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A TAXONOMIC REVISION OF THE MALESIAN AND AUSTRALIAN SPECIES OF UNCINIA (CYPERACEAE)

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UNCINIA

Uncinia Pers., Syn. Pl. 2 (1807) 534; Boeck., Linnaea 41 (1877) 339—352; Clarke, J. Linn. Soc. Bot. 20 (1883) 389—403; Kük., Pfl. R. Heft 38 (1909) 50—67; Nelmes, Kew Bull. (1949) 140—145; Hamlin, Dom. Mus. Bull. 19 (1959) 1—88, t. 1—11 (New Zealand spp.); Edgar, Fl. of New Zealand 2 (1970) 215—235 (New Zealand spp.)

Perennial monoecious herbs, glabrous (or with hispid utricles). *Stems* central, tufted or approximate on a more or less creeping rhizome, erect or ascendent, sharply trigonous to subterete, striate, smooth, or scabrid below the inflorescence. *Leaves* narrowly linear, flat or involute, more or less scabrid on margins and nerves; basal sheaths bladeless, often disintegrating into fibres. *Inflorescence* a single, bisexual, terminal spikelet; male part above, shorter than the lower female part. *Glumes* spirally arranged, ovate to oblong, concave, persistent or caducous, all flower-bearing, the lowest often produced into a setaceous to foliaceous bract. *Male flowers* naked, consisting of (1) 2 or 3 stamens with linear (or dilated, New World spp.) filaments and linear anthers; connective shortly produced. *Female flowers* naked, enclosed in a bottle-shaped, obtusely trigonous organ (utricle, perigynium) which is closed up to the truncate top, hispid or (in all Malesian and Australian spp.) glabrous. Style incrassate at the base; stigmas 3, exserted from the utricle. Rhachilla (see note 1) reduced to a rigid bristle below the nut and produced far beyond the mouth of the utricle, hooked at the top. Nut trigonous.

Distribution. A genus probably of Antarctic origin, with wide southern distribution; from the extreme south of S. America including the Falkland Is., along the Andes to Mexico and Jamaica; islands in the southern parts of the Atlantic and of the Indian Ocean; from Tasmania through E. Australia northwards to Malesia, Mt. Pulog in the Philippines being the most northern extension; highly developed in New Zealand and neighbouring islands, from there 1 species extending to Hawaii.

Chromosomes. Beuzenberg (N. Z. J. Bot. 8, 1970: 260—263) gives chromosome numbers for all the 31 species recognised by Hamlin. The chromosome number is 88 for all the species except *U. sinclairii* Boott and *U. elegans* (Kük.) Hamlin, together forming the series *Macrolepidae*. In these species the chromosome number is 94 or 96.

Subdivision of the genus. Kükenthal divided *Uncinia* into two subgenera, *Uncinia* (*'Eu-Uncinia'*) and *Pseudocarex*, the latter containing only *U. kingii* Boott from Antarctic S. America, in which the rhachilla is but shortly

hooked. Subgenus *Uncinia* is divided into two sections, which are to some extent also geographically defined.

Sect. a. **Uncinia**

Sect. *Stenandra* Clarke, J. Linn. Soc. Bot. 20 (1883) 389. — Sects. *Australiensis & Patagonicae* Clarke, Kew Bull. Add. Sér. 8 (1908) 137.

Filaments filiform, not dilated. Utricles usually glabrous, in few spp. sparsely hispidulous.

Distribution. Mainly Australian, a few spp. in S. America; all Malesian and Australian spp. belong to this section.

Sect. b. **Platyandra**

Sect. *Platyandra* Clarke, J. Linn. Soc. Bot. 20 (1883) 396. — Sect. *Americanae* Clarke, Kew Bull Add. Sér. 8 (1908) 138.

Filaments dilated. Utricles hispidulous.

Distribution. Exclusively American.

Notes. 1. Like in *Carex*, to which genus *Uncinia* is very closely related, the female flower surrounded by a prophyll (the utricle) is the remainder of a strongly reduced partial inflorescence. Originally this partial inflorescence must have consisted of a basal female flower in the axil of the prophyll and of some superposed male flowers, each in the axil of a bract (in anomalous flowers this condition is still present, the rhachilla bearing some bracts with male flowers). The only difference between *Carex* and *Uncinia* is that in the former the axis of the partial inflorescence (the rhachilla) usually is vestigial, whereas in the latter it is still present as a seta protruding from the utricle and hooked at the top. The hook is the folded bract of a vestigial male flower, more or less indurated and sharply pointed, acting as a mechanism for zoochorous dispersal of the fruits (see Snell, Bull. Torrey Bot. Club 63, 1936: 283). However, in a relatively small number of *Carex* spp. the rhachilla, though completely hidden in the utricle, is still easily observable, and in *C. microglochin* Wahlenb., a unispicate species much resembling an *Uncinia*, even considerably produced beyond the mouth of the utricle, but not hooked. For this reason *C. microglochin* is sometimes considered an *Uncinia* (*U. microglochin* Spreng.; *U. europaea* Gay.). It seems more appropriate to restrict *Uncinia* to those spp. in which the rhachilla is hooked. It must be admitted that also then the dividing line between *Carex* and *Uncinia* is drawn rather arbitrarily in morphological respect.

2. For lack of a recent monograph of the genus the number of its species is hardly ascertainable. In Kükenthal's monograph of 1909, in which the species concept corresponds fairly well with that in Clarke's monograph of 1883, it amounted to 24. For New Zealand Clarke mentioned 11 species, Kükenthal 13. In Hamlins revision (1959) the number of the New Zealand species is 31, all but 3 endemics. To me this splitting up is taxonomically not justified. *Uncinia* is an extremely homogeneous group, and the species are therefore difficult of discrimination. The characters used in *Carex*, even the most important ones of the utricles, show here only a small range of variation. Shape and innervation of

the utricles usually are very variable. The best character that exists is whether the glumes are caducous or persistent. If the glumes are caducous, often an abscissionlayer is visible in young stadia, but this is not always clear. Especially if the glumes fall very late, as in the type of *Uncinia silvestris* Hamlin, this character is difficult to use. Because some of the glumes are already semi-detached, I reduced this species to *U. compacta.*

An other important character is the culm being either sharply triangular and scabrid beneath the inflorescence, or obtusely trigonous and smooth. In *Uncinia compacta* the culms are obtusely trigonous and smooth, but there are a few exceptions. Sometimes the plants or part of them are (in New Zealand) red coloured (*U. purpurata, U. fuscovaginata, U. rubra*). It is not impossible that this colour is not important as a character and should not be used for discrimination of species. I am of the opinion that the revision of Hamlin (1959) and also the treatment in the Flora of New Zealand (1970) accept many 'species' that are in reality nothing but ecological races, often even not worth the status of variety because of the high degree of variability. Edgar (Fl. of New Zealand 2, 1970: 235) made 50 artificial crosses. It appeared that all the intraseries crossed and about half of the interseries crosses produced fully developed seed. (One of the series of Hamlin, the *Compactae*, contains 11 'species'!)

A revision of the whole genus, including the Old as well as the New World is badly needed. Wile identifying the Kew collections I found *U. sinclairii* Boott from New Zealand conspecific with *U. smithii* Philcox from S. Georgia.

3. *U. dawsonii* Hamlin (Trans. Roy. Soc. N.Z. Bot. 2, 1963: 128) from New Caledonia, for which species Hamlin made a new series, ser. *Oceanicae*, is nothing but *U. uncinata* (L.*f.*) Kük. I have seen several collections from New Caledonia, a.o. *McKee 4989* and *9783*. The only difference is the constriction in the middle of the nut in *U. dawsonii*. But carefull examination of the New Zealand material revealed that in many of the collections the nuts are either convex to the base, or irregularly shaped with a slight constriction as in *U. dawsonii.*

KEY TO THE SPECIES

1a. Glumes persistent. Stems scabrid beneath the inflorescence . **1. U. riparia**
b. Glumes caducous, when young often an abscission layer visible. Stems smooth, or rarely in Australia slightly (often discontinuously) scabrous beneath the inflorescence 2
2a. Stamens usually 2. Glumes with 1-nerved central stripe. Utricles 3—4 mm. Leaves smooth or slightly scabrous on the margins, 1/4—3/4 mm broad. Plant delicate, 3—17 cm high . . . . . **2. U. tenella**
b. Stamens 3. Glumes with 3-nerved central stripe, sometimes more nerves present. Utricles $3^1/_2$—7 mm. Leaves scabrous on margins and nerves at least in the upper half, $^1/_4$—3 mm broad. Plant usually coarser, 5—45 cm high . . . . . **3. U. compacta**

1. Uncinia riparia R. Brown

U. riparia R. Brown, Prod. (1810) 241; Boott, in Hook. *f.*, Fl. Tasmania 2 (1860) 102, t. 152 f. B; Benth., Fl. Austr. 7 (1878) 434; Clarke, J. Linn. Soc. Bot. 20 (1883) 392, excl. var.; Kük., Pfl. R. Heft 38 (1909) 63, excl. var.; S. T. Blake, J. Arn. Arb. 35 (1954) 234. — *Carex riparia* Poir., in

Lam., Enc. Méth. Suppl. 3 (1813) 282. — Lectotype: *R. Brown 6072* (K, BM) Tasmania.

U. laxiflora Petrie, Trans. N.Z. Inst. 17 (1885) 271; Hamlin, Dom. Museum Bull. 19 (1959) 31, t. 5, d-f; Edgar, Flora of New Zealand 2 (1970) 223. — Lectotype (Hamlin 1959): *Cheeseman (WELT 2818, non vidi)*. Syntype: *P. Goyen s.n.* (K) Catlins River.

U. purpurata Petrie, Trans. N.Z. Inst. 17 (1885) 272; Hamlin, Dom. Mus. Bull. 19 (1959) 18; Edgar, Flora of New Zealand 2 (1970) 221. — Type: *Petrie* (WELT, *non vidi*), Signal Hill; I have seen several collections annotated by Petrie from BM and K.

U. fuscovaginata Kük., Bull. Herb. Boissier II, 4 (1904) 50; Pfl. R. Heft 38 (1909) 60; Hamlin, Dom. Mus. Bull. 19 (1959) 19; Edgar, Flora of New Zealand 2 (1970) 221. — *U. purpurata* Petrie var. *fuscovaginata* Cheeseman, Man. N.Z. Flora (1906) 801. — Lectotype (Hamlin 1959): *Cockayne 7790* (WELT, *non vidi*), Arthur Pass. I have seen several collections of the type locality.

U. purpurata Petrie var. *subcaespitosa* Kük., Pfl. R. Heft 38 (1909) 61. — Type: *Cockayne 7821* (WELT, *non vidi*; iso in P), Old Man Range.

U. sclerophylla Nelmes, Kew Bull. (1949) 143. — Type: *Clemens 6070A* (A, fragment in K), New Guinea, Morobe Dist., Mt. Sarawaket.

U. ohwiana Koyama, Bot. Mag. Tokyo 69 (1956) 214, f. 6. — Type: *TNS 92552* (*non vidi*), New Guinea.

U. affinis auct. non Colenso *ex* Clarke: Hamlin, Dom. Museum Bull. 19 (1959) 30, t. 5 a–c; Edgar, Fl. of New Zealand (1970) 223, *pro descriptione et syn. U. purpurata* Petrie var. *subcaespitosa* Kük., *excl. syn. U. riparia* R. Brown var. *affinis* Colenso *ex* Clarke.

Rhizome more or less creeping. *Stems* approximate on the rhizome, very slender, sharply trigonous, scabrid in the upper half, (10—)40—75 cm by $^1/_2$—1 mm. *Leaves* from slightly shorter to slightly longer than the stems, rigid, flat or canaliculate, long attenuate, scabrous on margins and nerves in upper half, $1^1/_2$—3(—?4) mm wide; basal sheats bladeless or short-bladed, fuscous. *Spikelet* narrowly linear, often very loosely flowered, ebracteate or with a filiform bract usually not overtopping the inflorescence, 3—7(—15) by 2—5 mm, the male part few-flowered, 1—$1^1/_2$(—2) cm long. *Glumes* persistent, oblong-ovate, acute, muticous, rigid, stramineous with broad, 3-nerved, green centre and sometimes brown margins, (4—)5—6(—$8^1/_2$?) mm long, the midrib not reaching the apex. *Utricles* slightly exceeding the glumes, erect, linear-oblong or linear-lanceolate, compressed-trigonous, glabrous and smooth, fine-nerved, stramineous, 6—7 by *c.* 1 mm, at the base subgradually narrowed into a *c.* $1^1/_2$ mm long stipe, at the apex into a *c.* $1^1/_2$ mm long compressed-conical beak with narrow hyaline mouth. *Nut* linear-oblong or narrowly ovate-oblong, broadly short-stipitate, shortly apiculate, *c.* 4 by 1 mm.

Distribution. New Guinea: W. Irian, Wilhelmina top; Papua New Guinea. Australia: Victoria, Upper Hume River and Mt. Kosciusko (acc. to Fl. Austr. 7, 1878, 434, no specimens seen); Tasmania and New Zealand.

Ecology. In shaded places. In New Guinea generally between moss on the floor of the moss or subalpine forest between 3000 and 4117 m, above 4000 m also in grassland with shrubs. Fl. fr. I–XII (New Guinea).

Notes. 1. Whether the glumes are persistent or caducous often can be seen in old inflorescences only. It is not impossible that hybrids occur with *U. compacta*, thus giving more variability and plants in which the glumes fall off very late. In these plants the sharply triquetrous culms become more or less rounded and soft instead of scabrous.

2. Possibly, *U. rubra* Boott is only a red coloured variety of *U. riparia*.

2. Uncinia tenella R. Brown

U. tenella R. Brown, Prod. (1810) 241; Boott in Hook *f.*, Fl. Tasm. 2 (1860) 102, t. 152 A; F. v. Muell., Fragm. 8 (1874) 151; Benth., Fl. Austr. 7 (1878) 433. — *Carex tenella* Poir., in Lam., Enc. Méth. Suppl. 3 (1813) 282. — T y p e: *R. Brown* (BM; iso in K, P), Tasmania.

Stem smooth, filiform, 3—17 cm long by $^1/_2$—$^1/_4$ mm diam. *Leaves* smooth or very slightly scabrous along the margins, flat or involute, $^1/_4$—$^3/_4$ mm broad, flexuous, not conspicuously circinate towards the apex, shorter to longer than stem. *Inflorescence* 5—15 mm long, female flowers 3—12, male flowers 3 or 4, with 2 (rarely 3) stamens. *Utricles* fusiform, trigonous, 3—4 by 1 mm, with conical 1 mm long stipe and *c.* 1 mm long beak. *Glumes* caducous, about as long as utricle, with 1-nerved green central stripe.

D i s t r i b u t i o n. Australia: N.S. Wales, Victoria, and Tasmania.

E c o l o g y. In shade of forests or shrubs in temperate and cool climates. Fl. fr. XI—VI.

N o t e. Closely allied to *U. compacta*, possibly an ecotype of that species, but as the number of stamens is usually two, I treat it as a separate one.

3. Uncinia compacta R. Brown

U. compacta R. Brown, Prod. (1810) 241; Boott, in Hook. *f.*, Fl. Tasmania 2 (1860) 103; F. v. Muell., Fragm. 8 (1874) 152; Bentham, Fl. Austr. 7 (1878) 434; Clarke, J. Linn. Soc. Bot. 20 (1883) 395; Cheeseman, Man N.Z. Fl. (1906) 800; Kük., Pfl. R. Heft 38 (1909) 65; Cheeseman, Man. N.Z. Fl. 2nd ed. (1925) 245; Lourteig, Bull. Com. Nat. Fr. Rech. Antarct. (1968) 25—31. — *Carex compacta* Poiret in Lam., Enc. Méth. Suppl. 3 (1813) 282. — L e c t o t y p e: R. Brown (BM; iso in K, P), Tasmania, Table Mt. near Derwent River.

U. rupestris Raoul, Ann. Sci. Nat. III, 2 (1844) 117; Boott, in Hook. *f.*, Fl. Nov. Zel. 1 (1853) 286; Clarke, J. Linn. Soc. Bot. 20 (1883) 392; Kük., Pfl. R. Heft. 38 (1909) 64; Hamlin, Dom. Mus. Bull. 19 (1959) 39; Edgar, Fl. of New Zealand 2 (1970) 225. — T y p e: *Raoul* (P), New Zealand.

U. hookeri Boot, in Hook *f.*, Fl. Auckl. & Campbell Is. 1 (1847) 91, t. 51; Hamlin, Dom. Mus. Bull. 19 (1959) 62; Edgar, Fl. New Zealand 2 (1970) 231. — *U. riparia* R. Brown var. *hookeri* Kük., Pfl. R. Heft 38 (1909) 63. — T y p e: Hooker *f.* (K; iso in BM, P), Campbell I.

U. filiformis Boott, in Hook. *f.*, Fl. Nov. Zel. 1 (1853) 286; Clarke, J. Linn. Soc. Bot. 20 (1883) 391; Kük., Pfl. R. Heft 38 (1909) 66; Hamlin, Dom. Mus. Bull. 19 (1959) 43. — T y p e: *Colenso 1641* (K), New Zealand.

U. divaricata Boott in Hook. *f.*, Fl. Nov. Zel. 1 (1853) 286; Hamlin, Dom. Mus. Bull. 19 (1959) 54. — *U. compacta* R. Brown var. *divaricata* Hook. *f.*, Handb. N.Z. Fl. 1 (1864) 309; Kük., Pfl. R. Heft 38 (1909) 65. — L e c t o t y p e (Hamlin 1959): *Lyall* (K), New Zealand, Milford Sound.

U. caespitosa Boott in Hook. *f.*, Fl. Nov. Zel. 1 (1853) 287; Clarke, J. Linn. Soc. Bot. 20 (1883) 393; Cheeseman, Man. N.Z. Fl. (1906) 801; Kük. Pfl. R. Heft 38 (1909) 61; Cheeseman, Man. N.Z. Fl. 2nd ed. (1925) 246; Hamlin, Dom. Mus. Bull. 19 (1959) 50. — T y p e: *Colenso 1644* (K), New Zealand, Ruahine.

U. nervosa Boott, in Hook. *f.*, Fl. Tasmania 2 (1860) 102; Cheeseman, Man. N.Z. Fl. (1906) 800; 2nd. ed. (1925) 244; Hamlin, Dom. Mus. Bull. 19 (1959) 59. — *U. compacta* var. *nervosa* Clarke, J. Linn. Soc. Bot. 20 (1883) 395. — T y p e: *Gunn* (K), Tasmania.

U. debilior F. v. Muell., Fragm. 8 (1874) 151; Benth., Fl. Austr. 7 (1878) 435; Clarke, J. Linn. Soc. Bot. 20 (1883) 391. — T y p e: *Fullagar* (K), Lord Howe I.

U. moseleyana Boeck., Flora 61 (1878) 170. — T y p e: *Moseley* (K; iso in P), Kerguelen Is.

U. riparia R. Brown var. *affinis* Colenso *ex* Clarke, J. Linn. Soc. Bot. 20 (1883) 392; Kük., Pfl. R. Heft 38 (1909) 63 excl. syn.; Cheeseman, Man. N.Z. Fl. 2nd ed. (1925) 248, excl. syn. — *U. affinis* Hamlin, Dom. Mus. Bull. 19 (1959) 30 et Edgar, Fl. of New Zealand 2 (1970) 223 *pro syn.* *U. riparia* var. *affinis* Colenso *ex* Clarke, excl. descr. — T y p e: *Colenso 1643* (K), New Zealand, Dry Hills.

U. compacta var. *elongata* Clarke, J. Linn. Soc. Bot. 20 (1883) 395. — T y p e: *de l'Isle 55* (K; iso in P), Amsterdam I.

U. compacta var. *viridis* Clarke, J. Linn. Soc. Bot. 20 (1883) 395. — *U. caespitosa* var. *viridis* Hamlin, Dom. Mus. Bull. 19 (1959) 52. — T y p e: *Colenso 1640* (K), New Zealand, Ruahine Mts.
U. horizontalis Colenso, Trans. N.Z. Inst. 15 (1883) 334. — T y p e: *Colenso* (iso in K), Fagus woods, Norsewood, Hawke's Bay Dist., N. Island, flowering early in november 1881.
U. cheesemanniana Boeck., Bot. Jahrb. 5 (1884) 521. — S y n t y p e s: *Cheeseman 63, 74, 76* (BM, K), New Zealand, Mt. Nelson, 4000 ft.
U. clarkei Petrie, Trans. N.Z. Inst. 20 (1888) 185. — *U. compacta* var. *clarkei* Cheeseman, Man. N.Z. Fl. (1906) 800; 2nd ed. (1925) 245. — L e c t o t y p e: (Hamlin 1959): *Petrie* (WELT 1388, P) Eweburn Creek, Naseby, 2000 ft, New Zealand.
U. tenella var. *robustior* Kük., Bot. Centralbl. 76 (1898) 211. — T y p e: *F. v. Mueller* (iso in BM), Victoria, Mt. Baw Baw.
U. rupestris var. *flavescens* Kük., Bot. Centralbl. 76 (1898) 211. — T y p e: *Travers* (*non vidi*), New Zealand.
U. compacta var. *petriei* Clarke in Cheeseman, Man. N.Z. Fl. (1906) 800. — *U. divaricata* var. *petriei* Hamlin, Dom. Mus. Bull. 19 (1959) 57. — T y p e: *Petrie* (K, prob. an isotype of *U. clarkei*), New Zealand, Eweburn.
U. caespitosa var. *minor* Kük. in Cheeseman, Man N.Z. Fl. (1906) 802; 2nd ed. (1925) 246. — L e c t o t y p e (Hamlin 1959): *Cockayne 7861 (non vidi)*; s y n t y p e s: *Cockayne 7797, 7799* (K), *7813*.
U. pedicellata Kük., Pfl. R. Heft 38 (1909) 61. — T y p e: *Cockayne 7867* (*non vidi*).
U. rupestris var. *capillacea* Kük., Pfl. R. Heft 38 (1909) 64. — T y p e: *Cockayne 7827* (WELT 2798, *non vidi*), Clinton Valley, Lake te Anau.
U. rupestris var. *planifolia* Kük., Pfl. R. Heft 38 (1909) 64. — *U. angustifolia* Hamlin, Dom. Mus. Bull. 19 (1959) 42; Edgar, Fl. of New Zealand 2 (1970) 226. — T y p e: *Cockayne 7845* (WELT, *non vidi*), Rongahere, Tuapeka Cnty.
U. tenella auct. non R. Brown: Cheeseman, Man. N.Z. Fl. (1906) 799. — *U. tenella* var. *longifructus* Kük., Pfl. R. Heft 38 (1909) 66; Cheeseman, Man. N.Z. Fl. 2nd ed. (1925) 244. — *U. longifructus* Petrie Trans. N.Z. Inst. 52 (1920) 17; Hamlin, Dom. Mus. Bull. 19 (1959) 46; Edgar, Fl. of New Zealand 2 (1970) 227. — T y p e: *Kirk 1265* (iso in K), New Zealand, Routburn, Otago.
U. compacta var. *caespitiformis* Kük. in Cockayne, Rep. Bot. Surv. Stew. Is. (1909) 42. — T y p e: *Cockayne 7871* (*non vidi*).
U. caespitosa var. *collina* Petrie, Trans. N.Z. Inst. 52 (1920) 19; Cheeseman, Man. N.Z. Fl. 2nd ed. (1925) 246. — T y p e: *Petrie* (WELT 1628, *non vidi*), Mt. Holdsworth.
U. riparia var. *stolonifera* Kük. & Steen., Bull. Jard. Bot. Btzg III, 13 (1934) 213. — L e c t o t y p e: *Clemens 32341* (iso in L), Borneo, Kinabalu, Paka, 3000 m.
U. riparia auct. non R. Brown: Ohwi, Bot. Mag. Tokyo 56 (1942) 213.
U. subtrigona Nelmes, Kew Bull. (1949. 144. — T y p e: *Clemens 29004* (iso in L), Borneo, Kinabalu, Paka, 3000 m.
U. dykei Nelmes, Kew Bull. (1949) 377. — T y p e: *Dyke* (K), Marion I.
U. flaccida Blake, Proc. Roy. Soc. Queensl. 51 (1940) 49 — T y p e: *Blake 7398* (BRI, *non vidi*; iso in K), Victoria, Mt. Buffalo.
U. silvestris Hamlin, Dom. Mus. Bull. 19 (1959) 26. — T y p e: *Hamlin 550* (iso in BRI, K), Head of Waikamaka stream, Ruahine Mountains.
U. egmontiana Hamlin, Dom. Mus. Bull. 19 (1959) 33. — T y p e: *Hamlin 418* (*non vidi*), The swamp, Mt. Egmont.
U. silvestris Hamlin var. *squamata* Hamlin, Dom. Mus. Bull. 19 (1959) 28. — T y p e: *Petrie in Cockayne 7848* (*non vidi*), Owake flat, Clutha Cnty.
U. involuta Hamlin, Dom. Mus. Bull. 19 (1959) 49; Edgar, Fl. of New Zealand 2 (1970) 228. — T y p e: *Hamlin 451* (iso in K), Mt. Egmont, New Zealand.
U. zotovii Hamlin, Dom. Mus. Bull. 19 (1959) 37. — T y p e: *Aston* (WELT 1601, *non vidi*), Mt. Holdsworth, Tararua Mountains.
U. drucei Hamlin, Dom. Mus. Bull. 19 (1959) 58; Edgar, Fl. of New Zealand 2 (1970) 229. — T y p e: *Hamlin 532* (iso in K), Hikurangi Ra., Ruahine Mountains.
U. drucei Hamlin var. *pauciflora* Hamlin, Dom. Mus. Bull. 19 (1959) 59. — T y p e: *Hamlin 452* (iso in K), Mt. Egmont.
U. aucklandica Hamlin, Dom. Mus. Bull. 19 (1959) 63; Edgar, Fl. of New Zealand 2 (1970) 232. — T y p e: *Aston* (WELT 2980, *non vidi*) Carnley Harbour, Auckland Is.

Plant laxly to densely caespitose or with short rhizome and stems densely tufted, erect; sometimes stems decumbent, forming new tufts; *culms* slender, rare-

ly more than 1 mm thick, obscurely trigonous, smooth (but in some plants of Victoria and New S. Wales sharply triquetrous, scabrous, see note 5), 5—45 cm. *Leaves* shorter or longer than stems, flat, involute, convolute, or conduplicate, sometimes (var. *nervosa*) planoconvex and then often canaliculate, long attenuate, scabrous on margins and nerves at least in upper half, $^1/_4$—3 mm wide, the tip mostly rather acute, triquetrous, rarely flat or planoconvex and blunt (var. *nervosa*); basal sheaths bladeless, brown. *Spikelet* narrowly oblong, loosely to very densely flowered, sometimes bracteate (1–)$1\,^1/_2$—$5\,^1/_2$ cm long by $2\,^1/_2$—20 mm, the male part $^1/_2$—$1\,^1/_2$ cm. long. *Glumes* caducous, when young often the absciss-layer already visible, oblong-ovate or lanceolate, acute, muticous, at least the margins hyaline, greenish or brown, with 3-nerved central stripe but often with several more nerves, 4—6(—8 mm in the Antarctic Is.) long by 1.6—3 mm. *Utricles* shorter to slightly longer than glumes, obliquely erect to patent, lanceolate elliptic or ovoid, with 2 conspicuous submarginal nerves, sometimes slenderly nerved towards the base or striate when these nerves are prolonged, $3\,^1/_2$—6(—7) by 1—2 mm, at the base contracted into a 1—$1\,^1/_2$ mm long stipe, at the apex (gradually) narrowed into a 1—2 mm long beak. Nut oblong.

Distribution. Malesia (Philippines, Borneo, Celebes, New Guinea); Australia (Victoria, N.S. Wales, and Tasmania); New Zealand; Amsterdam I; Kerguelen; Crozet; Marion; Gough and Tristan da Cunha.

Ecology. In the tropics high in the mountains, 2000—4300 m, outside the tropics as well in temperate as in cold climates; in open places and in forest.

Notes. 1. The vaste area and the very diverse ecology result in a high degree of variability. It is a common feature of many wide spread species that they are heterogeneous, being genotypically as well as phenotypically differentiated. Several combinations of characters repeatedly are met with throughout vast parts of the area, and might be caused by ecological circumstances, while other combinations are more local and might be produced by the above circumstances as well as by genetic drift. I consider the species *U. compacta* as a *commiscuum* in the sense of Danser, divided in many *convivia* (Danser). The *convivia* partly can be considered as ecotypes in the sense of Turesson. The var. *nervosa* in my opinion is the result of ecological factors, working in a vast area of the species, while the var. *alpina* possibly only locally has originated, also as a result of ecological factors. This var. closely resembles plants of the antarctic islands (Auckland Arch., Maquarie!), were also severe climatological circumstances prevail. Because of the accurate and complete labelling by the recent collectors in New Guinea I came to this conclusion. I refrain from further subdividing the species because my lack of knowledge of the ecology. Besides, the vast area, between 16° 36′ N and 55° SL., makes it very difficult to compare the ecological circumstances. The species is closely related to *U. uncinata* Kük.; a few intermediates exist.

2. *U. affinis* (Clarke) Hamlin is described by Hamlin (1959: 30) and by Edgar (1970: 223) as having the culms scabrid under the inflorescence and having persistent glumes. I have seen the type, *Colenso 1643* (K), which has glabrous culms and caducous glumes. Besides, in one spike of this collection the internodes in the spike are aequidistant, in an other the lower internodes are distinctly longer.

The latter condition is described by Hamlin and Edgar and forms according to them an important character for the separation of species in *Uncinia*.

3. *U. nervosa* in the flora of New Zealand can only be identified by its so called plano-convex leaves. In the type of *U. cheesemanniana*, *Cheeseman 63* (K), considered conspecific with *U. nervosa* by Hamlin and Edgar, the leaves are involute.

4. The type of *U. hookeri* Boott (*Hook.f.*, K) is impossible to identify with the flora of New Zealand, as the internodes of the spike become progressively longer towards the base, while they are supposed to be aequidistant (see also note 2).

5. Several collections of Australia (Victoria, Mt. Baw Baw, and Mt. Cobbler, N.S. Wales, Kosciusko area) possess sharply trigonous culms which are at least partially scabrous beneath the inflorescence; this character is rarely found in New Zealand plants. Possibly this condition is the result of former hybridisation with *U. riparia*. The collections described as *U. flaccida* Blake belong here.

6. *Uncinia caespitosa* Boott was described with 4 varieties, of var. β, γ, and δ the locality is mentioned. All types are collected by Colenso, but only *Colenso 1644* is named by Colenso '*caespitosa*'. As no localities are indicated on the sheets, the meaning of the varieties remains obscure. I did not find any citations of the varieties in the literature. I suppose that all the varieties belong to *U. compacta*.

KEY TO THE VARIETIES

1a. Spikelets *c.* 1 cm long. Leaves strongly circinnate towards the apex. Usually small plants . . . . . **c.** var. **alpina**
b. Spikelets $1^1/_2$—$5^1/_2$ cm. Leaves not or less circinnate. Plants often larger 2
2a. Leaves flat (always in New Guinea), involute, convolute, or conduplicate with acute, trigonous, or triquetrous tip. . . . . **a.** var. **compacta**
b. Leaves planoconvex with flat, or planoconvex blunt tip. . . **b.** var. **nervosa**

a. var. **compacta**

Spikelets $1^1/_2$—$5^1/_2$ cm. Leaves flat, involute, convolute, or conduplicate (in New Guinea leaves flat). Leaf tip acute, trigonous, or triquetrous, undulate or (somewhat) circinnate.

Distribution. As for the species.

Ecology. In Malesia in forest, elsewere as well in forest as in open places, probably with different ecotypes. Fl.fr. I–XII (Malesia); IX–III (Australia); XI–IV (Antarctic).

b. var. **nervosa** Clarke

U. nervosa Boott — *U. cheesemanniana* Boeck.

Spikelets $1^1/_2$—3 cm. Leaves planoconvex, usually canaliculate, sometimes some of the leaves convolute. Leaf tip flat, or planoconvex, blunt.

Distribution. New Guinea, in the mountains; Australia: N.S. Wales, Kosciusko Area, and Tasmania; New Zealand.

Ecology. In open places, mostly in grassland. Alt. in New Guinea between 3000 and 4026 m. Fl.fr. V–IX (New Guinea); I–V (New Zealand); I–III (Australia).

c. var. **alpina** Noot., *var. nov.*

Spicae c. 1 cm longae floribus feminibus c. 5. Folia involuta ad 2 mm lata apice circinnata.
Typus: *ANU 7289 Wade & Mc Vean*, New Guinea, Mt. Wilhelm track $^1/_2$ mile past trig. point, Eastern Highlands, wet turf in gullies leading to ridges, alt. *ca.* 14.200 ft. (L; iso in CANB, K).

Spikelets *c.* 1 cm long, female flowers *c.* 5, utricles $3^1/_2$—4 mm, glumes 6—7 mm. Leaves involute, strongly circinnate towards the triquetrous or trigonous acute apex.

Distribution. New Guinea, Mt. Wilhelm and Mt. Giluwe.

Ecology. In exposed places, often periodically covered by snow, also solifluction terrace. Alt. 3770—4350 m. Fl. fr. IX–IV.

LIST OF COLLECTIONS, STUDIED FOR THIS REVISION

1 = *Uncinia riparia* R. Brown
2 = *Uncinia tenella* R. Brown
3a = *Uncinia compacta* R. Brown var. *compacta*
3b = *Uncinia compacta* R. Brown var. *nervosa* Clarke
3c = *Uncinia compacta* R. Brown var. *alpina* Noot.

ANU *5157B*: 3c; *5165*: 1; *5237*: 3c; *7091*: 3a; *7092*: 1; *7161*: 3b; *7205*, *7289*: 3c; *7370*: 3b; *7381*, *8740*: 3a; *10756*: 1; *10760*: 3a; *10769*: 1; *11308*: 3c; *11531*, *11666*: 3a; *13049*, *13051*, *13053*: 3c; *15012*: 3a; *15013*, *15127*: 1; *15136*: 3c; *15167*: 3b; *15215*: 3a; *15231*: 1; *15384*: 3c; *15531*: 3a; *15598*: 1; Aston *2756*: 3a; Aubert *25*, *27*: 3a.

van Balgooy *251*: 3a; *254*: 1; *730*, *755*, *851*: 3a; Beauglehole *5985*: 3a; Blake *7234*, *18303*: 2; *18304*, *18337*: 1; *18338*: 2; *18377*, *18407*: 1; *18413*: 3b; Brass *4415*: 1; *30048*: 3a; *30063*: 1; *30878*: 3a; Brass & Meijer Drees *9847*: 1; Brockie *685*, *686*: 3a; Brown *6071*: 2; *6072*: 1; Burbidge *2998*: 2; *3267*: 3a; *3338*: 2; *3765*: 3a; Burns 676: 1.

Cheeseman *24*: 3b; *60*: 3a; *63*, *74*, *76*: 3b; *174*: 3a; Chew, Corner & Stainton *867*: 3a; CHR *117826*: 3a; *117985*, *134154*, *157055*, *157056*, *157057*, *157062*, *234459*: 3a; Christophersen *2387*, *2477*: 3a; Christophersen & Meijland, *43*, *64*, *516*, *633*, *1065*: 3a; Clemens *6070A*: 1; *29004*, *32333*, *32341*: 3a; Cockayne *7791*: 3a; *7792*, *7796*: 1; *7798*, *7799*: 3a; *7804*: 3b; *7809*, *7879*: 3a; Colenso *85*, *1641*, *1643*, *1644*, *1875*, *4169*: 3a; Cooke *1094*: 1; *1108*: 3a; *1110*, *1128*: 1; *1146*: 3a; Costin & Moore *29*: 3a; Coulaud *46*: 3a; Cour *408*: 3a; Craven *1721*: 3a; *2663*: 1; *2787*: 3a; *2799*, *2962*: 1; *3000*: 3b; Curtis *1095*: 3a; *1096*: 1.

Davis *2438*, *2478*: 2; Druce *157060*: 3a.

Edgar *127065*: 3a; Edwards *41*: 3a; Elmer *10637*: 3a; Eyma *781*, *4991*: 3a.

Gray *5403*: 2; Gray & Costin *6597*: 3b; Gray & Totterdell *6187*, *6638*: 3b; Green *1605*, *1660*: 3a; Gunn *1408*: 3a.

Hamilton *1894*: 3a; Hamlin *419*: 1; *451*, *452*, *520*, *532*, *539*, *540*, *548*, *550*, *554*: 3a; *556*: 3b; *560*: 1; *561*, *562*, *564*, *565*: [illegible] 1; *592*: 3b; Hartley *11254*: 3a; *11278*: 1; Hemsley *6652*: 1; Huntley *2065*: 3a. de l'Isle *34*, *55*: 3a.

Jacobs *7268*, *7297*: 3a; Jermy *4271*, *5269*, *5294*: 3a; Johnson *19618*: 3a; Johnson & Constable *19531*: 3b.

Kirk *134*, *694*, *706*, *866*, *1032*, *1033*, *1051*, *1262*, *1263*, *1264*, *1267*, *1270*, *1271*, *1275*, *1277*, *1421*: 3a; Kleckham *1*: 3a; *6*: 3b; *12*: 1.

LAE *51435*: 1; *51468*, *54182*: 3a; *54221*: 1; *54406*, *54601*: 3a; *54605*: 1; *55838*, *55888*: 3a; *55962*: 3c; *61437*: 3a; *65124*: 3b; Lair *176—179*: 3a; Lourteig & Cour *17*, *41*, *379*: 3a.
Mason & Moor *1284*: 3a; *4673*: 3b; Melville *2286*, *71816*: 2; Meijland *1368*, *1371*, *1379*, *1387*, *1517*, *1557*, *1654*: 3a.
NGF *16196*: 3a; *39657*: 1; *40270*: 3a; *46226*: 3b.
Oldfield *101*: 1; *124*: 2.
Petrie *1*, *2*, *3*: 1; *6*, *7*, *9*, *10*: 3a; *15*: 1; *17*, *18*, *19*, *20*, *21*, *22*, *23*, *25*: 3a; *27*: 1; *29*, *WELT 1355*, *1399*: 3a; Philipson, W. R. & M. N. *3494*: 3b.
Rand *3519*: 3a; Raoul *1843*: 3a; Rodway *1094*: 2.
Schlechter *18830*: 3a; Schodde *1967A*: 1; *3443*: 2; Stuart *1849*: 3a; Sutton *1956*, *1957*: 3a.
Talbot *1101*, *1113*, *1116*: 3a; Totterdell *138*, *140*, *307*: 3a.
Veldkamp *6506*: 1; *6617*, *7426*: 3b; *7642*: 3a; *7661*: 3b; Vink *17439*: 3a.
Wace *122 p.p.*, *T 168*, *T 227*, *T 228*, *T 320*: 3a; Wakefield *2985*: 3a.
van Zinderen Bakker *1209*: 3a.