

THE IDENTIFICATION AND DISTRIBUTION OF SOME CYPERACEAE AND GRAMINEAE, CHIEFLY FROM AUSTRALIA.

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(With Plates V and VI.)

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SUMMARY.

The identification, nomenclature and distribution of some Cyperaceae and Gramineae are discussed. Six species are new records for Australia, one for both Queensland and South Australia, and two for Queensland, while six new species are described.

Many sedges and grasses found in Australia are also found over a wide area beyond Australia. The identification of these "wides" is often a serious difficulty which can only be solved by the study of types of all the names of allied species, many of which are not readily available. The loan of several such types from the herbaria at Lund (LD), Paris (P) and Copenhagen (C) has been made to me through the kindness of Dr. A. Hässler, Prof. H. Humbert and Dr. O. Hagerup respectively, and I wish to express my gratitude to them for their assistance. Miss M. B. Tindale and Mr. E. Nelmes have kindly copied passages from publications in the library of the Kew Herbarium which are unavailable in Australia. Some of the species studied are discussed in this paper; the opportunity has been taken to record extensions to the previously known range of some allied endemic species, to describe some new ones, and to correct an error in nomenclature.

Cyperaceae.

Cyperus sulcinus C. B. Clarke in J. Linn. Soc. **21** : 56 (1884).

QUEENSLAND.—North Kennedy District: Bowen, near roadside in granite sand, 25th Sept. 1950, *Blake* 18544.

New for Australia; widely spread through Malaysia to India and Indo-China. The collection cited above consists of a large number of small plants with culms 1-7 cm. high and the wide-spreading rays of the inflorescence up to 5.5 cm. long below the rich brown spikelets. The species belongs in subgenus *Pycneus* and its chief distinguishing characters are its annual habit, very obtuse glumes closely 3-nerved on the back with nerveless sides, and oblong nut with a shallow furrow down each face.

Scirpus L. Sect. **Actaeogeton** Reichb. Ic. Fl. Germ. et Helv. 40 (1846); Beetle in Amer. J. Bot. **29** : 653-6 (1942).

This section is based on *Scirpus mucronatus* L. and its characteristic features are that the culms are nodeless above the base or have but one node in the lower part, the leaves are commonly reduced to more or less mucronate sheaths, the outer involucreal bract appears like a continuation of the culm, and the black or dark-brown or grey-brown nut is marked by transverse, wavy ridges; there may be two or three stigmas and hypogynous bristles may be present or absent; some species regularly produce flowers in the leaf-sheaths with greatly elongated styles and stigmas. Difficulties which had been encountered when studying the Australian members of this group were not solved by the application of Beetle's revision

cited above. The following discussion is offered as a contribution towards a better understanding of the species which have been associated in one way or another with the name *S. supinus* L. The names and more important references which must be considered are as follows:—

Eleocharis juncoides (Roxb.) Schult. Mant. **2**: 90 (1824).

Isolepis ambigua Steud. in Zoll. Verz. Ind. Arch. heft **2**: 62 (1854);
C. B. Clarke in Philip. J. Sci. **2**, **C**: 99 (1907).

Isolepis ambigua Steud. Syn. Cyp. 91 (1855).

Isolepis (?) *juncoides* (Roxb.) Miq. Fl. Ind. Bat. **3**: 312 (1856).

Isolepis oryzetorum Steud. Syn. Cyp. 96 (1855) ("oryetorum").

Isolepis polycolea (Notaris) Steud. Syn. Cyp. 95 (1855).

Isolepis proxima Steud. Syn. Cyp. 95 (1855).

Isolepis supina (L.) R. Br. Prodr. 221 (1810); Nees in Wight Contrib. Bot. Ind. 108 (1834).

Isolepis uninodis Delile Fl. Egypt. 8, t. 6, fig. 1 (1812).

Scirpus cernuus Vahl Enum. **2**: 245 (1806); Bedevian, Illustrated Polyglottic Dictionary of Plant Names 535 (1936).

Scirpus dissachanthus S. T. Blake in Vict. Nat. **63**: 116 (1946).

Scirpus erectogracilis Hayata Ic. Pl. Formos. **6**: 114 (1916).

Scirpus erectus Poir. Encycl. **6**: 761 (1804); C. B. Clarke in Hook.f. Fl. Brit. Ind. **6**: 656 (1894); Cherm. in Arch. Botanique **4** (7): 26 (1931); Beetle in Amer. J. Bot. **29**: 654 (1942).

Scirpus hallii Gray Addenda Man. ed. 2 (1863).

Scirpus junciformis Nees in Wight Contrib. Bot. Ind. 112 (1834); nec Retz. (1791) nec (H. B. K.) Poir. (1817).

Scirpus juncoides Roxb. Hort. Bengal. 81 (1814), *nomen nudum*; Fl. Ind. **1**: 228 (1820), ed. Carey **1**: 216 (1832); non Willd. ex Kunth (1837).

Scirpus lateralis Forsk. Fl. Aegypt.-Arab. 15 (1775); Vahl Enum. **2**: 280 (1806); Spreng. Syst. Veg. **1**: 207 (1825); C. B. Clarke in Prain Fl. Trop. Afr. **8**: 453 (1902), *in syn.*; Christens. in Dansk Bot. Arkiv **4**: 12 (1922).

Scirpus lateralis Retz. Obs. **4**: 12 (1786); Nees in Wight Contrib. Bot. Ind. 108 (1834), *in syn.*; C. E. C. Fischer in Kew Bull. **1932**: 70 (1932).

Scirpus lateriflorus Gmel. Syst. 127 (1791).

Scirpus luzonensis Presl Rel. Haenk. **1**: 193 (1828).

Scirpus oryzetorum (Steud.) Ohwi in Mem. Coll. Sci. Kyōto Imp. Univ. ser. B, **18** (1): ? (1944).

Scirpus polycoleus Notaris in Ann. Sci. Nat. III, **9**: 326 (1848).

Scirpus supinus L. Sp. Pl. 49 (1753); Benth. Fl. Austral. **7**: 330 (1878);
C. E. C. Fischer in Kew Bull. **1932**: 70 (1932).

Scirpus supinus L. var. *digynus* Boeck. in Linnaea **36**: 700 (1870).

Scirpus supinus L. var. *digynus* Boiss. Fl. Orient. **5**: 380 (1884).

Scirpus supinus L. var. *elatiior* Boeck. in Linnaea **36**: 700 (1870).

Scirpus supinus L. var. *hallii* (Gray) Gray Man. Bot. N. U.S. ed. 5, 563 (1867).

Scirpus supinus L. var. *uninodis* (Delile) Asch. & Schweinf. Ill. Fl. d'Égypte 157 (1887); Christens. in Dansk Bot. Arkiv 4: 12 (1922).

Scirpus supinus L. var. *uninodis* (Delile) C. B. Clarke in Hook.f. Fl. Brit. Ind. 6: 656 (1894) et in Prain Fl. Trop. Afr. 8: 453 (1902).

Scirpus timorensis Kunth Enum. 2: 162 (1837).

Scirpus uninodis (Delile) Beetle in Amer. J. Bot. 29: 656 (1942) (*author wrongly cited*), in Amer. Midl. Nat. 34: 734 (1945); S. T. Blake in Vict. Nat. 63: 119 (1946) (*author wrongly cited*).

Scirpus uninodis (Delile) "Boiss." var. *hallii* (Gray) Beetle in Amer. J. Bot. 29: 656 (1942).

The earliest of these names is *S. supinus*, which was based on European specimens. Most of the other names were proposed for plants from other parts of the world, some of which were originally carefully distinguished from *S. supinus*, but most of which have been considered by one botanist or another to be conspecific with *S. supinus* or only varietally distinct from it.

S. lateralis Forsk. was described from a plant collected by Forskahl in Arabia, to the north-west of Aden. The specimen was lost prior to 1806 (Vahl, 1806) and has not been found since (Christensen, 1922; Hagerup, *in litt.*). Sprengel (1825) thought that Forskahl's plant was conspecific with the later described *Isolepis uninodis* Delile; at one time, C. B. Clarke (1902) followed this opinion and Christensen (1922) was inclined to agree. Otherwise the species has been usually ignored or placed among the doubtful species. Forskahl's description is brief and does not mention flower or fruit. So far as it goes, it could apply to specimens of *Isolepis uninodis* except for the longer and apparently more numerous rays of the inflorescence and the leafy base; also it would apply to *Scirpus litoralis* Schrad. (the only other species which I have found recorded from Arabia) except that the height "pedalis & saepe cubitalis" is much less than is usual for the species. The phrase "basi foliosa" does not very well apply to either species unless sterile culms are meant, but *S. litoralis* does sometimes produce conspicuous basal leaves. The Arabic name quoted by Forskahl and transliterated by him "hallâl" (better, "hhalâl") is applied to *S. cernuus* in Egypt according to Bedevian (1936), but Forskahl's description certainly does not apply to this species. From the available evidence, slight as it is, it appears that Forskahl's name does not refer to *Isolepis uninodis*, but may refer to *Scirpus litoralis*.

From a specimen collected in Ceylon by Koenig, Retzius described a species which he also called *Scirpus lateralis*, apparently in ignorance of Forskahl's earlier use of the name. Gmelin altered Retzius' name to *Scirpus lateriflorus*, apparently because it was a later homonym. *Scirpus lateralis* Retz. was referred to *Isolepis supina* (L.) R.Br. (*Scirpus supinus* L.) by Nees (1834) and to *Scirpus supinus* L. by C. E. C. Fischer (1932), but otherwise it and *S. lateriflorus* appear to have been usually ignored.

Scirpus erectus Poir. was based on a specimen collected by du Petit Thouars in Mauritius (Madagascar was quoted in the original description, but the locality on the label is "Ile de France"). This name was misapplied by C. B. Clarke (1894 and elsewhere) and by Beetle (1942) to a species quite distinct from that represented by Poiret's type. Neither Clarke nor Beetle included Mauritius in the range of *S. erectus*, yet Clarke saw Poiret's type and annotated it "*Scirpus supinus* Linn. var. γ *uninodis* (sp.) Delile."

Isolepis uninodis Delile was based on an Egyptian plant. C. B. Clarke (1894, 1902) treated it as a variety of *Scirpus supinus* and the ternary combination has been commonly cited as *S. supinus* L. var. *uninodis* (Delile) C. B. Clarke in Hook.f. Fl. Brit. Ind. 6: 656 (1894), although the combination had been published earlier, though rather carelessly, by Ascherson and Schweinfurth (1887). Chermeson (1931) treated *Scirpus erectus* and *Isolepis uninodis* as synonymous and pointed out that Clarke had misapplied Poiret's name to a species of which the correct name is *S. juncoides* Roxb. In the synonymy, Chermeson quoted "Trabut" as the author of the combination *Scirpus uninodis*, but no evidence for this has been found by me or by Mr. E. Nelmes who kindly made a search for it. Beetle treated *Isolepis uninodis* as a distinct species of *Scirpus*, citing the name as *Scirpus uninodis* (Delile) Boiss. Fl. Orient. 5: 380 (1884), but in actual fact Boissier treated it as a variety of *S. supinus* (*S. supinus* L. var. *digynus* Boiss.) and cited as a synonym (the basonym) "*S. uninodis* Del. Descr. Eg. p. 132 sub *Isolepide* tab. 6, fig. 1." Actually, Beetle himself made the transfer and he correctly cited the author in a later paper (Beetle, 1945) but without reference to the place of publication. He gave "Eurasia" as the range of the species, although Egypt is the type locality, and followed C. B. Clarke in misapplying the name *S. erectus* to *S. juncoides*. I followed Beetle by citing *S. uninodis* (Delile) Boiss. when *S. dissachanthus* was described and its affinities discussed (Blake 1946).

"*Isolepis ambigua* Steud. ! in Zoll. Verz. Ind. Archip. heft 2, 62" was cited by C. B. Clarke (1907) as a synonym of *S. supinus* var. *uninodis*; this is a *nomen nudum*, while the description of *I. ambigua* Steud. Syn. Cyp. 91 refers to a very different species from those discussed in this paper.

Isolepis oryzetorum Steud. was based on specimens from Java; the epithet was spelled "*oryetorum*," but this is an evident "unintentional orthographic error" (there are other misprints on the page) and the epithet was correctly spelled in the index.

Among the numerous specimens and other material examined, the following were of particular importance in interpreting the names mentioned above:—

The type of *Scirpus lateralis* Retz. and consequently of *S. lateriflorus* Gmel. (LD); a rubbing and piece of the type of *Scirpus erectus* Poir. (P); a tracing of Delile's excellent plate and a copy of his elaborate description of *Isolepis uninodis* (BRI) on which name *Scirpus supinus* var. *digynus* must be typified; topotypes of *Isolepis oryzetorum*, *Scirpus luzonensis*, *Scirpus supinus* and *Scirpus timorensis*; and the original figure and description of *Scirpus erectogracilis*. Three distinctive species can be recognised, all with slender, non-septate culms and very long lower involucre bracts. They may be distinguished as follows:—

Culms nodeless above the base, without flowers in the leaf-sheaths; involucre bract solitary; spikelets always sessile, usually few, rarely solitary; glumes many-striate with glabrous margins; nut obovate in outline:

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| Annual plants with black, rather sharply trigonous, prominently transversely wavy-ridged nuts and no hypogynous bristles; leaf-blades well-developed | <i>S. supinus</i> |
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| Perennial plants with brown, plano-convex, faintly wavy-ridged nut and 6 well-developed, retrorsely scabrous, hypogynous bristles; leaf-blades rudimentary | <i>S. juncoides</i> |
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Culms with a node well above the base; leaf-blades rudimentary; solitary flowers in the leaf-sheaths with long-exserted stigmas; 2 involucre bracts usually present, the second one short; some spikelets peduncled but the peduncles sometimes very short; glumes 3-1-nerved, prominently keeled, minutely ciliolate on the upper margins; nut suborbicular in outline, plano-convex to trigonous, black when ripe, faintly to conspicuously transversely wavy-ridged *S. lateriflorus*

S. supinus appears to be confined to Europe; its complete synonymy has not yet been worked out. The synonymy and distribution of the other two species follow:—

Scirpus lateriflorus Gmel. Syst. 127 (1791).

Scirpus lateralis Retz. Obs. 4: 12 (1786), non Forsk. (1775).

Scirpus erectus Poir. Encycl. 6: 761 (1804).

Scirpus polycoleus Notaris in Ann. Sc. Nat. III, 9: 326 (1848).

Scirpus supinus L. var. *digynus* Boiss. Fl. Orient. 5: 380 (1884), non Boeck. (1870).

Scirpus supinus L. var. *uninodis* (Delile) Asch. & Schweinf. Ill. Fl. d'Égypte 157 (1887).

Scirpus supinus L. var. *uninodis* (Delile) C. B. Clarke in Hook.f. Fl. Brit. Ind. 6: 656 (1894).

Scirpus erectogracilis Hayata Ic. Pl. Formos. 6: 114 (1916).

Scirpus oryzetorum (Steud.) Ohwi in Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 18 (1): ? (1944).

Scirpus uninodis (Delile) Beetle in Amer. J. Bot. 29: 656 (1942)
(author wrongly cited) et in Amer. Midl. Nat. 34: 734 (1945).

Isolepis uninodis Delile Fl. Egypt. 8, t. 6, fig. 1 (1812).

Isolepis polycolea (Notaris) Steud. Syn. Cyp. 95 (1855).

Isolepis oryzetorum Steud. Syn. Cyp. 96 (1855) ("oryetorum").

? *Isolepis proxima* Steud. Syn. Cyp. 95 (1855).

S. lateriflorus is widely spread in the tropics and subtropics of Africa, Asia and Australia, chiefly in rice-fields, at the edges of swamps and streams and on the beds of drying-out lagoons and water-courses. The following specimens have been examined in various herbaria:—

AFRICA.—EGYPT (tracing of Delile's figure of *Isolepis uninodis* Delile). MAURITIUS, du Petit Thouars (type of *Scirpus erectus* Poir.).

ASIA.—INDIA: Eastern India, Wight 2893. CEYLON: Ganorawa, in rice-field, Sept. 1926, Alston 318; without definite locality, Koenig (type of *Scirpus lateralis* Retz. and *S. lateriflorus* Gmel.). FORMOSA: (Original figure of *S. erectogracilis* Hayata). MALAYA: Kedah, Kepala Batas, Nov. 1941, Corner in Singapore Field No. 38108; Langkaw, rice-fields near Kuah, Nov. 1941, Corner in Singapore Field No. 37975. PHILIPPINE ISLANDS: Pangasinan Province: Alaminos, Dec. 1922, McGregor in Bureau of Science No. 41456. Bulacan Province: Manila and vicinity, Oct. 1913, Ramos in Bureau of Science No. 21970, and without exact locality, Sept. 1913, Ramos in Bureau of Science No. 1441 partly. JAVA: Without definite locality, Ploem; Gënnëng, 28th May 1913, Haarsveld; Redzoso, E. of Pasoeroean, 10th June 1924, Kooper; (topotypes of *Isolepis oryzetorum* Steud.). SOEDHONO: Without definite locality and without collector's name, 19th June 1925. LOMBOK: Pangantap, coast, July 1909, Gründler 2377.

AUSTRALIA.—WESTERN AUSTRALIA: Kimberley Division: Isdell R., 5 miles below Mt. Bartlett, July 1905, *Fitzgerald*; Lennard R., 10 miles above junction of Barker R., May 1905, *Fitzgerald* 588. NORTHERN TERRITORY: Fitzmaurice R., Oct. 1855, *Mueller*; 12° 43' S., 131° 30' E., dried-out depressions at edge of lagoon, 17th Sept. 1946, *Blake* 17033; near Rum Jungle and Finnis R., about 12° 59' S., 130° 58' E., wet sandy creek bank, 55 m., 8th August 1946, *Blake* 16728; Mary R., about 13° 5' S. and 131° 47' E., muddy bank, about 55 m., 28th Sept. 1946, *Blake* 17088; about 14° 7' S., 131° 16'-18' E., edge of open swamp, about 45 m., 1st July 1946, *Blake* 16273. QUEENSLAND: Burke District: Near Burketown, June 1943, *Whitehouse*; near Normanton, edge of fresh-water lagoon, 19th August 1936, *Blake* 12626; between Norman and Gilbert Rivers, *Gulliver*. Cook District: Endeavour R., *Banks & Solander*. North Kennedy District: Near Woodstock, S. of Townsville, on mud in drying-out *Melaleuca* swamp, 23rd Sept. 1950, *Blake* 18510; Pentland, edge of tank, 390 m., 12th June 1934, *Blake* 6148. Mitchell District: Geera, E. of Barcaldine, in fresh water at 270 m., 29th Nov. 1935, *Blake* 10337, and in wet places at end of bore-drain, 270 m., 6th Dec. 1935, *Blake* 10363. NEW SOUTH WALES: North Coast: Richmond R., *Woolls*. Central Coast: Centennial Park, Sydney, Feb. 1916, *Hamilton*. VICTORIA: Mallee: Lake Lalbert, *Mueller*; Dimboola, Jan. 1895, *Reader*.

Of the names cited at the beginning of this discussion, *S. hallii* Gray, *S. supinus* var. *hallii* (Gray) Gray and *S. uninodis* var. *hallii* (Gray) Beetle refer to a plant of the eastern United States. Beetle stressed the sharp ridges on the nut and its prominent mucro; it is evidently very close to *S. lateriflorus*, of which some Australian specimens have sharply ridged nuts, but I have not seen sufficient American material to form an independent opinion on its status.

Scirpus juncoides Roxb. Hort. Bengal. 81 (1814), *nomen nudum*; Fl. Ind. 1: 228 (1820), ed. Carey 1: 216 (1832); non Willd. ex Kunth (1837).

Scirpus luzonensis Presl Rel. Haenk. 1: 193 (1828).

Scirpus junciformis Nees in Wight Contrib. Bot. Ind. 112 (1834); non Retz. (1791) nec (H. B. K.) Poir. (1817).

Scirpus timorensis Kunth Enum. 2: 162 (1837).

Scirpus supinus L. var. *elator* Boeck. in Linnaea 36: 700 (1870).

Eleocharis juncoides (Roxb.) Schult. Mant. 2: 90 (1824).

Isolepis (?) *juncoides* (Roxb.) Miq. Fl. Ind. Bat. 3: 312 (1856).

This is the plant for which the name *Scirpus erectus* Poir. has been commonly used. It is a stouter plant than the species to which this name was originally applied (= *S. lateriflorus* Gmel.), with few, larger, ovoid, terete, sessile spikelets, tightly appressed, striate glumes keeled only near the broadly rounded and more or less mucronate tip and glabrous on the margins, well-developed hypogynous bristles, and more or less plano-convex brown nut which is only faintly rugose. It is widely spread and apparently common from India and China to Malaysia as far east as Timor.

Scleria sumatrensis Retz. Obs. 5: 19 (1789).

QUEENSLAND.—Cook District: Yarrabah near Cairns, in swamp forest, 28th June 1935, *Blake* 9649; Innisfail, in *Pandanus* swamp, about 4.5 m., 28th Nov. 1941, *Blake* 14467.

New for Australia; widely spread through Malaysia to Ceylon and India, but not yet known from New Guinea. The type (LD) consists of an inflorescence with some immature fruit; the Australian specimens have paler spikelets. The species belongs to a group of closely allied coarse species which have the leaves in the middle part of the stem and the lower bracts clustered in false-whorls of 3, large inflorescences of several partial panicles, unisexual spikelets, and a 3-lobed disc; *S. sumatrensis* is distinguished by the tall disc which is from one-half to two-thirds as high as the nut.

***Scleria terrestris* (L.) Fassett in Rhodora 26: 159 (1924).**

QUEENSLAND: Cook District: Innisfail, in *Pandanus* swamp, about 4.5 m., 28th Nov. 1941, *Blake* 14468.

New for Australia; widely spread through Malaysia to China and Ceylon. It is a coarse species with scattered leaves, unisexual spikelets and a small disc with rounded short lobes.

***Scleria poaeformis* Retz. Obs. 4: 13 (1786).**

Scleria oryzoides Presl Rel. Haenk. 1: 201 (1830); Benth. Fl. Austral. 7: 432 (1878).

QUEENSLAND.—North Kennedy District: Cardwell, in *Melaleuca* swamps about sea-level, dominating with *Lepironia articulata* the wetter parts, 26th Sept. 1935, *Blake* 9700; Ingham, fairly common in open swamp, 5th Dec. 1942, *Blake* 14787.

New for Queensland; previously reported from the Northern Territory by Bentham, *l.c.*, under the name of *S. oryzoides* Presl. The type (LD) consists of an inflorescence only, which is matched by those of the Queensland specimens. The stout stems are rather distantly produced from a long-creeping rhizome and bear scattered, broad, more or less obtuse leaves and solitary, terminal, decompound panicles of chiefly male spikelets; female spikelets occur only towards the base of the branches in the lower part of the panicles. It is widely spread through Malaysia to India.

Gramineae.

***Stipa nodosa* S. T. Blake; species nova, affinis *S. scabrae* Lindl., sed culmis plurinodibus, foliis basalibus perpaucis, ligulis brevioribus glabrisque praecipue differt.**

Gramen perenne, caespitosum, circa 1 m. altum. Culmi erecti, graciles, teretes, duri, leviter striati, dense granuloso-asperuli, glabri, pro more 5-8-nodes nodis incrassatis, simplices vel parce ramosi, basi cataphyllis paucis stramineis plus minusve sericeis cincti; innovationes perpaucae. Folia plerumque caulina, basalia perpauca; vaginae arctae, convolutae, striatae, asperulae, margine exteriori ciliatae, ore barbatae, nodis glabrae, internodiis breviores; auriculae incrassatae; ligulae truncatae, glabrae, 0.5-0.75 mm. longae; laminae rigidae, setaceae, convolutae vel involutae, acutissimae, minute scabridae, usque ad 30 cm. longae, explanatae usque ad 3.5 mm. latae, sursum nervis scabridae, inferiores gradatim minores. Panicula exserta, subtaxiflora, linearis, 20-30 cm. longa (aristis exclusis) et 4-6 cm. lata; axis communis pro maiore parte teres laevisque, parte superiore plus minusve angulosa scabra, nodis (praecipue inferioribus) albo-pilosa; rami ad nodum quemque plures, unilateraliter fasciculati, tenuiter filiformes, suberecti vel patentes, fere ad medium nudi, longiores usque ad 6 cm. longi iterum ramulosi; pedicelli sursum scabridi, 4-10 mm.

longi. Spiculae lineares, purpurascentes. Glumae subaequales, 7-8 mm. longae, tenuiter membranaceae, lanceolatae, acutissime acuminatae, glabrae, carina percurrente sursum vix scabridae ceterum laeves; inferior 3-nervis nervis lateralibus brevibus; superior parum (usque ad 1 mm.) brevior, 5-nervis, nervis exterioribus brevioribus, intermediis cum nervo mediano supra medium anastomosantibus. Lemma demum fuscum, lineari-fusiforme, callo incluso 5.5-5 mm. longum, 0.7-0.8 mm. latum, puncticulatum, albobilosum, apice minute lobulato nudum; callus 1.3-2 mm. longus, albo-barbatus, apice curvatus pungens. Arista gracilis, 45-50 mm. longa, scabrida; columna 11.5-13 mm. longa, sursum flexuosa; seta falcata, gracillima. Palea lemmate fere aequilonga, carinis longe pilosa. PLATE V.

SOUTH AUSTRALIA.—Flinders Ranges: In Parachilna Gorge between Blinman and Parachilna, at edge of Parachilna Spring, about 225 m., 1st Sept. 1946, *Blake* 16914 (TYPE); ENE. of Port Augusta in Pichirichi Pass, in mallee (chiefly *Eucalyptus gracilis*)-*Kochia* open scrub, 29th August 1946, *Blake* 16863.

Stipa nodosa closely resembles *S. scabra* in the structure of the inflorescence and spikelet, but it is entirely different in habit. The hard culms with usually 5-8 nodes and paucity of basal leaves and innovations in *S. nodosa* contrast sharply with the 3-4-noded, softer culms of *S. scabra* with their abundance of basal leaves and innovations; the leaf-blades are less scabrous and more rigid, the ligule is much shorter and quite glabrous (not hairy on the back), the panicle is exerted rather early and not permanently included at its base in the uppermost leaf-sheath as in *S. scabra*, and the glumes and awns are slightly shorter. Each of the collections cited consists of several sheets with panicles in various stages of development. The plants in Pichirichi Pass were associated with *S. scabra* (*Blake* 16864).

Stipa brachystephana S. T. Blake; species nova, affinis *S. aristiglumi* F. Muell., *S. bigeniculatae* Hughes et *S. blackii* C. E. Hubbard, sed ab omnibus ligulis elongatis glabris atque aristis brevioribus differt.

Gramen perenne, caespitosum, circa 70-90 cm. altum. Culmi erecti, teretes, leviter striatuli, dense granuloso-asperuli, glabri, 3-4-nodes, simplices, basi cataphyllis subsericeis fulvis vel brunnescentibus cincti. Foliorum vaginae arctae, convolutae, glabrae, laeves vel minute asperulae, superiores vel omnes internodiis multo breviores; ligulae rigidae, striatae, glabrae, apice integrae vel saepe emarginatae vel tandem bifidae, 4-7 mm. longae, eae foliorum basium gradatim breviores; laminae setaceae, arcte convolutae quasi teretes, rigidiusculae, apice acutissimae sed vix pungentes, suberectae, longissimae, inferiores medium culmum superantes, superiores paniculam attingentes, minute asperulae vel laeves, supra pilosulae, marginibus scabridae, explanatae 0.8-1 mm. latae, eae foliorum basium gradatim breviores. Panicula angusta, sublaexiflora, tandem longe exserta, aristis exclusis 13-15 cm. longa at 1.5-2.5 cm. lata; axis communis inferne compressa sublaevis, sursum angulosa scabrida; rami terni vel bini, usque ad 3.5 cm. longi, plus minusve erecti, usque ad medium pro more nudi, sursum parum divisi pauciflori; pedicelli compresso-filiformes, scabri, 2-8 mm. longi. Spiculae primum fusiformes tandem plus minusve hiantes, purpurascentes. Glumae firme membranaceae, margines versus hyalinae, 5-nervis nervo medio plus minusve percurrente sursum scabro, 2 lateralibus circa mediam glumam evanescentibus, 2 exterioribus brevibus, sursum dorso scabridae, dorso admodum incurvae, explanatae lanceolatae, acuminatae saepe cuspidatae; inferior 11-12 mm. longa; superior 9-10 mm.

longa minus acuminata. Lemma oblanceolato-fusiforme, apice subabrupte acuminatum, apice integrum pilis albis usque ad 0.9 mm. longis coronatum, ceterum pilis longis albis dense vestitum, callo incluso 6.5-7 mm. longum, circa 1.2 mm. latum; callus curvatus pungens, 1.6-1.8 mm. longus, pilis albis barbatus. Arista bigeniculata, scabra, 2.3-2.6 cm. longa; seta recta, columnam fere adaequans vel quam ea distincte brevior. Palea lemma adaequans. PLATE VI.

SOUTH AUSTRALIA.—Flinders Ranges: Port Germein Pass, steep stony hillsides with scattered eucalypts and *Xanthorrhoea* sp., about 210 m., 29th August 1946, *Blake* 16858.

On account of the turgid spikelets with firm, prominently 5-nerved, bulging and upwardly incurved glumes, the prominently bearded tip of the lemma and the bigeniculate awn, this species appears to be most closely related to *S. aristiglumis* F. Muell., *S. bigeniculata* Hughes and *S. blackii* C. E. Hubbard, but the very long glabrous ligule (sometimes split to the base) and relatively short awns and panicle-branches sharply distinguish it from all three. The glabrous nodes further distinguish it from *S. bigeniculata* and *S. blackii* and the nearly smooth and glabrous leaves and shorter tuft of hairs at the apex of the lemma still further distinguish it from *S. blackii*. *S. brachystephana* and *S. blackii* were found growing in association, but the hairy leaves and longer panicle-branches of *S. blackii* provided a ready means of distinguishing them in the field.

Echinochloa stagnina (Retz.) Beauv. Agrost. 161 (1812).

Panicum stagninum Retz. Obs. 5: 17 (1789).

WESTERN AUSTRALIA.—Kimberley Division: Milligan's Lagoon near Wyndham, 10th April 1950, *Langfield* 211.

QUEENSLAND.—Cook District: Forest Home Station, very abundant in swamps, April 1931, *Brass* 1886.

New for Australia; widely distributed in the tropics of the Eastern Hemisphere and considered an excellent pasture grass in Tropical Africa. The Australian specimens differ from the type (S. India, *Koenig*—LD) in having a scarcely hispid lower glume and a much longer awn to the lower lemma, but both these characters are variable in this species.

Echinochloa walteri (Pursh) Heller Cat. N. Amer. Pl. ed. 2: 21 (1900).

Panicum hirtellum Walt. Fl. Carol. 72 (1788), non L. (1759).

Panicum walteri Pursh Fl. Amer. Sept. 66 (1814).

QUEENSLAND.—Wide Bay District: Stony Creek near Bundaberg, 2nd Jan. 1939, *Goy & Smith* 631; Bingera Weir near Bundaberg, along river bank, 30th Dec. 1937, *Smith* 407; near Mapleton, on more or less open muddy bank of small stream about 150 m., 14th April 1940, *Blake* 14176. Moreton District: North Pine R., Petrie, in mud at water's edge, 26th Dec. 1930, *Blake* 91; Brisbane R., *Bailey*; Holliand Park, near Brisbane, common on outskirts of shallow waterhole full of *Leersia hexandra* and *Phragmites communis*, 15th Feb. 1938, *Smith* 290; Ekibin, Brisbane, 8th May 1909, *White*; Samford Creek, common in soft mud on edge of creek, 29th March 1936, *Goy* 115; Enoggera, 17th May 1915, *White*; Wellington Point, March 1916, *White*; Currumbin, in a heap of road sand by the roadside, 10th Dec. 1932, *White* 8739; foot of Mt. Gipps (McPherson Range), in a gully, about 210 m., 11th April 1941, *Blake* 14319. Darling Downs District: "Merivale" near Injune (no collector's name).

NEW SOUTH WALES.—North Coast: Lynch's Creek, in wet gullies in *Eucalyptus* forest, 15th March 1944, White 12599.

New for Australia; native of the eastern United States. The Australian specimens correspond to forma *laevigata* Wiegand with almost glabrous sheaths.

The Australian species of *Echinochloa* may be distinguished as follows:—

Ligule represented by a fringe of hairs:

Spikelets much narrower than long, rather gradually acuminate and distinctly awned *E. stagnina* (Retz.) Beauv.

Spikelets nearly as broad as long, abruptly acuminate and cuspidate but not awned *E. turneriana* Domin

Ligule represented by a discoloured zone only:

Lower glume and upper lemma equally acute or cuspidate; racemes 3-4-seriate, \pm erect *E. colonum* (L.) Link

Lower glume and upper lemma cuspidate or produced into an awn, the latter more so than the former; racemes \pm spreading:

Inflorescence \pm erect, with awns up to 10 mm. long or spikelets awnless; leaf-sheaths with a few long hairs on the margins or glabrous:

Spikelets \pm awned, \pm 2-seriate; racemes usually straight *E. crus-galli* (L.) Beauv.

Spikelets awnless, 4-seriate; racemes up-curved *E. crus-galli* var. *frumentacea* W. F. Wight

Inflorescence \pm nodding, the spikelets partly hidden by awns 10-25 mm. long; leaf-sheaths puberulous on the collar *E. walteri* (Pursh) Heller

Panicum fulgidum Hughes in Kew Bull. 1923: 323 (1923).

Panicum bicolor R.Br. Prodr. 191 (1810), non Moench. (1794).

Panicum bicoloratum S. T. Blake in Proc. Roy. Soc. Queensl. 59: 158 (1948).

Panicum bicoloratum was proposed as a new name because the epithet chosen by Hughes when renaming *P. bicolor* R.Br. "had already been used by Stapf for another species of the genus." This, however, is incorrect; the name published by Stapf was *Panicum fulgens*, not *Panicum fulgidum*, and *Panicum bicoloratum* is therefore a superfluous name. Mr. C. E. Hubbard, of the Kew Herbarium, kindly drew my attention to the error.

Paspalidium Stapf in Prain Fl. Trop. Afr. 9: 15 (1917), *in clavi*, et 582 (1920), *descr.*

The name *Paspalidium* was proposed for a group of species previously included in *Panicum* and still so treated by some American botanists. The genus has a fairly distinctive facies, and it resembles *Setaria* rather than *Panicum* in the structure of the spikelet and the sterile tip of the branches of the inflorescence. The genus is widely distributed over the warmer parts of the world and is particularly well-developed in Australia where at least 21 of the 30 or so known species have been found. An account of the Australian species is in preparation, but some new records and descriptions of new species are given here; for the latter, only the types and general range are cited.

***Paspalidium flavidum* (Retz.) A. Camus** in Lecomte Fl. Gén. Indo-Chine 7 : 419 (1922).

Panicum flavidum Retz. Obs. 4 : 15 (1786).

QUEENSLAND.—Cook District : Mareeba, open sandy ground, 375 m., 18th June 1935, *Blake* 9469. North Kennedy District : Mt. Julian, *Michael* 1405. Port Curtis District : Rosedale, uncommon, *Dovey* G.30; Rosedale, only on creek flats, 21st Jan. 1934, *Dovey* 459. Wide Bay District : Fraser Island, between Ungowa and the Forestry Station, in mixed forest on sand, 26th August 1941, *Blake* 14397; Fraser Island, Oct. 1921, *White*; Noosa, on sandy track through open forest above the beach, 15th July 1943, *D. A. & L. S. Smith*. Moreton District : Coolum, hillsides in open forest on sand, 15th April 1938, *Blake* 13747; Maroochydore, April 1916, *White*; Bribie Island, 10th April 1938, *White*; Stradbroke Island, March 1916, *Bick & White*; Enoggera Range, 1st May 1916, *White*; Sunnybank, Dec. 1916, *White*; Sunnybank, open forest on loose sandy soil, 7th Dec. 1933, *Blake* 4997; Sunnybank, 15th Feb. 1938, *L. S. Smith* 347; Brisbane, shady corner in University grounds, 28th April 1932, *Blake* 266; Canungra, on southern slopes of Mt. Tamborine, in *Eucalyptus* forest, 240 m. and upwards, 26th March 1937, *Blake* 12874.

NEW SOUTH WALES.—North Coast : Between Kingscliff and Norries Head, among *Imperata* and *Pteridium* in mixed open forest on slopes of low sandridges behind the coast, 19th April 1950, *Blake* 18495.

New for Australia, as all previous records from here appear to be based on misidentifications. It was definitely recognised by C. E. Hubbard when he sorted the material in the Queensland Herbarium in 1930-1. The Australian material agrees well with the type collected in Ceylon by Koenig (LD), but has somewhat longer leaves; the length of the spikelets varies from 2.6 to 3 mm. (2.6-2.9 mm. on the type), which is somewhat greater than the length given in most published descriptions of the species. Perhaps other species have been confused with it in Ceylon and India as in Australia. The following names and references must be considered in explaining the confusion with other Australian species :—

Panicum brizoides L. ; F. Muell. Fragm. 8 : 189 (1874).

Panicum distans Trin. Spec. Gram. t. 172 (1829) ; non Willd. ex Spreng. Syst. Veg. 1 : 305 (1805), *pro syn.*

Panicum flavidum Retz. Obs. 4 : 15 (1786) ; R.Br. Prodr. 190 (1810) ; Benth. Fl. Austral. 7 : 474 (1878) ; Domin in Biblioth. Bot. 85 : 300 (1915).

Panicum flavidum Retz. var. *jubiflorum* (Trin.) Domin in Biblioth. Bot. 85 : 300 (1915).

Panicum flavidum Retz. var. *orarium* Domin in Biblioth. Bot. 85 : 300 (1915).

Panicum flavidum Retz. var. *tenuius* Benth. Fl. Austral. 7 : 474 (1878) (“*tenuior*”) ; Domin in Biblioth. Bot. 85 : 300 (1915).

Panicum globoideum Domin in Fedde Repert. Nov. Sp. 10 : 119 (1911).

Panicum gracile R.Br. Prodr. 190 (1810) ; Benth. Fl. Austral. 7 : 475 (1878).

Panicum jubiflorum Trin. Gram. Panic. Dissert. 2 : 150 (1826).

Panicum paractaenum Kunth Enum. 1 : 134 (1833).

Panicum retiglume Domin in Fedde Repert. Nov. Sp. 10 : 119 (1911).

Paractaenum novae-hollandiae Beauv. Agrost. 47, t. 10, f. 6 (1812) ; Hughes in Kew Bull. 1923 : 287-9 (1923).

Paspalidium distans (Trin.) Hughes in Kew Bull. 1923 : 317 (1923).

Paspalidium flavidum (Retz.) A. Camus in Lecomte Fl. Gén. Indo-Chine 7 : 419 (1922).

Paspalidium globoideum (Domin) Hughes in Kew Bull. 1923 : 317 (1923).

Paspalidium gracile (R.Br.) Hughes in Kew Bull. 1923 : 318 (1923).

Paspalidium jubiflorum (Trin.) Hughes in Kew Bull. 1923 : 317 (1923).

Paspalidium retiglume (Domin) Hughes in Kew Bull. 1923 : 317 (1923).

The first reference to the occurrence of *Paspalidium flavidum* in Australia was made by R. Brown (*Panicum flavidum*) ; he indicated that he saw living plants on the tropical coast, but I have seen no further reference to these specimens, unless they are the ones referred to *Paspalidium jubiflorum* by Hughes. F. Mueller treated *Panicum flavidum*, *P. distans*, *P. jubiflorum* and *P. paractaenum* as synonyms of *P. brizoides* L. which appears to be truly a synonym of *Echinochloa colonum* (L.) Link, but which has been misapplied to *P. flavidum*. Bentham cited four Australian collections under *Panicum flavidum* ; of these : one (Upper Victoria R., Mueller) became the type of *Panicum retiglume*, two (Peak Downs, Burkitt, and Springsure, Wuth) became syntypes of *P. globoideum*, while the fourth also appears to belong to *P. globoideum* (to judge from later references). *Panicum flavidum* var. *tenuius* was based on several specimens, some of which were later distributed by Hughes between *Paspalidium jubiflorum* and *Paspalidium distans*. Bentham also treated *Panicum jubiflorum*, *P. distans* and *Paractaenum novae-hollandiae* as synonyms of *P. gracile*. Domin (1915) referred only one collection to *P. flavidum*, his own from Winton, but from geographical considerations it must belong to *P. jubiflorum*. Under *Panicum flavidum* var. *jubiflorum* he synonymised *Panicum jubiflorum* and *P. distans*, but the only specimen cited came from a wet coastal locality and cannot be *P. jubiflorum* which belongs to the drier inland regions. From the notes given, *P. flavidum* var. *orarium* appears to be *P. distans*.

Paractaenum novae-hollandiae (*Panicum paractaenum*) is generically distinct from *Paspalidium* (Hughes, 1923). The species confused with *Paspalidium flavidum* may be distinguished by the following key:—

Rhachis of racemes articulate with the main axis, the racemes falling entire *Paractaenum novae-hollandiae*

Rhachis of racemes not articulated with the main axis, long persistent ; spikelets falling separately and singly (*Paspalidium*) :

Upper glume 9-13-nerved with the nerves anastomosing by means of cross-veins, at least in the upper part :

Spikelets 2-2.7 mm. wide ; nerves anastomosing only in the upper part ; densely tufted perennial

P. globoideum

Spikelets 1.4-1.5 mm. wide ; nerves anastomosing almost throughout ; annual

P. retiglume

Upper glume 5-7 (rarely 9) -nerved ; nerves free or uniting at or very close to the tip :

All or nearly all the racemes with the spikelets closely and evenly biseriate on pedicels 0.2-0.5 mm. long, those of each series more or less contiguous ; racemes nearly always simple :

Spikelets about twice as long as wide ; all or nearly all the racemes longer than the internodes of the main axis ; leaf-sheaths glabrous throughout

P. jubiflorum

Spikelets about 1.5-1.7 times as long as wide ; lower racemes much shorter than the internodes of the main axis ; leaf-sheaths more or less ciliate on at least one margin, particularly near the top :

Spikelets 2.6-3 mm. long, 1.4-1.6 mm. wide, widely spreading from the rhachis, those of each series contiguous for about half their length, not strongly curved in profile

P. flavidum

Spikelets 2.2-2.5 mm. long, 1.1-1.25 mm. wide, obliquely spreading, those of each series contiguous only by the base of the one above and the tip of the one below

P. distans

Racemes with the spikelets loosely arranged or irregularly biseriate, slightly contiguous to distant on pedicels 0.25-5 mm. long ; at least the lower racemes with 1 or more 1-flowered branches

P. gracile

***Paspalidium basicladum* Hughes in Kew Bull. 1923 : 318 (1923).**

QUEENSLAND.—Burke District : Cloncurry, on stony to rocky quartzite hillsides about 225 m., 7th Nov. 1935, *Blake* 10123. Gregory North District : Tranby, 22° 40' S., 142° 25' E., gullies in rugged sandstone ridges, 165-210 m., with *Triodia* sp., 8th May 1936, *Blake* 11410, 11411 ; Elderslie, W. of Winton, garden weed, one specimen seen, 27th Oct. 1935, *Blake* 10006.

SOUTH AUSTRALIA.—Flinders Ranges : Near Blinman, on barren stony slopes in mixed low scrub, 420-450 m., 31st August 1946, *Blake* 16904.

New for both Queensland and South Australia.

***Paspalidium clementii* (Domin) C. E. Hubbard in Kew Bull. 1934 : 447 (1934).**

Panicum clementii Domin in J. Linn. Soc. Bot. 41 : 272 (1912).

QUEENSLAND.—Gregory North District : Duchess, in rock crevice on low rugged hill, about 390 m., 18th May 1936, *Blake* 11531 ; near Boulia, on low stony ridge with scattered *Acacia* spp., etc., 24th July 1936, *Blake* 12379 ; Tranby, 22° 40' S., 142° 25' E., gullies in rugged sandstone ridges, 165-210 m., with *Triodia* sp., 8th May 1936, *Blake* 11412 ; Elderslie, W. of Winton, on stony hillside, 5th June 1936, *Blake* 11657. Gregory South District : Betoota, on barren stony desert hills, 17th July 1936, *Blake* 12177 ; 45 miles W. of Windorah, on scrubby, stony, sandstone ridges, about 150 m., 14th July 1936, *Blake* 12125 ; Mt. Howitt Station, about

70 miles W. of Eromanga, on barren sandstone hillsides under *Acacia* spp., 180-240 m., 3rd July 1936, *Blake* 11917. North Kennedy District: Charters Towers, sandstone ridge, *Eucalyptus-Acacia* forest, 330-360 m., 11th June 1936, *Blake* 11705.

New for Queensland.

P. basicladum and *P. clementii* were hitherto known only from Western Australia, the former from the south, the latter from the north. The specimens cited constitute a wide extension of range for both species, and it is interesting to note that the ranges of the two overlap in western Queensland, both having been collected together at Tranby and in different years at Elderslie. They are closely allied annual species which may be distinguished as follows :—

| | |
|--|----------------------|
| Spikelets 2.75-3.1 mm. long, elliptic-oblong, \pm acute; upper florete distinctly attenuated towards the base, coarsely though shallowly rugose; culms \pm scabrous; lower racemes mostly overlapping | <i>P. basicladum</i> |
|--|----------------------|

| | |
|---|---------------------|
| Spikelets 2.2-4 mm. long, oblong to somewhat elliptic, \pm obtuse; upper florete scarcely attentuated towards the base, faintly and finely rugose; culms smooth; lower racemes \pm distant .. | <i>P. clementii</i> |
|---|---------------------|

Two other annual species are known. *P. tabulatum* (Hack.) C. E. Hubbard is distinguished by its filiform leaves and *P. rarum* (R.Br.) Hughes by all the racemes reduced to 2 or (more usually) 1 spikelet.

Paspalidium albovillosum S. T. Blake; species nova affinis *P. distantii* (Trin.) Hughes et *P. caespitoso* C. E. Hubbard; ab hoc foliis latioribus ab illo spiculis haud incurvis, ab utroque spiculis paullo minoribus latioribusque atque foliis et inflorescentiae axi ramisque pilis longis mollibus vestitis differt.

Gramen perenne, pallide virens vel flavovirens. Culmi caespitosi, recti, usque ad 40 cm. longi, graciles, molles, laeves, 3-5-nodes, ramosi, prope inflorescentiam saepe laxe pilosi ceterum glabri. Folia pilis longis gracilibus mollibus albis e tuberculis ortis dense hirsuta; vaginae plus minusve carinatae, arcte convolutae vel hiantes, tenues, conspicue nervosae, margine altero longe ciliatae, dorso sursum hirsutae, nodis glabrae, inferiores internodiis longiores, superiores breviores; ligulae ad marginem augustissimum breviter ciliatum redactae, in toto circa 0.5 mm. longae; laminae molles, anguste lineares, breviter acutae, planae vel plus minusve incurvae, explanatae 1-4 mm. latae, usque ad 15 cm. longae, utrinque molliter hirsutae, sursum marginibus scabridae. Inflorescentia longe exserta, 8-15 cm. longa; axis communis plus minusve triquetra, pro majore parte vel omnino longe laxequae pilosa (pilis tenuibus mollibus e tuberculis ortis), sursum angulis minute scabrida. Racemi 6-10, inferiores plerumque 1-2 cm. longi, internodiis axeos communis breviores, interdum prope basim ramosi, superiores gradatim breviores internodiis paullo longiores, simplices; rhachis flexuosa, circa 0.25 mm. lata, triquetra, marginibus longe ciliata, seta 0.5-2 mm. longa terminata; pedicelli 0.2-2.4 mm. longi, pilosi, apice discoidei, inter se 0.25-1.5 mm. distantes. Spiculae purpurascens, biseriatae, contiguae, oblique patentes, ambitu ellipticae vel ovato-ellipticae vel obovato-ellipticae, late acutae, prope basim admodum attenuatae, facie depressae a latere visae rectae (haud incurvae), dorso alte convexae, 1.5-1.9 mm. longae, 1-1.2 mm. latae, glabrae. Glumae membranaceae, tenuiter nervosae; inferior dimidiam spiculam aequans vel fere aequans et ejus basim amplexens,

oblata, late obtusa, 3-nervis nervis lateralibus cum medio prope apicem conjunctis; superior tres usque novem partes spiculae attingens, late rotundata, 5-7-nervis nervis subparallelis fere percurrentibus. Anthoecium inferum sterile: lemma spiculam aequans, explanata late rotundata, 5-nervis; palea usque circa 0.6 mm. longa vel 0. Anthoecium superum spiculae apicem attingens, fere ellipticum, utrinque acutum, apice subacuminatum brevissime apiculatum (apiculo fere recto), dorso leviter reticulatum minime rugulosum.

TYPUS: Queensland; Maranoa District, 20 miles W. of Mitchell, dense *Cadellia*-*Acacia* forest, greyish gravelly silt loam, 480 m., 31st March 1936, *Blake* 10947.

The species is represented by 23 collections from Queensland collected in the Districts of South Kennedy, Wide Bay, Burnett, Leichhardt, Warrego, Maranoa, Darling Downs and Moreton. It is easily recognised by the small but broad spikelets and the long, slender, soft, more or less spreading hairs on the leaf-blades, main axis of the inflorescence, rhachis of the racemes and the pedicels.

Paspalidium spartellum S. T. Blake; species nova, affinis *P. gracili* (R.Br.) Hughes, sed foliorum vaginis (haud carinatis) laminisque brevibus, racemis omnibus 1-2-spiculatis, pedicellis perbrevibus, anthoecio supero basim versus rotundato apice recto dorso vix ruguloso differt.

Gramen perenne, caespites duros efformans. Culmi erecti, circa 50 cm. alti, graciles, duri, rigidi, teretes, striolati, laeves, glabri, 5-8-nodes, iterum ramosi ramis ramulisque patulis. Folia breviter; vaginae primum convolutae teretes, demum solutae et apertae, haud carinatae, conspicue nervosae, internodiis multo breviores, glabri laevesque; ligulae ad marginem brevissime ciliolatum in toto circa 0.15 mm. altum redactae; laminae patulae vel deflexae, angustissime lineares, acutissimae, rigidae, involutae, explanatae usque ad 1 mm. latae, nervis utrinque scabridae ceterum glabrae laevesque, usque ad 6 cm. longae. Inflorescentia exserta, pauciflora, subracemiformis, 1.5-3.5 cm. longa; axis communis inferne compresso-canaliculata sursum subtriquetra, omnino scabrida. Racemi 4-6, erecti, ad spiculas 1-2 redacti, inferiores distantes saepe ramosi, superiores contigui simplices; rhachis triquetra, scabrida, circa 0.25 mm. lata, seta subulata 0.5-1.5 mm. longa terminata; pedicelli 0.4-0.6 mm. longi, scabridi, apice discoidei, usque 1.5 mm. distantes. Spiculae brunnescentes, erecti, ambitu angustius ellipticae acutae, prope basim constrictae, a latere visae rectae, 2.9-3 mm. longae, 1.1-1.2 mm. latae, conspicue nervosae. Glumae membranaceae; inferior ovata, acuta, duas partes spiculae aequans vel fere aequans, valide 3-nervis nervis prope apicem convergentibus; superior quattuor partes spiculae aequans, specie acuta sed explanata rotundata, 5-7-nervis, nervis 5 prope apicem convergentibus et ibi cum se unitis ceteris brevibus. Anthoecium inferum sterile; lemma glumae superiori simile sed spicula aequilongum, 7-nervis nervis prope apicem convergentibus cum se conjunctis; palea 0. Anthoecium superum spicula aequilongum, oblongo-ellipticum, acutum, minute apiculatum, plano-convexum, tenuiter reticulatum, dorso inferiore inconspicue tenuissimeque rugulosum.

TYPUS: Queensland; North Kennedy District, W. of Pentland, between Warrigal and Burra, on slopes of Great Dividing Range, in open forest on shallow sand overlying sandstone, 450-495 m., 19th October 1935, *Blake* 9939.

Known only from the type-collection, this species is very distinct in appearance by reason of the wiry branched culms, short and often deflexed leaves with short spreading sheaths which at length open out to become nearly flat, and short, reduced inflorescences of few racemes with only 1-2 strongly nerved spikelets.

Paspalidium criniforme S. T. Blake; species nova, affinis *P. gracili* (R.Br.) Hughes, sed spiculis paullo minoribus pro rata angustioribus, anthoecio supero brevissime apiculato basi vix attenuato praecipue differt.

Gramen perenne viride. Culmi caespitosi, erecti vel geniculati, circa 10-27 cm. alti, setacei, compressi, striolati, glabri, laeves, 4-7-nodes, iterum ramosi. Folia pilis longiusculis tenuibus e tuberculis parvis ortis praedita; vaginae carinatae, crebre nervosae, laeves, sursum laxe pilosae, ore barbatae, vel omnino glabrescentes, primo convolutae tandem per ramos solutae, inferiores internodiis longiores, superiores eis breviores; ligulae ad seriem ciliorum vix 0.2 mm. longorum redactae; laminae plerumque setaceo-involutae, raro planae et usque 1.5 mm. latae, usque 6.5 cm. longae, utrinque pilosae, supra nervis marginibusque scabridulae. Inflorescentia fere filiformis, pauciflora, 2.5-6 cm. longa vel interdum brevior; axis communis canaliculato-triquetra, sursum minute scabrida. Racemi 4-6, appressi, inferiores usque 1 cm. longi, saepe ramosi, usque 5 spiculas gerentes, superiores breviores, his vel interdum omnes unispiculati; rhachis anguloso-filiformis, circa 0.15 mm. lata, scabrida, leviter flexuosa, seta 2-4 mm. longa terminata; pedicelli 1-2 mm. longi, scabriduli, apice discoidei. Spiculae quasi uniseriatae, pallidae, suberectae glabrae, ambitu elliptico-lanceolatae vel oblongo-lanceolatae, acutae, acuminato-apiculatae, plano-convexae haud incurvae, 2-2.2 mm. longae, 0.9-1 mm. latae, nervis angustis viridibus conspicue notatae. Glumae membranaceae; inferior ovata, acuta, spiculae duas partes aequans vel fere aequans, 3- vel sub-5-nervis; superior elliptica, late rotundata, spiculae tres usque quinque partes aequans, 5- vel sub-7-nervis nervo mediano percurrenti lateralibus prope apicem incurvis cum se junctis, eis paris tertii brevibus saepe liberis. Anthoecium inferum sterile: lemma spiculam aequans, specie apiculatum sed explanatum ellipticum rotundato-obtusum, 5-nerve, utrinsecus nervum medianum sulcatum; palea minuta. Anthoecium superum ovatum, acutum, minute apiculatum (apiculo incurvo), dorso alte convexo rugulosum.

TYPUS: Queensland; Moreton District, Moggill near Brisbane, on dry hillside in mixed open forest, 10th March 1934, *Blake* 5282.

The species is known from five collections from the Moreton District of Queensland. The dense tufts of very slender culms and very fine leaves and the very slender inflorescences of few, small spikelets give the plant a distinctive appearance. The living plants have a faint but distinct curry-like odour.

Paspalidium udum S. T. Blake; species nova, affinis *P. punctato* (Burm.) A. Camus (speciei asiaticae), *P. paludivago* (Hitchc. & Chase) Parodi (speciei americanae) et *P. geminato* (Forsk.) Stapf (speciei fere cosmotropicae), sed spiculis majoribus, gluma superiore manifeste 5-nervi, anthoecio supero manifeste ruguloso ab omnibus differt.

Gramen perenne, viride. Culmi elongati, usque metrales, basi plus minusve repentes et nodis inferioribus radicanter, sursum adscendentes, molles, striati, laeves, glabri, multinodes, ramosi, inferne usque 7 mm. crassi. Folia plus minusve conferta; vaginae primo convolutae mox

hiantes, parte superiore carinatae, glabrae laevesque, internodiis plerumque longiores; ligulae ad marginem longe ciliatum redactae, in toto circa 1.5 mm. longae; laminae anguste lineares, acutae, basim versus leviter angustatae, planae vel saepius convolutae vel involutae, marginibus atque nervis supra scabridae ceterum glabrae laevesque, quoad magnitudo maxime variabiles, saepius 4–8 mm. latae et 5–20 cm. longae. Inflorescentia angustissima, tandem exserta, 14–22 cm. longa; axis communis inferne compressa canaliculata laevis, sursum triquetra admodum scabrida. Racemi 10–16, appressi, inferiores distantes, superiores vel plures imbricati, omnes simplices, plerumque 1.5–3 cm. longi, supremi plerumque breviores; rhachis leviter anfractuosa, triquetra, scabro-ciliata, circa 0.6–0.7 mm. lata, seta subulata 1–4 mm. longa terminata; pedicelli cuneati, scabri, 0.2–0.3 mm. longi, apice plus minusve discoidei, circa 1–1.5 mm. distantes. Spiculae confertae, eleganter biseriatae, fere erectae, eae seriei cujusque longe imbricatae, manifestius nervosae, ambitu oblongo-ovatae vel oblongo-ellipticae, acutae, a latere visae rectae, facie leviter concavae, 3–3.3 mm. longae, 1.2–1.5 mm. latae. Glumae membranaceae; inferior quartam vel tertiam partem spiculae subaequans, oblata, truncata vel admodum rotundata, enervis; superior tres quintas vel tres quartas partes spiculae aequans, elliptica, rotundo-obtusa, conspicue 5-nervis nervo mediano percurrente ceteris subparallelis prope marginem incurvis conjunctisque vel nervo transverso irregulari inconspicue unitis. Anthoecium inferum sterile: lemma membranaceum, spicula aequilongum, explanatum oblongo-ellipticum rotundo-obtusum, 5-nervis nervis sursum convergentibus et juxta marginem unitis mediano percurrenti; palea lemmate aequilonga, hyalino-membranacea, 2-carinata, marginibus late inflexa. Anthoecium superum spicula aequilongum vel fere aequilongum, ambitu ovatum acute acuminatum, apiculatum, a latere visum rectum, depresso plano-convexum, reticulatum et rugulosum; lemma tenuiter 5-nervis. Antherae 1.2 mm. longum.

TYPUS: Northern Territory; Near Alligator Point, Daly R., 13° 26'–29' S., 130° 26'–27' E., common in damp places with *Phyla nodiflora*, 15 m., 28th July 1946, Blake 16659.

Known only from the type-collection, this species differs in habit from other Australian species in the coarse, spongy, creeping and ascending culms in which it resembles *P. geminatum* (Forsk.) Stapf (a nearly cosmotropical species which is the type of the genus), *P. punctatum* (Burm.) A. Camus (from Asia) and *P. paludivagum* (Hitchc. & Chase) Parodi (from America). The first-mentioned differs from the others in its much smaller, rather broadly ovate spikelets with an almost quite smooth fertile floret; it was based on *Panicum geminatum* Forsk., the type of which is a specimen collected at Damietta, Egypt, by Forskahl (c). *P. punctatum*, *P. paludivagum* and *P. udum* are much alike in general appearance and characters of the spikelet, but there are minor differences in the size and shape of the spikelet, the relative length of the upper glume, the number and distinctness of the nerves of the upper glume and lower lemma, and in the surface of the fertile floret. *P. udum* has the largest spikelets with the most prominent nerves and distinctly rugulose fertile florets; its upper glume is 5-nerved and at least usually 3-nerved in the others.

The combination *Paspalidium paludivagum* has been made independently on three different occasions: Parodi Gram. Bonar. ed. 3, 85, 89 (1939); Henrard in Blumea 3 (3): 434 (1940); and Pilger in Engl. & Prantl Pflanzenfam. ed. 2, 14e: 29 (1940).

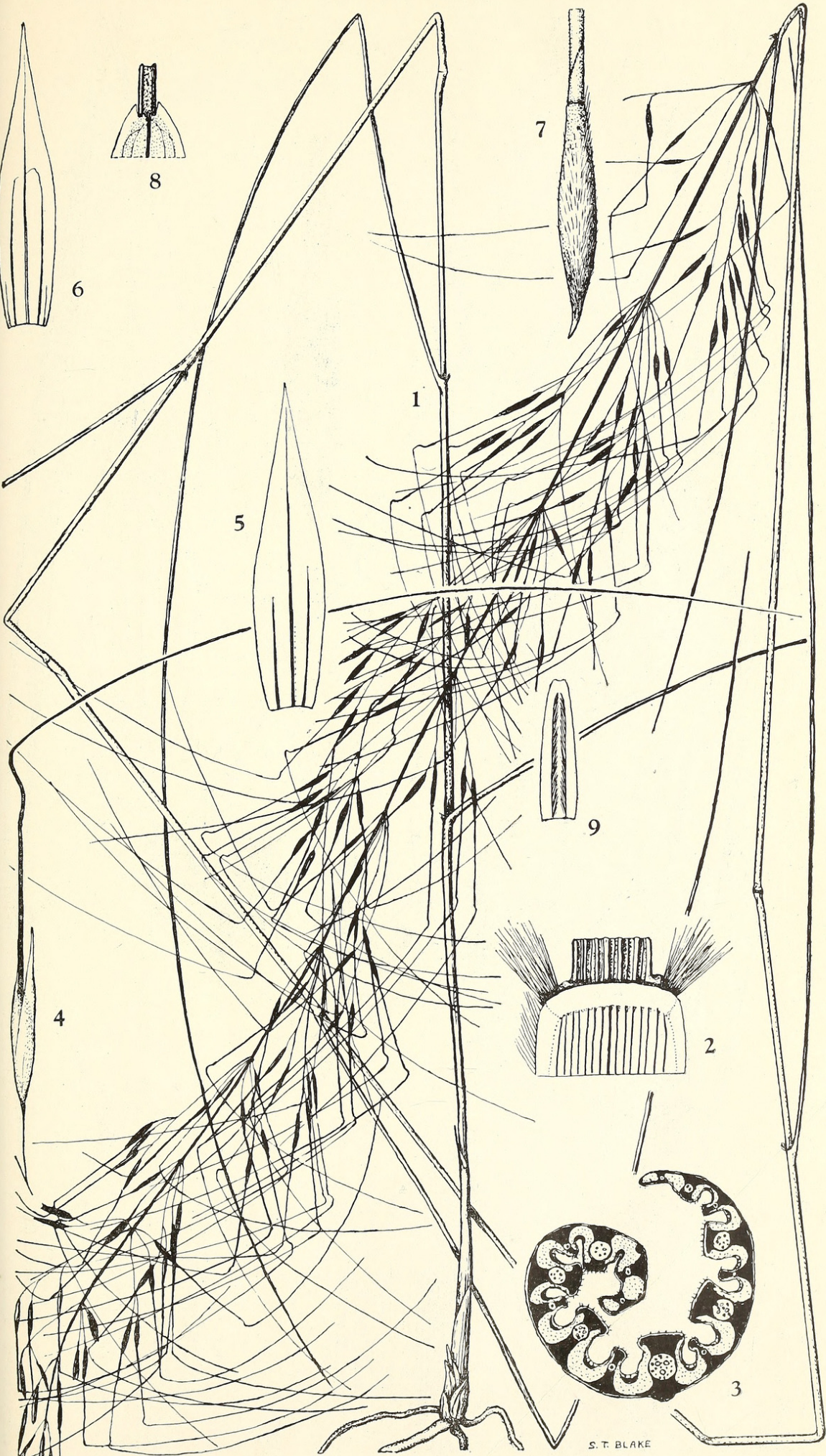
EXPLANATION OF PLATES.

PLATE V.

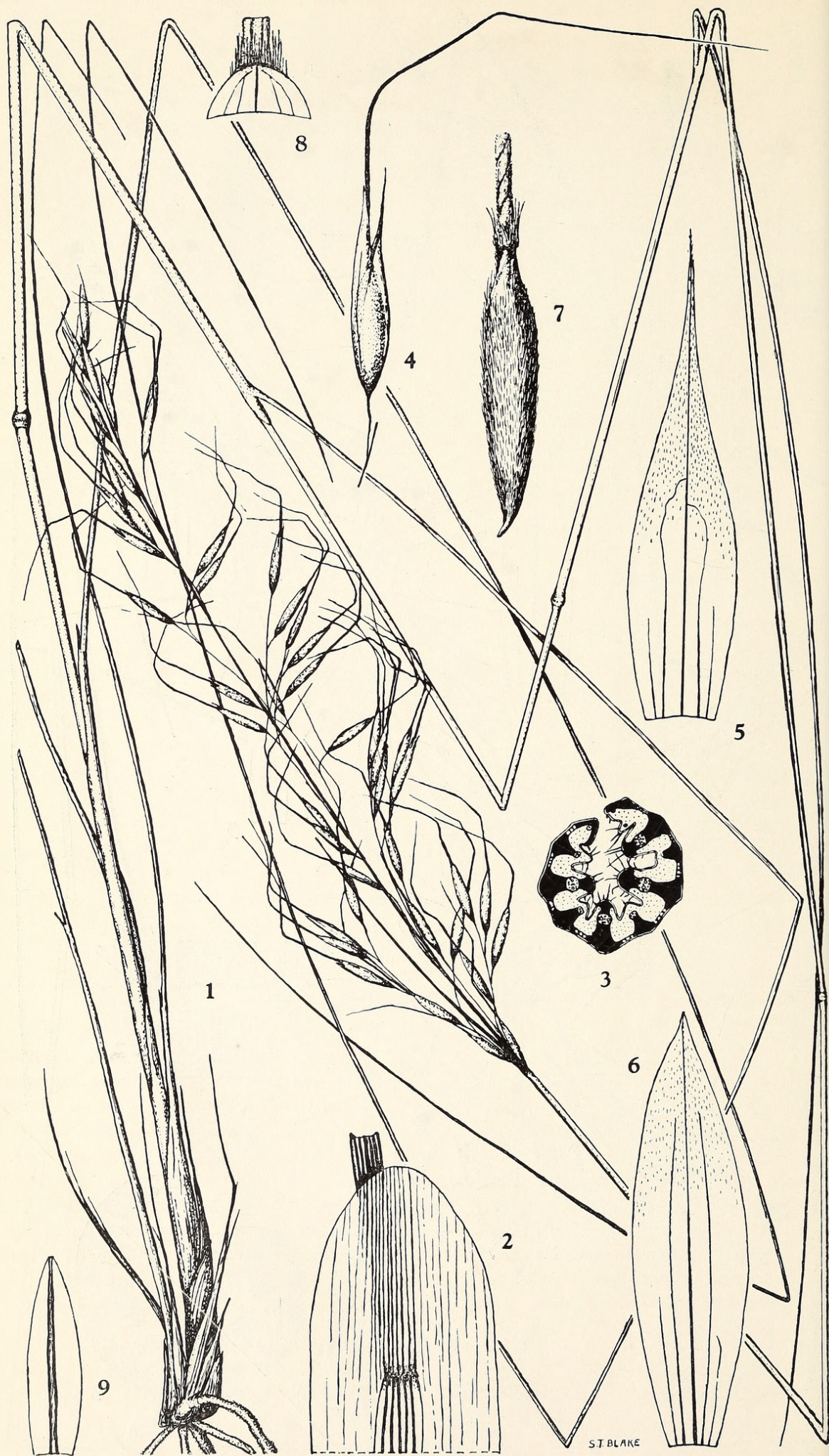
Stipa nodosa S. T. Blake. Fig. 1, portion of plant, natural size; 2, ligule, with part of sheath and blade, flattened out $\times 6$; 3, transverse section of leaf, $\times 30$; 4 spikelet, $\times 3$; 5, lower glume, flattened out, $\times 6$; 6, upper glume, flattened out, $\times 6$; 7, floret, greater part of awn removed, $\times 6$; 8, part of lemma with base of awn, flattened out, $\times 6$; 9, palea, flattened out, $\times 6$.—From type.

PLATE VI.

Stipa brachystephana S. T. Blake. Fig. 1, portion of plant, natural size; 2, ligule with part of sheath and blade flattened out, $\times 6$; 3, transverse section of leaf $\times 30$; 4, spikelet, $\times 3$; 5, lower glume, flattened out, $\times 6$; 6, upper glume flattened out, $\times 6$; 7, floret, greater part of awn removed, $\times 6$; 8, tip of lemma with base of awn, flattened out, $\times 6$; 9, palea, flattened out, $\times 6$.—From type.



Stipa nodosa S. T. Blake.



Stipa brachystephana S. T. Blake.



Blake, Stanley T. 1952. "The Identification and Distribution of some Cyperaceae and Gramineae, Chiefly from Australia." *The Proceedings of the Royal Society of Queensland* 62, 83–100. <https://doi.org/10.5962/p.351758>.

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