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NOTES RELATING TO THE FLORA OF BHUTAN: XIX
Kobresia (Cyperaceae)

H.J. NOLTIE

The following new taxa, combinations and synonymy in the genus *Kobresia* from E Himalaya and SW China are proposed: *K. pseuduncinoides* Noltie *sp. nov.*; *K. woodii* Noltie *sp. nov.*; *K. esenbeckii* (Kunth) Noltie *comb. nov.* of which *K. seticulmis* Boeckeler, *K. hookeri* Boeckeler, *K. angusta* C.B. Clarke and the illegitimate *K. trinervis* Boeckeler become synonyms; *K. esenbeckii* var. *fissiglumis* (C.B. Clarke) Noltie *comb. nov.*; *K. prattii* C.B. Clarke and *K. harrysmithii* Kük. are reduced to synonymy of *K. vidua* (Boott ex C.B. Clarke) Kük.; *K. williamsii* is reduced to synonymy of *K. gammiei*; *K. curvata* is reduced to synonymy of *K. fragilis*; *K. stiebritziana* is reported new to Bhutan and Sikkim and *K. curticeps* and *K. gammiei* new to Bhutan. Notes on *K. nepalensis*, *K. vaginosa*, *K. vidua*, *K. gammiei* and *K. cercostachys* are given. Observations on apparent dioecy and distribution of sex within the species *K. esenbeckii*, *K. vidua*, *K. vaginosa* and *K. curticeps* are reported.

INTRODUCTION

The genus *Kobresia* has recently been revised for the *Flora of Bhutan*. The Sino-Himalayan region is the major centre of diversity for this genus; the area covered by the *Flora* (Bhutan, Sikkim and Darjeeling) contains 22 species out of a worldwide total of c.50 and represents something of a meeting point within the region of eastern and western elements with, for example, *K. laxa* representing the western and *K. stiebritziana* the Chinese elements. The genus has recently been revised for Nepal (Rajbhandari & Ohba, 1991) but these authors took a rather conservative view. Although Kobresias are relatively humble in appearance, they are of considerable economic significance forming a major component of high pastures (over 4000m) grazed in summer by yak and sheep. The following notes were originally based purely on herbarium studies, but have been greatly expanded from recent fieldwork in E Nepal, Bhutan and Sikkim.

NOTES & OBSERVATIONS

A. Observations on apparent dioecy

Before discussing one of the commonest and most variable species of Himalayan *Kobresia* (*K. esenbeckii*), a note is necessary on sexual expression in the group. Useful information was obtained on this subject on a recent trip to the alpine zone of W Sikkim.

The subject of variability in distribution of sexes in apparently dioecious species in the tribe Cariceae has been studied more extensively in *Carex* than *Kobresia*. For example, Martens (1939) reported the occasional production of androgynous spikes in the normally strictly dioecious *Carex picta*. In *Kobresia* the phenomenon has been little studied and existing descriptions in Flora accounts are often ambiguous.

In sect. *Hemicarex* (sensu Kükenthal), which has single- flowered spikelets arranged in a simple spike that may be female only, male only or bisexual (androgynous or gynaecandrous), many taxa have been described as being dioecious implying that male

and female spikelets are borne on separate plants. This, however, has been deduced largely from herbarium specimens and in the field a more complex situation is found to pertain in at least three species (*K. vaginosa*, *K. vidua* and *K. esenbeckii*).

It should be noted that these plants are difficult to collect as they form very dense, brittle mats or tussocks often of large extent, and it is only too easy to break mere fragments from the edge. If care is taken, however, it is possible to dissect out larger pieces in which it is possible to prove physical connections between different inflorescence-bearing shoots.

The following dispositions of spike types within such dissected pieces were found:

	m+m	f+f	m+f	m+f+m/f	m+f+f/m	f+m/f	m+f+f/m/f	m/f+m/f
K. esenbeckii (incl. *K. angusta*)	x	x	x	x				x
K. vaginosa	x	x			x		x	
K. vidua	x	x	x			x		

f/m = gynaecandrous spike; m/f = androgynous spike; f/m/f = mixed spike; m = entirely male spike; f = entirely female spike; + = physical connection proved between spikes

Note: pieces bearing spikes of only a single sex cannot definitely be stated to represent a dioecious condition since they could have been part of a larger individual bearing the opposite sex in another part of the clump. Voucher specimens demonstrating these conditions have been preserved at E.

What can be concluded from the table above is that individuals are commonly and unambiguously found which bear both male and female inflorescences on the same individual, which if broken off during collecting would give rise to an apparently dioecious condition on the herbarium sheet. These species often exhibit, therefore, a type of monoecism, though on occasions, perhaps true dioecism may occur. Variability certainly occurs and this type of variation in distribution of sexes cannot be taken to be of taxonomic significance as has been done in the past.

This type of monoecism is analogous to that in many *Carex* species - although in *Carex* the male and female 'spikes' are normally part of a single infloresence rather than, as here, separated on different shoots.

The sort of variation recorded above in *K. vaginosa* and *K. vidua*, i.e. normally unisexual inflorescences sometimes producing spikelets of the opposite sex in various positions, is well-known in certain *Carex* spikes (e.g. Holm, 1921).

Experiments are clearly needed to see if expression of sex changes, for example, from year to year or by altering nutrition.

In sect. *Eucobresia* (sensu Kükenthal) with highly branched inflorescences the distribution of sexes is more complex and more variable. The Himalayan *K. laxa* has been studied in detail in this respect (e.g. Timmonen, 1985) as it is almost certainly a primitive inflorescence-type within the tribe Cariceae and provides useful evidence on the evolution of the group and light on the vexed question of the separation of *Schoenoxiphium* and *Kobresia* (Kern, 1958). Variability in distribution of male and female spikelets in *K. laxa* was noticed early and led to confusion. Bentham, for example, placed different forms of what was (to others) obviously the same species in different genera.

Clarke (1883) realised this and noted 'I always supposed this species (as are many others) somewhat dimorphic, the male flowers predominating in one form, the female in another'. Kern (1958) says that according to Clarke sometimes wholly male or wholly female plants occur. I cannot trace the origin of this statement; but even if quoted correctly I suspect it not to be true and that a similar situation pertains as with the 'apparent dioecy' in sect. *Hemicarex*, with problems arising from incomplete herbarium specimens. In the field in Sikkim the same phenomenon was found to occur in *K. curticeps* (a rarely collected species now reported from as far east as the Dochu La in W Bhutan), which normally has single-flowered, androgynous lateral spikes with male spikelets above and female below (though occasionally with a few basal, androgynous spikelets). At Dzongri (W Sikkim) several entirely female inflorescences were found and one individual was proved, by uprooting, to bear both an androgynous and an entirely female inflorescence. If such flowering stems had been broken off separately, then the appearance in the herbarium would have suggested dioecy.

B. The correct name for *Kobresia trinervis* Boeckeler and its allies

Carex trinervis Nees (1834) non Degland (1807) is an illegitimate homonym based on a Royle specimen of a *Kobresia* from Nepal (isotype: *Royle* 138 in part, LIV). This consists (in addition to two specimens of *Carex parva*) of a single, distinctive, plant bearing 2 male-only spikes, with strong basal leaf-sheaths and glumes with wide, hyaline margins. Kunth (1837) provided this with a new name – *Carex esenbeckii* (based on the same type).

Boeckeler (1875) with some caution transferred the (illegitimate) *trinervis* to *Kobresia*, thus forming the illegitimate combination *K. trinervis* Boeckeler, giving *Carex esenbeckii* as a synonym. In the same paper he described two new species of *Kobresia* – *K. seticulmis* and *K. hookeri*, based on duplicates of specimens collected in Sikkim by J.D. Hooker, without commenting on their relationship to *K. trinervis*.

Since the holotype of *K. hookeri*, which should be at Berlin, is presumed to have been destroyed, it is necessary to lectotypify the name. Two relevant sheets are present at Kew, both bearing the same data – 'Sikkim [Lachen, 20.6.1849], 12,000ft, J.D. Hooker. C. esenbeckii Kunth?'– one from Hooker's own herbarium and the other a duplicate from Boott's. Most authors have placed great weight on the distribution of the sex of the spikelets within the spike in this group of species, which we have seen to be unreliable. The specimen from Boott's herbarium actually demonstrates this unreliability, showing a gradation of states from spikes almost entirely male to predominantly female; and it is this sheet that I propose as the lectotype. There can be no doubt that this plant is the same as the male-only type of *Carex esenbeckii*; Hooker presumably queried it as belonging to this species because most of the spikes are androgynous. Harry Smith correctly equated the two species when he determined the Hooker sheet as *K. trinervis* Boeckeler in 1937. It should be noted that C.B. Clarke annotated both sheets with the name *K. hookeri* Boeckeler, thus demonstrating his concept of the species (see below).

The same question of typification applies to *K. seticulmis*, with two sheets at Kew (both from Hooker's own herbarium) bearing the relevant data – 'Sikkim [Lachen,

25.6.1849], 13,000ft. J.D. Hooker. Elyna 2'. There are no significant differences between the sheets so the sheet traditionally regarded as the type is therefore designated the lectotype - this bears a drawing of a spike and a female spikelet by C.B. Clarke. The specimens have androgynous, but primarily female spikes, but the spikelets are more mature than in the type of *K. hookeri*, so that the stoutly-beaked nuts are emergent from the prophylls; other minor differences include the weaker sheaths and narrower, longer leaves. Realising the lack of real differences between these taxa, Clarke (1883) originally united them under the name *Hemicarex hookeri*, citing (by implication - from the altitudes given) the Hooker syntypes of both species and one of his own specimens (*Clarke* 25648, Singaleleh, 11,500ft). He later (1894) changed his mind, retaining them as distinct species under *Kobresia* – in this same work he further confused the issue by saying that Boeckeler's description of *seticulmis* was partly based on specimens of *K. filicina* C.B. Clarke. The glumes and nuts of this predominantly W. Himalayan species, however, are distinctive and Hooker did not collect the species in Sikkim, so it is difficult to give any credence to Clarke's comment.

Kükenthal (1909) correctly subsumed *K. hookeri* Boeckeler under *K. trinervis* (Nees) Boeckeler, but created confusion by assuming that Clarke had misinterpreted Boeckeler's *hookeri* and creating a spurious taxon *K. hookeri* sensu Clarke 1883 (which should in any case have had a new name); from Clarke's annotations and the specimens he cited (see above), however, there is no reason to think that he misinterpreted Boeckeler's name.

Koyama (1978) treated *K. hookeri* and *K. seticulmis* as synonymous under the latter name, aptly stating 'my observations revealed continuous variation from the one to the other without any discontinuity at all, and hence it is impossible to mark any taxonomic boundary'. He is wrong, however, in saying that 'the relatively larger phase ('*K. hookeri*') occurs at lower altitudes up to c.4000m, while *K. seticulmis* as originally defined has been collected mostly at higher altitudes above c.4000m'.

Recent fieldwork in W Sikkim shows the pattern of variation to be complex and not easily interpreted. Weak forms (of which *K. angusta* is only the extreme) occur on rocks and cliff ledges especially in shade, but these include both androgynous and unisexual forms. The stouter, broad-leaved form with unisexual spikes sometimes occurred at the same site but in obviously deeper soils and once in a base-rich habitat but in one locality (ESIK 527) was found growing on the same rock as a starved, androgynous form. Thus while microecological differences sometimes seem to be relevant, other factors must be involved and more work is clearly needed.

It should be noted that at extreme altitudes (4550–4850m) on nutrient-poor (presumably acid) glacial debris, a minute, apparently truly dioecious form occurred (height under 2cm, male and female spikes both under 8mm and reduced to c.6 spikelets), but this also seems to belong to the same species, being analogous to depauperate forms of *Carex haematostoma* and *K. stiebritziana* with which it was associated.

In conclusion, these taxa can all be united under the name *K. esenbeckii* having a wide distribution from NW Himalaya to SW China (SE Tibet and Yunnan).

Kobresia esenbeckii (Kunth) Noltie, **comb. nov.**

Syn.: *Carex esenbeckii* Kunth, Enum. Plantarum 2: 522 (1837). Type: *Royle* 138p.p. (iso. LIV).

C. trinervis Nees in R. Wight, Contrib. Bot. India: 120 (1834), *nom. illegit.* (Art. 64.1), non Degland in Loiseleur, Fl. Gallica 2:731 (1807).

Kobresia trinervis Boeckeler in Linnaea 39:4 (1875), *nom. illegit.* (Art. 63.1)

K. seticulmis Boeckeler in Linnaea 39: 3 (1875). Type: 'Sikkim [Lachen, 25.6.1849], 1300ft, *J.D. Hooker*. Elyna 2' (lecto. K, chosen here).

K. hookeri Boeckeler in Linnaea 39: 4 (1875). Type: 'Sikkim [Lachen, 20.6.1849], 12,000ft, *J.D. Hooker*. C. esenbeckii Kunth?' (lecto. K ex Boott herb., chosen here).

K. hookeri var. *dioica* C.B. Clarke in Hooker, Fl. Br. India 6:695 (1894).

K. angusta C.B. Clarke in Hooker, Fl. Br. India 6:695 (1894).

K. fissiglumis also belongs to this group but is worth retaining at varietal rank on account of having prophylls open to the base and blunt female glumes with hyaline margins.

K. esenbeckii var. **fissiglumis** (C.B. Clarke) Noltie, **comb. nov.**

Syn.: *K. fissiglumis* C.B. Clarke in Hooker, Fl. Br. India 6:696 (1894).

C. *Kobresia curvata* and *K. fragilis*

Boott based his *Carex curvata* on a mixed collection of Hooker from two localities in Sikkim – Tungu and Lachen. Two forms are present on the type sheets, though it is impossible to be completely certain which comes from which locality.

Form 1: lower lateral spikes branched; glumes pale. By elimination this was probably collected at Tungu. This is the form illustrated by Boott and therefore the one to which the name should strictly refer. The bottom right-hand specimen on the sheet from Boott's own herbarium comes closest to one of his illustrations and is here chosen as the lectotype.

Form 2: all lateral spikes simple; glumes chestnut. A packet of dissections labelled by Boott indicates that these are the specimens from Lachen; of these one specimen has a notably erect habit (see below).

Unfortunately *C. curvata* was an illegitimate homonym and the name was not validated until 1908 – in the genus *Kobresia* (where it correctly belongs). In the meantime (1903) *Kobresia fragilis* had been described by Clarke from Sichuan, based on a single specimen (*Soulié* 731, K). In addition to several detached culms, the type consists of a single large plant with very erect flowering culms, the smallest and youngest of which exactly matches the erect specimen of 'C. curvata' from ?Lachen. The larger inflorescences are characterised by bearing some androgynous spikelets, which have been stated to be diagnostic (Kükenthal, 1909; Koyama, 1978). In view of the variation in sexual

expression in other *Kobresia* species described above I am not inclined to view this character as being worthwhile in itself in supporting specific status. The other main diagnostic character used to separate *K. fragilis* from *K. curvata* has been erect versus curved stems; fieldwork, however, suggests that curvature is a response to grazing and trampling. Forms with the habit of *K. fragilis* have been seen from Bhutan (*Wood* 6493, E), Tibet (*Ludlow, Sherriff & Taylor* 4517, E) and Nepal (*KEKE* 528, E; *Polunin, Sykes & Williams* 4793, E, BM) and forms matching the lectotype of *K. curvata* with branched lateral spikes from Sikkim (*ESIK* 227, E; *Bor's Collector* 45, K). However there are many intermediates from Bhutan and Nepal and I see no option but to regard them all as forms of a single species, for which *K. fragilis* is unfortunately the correct name.

K. fragilis C.B. Clarke in J. Linn. Soc. Bot. 36:267–268 (1903). Type: *Soulié* 731 (holo. K).

Carex curvata Boott, Ill. Genus Carex 1:2, t. 5 (1858) *nom. illegit.* (Art. 64.1), non Knaf in Flora 30:184 (1847).

Kobresia curvata C.B. Clarke in Kew Bulletin, Add. Ser. 8:68 (1908). Type: Sikkim, *J.D. Hooker* (lecto. K ex Boott herb. – bottom right-hand specimen, chosen here; see notes above).

D. *Kobresia nepalensis* and allies

K. vaginosa was described from Hooker specimens from north-central Sikkim (Momay). Kükenthal, however, also included NW Himalayan specimens in his concept of the taxon and reduced it to a variety of *K. nepalensis*. Koyama (1978) identified material from Nepal as being the same as the NW Himalayan element and raised it to a subspecies. This taxon is a large, robust plant with stiffly erect leaves, large prophylls and cream glumes and is quite different from the Sikkim plant to which the name must be restricted. *K. vaginosa* was found in some quantity in W Sikkim, where it could be dominant on dry slopes; it is very distinct and appears to be endemic to Sikkim. It is characterized by its usually unisexual spikes (see above) and its prophyll similar in size to *K. nepalensis*, from which it differs in its laxer, very slender spikes and blunt, hyaline glumes.

The other variety formerly included by Kükenthal under *K. nepalensis* (var. *elachista* (C. B. Clarke) Kük.) was seen in W Sikkim and proved to be only a starved form from trampled pasture and not worthy of formal recognition. In the field it superficially looks very different from *K. nepalensis* and more like *K. pygmaea* or *K. prainii*.

K. stiebritziana Hand.-Mazz. was described from NW Yunnan on the basis of rather depauperate specimens (*H.-M.* 4734, iso. E). It is superficially similar to *K. nepalensis*, from which it differs in its darker, non-aristate female glumes, shorter beak to the nut and especially in its prophyll which is open to the base. This species has now been found in Bhutan and Sikkim; in W Sikkim it was found to be very common, often growing with *K. nepalensis*.

E. *Kobresia vidua* and allies

Kobresia vidua was described as a dioecious species, the type specimen consisting of some rather depauperate female spikes collected by Hooker in Sikkim. The prophyll is

closed having an apical orifice exactly like the utricle of a *Carex* – in which genus it was originally placed. It was not re-collected (or at least identified as such) until 1952 – this time in W Nepal (*PSW* 134, BM, E) and again only entirely female inflorescences were collected. A search in herbaria, however, discovered a husband for this persistent spinster in the form of two specimens from E Bhutan (*LSH* 20694 a & b, BM). These were labelled as male and female of a single species, but had remained unidentified until Koyama mistakenly determined them as *K.* aff. *duthiei* C.B. Clarke. These specimens differ from the type in having been collected at anthesis, before the culms had elongated. Recent fieldwork has confirmed that this elongation is a marked feature of this and other species of *Kobresia*, *K. vidua* being commonly found in W Sikkim. At the same time, observations on distribution of sexes were made (for results see above) with the result that although the species might sometimes be truly dioecious, it can also be monoecious with male and female spikes produced on the same plant. Moreover, the spikes are not always strictly unisexual and androgynous spikes were found.

Examination of the types of two Chinese species, in the light of these new collections prove them to be synonymous with *K. vidua*.

K. prattii C.B. Clarke was described from a male plant from W Sichuan/Tibet (type *Pratt* 744, K) and is identical with male *K. vidua*. In this case, however the wrong 'wife' (*Pratt* 741) was initially (in ms on sheet) assigned to it by Clarke. Clarke later (1903) realised his mistake and re-determined this as *K. cercostachys* (Franchet) C.B. Clarke. Kükenthal (1909) repeated Clarke's original mistake and assigned *Pratt* 741 to *K. prattii*. This specimen, however, differs fundamentally from both *K. prattii* and *K. cercostachys* (both of which have strictly unisexual spikelets) in having androgynous spikelets. It is possibly referrable to *K. setschwanensis* Hand.-Mazz., or one of its allies, but this group requires further study.

An isosyntype of *K. harrysmithii* Kük. from N. Sichuan with both male and female spikes (*Smith 3729, K*) can also be clearly referred to *K. vidua*.

K. vidua therefore provides another example of the links between the flora of the E Himalaya and SW China.

The following synonymy can therefore be presented:

K. vidua (Boott ex C.B. Clarke) Kük., Pflanzenreich., 38. IV. 20:40 (1909).

Syn: *Carex vidua* Boott ex C.B. Clarke in Hooker, Fl. Brit. India, 6:713 (1894). Type: see text and specimen citations.

K. prattii C.B. Clarke in J. Linn. Soc. Bot., 36:268 (1903). Type: see text and specimen citations.

K. (Cobresia) harrysmithii Kük. in Medd. Goteborg Bot. Trad., 5:37 (1930). Type: see text and specimen citations.

Specimens seen

NEPAL: Maharigaon, 14,500ft, 13 vii 1952, *Polunin, Sykes & Williams* 134, female (BM, E). SIKKIM: Lachen, 13,000ft, 15 vii 1849, *Hooker* s.n., female (K: holotype). Above Thangshing, 4350m, 20 vii 1992, *ESIK* 562 (E). Thangshing to Lam Pokhri, 4150m, 19 vii 1992, *ESIK* 524 (E).

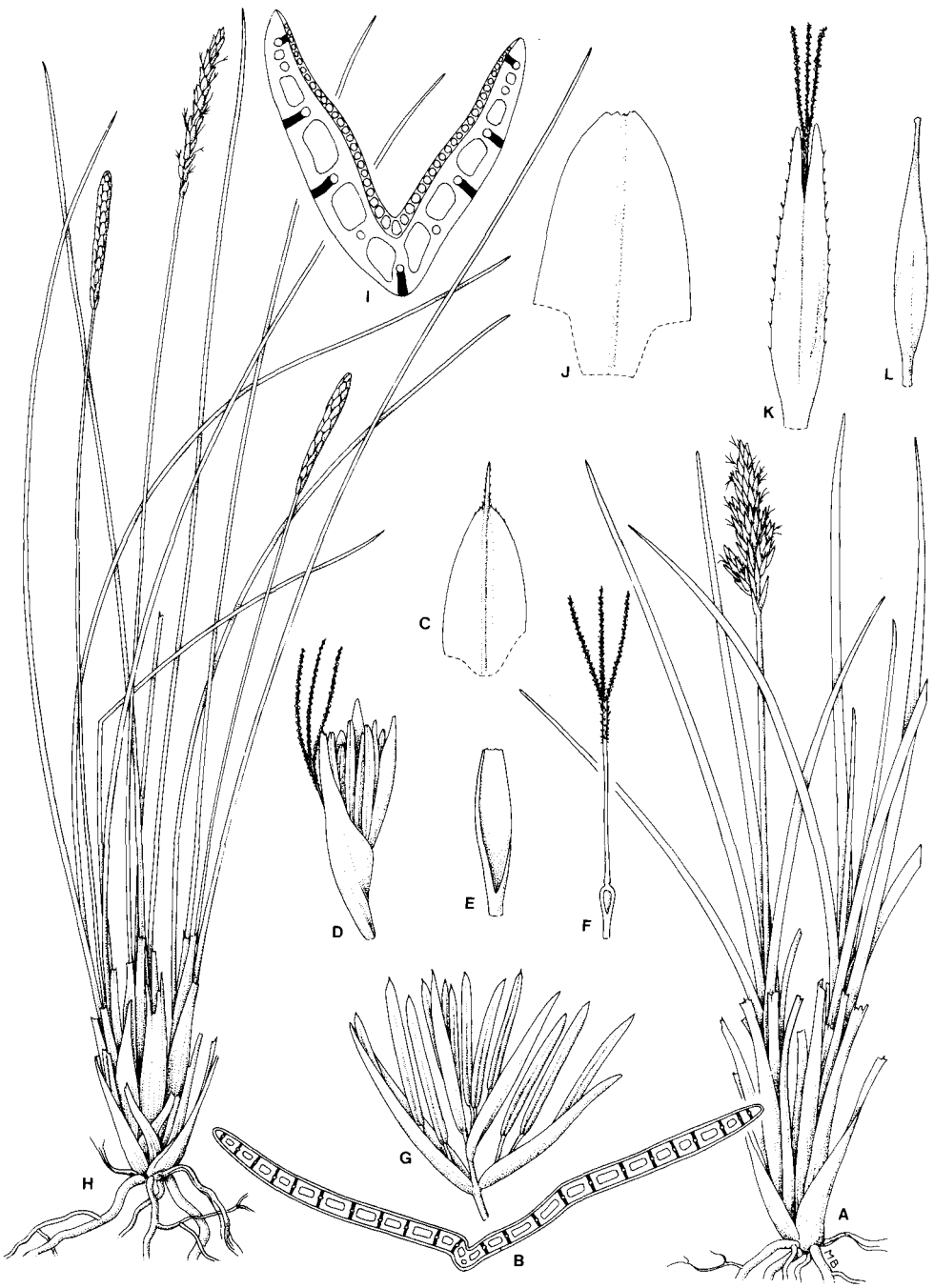

FIG. 1. A–G, *Kobresia pseuduncinoides* Noltie. A, habit (x ½); B, T.S. leaf (x 14); C, glume of spikelet; D, undissected spikelet; E, prophyll; F, immature gynoecium; G, male flowers dissected out of prophyll (dissections all x 4). H–L, *K. woodii* Noltie. H, habit (x ½); I, T.S. leaf (x 24); J, glume of female spikelet; K, female spikelet; L, nut (dissections all x 6).

CHUMBI: Lingmathang, 11,000ft, 2 vi 1945, *Bor & Ram* 20792, male (K). Chumbithang, 13,000ft, 2 vi 1945, *Bor & Ram* 19662, male (K).
BHUTAN: Shingbe, Me La, 13,000ft, 3 vi 1949, *Ludlow, Sherriff & Hicks* 20694 a & b, male and female (BM). N side of Shingche La, 4530m, 23 ix 1984, *Sinclair & Long* 5266, female (E).
CHINA (Sichuan): Szechuan austr., in mont. altiss. supra Nerali vers. bor. occid., solo schistoso, 4200m, 22 v 1914, *Schneider* 1404 (E). Montis Tschahungnyotscha ... ad septentr. oppidi Yenyuen, 4150–4300m, 27 v 1914, *Handel-Mazzetti* 2651 (E). Dongergo, 4800–5000m, 21 vii 1922, *H. Smith* 3729 (K: isosyntype of *K. harrysmithii*). W Szechuen and Tibetan Frontier, chiefly near Tachienlu, 9–13,500ft, *Pratt* 744 (K, BM: holotype & isotype of *K. prattii*).

F. *Kobresia gammiei*

K. gammiei was distinguished as a new species from Sikkim by C.B. Clarke but unfortunately published posthumously and with an inadequate description. This description omits any reference to its stoloniferous rhizomes - one of its most distinctive characteristics and one that is rare in the genus. Koyama in 1973 described *K. williamsii* as a new species from Nepal characterized by stoloniferous rhizomes. Inspection of the holotype of *K. williamsii* at BM and the only syntype of *K. gammiei* remaining at CAL (Sikkim, *Gammie* s.n., 1892) show them to be conspecific – as suspected from the descriptions. An expanded description and drawing of *K. gammiei* was provided by Ghildyal (1986), but it should be noted that this is incorrect in showing an open prophyll and must have been based on examination of a damaged spikelet. Recent fieldwork has shown *K. gammiei* to be not uncommon in W Sikkim and to occur as far east as the Bumthang district in Central Bhutan. It should be noted that the species was also collected by Hara *et al.* in W Sikkim but misidentified as *K. sikkimensis* Kük. (Hara, 1966).

G. New Species

Kobresia pseuduncinoides Noltie, **species nova** a *K. uncinoide* (Boott) C.B. Clarke spiculis androgynis, basibus vaginarum foliorum atroisabellinis nitidis, circum caespites collum perdurans formantibus, foliis latioribus (magis quam 4.7mm, nec minus 4mm lata), crassioribus differt. **Fig. 1.**

Densely tufted perennial. *Bases of leaf sheaths* dark yellowish-brown, shining, persistent, not fibrillose. *Leaves* sub-basal, about equalling stems, 4.7–9mm wide, flat, very acute, thick-textured, cross-veinlets prominent when dry. *Culm* 24–38cm, erect, stout (2.5–2.7mm wide), acutely trigonous, angles minutely scabrid. *Inflorescence* a dense, spike-like panicle, 5.5–6.5 x 1.5–1.8cm, with 8 or more appressed lateral partial inflorescences; inflorescence bract with large (0.7–1.6cm), oblong, glume-like base with brown-hyaline sides and broad green midrib produced as filiform tip not exceeding inflorescence. *Partial inflorescences* with upper spikelets single-flowered, male, lower 5–10 spikelets androgynous with 1 female and 2–4 male flowers within a prophyll; 'glumes' of spikelets 6.2–6.5 (excl. arista) x 2.3–3.5mm, oblong-elliptic, acute to aristate, sides brown, midrib green, 1-veined, narrow, margins narrowly hyaline near apex. *Prophyll* 5.6–7 x 1–1.3mm, oblong, truncate, open to base, hyaline, flushed brown, margins minutely scabrid. *Style* 2.5–4mm; stigmas 3, 3–4.5mm. Mature nut not seen.

Male glumes 7–7.5 x 2–2.6mm, lanceolate, acute, brown. *Stamens* 3 per flower, anthers 3.2–4.9mm, linear, apex minutely apiculate.

Type: Bhutan, Upper Kulong Chu district, Shingbe, Me La, 12,500ft, 11 vi 1949, *Ludlow, Sherriff & Hicks* 20725 (holo. BM).

Habitats recorded: Grassy slopes (in open or among dwarf rhododendrons); grassy moraine 'flats'; near small streams; open marshes, 3810–4420m.

Distribution: Nepal, Bhutan, SE Tibet.
Other specimens seen:

NEPAL: Jangla Bhanjang, 13,000ft, 29 vi 1952, *Polunin, Sykes & Williams* 2334 (BM, E). Maharigaon (Khola), c.14,000ft, 16 vii 1952, *Polunin, Sykes & Williams* 1563 (BM). Near Dogadi Khola, 14,000ft, 24 vi 1954, *Stainton, Sykes & Williams* 3236 (BM, E).
SE TIBET: Tsari Sama, Langong, 14,500ft, 14 vi 1938, *Ludlow, Sherriff & Taylor* 5548 (BM).

Note: this species has been confused with *K. uncinoides*, to which it bears an uncanny but superficial resemblance. It differs, however, fundamentally in its androgynous spikelets, leaf sheaths and leaf blades. Harry Smith on a note on *LST* 5548 pointed out that it was probably an undescribed species, but said it was too young for identification. It is curious that this species has not been distinguished earlier as there are several good collections and it is very spectacular in appearance. It has been collected only in its flowering stage, when it is presumably conspicuous on account of its large number of anthers. Fruiting material is still required.

Kobresia woodii Noltie, **species nova** a *K. cercostachyde* (Franchet) C.B. Clarke spicis unisexualibus, glumis femineis latioribus (c.6.5mm, non c.2mm) obtusis (haud acutis usque aristatis), prophyllis longioribus (7–9mm non minus quam 6.5mm) et ad basem apertis, rostro nucis longiore (c.1.5mm, non c.0.5 mm) differt. **Fig. 1.**

Densely tufted perennial. *Upper parts of leaf sheaths* straw-coloured, lower parts chocolate brown with darker margins, slightly shining, persistent, not fibrillose. *Leaves* slightly exceeding scapes, c.1.5mm diameter, semi-circular to V-shaped in section, scarcely keeled. *Culm* 24–28cm, c.1mm diameter, ± terete. *Inflorescences* unisexual, male and female borne on same plant, spike-like, unbranched. *Female inflorescence* 6 x 0.6cm, linear, lower spikelets slightly distant. *Female glumes* 6.5 x 4mm, oblong-ovate, blunt, brown, margins narrowly hyaline, midrib wide, green, 1-veined; lowest glume (inflorescence bract) shortly aristate. *Prophyll* 7–9 x 1mm, linear oblong, keels minutely scabrid, margins free to base, overlapping, apex brown. *Nut* linear: stipe c.1mm, body c.2.5 x 0.7mm, beak c.1.5mm; style c 2.5mm; stigmas 3, c.3mm. *Male glumes* c.8 x 2.5mm, oblong-oblanceolate, rounded.

Type: Bhutan, Thimphu district, below Phajoding Monastery, 3300m, 21 vi 1987, *J.R.I. Wood* 5534a (holo. E).

Habitat: Grassland, possibly seasonally burnt, in upper forest limits.

Known only from the type collection which was mixed with *K. capillifolia* (Decne.) C.B. Clarke (an abnormal form with atypical, aristate glumes).

Named after J.R.I. Wood who discovered this species and who has made such a significant contribution to our knowledge of the Bhutanese flora.

K. cercostachys has a simple androgynous spike (though as with other members of sect. *Hemicarex* forms with unisexual spikes might well be expected to occur), with single-flowered spikelets; female glumes (c.6 x 2mm) are narrow, acute and aristate; prophyll closed (originally described as a *Carex*); beak of nut very short (c.1mm). This species has been much confused and is probably known only from the type collection (*Delavay* 3403, iso. E). Clarke (1903) included within his concept of *K. cercostachys* a discordant element with androgynous spikelets (*Pratt* 741 – see above) which is perhaps referable to *K. setschwanensis* Hand.-Mazz. (also close to *K. cuneata* Kük.). This incorrect application of the name has unfortunately been followed by some subsequent workers (in identifications on herbarium specimens); though more collections are needed from China to resolve the taxonomy of the forms with androgynous spikelets.

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