

CYPERACEAE OF EAST AFRICA - I

By

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Introduction

The sedges are regarded by many people as being 'worse than the grasses' to recognise and identify. Since, owing to their economic value, the latter group has been covered by various official publications for Kenya, Uganda and, shortly, for Tanganyika, it seems appropriate that the other major family in the Glumiflorae should now receive attention.

It is hoped that this and the series of papers which follow it will stimulate the collection of these interesting and too rarely gathered plants, as in many cases little or nothing is known of their habitat, distribution and variation. The species recorded here, and the names given to them, are merely the result of routine work carried out in the East African Herbarium and do not necessarily make a complete list of all material collected.

Owing to the diversity of vegetative form and inflorescence found throughout the larger genera, botanists find it extremely difficult to separate them and have relied on minute characters of flower structure and seed, examination of which requires the aid of a microscope; an attempt has been made here to separate both the genera and species occurring in a limited area on the more readily observed characters of root, leaf and inflorescence. All characters used in the keys will be found to be visible on careful examination with a x 10 hand lens, though occasionally a needle or pin may be necessary to separate the spikelets or remove a nutlet. Explanations of the botanical terms employed can be found in the Glossary of the Flora of East Tropical Africa.

The Cyperaceae is predominantly a family of moist habitats, damp meadows, river banks, swamps, etc., and has a world-wide distribution. Although relatively poor in number of genera the family includes two very large ones, Cyperus and Carex; the former is mainly tropical in its distribution and occurs throughout East Africa, while the latter occurs chiefly in the temperate areas of the northern hemisphere and its few tropical representatives are restricted to the cooler montane regions, in East Africa rarely at altitudes lower than 7,000 ft. Twenty-five genera occur in East Africa and with the exception of Cyperus they are all fairly small, with from 1 to 30 recorded species.

Characters of Taxonomic Importance.

Vegetative. It cannot be too strongly emphasised that to simplify the naming of sedges, especially the many species of Cyperus, the underground parts need to be dug out and examined. To find out whether the plant is annual, has stolons, or has a creeping rhizome

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with long or very short internodes and tubers is usually easier than dissecting the spikelets under a microscope. Whether the sheathing bases of the lower leaves are swollen into a pseudo-bulb or not can be an equally important feature.

It is rarely wise to place too much reliance on the recorded size of the plant except where this is noted in relation to habitat, as most sedges are very sensitive to available ground water and show considerable variation in size accordingly.

Inflorescence. Solitary spikes, dense heads, simple and compound panicles are all to be found in the family, and frequently in the same genus, so they rarely make useful characters for generic distinctions; but for separating related species, the form of the inflorescence and the shape of the bracts at its base, their number and length relative to the inflorescence are characters of value. The colour of the spikelets is also helpful, but since this often varies from green when young to golden brown on maturity, care must be taken to ensure that mature specimens are examined.

The spikelets, being the ultimate divisions of the inflorescence, need a more detailed examination. The number of glumes, whether all are nutlet-bearing, whether fertile ovary and stamens are in the same flower (best ascertained by the presence of nutlet and persistent filaments) are among the characters used in the keys, as well as glume length, nutlet size and shape, etc. The finer points have been avoided as far as possible in order to keep the keys simple.

Flower and Spikelet Structure. Spike and spikelet are much more varied in the sedges than in the grasses and care must be taken in the use of these terms as, for example, a short female spike of a Carex may look very like an unmodified spikelet of a less specialised sedge. The basic spikelet pattern is that of a raceme (as in Cyperus, Scirpus etc.) or a cyme (as in Rhynchospora, Scleria etc.) of 1 to many bisexual florets, each with a subtending bract (Fig. 1), these spikelets then being variously arranged in spikes, umbels, capitulae, etc. (Figs. 7 - 12). Floral reduction of some sort occurs in all species; the corolla is reduced to small hypogynous bristles or scales or, more frequently, is completely absent (Figs. 2 - 5); the stamens are variously 2 or 3, mostly the latter, and may be present in the fertile flowers or only in unisexual ones. It is quite usual in spikelets with several florets for some of them to be bisexual and some staminate, either above or below the bisexual. Completely barren flowers are often present at the base or apex of such a spikelet (Fig. 1). The ovary contains a single ovule and has a single style with 2 or 3 branches; in the former instance the mature nutlet is lens-shaped, in the latter it is triangular in section. In some genera the number of style branches seems to be linked with the other generic characters, but in others both forms occur.

Reductions also occur in the number of flowers in a spikelet and in some genera authors have attached primary importance to the number of nutlets matured per spikelet. Where the number of flowers is reduced, there is often a correlation with separation into unisexual spikelets (subfamilies Sclerieae and Cariceae etc.). In the Cariceae a further peculiar modification of the spikelet

occurs. The bract or glume of the fertile flower is expanded and the margins fused to form the 'utricle' which completely surrounds both the flower and its rhachilla, so the so-called glume is really the bract subtending the spikelet. In Schoenoxiphium where the spikelet consists of a single basal fertile flower and several staminate ones above it the rhachilla and staminate flowers protrude from the mouth of the utricle (Fig. 6) and the nature of the "glume" is more obvious. In Carex the reduction is more extreme and the fertile spikelet is represented only by the bract and the utricle containing the nutlet (Fig. 3). Utricles enclosing the nutlets are also found in Coleochloa, but in this genus the spikelets are hermaphrodite and the utricle develops within the perianth of the female floret which is represented by conspicuous long hairs (Fig. 2).

The Tribes of the Cyperaceae according to their Natural Affinities
(Based on Hutchinson - Fam. Fl. Pl. Ed. I, Vol. II, (1934))

- Flowers unisexual
 - Utricle present Cariceae
 - Utricle absent Sclerieae
- Flowers hermaphrodite
 - Hypogynous scales well developed, folded, often enclosing the flower Hypolytreae
 - Hypogynous scales absent, filiform, or broader and flat
 - Glumes spirally arranged, spikelets not compressed
 - Spikelets with several empty glumes at the base and only 1 - 2 flowers Rhynchosporae
 - Spikelets with 2 - 0 empty glumes and more numerous flowers Scirpeae
 - Glumes distichous, spikelets often compressed Cypereae

- Cariceae - Carex, Schoenoxiphium
- Sclerieae - Scleria, Diplachrum, Acriulus, Coleochloa
- Hypolytreae - Hypolytrum, Ascolepis
- Rhynchosporae - Cladium, Carpha, Rhynchospora, Remirea
- Scirpeae - Ficinia, Bulbostylis, Fimbristylis, Scirpus, Eleocharis, Fuirena, Lipocarpa
- Cypereae - Kyllinga, Pycneus, Mariscus, Courtoisia, Juncellus, Cyperus.

Key to Genera

1. Utricles present, completely enclosing the nutlets 2
 Utricles absent 4
2. Utricles surrounded by long hairs Coleochloa
 Utricles not surrounded by long hairs 3
3. Stiffly erect perennials of montane forest or alpine grassland; utricles containing a solitary female flower Carex

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- Slender forest perennials with scanty
inflorescences; some or all of the utricles
with the staminate portion of the spikelet
or its rhachilla protruding, rarely all
reduced to the female floret only..... Schoenoxiphium
4. Large leafy perennials 3 - 8 ft. high 5
Small plants 3 ins. - 3 ft. high, or if
larger, then with leafless stems though
a few basal leaves may sometimes be present11
5. Glumes grey-green with a conspicuous reflexed
terminal bristle (rarely straight) Fuirena
Glumes brown or green, sometimes purplish..... 6
6. Nutlets globose, large and whitish,
partially exposed Scleria
Nutlets small, 2- or 3-angled 7
7. Leaf margins coarsely serrate or toothed..... 8
Leaf margins entire10
8. Peduncles short, up to 3 ins. long 9
Peduncles slender 3 - 8 ins. long Acriulus
9. Nutlets 3-angled Cladium
Nutlets 2-angled Hypolytrum
10. Spikelets compressed; glumes distichous
(2-ranked); style branches 3 Cyperus
Spikelets plump; glumes spirally arranged;
style branches 2 Rhynchospora
11. Inflorescence a solitary spikelet; subtending
bracts small and scale-like12
Inflorescence variously compound with at
least 2 spikelets16
12. Succulent-stemmed leafless plants Eleocharis
Slender leafy plants13
13. Spikelets small, up to 4 mm. long14
Spikelets over 8 mm. long15
14. Subtending bracts 1 or more, as long as
or longer than the spikelets Scirpus
Subtending bracts, if present, about as
long as the glumesEleocharis
15. Spikelets whitish or cream Fimbristylis
Spikelets brown Bulbostylis
16. Glumes distichous; spikelets compressed (Cyperus s.l)36
Glumes spirally arranged; spikelets not compressed17
17. Inflorescence white or yellow, daisy-like,
the hypogynous scales large with
petal-like extensions Ascolepis

	Inflorescence various but never with daisy-like "petals", hypogynous scales small or absent	18
18.	Spikelets whitish; inflorescence capitate or subumbellate (see <u>Remirea</u>).....	19
	Spikelets variously coloured but never white	20
19.	Leaves basal only	<u>Lipocarpha</u>
	Numerous stem leaves also present	<u>Rhynchospora</u>
20.	Spikelets dense, plump, with grey-green glumes (rarely brown) having a conspicuous and usually reflexed terminal bristle	<u>Fuirena</u>
	Spikelets dense or lax, but the glumes not as above (except <u>Fimbristylis squarrosus</u> which has whitish glumes with green bristles).....	21
21.	Inflorescence paniculate with usually leafy bracts, or contracted into an unbranched, interrupted spike	22
	Inflorescence capitate or umbellate, bracts rarely leafy	26
22.	Nutlets globose, white or bluish, partly exposed in the spikelet	23
	Nutlets not visible, 2- or 3-angled	24
23.	Annuals or perennials over 9 ins. high	<u>Scleria</u>
	Small annuals 2 - 7 ins. high	<u>Diplachrum</u>
24.	Style branches 2; nutlet 2-angled	<u>Rhynchospora</u>
	Style branches 3; nutlet 3-angled or rounded	25
25.	Peduncles short, up to 1½ ins. long	<u>Carpha</u>
	Peduncles 3 - 8 ins. long	<u>Acriulus</u>
26.	Rhizomatous perennial of the seashore; very rare	<u>Remirea</u>
	Not as above	27
27.	Inflorescence capitate	28
	Inflorescence umbellate	33
28.	Flowering head appearing lateral, the subtending bract looking like a continuation of the stem	<u>Scirpus</u>
	Flowering head terminal	29
29.	Heads composed of 1 - 3 spikes	30
	Heads of numerous spikes	31
30.	Head over ¾ in. wide	<u>Rhynchospora</u>
	Head up to ½ in. wide	<u>Kyllinga</u>
31.	Perennials with stout woody rhizomes	<u>Ficinia</u>
	Annuals or perennials, slender rhizomes sometimes present	32

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32. Heads usually very dark, brown or purplish Bulbostylis
 Heads pale green Scirpus
33. Leaves filiform or narrow; heads with small
 scaly bracts 34
 Leaves wider, flat; heads with foliose
 subtending bracts 35
34. Spikelets very small, not over 1.5 mm. wide..... Bulbostylis
 Spikelets larger, at least 2 mm. wide Fimbristylis
35. Heads globose Scirpus
 Heads spike-like Mariscus
36. Style branches 2; nutlet 2-angled37
 Style branches 3; nutlet 3-angled38
37. Inflorescence appearing lateral, the subtending
 bract looking like a continuation of the stem... Juncellus
 Inflorescence obviously terminal, with
 several unequal bracts Pycneus
38. Glumes with a conspicuous wing on the keel Courtoisia
 Glumes rounded on the back, or keeled but
 not winged39
39. Glumes deciduous, falling from the persistent
 rhachilla Cyperus
 Glumes not deciduous, the rhacilla and
 glumes falling together Mariscus

CAREX L.

Carex is one of the larger genera of sedges, with nearly 1,000 species most of which occur in the temperate regions of the northern hemisphere. In tropical Africa there are only about 30, restricted to the damp grasslands, forest and montane vegetation of the higher altitudes (mostly over 7,000 ft.). The similar, but more slender, representatives of Schoenoxiphium in East Africa normally occur at lower altitudes.

Most African species of Carex are leafy perennial herbs, some with creeping rhizomes and some compacted into dense tufts. Three kinds of inflorescence are readily recognisable in the genus; solitary, dense bisexual spikes (Fig. 13); much branched, often dense panicles with numerous short sessile or subsessile bisexual spikes of few spikelets (Figs. 18, 25); and very sparingly branched inflorescences of a few sessile or pedunculate long spikes (Figs. 20, 38). The spikelets are always unisexual. In some species they are borne in unisexual spikes, in others the spikes are bisexual. In the section Eu-Carex three obvious trends occur in the arrangement of male and female in the spikes. In C. vallis-rosetto and its allies all the spikes are bisexual with the male spikelets at the top. In the rest, the upper 1 to 3 spikes are male or almost entirely so with the lateral spikes predominantly

female; in some of these species the male spikelets are above the female in the spikes, in others the male spikelets are below. In the field, male spikelets may be recognised either by the presence of stamens or, when these have been shed, by the absence of utricles as the male flowers mature first and shed their stamens before the utricles reach maturity.

Key to Species

1. Spikes solitary, terminal 2
 Spikes several or numerous 3
2. Culms angular; glumes light brown with broad
 hyaline margins 1. C. monostachya
 Culms terete; glumes dark brown, margins
 not hyaline 2. C. runssoroensis
3. Spikes sessile, bisexual; inflorescence
 always very dense 4
 Spikes pedunculate, unisexual or bisexual;
 inflorescence paniculate 6
4. Leaves 2 - 4 mm. wide; utricles much longer
 than the bracts and with a long scabrid
 beak 5. C. erythrorrhiza var. scabrida
 Leaves 4 - 12 mm. wide; utricles scarcely
 longer than the bracts, beak often
 very short 5
5. Utricles 3 - 4 mm. long; leaves 4 - 8 mm.
 wide; culm bases up to 6 mm. thick
 3. C. conferta var. leptosaccus
 Utricles 4 - 6 mm. long; leaves 8 - 12 mm.
 wide; culm bases over 7 mm. thick 4. C. lycurus
6. Inflorescence much branched with very
 numerous, scarcely stalked, short spikes 7
 Inflorescence of a few long very dense
 spikes, usually with long peduncles 10
7. Utricles much longer than the mucronate
 chestnut bracts 8
 Utricles equalling or scarcely exceeding
 the aristate bracts 9
8. Utricles pale green, hispid below the
 beak, 4 mm. long 6. C. spicato-paniculata
 Utricles very dark brown or black,
 glabrous, 5 mm. or more long 9. C. castanostachya
9. Utricles 4 mm. long 7. C. echinochloe
 Utricles 5 - 6 mm. long 8. C. chlorosaccus
10. Lateral spikes always distinctly pedunculate;
 leaf sheaths parallel veined 11
 Lateral spikes sessile or subsessile;
 leaf sheaths reticulate veined 24

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11. Utricles with a very short truncate beak 12
 Utricles with a well developed beak,
 bidentate except in C. johnstonii 13
12. Utricles brown, biconvex and very broad;
 bracts green 10. C. papillosissima
 Utricles 3-angled, narrower; bracts
 tawny 11. C. bequaertii
13. Female spikes loose; utricles 5 - 7 mm.
 long with a long entire beak 12. C. johnstonii
 Female spikes dense; utricles 3 - 5 mm.
 long with a bidentate beak 14
14. Spikes all androgynous, similar; male
 spikelets making less than half the
 length of the spike 15
 Upper 1 - 3 spikes usually male or almost
 entirely so, the lateral spikes female
 or bisexual 17
15. Utricle bracts golden brown 15. C. mildbraediana
 Utricle bracts green or brown 16
16. Utricle beak conspicuously bent 13. C. vallis-rosetto
 Utricle straight 14. C. greenwayii
17. Lateral spikes female, the upper ones usually
 with several male spikelets at the top;
 terminal spike often with a few female
 spikelets at the base 18
 Lateral spikelets purely female, or some
 of the upper ones with a few male
 spikelets at the base; terminal spike
 often with a few female spikelets at
 or near the top 20
18. Spikes 2 - 3 ins. long, brown or green16. C. cyrtosaccus
 Spikes 1 - 2 ins. long, reddish or green 19
19. Bracts 5 - 6 mm. long, as long as the
 mature utricles 17. C. elqonensis
 Bracts 4 mm. long, shorter than the
 mature utricles 18. C. manni
20. Lateral spikes all unisexual, 5 mm. wide 21
 Lateral spikes mostly bisexual, 6 - 8 mm. wide 22
21. Bracts black, with a conspicuous green
 midrib 19. C. simensis
 Bracts green and rust 20. C. fischeri
22. Leaves stiff, longest spikes 2 ins. long;
 lower glumes rust coloured, shorter than
 the utricle; peduncles stoutish, usually
 short 21. C. cuprea
 Leaves flaccid; spikes often over 2 ins. long;
 glumes brown, as long as the utricles;
 peduncles very slender and long 23

23. Leaves 3 - 4 mm. wide; mountains west of the Rift Valley22. C. ninagongensis
 Leaves 6 - 9 mm. wide; mountains east of the Rift Valley 23. C. longipedunculata
24. Spikes brown; bracts hairy on the nerves 25
 Spikes yellowish or pale green 26
25. Crater highlands of Tanganyika 24. C. phragmitoides
 Eastern highlands of Kenya 25. C. taylori
26. Spikelets very densely packed; utricles 3 mm. long 26. C. pseudosphaerogyna
 Spikelets loosely packed; utricles 4 mm. long 27. C. cognata

1. C. monostachya A. Rich. (Figs. 13, 14)

Stiffly erect tufted perennials, about 18 ins. high, often forming 'stilts' Wet Alpine grassland, 9,000 - 15,000 ft.
 KENYA - Kenya and Aberdare Mountains.
 TANGANYIKA - Kilimanjaro.

2. C. runssoroensis K. Schum. (Fig. 15)

Tufted perennial forming tussocks up to 3 ft. high. Leafless. Very similar to the above. Wet montane grasslands 11,000 - 13,000 ft.
 UGANDA - Virunga Mts., Ruwenzori Mts., Mt. Elgon.

var. aberdarensis Kuk. differs in the white hyaline margins to the bracts and is more slender.
 KENYA - Kenya and Aberdare Mountains.

3. C. conferta A. Rich. var. leptosaccus (C.B.Cl.) Kuk. (Figs. 18, 19)

Short tufted plants ½ - 2 ft. high. Montane moorland and swamps 8,000 - 12,000 ft. The typical form of the species, known from Ethiopia, has shorter beaked utricles, but is otherwise indistinguishable.

KENYA - Naro Moru, Ol Joro Orok, Nyiru, Aberdare and Elgon Mountains.
 TANGANYIKA - Kilimanjaro.
 UGANDA - Mt. Mgahinga.

4. C. lycurus K. Schum. (Fig. 17)

Stout tufted perennial 2 - 4 ft. high. Leaves broad. Inflorescence pale brown. Mostly in shady places, forests, stream banks, or upland swamp grassland at 7,000 - 10,000 ft., but down to 4,500 ft. in the Usambara Mountains.

KENYA - Cherangani Hills, Kinangop, Molo.
 TANGANYIKA - Crater Highlands, Usambara Mts., Mufindi.

5. C. erythrorrhiza Boeck. var. scabrida Kuk. (Fig. 16)

Narrow leaved tufted sedge 1 - 2 ft. high. In swamps, bamboo and montane forests 10,000 - 12,000 ft., rarely lower. So far only the variety is known from East Africa.

KENYA - Mt. Kenya, Cherangani Hills.
 TANGANYIKA - Crater Highlands.
 UGANDA - Mt. Mgahinga.

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6. C. spicato-paniculata C.B.Cl. (Fig. 23)
Tufted perennial very like C. chlorosaccus but differing in the usually denser and browner inflorescence, the absence of awns and the scabrid utricle. 3,000 - 6,000 ft.
TANGANYIKA - Mlinga Peak (Usambara), Iringa District, Kigogo.
7. C. echinochloe Kunze (Fig. 27)
Tufted perennial 2 - 3 ft. high with a rather dense inflorescence. High rainfall grasslands, bush and Combretum savannah.
KENYA - Kitale.
TANGANYIKA - Arusha, Kilimanjaro, Usambara Mts.
UGANDA - Fort Portal, Kigezi.
8. C. chlorosaccus C.B.Cl. (Figs. 25, 26)
Tufted leafy perennial 2 - 3 ft. high. Glumes aristate, green or yellowish becoming pale brown like the utricle.
Forests, 6,000 - 8,000 ft., rarely lower.
KENYA - Trans Nzoia, Aberdares, Kericho, Mau, Mt. Elgon, Chyulu Hills.
TANGANYIKA - Mufindi, Kilimanjaro, Ngorongoro, Pare and Usambara Mountains.
UGANDA - Bugishu.
9. C. castanostachya K. Schum. (Fig. 24)
Tufted leafy perennial 4 ft. high with a fairly dense paniculate inflorescence. Bracts chestnut brown, utricles very dark, curved. 6,500 - 7,500 ft.
TANGANYIKA - Uluguru, Usambara and Pare Mountains.
10. C. papillosissima Nelmes (Fig. 29)
Stout tufted perennial up to 4 ft. high. Spikes numerous. Utricles very broad, dark brown, with a very short beak.
Forests, 5,000 - 6,000 ft.
TANGANYIKA - Sao Hill.
11. C. bequaertii De Wild. (Fig. 28)
(C. petitiana auctt. non A. Rich.)
Tussock perennial 3 - 4 ft. high with long broad leaves. Inflorescence of 6 - 8 dense pedunculate spikes, the upper 1 to 3 male only, the rest female, long, and 8 mm. broad.
Wet grasslands, swamps, forest edges and stream banks, 9,000 - 12,000 ft.
KENYA - Elgon, Kenya and Aberdare Mountains.
TANGANYIKA - Crater Highlands, Southern Highlands.
UGANDA - Virunga Mts., Kigezi.
12. C. johnstonii Boeck. (Fig. 30)
Tufted perennial 2 - 3 ft. high with very narrow spikes. Utricles 8 - 9 mm. long and inflated. Bamboo and upland forests, 7,000 - 10,000 ft.
KENYA - Elgon and Aberdare Mountains, Kericho, Mau Forest.
TANGANYIKA - Oldeani, Kilimanjaro, Usambara and Uluguru Mountains.
13. C. vallis-rosetto K. Schum.
Tufted perennial 2 - 3 ft. high with 8 - 12 androgynous spikes. Utricles 5 mm. long, few nerved, conspicuously bent at the base of the beak.
TANGANYIKA - Usambara and Uluguru Mountains.

14. C. greenwayi Nelmes (Fig. 33)
Very close to the above. The main differences lie in the more numerous spikes (about 12) and the very straight utricle. Montane and bamboo forests, swampy places, 5,000 - 11,000 ft. KENYA - Kenya and Aberdare Mountains, Mau Forest. TANGANYIKA - Meru, Kilimanjaro and Uluguru Mountains.
15. C. mildbraediana Kuk. (Fig. 34)
3 - 6 ft. high perennial of wet montane forests and water pools, at about 8,000 ft. UGANDA - Karamoja, Ruanda.
16. C. cyrtosaccus C.B.Cl. (Fig. 35)
Tufted perennial 1½ - 2 ft. high, similar to C. fischeri but with larger utricles. In forest, 6,000 - 7,000 ft. TANGANYIKA - Southern Highlands. Also Nyasaland.
17. C. elgonensis Nelmes (Figs. 38, 39)
Tufted perennial 1 - 2 ft. high similar to C. cuprea but with shorter dark red androgynous spikes. In ericaceous and Hypericum scrub 10,000 - 11,000 ft. KENYA - Elgon, Kenya and Aberdare Mountains.
18. C. manni E.A. Bruce
(C. boryana auctt. pro parte)
Tufted perennial 2 - 3 ft. high. Leaves up to ¼ in. wide. Upper spike male, rarely female at the base, the others female with a few male spikelets at the top. Alpine grasslands and thickets etc. over 10,000 ft. UGANDA - Ruwenzori.
19. C. simensis A. Rich. (Fig. 40)
Stout tufted perennial 1½ - 2 ft. high with broad leaves. Upper spike or spikes male, the lateral ones female or with a few male spikelets at the top. Fertile glumes black. Utricles green, shortly beaked, bidentate, 4 - 5 mm. long. Alpine grasslands, Hypericum thicket, swampy ground, 11,000 - 13,000 ft. KENYA - Elgon, Kenya and Aberdare Mountains.
20. C. fischeri K. Schum. (Figs. 31, 32)
Tufted perennial with green and brown spikes 2 - 3 ins. long. Uppermost spike male, often with some female spikelets near the top. The lateral spikes female throughout. Ericaceous thicket, forest, valley and ravine scrub, often on swampy ground, 8,000 - 11,000 ft. KENYA - Occurs on all mountain ranges.
21. C. cuprea (Kuk.) Nelmes (Figs. 36, 37)
Common tufted perennial 2 - 3 ft. high with several chestnut brown spikes 2 ins. long. Bracts chestnut with conspicuous green keels. Upland grasslands, swamps and stream sides, 8,000 - 9,000 ft. KENYA - Kinangop, Ol Joro Orok, Mau. UGANDA - Kigezi.
22. C. ninagongensis (Kuk.) Robyns (Fig. 41)
Tufted perennial 2 - 3 ft. high, with leaves under ¼ in. wide. Spikes 2 ins. long. Swamps, forest and Hypericum thicket, 10,000-12,000 ft. KENYA - Mt. Elgon.

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23. C. longipedunculata K. Schum.
Tufted perennial with 2 in. long spikes scarcely distinct from the above except for the $\frac{1}{4}$ - $\frac{1}{2}$ in. wide leaves. Swampy stream banks about 8,000 ft.
KENYA - Aberdare Mts., Mau Forest.
TANGANYIKA - Kilimanjaro.
UGANDA - Mt. Mgahinga.
24. C. phragmitoides Kukenth.
Tufted perennial over $1\frac{1}{2}$ ft. high with 4 - 5 brown spikes about $1\frac{1}{2}$ ins. long. Bracts hairy, awned, much longer than the utricles.
TANGANYIKA - Crater Highlands.
25. C. taylori Nelves
Tufted perennial very similar to the above.
KENYA - Aberdare Mountains.
I have not been able to examine material of either of these species but from a comparison of the rather inadequate descriptions it would seem that they are possibly synonymous, in which case C. phragmitoides is the name which should be used.
26. C. pseudosphaerogyna Nelves (Fig. 22)
Tufted perennial 2 - 3 ft. high. Very similar to C. cognata.
UGANDA - Ruwenzori and Virunga Mountains.
27. C. cognata Kunth (Figs. 20, 21)
Densely tufted perennial 2 - 3 ft. high with short thick yellowish spikes. Stream banks in forest or plateau grasslands.
TANGANYIKA - Southern Highlands.

SCHOENOXIPHIMUM Nees

This predominantly South African genus of about 15 species has only three known representatives in East Africa, in each case representing the northern limit of distribution of a species better known from Nyasaland and the Transvaal. The majority of the southern species are stout plants 2 to 3 ft. high, but the ones represented here are characterised by slender, very leafy culms which in the field can be readily mistaken for grasses unless in flower. The normal habitats are damp forests and wooded or open grasslands.

The inflorescence is similar to a depauperate Carex with short distant androgynous lateral spikelets, but the two genera are distinguished by the lesser reduction of the fertile spikelets in Schoenoxiphium where it is rare for all the fertile spikelets to be reduced to the nutlet-bearing flower; some of them at least have 4 - 6 staminate flowers above the female flower which protrude from the mouth of the utricle. However, care must be taken as it does sometimes happen that reduction is complete on a particular plant. It is unusual for Schoenoxiphium to occur at the higher altitudes (over 7,000 or 8,000 ft.) where Carex usually occurs.

Key to Species

1. Bracts twice as long as the utricles, awned...1. S. caricoides
 Bracts as long as the utricles or slightly
 shorter 2
2. Utricles 2 - 3 mm. long including the
 $\frac{1}{2}$ - $\frac{3}{4}$ mm. long beak 2. S. sparteum
 Utricles 4 - 5 mm. long, including the
 1 - $1\frac{1}{2}$ mm. long beak 3. S. lehmannii

1. S. caricoides C.B.Cl. (Fig. 46)

(= *Carex dregeana* Kunth, *Schoenoxiphium kunthianum* Kuk.)

An erect shortly rhizomatous perennial 10 - 15 ins. high with yellow-green foliage. Inflorescence a narrow, scanty panicle.

Fertile spikelets mostly reduced to the fertile floret only.

Damp wooded or open grasslands. 6,000 - 7,000 ft.

KENYA - Trans Nzoia, Kericho.

2. S. sparteum (Wahlenb.) Kuk. (Figs. 42-44)

Erect tufted perennial 1 - 2 ft. high. Inflorescence with numerous pedunculate panicle branches. Forest edges and damp upland grasslands, rarely below 6,000 ft.

KENYA - East Wall of the Rift Valley.

TANGANYIKA - Usambara Mts., Southern Highlands.

UGANDA - Kigezi, Karamoja.

3. S. lehmannii (Nees) Steud. (Fig. 45)

(*S. sparteum* var. *lehmannii* auctt, *Carex uhligii* C.B.Cl.)

Very similar to the above, but with a more scanty inflorescence with sessile lateral panicle branches. Damp places in evergreen forest, 3,500 - 6,500 ft.

KENYA - Marsabit, Ngong, Mau Forest.

TANGANYIKA - W. Usambara Mts., Kilimanjaro, Bukoba District.

UGANDA - Karamoja.

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CYPERACEAE OF EAST AFRICA

Explanation of Figures

PLATE I

- Fig. 1. Diagrammatic spikelet of Cyperus esculentus: a. sterile glume, b. fertile glume, c. rhachilla, d. stamen filament, e. anther, f. ovary, g. style, h. stigma.
 Fig. 2. Coleochloa abyssinica - ♀ floret: b. fertile glume, k. utricule, l. hypogynous bristles.
 Fig. 3. Carex cyrtosaccus - ♀ spikelet: h. stigma, i. bract, k. utricule.
 Fig. 4. Ascolepis anthemiflora - ♀ floret: b. fertile glume, f. ovary, m. fused hypogynous scales (2).
 Fig. 5. Rhynchospora corymbosa - ♀ floret: b. fertile glume, f. ovary, g. style, l. hypogynous bristles.
 Fig. 6. Schoenoxiphium sparteum - ♂ spikelet: i. bract, k. utricule, n. glumes of ♂ florets, o. anthers.
 Fig. 7. Solitary spikelet - Fimbristylis monostachya;
 Fig. 8. Umbel - Mariscus cyperoides.
 Fig. 9. Panicle - Scleria glabra.
 Fig. 10. Dense head of spikes (3) - Kyllinga odorata.
 Fig. 11. Capitulum - Ascolepis anthemiflora.
 Fig. 12. Pseudo-lateral head - Scirpus mucronata.

PLATE II

- Figs. 13, 14. Carex monstachya.
 Fig. 15. Carex runsoroensis.
 Fig. 16. Carex erythrorrhiza var. scabrada.
 Fig. 17. Carex lycurus.
 Figs. 18, 19. Carex conferta var. leptosaccus.
 Figs. 20, 21. Carex cognata.
 Fig. 22. Carex pseudosphaerogyna.

Inflorescences x ½, utricles x 4.

PLATE III

- Fig. 23. Carex spicato-paniculata.
 Fig. 24. Carex castanostachya.
 Figs. 25, 26. Carex chlorosaccus.
 Fig. 27. Carex echinochloe.
 Fig. 28. Carex bequaertii.
 Fig. 29. Carex papillosissima.
 Fig. 30. Carex johnstonii.
 Figs. 31, 32. Carex fischeri.
 Fig. 33. Carex greenwavi.
 Fig. 34. Carex mildbraediana.
 Fig. 35. Carex cyrtosaccus.

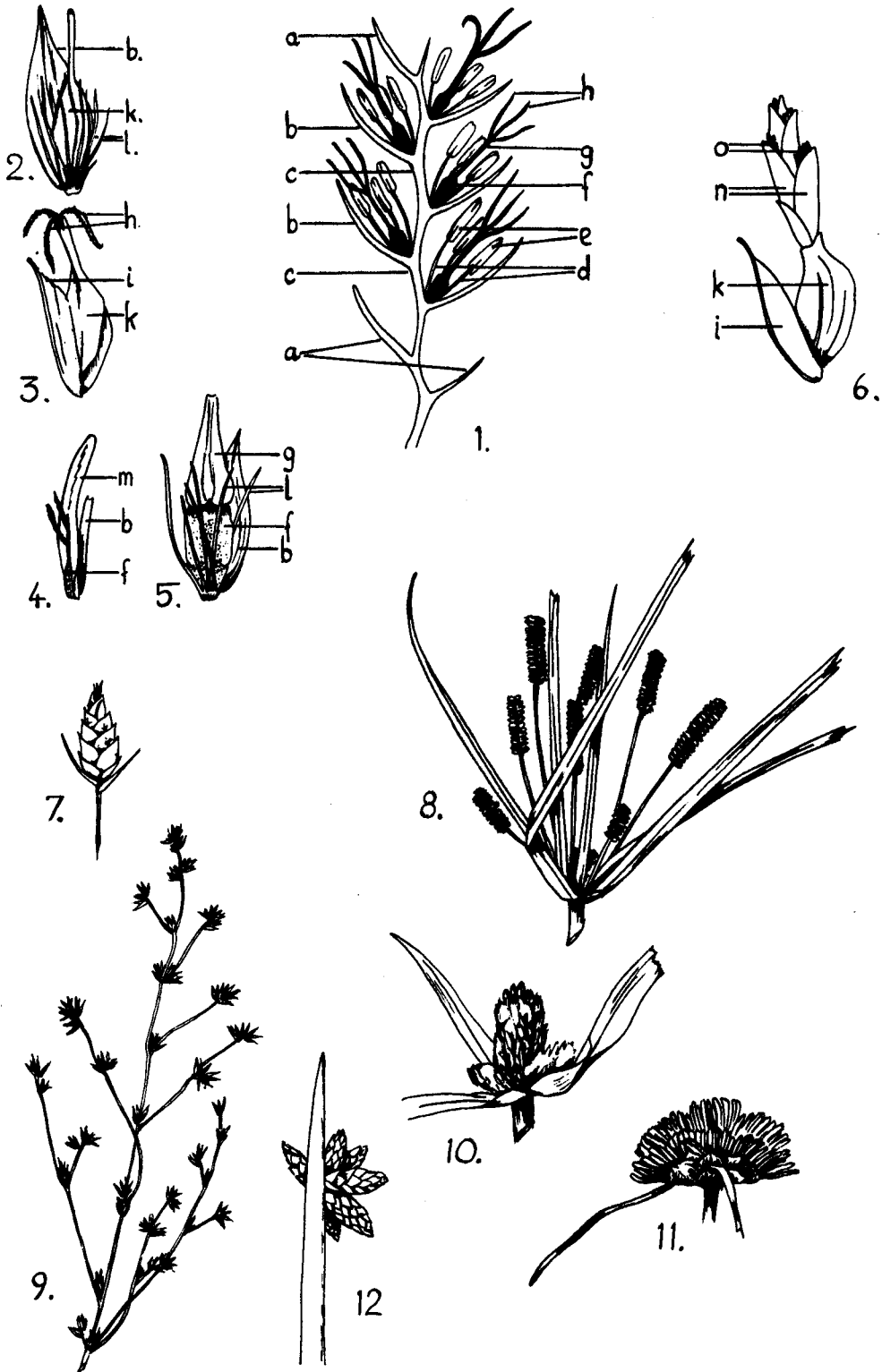
Inflorescences x ½, utricles x 4.

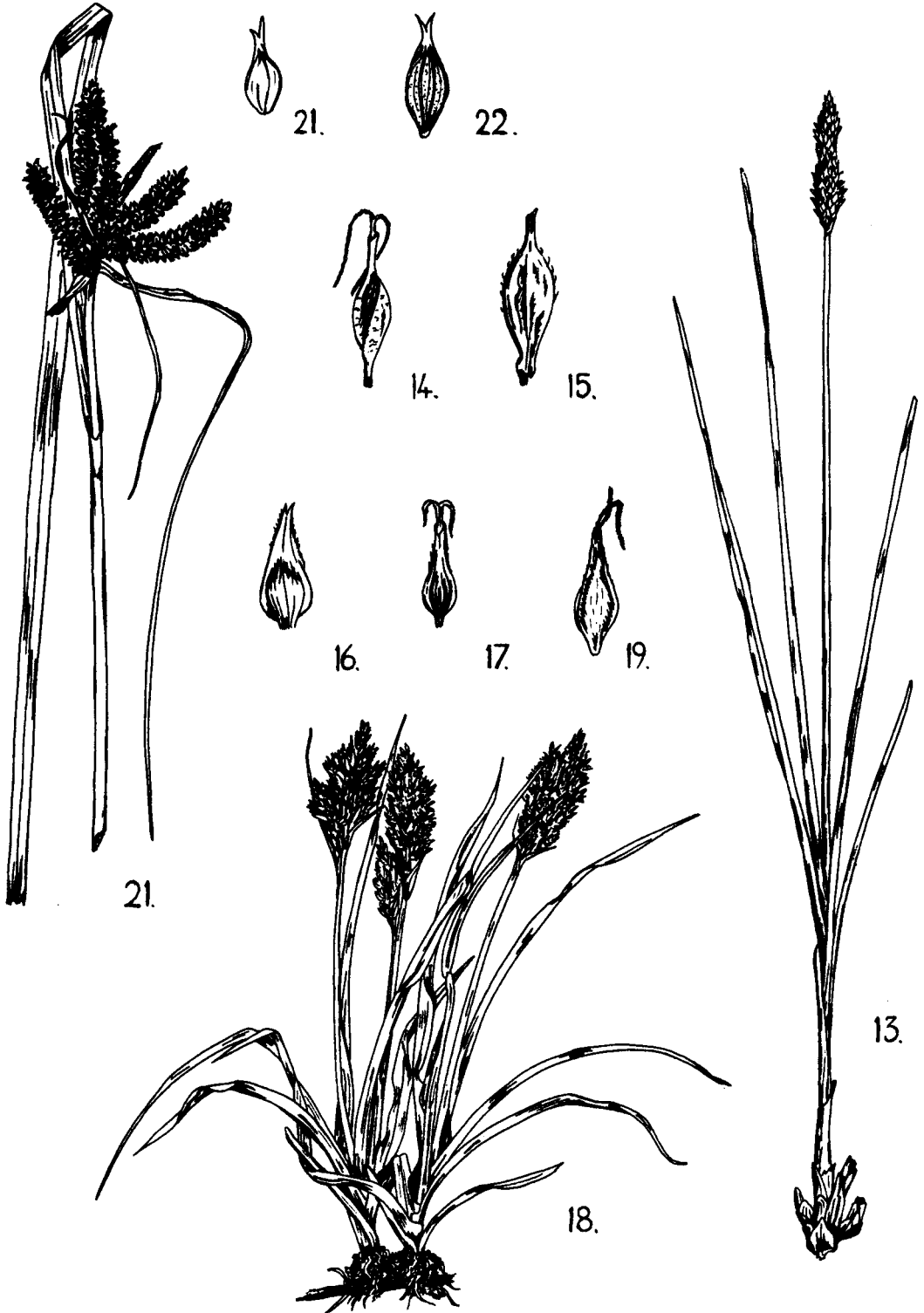
PLATE IV

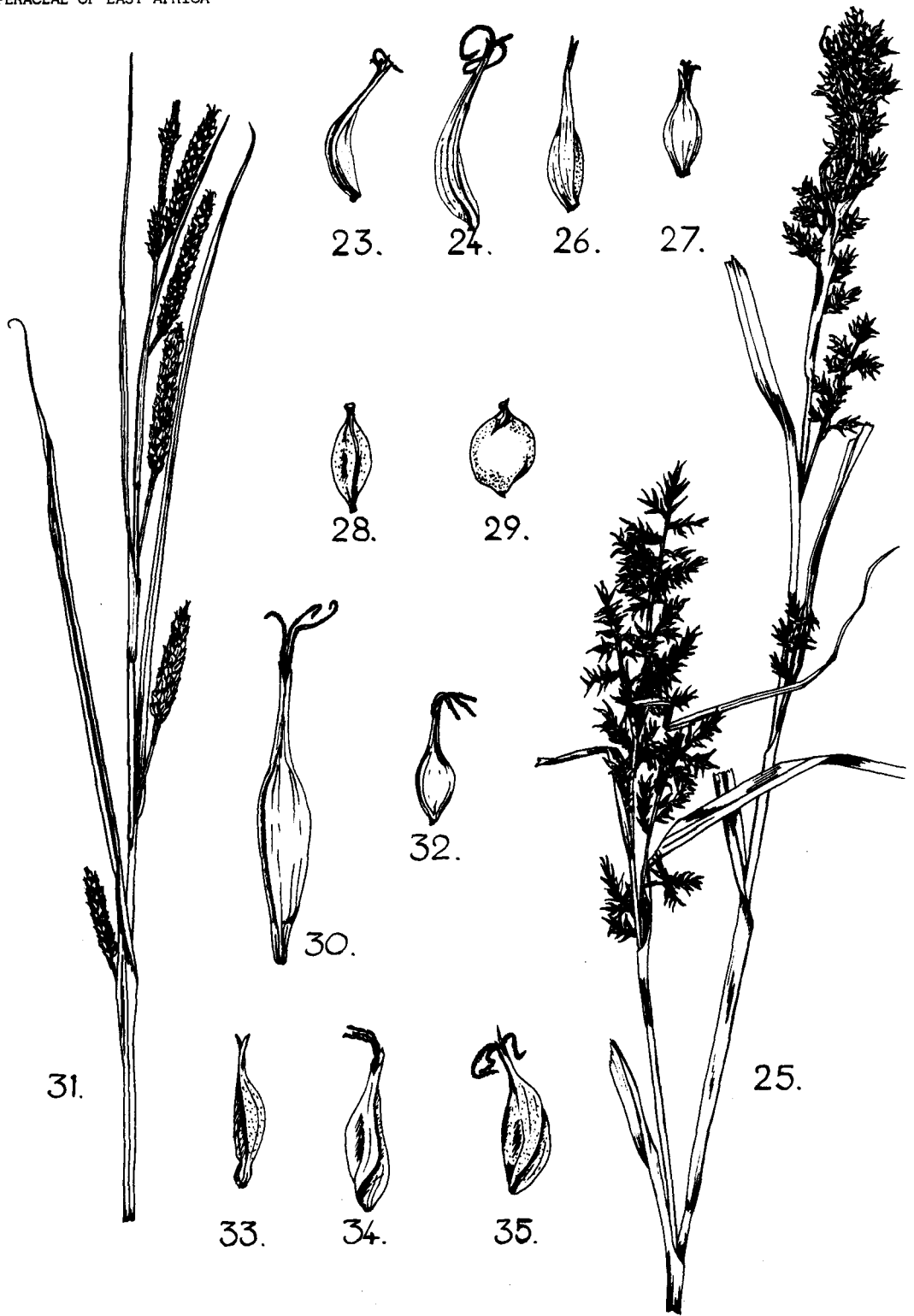
- Figs. 36, 37. Carex cuprea.
 Figs. 38, 39. Carex elgonensis.
 Fig. 40. Carex simensis.
 Fig. 41. Carex ninaongensis.
 Figs. 42, 43, 44. Schoenoxiphium sparteum.
 Fig. 45. Schoenoxiphium lehmannii.
 Fig. 46. Schoenoxiphium caricoides.

Inflorescences x ½, utricles x 4.

m. ♂ portion of spike, s. flowers protruding from utricule, u. utricles.







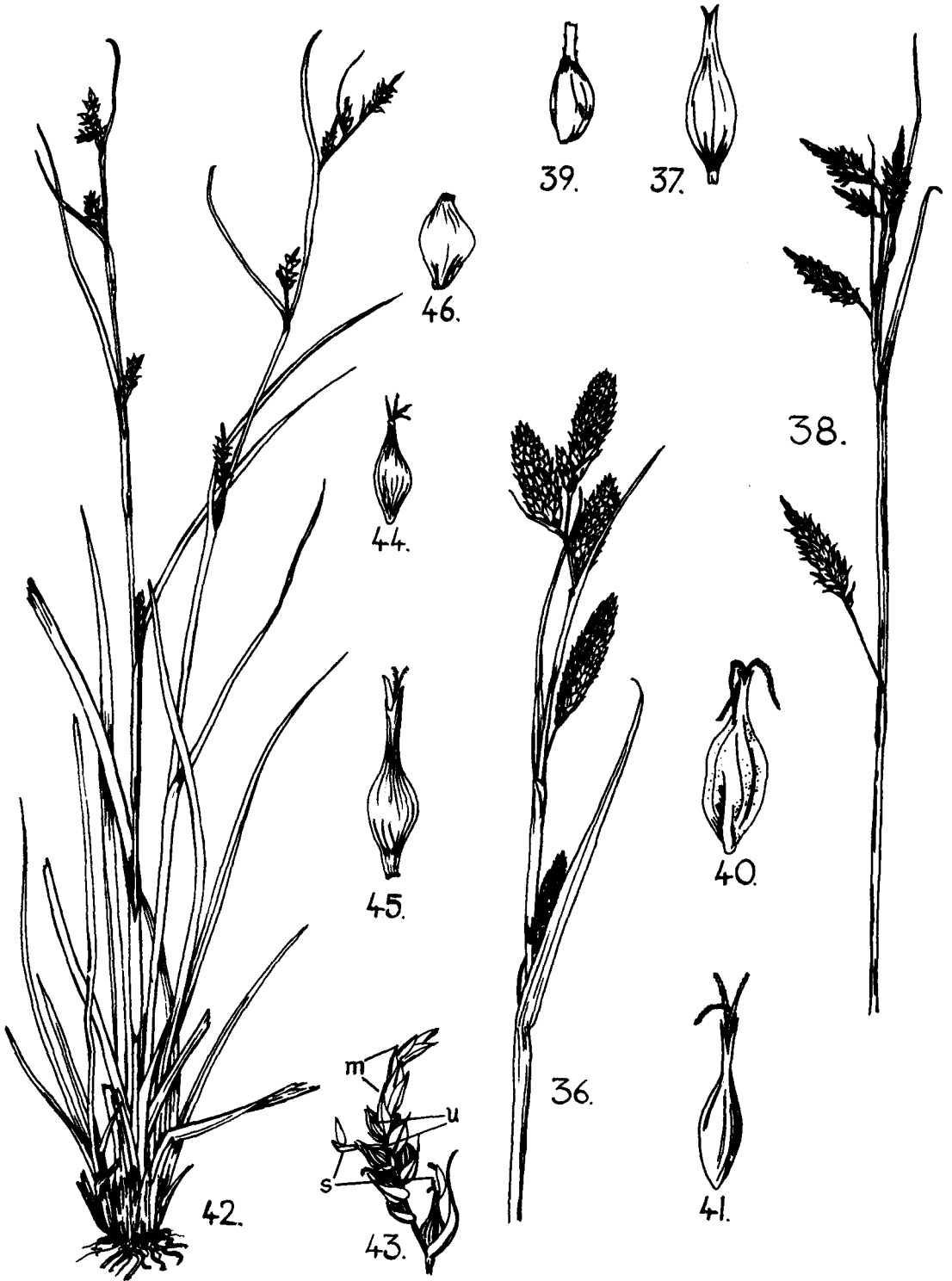


PLATE IV