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The genus *Scleria* in southern Africa

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ABSTRACT

The 23 species of *Scleria* (Sclerieae, Caricoideae, Cyperaceae) in southern Africa are revised. Two subgenera are recognized, *Hypoporum* with one section, *Hypoporum*, and *Scleria* with three sections, *Scleria*, *Acriulus* and *Schizolepis*. The tribes Sclerieae and Bisboeckelereae are distinguished.

INTRODUCTION

Scleria Bergius is a pantropical genus comprising approximately 200 species, 23 of which have been recorded in southern Africa. No general agreement has been reached on the circumscription of the genus, its subdivision, its tribal affiliation, or the systematic position of its tribe within the family Cyperaceae.

The number and delimitations of tribes in Cyperaceae varies, for example, Bentham (1883) recognized six tribal units, Clarke (1908) seven, Holttum (1948) six, Hutchinson (1959) seven, Koyama (1961) six, Hooper (in Metcalfe, 1971) eight and Eiten (1976) nine with two genera *(Scleria* and *Dulichium)* not assigned to tribes because of uncertainty with regard to their taxonomic position.

The main lines of evolutionary development have been suggested by the grouping of tribes in categories of higher hierarchical level within which the positioning of the tribes indicates putative phylogenetic relationships. Bentham *(l.c.)* grouped his six tribes into two Series, Monoclines, with hermaphrodite flowers (Scirpeae, Hypolytreae, Rhynchosporeae) and Diclines with unisexual flowers (Cryptangieae, Sclerieae, Cariceae). The four subfamilies recognized by Clarke *(l.c.)* were Scirpo-Schoeneae (Cypereae, Scirpeae, Schoeneae, Rynchosporeae, all with hermaphrodite flowers); Mapaniae with a single tribe diagnosed as having unisexual flowers in an inflorescence with a terminal female flower and basal male spikelets; Scleriae with a single tribe diagnosed as having unisexual flowers in monopodial bisexual spikelets with a single basal female flower and male flowers towards the apex or in monopodial unisexual spikelets, the male multiflowered, the female 1-flowered; and Caricineae, also with a single tribe having unisexual flowers in monopodial spikelets with the female flowers enclosed in a utricle. Holttum *(l.c.)* followed Bentham's arrangement but switched the position of Hypolytreae and Scirpeae in Monoclines. Hutchinson *(l.c.)* failed to recognize subfamilial rank thereby indicating his seven tribes as representing separate evolutionary lines. Koyama (1961) recognized four subfamilies, Mapanioideae with a single tribe, Hypolytreae; Scirpoideae (Scirpeae, Cypereae); Rhynchosporoideae (Rhynchosporeae, Sclerieae); and Caricoideae (Cariceae). By his placement of Mapanioideae as the most primitive subfamily, he failed to recognize, as had Bentham (1883), Pax (1886, 1887) and Holttum (1948) the pseudanthial nature of the ultimate inflorescence unit in this group.

Hooper *(l.c.)* proposed the acceptance of the seven tribes recognized by Hutchinson with the addition of an eighth tribe for *Dulichium* arranged, with slight modification in the sequence of some genera, in the framework proposed by Clarke. Subfamily Scirpoideae comprised Cypereae, Scirpeae, Rhynchosporeae (Rhynchosporeae and Schoeneae of Clarke) and Dulicheae; Mapanieae comprised a single tribe, Hypolytreae; Caricoideae comprised Sclerieae (Scleriae, part 1 of Clarke), Cryptangieae (Scleriae part 2 of Clarke) and Cariceae.

Eiten *(l.c.)* proposed a system of classification based upon analysis of the branching patterns of the ultimate branch orders of the inflorescence together with the sex of the flowers. She recognized three subfamilies, the arrangement of which differs from that of all earlier systems in their sequence. By placing Mapanioideae last, she suggests that this is the most specialized group in the family. Cyperoideae (=Rhynchosporoideae) (Scirpeae, Cypereae, Rhynchosporeae and the genus *Dulichium*) is distinguished as having true, bisexual flowers arranged in true, racemosely-branched spikelets; Caricoideae (Lagenocarpeae, Bisboeckelereae, Cariceae and the genus *Scleria*) as having true, always unisexual flowers arranged in true, racemosely-branched spikelets; and Mapanioideae (Mapanieae, Syntrinemeae, Micropapyreae) having an inflorescence of one or more pseudospikelets, each pseudospikelet made up of pseudanthia of unisexual flowers borne racemosely on a rhachilla.

By its placement in the tribe Sclerieae (Nees, 1834) the distinctiveness of *Scleria* within Cyperaceae was early recognized. The unisexuality of its flowers was also soon brought to attention (Bentham, 1883). Both Pax (1886, 1887) and Eiten (1976) placed the genus in subfamily Caricoideae but, according to the former author, the subfamily was diagnosed by 'spikelet with a terminal flower'; according to the latter author the 'true, always unisexual flowers are arranged in true, racemosely-branched spikelets'. This reflects both the changing diagnosis of categories with time and increasing understanding and knowledge and, for *Scleria*, the

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on-going conflict in intrepretation of the position of the female flower in the bisexual (androgynaeceous) spikelet.

Interpretation of spikelet morphology

Eiten's recent work on South American plants has brought yet further authority to the opinion held by Nees (1842), Bentham (1883), Holttum (1948), Koyama (1961) favouring the lateral positioning of the female flower in the bisexual spikelet. Pax *(l.c.)*, Core (1936), Kern (1961, 1974), Schultze-Motel (1964) and Koyama (1967, 1969) have interpreted the bisexual spikelet of *Scleria* as comprising two axis systems; a sympodial axis which terminates in a female flower with a second, higher order axis system bearing male flowers arising laterally from the first axis.

Since the first appendage of a lateral branch is a prophyll (Blaser, 1944), which is recognizable because of its position and its distinctive form then, if the second interpretation were correct, a prophyll would be present in the adaxial position near the base of the axis which bears male flowers.

I have found no evidence of a prophyll in such a position in the bisexual spikelets of any species. Kern (1961) illustrates (Fig. 1; I, II) prophylls in diagrams of spikelets of 'bisexual *Scleria* species'. It seems apparent that the diagrams were constructed to support an interpretation for which no direct evidence could be found and are hypothetical. Koyama (1961, p. 50) stated unequivocally that the female flower in the bisexual spikelet of *Scleria gracillima* is truly axillary, citing evidence and illustrating his findings in Fig. 3C. In a later publication (1969), he included a prophyll in illustrations (Figs 5, 6 & 27) which appear to be based on the 1961 drawing. However, I doubt whether the prophyll depicted in the 1969 publication really exists.

Since in the plants themselves no prophyll is interposed between the proximal female part of the spikelet and the distal male part, there is direct evidence that the spikelet is a monopodial structure. Further evidence obtained from analysis of branching patterns of the whole inflorescence also supports this interpretation.

If the bisexual spikelet is interpreted as consisting of two axes, with the female flower terminating the first axis (thus sympodial) and the lateral (second) axis bearing male flowers, then in the species which have truly unisexual spikelets, lateral branches of the axis which terminates in a female spikelet might be expected to bear terminal male spikelets. Only *Scleria angusta*, *S. greigiifolia* and *S. poiformis* among southern African species have female spikelets which usually lack male rudiments and none of their inflorescences have such a branching pattern. If a lateral axis is developed in these species from an axis with a terminal female spikelet it, too, terminates in a female spikelet.

There is, therefore, no morphological evidence to support the interpretation of the bisexual spikelet as a double axis system with the female flower terminating a sympodial axis from which the second axis bearing male flowers arises laterally.

My findings, based on study of southern African material have led me to conclude, independently of Eiten (1976) who worked with Brazilian species, that the bisexual spikelet of *Scleria* is a monopodial structure. Analytical diagrams of *Scleria* spikelet types are given in Fig. 1, A–D.

Amended circumscription of tribe Sclerieae

The tribe Sclerieae comprising the genera *Becquerelia, Bisboeckelera, Calyptrocarya, Diplacrum* (including *Pteroscleria*), and *Scleria* (including *Acriulus*), was not upheld by Eiten (1976), on the grounds that whereas the ultimate inflorescence unit of four of these genera is a compound axis system in which the main axis which bears lateral, true, racemosely-branched spikelets of true, male flowers terminates in a pistil, the ultimate inflorescence unit of *Scleria* is a simple axis which comprises a true, racemosely-branched spikelet of true, unisexual flowers; that is, in *Scleria* no branch system terminates in a pistil. Accordingly, *Scleria* was excluded from the assemblage and the tribe Bisboeckelerieae was proposed for the other four genera, since *Bisboeckelera* is the earliest legitimate generic name in the new tribe.

Scleria was not assigned by Eiten *(l.c.)* to any tribe since, although two tribes, Rhynchosporeae and Cariceae have spikelets with a branching pattern similar to that of *Scleria*, the former has bisexual flowers and the latter has the female flower included in a utricle or a semiutricular prophyll.

Since my findings support Eiten's view of the intrepretation of spikelet morphology in *Scleria*, it is proposed that the tribe Sclerieae be maintained, and that its circumscription be modified so that it includes (in the present state of our knowledge) only the name genus.

Therefore in subfamily Caricoideae (Eiten, 1976) which is diagnosed as having true, always unisexual flowers in true, racemosely-branched spikelets, it is proposed to distinguish the tribes Bisboeckelereae and Sclerieae as follows:-

Ultimate inflorescence unit compound, comprising an axis apparently terminating in a pistil, and lateral, true, racemosely-branched spikelets of true male flowers..... Bisboeckelereae *(Bisboeckelera, Becquerelia, Calyptrocarya, Diplacrum)*.

Ultimate inflorescence unit simple, comprising a true, racemosely branched spikelet of true unisexual flowers..... Sclerieae *(Scleria)*

Tribus Sclerieae Nees emend. E. F. Franklin a tribu Bisboeckelereae Mattf. in Diels inflorescentiae monadate ultima simplici, ex spicula vera racemosa floribus unisexualibus veris constanti dignoscendus. Typus: *Scleria* Bergius.

Generic limits of Scleria

Although the distinctiveness of *Scleria* has long been recognized, there is still some difference of opinion with regard to the relationship of *Scleria* and *Diplacrum* R. Brown (1810) and *Scleria* and *Acriulus* Ridley (1884). *Diplacrum* is maintained as a sep-

arate genus by most cyperologists but Kern (1961, 1974), Koyama (1961) and Raymond (1966) included it in *Scleria*. Eiten (1976) has demonstrated that the fundamental branching patterns of the ultimate inflorescence units of *Scleria* and *Diplacrum* differ, so that, far from being congeneric, these taxa must, on this basis, be assigned to different tribes.

The genus *Acriulus* was reduced to congenerity in *Scleria* by Clarke (1902) and subsequently (1908) restored by him to generic rank. In 1963 it was once more reduced to synonymy by Kern, and the number of species was reduced from three to one *(S. greigiifolia)* and the spelling of the specific epithet was corrected. Although I do not agree with Kern's intrepretation of the inflorescence of *Scleria,* I agree that inflorescence structure in *Scleria* and *Acriulus* is fundamentally the same. The validity of his argument in favour of reducing *Acriulus* to congenerity in *Scleria* is accepted and additional evidence in support of this course is offered.

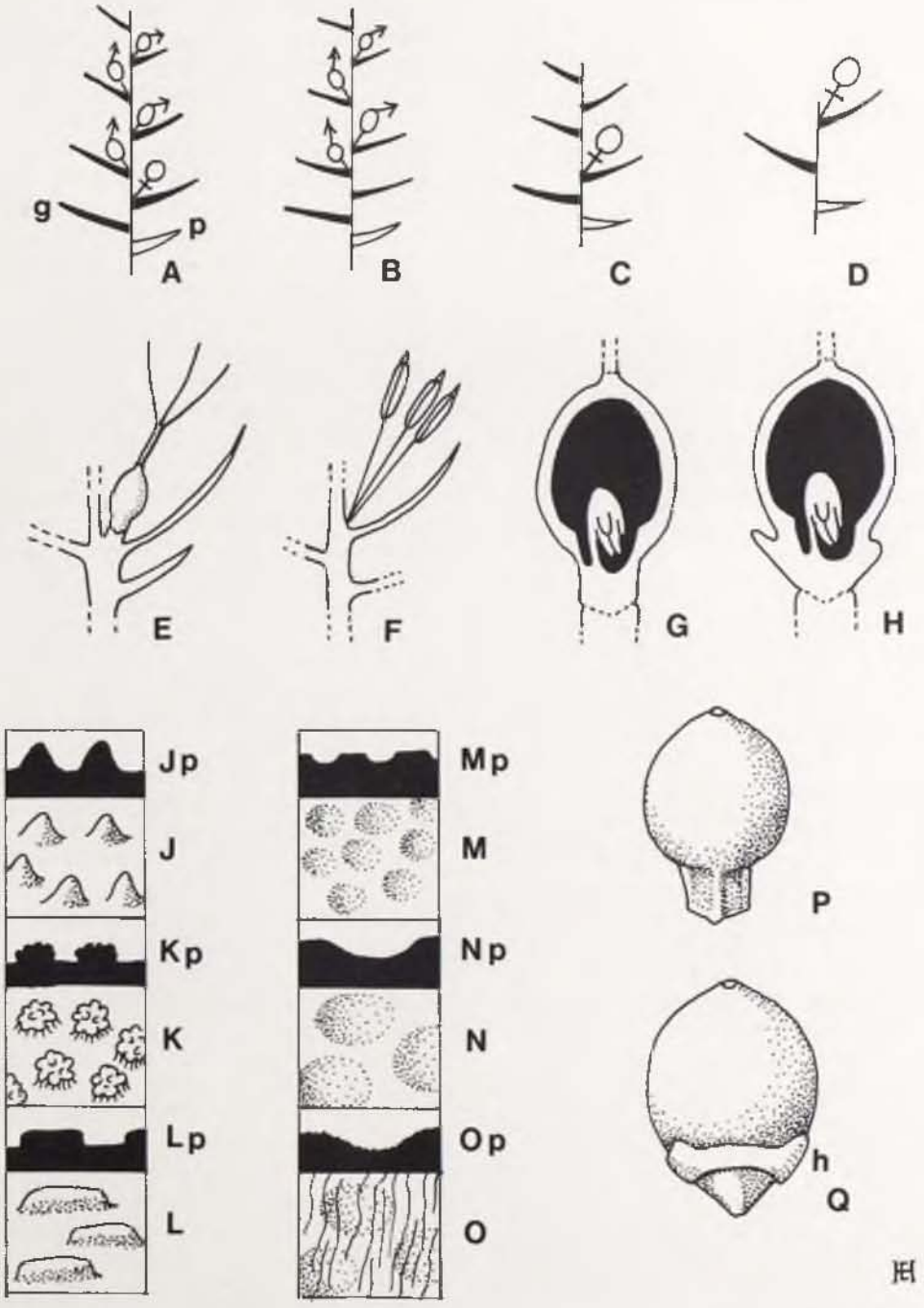

FIG. 1. — *Scleria*, explanatory diagrams: A, androgynaceous; B, male; C, subandrogynaeceous; D, female spikelets; p, prophyll; g, glume; E, female flower in axil of glume; F, male flower in axil of glume; G, L/S ovary of subgenus *Hypoporum;* H, L/S ovary of subgenus; *Scleria;* J–L, raised surface-patterns on achenes; J, tuberculate; Jp, pattern profile; K, tuberculate-verrucose; Kp, pattern profile; L, trabeculate; Lp, pattern profile; M–O, depressed surface-patterns on achenes; M, alveolate, Mp, pattern profile; N, lacunose; Np, pattern profile, O, striate-lacunose; Op, pattern profile; P, achene of *S. nutans*, subgenus *Hypoporum*, with trigonous stipe without hypogynium; Q, achene of *S. poiformis*, subgenus *Scleria*, with obpyramidal stipe with hypogynium; h, hypogynium.

1. The type of habitat occupied by *Acriulus* is the same as that occupied by some species of *Scleria*, for example, *S. poiformis*.
2. The habit of *Acriulus* is like that of, for example, *S. poiformis*.
3. The fundamental branching pattern of the inflorescence of *Acriulus* and *Scleria* is the same.
4. Spikelet morphology of *Acriulus* and some species of *Scleria* is the same.
5. Morphology of the flowers of *Acriulus* is fundamentally the same as that of *Scleria*.
6. Achene morphology of *Acriulus* and some species of *Scleria* such as *S. melanomphala* is very similar, *Acriulus* being distinguished only by its pronounced beak, a feature which may occur in species of *Scleria* not represented in southern Africa.
7. The form of the hypogynium of *Acriulus* is similar to that of some species of *Scleria*, notably *S. melanomphala*.
8. The achenes of *Acriulus* and *Scleria* are silicified (Franklin, 1979) in the same manner, and to an extent not known in any other genus in Cyperaceae.
9. Structure of the pericarp is fundamentally the same in *Acriulus* and *Scleria*.
10. No anatomical feature of the root, rhizome or lamina of *Acriulus* is not shared by one or more species of *Scleria*.
11. Most anatomical features of the culm of *Acriulus* are shared by one or more species of *Scleria*, the exception being the possession by *Acriulus* of some (not all) amphivasal vascular bundles, a feature which may be shared by some species of *Scleria* from regions other than southern Africa.

Infrageneric (supraspecific) groups in Scleria

It has long been recognized that the genus comprises several natural assemblages which have variously been designated as subgenera, sections and series. Little agreement on the hierarchical levels of infrageneric groups, or their delimitation has been reached. Opinions as to whether evolution in the genus has been monophyletic, diphyletic or polyphyletic vary.

Analysis of habitat preferences, habit, morphology and anatomy of southern African species has led me to conclude that evolution in *Scleria* has been diphyletic. Some of the evidence upon which this conclusion is based is shown in Table I. Each of the two co-lateral 'lines' comprises not a linear sequence of taxa, but a far more complex dendritic pattern of ascending, interlinked branches of different lengths. Subgeneric rank is proposed for each of these lines, a treatment first used by Clarke in 1894 but abandoned by him later.

Features of the subgenera

Subgenus *Hypoporum* (Nees) C.B.Cl. comprises slender, narrow-leaved, sometimes hairy plants of open, seasonally dry, often temperate habitats. They are either annuals, or have subterranean perennating organs and annual aerial parts. The evolution of drought/cold escape mechanisms (completion of the life-cycle in a season, or withdrawal of food reserves into a protected underground organ and sometimes also into enlarged culm-bases) has permitted members of this subgenus to exploit a wider range of habitats than is available to taxa without such escape mechanisms, such as predominate in subgenus *Scleria*.

Subgenus *Scleria* (Berg.) C.B.Cl. comprises more-or-less robust, usually broad-leaved, often evergreen perennials, and, less often, annuals. Many taxa are shade-dwellers and the majority are hygrophilous or hydrophilous, are restricted to tropical and subtropical habitats, and, with few exceptions do not manifest drought/cold escape-mechanisms. The annual species occupy tropical habitats in areas where seasonal drought may be experienced and it is suggested that the annual habit is a drought escape-mechanism in such species. Among southern African species in this subgenus, only one is known which has annual aerial parts and a perennial rhizome with swollen, persistent, culm-bases. It is significant that this species, *S. transvaalensis*, occurs at higher, more temperate altitudes than other local species in the subgenus.

The more robust habit and greater breadth of the laminas of most members of subgenus *Scleria* is consistent with the longer lifespan of the aerial parts of these plants compared with that of members of subgenus *Hypoporum*. The shady habitats occupied by some members of subgenus *Scleria* is also conducive to increased stature and to increased breadth of laminas. It is suggested that the lateral, pseudodorsiventral wing of laminar tissue present in the species with praemorse leaves is a modification which, by increasing surface area and volume, may increase the photosynthetic capacity of these shade-dwellers. A feature of the laminas of shade-dwelling species is the absence of stomata from the adaxial epidermis (except a few in the pseudodorsiventral laminar extension when it is present), which is wholly bulliform except where it overlies mechanical tissue in the lateral ribs. The rôle of the bulliform cells is not known, but I suggest that, since a wholly-bulliform adaxial epidermis is present only in shade-tolerant species, it may serve as a light-transmitting layer. Epidermal cells of *Scleria* are a repository for silica. Since the walls of bulliform cells are silicified and their lumina often filled with silica, the uninterrupted layer is rigid, so that laminas which possess such a layer are maintained in a fully-expanded state, which may be an advantage in a shady habitat.

Thickness of laminas is greatest in lacustrine, heliophilic taxa of members of subgenus *Scleria* and is an external manifestation of the development of an extensive air-space system in the mesophyll. Such laminas are amphistomatic, as are the laminas of all southern African members of subgenus *Hypoporum* and, as in *Hypoporum*, may lack intercostal bulliform cells in the adaxial epidermis or may have files of bulliform cells alternating with files of smaller cells in which stomata are present.

TABLE 1.—Distribution of some taxonomically useful characters among southern African species of *Scleria*

Inflorescence		Spikelets					Hypogynium			Culm anatomy				Lamina a	
							Present			vascular bundles		peripheral sclerenchyma ring			out
ed te	± simply glomerate spicate	inter-rupted panic-ulate	androgyn-aeceous, and male	androgyn-aeceous subandro-gynaeceous and male	subandro-gynaeceous female and male	female and male	Absent	non-buoyant		buoyant	col-lateral	amphi-vasal	absent	present	amphi-stomatic	hypo-stomatic	cont ar asso
								margin smooth	margin fimbriate	margin ciliate							
			X				X				X		X		X		
	rarely		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
	X		X				X				X		X		X		
		X		X			X				X		X		X		
		X			X		X				X		X			X	
		X			X		X				X		X			X	
		X			X		X				X		X			X	
		X			X		X				X		X			X	
		X			X		X				X		X			X	
		X			X		X				X		X			X	
		X			rarely	X	X				X			X	X		
		X				X	X				X	X		X	X		
		X				X			X		X			X			X
		X				X				X	X			X			X

Although the fundamental branching pattern of the paniculate inflorescence of all species of *Scleria* is the same, modification has taken place in two ways, namely, by progressive contraction of all or most ramuli leading to the 'glomerate-spicate' type of inflorescence characteristic of subgenus *Hypoporum* in which the bracts are (mostly) reduced, glumiform structures, and, by progressive contraction of some ramuli together with progressive elongation of others leading to the 'interrupted-paniculate' type of inflorescence characteristic of subgenus *Scleria,* in which most bracts are foliaceous. It is suggested that in *Hypoporum* the branched glomerate-spicate type of inflorescence such as is seen in *S. woodii* is less specialized than the simply glomerate-spicate type seen in *S. aterrima.* In subgenus *Scleria* it is postulated that the greater the degree of elongation of proximal internodes in the inflorescence, and the greater the number of such elongated ramuli, the more highly specialized the inflorescence. Based upon these criteria, the southern African species in subgenus *Scleria* with the least specialized inflorescences are *S. lacustris* and *S. poiformis* and those with the most specialized are *S. greigiifolia* and *S. angusta.*

It is postulated that unisexual spikelets in *Scleria* have been derived by reduction from bisexual (androgynaeceous) spikelets (Fig. 1, A–D). Unisexual female spikelets are unknown in subgenus *Hypoporum,* which has bisexual spikelets and unisexual male spikelets. It is suggested that the higher the ratio of bisexual to male spikelets in the inflorescence, the less specialized the inflorescence.

In subgenus *Scleria,* unisexual male and functionally female spikelets occur in an inflorescence and, rarely, *(S. lacustris)* also some bisexual spikelets. It is suggested that species which consistently produce some bisexual spikelets are more primitive than those which consistently lack them, and that species whose functionally female spikelets consistently lack any vestigial male parts (Fig. 1D) are more advanced than those which have male rudiments (Fig. 1C).

The hypogynium or 'disc' which is present on some achenes is considered to be a new modification of the stipe of the achene and not a vestigial structure (Fig. 1H, Q), therefore it is postulated that the type of achene found in subgenus *Hypoporum* which has a trigonous stipe lacking any distal elaboration as a hypogynium (Fig. 1G, P), is primitive, and that the type of achene found in subgenus *Scleria* which has an obpyramidal stipe elaborated distally as a hypogynium is derivative.

There is evidence that in *Scleria,* evolution of two different types of plants, two different types of inflorescence, different types of achene-bearing spikelets and two different types of achene has occurred in response to differences in habitat.

Glomerate-spicate inflorescences are characteristic of taxa which occupy seasonally dry, grassland habitats. The achene-bearing spikelets are bisexual, mature simultaneously on the plant, and are often held stiffly erect. There is no hypogynium developed, therefore the female glumes continue to clasp the achene firmly even after silicification of the pericarp is complete and the achene becomes detached from its pedicel. Achenes are not shed, but reach the substratum only when the aerial parts of the plant die back in winter. The inevitable result is that achenes are mostly distributed in the immediate vicinity of the parent plants, thereby ensuring that when germination takes place the seedlings are in a suitable habitat. Since germination is likely to occur more-or-less simultaneously with the onset of favourable conditions in spring, shedding of achenes over an extended period would confer no advantage on such plants.

Taxa with interrupted-paniculate inflorescences are, with few exceptions, evergreen hygro- or hydrophilous plants of tropical or subtropical habitats. The inflorescences, achene-bearing spikelets and achenes of these plants have become modified so that achenes mature progressively in an inflorescence, and can be shed instead of being retained on the plants for the extended lifespan of the aerial parts. By elongation of their proximal internodes the partial panicles have become pendulous (mostly) so that the spikelets hang upside-down. The achene-bearing spikelets have lost, wholly or in part, the distal male part so that the solitary female flower appears to be terminal. The loss of the distal male part of the spikelet and assumption of a pseudoterminal position by the female flower remove mechanical obstruction to the spreading of the female glumes as the pistil matures. The presence of a hypogynium increases the width of the achene towards its base and forces the glumes to spread apart further than would occur if no hypogynium were present. When the process of silicification of the achene is complete and the vascular supply is severed, the hypogynium which is not wholly silicified, becomes desiccated and shrinks, and the achene drops out of the inflorescence. The advantages of such a system to taxa occupying wet habitats in areas with little seasonal temperature fluctuation are obvious.

Sections within the subgenera

The number of southern African species of *Scleria* is small, representing only about 10% of the genus. It has not been possible to accumulate sufficient evidence from such a small sample to permit grouping of the southern African species of subgenus *Hypoporum* into more than one section. Pending worldwide revision of the genus a single section, *Hypoporum* (Nees) Endlicher, is recognized, with the characters of the subgenus.

Even with such a small sample, subdivision of subgenus *Scleria* as it is represented in southern Africa is possible, based partly upon the presence or absence of male rudiments in the achene-bearing spikelets. Three sections are recognized in our area and a fourth is represented close to our border in Mozambique.

To section *Scleria* (Bergius) Endlicher are assigned those taxa in which most functionally female spikelets retain rudimentary distal male parts. The least specialized condition is one in which there are some fully androgynaeceous (bisexual) spikelets as well as functionally female and male spikelets in the

same inflorescence e.g. *S. lacustris*. The hypogynia, although morphologically different in different taxa, all have entire margins.

This is the least homogeneous section in subgenus *Scleria*. Its members occupy a greater variety of habitats and show a wider range of morphological diversity than do members of the more highly specialized sections. Within the section it is possible to discern groups of species which share similar morphological and anatomical features. However, since so few species are present in southern Africa circumscription of species groups will have to be deferred pending world-wide revision of the genus.

Those taxa in subgenus *Scleria*, in which the functionally female spikelets are (with rare exceptions) without male rudiments, have been assigned to three sections namely, *Acriulus* (Ridley) C.B.Cl., *Schizolepis* (Nees) C.B.Cl. and *Ophryoscleria* (Nees) C.B.Cl.

Section *Acriulus* is monotypic, *S. greigiifolia* being distinguished from members of section *Scleria* by its strictly female spikelets; by its adaxially hirsute female glumes; by its long-beaked achene and by the presence of amphivasal vascular bundles in the culm. Its hypogynium is like that of some members of section *Scleria*. *Acriulus* is maintained as a section pending world-wide revision of the genus which may show that the characters enumerated are shared by some members of section *Scleria* in which case *S. greigiifolia* would have to be placed in that section and the sectional diagnosis amended.

Members of sections *Schizolepis* and *Ophryoscleria* occupy swamp-forest habitats, are alike in habit and have praemorse leaves. The sections are distinguished by their hypogynia which, in *Schizolepis* have fimbriate margins, and in *Ophryoscleria* are corky, cupuliform, exceed the achene in width and have ciliate margins.

Although there are hydrophilous taxa in all sections of subgenus *Scleria*, none but the members of section *Ophryoscleria* have buoyant achenes. Buoyancy of the fruit is attributable to the highly specialized type of hypogynium. The achene sinks in water if the hypogynium is artifically removed. Population spread is probably facilitated by buoyancy of the fruit, therefore it is considered to be likely that taxa with this type of morphologically distinctive hypogynium which serves a biologically important function not attained in any other section, have reached the highest level of specialization in *Scleria*.

SCLERIA

Scleria *Berg.* in Vet. Akad. Handl. Stockh. 26: 142, t.4 (1765); Sw. in Prodr. 18 (1788); Endl., Gen. Pl. 112 (1836); Kunth, Enum. Pl. 2: 339 (1837); Boeck. in Vidensk. Medd. Dansk Naturh. Foren. Kbh. 9–13: 150 (1869); Boeck. in Linnaea 38: 436 (1874); Boeck. in Flora 62: 569 (1879); Benth. & Hook. f., Gen. Pl. 3: 1070 (1883); C.B.Cl. in Fl. Brit. Ind. 6: 685 (1894); C.B.Cl. in FC 7: 293 (1898); C.B.Cl. in Urban, Symb. Antill. 2: 137 (1900); C.B.Cl. in FTA. 8: 493 (1902); C.B.Cl. in Journ. Misc. Inf. Kew add. ser. 8: 131 (1908); Schonland in Mem. bot. Surv. S. Afr. 3: 64 (1922); Brain in Proc. Rhod. scient. Assoc. 33: 51 (1934); Hutch. in FWTA 2: 491 (1936); Chermezon in Arch. Bot. Caen 7, Mém. 2: 88 (1936); Core in Brittonia 2: 1 (1936); Piérart in Lejeunia 13: 1 (1951); Phillips, Gen. edn 2, 158 (1951); Nelmes in Kew Bull. 10: 415 (1955); Nelmes in Kew Bull. 11: 73 (1956); Kern in Blumea 11: 140 (1961); Koyama in J. Fac. Sci. Tokyo Univ. (Bot.) 8: 134 (1961); Napper in Jl E. Africa nat. Hist. Soc. 24: 23 (1964); Robinson in Kew Bull. 18: 487 (1966); Podlech in FSWA 51 (1967); Jacot Guillarmod in Fl. Lesotho 132 (1971); Gordon-Gray in Ross, Fl. Natal 111 (1972); Kern in Fl. Malesiana 722 (1974); Compton in Fl. Swaziland 73 (1976); Dyer, Gen. 2: 889 (1976). Type species: *S. flagellum-nigrorum* Berg.

Acriulus Ridl. in J. Linn. Soc., Bot. 20: 336 (1883). For other synonymns see Benth. in Benth. & Hook. f., Gen. Pl. 3: 1071 (1883).

Monoecious annual herbs with fibrous roots, or stout or slender monoecious perennial herbs with short or long, horizontal, oblique or descending, fleshy or woody rhizomes or with ± horizontal subterranean soboles, or with both rhizomes and soboles. *Culms* nodose, solitary or ± tufted, erect or scandent, trigonous or triquetrous, leafy towards the base or throughout, smooth or more usually scabrid on the angles, glabrous or hairy. *Leaves* 3-ranked, narrowly to broadly linear with sheathing bases, ± smooth to scabrid on the margins and the 3–5 principal ribs, glabrous or hairy, the lowermost represented by almost bladeless or bladeless sheaths; *laminas* tapering smoothly towards apex or suddenly narrowed at unequal distances on each side from the apex ('praemorse'); profile ± V-shaped, flanged V-shaped or in the praemorse species flanged V-shaped distally with additional lateral wings to the flanges proximally; *sheaths* closed, sometimes shortly 3-winged, the mouth truncate, concave, convex or produced into a short tongue. *Inflorescence* paniculate with a lax or compact terminal panicle and usually one or more lateral panicles, with (rarely without) foliaceous bracts, or branched or simply glomerate-spicate with ± glumaceous bracts. *Spikelets* androgynaeceous (bisexual) or unisexual, the functionally female spikelets sometimes subandrogynaeceous; *androgynaeceous spikelets* with one basal or sub-basal, lateral female floret and 1 to several upper male florets some of which may be sterile; *functionally female spikelets* with 2–4 empty glumes proximally and one sub-basal lateral female floret and 1 to several empty glumes distally (subandrogynaeceous), or lacking sterile distal glumes; *male spikelets* with 1–2(3) empty glumes proximally and several to many male florets of which the distal few may be sterile. *Flowers* unisexual, solitary in axils of spirally arranged glumes. *Male flower* of (1) 2–3 stamens; anthers bithecate, linear, often apiculate. *Female flower* consisting of a tricarpellary, unilocular ovary with a terminal style branched above into 3 filiform stigmas, the style deciduous or, rarely, the base persistent. *Achenes* ovoid, ellipsoid or subglobose and obscurely or obtusely trigonous or strongly trigonous, smooth or variously sculptured, glabrous or hairy, with silicified pericarp, whitish, grey,

brown, purple or violet, lustrous or dull, borne on a trigonous or obpyramidal stipe which is sometimes expanded at the apex into a persistent, triangular, trilobed, zoniform or cupulate hypogynium with entire, fimbriate or ciliate margin.

A genus of ± 200 species distributed throughout the tropics and subtropics. 23 indigenous species occur in our area, 3 of which may be endemic.

The generic name *Scleria* is derived from the Greek word *scleros*, meaning hard, in allusion to the hard fruit, the pericarp of which is silicified.

The genus is divided into 2 subgenera and 5 or 6 sections, 5 of which are represented in Africa and 4 in southern Africa. The section *Hymenolytrum* (Nees) Core which is endemic in South America may not be distinct from sect. *Scleria* (Berg.) Endl. (Refer Fig. 1).

KEY TO SECTIONS

Inflorescence glomerate-spicate, branched or simple, terminal; bracts glumiform or the lower subfoliaceous; spikelets androgynaeceous or androgynaeceous and male; hypogynium absent ..... *Hypoporum* (spp. 1–12)

Inflorescence paniculate, terminal and lateral or terminal *(S. poiformis)*; bracts foliaceous (except *S. poiformis)*; spikelets androgynaeceous, subandrogynaeceous and male *(S. lacustris)*, subandrogynaeceous, female and male, or female and male; hypogynium present:

Hypogynium margin entire, glabrous:

Female glumes glabrous on adaxial surface..... *Scleria* (spp. 13–21)

Female glumes densely hirsute on adaxial surface..... *Acriulus* (sp. 22)

Hypogynium margin fimbriate or ciliate:

Margin of hypogynium fimbriate; hypogynium not cupuliform; style-base not persistent..... *Schizolepis* (sp. 23)

Margin of hypogynium ciliate; hypogynium cupuliform, broader than the achene; style-base persistent ..... **Ophryoscleria*

I. Subgenus **Hypoporum** *(Nees) C.B.Cl.* in Hook. f., Fl. Brit. Ind. 6: 685 (1894). Type species: *Hypoporum pergracile* Nees.

Slender to very slender perennial or annual herbs up to 1,5 m tall, the perennial species rhizomatous or soboliferous or with both rhizomes and soboles. *Leaves* evenly spaced along length or crowded towards base of culm, (1) 2–9 mm broad, tapering smoothly towards apex, glabrous or hairy, the ribs and margins scaberulous or smooth. *Inflorescence* terminal, glomerate-spicate, branched or unbranched, with ± glumaceous bracts. *Spikelets* all bisexual (androgynaeceous) or bisexual and male. *Achenes* smooth or variously sculptured, glabrous, the stipe trigonous. *Hypogynium* absent.

Section *Hypoporum* (Nees) Endl., Gen. Pl. 112 (1836).

Hypoporum Nees in Journ. Edinb. Phil. Soc. 17: 266 (1834) et in Mart., Fl. Bras. 2: 169 (1842). Type species: *Hypoporum pergracile* Nees.

Characters of subgenus *Hypoporum*.

II. Subgenus **Scleria** *(Berg.) C.B.Cl.* in Hook. f., Fl. Brit. Ind. 6: 686 (1894). Type species: *Scleria flagellum-nigrorum* Berg.

Plants herbaceous, tall (to 2,5 m), stout, rhizomatous perennials or medium-sized (to 2 m) rhizomatous perennials or medium-sized annuals. *Leaves* evenly spaced along length or crowded towards base of culm, 2–40 mm broad, tapering smoothly towards apex or abruptly and unequally narrowed in the distal part, glabrous or hairy, the ribs and margins scabrid or scaberulous. *Inflorescence* paniculate, the panicles lax or contracted, terminal or terminal and lateral, with foliaceous bracts. *Spikelets* androgynaeceous (rarely), subandrogynaeceous, female and male. *Achenes* smooth or variously sculptured, glabrous or hairy, the stipe obpyramidal. *Hypogynium* present.

1. Section *Scleria* (Berg.) Endl., Gen. Pl. 112 (1836).

Scleria Berg. in Vet. Akad. Handl. Stockh. 26: 142 (1765). Type species: *Scleria flagellum-nigrorum* Berg.

Plants tall (to 2 m), stout *(S. poiformis)* or medium-sized perennials, or medium-sized annuals *(S. lacustris, S. foliosa)*. Leaves evenly spaced along length of culm or, *(S. poiformis)*, crowded towards base of culm, 2 mm broad *(S. unguiculata)* – 40 mm broad *(S. poiformis)*, usually tapering smoothly towards apex. *Inflorescence* terminal *(S. poiformis)* or terminal and lateral. *Spikelets* androgynaeceous (rarely, *S. lacustris)* subandrogynaeceous, female and male. *Female glumes* glabrous on adaxial surface. *Achenes* smooth or variously sculptured, glabrous or hairy, beakless or almost so. *Hypogynium* strongly or obscurely trilobed, rarely zoniform *(S. melanomphala)*, the margin entire, glabrous.

2. Section *Acriulus* (Ridl.) C.B.Cl. in FTA 8: 495 (1902).

Acriulus Ridl. in J. Linn. Soc. Bot. 20: 336 (1883). Type species: *Acriulus greigiifolius* Ridl. as *greigifolius*.

Plants tall (to 2 m), stout, perennial. *Leaves* crowded towards base of culm, 5–12 mm broad, usually tapering smoothly towards apex. *Inflorescence* lax, copious, terminal and lateral. *Spikelets* female and male. *Female glumes* densely hirsute on adaxial

* Recorded from Mozambique but not yet recorded from FSA area.

surface. *Achenes* smooth, glabrous, strongly beaked. *Hypogynium* zoniform, the margin entire, glabrous.

3. Section *Schizolepis* (Nees) C.B.Cl. in Hook. f., Fl. Brit. Ind. 6: 694 (1894).

Schizolepis Nees in Mart., Fl. Bras. 2: 186 (1842). Type species: *Scleria latifolia* Sw.

Plants tall (to 2,5 m), stout, perennial. *Leaves* evenly spaced along length of culm, 6–16 mm broad, usually abruptly and unequally narrowed towards apex. *Inflorescence* terminal and lateral. *Spikelets* female and male. *Female glumes* glabrous on adaxial surface. *Achenes* smooth, glabrous, beakless. *Hypogynium* trilobed, the margin fimbriate.

5. Section *Ophryoscleria* (Nees) C.B.Cl. in Urban, Symb. Antill. 2: 138 (1900).

Ophryoscleria Nees in Mart., Fl. Bras. 2: 182 (1842). Type species: *Scleria racemosa* Poir.

Plants tall (to 2,5 m), stout, perennial. *Leaves* evenly spaced along length of culm, 8–35 mm broad, usually abruptly and unequally narrowed towards apex. *Inflorescence* terminal and lateral. *Spikelets* female and male. *Female glumes* glabrous on adaxial surface. *Achenes* smooth or variously sculptured, glabrous or hairy, beakless or beaked, with persistent style-base. *Hypogynium* cupulate, broader than the achene, the margin ciliate.

KEY BASED ON VEGETATIVE AND FRUIT CHARACTERS

a Inflorescence in terminal and lateral panicles, or (in *S. poiformis* and, rarely, *S. melanomphala)* in a solitary terminal panicle; bracts foliaceous (except *S. poiformis);* hypogynium present:

Lamina usually abruptly narrowed towards apex (praemorse); hypogynium margin fimbriate ..... 23. *S. angusta*

Lamina tapering smoothly towards apex; hypogynium margin entire:

Leaves 20–40 mm broad; inflorescence terminal, without foliaceous bracts; hypogynium obscurely 3-lobed; achene ± globose, smooth, glabrous, grey-brown or white if immature..... 21. *S. poiformis*

Leaves less than 20 mm broad; inflorescence terminal and lateral, with foliaceous bracts; hypogynium 3-lobed or collar-like without defined lobes; achene smooth or patterned, glabrous or hairy:

b Achene hairy (at least proximally):

Achene hairy proximally, glabrous distally, smooth or faintly striate-lacunose ..... 19. *S. lagoensis*

Achene hairy distally and proximally, patterned:

Achene very faintly reticulate-lacunose; male spikelets 7–9 mm long; lateral panicles single at nodes ..... 18. *S. achtenii*

Achene distinctly tessellate-lacunose; male spikelets 3–5 mm long; lateral panicles 2–4(5) at the nodes..... 17. *S. unguiculata*

bb Achene glabrous:

c Achene patterned:

Plant caespitose, without rhizome, annual; achene alveolate-lacunose ..... 16. *S. foliosa*

Plant rhizomatous, perennial; achene reticulate-lacunose to tuberculate-lacunose:

Culm bases 3–4 mm in diameter, not or hardly swollen; foliaceous bracts of terminal panicle ensiform, 3–4 mm broad 10 mm behind apex, exceeding inflorescence ..... 15. *S. natalensis*

Culm bases 9–10 mm in diameter, swollen; foliaceous bract of terminal panicle subulate, 1–2 mm broad 10 mm behind apex, sometimes exceeding inflorescence ....14. *S. transvaalensis*

cc Achene smooth:

Plant without rhizome, annual, lacustrine; with adventitious roots at base of culm from several nodes above the base; hypogynium very small, 3-lobed ..... 13. *S. lacustris*

Plant rhizomatous:

Panicles compact, spiciform, 1–2–(4); female glumes 7–11 mm long, glabrous adaxially; achene avoid, beakless, grey with blackish apex ..... 20. *S. melanomphala*

Panicles lax, many; female glumes 6–7 mm long, densely villous adaxially in distal half; achene broadly ovoid, strongly beaked, pinkish-brown, sometimes with violet blotches ..... 22. *S. greigiifolia*

aa Inflorescence terminal, glomerate-spicate, branched or simple; bracts glumaceous or the lowermost sub-foliaceous; hypogynium absent:

Plants without propagative stems, annual; lamina profile flattened V-shaped..... 9. *S. pergracilis*

Plants with subterranean propagative stems:

Plants without rhizome, spreading by means of long, hard, horizontal, culm-like soboles with internodes 8–47 mm long; achene with a series of deep horizontal and vertical ridges at junction of stipe and body..... 8. *S. sobolifer*

Plant with true rhizome:

Rhizome soft, fleshy, strongly-scented, white or pink, tuberous, shrinking markedly soon after removal from soil; inflorescence much-branched, the branches delicate; lamina profile V-shaped..... 1. *S. woodii*

Rhizome not as above; inflorescence simply glomerate-spicate or sparingly branched; lamina profile flanged V-shaped:

d Rhizome descending:

Rhizome stout, woody; leaves crowded towards base of culm, 2–7 mm broad, the majority short-bladed or bladeless; achene acutely trigonous, strongly reticulate-trabeculate, grey ..... 6. *S. veseyfitzgeraldii*

Rhizome very slender, terminating in a swollen tuber up to 1 cm long; leaves 1–2,5 mm broad; achene subglobose, trabeculate-verrucose, grey, the trabeculae pale to bright reddish-gold ..... 10. *S. dieterlenii*

dd Rhizome ± horizontal:

Culms distinctly bulbous and ± woody at the base ..... 5. *S. bulbifera*

Culms not, or only very slightly bulbous at the base:

e Culms clustered, rhizome with very short internodes; soft, short soboles sometimes present:

Glomerules reflexed at maturity; inflorescence unbranched; glumes densely hirsute, the hairs blackish; achene smooth ..... 12. *S. aterrima*

Glomerules not reflexed; inflorescence unbranched or with few short basal branches; glumes glabrous or sparsely ciliate; achene smooth or tuberculate or trabeculate towards the apex ..... 7. *S. dregeana*

ee Culms arising in a ± straight series from a hard horizontal rhizome at least 2 mm thick:

Glomerules reflexed at maturity; inflorescence unbranched; glumes densely hirsute, the hairs pale, reddich or blackish; achene smooth or lightly tuberculate ..... 11. *S. nutans*

Glomerules not reflexed:

Spikelets 8–9 mm long; glumes hairy, the hairs pale; achene smooth, light brown with black stipe ..... 4. *S. longispiculata*

Spikelets less than 8 mm long; glumes glabrous or glabrescent; achene smooth or tuberculate, stipe pale:

Inflorescence rhachis drooping, 60–250 mm long; spikelets 5–7(8) mm long; glumes tawny, glabrous or glabrescent ..... 2. *S. welwitschii*

Inflorescence rhachis stiffly erect, less than 170 mm long; spikelets 4–5 mm long; glumes reddish-brown to dark brown, glabrous ..... 3. *S. rehmannii*

KEY FOR FIELD USE

a Plants tall (to 2,5 m) and stout or medium sized; inflorescence paniculate:

Leaves abruptly and unequally narrowed towards the apices; shade-dwelling in coastal swamp-forest; Transkei, Natal ..... 23. *S. angusta*

Leaves tapering smoothly towards apices:

Inflorescence terminal, without foliaceous bract; leaves ± 40 mm broad, thick and spongy proximally; forming dense stands in open coastal pans; Natal, north of Tugela River.... 21. *S. poiformis*

Inflorescence terminal, or terminal and lateral, with foliaceous bracts:

b Achene hairy (at least proximally):

Achene hairy proximally, glabrous towards and on top; open damp habitats; known for FSA area only from Swaziland ..... 19. *S. lagoensis*

Achene hairy proximally and on top:

Lateral panicles single at each node; male spikelets 7–9 mm long; achene hairs white; open damp habitats; Natal coastbelt ..... 18 *S. achtenii*

Lateral panicles 1–3 or more at each node; male spikelets 3–5 mm long; achene hairs golden; open wet habitats; northern Botswana ..... 17. *S. unguiculata*

bb Achene glabrous:

Achene patterned:

Plants caespitose, without rhizome; achene smooth on top, patterned proximally; annual in open, seasonally wet habitats inland; Swaziland, Transvaal, northern Namibia ..... 16. *S. foliosa*

Plants rhizomatous, perennial:

Panicles lax, pale greenish-yellow; bracts ensiform, 3–4 mm broad in the distal 10 mm, overarching their panicles; culm bases not or hardly swollen; partly shaded streambanks in margins of coastal forest; Natal and Transkei ..... 15. *S. natalensis*

Panicles dense, golden or reddish; bracts subulate, 1–2 mm broad in the distal 10 mm, not conspicuously overarching their panicles; culm-bases swollen to c. 10 mm diameter; open, damp habitats or semi-sheltered by banks or among rocks; northern and eastern Transvaal, Swaziland and known from one locality (Nkandla) in Natal ..... 14. *S. transvaalensis*

Achene smooth:

Leaves evenly spaced along length of culm; panicles very compact, spike-like, dark reddish-brown; achene ovoid, beakless, grey with black apex; in, or on periphery of open, wet, frostfree habitats: Transkei, Natal, Transvaal, Swaziland, northern Botswana ..... 20. *S melanomphala*

Leaves crowded towards base of culm; panicles lax, very copiously branched, dark reddish-brown; achene ovoid, strongly beaked, light brown sometimes with violet blotches; in, or

on periphery of open, wet, frost-free habitats; Southern Natal and known from one locality near Lake St. Lucia ..... 22. *S. greigiifolia*

aa Plants medium sized to small (0,5 m), sometimes very slender; inflorescence glomerate-spicate, branched or unbranched:

Plants without propagative stems; annuals:

Plants medium sized, aquatic, with floating roots at several basal nodes of culm; inflorescence stiffly branched, the branches glomerate-spicate; bracts subfoliaceous; in rivers or lakes; northern Botswana ..... 13. *S. lacustris*

Plants slender, caespitose; leaf profile flattened V-shaped without lateral flanges, margins slightly recurved; inflorescence simply glomerate-spicate or with one short basal branch; seasonally wet areas; near Dundee in Natal..... 9. *S. pergracilis*

Plants with subterranean propagative stems:

Achene acutely trigonous; rhizome very short, ± vertical and difficult to discern; culm bases thickly invested with numerous dry leaf-sheaths; leaves mostly short-bladed, crowded towards base of culm; seasonal flood-plains; Caprivi Strip ..... 6. *S. veseyfitzgeraldii*

Achene ovoid to subglobose, obscurely trigonous:

Culm bases distinctly bulbous and woody; leaves subequally spaced along length of culm; inflorescence simply glomerate-spicate or with 1 – several basal branches; open, seasonally damp grassland; Transkei, Natal, Transvaal, Swaziland ..... 5. *S. bulbifera*

Culm bases not, or only very slightly bulbous:

c Rhizome woody, at least 2 mm thick, elongate, ± horizontal, with culms arising at intervals from it:

Glumes densely hairy:

Glomerules reflexed at maturity; hairs on glumes mostly reddish-black; leaves ± evenly spaced along length of culm; open, permanent bogs; Transkei, Natal, Transvaal ..... 11. *S. nutans*

Glomerules not reflexed at maturity; hairs on glumes pale; achene stipe black; open, damp grassland in sandy soil; northern Botswana and northern Namibia..... 4. *S. longispiculata*

Glumes glabrous or very sparsely hairy:

Inflorescence simply glomerate-spicate or sparingly branched, usually drooping; spikelets dull straw-coloured, 5–8 mm long; open permanent bogs; Natal midlands and uplands, Transvaal, Swaziland ..... 2. *S. welwitschii*

Inflorescence simply glomerate-spicate or sparingly branched, stiffly erect; spikelets reddish-brown, 4–5 mm long; open, seasonally or permanently wet grassland; Transvaal, north-east Namibia..... 3. *S. rehmannii*

cc Rhizome and culms not as above:

Glomerules reflexed at maturity; glumes densely hairy, the hairs purplish-black; leaves crowded towards base of culm; plant apparently caespitose because rhizome very short; sometimes with 1 – several soft fleshy soboles arising from culm-cluster; open, permanently wet areas in sandy soil; Transkei, Natal, Transvaal ..... 12. *S. aterrima*

Glomerules not reflexed at maturity:

Perennating stem wholly or partly softly tuberous, swollen:

Rhizome descending, very slender becoming swollen and softly tuberous towards the tip; slender, delicate, caespitose, strictly montane plants of open, seasonally wet habitats eastern Cape, Transvaal, Natal, Lesotho ..... 10. *S dieterlenii*

Rhizome horizontal or oblique, the internodes of young rhizomes pearly-white or pink, swollen and softly tuberous, very strongly scented; lamina profile V-shaped without lateral flanges; inflorescence copiously branched, the branches delicate; glomerules of few spikelets; open, seasonally wet habitats or damp woodland in partial shade; Transkei, Natal, O.F.S., Transvaal, Lesotho, Swaziland..... 1. *S. woodii*

Perennating stem not swollen and tuberous:

Culms clustered, sometimes with 1 or more soft, terete soboles from base of culm-cluster; rhizome very short; inflorescence simply glomerate-spicate or sparingly branched towards base; open, permanently wet habitats; northern and eastern Cape, Natal, Transvaal, Lesotho, Swaziland, northern Botswana. 7. *S. dregeana*

Culms usually solitary, widely spaced, linked by hard, trigonous, red-speckled soboles with internodes 8–47 mm long; inflorescence simply glomerate-spicate; strictly coastal in open, seasonally wet habitats in sandy soil; Natal..... 8. *S. sobolifer*

1. **Scleria woodii** *C.B.Cl.* in FC 7:295 (1898) et in FTA 8:501 (1902); Nelmes in Kew Bull. 10:428 (1955); Napper in Kew Bull. 25:443 (1971) *non* Robinson (1966); [S. *woodii* sensu E.A. Robinson in Kew Bull. 18:512 (1966), pro parte]. Type: South Africa, Zululand, *Wood* 3994 (K, lecto.!; NH!; BOL!).

Perennial. *Rhizome* 2–4 mm thick, fleshy, white or pink, strongly scented; scales pink. *Culms* 0,25–0,75 mm tall, solitary or few, clustered, glabrous or glabrescent. *Leaves* 1–3 mm broad, glabrous or glabrescent; sheaths with truncate or concave, glabrescent to densely hirsute mouths. *Inflorescence* branched, delicate, 80–200 mm long. *Glo-*

merules 1–3–(4) per branch, sessile, of 1–6 spikelets. *Bracts* shorter than or exceeding the glomerules, with scabrid awn 1–10 mm long. *Spikelets* 2,5–5 mm long. *Glumes* 2,5–4,5 mm long, glabrous, shortly awned, pale red with darker red striae. *Achene* ovoid to subglobose, 1,5–1,8 × 1–1,5 mm, glabrous, smooth, tuberculate or trabeculate, even on the same plant, grey.

Perennial with annual aerial parts, widespread in seasonally boggy open areas and damp woodland in partial shade in the summer rainfall region of southern Africa (Fig. 2) and to the north in Zimbabwe, Zambia, Tanzania and Angola.

This species is distinguished from other southern African representatives of subgenus *Hypoporum* mainly by its strongly scented, soft, fleshy, tuberous, pearly white or pink rhizome; by its narrowly V-shaped lamina profile; and by its delicate, often profusely-branched inflorescence.

Vouchers : *P. A. Smith* 2033; *Acocks* 11340; *Killick* 1222; *Ward* 8738; *B. R. Roberts* 3087.

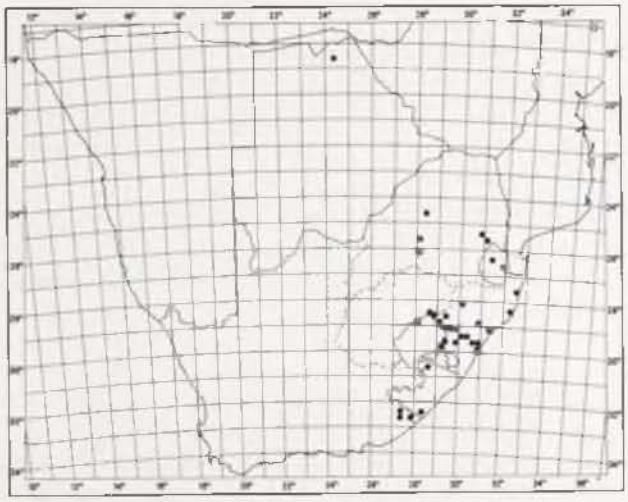

FIG. 2. — Distribution map of *Scleria woodii*.

2. **Scleria welwitschii** *C.B.Cl.* in Dur. & Schinz, Consp. Fl. Afr. 5:675 (1895) et in FTA 8:501 (1902); Nelmes in Kew Bull. 10:423 (1955); Robinson in Kew Bull. 18:506 (1966); Compton, Fl. Swaziland 74 (1976). Type : Angola, *Welwitsch* 7138 (BM, lecto.!).

S. junciformis Welw. in Ridl. in Trans. Linn. Soc. ser. 2, Bot. 2: 168 (1884), nom illegit, *non* Thw. (1864). Type : as above.

Perennial. *Rhizomes* 3–4 mm thick, woody, red; scales stramineous-reddish. *Culms* 0,30–1 m tall, villous to glabrescent, 5–7 mm distant. *Leaves* 2–3 mm broad, glabrous to villous; sheath with mouth produced into a triangular or rounded, villous or glabrescent tongue 1–2 mm long. *Inflorescence* branched or unbranched, (60)–150–250 mm long, drooping. *Glomerules* (1)–3–8 per branch, of 1–2–(6) sessile spikelets. *Bracts* shortly awned, shorter than the glomerules. *Spikelets* 5–7–(8) mm long. *Glumes* 3–5 mm long, glabrous or minutely hispidulous distally, shortly awned, pale stramineous with faint reddish streaks. *Achene* ellipsoid to ovoid, 1,5–1,8 × 1–1,2 mm, glabrous, smooth, grey.

Perennial with annual aerial parts, occurring in permanently boggy grassland areas at temperate altitudes in summer rainfall region of southern Africa (Fig. 3) and to the north in Zimbabwe, Malawi and Angola.

This species is morphologically similar to *S. rehmannii* C.B.Cl. and *S. longispiculata* Nelmes. All three species have ± horizontal, woody rhizomes; that of *S. welwitschii* is reddish, those of *S. rehmannii* and *S. longispiculata* pale stramineous. The inflorescences of *S. welwitschii* and *S. rehmannii* are simply glomerate-spicate or, in *S. welwitschii* and less often in *S. rehmannii* with one or a few lateral branches from the proximal glomerules, whereas that of *S. longispiculata* is unbranched. The inflorescence of *S. welwitschii* is lax and drooping, those of *S. rehmannii* and *S. longispiculata* are rigid, ± erect. Spikelets of *S. welwitschii* are 5–8 mm long; of *S. rehmannii* 4–5 mm long; of *S. longispiculata* 8–9 mm long. The glumes of *S. welwitschii* are fulvous-stramineous or castaneous; of *S. rehmannii* wholly or partly blackish-red; of *S. longispiculata* light castaneous. Achenes of *S. welwitschii* and *S. longispiculata* are smooth; those of *S. rehmannii* smooth or lightly tuberculate. Achenes of *S. welwitschii* and *S. rehmannii* are grey or light brown; of *S. longispiculata* brown with the stipe black. Achenes of *S. welwitschii* and *S. rehmannii* are ± 2 mm long; those of *S. longispiculata* ± 4 mm long.

Vouchers : *C.J. du Plessis* 880; *Gordon-Gray* 6096; *Smook* 1058; *Killick* 1233; *Edwards* 1127.

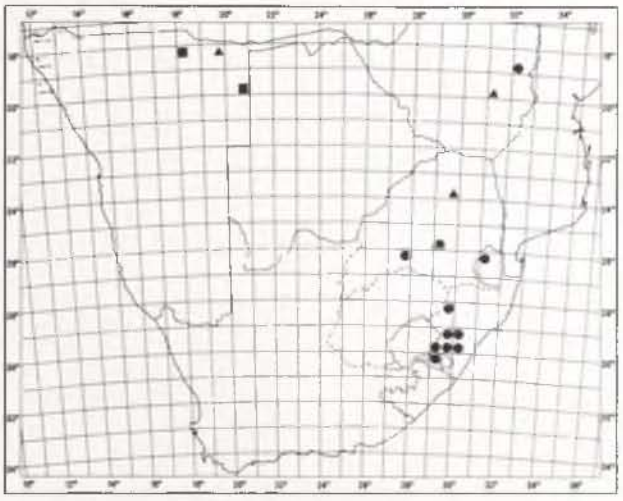

FIG. 3. — Distribution map of *Scleria welwitschii* ●; *S. rehmannii* ▲ and *S. longispiculata* ■.

3. **Scleria rehmannii** *C.B.Cl.* in FC 7: 295 (1898) et in FTA 8: 501 (1902); Nelmes in Kew Bull. 10: 425 (1955); Robinson in Kew Bull. 18: 507 (1966); Podlech in FSWA 165: 52 (1967). Type: *Rehmann* 5626 (K, holo.!; BOL!).

S. welwitschii var. *tuberculata* Cherm. in Arch. Bot. Caen 7: 13 (1936). Type: Ubangi Shari (Central African Republic), *Tisserant* 2922 (P, holo.!).

Perennial. *Rhizome* 3–6 mm thick, woody, yellow; scales light brown. *Culms* 0,3–1,5 m tall, glabrous, 5–10 mm distant. *Leaves* 1–3,5 mm broad, villous to glabrescent; sheath with mouth produced into a tri-

angular, villous or glabrescent: tongue 1–2 mm long. *Inflorescence* branched or unbranched, 40–120–(170) mm long, stiffly erect. *Glomerules* (1)–2–12 per branch, of 1–6 sessile spikelets. *Bracts* shortly awned, shorter than or equalling the glomerules. *Spikelets* 4–5 mm long. *Glumes* 2–4,5 mm long, glabrous, shortly awned, blackish-red or pale red with darker streaks. *Achene* broadly ovoid or subglobose, 1,25–2 × 1–1,6 mm, glabrous, smooth or tuberculate, grey or light brown.

Perennial with annual aerial parts, occurring in seasonal or permanent bogs in open grassland. Known in southern Africa only from Transvaal and north-east Namibia near Rundu (Fig. 3). Widespread in Zimbabwe, Zambia, Mozambique, Malawi, Tanzania, Angola, Zaire and Central African Republic.

Morphological characters which distinguish this species from the closely allied species *S. welwitschii* and *S. longispiculata* are discussed under *S. welwitschii*.

Vouchers: *Vesey-Fitzgerald* 1007 (NU); *A. Johnston* 17 (NU); *De Winter & Marais* 5049.

4. **Scleria longispiculata** *Nelmes* in Kew Bull. 13: 150 (1958); Robinson in Kew Bull. 18: 506 (1966); Podlech in FSWA 165: 52 (1967). Type: Tanzania, *Milne-Redhead & Taylor* 9739 (K, lecto.!, sheet I).

Perennial. *Rhizome* 4–6 mm thick, woody, tawny; scales light brown. *Culms* 0,45–1,05 m tall, glabrous or sparsely villous, 5–20 mm distant. *Leaves* 2–4–(5) mm broad, glabrous or villous; sheath with mouth produced into a triangular or rounded, glabrous or villous tongue 0,5–5 mm long. *Inflorescence* unbranched, 40–130 mm long. *Glomerules* 4–8, of 1–5 sessile spikelets. *Bracts* awned, shorter than or exceeding the glomerules. *Spikelets* 8–9 mm long. *Glumes* 4–7 mm long, hispidulous-pubescent, awned, castaneous. *Achene* ovoid to broadly ovoid, 4–4,4 × 2–2,75 mm, glabrous, smooth, light brown with three darker interangular stripes, the stipe black.

Perennial with annual aerial parts, occurring in well-drained sandy soil bordering wet grassland on Kalahari sands. Known in southern Africa only from north-east Namibia (Fig. 3), and elsewhere only from Zambia and Tanzania.

Morphological characters which distinguish this species from the closely allied species, *S. welwitschii* and *S. rehmannii* are discussed under *S. welwitschii*.

Vouchers: *Story* 6467; *De Winter* 3915.

5. **Scleria bulbifera** *Hochst. ex A. Rich.*, Tent. Fl. Abyss. 2: 510 (1851); C.B.Cl. in FTA 8: 500 (1902); Kukenth. in Fedde, Repert Beih. 40: 530 (1938); Piérart in Lejeunia 13: 24, t.1, fig. 9 (1953) : Nelmes in Kew Bull. 10: 438 (1955); Robinson in Kew Bull. 18: 503 (1966); Compton, Fl. Swaziland 74 (1976). Syntypes: Ethiopia, *Schimper* 1557 (BM; K!); *Quartin-Dillon & Petit* s.n. (BM; K!).

S. atrosanguinea Hochst. ex Steud., Syn. Pl. Glum. 2: 175 (1885). Type: Ethiopia, *Schimper* 327 (K, holo.!; BM!).

S. schweinfurthiana Boeck. in Flora 62: 570 (1879). Type: Sudan, *Schweinfurth* 2193 (K, holo.!).

S. buchananii Boeck., Cyper. Nov. 1: 33 (1888); C.B.Cl. in FC 7: 295 (1898) et in FTA 8: 499 (1902). Syntypes: Malawi, *Buchanan* 32 (K!); 1272 (K!).

S. verdickii De Wild, in Rev. Zool. Afr. 14 Suppl. Bot. 26 (1926). Type: Congo, *Verdick* 398 (BR, holo.!).

S. schliebenii Gross in Notizbl. Bot. Gart. Berlin 11: 657 (1932). Type: Tanzania, *Schlieben* 782 (B†).

S. thomasii Piérart in Bull. Soc. Bot. Belg. 83: 405 (1951). Type: Zaire, *R. X. L. Thomas* 1202 (BR, holo.!).

Perennial. *Rhizome* little more than the connective between swollen, contiguous culm-bases, or the internodes longer and culm-bases intervallate; scales light brown. *Culms* 0,12–1,10 m tall; bases swollen, woody, up to 12 mm thick, glabrous or hairy above. *Leaves* 1–5(9) mm broad, glabrous or hirsute; sheath with mouth concave, truncate, or produced into a short membranous tongue. *Inflorescence* unbranched or branched, 20–200 mm long. *Glomerules* 3–17, of 1–12 sessile spikelets. *Bracts* awned, equalling or up to twice the length of the glomerule, or the lowermost subfoliaceous, up to 30 mm long. *Spikelets* 4–6,5 mm long. *Glumes* 2–5 mm long, glabrous or hairy, awned, castaneous or dark reddish-brown. *Achene* obovoid to subglobose, 1,6–2 × 1–1,8 mm, glabrous, smooth or lightly or strongly tuberculate or trabeculate, grey or light brown.

Perennial with annual aerial parts, occurring in dry, or seasonally wet or permanently boggy open grassland habitats. Widespread in the summer rainfall region of southern Africa (Fig. 4) and to the north in tropical Africa and in Malagasy.

The morphology of the inflorescence of this species varies from branched to simply glomerate-spicate, with the glomerules comprising few or many spikelets. The surface patterning of the achene is also variable, with smooth, tuberculate or trabeculate achenes occurring, sometimes even on the same plant. The same types of inflorescence and achene may occur in several species from all of which *S. bulbifera* is distinguished by its bulbous, woody and silicified culm bases which arise from a woody, horizontal rhizome with (usually) very short internodes so that adjacent culm bases are ± contiguous.

Vouchers: *C. A. Smith* 1341; *Acocks* 18794; *R. P. Ellis* 3279; *E. F. Hennessy* 407 (NU; UD–W); *Rudatis* 528 (STE).

6. **Scleria veseyfitzgeraldii** *E. A. Robinson* in Kew Bull. 18: 503 fig. 3. (1966). Type: *Robinson* 4220 (K, holo.!; NU!).

Perennial. *Rhizome* descending, ± vertical, short, woody. *Culms* clustered, to 1 m tall, the bases 3 mm thick, invested with many dry leaf-sheaths. *Leaves* 2–7 mm broad, glabrescent to densely hirsute, most crowded towards base of culm, bladeless or short-bladed, with deeply concave mouths. *Inflorescence* unbranched, rarely branched, 50–150 mm long. *Glomerules* dense, multispiculate. *Bracts* awned, equalling or to twice the length of glomerules, the lowermost subfoliaceous. *Spikelets* 4–6,5 mm long. *Glumes* 4–6 mm long, glabrescent or hirsute, shortly awned, castaneous or dark brown with green keels. *Achene* acutely trigonous, broadly obovoid, 2 × 1,3–1,6 mm, glabrous, reticulate-trabeculate, grey.

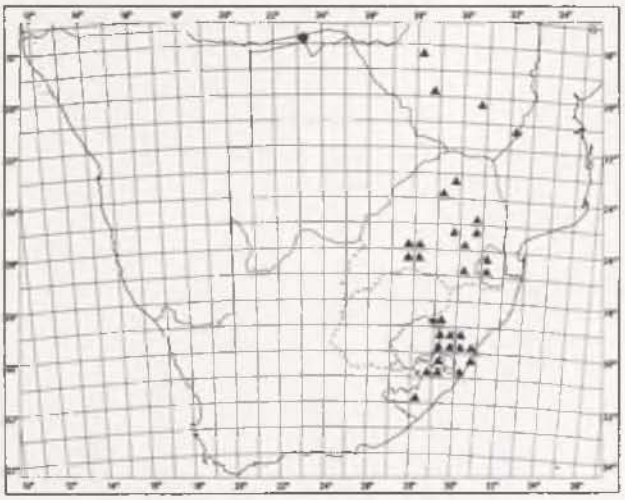

FIG. 4. — Distribution map of *Scleria bulbifera* ▲ and *S. veseyfitzgeraldii* ●.

Perennial with annual aerial parts, occurring in open, seasonally inundated or saturated flood plains. Known for FSA area only from the Caprivi Strip in north east Namibia (Fig. 4) and elsewhere from Zambia and Tanzania.

In its aerial parts this species bears a superficial resemblance to some specimens of *S. bulbifera* from which it is distinguished by its short, descending rhizome which is not apparent without sectioning; by its culm bases not or hardly enlarged, thickly invested with numerous dry leaf sheaths; by its leaves mostly short-bladed or bladeless, crowded towards the base of the culm, and by its acutely trigonous achenes.

Voucher: *Killick & Leistner* 3218.

7. **Scleria dregeana** *Kunth*, Enum. Pl. 2: 354 (1837); C.B.Cl. in FC 7: 295 (1898) et in FTA 8: 499 (1902); Nelmes in Kew Bull. 10: 426 (1955); Robinson in Kew Bull. 18: 510 (1966); Compton, Fl. Swaziland 74 (1976). Type: South Africa, Cap. b. spei, *Drège* s.n. sub *C.B.Cl.* 3934 (B†; K, lecto.!).

S. meyeriana Kunth l.c.:354 (1837); C.B.Cl. in FC 7: 294 (1898) et in FTA 8: 498 (1902); Nelmes in Kew Bull. 10: 431 (1955). Type: South Africa. Cap. b. spei, *Drège* s.n. sub *C.B.Cl.* 4363 (B†).

S. holcoides Kunth l.c.:354 (1837); C.B.Cl. in FC 7: 296 (1898); Nelmes in Kew Bull. 10: 427 (1955). Type: South Africa, *Drège* s.n. sub *C.B.Cl.* 4381 (B†; K, lecto.!).

S. caespitosa Welw. ex Ridl. in Trans. Linn. Soc. ser. 2 Bot. 2: 167 (1884). Type: Angola, *Welwitsch* 7135 (BM, holo.; K; LISU).

S. setulosa Boeck., Cyper. Nov. 1: 33 (1888). Type: Malawi, *Buchanan* 36 (K, holo.!).

Perennial with two different kinds of propagative stems. *Rhizome* little more than the connective between ± contiguous culm bases; scales reddish-brown. *Soboles* sometimes produced from culm bases, soft, terete, 10 mm long, with collateral vascular bundles. *Culms* 0,25–1 m tall, glabrous or glabrescent. *Leaves* 1–3 mm broad glabrescent or hirsute; mouth of sheath truncate, villous below. *Inflorescence* unbranched or branched, 10–100 mm long. *Glomerules* 1–11 per branch, of 1–8 sessile or subsessile spikelets. *Bracts* aristate, equalling the glomerules or the lowermost up to 35 mm long. *Spikelets* 4,5–6 mm long. *Glumes* 2,25–5 mm long, glabrous or sparsely ciliate, shortly awned, blackish-red, red-brown or pale with red streaks. *Achene* ovoid, ellipsoid or subglobose, 1,5–2 × 1,2 mm, glabrous, smooth or tuberculate or trabeculate towards the apex, smooth at junction of stipe and body, grey.

Perennial with annual aerial parts, widespread in open, permanent bogs and wet streambanks in summer rainfall area of southern Africa (Fig. 5) and to the north in Zimbabwe, Zambia, Malawi, Tanzania, Angola and Zaire.

This is a morphologically variable species. Rhizome internodes may be so short that the plants appear caespitose or they may be slightly longer so that the culm bases are not contiguous. Subterranean propagative stems (soboles) may arise from the culm bases. Whereas rhizomes have amphivasal vascular bundles, those of soboles are collateral. Inflorescences may be simply glomerate-spicate or sparingly branched glomerate-spicate. Glumes may be dark or pale. *S. dregeana* Kunth, *S. caespitosa* Welw. ex Ridl. and *S. setulosa* Boeck. were based on glabrescent plants with unbranched inflorescences and dark glumes; *S. meyeriana* Kunth on a very hairy plant with an unbranched inflorescence and pale glumes and *S. holcoides* Kunth on a hairy plant with a branched inflorescence and pale glumes. The achenes of the types are sparingly tuberculate distally and smooth proximally but gatherings of plants with wholly smooth achenes (*Lubke* 181), and of plants with achenes which are tuberculate distally and trabeculate proximally (*Galpin* 9104) exist. Tubercles, when present, are invariably best developed near the apex of the achene.

This species is likely to be confused with *S. sobolifer* E. F. Franklin from which it is distinguished mainly by the presence of a true rhizome with amphivasal vascular bundles and by the absence of a pattern of ridges, troughs and fine transverse bars between the stipe and body of the achene.

Vouchers: *P. A. Smith* 2635; *Rodin* 3922; *Dieterlen* 889; *Moll* 1424; *R. A. Lubke* 181.

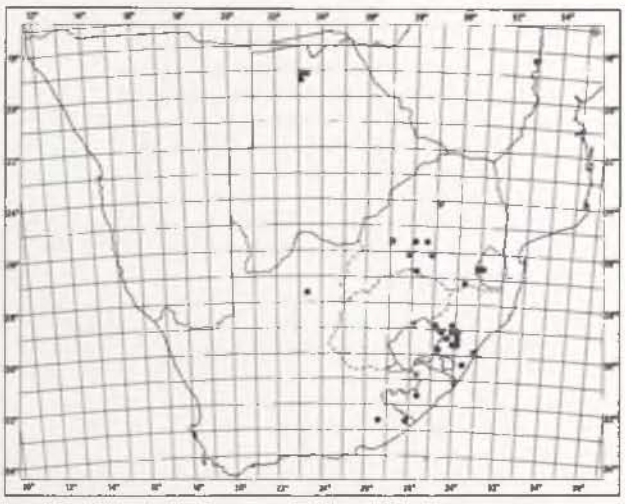

FIG. 5. — Distribution map of *Scleria dregeana*.

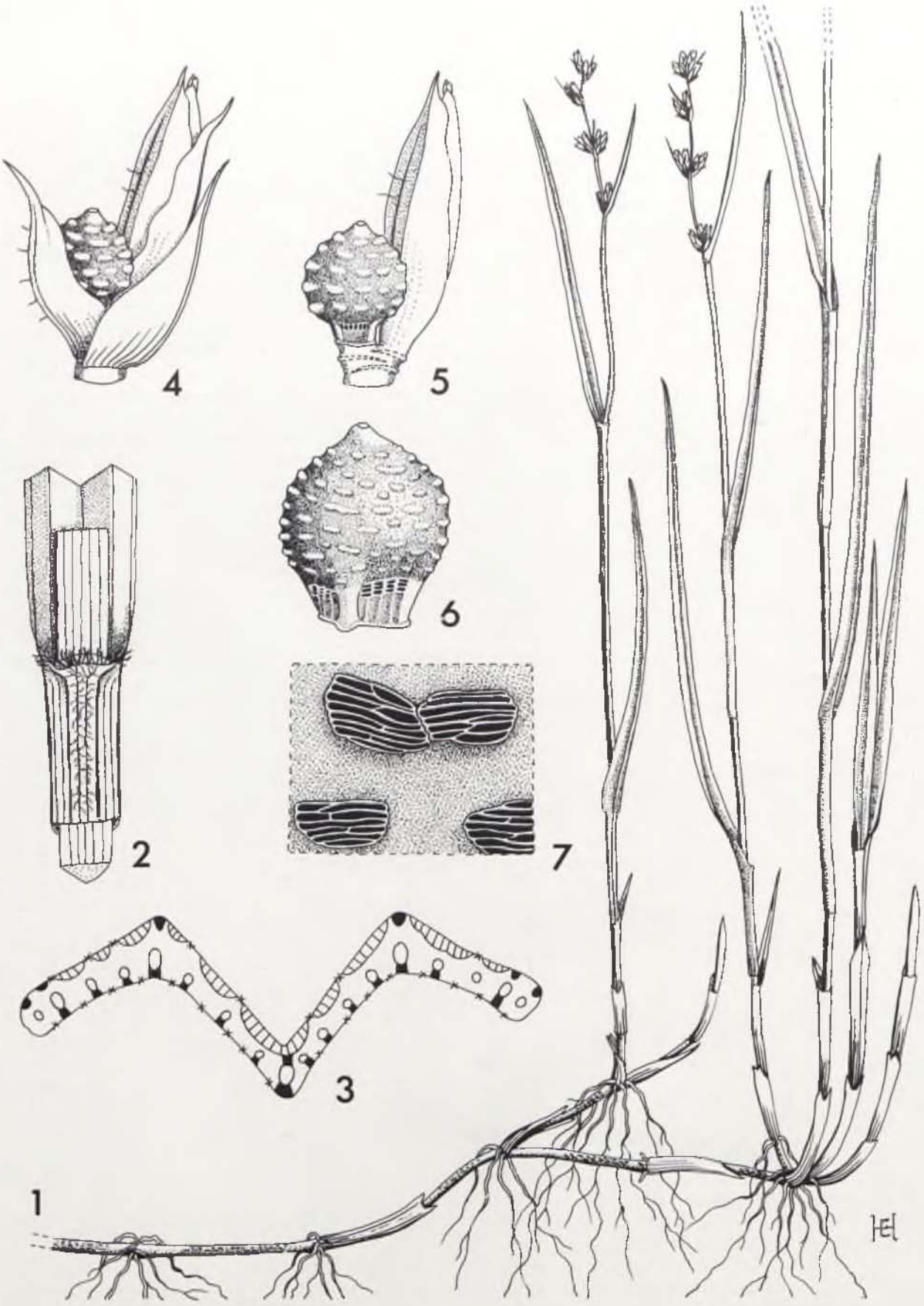

FIG. 6. — *Scleria sobolifer*. 1–5 from *Ward* 5218; 6,7 from *Ward* 8851. 1, habit, × 0,9; 2, portion of leaf and culm at junction of lamina and sheath, × 8,5; 3, plan of T/S mid-lamina, × 29,8; 4, androgynaeceous spikelet, × 13,6; 5, androgynaeceous spikelet with lower glumes removed to reveal achene, × 13,6; 6, achene, × 25,5; 7, achene surface pattern from SEM, × 213.

8. **Scleria sobolifer** *E. F. Franklin* in Kew Bull. 38: 33 (1983). Type: South Africa, Natal, *Ward* 5128 (K, holo.!; PRE!; NH!; NU!; UD–W!).

Perennial. *Rhizome* none. *Soboles* trigonous, 1–1,5 mm thick, hard, whitish with wine-red blotches; scales purple-red. *Culms* 0,18–1,01 m tall, glabrous or glabrescent. *Leaves* 1,1–2,6 mm broad, glabrous adaxially, sparsely hirsute abaxially; mouth of sheath truncate, hirsute. *Inflorescence* unbranched, 20–65 mm long. *Glomerules* 2–6, of 2–6 sessile spikelets. *Bracts* glabrous, the margins sparsely hirsute, shortly awned, pale stramineous with red striae. *Spikelets* c.4 mm long. *Glumes* 1,7–2,6 mm long, glabrous or sparsely hirsute or midrib stramineous with red striae. *Achene* subglobose, 1,5–1,8 × 1,2 mm, glabrous, undulate-tuberculate, with a series of deep horizontal troughs separated by horizontal and vertical ridges at junction of stipe and body, grey. (Fig. 6).

Perennial with annual aerial parts known only from coastbelt of Natal in open, sandy, seasonally damp areas (Fig. 7).

This perennial species lacks a true rhizome and has elongate, subterranean propagative stems (soboles) with collateral vascular bundles. In its aerial parts it resembles some species of S. *dregeana* in having unbranched glomerate-spicate inflorescences. The achenes are tuberculate and differ from the tuberculate achenes of some specimens of S. *dregeana* in that the distal tubercles are no more prominent than the proximal ones, and in having a pattern of ridges, troughs and fine transverse bars between the stipe and body of the achene (Fig. 6,6). At high magnification it is possible to discern a pattern of fine raised, more-or-less horizontal ridges (Fig. 6,7) on the crests of the tubercles created by the proud-standing, silicified radial walls of groups of horizontally elongated epidermal cells. Such a pattern is absent from the crests of the tubercles of the achene of S. *dregeana*.

Vouchers: *Strey* 5136; *Michelmore* 44; *Arnold* 467; *Baijnath* 126; *Nicholson* 1141.

9. **Scleria pergracilis** *(Nees) Kunth*, Enum. Pl. 2: 354 (1837); C.B.Cl. in FTA 8: 495 (1902); Hutch. & Dalz., FWTA 2: 491 (1936); Piérart in Lejeunia 13: 20, t.4, figs 1,2 (1953); Nelmes in Kew Bull. 10: 445 (1955); Robinson in Kew Bull. 18: 494–5 (1966). Type: India, *Wallich* 3406 (K, holo., as *Hypoporum pergracile* Nees).

Hypoporum pergracile Nees in Edinb. New Phil. Journ. 17:267 (1837). Type: as above.

Scleria pergracilis var. *brachystachys* Nelmes in Kew Bull. 10: 446 (1955); Napper in Jl E. Africa nat. Hist. Soc. 24: 31 (1964); Robinson in Kew Bull. 18: 494 (1966). Type: Zimbabwe, *Brain* 3710 (K, holo.!; PRE; SRGH).

Annual, caespitose. *Culms* 0,13–0,38 m tall, glabrous. *Leaves* 1–2 mm broad, glabrous or the sheaths minutely pilose towards the truncate or concave mouths. *Inflorescence* unbranched, 20–65 mm long, or with one short basal branch bearing a single glomerule. *Glomerules* 2–13–(18) of 1–7 sessile or subsessile spikelets. *Bracts* acuminate, shorter than or slightly exceeding the spikelets. *Spikelets* 4–5 mm long. *Glumes* 2,5–3,5 mm long, glabrous, mucronulate, pale with red-brown striae, or wholly reddish-brown. *Achene* subglobose, 1,4–1,8 × 1,2–1,6 mm, glabrous, trabeculate to tuberculate-verrucose, grey possibly with brown stipe (only immature achenes seen).

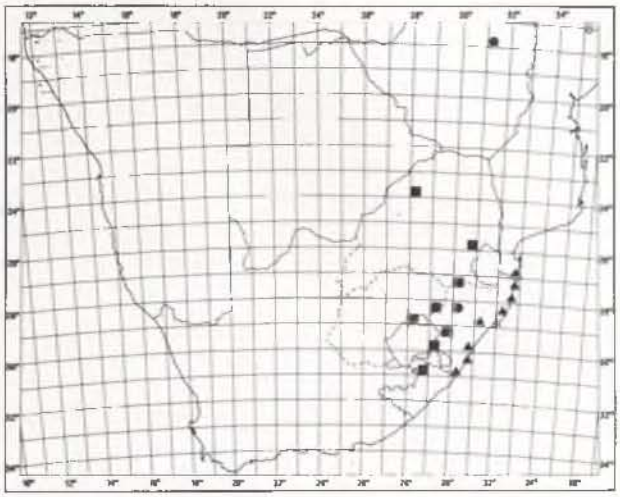

FIG. 7. — Distribution map of *Scleria sobolifer* ▲; *S. pergracilis* var. *brachystachys* ● and *S. dieterlenii* ■

Open seasonal bogs in neutral or acid soil. This species is known in Southern Africa from a single gathering *(Pentz & Acocks* 10277) made near Dundee in Natal in 1944 (Fig. 7). The gathering was identified as var. *brachystachys* by Nelmes in 1955. Robinson (1966) expressed reservations about the validity of maintaining var. *brachystachys*. I am unable to express an opinion since the species is unknown to me in the field and I have seen very little material. The species is widely distributed in Africa, India, Sri Lanka and New Guinea and var. *brachystachys* is recorded outside the FSA area from Zimbabwe and Tanzania.

This annual species may be distinguished from the perennial *S. dieterlenii* which it resembles in its aerial parts, by the lack of a rhizome or any other perennating stem, by its broadly V-shaped lamina-profile (the lamina-profile of *S. dieterlenii* is flanged–V-shaped); by its glabrous glumes and by its grey, strongly tuberculate-verrucose achenes with the crests of the tubercles lighter grey.

Voucher: *Pentz & Acocks* 10277 (PRE; NH).

10. **Scleria dieterlenii** *Turrill* in Bull. Misc. Inf. Kew 1914: 20 (1914); Nelmes in Kew Bull. 10: 441 (1955); Napper in Kew Bull. 25: 443 (1971). Type: Lesotho, *Dieterlen* 749 (K, holo.!; PRE!; NH!).

S. schweinfurthiana sensu Hutch. & Dalz., FWTA 2: 491 (1936) pro parte, non Boeck. (1879).

S. flexuosa sensu Robinson in Kew Bull. 18: 505 (1966), pro parte, non Boeck. (1888).

Perennial. *Rhizome* curved-descending, 0,5–1 mm thick with terminal swollen tuber up to 10 × 4 mm; scales pale, reddish-striate. *Culms* clustered, 0,15–0,37–(0,45) m tall, glabrous or sparsely villous. *Leaves* 1–2,5 mm broad, glabrous or sparsely villous; sheaths with truncate or concave, villous mouths. *In-*

florescence unbranched, rarely with one basal branch, 20–80 mm long. *Glomerules* 3–8 of 1–8 sessile spikelets. *Bracts* awned, shorter than or exceeding the glomerules, the lowermost subfoliaceous, 25–40 mm long. *Spikelets* 4–5 mm long. *Glumes* 2,5–4,5 mm long, sparsely or densely villous, shortly awned, orange-brown with red striae. *Achene* subglobose, 1,3–1,8 × 1–1,25 mm, glabrous, trabeculate-verrucose, grey with the trabeculae light reddish-gold.

Perennial with annual aerial parts, occurring in seasonal bogs at high elevations in eastern Cape, Natal, Transvaal and Lesotho (Fig. 7) and to the north at high elevations in Zimbabwe, Zambia, Angola, Guinea, Sierra Leone and the Ivory Coast.

This species differs from *S. pergracilis* in having a slender, descending, subvertical rhizome with a swollen, tuberous tip; in having a flanged-V-shaped lamina-profile; in having hairy glumes, and in having grey, trabeculate-verrucose achenes with the crests of the trabeculae light to bright reddish-brown.

Vouchers: *H. G. Breyer* 18070; *Bews* 471; *Killick & Vahrmeijer* 3663; *Hoener* 2014 (NU; UD–W); *Acocks* 2196.

11. **Scleria nutans** *Wild. ex Kunth*, Enum. Pl. 2: 351 (1837); Robinson in Kirkia 4: 179 (1964), Kew Bull. 18: 502 (1966); Gordon-Gray in Ross, Fl. Natal 112 (1972). Type: Venezuela, Cumana, *Humboldt* s.n. (B–W 17336, holo.).

Hypoporum nutans (Willd. ex Kunth) Nees in Mart., Fl. Bras. 2: 170 (1842).

Hypoporum humile Nees in Linnaea 9: 303 (1834) *nomen nudum*.

Scleria mollis Kunth, l.c.: 352 (1837). Type: Brazil, *Sellow* s.n. (K, holo.!).

S. cenchroides Kunth l.c.: 352 (1837). Type: South Africa, between Umtentu and Umzimkulu Rivers below 500 ft, *Drège* s.n. (B†; K, lecto.!).

S. bojeri C.B.Cl. in Dur. & Schinz, Consp. Fl. Afr. 5: 669 (1895) *nomen nudum*.

S. hirtella Sw. var. *tuberculata* C.B.Cl. in FC 8: 294 (1898); Schonl. in Mem. bot. Surv. S. Afr. 3: 64 fig. 73 (1922). Type: South Africa, *Burke* 62 (K, holo.!).

S. hirtella Sw. var. *chondrocarpa* Nelmes in Kew Bull. 10: 451 (1955). Type: Uganda, *A. S. Thomas* 95 (K, holo.!). [*S. hirtella* auctores permulti, *non* Sw.]

Perennial. *Rhizome* 2–4 mm thick, woody: scales brown. *Culms* 0,16–0,5 m tall, glabrous or the angles sparsely hirsute, 2–15 mm distant; bases sometimes thickened to 7 mm. *Leaves* 1,5–5 mm broad, glabrous to villous, mouths of sheaths truncate or convex, villous. *Inflorescence* unbranched, 25–85 mm long. *Glomerules* reflexed, 3–6–(7), of 2–7 sessile or subsessile spikelets. *Bracts* densely pale-, reddish- or blackish-ciliate, awned, 4–12 mm long. *Spikelets* 4–5 mm long. *Glumes* 2–5 mm long, densely pale-, reddish- or blackish-ciliate, awned, pale with red streaks. *Achene* ovoid to subglobose, 1,2–1,5 × 1 mm, glabrous, smooth or lightly tuberculate, grey or grey-brown.

Perennial with annual aerial parts occurring in open, permanently boggy areas in the summer rainfall areas of southern Africa (Fig. 8) to the north in Zambia, Tanzania, Uganda, Zaire, Gabon and Nigeria, also in Madagascar and in South America, in Brazil and Venezuela.

The features which most easily distinguish this species from *S. aterrima* with which it has often been confused, are its woody, often long, horizontal rhizome; the spacing of its leaves more-or-less evenly along the length of the culm; by the vestiture of the glumes of some specimens being pale or reddish (not invariably blackish) and by the absence of hypodermal translucent cells in the intercostal region of the lamina.

Vouchers: *Killick & Strey* 2506; *C. Reid* 423; *Ward* 5057; *K. D. Huntley* 705 (K; NU); *Arnold* 796.

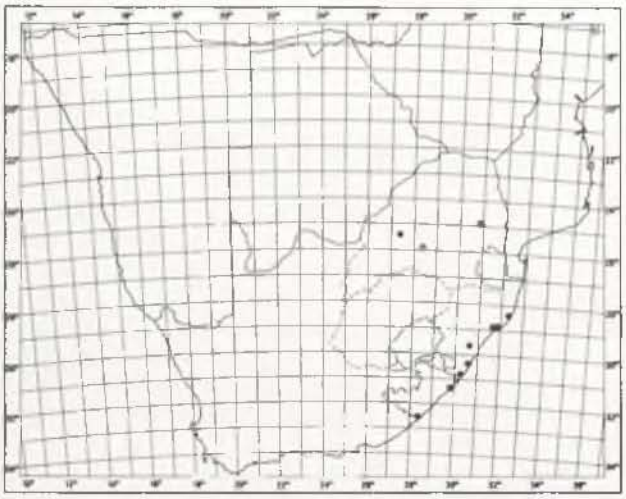

FIG. 8. — Distribution map of *Scleria nutans*.

12. **Scleria aterrima** *(Ridl.) Napper* in Kew Bull. 25: 145 (1971). Type: Angola, *Welwitsch* 7143 (BM, holo.; K, iso.!).

S. hirtella Sw. sensu Boeck. in Linnaea 38: 439 (1874) excl. synon., quoad *Barter* 1561.

S. hirtella Sw. var. *aterrima* Ridl. in Trans. Linn. Soc., ser. 2, Bot. 2: 166 (1884). Type: Angola, *Welwitsch* 7143 (BM, holo.; K iso.!).

S. catophylla C.B.Cl. in Dur. & Schinz, Consp. Fl. Afr. 5: 670 (1895) *pro parte* excl. synon. Amer., et in FC 7: 294 (1898), et in FTA 8: 498 (1902); Hutch. in FWTA 2: 491 (1936); Robinson in Kirkia 4: 182 (1964), et in Kew Bull. 18: 501 (1966); Berhaut, Fl. Sén., edn 2: 356 (1967). Type: Nigeria, *Barter* 1561 (K, holo.!).

Perennial with two different kinds of propagative stems. *Rhizome* little more than the connective between ± contiguous culm bases; scales castaneous. *Soboles* sometimes produced from culm-bases, soft, terete, 10 mm long, with collateral vascular bundles. *Culms* solitary or clustered, 0,25–0,70 m tall, villous. *Leaves* 2–3 mm broad, usually villous, mostly crowded towards base of culm; mouths of sheaths truncate or concave, densely villous. *Inflorescence* unbranched, 40–180 mm long. *Glomerules* 4–15, of 1–7 reflexed sessile spikelets. *Bracts* glumiform, awned, densely black-hirsute, 6–7 mm long. *Spikelets* c. 6 mm long. *Glumes* densely blackish-hirsute, 2,5–4,5 mm long. *Achene* broadly ovoid to globose, 1,2–1,5 mm × 1 mm, glabrous, smooth, grey or grey-brown.

Perennial with annual aerial parts occurring in open, perennially wet sandy areas. Known for FSA area from Transkei, Natal and Transvaal (Fig. 9) and widespread in east, central and west tropical Africa. This species is often confused with *S. nutans* from which it is distinguished by its soboles, its abbreviated rhizome, its basally congested leaves and by the presence of bulliform translucent cells subjacent to the adaxial epidermis in the intercostal regions.

Vouchers: *Acocks & Naude* 34; *Schweickerdt* 2344; *Moll* 4759; *Nicholson* 1103; *Strey* 10102.

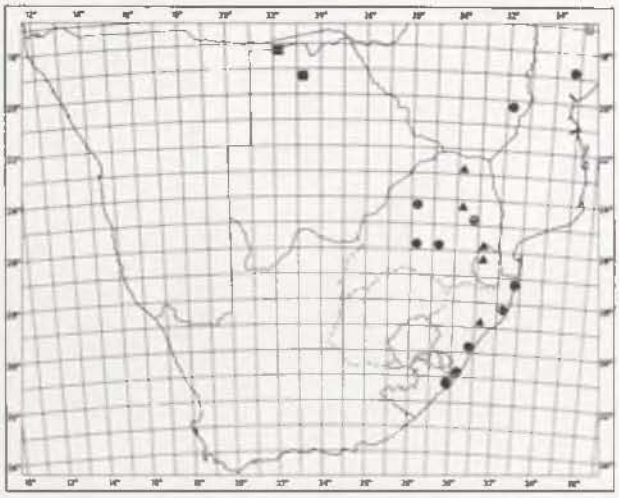

FIG. 9. — Distribution map of *Scleria aterrima* ●; *S. lacustris* ■; *S. transvaalensis* ▲; *S. aterrima* and *S. transvaalensis* ⍟

13. **Scleria lacustris** *Wright* in *Sauvalle* in Anal. Cienc. Habana 8: 152 (1871); Nelmes in Kew Bull. 10: 422 (1955); Robinson in Kew Bull. 18: 517, 519 (1966). Type: Cuba, *Wright* s.n. (K, holo.!).

S. aquatica Cherm, in Bull. Soc. Bot. Fr. 77: 279 (1930); Piérart in Lejeunia, Mém. 13: 33, t. 1, figs 20–23 (1953). Type: Gabon, *Le Testu* 5845 (P, holo.!).

Annual (?), aquatic with stout basal adventitious roots and finely branched floating roots at one–several submerged nodes of culm. *Rhizome* none. *Culm* solitary, up to 1,8 m tall, 7–12 mm thick, with angles spinulose. *Leaves* 10–15 mm broad, scabrid on margins and major ribs; mouth of sheath produced into an oval membranous tongue 5–10 mm long with a narrow, blackish, hispid zone in the angles at its base. *Inflorescence* branched paniculate, 0,19–1 m long; *bracts* of primary axis foliaceous; higher order bracts setaceous from auriculate base with few, stiff, blackish hairs on auricles, 5–25 mm long. *Spikelets* bisexual, female and male, 4–6 mm long. *Glumes* glabrous, dark red-brown, mucronulate, 3,5 mm long. *Achene* ovoid, 3–3,5 × 2–2,5 mm, smooth, glabrous, grey-brown: *hypogynium* small with three very small triangular lobes, brown.

Aquatic annual known for FSA region only from Okavango swamps in Botswana (Fig. 9) and elsewhere in Africa from Zambia, Zaire, Sierra Leone, Central African Republic and Gabon. Also from Madagascar and from Cuba, French Guiana, Paraguay and Brazil.

This species cannot be confused with any other from the region, being distinguished by its finely-divided floating roots, by its having androgynaeceous and subandrogynaeceous spikelets, and by its very small trilobed hypogynium.

Vouchers: *P. A. Smith* 2718; 2796.

14. **Scleria transvaalensis** *E. F. Franklin* in Kew Bull. 38: 35 (1983). Type: South Africa, Transvaal, *T. H. Arnold* 336 (K, holo.!; PRE!).

Perennial. *Rhizome* little more than the connective between contiguous, woody, swollen culm-bases; scales reddish-brown. *Culms* 0,5–1,25 m tall with bases 8–10 mm thick; glabrous. *Leaves* 4–10 mm broad, subulate, glabrous; sheath with mouth produced into a deltoid-rounded tongue 2–5 mm long with a membranous extension up to 1 mm long. *Inflorescence* with terminal panicle 45–90 × 20–45 mm and smaller lateral panicles 1–2 per node at 1–2 nodes exserted 20–120 mm from sheaths. *Bracts* foliaceous, exceeding their panicles, subulate. *Male spikelets* sessile or shortly pedicillate, 4–6 mm long; glumes reddish-brown, glabrescent. *Female glumes* reddish-brown with green midrib excurrent into an awn c. 1 mm long; 4–5 mm long. *Achene* oblong-subglobose, 2,5–3 × 2 mm, glabrous, tessellate-lacunose to tuberculate-lacunose, brownish-white: *hypogynium* obtusely trilobed, stramineous.

Perennial with annual aerial parts occurring in seasonally damp, open or semi-shaded habitats at temperate altitudes in Transvaal, Swaziland and Natal (Fig. 9). Apparently endemic in FSA region.

This species has hitherto been confused with *S. natalensis* from which it is distinguished by its bulbously thickened culm-bases; its subulate leaf and bract-apices 1–2 mm broad in the distal 10 mm; its relatively dense inflorescences with 1–2 lateral panicles per node; its bright terra-cotta red glumes and its barrel-shaped achenes.

Vouchers: *Obermeyer* 3095; *F. Venter* 1150; *R.P. Ellis* 2964; *Gordon-Gray* 6020 (NU) *Seagrief* 18 (NU).

15. **Scleria natalensis** *C.B.Cl.* in FC 7 : 296 (1898); Nelmes in Kew Bull. 11: 88 (1956), pro parte, non C.B.Cl; Franklin in Kew Bull. 38: 35 (1983). Type: South Africa, Natal, *Buchanan* 352 (K, holo.!; NH!).

Perennial. *Rhizome* usually with very short internodes little more than the connective between almost-contiguous culm bases; scales reddish-brown. *Culms* 0,5–0,85 m tall with bases 2–3(–4) mm thick; glabrous. *Leaves* 4–11 mm broad, ensiform, glabrous; sheath with mouth produced into a deltoid-rounded tongue 2–5 mm long with a membranous extension 1 mm long. *Inflorescence* with terminal panicle 25–65 × 15–20 mm and smaller lateral panicles (1–) 2–4 per node at 2–3 nodes exserted 30–230 mm from sheaths. *Bracts* foliaceous, exceeding their panicles, ensiform. *Male spikelets* sessile or pedicillate, 4–6 mm long; glumes stramineous with fine reddish striae, glabrescent. *Female glumes* stramineous with reddish striae, with midrib excurrent into an awn c. 1 mm long; 4–5 mm long. *Achene* subglobose,

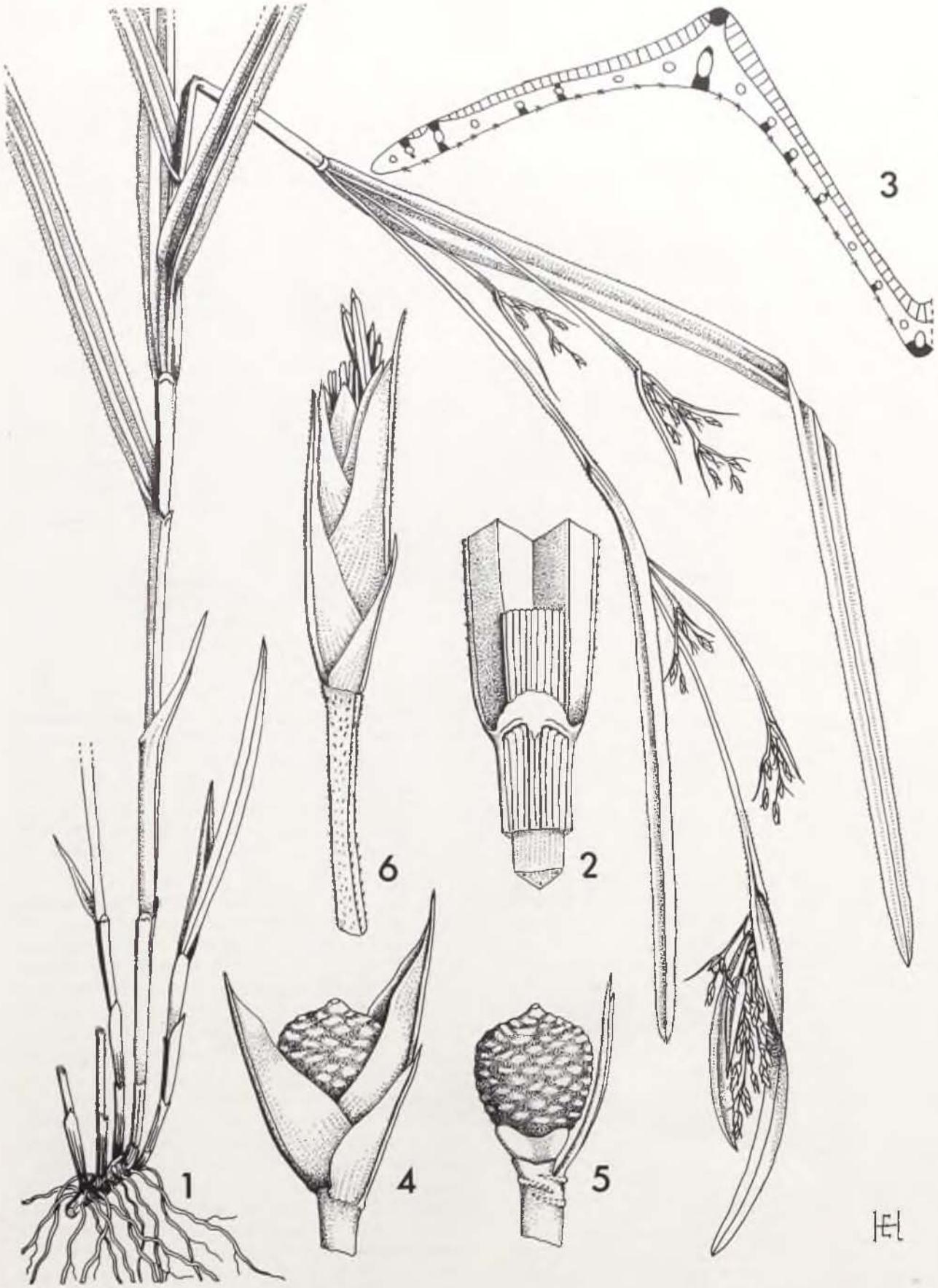

FIG. 10. — *Scleria natalensis*. 1,2 from *Ward* 4953; 3 from *Hennessy* 372; 4–6 from *Ward* 5043. 1, habit, × 0,6; 2, portion of leaf and culm at junction of lamina and sheath, × 4,3; 3, plan of T/S half mid-lamina, × 30; 4, subandrogynaceous spikelet, × 8,5; 5, subandrogynaeceous spikelet with lower glumes removed to reveal young achene with its hypogynium, and distal empty male glumes, × 8,5; 6, male spikelet, × 10,2.

obtusely trigonous, 2,5 × 2 mm, glabrous, reticulate-lacunose to tuberculate-lacunose, brownish-white: *hypogynium* obtusely trilobed, stramineous. (Fig. 10).

Perennial with evergreen aerial parts occurring in seasonally damp open or semi-shaded habitats at low altitudes along coastbelt of Natal and Transkei (Fig. 11). Apparently endemic in FSA region.

This species is distinguished from *S. transvaalensis* by its culm-bases not bulbously-thickened; its ensiform leaf and bract apices 3–4 mm broad in the distal 10 mm; its relatively less dense inflorescence with 1–4 lateral panicles per node; its dull straw-coloured glumes with some faint red streaks near the margins and its subglobose and obtusely trigonous achenes.

Vouchers: *T. H. Arnold* 435; *Ward* 4935; *Strey* 9464; *Galpin* 10988; *Moss* 5515 (K; J).

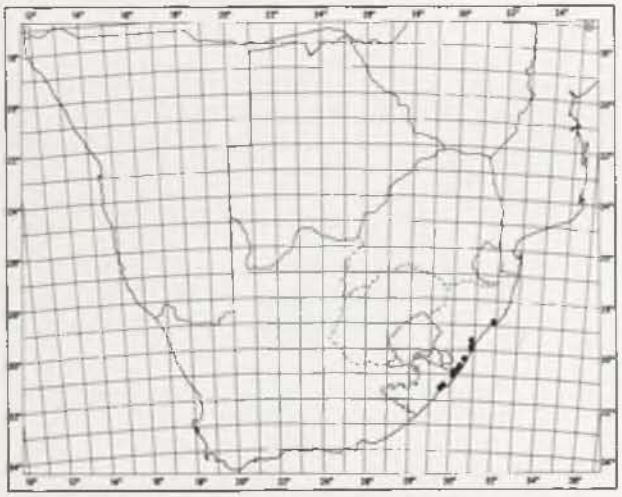

FIG. 11. — Distribution map of *Scleria natalensis*.

16. **Scleria foliosa** *Hochst. ex A. Rich.*, Tent. Fl. Abyss. 2: 509 (1851); C.B. Cl. in FTA 8: 503 (1902); Piérart in Lejeunia, Mém 13: 40, t. 2, figs 4 & 5 (1953); Nelmes in Kew Bull. 11: 102 (1956); Robinson in Kirkia 2: 177 (1961) et in Kew Bull. 18: 525 (1966); Podlech in FSWA 165: 52 (1967). Syntypes: Ethiopia, *Schimper* 1232 (K; BM, isosyn.!); *Quartin Dillon & Petit* s.n. (K; P, isosyn.!).

S. dumicola Ridl. in Trans. Linn. Soc., ser. 2 Bot. 2: 169 (1884). Type: Angola, *Welwitsch* 7122 (BM, holo.!).

S. perrieri Cherm. in Bull. Soc. Bot. Fr. 70: 297 (1923). Type: Madagascar, *Perrier de la Bâthie* 12704 (P, holo.!).

Annual, without rhizome. *Culms* 0,20–0,60 m tall, glabrous. *Laminas* 2–7 mm broad, glabrous, scabrid on margins and ribs: *sheaths* glabrescent except near mouths where villous; mouths truncate or with ligule 1–2 mm long. *Inflorescence* with terminal panicle 25–50 mm long, smaller lateral panicles single at 1–3 nodes, shortly exserted from sheaths. *Bracts* foliaceous, exceeding panicles. *Male spikelets* sessile or shortly pedicillate, 4–5 mm long; glumes castaneous, glabrous. *Female glumes* castaneous or dark brown distally, paler proximally, with green midrib excurrent into an awn c. 1 mm long, glabrous. *Achene* ovoid, 3–4 × 2–2.5 mm, alveolate lacunose proximally, smooth distally, grey: *hypogynium* obtusely trilobed, stramineous.

Caespitose annual, occurring in seasonal shallow pans in Transvaal, Swaziland, northern Namibia (Fig. 12), widespread in east, central and west Africa, also in Madagascar and India.

This species is distinguished from other species of subgenus *Scleria* of the region by the absence of a rhizome and by the type of surface-patterning of the achene which is smooth distally, strongly alveolate-lacunose proximally.

Vouchers: *Junod* 563; *P. van Wyk* 4786; *M. Müller & Giess* 489; *Schoenfelder* 808; *R. W. Haines* 7043.

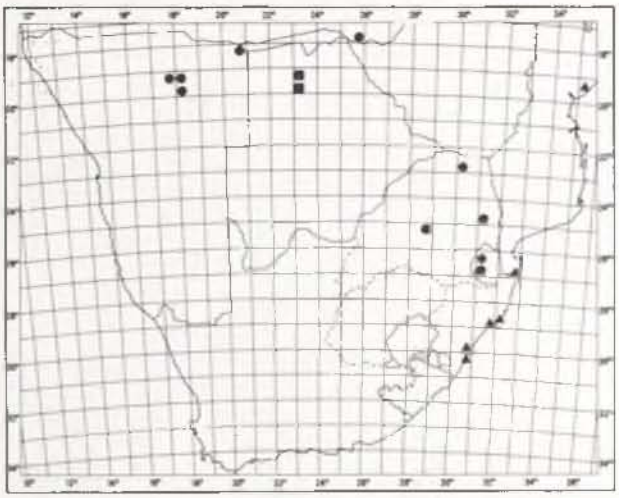

FIG. 12. — Distribution map of *Scleria foliosa* ●; *S. unguiculata* ■; *S. achtenii* ▲ and *S. lagoensis* ★.

17. **Scleria unguiculata** *E. A. Robinson* in Kew Bull. 18: 536 (1966). Type: Zambia, *Robinson* 5056 (K, holo.!).

Perennial. *Rhizome* usually with very short internodes little more than the connective between almost contiguous, slightly swollen culm bases; scales pale brown. *Culms* 0,45–1,0 (–1,35) m tall, glabrous. *Leaves* 1,4–5 mm broad, glabrous or sparsely pilose; mouths of sheaths truncate or convex. *Inflorescence* much elongated; terminal panicle c. 30 mm long; shorter lateral panicles 2–4(–5) per node at 2–3 nodes on slender, unequally exserted drooping peduncles. *Bracts* foliaceous. *Male spikelets* pedicillate, 4–5 mm long with pedicels 1–8(–10) mm long; *glumes* stramineous or castaneous with green keels, glabrous. *Female glumes* similar with midrib excurrent into an awn c. 1 mm long; 3,5–4 mm long. *Achene* ovoid or subglobose, 2,7 × 1,7–1,9 mm. hairy, lightly tessellate-lacunose, grey or light brown, the hairs white or golden: *hypogynium* with three unguiculate lobes clasping the achene, light brown.

Perennial with evergreen aerial parts occurring in perennially damp, open areas in northern Botswana (Fig. 12), and recorded from Zambia, Tanzania, Sudan, Central African Republic and Togo Republic.

This species is easily confused with *S. nyasensis* C.B. Cl., which has not been recorded from the FSA region to date, from which it is distinguished by its narrower leaves, by its fewer lateral panicles, by its golden achene-hairs and by its three strongly unguiculate hypogynium lobes. Of the species recorded from the FSA region it most closely resembles *S. achtenii* from which it is distinguished by its narrower leaves, by its more numerous lateral panicles, by its distinctly tessellate-lacunose, more densely hirsute, golden-haired achenes and by its three strongly unguiculate hypogynium lobes.

Vouchers: *P. A. Smith* 1980; 1994; 2790; 2799.

18. **Scleria achtenii** *De Wild.* in Rev. Zool. Afr. Suppl. Bot. 14: 16 (1926) et in Pl. Bequaert. 4: 219 (1927); Piérart in Lejeunia 13: 27 (1951); Robinson in Kew Bull. 18 : 534 (1966). Type: Congo, *Achten* 97 B (BR, holo.!).

S. substriatoalveolata De Wild. in Rev. Zool. Afr. Suppl. Bot. 14: 23 fig. 6 (1926) et in Pl. Bequaert. 4: 240 (1927). Types: Congo, *Vanderyst* 1060, 8190 and s.n. (BR, syn.!).

S. subintegriloba De Wild. in Pl. Bequaert. 4: 238 (1927); as *S. achtenii* var. *subintegriloba* (De Wild.) Piérart in Lejeunia 13: 47 (1951). Type: Congo, *Vanderyst* 2839 (BR, holo.!).

S. nyasensis sensu Nelmes, Kew Bull. 11: 86 (1956), pro parte, non C.B. Cl.

Perennial. *Rhizome* little more than the connective between ± contiguous culm bases or elongate with culms arising at intervals of up to 15 mm; scales reddish-brown. *Culms* 0,7–1,10 m tall, glabrescent or sparsely villous-hispidulous. *Leaves* 2,5–5 mm broad, villous on abaxial ribs and sheaths, glabrous adaxially and below mouths of sheaths; mouths convex with a membranous margin 1 mm long, the margin base villous. *Inflorescence* with terminal panicle up to 90 mm long, smaller lateral panicles single at 2–3 nodes exserted up to 180 mm from sheaths. *Bracts* foliaceous. *Male spikelets* sessile or shortly pedicillate, 7–9 mm long; glumes stramineous or reddish-striate, glabrous. *Female glumes* similar, shortly awned. *Achene* obovoid to subglobose, 2,5–3 × 1,8–2 mm, hairy, lightly and obscurely lacunose, grey or brownish-grey, hairs white: *hypogynium* small with 3 acuminate, acute, or bifid lobes, white.

Perennial occurring in open, perennially damp habitats on coastbelt of Natal (Fig. 12) and in Mozambique, Zambia and Zaire.

S. achtenii is distinguished from *S. unguiculata* by its broader leaves, fewer lateral panicles, very faintly reticulate-lacunose, sparsely white-hirsute achenes and by its small trilobed hypogynium with the lobes often 2–3-fid, not unguiculate.

Vouchers: *Tinley* 361; *Ward* 8887; *E. A. Robinson* 5523 (K); *Ward* 5508; *Gordon-Gray* 6215 (NU).

19. **Scleria lagoensis** *Boeck.* in Vidensk. Medd. Dansk Naturh. Foren. Kbh. 1869: 151 (1869); Core in Brittonia 2, 85 (1936); Robinson in Kew Bull. 18: 538 (1966). Type: Brazil. 2. iii. 1864, *Warming* s.n. (C, lecto.!).

S. moritziana Boeck. in Linnaea 38: 460 (1874). Type: Venezuela, *Moritz* 645 a (BM, iso.).

S. canaliculato-triquetra Boeck. in Flora 62: 573 (1879); Hutch. in FWTA 2: 493 (1936); Piérart in Lejeunia, Mém. 13: 48 (1951). Type: Sudan, *Schweinfurth* 2474 (K, iso.!).

S. diurensis Boeck. in Flora 62: 573 (1879). Type: Sudan, *Schweinfurth* 2389 (K, iso.!; pro parte).

S. cervina Ridl. in Trans. Linn. Soc. ser. 2, Bot. 2: 171 (1884) Type: Angola, *Welwitsch* 7127 (BM, holo.!).

S. mayottensis C.B. Cl. in Bull. misc. Inf. R. bot. Gdns, Addit. Ser. Kew 8: 92 (1908). Type: Madagascar, *Boivin* 3043 (P, holo.!).

S. vanderystii De Wild. in Rev. Zool. Afr. Suppl. Bot. 14: 25 (1926), et in Pl. Bequaert. 4: 241 (1927). Types: Zaire, *Vanderyst* 3471 (BR, syn.) and 5 others.

S. canaliculato-triquetra var. *clarkeana* Piérart in Lejeunia, Mém. 13: 49 (1951). Types: Zaire and Rwanda Burundi, *Mullenders* 159, 672 (K, syn.) and 8 others.

Perennial. *Rhizome* little more than the connective between ± contiguous culm bases; scales light brown. *Culms* 0,5–2 m tall, glabrous. *Leaves* 5–12 mm broad, glabrous, sometimes distally scaberulous; sheaths often villous near mouths; mouths truncate or produced into a short, membranous, glabrous or villous tongue. *Inflorescence* with terminal panicle 30–120 mm long, smaller lateral panicles 1–3 at 2–3 nodes unequally exserted from sheaths. *Bracts* foliaceous. *Male spikelets* sessile or subsessile, 4–6 mm long; glumes pale, reddish-brown striate, glabrous. *Female glumes* similar with midrib excurrent into a scabrid awn c. 1 mm long; 4–5 mm long. *Achene* ovoid to subglobose, 3–4 × 2–2,5 mm, hairy proximally, glabrous distally, smooth or lightly striate-lacunose, grey or grey-brown; *hypogynium* with 3 narrowly lanceolate-acuminate lobes, creamy-white.

Perennial occurring in open or semi-shaded, perennially damp grassland. Known for FSA region only from Swaziland (Fig. 12). Widespread in tropical Africa, in Madagascar and also in Brazil, Colombia and Venezuela.

This species is distinguished from *S. unguiculata* and *S. achtenii*, both of which have hirsute achenes, by the absence of hairs from the top of the achene, the absence of patterning on the achene surface or its faintness and by the achene being ± globose in *S. lagoensis*, ovoid in *S. unguiculata* and *S. achtenii*. It is distinguished from *S. adpresso-hirta* (Kük.) E.A. Robinson by its glabrous female glumes in particular.

Voucher: *Compton* 29644.

20. **Scleria melanomphala** *Kunth* Enum. Pl. 2: 345 (1837); C.B.Cl. in FC 7: 296 (1898) et in FTA 8: 506 (1902); Schonland, Bot. Surv. Mem. 3: 65, t.74 (1922); Cherm, in Arch. Bot. Caen 4, Mém. 7: 93 (1936); Hutch, in FWTA 2: 491, 493 (1936); Piérart in Lejeunia Mém. 13: 26 t.1, fig. 26: 31 (1951); Nelmes in Kew Bull. 11: 88 (1956); Robinson in Kew Bull. 18: 546 (1966). Type: South Africa, *Drège* s.n. sub *C.B.Cl.* 4369 (K, lecto.!; OXF).

S. macrantha Boeck. in Flora 62: 572 (1879) non *S. macrantha* Boeck. (1859), nom. illegit. Type: Sudan, *Schweinfurth* 3746 (K, iso.!).

S. longigluma Kük. in Engl. Bot. Jahrb. 56, Beib. 125: 22 (1921). Types: Brazil, *Ule* 8066 (B†).

S. centralis Cherm. in Arch. Bot. Caen. 4, Mém. 7: 50 (1931). Types: Central African Republic, *Le Testu* 2436 (P, syn!). *Tisserant* 1233 (P, syn.!).

Perennial. *Rhizome* elongate or contracted, 4–5(–7) mm thick; scales reddish-brown. *Culms* 0,8–2 m tall, glabrous or glabrescent. *Leaves* 7–15(–20) mm broad, glabrescent or sparsely villous; sheaths with mouths produced into a convex tongue with pale, membranous margin. *Inflorescence* with terminal ± spiciform panicle 30–90(–110) mm long, smaller ± spiciform lateral panicles (0)–1–3 at (0)–1–3 nodes, exserted up to 300 mm from sheaths. *Bracts* foliaceous. *Male spikelets* sessile or subsessile, 10–12 mm long; *glumes* red-brown or blackish-red, hispidulous or villous on midrib. *Female glumes* red-brown or blackish-red with green, hispidulous or villous keels, shortly awned. *Achene* ovoid, 4–5,25 mm × 2,5–3,5 mm, glabrous or proximally sparsely hairy, smooth, grey or brown proximally, blackish distally; *hypogynium* obscurely trilobed or zoniform, pale brown.

Perennial with evergreen aerial parts occurring in open, perennially wet habitats in Transkei, Natal, Transvaal, Swaziland and Botswana (Fig. 13). Widespread in tropical Africa, in Madagascar and also in Argentina, Brazil and Paraguay.

This species is distinguished from *S. greigiifolia* by the even spacing of leaves along the culm, by its very compact, spiciform panicles, by its adaxially glabrous female glumes, by its beakless achene with a black apex. Both species have brown, zoniform hypogynia.

Vouchers: *P. A. Smith* 2789; *Hemm* 556; *Compton* 27369; *Strey* 8304; *Ward* 8837.

FIG. 13. — Distribution map of *Scleria melanomphala*.

21. **Scleria poiformis** *Retz.*, Obs. 4: 13 (1786); Willd. Sp. Pl. 4: 316 (1805); Nees in Wight, Contr. 118 (1834); Kunth, En. Pl. 2: 358 (1837); Steud. Syn. 2: 179 (1855); Fischer in Kew Bull. 5: 265 (1931); Blake in Proc. R. Soc. Queensl. 62: 89 (1952) et in J. Arn. Arb. 35: 231 (1954); Nelmes in Kew Bull. 11: 110 (1956); Kern in Blumea 11: 178 (1961); Robinson in Kew Bull. 18: 547 (1966). Type: India Or., *Koenig* s.n. (LD, holo.; LZ; K, iso.!)

S. oryzoides Presl, Rel. Haenk. 1: 201 (1828); Nees in Wight, Contr. 116 (1834); Kunth, En. Pl. 2: 356 (1837); Steud. Syn. 2: 169 (1855); Miq. in Fl. Ind. Bot. 3: 342 (1856); Thwait. in Fl. Austr. 7: 432 (1878); C.B.Cl. in Hook. f. Fl. Brit. Ind. 6: 691 (1894) et in J. Linn. Soc., Bot. 34: 101 (1898) et in FTA 8: 505 (1902) et in Philip. J. Sc. Bot. 2: 105 (1907); Ridl. in Fl. Mal. Pen. 5: 177 (1925); Cherm. in Arch. Bot. Caen 7: 94 (1936); Van Steenis in Bull. Jard. Bot. Btzg. 3: 399 (1948); Type: Philippines, *Haenke* s.n. (PR, holo.; K, iso.!).

Perennial. *Rhizome* elongate, 5–17 mm thick; scales brown. *Culms* 1,3–1,8(–2) m tall, glabrous. *Leaves* mostly crowded towards base of culm, 20–40 mm broad, bases sometimes corky, up to 5 mm thick, glabrous; sheaths usually split almost to the base from concave mouths. *Inflorescence* a single terminal panicle without (very rarely with) foliaceous bract, 100–200 × 50–120 mm. *Male spikelets* sessile, 3,5–4,5 mm long; glumes reddish-brown, glabrous or hispidulous. *Female glumes* similar, 3,5–5 mm long. *Achene* broadly ovoid to subglobose, 3–3,5 × 2,5–2,8 mm, glabrous, smooth, grey-brown; *hypogynium* small, trilobed, lobes short, broadly triangular, white or finely red-brown striate.

Perennial, stout, aquatic, with evergreen aerial parts, occurring in open shallow lakes in coastal pans in northern Natal (Fig. 14) and Mozambique. Also on Zanzibar, on Mafia Island and in Madagascar where it is said by Chermezon to be an introduction, and in India, Malaysia, Thailand, Philippines and northern Australia.

This species is unlikely to be confused with any other. It is very robust, forms dense, almost pure stands in shallow coastal pans, has leaves which are broader and thicker than those of any other local species and is the only southern African species other than *S. lacustris* with a very small hypogynium with three obtusely triangular lobes. The two species are allopatric and differ in habit.

Vouchers: *Strey* 8199; *Ward* 4024; *E. F. Hennessy* 373 (UD–W); *R. H. Taylor* 218 (NU).

22. **Scleria greigiifolia** *(Ridl.) C.B.Cl.* in FTA 8: 509 (1902); Kern in Blumea 12: 41–44, fig. 1 (1963); Robinson in Kew Bull. 18: 546 (1966). Type: Angola *Welwitsch* 6959 (BM, lecto.!).

Acriulus greigifolius Ridl. in J. Linn. Soc., Bot. 20: 336 (1883) et in Trans. Linn. Soc. 2: 166, t. 22, figs 1–5 (1884); C.B.Cl. in

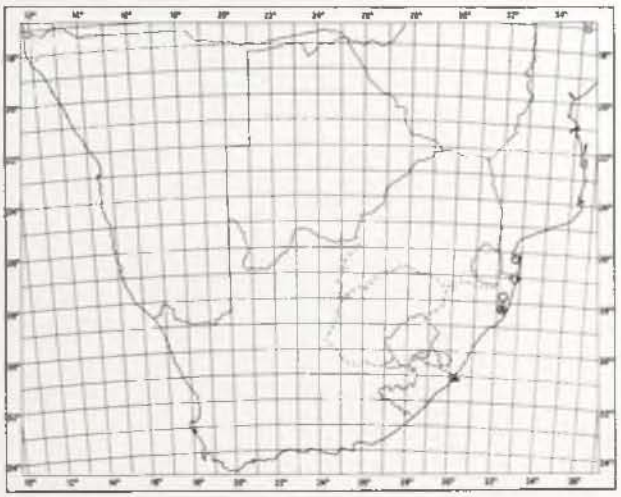

FIG. 14. — Distribution map of *Scleria poiformis* ○ *and S. greigiifolia* ▲.

Dur. & Schinz, Consp. Fl. Afr. 5: 675 (1895); Rendle, Cat. Afr. Pl. Welw. 2: 132 (1899). Type: Angola, *Welwitsch* 6959 (BM, holo.!).

A. madagascariensis Ridl. in J. Linn. Soc., Bot. 20: 336 (1883) et in Trans. Linn. Soc. 2: 2: 166, t.22, fig. 6–7 (1884); C.B.Cl. in Dur. & Schinz, Consp. Fl. Afr. 5: 676 (1895); K. Schum, in Engler, Pfl. Ost-Afr. C: 128 (1895); Cherm. in Mém. Acad. Malgache 10: 11 & 43 (1931) et in Arch. Bot. Caen 7: 101 (1936) et in Humbert, Fl. Madag. 29e fam. 266, fig. 27, 1–2 (1937). *Scleria acriulus* C.B.Cl. in FTA 8: 509 (1902); De Wild., Bull. Jard. Bot. Brux. 5: 143 (1916); De Wild., l.c. 7: 5 (1920). Types: Madagascar, *Baron* 1870 (K, syn!); *Hildebrandt* 3571 (K, syn.!).

A. titan C.B.Cl. in Bull. misc. Inf. R. bot. Gdns., Addit. Ser. Kew 8: 62 (1908) Type: Congo *Gentil* s.n. (BR, holo.!).

Scleria acriulus C.B.Cl. f. *leopoldiana* C.B.Cl. ex De Wild., Etude F. Bas-et Moyen Congo 1: 221 (1906). Type: Congo, *Gillet* 2818 (BR, holo.).

S. friesii Kük. in Wiss. Ergebn. Schwed. Rhodesia–Kongo Exped., 1911–12, 1: 9 (1921). Type: Zambia, *Fries* 743 (UPS, holo.; K, iso.!).

Perennial. *Rhizome* elongate or contracted, 6–10 mm thick; scales brown or reddish-brown. *Culms:* 1–2 m tall, glabrous. *Leaves* mostly crowded towards base of culm, 5–12 mm broad, tapering smoothly towards apex or, rarely, unequally laterally praemorse; glabrescent or hispidulous; *sheaths* with concave mouths, the margins minutely ciliate. *Inflorescence* with lax, copious terminal panicle c. 150 mm long and smaller lateral panicles 4–7 per node at 2–3 nodes exserted up to 200 mm from sheaths. *Bracts* foliaceous. *Male spikelets* sessile – shortly pedicillate, c. 5 mm long; glumes reddish-black proximally, castaneous distally; midrib hispidulous, margins setulose-ciliate. *Female glumes* similarly coloured, shortly awned, midrib and awn hispidulous, margins setulose-ciliate and distal half of adaxial surface with dense indumentum of stiff, upward-pointing hairs. *Achene* broadly ovoid, laterally compressed, strongly beaked, 6 × 3,5 mm; glabrous, smooth, pale brown or pinkish-brown sometimes with violet blotches; *hypogynium* zoniform, brown.

Perennial, stout, aquatic with evergreen aerial parts occurring in open permanent bogs or shallow lakes. Known for the FSA area from southern Natal coastbelt and from Eastern Shore, Lake St Lucia in northern Natal (Fig. 14). Also in tropical Africa and Madagascar.

This species is distinguished from *S. melanomphala* by its leaves crowded towards the base of the culm, by its lax, copiously branched panicles, by its adaxially densely-hirsute female glumes and by its strongly-beaked achene which lacks a black apex.

Vouchers: *P. G. Stewart* 293; *Moss* 19166 (J); *K. D. Huntley* 781 (NH; NU); *Strey* 7251; *H. B. Nicholson* 1598.

23. **Scleria angusta** *Nees ex Kunth*, Enum. Pl. 2: 346 (1837); C.B.Cl. in FC 7: 296 (1898); Cherm. in Arch. Bot. Caen 7, Mém. 2: 97 (1936); Nelmes in Kew Bull. 11: 73 (1956); Robinson in Kew Bull. 18: 548 (1966). Type: South Africa, *Drège* s.n. sub. *C.B.Cl.* 4246 (B†; K, lecto.!).

Perennial. *Rhizome* elongated, 4–7 mm thick; scales brown. *Culms* 1,3–2,5 m tall, glabrous below, hirsute above. *Leaves* unequally laterally praemorse distally, 6–16 mm broad, glabrous or sheaths densely villous below mouths; mouth produced into deltoid-rounded tongue 2–5 mm long. *Inflorescence* with compact terminal panicle 35–60 mm long, lateral panicles erect, single at 3–7 nodes, 30–40(–60) mm long, shortly exserted from sheaths. *Bracts* foliaceous. *Male spikelets* sessile or subsessile, 3,5–4 mm long, glumes pale brown with reddish striae, keels and distal margins hispidulous. *Female glumes* glabrescent or hispidulous on keels and distal margins, 3–3,5 mm long, pale brown with darker reddish streaks. *Achene* ovoid to ovoid-globose, 2,25–3,5 × 1,8–2,3 mm, glabrous, smooth, violet or purple: *hypogynium* obscurely trilobed with fimbriate margin, brown.

Perennial, stout, aquatic with evergreen aerial parts occurring in shade in swamp forest in coastal Natal and Transkei (Fig. 15). Also recorded from Mozambique and Madagascar.

This species is distinguished from all others of the FSA region by its praemorse leaves, its violet or purple achene and its fimbriate hypogynium.

Vouchers: *Tinley* 254; *Edwards* 2559; *Ward* 8083; *Strey* 9905; *Strey* 11306.

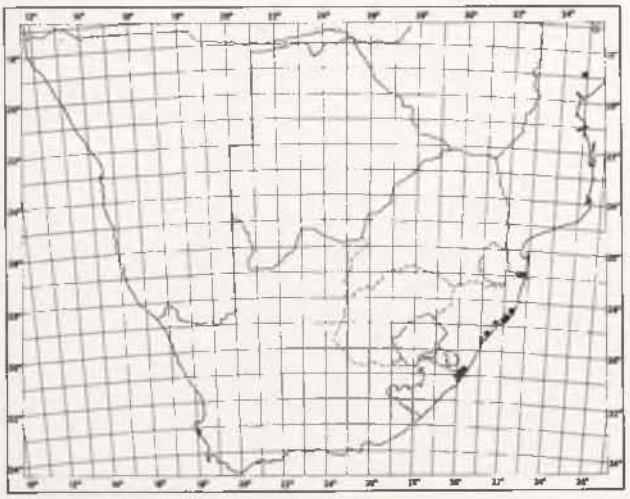

FIG. 15. — Distribution map of *Scleria angusta*.

UITTREKSEL

Die 23 spesies van Scleria *(Sclerieae, Caricoideae, Cyperaceae) in suidelike Afrika word hersien. Twee subgenera word erken,* Hypoporum *met een seksie,* Hypoporum, *en* Scleria *met drie seksies,* Scleria, Acriulus *en* Schizolepis. *Die tribus Sclerieae word van die tribus Bisboeckelereae onderskei.*

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APPENDIX : SPECIMENS STUDIED

The specimens are listed alphabetically according to the name of the collector. The figures in parentheses refer to the number of the taxon in the text. The herbaria in which the specimens examined are housed, are indicated by the letter codes of Holmgren & Keuken, Index Herbariorum (1974), except that of the University of Durban-Westville, UD–W, which is as yet unlisted.

Achten 97 A,B (18) BR. *Acocks* 2196 (10) K, PRE; 10007 (1) PRE, NH; 10735 (5) NH; 10738 (7) PRE, NH; 10745 (5) PRE, NH; 10758 (5) PRE, NH; 10850 (7) PRE, NH; 11304 (1) K, PRE; 18794 (5) PRE; 20882 (5) PRE; 21929 (1) K, PRE; 22048 (5) PRE; 22049 (2) K, PRE; 22171 (2) PRE. *Acocks & Naudé* 34 (12) PRE; 76 (1) PRE. *Arnold* 336 (14) K, PRE; 435 (15) K, PRE; 467 (8) PRE; 796 (11) PRE.

Baijnath 126 (8) PRE, NU, UD–W. *Baron* 1870 (22) K. *Barter* 1561 (12) K. *Baur* 311 (7) K; 759 (5) K. *F. Bayer* s.n. (20) NU. *Bews* 471 (10) NU. *Biegel & Russell* 3889 (7) PRE, NU. *Bingham* s.n. (5) NU. *Boivin* 3043 (19) P. *Bolus* 8274 (1) PRE, BOL. *Brain* 3710 (9) K; 8788 (16) K. *Breyer* 18070 (10) PRE; 24236 (5) PRE. *Buchanan* 3 (7) K; 32 (5) K; 36 (7) K; 349 (7) K; 351 (20) K; 352 (15) K. 1272 (5) K. *Burchell* 2463 (7) K. *Burke* 62 (11) K. *Burtt-Davy* 767 (5) PRE.

Chandler 1335 (22) K. *Chiparawasha* 349 (22) NU. *Clark* 334 (5) NU. *Coetzee* 499 (5) PRE. *Coleman* 691 (5) PRE, NH. *Collins* 26 (5) PRE. *Cooper* 3365 (7) K. *Compère* 1534 (22) K. *Compton* 24985 (14) PRE; 27364 (5) PRE; 27369 (20) PRE; 27790 (5) PRE; 29644 (19) K, PRE; 30964 (2) PRE; 31805 (14) PRE; 31872 (2) PRE; 32221 (5) PRE; 32441 (5) PRE.

Davidson & Mogg 32901 (14) PRE. *Devenish* 970 (7) K, PRE. *Devred* 1287 (11) NU; 1901 (22) K. *De Winter* 3915 (4) K, PRE. *De Winter & Marais* 5049 (3) K, PRE. *Dieterlen* 749 (10) K, PRE, NH; 776b (1) PRE; 889 (7) PRE. *Dinter* s.n. (16) K. *Doidge & Bottomley* s.n. (7) PRE. *Downing* 233 (7) PRE. *Drège* s.n. (3934 of C. B. Clarke) (7) K; s.n. (4246 of C.B.Cl.) (23) K; s.n. (4369 of C.B.Cl.) (20) K; s.n. (4381 of C.B.Cl.) (7) K. *Du Plessis* 880 (2) PRE. *Du Toit* 257 (16) PRE.

Edwards 1127 (2) K, PRE, NU; 2405 (1) PRE, NU; 2559 (23) PRE, NU; 2563 (8) K. *Ellis* 2964 (14) PRE; 3279 (5) PRE.

Feeley & Ward 7 (11) PRE, NU. *Flanagan* 954 (1) PRE, BOL; 988 (20) PRE, BOL; 1260 (7) K, BOL; 2035 (1) PRE; 2363 (11) K, BOL. *Forbes* 803 (5) NH. *Frankish* 318 (1) NU. *Fries* 743 (22) K.

Galpin 8581 (20) PRE, STE; 9104 (7) PRE; 10988 (15) NU. *Gentil* s.n. (22) BR. *Gilliland* 25046 (1) PRE, J; s.n. (5) J. *Gordon-Gray* 2050 (1) NU, UD–W; 2060 (1) NU; 6020 (14) NU; 6096 (2) PRE, NU; 6182 (11) NU; 6188 (20) NU; 6210 (11) NU; 6215 (18) NU; 6217 (20) NU; 6245 (15) NU; 6251 (8) NU; s.n. (15) NU.

Haenke s.n. (21) K. *Haines* 7009 (7) PRE; 7010 (7) PRE; 7031 (1) PRE; 7043 (16) PRE. *Hancock* s.n. (7) J. *Hancox* s.n. (2) NU. *Hemm* 556 (20) PRE, J; 563 (14) PRE, J. *Hennessy* 373 (21) UD–W; 374 (21) UD–W; 406 (1) NU, UD–W; 407 (5) NU, UD–W; 408 (2) NU, UD–W; 409 (1) NU, UD–W; 410 (15) UD–W; 431 (1) UD–W; 433 (5) NH, NU, UD–W; 437 (5) UD–W; 438 (1) UD–W; 440 (5) UD–W. *Hildebrandt* 3571 (22) K. *Hilliard & Burtt* 1089 (2) NU; 13394 (5) NU; 13795 (7) NU; 13843 (2) NU. *Hoener* 2014 (10) NU, UD–W. *Hooper & Townsend* 553 (22) K. *Hunt & Ramos* 6067 (19) K. *B. J. Huntley* 696 (20) NU; 781 (22) NH, NU; 789 (20) NU; 898 (23) NU. *K. D. Huntley* 425 (7) K, NU; 567 (5) NU; 705 (11) K, NU; 781 (22) NH, NU; 910 (1) NU.

I'Ons & Basel 129/82 (11) NU.

Jacobsen 1152 (7) PRE; 1181 (5) PRE. *Jarman & Guy* 404 (15) NU. *Jenkinson* 8 (20) K. *Johnston* 17 (3) NU. *Junod* 563 (16) PRE. *Kafuli* 88 (5) NU. *Killick* 249 (11) K, PRE, NU; 706 (5) NU; 1063 (5) K, PRE, NH; 1084 (7) K, PRE, NH, NU; 1222 (1) K, PRE, NH, NU; 1233 (2) K, PRE, NH, NU; 1254 (1) K, NH, NU; 1579 (5) K, NU. *Killick & Leistner* 3218 (6) PRE. *Killick & Strey* 2506 (11) PRE. *Killick & Vahrmeijer* 3663 (10) K, PRE; 3683 (1) K, PRE. *Kluge* 316 (5) PRE; 403 (1) PRE; 435 (20) PRE; 2017 (5) PRE. *Koenig* s.n. (21) K. *Krauss* 42 (20) K. *Kuntze* s.n. (1) K.

Lawn 1213 (20) NH; 1665 (8) NH. *Leendertz* 1623 (5) PRE; 6213 (7) PRE; 16233 (5) PRE. *Le Testu* 2. 436 (20) P; 5845 (13) P. *Lieben* 2312 (22) K; 2409 (11) NU. *Lind* 134 (22) K. *Liskowski* 10640 (22) K. *Lubke* 181 (7) PRE. *Lukuesa* 100 (22) K.

McAllister 99 (5) PRE. *McCallum Webster* s.n. (11) NU; s.n. (12) NU; s.n. (20) NU; s.n. (22) NU. *McClean* 387 (20) PRE, NH. *Mason* 30 (7) NH. *Merxmüller & Giess* 2081 (16) PRE. *Meyer* s.n. (8) NU. *Michelmore* 9 (8) PRE; 10 (20) K, PRE; 44 (8) K, PRE. *Milne-Redhead & Taylor* 9739 (4) K. *Mitchell* 23/26 (5) NU. *Mogg* 896 (1) PRE; 897 (5) PRE; 4318 (20) PRE, J; 5543 (5) PRE; 5637 (7) PRE; 16575 (5) PRE; 17070 (20) PRE; 36608 (14) J; A 7 (1) K, PRE. *Moll* 255 (12) NH; 704 (2) PRE, NU; 1424 (7) PRE, NU; 2188 (23) NH; 4534 (8) K, PRE, NU; 4534 A (18) NH; 4759 (12) K, PRE, NH, NU; 4778 (8) NH, NU. *Moll & Strey* 3907 (23) PRE, NH. *Monro* 635 (5) BOL. *Moss* 1127 (1) J; 2358 (11) K, J; 4001 (20) K, J; 5515 (15) K, J; 7207 (5) K; 19166 (22) J; s.n. (1) K. *Moss & Rogers* 452 (5) BOL. *Mtombeni* 32 (20) PRE. *Müller* 2031 (14) PRE. *Müller & Giess* 489 (16) K, PRE. *Myre & Carvalho* 1147 (21) NU.

Nicholson 317 (20) NH; 1103 (12) PRE; 1141 (8) PRE; 1598 (22) PRE; 15411 (5) PRE.

Obermeyer 3095 (14) PRE. *Onderstall* 388 (1) PRE.

Pegler 322 (20) BOL; 1421 (1) K; 1498 (1) K. *Pellatt* s.n. (1) J. *Pentz & Acocks* 10277 (9) PRE, NH. *Perrier de la Bâthie* 12704 (16) P. *Phelan* 148 (5) NU. *Phillips* 3550 (14) K, PRE. *Physick* 78 (5) NU. *Pole-Evans* s.n. (12) PRE. *Pooley* 1967 (8) UD–W. *Pott* 15253 (5) PRE, BOL.

Quartin Dillon & Petit s.n. (5) K; s.n. (16) K.

Rehmann 5626 (3) K, BOL. *Reid* 423 (11) PRE. *Repton* 1113 (5) PRE, NH, BOL; 3295 (7) PRE. *Richards* 12383 (5) NU. *Roberts* 3087 (1) PRE. *Robinson* 1102 (16) K; 1724 (11) NU; 1748 (12) NU; 2228 (17) NU; 2267 (17) NU; 2269 (20) NU; 2270 (18) NU; 2870 (7) NU; 3027 (2) NU; 3368 (19) NU; 3405 (3) NU; 4220 (6) K, NU; 4700 (13) NU; 5055 (12) NU; 5056 (17) K; 5523 (18) K; 5524 (8) NU. *Rodin* 3922 (7) K, PRE. *Rogers* s.n. (7) K, PRE, J. *Ruch* 2034 (5) PRE. *Rudatis* 528 (5) STE; 736 (11) K, PRE, STE; 1083 (7) STE.

Sandwith s.n. (5) K. *Schimper* 327 (5) K; 1232 (16) K; 1557 (5) K. *Schlechter* 3705 (7) K, PRE, BOL; 5532 (1) PRE; s.n. (12) Z, PRE, BOL. *Schoenfelder* 808 (16) K, PRE. *Schönland* 4189 (20) PRE. *Schweickerdt* 2189 (16) K, PRE, NU; 2344 (12) K, PRE, NU. *Schweinfurth* 2193 (5) K; 2389 pro parte (19) K, P; 2474 (19) K; 3746 (20) K. *Seagrief* 18 (14) NU; 23 (NU); 2286 (20) RUH; 3157 (5) RUH. *Sellow* s.n. (11) K & ex B. *Siame* 209 (22) NU; 289 (5) NU. *Sim* 197 (1) PRE; 2705 (1) NU. *Simpson* 16/60 (12) NU. *Skead* 66 (7) NU. *C. A. Smith* 1341 (5) PRE. *P. A. Smith* 340 (20) PRE; 341 (7) PRE; 1980 (17) PRE; 1994 (17) PRE; 2033 (1) PRE; 2635 (7) PRE; 2718 (13) PRE; 2789 (20) PRE; 2790 (17) PRE; 2796 (13) PRE; 2799 (17) PRE. *Smook* 1055 (7) PRE; 1058 (2) PRE. *Smuts & Gillet* 3260 (14) PRE. *Stewart* 293 (22) PRE. *Stirton* 5649 (11) PRE. *Stohr* 570 (20) BOL. *Story* 6467 (4) K, PRE. *Strey* 4894 (11) K, PRE, NH; 5136 (8) PRE, NH; 5137 (21) NH; 5711 (8) K, PRE, NH, UD–W; 7035 (12) K, PRE, NH, UD–W; 7108 (23) K, PRE, NH, UD–W; 7251 (22) PRE, NH; 7705 (23) PRE, NH; 8199 (21) PRE, NH, UD–W; 8304 (20) PRE, NH; 9464 (15) PRE, NH; 9905 (23) PRE, NH; 10102 (12) K, PRE, NH; 10331 (15) NH; 11306 (23) PRE, NH. *Sutherland* s.n. (20) K.

H. C. Taylor 2101 (1) NU, UD–W. *R. H. Taylor* 120 (23) NU; 142 (8) NU; 218 (21) NU. *Tinley* 254 (23) PRE, NH, NU; 303 (20) PRE, NU; 361 (18) PRE, NH, NU. *Tisserant* 1233 (20) P; 2922 (3) P. *Thomas* 95 (11) K. *R. X. L. Thomas* 1202 (5) BR. *Thompson* 29 (11) NU. *Tyson* 1825 (5) PRE, BOL.

Unnamed Collector s.n. (21) PRE.

Van der Schijff 6384 (20) PRE. *Vanderyst* 1060 (18) BR; 2839 (18) BR; 8190 (18) BR; s.n. (18) BR. *Van Wyk* 4786 (16) PRE. *F. Venter* 1150 (14) PRE. *H. J. T. Venter* 733 (15) NH; 842 (20) NH; 890 (8) NH; 4839 (11) PRE; s.n. (5) PRE. *Verdick* 398 (5) BR. *Vesey-Fitzgerald* 230 (11) NU; 1007 (3) NU; 1258 (20) NU; 1333 (5) NU; 1353 (5) NU; 1447 (5) NU; 1507 (5) NU; 2260 (5) NU; 2345 (5) NU; 2488 (20) NU.

Wager s.n. (10) PRE. *Ward* 717 (23) NU; 723 (8) PRE, NU; 724 (20) NU; 1040 (20) NU; 1106 (11) NU; 1186 (23) NU; 2784 (8) PRE, NH; 2856 (20) PRE, NH, NU; 2924 (12) NH, NU; 3648 (20) PRE, NU; 3712 (23) PRE, NU; 4024 (21) PRE, NH, NU; 4327 (20) PRE; 4716 (15) NH, UD–W; 4737 (8) NH, NU, UD–W; 4935 (8) NU, UD–W; 4936 (20) NH, UD–W; 4937 (18) UD–W; 4953 (15) PRE, UD–W; 5043 (15) NH, NU, UD–W; 5057 (11) PRE, NH, NU, UD–W; 5077 (20) K, PRE, NH, NU, UD–W; 5128 (8) K, PRE, NH, NU, UD–W; 5172 (8) PRE, NH, NU, UD–W; 5435 (8) K, PRE, NH, NU, UD–W; 5437 (18) NH, NU, UD–W; 5470 (8) K, PRE, NH, NU, UD–W; 5508 (18) K, PRE, NH, UD–W; 6338 (1) PRE, NH, NU, UD–W; 7158 (15) PRE, UD–W; 7242 (8) PRE, UD–W; 7823 (12) UD–W; 7879 (18) UD–W; 7911 (23) UD–W; 8083 (23) PRE; 8108 (8) UD–W; 8494 (1) PRE; 8738 (1) PRE; 8741 (15) PRE, UD–W; 8837 (20) PRE, NH, NU; 8874 (20) NU, UD–W; 8886 (8) PRE, UD–W; 8887 (18) PRE, NH; 9071 (1) PRE; 9145 (8) PRE, UD–W; 9146 (18) PRE. *Warming* s.n. (19) C. *Weintraub* s.n. (1) J. *Welwitsch* 6959 (22) BM; 7122 (16) BM; 7127 (19) BM; 7138 (2) BM; 7143 (12) K. *Werdmann & Oberdieck* 1152 (5) K, PRE. *Wild*. 5467 (2) NU; 5468 (7) NU. *Wilms* 1586 (7) K; 1646 (5) K; 2327 (7) K. *Wilson* s.n. (5) NU. *Wood* 1428 (12) K, NH; 1597 (20) NH, BOL; 3863 (23) K, NH, BOL; 3994 (1) K, NH, BOL; 4757 (1) K, NH; 12022 (8) NH. *F. B. Wright* 1946 (7) NU; 2063 (7) NU. *Wright* s.n. (13) K.