatives Drège 4407 (forma *megastachys*) and Drège 3937 (forma *microstachys*) neither of which have been traced by us. Entity 2 differs from typical *C. marginatus* chiefly in features of the inflorescence. The description that follows includes these and other distinctions and should be read in conjunction with the description of Entity 1.

*Rhizome* more irregular than for the typical entity, due to occasional lateral branching of the main uniseriate structure and a tendency for culm bases to become slightly swollen. *Culms* (600–700–1800–1600) × 2.0(–3.0) mm long and wide, compressible in life. *Leaves* reduced to sheaths basally enveloping culms with mouths V-shaped up to 50 mm long; laminas and ligules never observed. *Inflorescence* not clearly pseudolateral even when young, lacking a defined central head of spikelets, open, with up to 11–13(–20) or more rays of varying length (up to 35 mm), all appearing to arise as branches from the abbreviated main axis, each ray terminating in a solitary spikelet, accompanied, or not, by varying numbers of lateral spikelets either sessile or rayed (rays = secondary branches); up to third order branches occur but these are generally few and short (< 3 mm); first order rays cladoprophyllically basally. Whole inflorescence usually about 900–940 × 30–40 mm long and wide, very variable in extent of spikelets to form either a delicate open structure, or a hewier, smaller mop-like mass. *Bracts* 2, about equal in size forming a *V*-shape, occasionally accompanied by a weak third, never conspicuous, 7–10(–13) × 2–3 mm long and wide, erect, firm, margins involucrate, *Spikelets* generally solitary, occasionally twinned or clustered, mostly podunculate, elliptic-linear to oblone-linear, 7–23 × 2–3 mm long and wide, minutely acuminated, *Glumes* 2.4–3.0 × 1.3–1.5 mm long and wide when flattened (greatest dimensions), terminating in acuminate apex up to 0.2 mm long; keel 3-nerved, flanks more or less uniform dull brown, not shining, membranous not hyaline. *Stamens* 3, anthers 1.3–1.6 mm long, connective minutely apiculate. *Style* as for Entity 1. *Nutlet* faintly trigonous, 1.4–1.6 × 0.4–0.6 mm long and wide, obovate to ellipsoid in outline, beaked, mid to dark brown, surface puncticate. Figures 1A (whole plant); 2A (rhizome); 3A (inflorescence); 4E, F [nutlet and its surface topography. Compare Figure 4E, F with Gordon-Gray 1995, Figure 2II, K (see References) which is also Entity 2].

**Habitat**

Entity 2 fringes small pools and backwaters amongst rocks along the banks of natural streamlets and rivers. The rhizomes are
rooted in the muddy or gravelly substrate and usually covered by shallow, moving, fresh water. Altitudes vary from 22–500 m, where plants are less common, up to about 1900 m, where there is greater frequency. In the Orange River mouth area, the Entity is to be found in residual pools on the floodplain, usually rooted in alluvial sand.

Distribution
Limits, at the present state of knowledge, are uncertain. Recorded from Swaziland, Lesotho, the area that previously constituted the Transvaal, especially its eastern parts, KwaZulu-Natal, the Eastern, Western and Northern Cape and Namibia, South Africa, with the possible exception of KwaZulu-Natal where the entity is quite well known, will benefit from reassessment.

Selected citations
—2630 (Carolina): Farm Hooggenoeg 1601T, Komati River banks (~BB). Browning 521 (J. NU).
—2816 (Oraijermund): Orange River, upper estuary, main course, right bank (~CB), CJ Ward 12448 (NU, UDW); upper-mid estuary (~CB), CJ Ward 12388 (BOL, K. NU, PRE, UDW); upper estuary (~CB), CJ Ward 13976 (NU, UDW); upper estuary (~CB), CJ Ward 13978 (NU, UDW).
—2817 (Vioolsdriif): Orange River, Sandberg area (–AA), CJ Ward 12292 (NU, UDW).
—2828 (Bethlehem): Bergville distr., Oliverschok Bridge, Royal Natal National Park (~DB), Edwards 2636 (NU, PRE); Rugged Glen vkl (~DB), Phytock 79 (NU).
—2829 (Harrismith): Cathedral Peak area, Inhalawasine River (~CC), Kiklik 1899 (NU, PRE).
—2830 (Dundee): Weenen, Sun Valley Estates (~CC), Basal 67 (NU); Weenen distr. 4 km from Muden near Rahl’s farm (~CD), Ram s.n. (NU).
—2930 (Pietermaritzburg): Camperdown area, Nagle Dam (~DA), Wells 1208 (NU); Mkongazi Valley below Hella Hella Game Valley Estates (~CC), CJ Ward 8018 (NU).

Variation
The example of Entity 2 illustrated [Basal 67 (NU), Figures 1A and 3A] shows mature spikelets that are longer than those of Entity 1 and, because of the greater length, are often considered characteristic of var. bladhii. This specimen depicts denser, more contracted inflorescences than are usual for Entity 2. Most are more delicate with longer rays, therefore more open and slendr with an overall inflorescence length that exceeds the overall width in a ratio of at least 30:1.

The two erect, short bracts are usually the only ones visible. If split and forced apart, other shorter bracts (an additional 2–3) are revealed. No evidence of proliferation from the inflorescence is known for Entity 2.

Entity 3
Morphologically Entity 1 and Entity 2 have more in common with one another than either has with Entity 3. The rhizome, the growth form and general structure of this predominantly 'dry-land' plant make it distinctive. Kunth (1837: 36) established C. fonticola [Type: 'Cap. spei (Klein-Namakuland, in proximate fl. Garip, ad fontem legit Drège')]. The identity of this type remains uncertain until Drège collections for the given locality [the Orange River, from where all three entities are known] have been compared. However, Kunth’s descriptive term for the stigmas ‘villosula’ suggests to us Entity 3, as the other two entities both have relatively smooth stigmatic surfaces.
Robust, cespitose perennial. Rhizome compact, of hard, woody, juxtaposed stem bases 10–15 mm wide that in old plants form a stout, firmly rooted stool, richly invested by dark, wiry, fibrous remains of decayed leaf sheaths. Roots robust, spongy in life. Culms up to 1150–2750 × 3–5(–8) mm long and wide, erect or leaning, becoming prostrate in age and frequently rooting from inflorescence, terete, nodeless, hard, glabrous, pithy internally, often spirally twisted. Leaves mostly reduced to sheaths enveloping culm bases, lowest short, deltoid, up to 8 mm wide at base, progressively lengthening upwards, dark often shining, strongly curved (cross veins visible) acute, decaying into persistent fibres; upper pallid to green, closed, enveloping culm, sheath mouth truncate, central lamellar portion membranous, a small zone soon breaking and sheath becoming loose. Ligule a ridge demarcating commencement of lamina (2.5-) 3.6–5.4(–100) × 3–4 mm long and wide (in young plants laminae are numerous and may be longer than dimensions given; in old plants and under adverse conditions laminae may be lacking). Inflorescence not clearly pseudolateral even when young, a compact "head" or open branched (rayed) construction usually slightly wider in diameter than deep (approximately 60–90 × 60–80 mm in diameter and depth), a central group of digitate spikelets accompanied by up to 10 rays terminating in smaller digitate spikelets (very variable), rays up to 48 mm long, with or lacking second order branches. Often exhibiting proliferation from meristematic buds. Bracts 3–5, lowest at first may continue line of culm, soon all radiating to surpass inflorescence, or not. (25–)33–50(–80) × (2–)3–4 mm long and wide, usually folded about the midline, furrowed adaxially, keeled axially, hard, acute. Spikelets digitately clustered in groups of 10–20, occasionally sparse, markedly flattened, lanceolate to linear in outline (8–)10–20(–27) × (2–)3–4 mm long and wide. Inflorescence basally. Glumes closely overlapping, narrowly deltoid to lanceolate when flattened, 2.4–2.6 × 1.4–1.6 mm long and wide, keel 3-nerved, lateral nerves forming keels basally, flanks nerved, translucent. Stamina 3, anthers 1.0–1.3 mm long, connective with dark apiculum up to 0.15 mm long, filaments wide, remaining attached to fruit. Style 3-branched, exceeding unbranched portion in length, papillate villose, conspicuous. Nutlet trigonous, 0.9–1.05 × 0.4–0.5 mm long and wide,avoid-elliptic in outline, beaked, dark brown at full maturity, surface punctulate. Figures 1C; 3C; 4C; D and 5.

Habitat

Entity 3 is a "dryland" plant in comparison with Entities 1 and 2, in that it occurs in sand or rock desert; but always in association with drainage lines, temporarily wet, or temporarily dry. It grows in silt, sand or gravel, mostly alluvial; among rocks along small flowing streamlets, fringing oligohaline springs, or narrow zones of riparian woodland.

Distribution

As presently known, the distribution of Entity 3 is predominantly western southern African. It is common in Namibia and Angola and extends southwards to the Northern and Western Cape. Its northern limits are not known; neither is its range in the Karoo and the Eastern Cape established. In the northern parts of the Eastern Cape there appears to be sympathy with Entity 1 and perhaps Entity 2, but field investigation is essential to support or discredit this preliminary deduction. There are other outliers that indicate presence towards the east. It is not known from Kwa-Zulu-Natal, but a collection from Elandskui, No 2, Venterdorp [2626 (Klerksdorp) CJ Frean s.n. (NU)] and another from the northern provinces [Smook 6251 (PRE)] cited by Retief and Herman (1997: 55), suggest Entity 3, but further field study in the north and east is essential. Haines and Lye (1983: 264) list and illustrate Cyperus marginatus Thunb. for Kenya. The description of the rhizome "3–8 mm thick, erect, woody" and the illustration of the nutlet apply to Entity 3, as does the reference to the involucre bracts "3–5, leafy, up to 3 cm long, usually shorter than the anthela".

Selected citations

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<tr>
<td>—1612 (Mocamedes) [now Namibia]: Mocamedes distr., Rio Giral, Barbosa 9499 (K, NU photo); Curoca River, Chitinde, de Menezes et C. Henriques 59 (K, NU photo); Porto Alexandre, Espinheira, Iona, de Sousa 116 (K, NU photo); Menezes 3784 (K). Iona National Park, Humbi spring (–DC), JD Ward 91 (NU); Bequicemo 16°47' S: 12°47' E (–DA), CJ &amp; JD Ward 36 (K, NU).</td>
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<td>—1712 (Posto Velho), Mocamedes distr., Iona National Park, Londio-Dondio spring (–BA), JD Ward 78 (NU).</td>
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<td>—1713 (Swartbooisdrif): Cunene River, Epupa Falls area (–AA), CJ Ward 12033 (NU, UDW).</td>
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<td>—2014 (Khorixas): between Ugab and Huab Rivers, NW of Brandberg, Gai-as spring 20°46' S: 14°00' E (–CC), CJ, JD &amp; MC Ward 10537 (NU, UDW).</td>
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<td>—2314 (Sandwich Bay): Namib Desert Park, Lower Kuiseb Valley near confluence with Aus River (–BD), CJ Ward 9254 (NU, UDW).</td>
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<td>—2817 (Violsdrif): Orange River Valley immediately below Fish River confluence 28°05' S: 17°09' E (–AA), CJ Ward 10087 (NU, UDW).</td>
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1a. Inflorescence open, less often congested, usually markedly longer than wide. Pedunculate solitary spikelets frequent. Bracts 2, approximately equal, arranged in V-shape. erect, firm, not exceeding 15 × 3 mm long and wide. Glumes 2.4–3.0 mm long, mid-brown, flanks dull, membranous. Nutlet oblanceolate to ellipsoid in outline, 1.4–1.6 × 0.4–0.6 mm long and wide. Uppermost leaf sheaths bladdished. Rhizome uniseriate, elongate, leaf blades membranous. Nervations derived from decaying leaf sheaths. Proliferation from the inflorescence never observed. A plant of the margins of fresh water streams and pools, often rooted under water.

**Key**

**Variant**

Figures 1D and 5 illustrate the proliferation possible from the inflorescence of Entity 3. Figure 1D was collected as a plant growing quite independently of any other attached plant. It was difficult to identify as it did not agree with eastern southern African representatives of *C. marginatus*, nor precisely with Namibian specimens. Only much later when Entity 3 had been more intensively studied in the field, did it become obvious that *CJ Ward* and *JD Ward* 36 (NU) represented development of a new ramet from the inflorescence of an already established clone, with the connection dissolved away. Figure 3 exemplifies the extent of proliferation that may take place from a compact inflorescence such as that on the left. Within Entity 3 bracts may or may not radiate to surpass inflorescence dimensions, but except where inflorescences are extremely dense they can be fairly readily detected. They tend to be depressed towards the culm as the inflorescence matures. Young plants, (or plants growing under favourable conditions?) carry leaf blades, often quite well developed but at maturity most plants bear only sheaths enveloping the culm bases.

**Discussion and Summary**

It is the morphological similarity in the organs of reproduction (spikelets, glumes, nutlets) and possibly the range of variability in the inflorescence form that has led to the association of three entities under the single species *Cyperus marginatus* s.l. However, even in these organisms distinctions exist.

It is field investigation that has elucidated more profound differences. Entity 3 has features that separate it decisively from Entities 1 and 2; particularly the rhizome with its beards of persistent wiry, dark fibres. This is supported by larger plant size, wider culms hard externally, tending to spiral and to lean before becoming prostrate and rooting. The rhizome, the tall, spongy yet durable culms, the construction of the inflorescence, the minute of spikelets, glume scales and nutlets, and the capacity for proliferation, are characters that link Entity 3 with *Cyperus textilis* Thunb. rather than with *Cyperus marginatus* Entities 1 and 2. *C. textilis* is itself problematic in that it is not adequately differentiated from *C. alternifolius* L., which is reported from Madagascar, the Mascarene Islands, Reunion and Mauritius and that is now (including variants) widely cultivated. In the Thompson Herbarium (UPS) nos 1506 and 1507 are syntypes of *C. textilis*. Both appear to have been in cultivation 'villa Alwen Smidt' [the name difficult to decipher] within the general locality 'Cap B. spel'. *C. textilis* is now widely reported from the Western and Northern Eastern Cape. It carries up to 20 or more leafy inflorescence bracts that are never present in Entity 3. This probably accounts for the placing of Entity 3 with *C. marginatus* rather than with *C. textilis* and its allies, where, from a morphological aspect, it is better accommodated.

Entity 2 is distinguishable from Entity 1 on its inflorescence form and its spikelet shape and usually the spikelet colouration, the glume scale size and texture and the fruit shape in outline. Up to now, the longer spikelets have been relied upon as significant, but this feature is not satisfactory as elongated spikelets have been observed in all three entities during this study.

The key that follows may be used to differentiate among the entities. It attempts to be comprehensive because all aspects of morphological form are not always represented in individual herbarium specimens that require identification. It, therefore, serves also as a summary of the more important morphological features of each entity.

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