

A REVISION OF THE SOUTH AFRICAN SPECIES OF *HELITOTRICHON*, *Bess. ex Schultes.*

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(With 12 Figures.)

I.—INTRODUCTION.

THE most elaborate account of the South African species of this genus is that by *Stapf*, in *Dyer*, Fl. Cap. VII. 472–477 (1899) under the name *Avenastrum* Jess., where a fairly broad view of the species was taken.

Stapf did not consult the actual type specimens of *Stuedel* and *Nees ab Essenbeck*, but based his identifications on the study of type numbers. For purposes of study he furthermore had only a comparatively narrow range of material at his disposal. During the last few years, however, a fair amount of material has accumulated in various South African herbaria. Because of this and the foregoing reasons, the author of the present paper found it desirable to undertake a revision of the genus with a view to elucidating several remarks made by *Stapf* in his account of the genus.

In this revision the material of several of the larger European and the more important South African herbaria has been included.

II.—HISTORY OF THE GENUS.

The generic name *Helictotrichon* Bess. first appears in *Schultes Mant. Syst. Veg. ii. Addit. I.* 526 (1827) and most probably is merely a revised spelling of the earlier name *Elictotrichon* Bess. ex Andr. [*Rys. Bot.* p. 9 (1823)]. The latter appeared in a list of plants as *Elictotrichon sempervirens* Bess. unaccompanied by any description and being a *nomen nudum* must thus be rejected.

At a date subsequent to the publication of the name *Elictotrichon sempervirens*, *Besser* communicated to *Schultes* a new classification of *Avena* and *Trisetum* in which he proposed several new genera, including *Helictotrichon*. As *Besser* had already used the name *E. sempervirens* for *Avena sempervirens* Host. and as the latter was also the first species to be listed under *Helictotrichon*, *Avena sempervirens* Host. naturally is the type species of the genus.

The name *Avenastrum* first appeared as a *section* to the genus *Avena* L. in *Koch*, *Syn. Fl. Germ. et Helv.* ed. 1. 795 (1837). This *section* was subsequently used in the same sense by authors such as *Benth.* and *Hooker* [*Gen. Pl.* iii. 1160 (1883)], *Hackel* [*Engl. Pflzfam.* ii. 2. 56 (1887) et *True Grasses*, 123 (1896)], *Aschers.* and *Graebner* [*Syn. Mitteleurop. Flor.* ii. 243 (1899)], *Hitchcock* [*Man. Grass. Un. States*, 297 (1935)], and as a *subgenus* by *Rouy* [*Fl. France*, XIV, 126 (1913)].

Jessen, in *Deutsch. Gräser*, 214 (1863) put forward the name *Avenastrum* as a genus and included under it species such as (1) *Avena flavescens* L., (2) *Avena elatior* L., (3) *Aira caryophyllea* L. and (4) *Aira praecox* L. He thus not only raised *Koch's* sectional name

to generic rank, but modified its sense appreciably by including in it the heterogenous elements quoted above. The name and genus *Avenastrum* Jessen is superfluous since *Jessen* had included under it the older valid names and genera *Trisetum* Pers. (1805) [for (1) above] and *Arrhenatherum* Beauv. (1812) [for (2) above] and for this reason must be rejected as a "nomen illegitimum."

Beck [Fl. Nieder.-Öst. 1. 72, in Ann. Nat. Hofmuseum. Wien V. 560-561 (1890)] recognised the genus *Avenastrum* Jess. but restricted its use and conceived it generically in the sense that *Koch* used it sectionally, i.e. differing only from *Koch's* conception in rank. The genus is used in the same restricted sense by *Stapf* [Dyer, Fl. Cap. VII, 472 (1899)] where strictly speaking the genus is *Avenastrum* Jess. pro parte.

Apparently *Beck* did not consider the genus *Heuffelia* Schur. [Enum. Pl. Transs. 760 (1866)] under which *Avena* sect. *Avenastrum* Koch [Syn. ed. 2. 918 (1844)] is cited as a synonym. *Avena pratensis* L. was included in this genus as well as in *Helictotrichon* Besser and on this account *Heuffelia* Schur. is congeneric with the older genus i.e. *Helictotrichon* Besser.

It may be pointed out that the name *Helictotrichon* Bess. is not an orthographic variant of *Helictotrichum* Nees (1818) as the former was derived from the adjective *helictos*, whereas the latter was derived from the noun *helix* and on this account both genera have the right to stand independently.

Furthermore the name *Helictotrichum* Bess. has been taken up in the Index. Kew. from Reichenb. Fl. Germ. Excurs. 1406. no. 352 (1832) where it is considered a synonym of *Avena planiculmis* Schrad. *Benth.* and *Hook. f.* [Gen. Pl. III. ii. 1160 (1883)] and *Hackel* [Engl. Pflzfam. II. ii. 56 (1887)] quote it as a synonym under *Avena* sect. *Avenastrum* Koch. It is probably only a misprint for *Helictotrichon* Bess.

III.—DESCRIPTION OF THE GENUS.

Helictotrichon Bess. ex Schult. Mant. Syst. Veg. ii. Addit. I. 526 (326 errore) (1827).

Spikelets narrowly-oblong to oblong or elliptic-oblong, laterally compressed, usually erect or suberect, of medium size (8-15 mm. long, rarely smaller or larger), in nearly always erect often stiff panicles, rarely nodding. *Rhachilla* disarticulating above the glumes and between the valves, produced into a short bristle beyond the uppermost floret or ending with a rudimentary lemma; rhachilla-internodes glabrous, or short- or long-hairy, 1.5-4 mm. long. *Florets* 2-6, ♂, or the uppermost more or less reduced. *Glumes* 2, persistent, hyaline or subhyaline, subequal or unequal, acute or acuminate, more or less distinctly keeled; the lower 1-3-nerved; the upper 3-7-nerved (3-nerved in the South African species). *Lemmas* usually distinctly exerted from the glumes, rarely subincluded, more or less herbaceous with scarious or hyaline tips, often rather firm, at length becoming indurated, acute or acuminate, bifid (rarely 4-fid), with or without bristles from the lobes, 5-11-nerved, awned; awn dorsal, from the middle or slightly above the middle of the lemma, kneed and twisted (at times spuriously) below the bend; callus short or elongate, villous. *Paleas* shorter than the lemmas, 2-keeled, ciliate. *Lodicules* 2, rather large, hyaline. *Stamens* 3. *Ovary* hairy from above the middle or at the apex only; styles distinct, short; stigmas usually laterally exerted, plumose. *Caryopsis* oblong, slightly laterally compressed, usually grooved in front, hairy at the apex, pallid, soft, embraced by the hardened lemma and palea; hilum linear, up to half the length of the grain; embryo small. *Caespitose* perennials; leaf blades linear, usually narrow, flat or convolute, sometimes setaceous; ligules hyaline or scarious; panicle narrow, more rarely diffuse, erect or nodding.

Species about 65; mainly natives of the temperate regions of the northern hemisphere, but also occurring on the mountains of Java, extending through the high mountain regions of tropical Africa to South Africa.

IV.—KEY TO THE SPECIES.

- A.—Rhachilla-internodes from 2·5–4 mm. long, densely bearded for the greater part of their length :
- B.—Inflorescence very compact, composed of numerous spikelets :
- C.—Lemma with prominently raised nerves, finely granular between but not on the nerves ; callus 1–1¼ mm. long ; glumes narrowly lanceolate, prominently nerved and hyaline..... 1. *quinquesetum*.
- CC.—Lemma not prominently nerved, often scabrous at the insertion of the awn but smooth dorsally below it, and minutely scaberulous towards the margins, distinctly so towards the apex of the lobes ; callus 1¼–2 mm. long ; glumes broadly lanceolate, not very prominently nerved, not sub-hyaline 2. *longum*.
- BB.—Inflorescence short, lax to very lax, composed only of relatively few spikelets :
- D.—Plants about 30 cm. high. Lemma about 1·0 cm. long (excluding the bristles), distinctly coarsely granular on the back in the dorsal middle third, granules also present on the nerves..... 3. *namaquense*.
- DD.—Plants about 80 cm. high. Lemma slender, about 1·5 cm. long (excluding the bristles), smooth dorsally, not prominently nerved, very minutely scaberulous near the margin in the upper half, slightly scaberulous along the nerves.. 4. *barbatum*.
- AA.—Rachilla-internodes 1·5–2·5 mm. long :
- E.—Rachilla-internodes glabrous, smooth, acute, hardly dilated at the apex ; lobes of lemma (above insertion of the awn) about 10 mm. long or slightly longer..... 5. *leoninum*.
- EE.—Rhachilla-internodes bearded and dilated near the apex ; lobes of lemmas up to 8 mm. long, but usually much shorter :
- F.—Lemmas scabrid or scaberulous :
- G.—Florets scarcely exerted beyond the glumes ; glumes broadly lanceolate ; outer surface of lemmas minutely scaberulous all over..... 6. *Galpinii*.
- GG.—Florets exerted well beyond the glumes ; glumes lanceolate ; lemmas scabrid mainly at the insertion of the awn :
- H.—Lemmas about 10 mm. long ; rhachilla-internodes 2 mm. long..... 7. *capense*.
- HH.—Lemmas about 7 mm. long ; rhachilla-internodes about 1·5 mm. long..... 8. *hirtulum*.
- FF.—Lemmas glabrous on the back below the point of insertion of the awn :
- I.—Lemmas about 7 mm. long ; column of awn with 1–3 twists..... 9. *natalense*.

II.—Lemmas usually 10 mm. long or somewhat longer ; column of awn with more than 3 twists :

K.—Leaves many from the base of the culms, setaceous and up to 40 cm. long ; spikelets usually gaping ; rachilla-internodes long-hairy and usually evident..... 10. *longifolium*.

KK.—Leaves not setaceous, often convolute. Rachilla-internodes usually not readily evident :

L.—Glumes broadly lanceolate ; lemmas lanceolate in profile ; lobes (above insertion of awn) 3–5 mm. long ; anthers 1 mm. long, rarely 2 mm. in some florets ; cleistogamous ?..... 11. *turgidulum*.

LL.—Glumes lanceolate, acuminate ; lemmas narrowly lanceolate, slender in profile ; lobes (above insertion of awn) 6–8 mm. long ; anthers 1.5–2 mm. long..... 12. *Dodii*.

V.—ENUMERATION OF THE SPECIES.

1. H. *quinqusetum* (Steudel) Schweickerdt, comb. nov.

Syn. : *Avena quinqueseta* Steudel, in Flora, 1829, 485 ; Kunth., Enum. I, 305 (1833).
Trisetum Steudelii Nees, in Linnaea, VII, 308 (1832) ; Fl. Afr. Austr., 349 (1841) ; Steudel, Syn. Pl. Glum, i, 228 (1854) ; Dur. and Schinz, Consp. Fl. Afr., V, 840 (1894).

Avenastrum quinqusetum Stapf, in Dyer, Fl. Cap., VII, 474 (1899).

Culms 50–75 cm. high, glabrous, 2–4-noded, sheathed to 5–10 cm. below the panicle. *Leaves* 4–6, arising from near the base, 2 higher up ; lowest sheaths somewhat compressed, firm, minutely puberulous, strongly nerved, the upper more terete and glabrous ; ligule truncate, irregularly lacinate, up to 3 mm. long ; blades linear, with callous tips, flat or conduplicate, up to 25 cm. long and 4 mm. wide, the upper usually much shorter, rigid, strongly and closely nerved, glabrous. *Panicle* contracted, rather dense and almost spike-like, narrow, 12–18 cm. long, straight or subflexuous ; branches fascicled, very unequal, branched from near the base, addressed to the rachis ; the longest up to 5 cm. long. *Spikelets* 12–18 mm. long, very loosely 2-sub-3-flowered. *Glumes* narrow-lanceolate, acuminate, prominently nerved, glabrous, scarious along the margin and towards the apex ; the lower 8–11 mm. long and about 1½ mm. broad ; the upper 10–13 mm. long and 1½–3 mm. broad. *Rachilla-internodes* 3½–4½ mm. long, acute, slightly broadened towards their apex, slender, hairy almost to the base with white spreading hairs up to 4 mm. long. *Lemmas* shortly exerted, linear-lanceolate, the lowest (including callus and lobes, but excluding the awn) up to 18 mm. long, pallid, rather firm, with prominently raised nerves, glabrous below the insertion of awn, finely granular between the nerves up to the base of the valve ; lobes 10–12 mm. long, finely scaberulous and scarious towards the apex ; each lobe usually terminating in 2 bristles of unequal length (termination of veins). *Callus* subulate, up to 1¼ mm. long, densely bearded with hairs about 1½ mm. long ; awn inserted ± 7 mm. from the base of the valve ; column 8–10 mm. long ; bristle up to 18 mm. long. *Palea* about 9 mm. long ; keels prominently ciliolate. *Anthers* 2½ mm. long. *Ovary* pubescent for the greater part of its length.

CAPE PROVINCE.—Table Mountain, near Capetown, *Ecklon*, 929 ! without precise locality, *Harvey*, 295 !

This species appears to be very rare ; it is represented in most herbaria only by duplicates of the type gathering (*Ecklon*, 929). The type specimen of *Avena quinqueseta* Steudel is deposited in the *Fielding Herbarium, Oxford*.

2. *H. longum* (Stapf) Schweickerdt comb. nov.

Syn.: *Trisetum antarcticum* Nees, Fl. Afr. Austr. 346 (1841) pro parte, exclud. syn. pro parte; in *Linnaea*, XX, 254 (1847), not in *Linnaea*, VII, 307 (1832).
Trisetum longifolium Nees, Fl. Afr. Austr., 347 (1841), pro parte.
Avena longa Stapf, in *Kew Bull.*, 1897, 292.
Avenastrum longum Stapf, in *Dyer, Fl. Cap.* VII, 473 (1899).
Avenastrum longum Stapf, var. *grande* Stapf, l.c.

Culms 60–110 cm. high, glabrous, about 3-noded, sheathed almost up to base of inflorescence. *Leaves* 3–6 from near the base, and usually 3 higher up along the culm; sheaths rather loose; the lower persistent, usually glabrous, strongly striate; the upper glabrous or more or less densely pubescent with reflexed short hairs; ligules conspicuous, 3–5 mm. long, truncate, usually somewhat torn; blades linear to linear-lanceolate, tapering to a fine point, 15–30 cm. long, very variable in width, 2.5–10 mm. wide, flat or involute, flaccid, glabrous, smooth or rough above, markedly striate. *Panicle* contracted or somewhat interrupted, linear, linear-oblong or oblong, 20–30 cm. long, nodding and flexuous, or fairly straight and robust; branches fascicled, very unequal; the longest up to over 5 cm. long, branched from near the base or simple, filiform, flexuous, scaberulous. *Spikelets* up to 30 mm. long (including the bristles of the lemmas), usually about 20 mm. long, 4–5 flowered. *Glumes* lanceolate, acuminate; the lower 6.5–9 mm. long, 1-sub-3-nerved; the upper 9–12 mm. long, 3-nerved. *Rhachilla-internodes* 2.5–3 mm. long, bearded throughout with hairs up to 3 mm. long. *Lemmas* rather firm, pallid, sometimes purplish, up to 18 mm. long (including the bristles but excluding the awn), not conspicuously nerved, minutely granular on the back below the insertion of the awn, sometimes scabrid along the margins; lobes beyond the insertion of the awn about 10 mm. long, scabrid. *Callus* 1.25–2 mm. long, long-bearded. *Awn* inserted about 8 mm. distant from the base of the lemma; column 6–9 mm. long; bristle 15 mm. or somewhat longer. *Palea* about 7 mm. long, inconspicuously ciliolate. *Anthers* 2.5–3 mm. long. *Ovary* puberulous in upper half.

The type specimen (*Zeyher*, 1807) is deposited in the *Kew Herbarium*.

CAPE PENINSULA.—Cap. b. Spei, *Bergius*, 228! In humidis planib. Capens. atque dunarum, Oct., *Zeyher*, 1807, 1807b! In arenosis ad litus maris pone van Kampsbay, Oct., *Zeyher* (38?) in *Herb. Bolus*, 21723 et in *Herb. Mus. Austro-Afr.*, 19430. Kenilworth Race Course, *L. Bolus*, 15054! University grounds, Rondebosch, Nov., *Levyne*,[†] 3674. Ottery Rd., sandy flats, *Adamson*, s.n! Klein Slangkop, about 500 ft., *Wolley-Dod*, 3004. Camp Ground, *Wolley-Dod*, 3473. Slopes beyond Miller's Point, Sept., *Wolley-Dod*, 3003! Table Mountain, *Rogers*, 30434! Upper northern slopes of Lion's Head, *Wolley-Dod*, 3571! Orange Kloof below farm, *Wolley-Dod*, 3128! In grassy rocky places above Camps Bay, *McOwan*, 1793! Stellenbosch Div., near Firgrove, Oct. *C. Sandwith*, 147!

Among the South African representatives, this species appears to be the most robust with regard to inflorescence; in width of leaf and indumentum of the vegetative parts it appears to be somewhat variable and for this reason Stapf's var. *grande* is considered merely an extreme form which does not deserve varietal rank.

3. *H. namaquense* Schweickerdt nom. nov.

Syn.: *Trisetum Dregeanum* Steud., Syn. Pl. Geum., 227 (1854), nomen illegit.; Dur. and Schinz, *Consp. Fl. Afr.*, V, 838 (1894).
Trisetum barbatum Nees β minus Nees, Fl. Afr. Austr., 345 (1841).
Avenastrum dregeanum (Steud.) Stapf, in *Dyer, Fl. Cap.*, VII, 473 (1899).

A densely caespitose perennial. *Culms* about 30 cm. long, slightly bulbous at the very base, glabrous, striate, slender, 1-noded; node much below the middle; sterile leafy shoots many at the base of the culms. *Leaves* about 4 from near the base of the culm, one

or two sheathing it for the greater part of its length; sheaths fairly tight, glabrous; the lower persistent and sub-membranous; the upper striate, somewhat contorted; ligule truncate, 1-1½ mm. long; blades linear with callous tips; the lower up to 10 cm. long, usually shorter and 2 mm. or less wide, flat or convolute, rigid, subglaucous, striate, hairy above, scaberulous beneath. *Panicle* suberect or nodding, 6-10 cm. long, very loose, secund; branches paired, 1-3-spiculate, very unequal, somewhat spreading, filiform, scabrid; the lowest up to 2½ cm. long. *Spikelets* 10-15 mm. long, very loosely 3-4-flowered. *Glumes* unequal, submembranous, lanceolate, acuminate; the lower 8-9 mm. long and 2 mm. broad, 1-nerved; the upper 12 mm. long, 3-3½ mm. wide, 3-4-nerved, scabrid on the main nerve. *Rhachilla-internodes* 2½-3 mm. long, bearded in the upper two thirds with hairs 4-5 mm. long. *Lemmas* long-exserted, oblong-lanceolate; the lowest ± 14 mm. long (including the setaceous lobes but excluding the awn), glabrous, pallid, firmly coriaceous, coarsely granular-scabrid on the back just below the insertion of the awn, smooth and glabrous towards the base; lobes strongly nerved, submembranous, ending in scaberulous bristles. *Callus* 1¼ mm. long, curved, bearded with hairs 2.5 mm. long. *Awn* inserted ± 5½ mm. from the base of the valve; column ± 8 mm. long; bristle ± 12 mm. long. *Palea* about 8 mm. long, linear-lanceolate, conspicuously ciliate. *Anthems* up to 3½ mm. long. *Ovary* hairy above the middle.

CAPE PROVINCE: Namaqualand, Kamiesbergen, steinige Berggegend bei Ezelsfontein, 3-4,000 ft., Nov., Drège, 2526!

The type specimen is deposited in the *Berlin Herbarium*.

Apparently a very rare species since only this gathering is known from the European herbaria. It has apparently not been gathered again either on the Kamiesbergen or in any other locality since Drège's time.

Stapf [in Fl. Cap. VII, 474 (1899)], under *Avenastrum dregeanum* cites Drège 2625. This number is probably an error for 2526 which is the number of the type specimen of *Trisetum barbatum* Nees var. *β minus* in Herb. Nees.

Stuedel [Syn. Pl. Glum. 227 (1854)] created the name *Trisetum Dregeanum*, with the intention that it should replace the name *Trisetum barbatum* Nees [Fl. Afr. Austr. 345 (1841)] which he considered to be a later homonym of *T. barbatum* Steud. [Nom. ed. II. ii. 713 (1841)]. The latter, however, is a *nomen tantum* whereas Nees' species bearing the same name was validly published. Consequently *T. barbatum* Nees may stand whereas *Trisetum Dregeanum* Steud. is a superfluous name and as such must be rejected.

In Stuedel's description of *T. Dregeanum* the culms are described as being "pedali" i.e. about 30 cm. high. This obviously does not apply to *T. barbatum* Nees var. *α*, which is a much taller plant and of which I have seen the type in Herb. Nees. It applies moreover to *T. barbatum* Nees var. *β minus* Nees as I have seen both the type of the latter and the specimen of *T. Dregeanum* from the *Stuedel Herbarium* (Paris) and have found them to agree in every respect, in fact they are part of the same gathering by Drège. It should be pointed out, however, that both these sheets represent a species distinct from *T. barbatum* Nees var. *α*.

As a result of misidentification Stuedel thus inadvertently applied a new name to the wrong plant. Later authors, e.g. Dur. and Schinz, and Stapf in following Stuedel have consequently also misapplied the epithet "dregeanum." It thus cannot be accepted to designate Nees' *T. barbatum* var. *β minus*. As this variety should be given specific rank, I have named it *H. namaquense*.

4. *H. barbatum* (Nees) Schweickerdt comb. nov.

Syn.: *Trisetum barbatum* Nees, var. — Nees, Fl. Afr. Austr., 345 (1841), non Stuedel.

Densely caespitose. *Culms* up to 75 cm. high, with numerous sterile leafy shoots from the base, glabrous or very minutely scaberulous, slender, striate, about 2-noded; nodes

somewhat exerted. *Leaves* few from near the base of the stem, two to three upwards along the culm; lowermost sheaths submembranous, pale, striate, persistent, glabrous, finally splitting into fine fibres; upper sheaths somewhat striate, glabrous or scaberulous towards the ligule, fairly lax and somewhat contorted; ligule about 3 mm. long, irregularly fimbriate; blades narrowly linear, up to 17 cm. long, usually much shorter, $1\frac{1}{2}$ –3 mm. wide, striate, scaberulous. *Panicle* very lax, few-flowered, about 8–10 cm. long, somewhat branched; branches filiform, unequal; the lowest up to $2\frac{1}{2}$ cm. long, scaberulous, each bearing 1–2 spikelets. *Spikelets* very laxly 3–4-flowered, 14–17 mm. long. *Glumes* lanceolate; lower 8–9 mm. long, submembranous, glabrous but scaberulous along the nerves, acute; upper 14 mm. long, 3-nerved, submembranous, acute, glabrous, somewhat scaberulous along the nerves. *Rhachilla-internodes* 3–3.5 mm. long, bearded in the upper two thirds with white hairs 5–6 mm. long. *Lemmas* 16 mm. long (including the bristly lobes, but excluding the awn), smooth on the back below the point of insertion of the awn, minutely but distinctly scaberulous along the nerves especially in region of the hyaline lobes beyond the insertion of the awn; lobes about 10 mm. long, each ending in a fine bristle. *Callus* about 1 mm. long, bearded with white hairs about 2 mm. long. *Awn* inserted about 6–7 mm. from base of valve; column of awn \pm 10 mm. long; bristles 15–17 mm. long. *Palea* 8 mm. long, not very conspicuously ciliolate. *Anthers* linear, 2– $2\frac{1}{2}$ mm. long. *Ovary* pubescent in upper half.

CAPE PROVINCE.—Namaqualand, on the Kamiesbergen, Nov., Drège, 2572b! in *Herb. Nees*. et in *Herb. Mus. Austr.-Afric.*

The type specimen is deposited in the *Berlin Herbarium*.

Nees [Fl. Afr. Austr. 345 (1841)] cites as the type of *Trisetum barbatum* var. a gathering by *Ecklon*. This is probably an error as the type in *Herb. Nees*, viz. the specimen cited is a gathering by *Drège*.

Trisetum barbatum Steud. [Nom. ed. II. ii. 713 (1841)] is a *nomen tantum* and therefore *Trisetum barbatum* *Nees*, which was validly published, can stand and takes precedence over the former.

Steudel [*Syn. Pl. Glum.* 227 (1854)] renamed the above plant *Trisetum Dregeanum*, but in reality his description applies to *Trisetum barbatum* *Nees* var. β minus *Nees* which is a species distinct from *T. barbatum* *Nees* var. *a*. *T. Dregeanum* *Steud.* therefore must be sunk in synonymy under the above species. For further information the reader is referred to the remarks in this paper under *H. namaquense*.

H. barbatum (*Nees*) *Schweickerdt* is apparently a rare species, since in herbaria it is only represented by *Drège's* gathering. No other collector seems to have found this species since *Drège's* time.

5. *H. leoninum* (*Steudel*) *Schweickerdt* comb. nov.

Syn.: *Avena leonina* *Steud.*, in *Flora*, 1829, 484; *Kunth*, *Rév. Gram.* ii, 521, t. 175 (1831); *Kunth*, *Enum.*, i, 303 (1833); *Trin.*, in *Mem. Acad. Petersb.*, Ser. VI, *Sc. Nat.*, IV, ii, 29 (1836).

Danthonia leonina *Steud.* ex *Kunth*, *Enum.*, i, 303 (1833), in syn.

Trisetum antarcticum *Nees*, in *Linnæa*, VII, 307 (1832), pro parte, non *Trin.*

Avenastrum antarcticum *Stapf*, in *Dyer*, *Fl. Cap.*, VII, 476 (1899), pro parte.

Densely caespitose with numerous barren shoots. *Culms* up to 50 cm. high, usually somewhat shorter, glabrous, 2–3-noded, internodes included or exerted. *Leaves* mainly from near the base; sheaths terete, fairly tight, glabrous or with spreading fine hairs, strongly striate; lowermost persistent and eventually splitting into fibres; upper somewhat compressed, not slipping off the culms; ligule about $1\frac{1}{2}$ to 2 mm. long, irregularly dentate; blades linear, flat, tapering to a callous point, up to 10 cm. long, but usually much shorter, up to 3 mm. wide, glabrous or scantily pubescent, markedly nerved. *Panicle*

contracted, linear, erect, stiff or somewhat flexuous, up to 10 cm. long, often much shorter; lower branches in pairs, unequal in length; the longer up to 4 cm. long and 2-3-spiculate, scaberulous. *Spikelets* 3-5-flowered, 12-14 mm. long, greenish. *Glumes* lanceolate, acuminate, unequal, glabrous; margins and apex scariosus; the lower $5\frac{1}{2}$ -7 mm. long, narrow; the upper $7\frac{1}{2}$ -9 mm. long. *Rhachilla-internodes* $1\frac{1}{2}$ -2 mm. long, gradually tapering to an acute point, never widened at the apex, usually glabrous but very rarely with a few scattered hairs near the apex. *Lemmas* 12-14 mm. long (including callus and lobes, but excluding the awn), coriaceous, dorsally scaberulous, decreasing in scabrosity towards the lobes above the insertion of the awn; lobes 9-10 mm. long, with scariosus margins. *Awn* inserted about $5\frac{1}{2}$ mm. from the base of lemma; column 7-9 mm. long; bristle \pm 13 mm. long. *Callus* 1 mm. long, clothed with short hairs. *Palea* conspicuously ciliolate. *Anthers* 2 mm. long. *Ovary* pubescent in the upper half.

CAPE PROVINCE.—Cape Peninsula: Table Mountain, *Pappe*, pro parte! Lion's Head Mountain, *Ecklon*, 928! and *Zeyher*, 101! Signal Hill, nr. Lion Battery, *Wolley-Dod*, 2747! Field below Prince of Wales Blockhouse, *Wolley-Dod*, 1474! 1477! Orange Kloof, below Constantia Nek, Oct., *Bolus*, 14667! Near Maitland Stn., Oct., *Wolley-Dod*, 3167! Alongside Pipe Track, Orange Kloof, Oct., *F. Bolus*, s.n.! Under Pine Trees, Signal Hill, Aug., *Levyms*, s.n.!

On account of the glabrous acute rhachilla-internodes this well-defined species taxonomically occupies a singular position among the South African representatives of the genus.

6. *H. Galpinii* Schweickerdt. spec. nov.; affine *H. turgidulo* (Stapf) Schweickerdt, sed lemmatibus omnino scaberulis distinguitur.

Syn.: Phillips, in Ann. A. Afr. Mus., XVI, i, 343 (1917), sub. *Avenastrum turgidulum* Stapf.

Gramen perenne, dense caespitosum. *Culmi* erecti, usque ad 60 cm. alti, graciles; 2-3-nodes, paniculis et nodis superioribus exsertis, glabri laevesque, striati, ad basin ramis foliatis. *Vaginae* pubescentes, infimae striatae, demum in fibras fissae, superiores striatae, vix glabrae. *Ligula* fere 1.5 mm. longa. *Laminae* erectae, fere rigidae, lineares, 12-16 mm. longae, nonnunquam breviores, in acumen callosum productae, planae vel leviter involutae, 2.5-3 mm. latae, subtus pilis fere dense munitae, supra sparse pubescentes et valde striatae. *Panicula* leviter contracta, 10-16 cm. longa, angusta; rhachis glabra laevisque, apicem versus nonnunquam scaberula; rami fasciculati, inaequales, usque ad 3.5 cm. longi, erecti, scaberuli, 2-4-spiculati. *Spiculae* 3-4-florae, floribus vix exsertis, 8-10 mm. longae, erectae. *Glumae* subaequales, tota facie scaberulae (vel minute pubescentes), valde striatae, subhylinae, purpureo-pictae; inferior 9 mm. longa et 2 mm. lata, 3-nervis, late lanceolata; superior 10.5 mm. longa et 3 mm. lata, 3-nervis, late lanceolata. *Internodia* rhachillae fere 1.25 mm. longa, apicem versus pilis 3 mm. longis valde barbata. *Lemmata* usque ad 8.5 mm. longa, 5-nervia; arista 4 mm. basin lemmatis inserta, tota facie minute scaberula; lobi 4-4.5 mm. longi, scabri, in setas scabras producti. *Callus* pilis 2 mm. longis barbatus. *Aristae* columna 5 mm. longa. *Paleae* dorso tertiis partibus superioribus scaberulae, carinis ciliolatis. *Antherae* 2 mm. longae. *Ovarium* 1.25 mm. longum, apicem versus dense villosum.

CAPE PROVINCE.—Barkly East distr., at an altitude of 9,700 feet (2,900 metres) on Ben McDhui (Wittebergen), March, *Galpin*, 6902, pro parte (type deposited in *Nat. Herb. Pretoria* and in the *Kew Herbarium*).

A species which appears to be well-defined by the subincluded florets, the lemmas of which are minutely scaberulous on the outer surface.

Galpin's gathering 6902 is a mixture of the above species and typical *H. turgidulum* (Stapf) Schweickerdt; the latter may, however, be readily distinguished by the glabrous lemmas.

7. *H. capense* Schweickerdt spec. nov.

Syn.: *Avenastrum antarcticum* Stapf, in Dyer, Fl. Cap., VII, 476 (1899), pro parte, affine *H. hirtulo* (Steud.) Schweickerdt, sed paniculis laxioribus, spiculis majoribus, lemmate minus scabrido, rachillae internodio longe brabato differt.

Gramen perenne, dense caespitosum. *Culmi* erecti, usque ad 100 cm. alti, glabri, circiter 3-nodes, nodis exsertis et basin versus ramis foliatis. *Vaginae* striatae, glabrae vel minute puberulae, inferiores demum in fibras fissae, superiores fere laxae. *Ligula* circiter 0.75 mm. longa. *Laminae* filiformis vel anguste lineares, nonnunquam involutae, usque ad 25 cm. longae, subtus glabrae vel minute scaberulae, supra pilis sparse praeditae. *Panicula* erecta vel leviter flexuosa, usque ad 20 cm. longa; rhachis glabra; rami inaequales, fasciculati, filiformis, leviter flexuosi, usque ad 4 cm. longi. *Spiculae* circiter 15 mm. longae, 4-5-florae. *Glumae* inaequales, lanceolatae, acuminatae, subhyalinae, valde nervatae; inferior fere 5.5 mm. longa; superior fere 7-9 mm. longa, dorso apicem versus minute scaberula. *Lemmata* usque ad 12 mm. longa, lineari-lanceolata, pallida, firma, dorso valde vel leviter scabra; lobi fere 6 mm. longi, minute scaberuli, in setis scabris producti. *Arista* fere 5 mm. basin lemmatis inserta; columna 4-5 mm. longa. *Internodia* rhachillae 2 mm. longa, apicem versus dilatata, pilis 3 mm. longis dense barbata. *Paleae* 5.5 mm. longae, carinis ciliolatis. *Antherae* 2 mm. longae. *Ovarium* apicem versus villosum.

The type specimens are deposited in the *Kew Herbarium* and in *Nat. Herb. Pretoria*.

CAPE PROVINCE.—Cape Peninsula: Table Mountain, *Pappe*, pro parte!. Kalk Bay Mountain, *Bolus*, 14652!. Riversdale distr.: Zoetmelksrivier, *Burchell*, 6694!. East London distr.: East London, May, *Rattray*, 720!. Gonubie, Sept., *Dyer*, 2053!. Komgha distr.: near Komgha, *Flanagan*, 935 (type)!. Kentani distr.: Among tall valley grasses, *Pegler*, 2057!. King Williamstown distr.: Nahoon River, near Kei Road Station, Nov., *Galpin*, 8244!. Near Cemetery, Nov., *Sim*, 2803!.

NATAL PROVINCE.—Durban: Clairmont, *Schlechter*, 3089!.

The plants placed under this species bear a close resemblance to *H. hirtulum* (Steud.) Schweickerdt and are often confused with that species. *H. capense* has, however, larger spikelets and the panicle tends to be somewhat more open than that of the allied species.

8. *H. hirtulum* (Steud.) Schweickerdt comb. nov.

Syn.: ?*Avena hirta* Schrad., in Goett. Gel. Anz., iii, 2075 (1821); Schult. Mant, pt. ii, 374 (1824).

Avena symphicarpa Trin. ex Steud., Nomencl., ed. ii, i, 173 (1840), nomen tantum.

Avenastrum antarcticum Stapf, in Dyer, Fl. Cap., VII, 476 (1899), pro parte *Trisetum hirtum* Nees, Fl. Afr. Austr., 350 (1841), non Trin.; Linnaea, XX, 254 (1847).

Trisetum hirtulum Steud., Syn. Pl. Glum, i, 228 (1854); Dur. and Schinz, Consp. Fl. Afr., V, 838 (1894).

A weak perennial with several barren shoots between the culms. *Culms* up to 100 cm. long but usually very much shorter, terete, glabrous, 2-3-noded; upper internodes exserted. *Leaves* few near the base, soon dying off, higher up somewhat distant; sheaths persistent; the lower soon breaking up into fibres, glabrous; the upper pubescent with reflexed hairs or glabrous, fairly light, terete; ligule about 1 mm. long, irregularly dentate; blades narrowly linear, tapering to an acute point, often involute, up to 25 cm. long, subrigid or flaccid, glabrous or hairy, finely nerved, smooth or scaberulous. *Panicle* contracted, linear, erect

or somewhat flexuous, 10–20 cm. long, branched; lower branches usually in pairs, of unequal length; the longer up to 5 or 6 cm. long. *Spikelets* up to 10 cm. long, 3–5-flowered. *Glumes* unequal, acute; the lower narrowly lanceolate, glabrous, almost hyaline, 1-nerved, $3\frac{1}{2}$ –6 mm. long; the upper broadly lanceolate, narrowed at the base, glabrous, hyaline towards the margins and apex, 3-nerved, up to 7 mm. long. *Rhachilla-internodes* $1\frac{1}{2}$ –2 mm. long, widened and flattened towards the apex, acute, clothed in the upper part with hairs 1·5–2 mm. long, glabrous in the lower part. *Lemmas* exerted beyond the glumes, lanceolate, acuminate, dorsally scabrous especially below the point of insertion of the awn; the lower 7–8½ mm. long; the upper somewhat shorter; lobes hyaline, setaceous, glabrous. *Awn* inserted $3\frac{1}{2}$ –4½ mm. from the base of the valve; column 5–7 mm. long. *Callus* of lemma very short, inconspicuous, bearded with hairs about 0·5 mm. long. *Paleae* hyaline, conspicuously and markedly ciliolate along the keels, about 6–6½ mm. long. *Anthers* $1\frac{1}{2}$ –2 mm. long. *Ovary* pubescent in upper half.

The type specimen indicated below is deposited in the *Berlin Herbarium*.

CAPE PROVINCE.—Cape Peninsula: Rondebosch, University Grounds, *Levyms*, 3560!, 3669!. Caledon distr.: Zwartberg, near the Hot Springs, 1,000–2,000 ft., *Ecklon* and *Zeyher*, 4553!. Albany distr.: Near Grahamstown, *McOwan*, 1302!. Kalksteinrücken auf der Höhe des linken Buschmann-flusses Ufer, *Zeyher*, 143!. Grahamstown, Apr., *Daly*, 150, 152.! Botha's Hill, *Dyer*, 1480!. Bathurst distr.: Trappes Valley, Dec., *Daly*, 678.! Alexandria distr.: Urwälder bei Olifantshoek am Bosjesman-rivier, *Ecklon*, s.n. (type)! Queenstown distr.: Fincham's Nek, 4,000 ft., *Galpin*, 3281!.

This species is allied to *H. capense*, but may be distinguished from the latter in being a weaker plant with smaller spikelets and having an inflorescence which usually is more contracted and spike-like than that of the allied species.

[Whether *Avena hirta* Schrad. l.c. is conspecific must remain an open question until the type specimen has been located. It is believed to be at Leningrad but so far has not been traced there.]

9. *H. natalense* Schweickerdt stat. nov.; affine *H. longifolio* (Nees) Schweickerdt, sed foliis latioribus, spiculis glumis lemmatibusque minoribus differt; affine *H. hirtulo* (Steud.) Schweickerdt, sed panicula laxiora, lemmatibus glabris distinguitur.

Syn.: *Avenastrum caffrum* Stapf, var. ? *natalensis* Stapf, in *Dyer*, Fl. Cap., VII, 477 (1899); *Medley Wood*, Natal Plants, II, tab. 191 (1904).

Gramen perenne. *Culmi* erecti, usque ad 1 m. alti, 4-nodes, infra nodes minute puberuli, graciles, nodis et paniculis exsertis. *Foliorum* vaginae striatae, minute scaberulae, pilis sparsis munitae. *Ligulae* breves, circiter 0·5 mm. longae. *Laminae* planae, vix subflaccidae, usque ad 25 cm. longae et 4 mm. latae, perraro involutae, valde striatae, subtus scaberulae supra scaberulae et pilis sparsis munitae. *Panicula* 25 cm. longa, diffusa, laxa, rhachis scaberula, filiformis; rami fasciculati, valde inaequales, usque ad 3·5 cm. longi, simplices vel parce ramosi, filiformes, flexuosi, scaberuli vel hispiduli. *Spiculae* 7–8 mm. longae, laxae 3-sub-4-florae, floribus exsertis. *Glumae* acuminatae, valde inaequales; inferior 3 mm. longa, anguste lineari-lanceolata, 1-nervis, glabra, secus carinam scaberula; superior 6 mm. longa, lanceolata, valde 3-nervis, glabra, secus carinam scaberula. *Lemmata* exserta, usque ad 8 mm. longa, lineari-lanceolata, pallida, rigida, valde nervata, dorso infra aristas minute granulata; lobi 3 mm. longi vel breviores, in setas producti, secus nervos minute scaberuli. *Arista* 4·5 mm. basin lemmatis inserta, columna breve fere 3 mm. longa. *Callus* brevissimus, breviter barbatus. *Internodia* rhachillae fere 1·5 mm. longa, apicem versus pilis 3 mm. longis barbata. *Paleae* fere 4 mm. longae, carinis conspicue ciliolatis. *Antherae* 1·5–2 mm. longae. *Ovarium* apicem versus hirsutum.

The type specimens are deposited in the *Kew Herbarium* and in the *Natal Herbarium*, Durban.

NATAL PROVINCE.—Umvoti distr. : Rietvlei, 4,000–5,000 ft., *Buchanan*, 238 (type)!. Zululand : Melmoth, Imfulazane, 4,500 ft., *Mogg*, 6089!.

TRANSVAAL PROVINCE.—Belfast Distr. : Dullstroom, 6,500 ft., *Galpin*, 13008!.

Although the lemmas in *Galpin* 13008 are on the whole more markedly nerved and slightly less conspicuously granulate than *Buchanan* 238, I have no hesitation in referring this sheet to *H. natalense* Schweickerdt.

Whereas all the other South African species have markedly twisted columns to the awn, this is not the case in the species in question, a character met with in the allied *Avenastrum lachmanthum* Pilger.

10. *H. longifolium* (Nees) Schweickerdt comb. nov.

Syn. : *Avena caffra* Stapf, in Kew Bull., 1897, 293.

Trisetum longifolium Nees, Fl. Afr. Austr., 348 (1841), pro parte ; Steud., Syn. Pl. Glum., 228 (1854) ; Dur. and Schinz, Consp. Fl. Afr., V, 839 (1894).

Avenastrum caffrum Stapf, in Dyer, Fl. Cap., VII, 477 (1899) ; Phillips, in Ann. S. Afr. Mus., XVI, i, 343 (1917).

Densely caespitose with several sterile leafy shoots. Culms up to 90 cm. long, glabrous, 3–4-noded, sheathed to the base of the panicle. Leaves several from the base, 2–3-higher up along the culm ; lower sheaths persistent, glabrous, markedly striate, breaking up into somewhat coarse fibres ; upper not very tight, slightly contorted, glabrous, not markedly striate or only so towards the ligule ; ligule oblong, up to 1½ mm. long ; blades usually very narrow, subsetaceous, convolute ; the lower up to 35 cm. long ; the upper usually shorter, glabrous, strongly and closely few-nerved, with distinctly rough margins. Panicle usually lax and open, up to 20 cm. long ; flexuous or slightly nodding and subflaccid ; rhachis filiform, striate ; branches fascicled, very unequal ; the longest up to 5 cm. long, branched or simple, finely filiform, flexuous, scaberulous to finely hispidulous. Spikelets loosely 3–4-flowered, 8–10 mm. long. Glumes very thin, almost hyaline, strongly nerved ; lower 5–6½ mm. long, very narrowly lanceolate, glabrous, acute, 1-nerved, scaberulous along the nerve ; upper 8–9 mm. long, lanceolate, acuminate, 3-nerved, scaberulous along the main nerve and margins. Rhachilla-internodes usually prominently exposed, about 2 mm. long, bearded with hairs 3–4 mm. long. Lemmas exserted, linear-lanceolate ; the lowest about 10 mm. long (including the lobes, but excluding the awn), glabrous, firm coriaceous, very minutely and evenly granular on the back below the insertion of the awn ; lobes ± 5 mm. long, scarious, produced into short fine bristles. Callus ¾ mm. long, bearded with hairs 1½–2 mm. long. Awn inserted 5–5½ mm. from base of the lemma ; column 5–8 mm. long ; bristle ± 10 mm. long. Palae about 6 mm. long ; keels ciliolate. Anthers 2–3 mm. long. Ovary pubescent in upper half.

CAPE PROVINCE.—Aliwal North distr. : Witte Bergen, on rocks, 7,500 ft., *Drège*, 8134! (Herb. Nees, lectotype!). Murraysburg distr. : At Snyder's Kraal, *Tyson*, 278!

ORANGE FREE STATE.—Senekal distr. : Wonderkop, frequent in moist places on upper and middle slopes of mountain, *Goossens*, 845! Doornkop, frequent on slopes of mountain, *Goossens*, 701!

BASUTOLAND.—Mafeteng distr. : Station Likhoele, *Dieterlen*, 400a! Leribe Plateau, *Dieterlen*, 967!

This species is liable to infection by a smut.

The species does not appear to occur in the south-western region of the Cape Province. *Stapf's* remark [Fl. Cap. VII, 477 (1899)] under *Avenastrum caffrum* is fully justified, as the sheets cited by *Nees* [Fl. Afr. Austr. 348 (1841)] under *Trisetum longifolium* are a mixture

of two distinct species. *Ecklon's* specimens from the dunes near Capetown belong to *Helictotrichon longum* (Stapf) Schweickerdt and in this paper are referred to that species, whereas *Drège* 8134 in Herb. Nees (Berlin) has been selected as the *lectotype* of *H. longifolium* (Nees) Schweickerdt. The specific epithet of the latter species takes precedence over that of *Avena caffra* Stapf.

11. *H. turgidulum* (Stapf) Schweickerdt comb. nov.

Syn.: *Trisetum antarcticum* Nees, Fl. Afr. Austr., 346 (1841), pro parte.

Trisetum imberbe Nees, Fl. Afr. Austr., 347 (1841); Steud., Syn. Pl. Glum., I, 228 (1854); Dur. and Schinz, Consp. Fl. Afr., V, 838 (1894).

Avena turgidula Stapf, in Kew Bull., 1897, 293.

Avenastrum turgidulum Stapf, in Dyer, Fl. Cap., VII, 474 (1899); Medley Wood, Natal Plants, II, tab. 190 (1904); Phillips, in Ann. S. Afr. Mus. XVI, i, 343 (1917).

Densely caespitose. Culms 30–100 cm. long, erect or geniculately ascending, glabrous, 2–3-noded; upper 2–3 internodes more or less exserted; uppermost often well exserted. Leaves few near the base, about 3 higher up along the culm; sheaths terete, not very tight, glabrous, puberulous or more rarely pubescent with short reflexed hairs, striate, often somewhat contorted; ligule truncate, up to 1.5 mm. long; blades linear, tapering to an acute point, up to 15 cm. long but often much shorter, up to 4 mm. broad, flat or involute, more or less rigid or subflaccid, subglauous, glabrous, more rarely scantily hairy, scaberulous above. Panicle contracted, sometimes interrupted, erect or slightly nodding, up to 30 cm. long; branches fascicled; the longer up to 5 cm. long, branched or simple, with spikelets sub-erect or somewhat spreading, filiform, scabrid. Spikelets 10–12 mm. long, greenish, compactly 3–5-flowered. Glumes lanceolate, acuminate; the lower 5–7 mm. long, 1-nerved; the upper 7–9 mm. long, 3-nerved. Rhachilla-internodes 2 mm. long, bearded with hairs \pm 3 mm. long. Lemmas exserted, oblong-lanceolate; the lowest 7–8 mm. long, coriaceous, glabrous and finely granular dorsally below the point of insertion of the awn; lobes scarious, 4–6 mm. long. Callus about $\frac{2}{3}$ mm. long, bearded with relatively short hairs about $1\frac{1}{2}$ mm. long. Awn inserted about 5 mm. from the base of the lemma; column 5–7 mm. long; bristle 10–12 mm. long. Palea not conspicuously ciliate, 6 mm. long. Anthers $\frac{2}{3}$ –1 mm. long, occasionally a floret with anthers up to 2 mm. long, always included and florets thus very probably cleistogamous. Ovary pubescent from the middle, hispidulous at the apex. Caryopsis $2\frac{1}{2}$ mm. long.

CAPE PROVINCE.—Uitenhage distr.: In somewhat moist places on the fields near the Zwartkops River, *Ecklon* and *Zeyher*, 463! *Zeyher*, 4551! Bathurst distr.: Trappes Valley, Dec., *Daly*, 639!. Mt. Currie distr.: Kokstad, Nov., *Goossens*, 323!, 339!, 179!. Ingeli Mountain, March, *Tyson*, 1270!. Umtata distr.: Bazeia, Nov., *Baur*, 364!. Engcobo distr.: Nqumakwe River, Jan., *Flanagan*, 2817!. Between Engcobo and Nqumakwe River, Jan., *Bolus*, 10363!. Queenstown distr.: Katberg, Effingham, Dec., *Galpin*, 8398!. Queenstown, *Everett*, 38!, 4!. Shiloh, Febr., *Baur*, 779!. Reservoir east of Queenstown, Jan., *Hilner*, 311!. Rocky banks of the Klipplaat River, 3,500 ft., *Drège*!. Molteno distr.: Broughton, Dec., *Flanagan*, 1673!. Molteno, June, *Mogg*, 2766!. Wittebergen, on Ben McDhui, March, *Galpin*, 6902 partim!. Aliwal North distr.: In a depression at Leeuwenspruit, between Kraai River and the Wittebergen, *Drège*, 3918!. Without precise locality, *Drège*, 4250 (*Herb. Nees*)!.

BASUTOLAND.—Leribe, 5,000–6,000 ft., *Dieterlen*, 400!, 753!. Febr., *Phillips*, 6317!. Mafeteng, Thaba Chicha Mountain, March, *Dieterlen*, 1275!.

NATAL PROVINCE.—Pietermaritzburg distr.: Near Maritzburg, Dec., *Medley-Wood* 7228!. Klip River distr.: Umsinga, base of Biggar's Berg, *Buchanan*, 100!. Umvoti distr.: Greytown, *Buchanan*, 172!. Rietvlei, *Buchanan*, 156!. Weenen distr.: Culvers,

Dec., *Rogers*, 28309!. Estcourt distr.: Oct., *Mogg*, 3314!. Bergville distr.: Mount aux Sources, *Bayer* and *McCleane*, 272!. Tintwa Mountain, Strydhoek, Jan., *Doidge*, in *Nat. Herb.*, *Pretoria*, 20565!. Lions River distr.: Nottingham Road, Oct., *Galpin*, 10251!.

ORANGE FREE STATE PROVINCE.—Ladybrand distr.: Pinekloof, *Goossens*, 1044! Ficksburg distr.: Riverhill Farm, Jan., *Potts*, in *Grey Un. Coll. Herb.*, 3689!, 3690!. Senekal distr.: Senekal, Dec., *Goossens*, 815!, 821!, 949!. Bethlehem distr.: Stony veld near Bethlehem, Oct., *Richardson*, s.n!. Kroonstad distr.: Experimental Farm, Febr., *Pont*, 36!. Fauresmith distr.: Fauresmith, *Henrici*, 2310!.

TRANSVAAL PROVINCE.—Potchefstroom distr.: Potchefstroom, Oct., *Burt Davy*, 5591!. *Theron*, 6!. Wakkerstroom distr.: Vlakfontein, *Burt Davy*, 4154!. Ermelo distr.: Nooitgedacht, Dec., *Henrici*, 1364!; *Burt Davy*, 9064!. Bethal distr.: Leslie, *Bell* in *Nat. Herb. Pretoria*, 20550!. Belfast distr.: Dullstroom, banks of Crocodile River, Dec., *Galpin*, 13009!. Pretoria distr.: Wonderboompoort, *Rehmann*, 4493!. Division of Plant Industry Grounds, Oct., *Stent* in *Nat. Herb.*, *Pretoria*, 20525!. Benoni distr.: Benoni, plentiful near water, *Bradfield*, T. 258!. Johannesburg distr.: Wattles, near a marsh, Oct., *Moss*, 13586!. Johannesburg, Oct., *Rand*, 920!.

The type specimen, *Zeyher* 463, is deposited in the *Kew Herbarium*.

In this species the ovaries are often infected by a species of *Tilletia* which may so alter the character of the inflorescence, that specimens so affected appear at first sight to belong to a different species. Among modern gatherings, *Dieterlen* 753 l.c. represents such an infected and malformed plant.

Trisetum imberbe cornutum Nees l.c. is furthermore such an infected plant, and since the name of this "species" was based on a monstrosity, it is a "*nomen illegitimum*" and for that reason must be rejected. It is pointed out elsewhere in this paper that *Avena antarctica* Thunb. is a *nomen dubium* and for that reason is rejected. The only remaining specific epithet available to designate this species is therefore that of "*turgidula*" derived from *Avena turgidula* Stapf l.c. and the type of this species is naturally also Stapf's plant, viz. *Zeyher* 463!.

12. *H. Dodii* (Stapf) Schweickerdt comb. nov.

Syn.: *Avenastrum Dodii* Stapf, in *Dyer*, Fl. Cap. VII, 475 (1899).

Perennial. Culms erect, slender, about 100 cm. high, glabrous, smooth, 3-4-noded, sheathed all along or nearly so, with 1-2 erect intravaginal branches from the lowest nodes. Leaves 3 or fewer from near the base, and 3-4 higher up, distant; sheaths not very tight; the upper rather loose, markedly striate, glabrous and smooth; ligule oblong, up to 4 mm. long; blades linear; the lower tapering from a long attenuate base to a fine point, 30-50 cm. long and 3-5 mm. wide, flat or with involute margins, fairly rigid, more or less glaucous, glabrous, smooth below, strongly striate and scabrid on the upper surface. Panicle contracted, 20-30 cm. long, narrow, dense or somewhat interrupted, slightly nodding; rachis smooth; branches fascicled, unequal, divided from the base or nearly so; longest up to 5 cm., erect, scaberulous or smooth below. Spikelets about 12 mm. long, narrow, erect, 4-5-flowered. Glumes subequal, lanceolate, shortly aristulate, subhyaline; the lower 6-7 mm. long and 1-nerved; the upper 7-9 mm. long and 3-nerved. Rhachilla-internodes 2 mm. long, bearded upwards with hairs about 3-3½ mm. long. Lemmas distinctly exserted, lanceolate, 13-14 mm. long (including the lobes but excluding the awn), glabrous, light green, rather firm, finely granular on the back; lobes scarious, 7 mm. long, produced into fine long bristles. Callus about ⅔ mm. long, short, bearded with hairs about 1.25 mm. long. Awn inserted 5-6 mm. from the base of the lemma; column 5-7 mm. long; bristle 12-15 mm. long. Palea 5 mm. long, densely but not conspicuously ciliolate along the keels. Anthers 2 mm. long. Ovary pubescent in upper half.

The type specimen *Wolley-Dod* 2775 is deposited in the Kew Herbarium.

CAPE PROVINCE.—Without precise locality, *Lehmann* (in Herb. Kunth)!. Cape distr.: Wet slopes near Oatlands Point, *Wolley-Dod*, 2775!. By wet rocks, Hout Bay Fisheries. *Wolley-Dod*, 3170!. Platklip, near Capetown, along contour path, Nov., *Andreae*, 83,! Rondebosch, University grounds, Nov., *Levyns*, 3672, 3565!.

VI.—*AIRA ANTARCTICA* FORST. AND *AVENA ANTARCTICA* THUNB.

During the investigation regarding the identity of *Avena antarctica* Thunb. it became evident that a specimen of this species first described in Thunb. Prodr. Pl. Cap. 22 (1794) is no longer deposited in Thunberg's Herbarium, i.e. at the present time the type specimen cannot be traced at Uppsala. All other efforts to trace the existence of a Thunberg specimen bearing that name in the Montin Herbarium, Bergius Herbarium (both at Stockholm), the Fielding Herbarium at Oxford and the Banksian Herbarium in the Brit. Museum all of which are known to contain a number of Thunberg plants, proved unsuccessful.

As a result of a request made to the authorities at Uppsala for the loan of the type of *Avena antarctica* Thunb., the following sheets were received at Kew:—

- (1) A sheet consisting of three culms and inflorescences of *Bromus bifidus* Thunb. collected in Japan. This sheet bore the name *Bromus bifidus* in the lower right hand corner and superimposed on this the name *Avena antarctica*. The specimen to which these last two names referred has at some time or other been removed from the sheet (traces of gum? can still be seen on the sheet). This may have been Thunberg's plant from the Cape which now cannot be traced. Apparently *Thunberg* thus at some time or other tried to identify his Cape plant with the Japanese *Bromus bifidus*, but later superimposed the name *Avena antarctica* to replace the misidentification. This sheet furthermore bears the name *Bromus bifidus* on the lower left hand corner and next to it the name *Aira antarctica* Forst.
- (2) A sheet consisting of an inflorescence of *Aira antarctica* Forst. This specimen agrees in every detail with *Forster's* co-type preserved in the Kew Herbarium and which is a plant very different from any present day known species of *Helictotrichon* from South Africa.

As a point of interest it should be mentioned that *Thunberg* visited England during December, 1778–January, 1779. He met *Forster* who showed him the plants he collected during Cook's voyage round the world. *Forster* even gave *Thunberg* a fairly large number of duplicates from his collection. These are now preserved in Thunberg's Herbarium. Thus sheet (2) mentioned above is probably an isotype of *Aira antarctica* Forst.

It may be assumed that *Thunberg* at some time removed the right hand specimen from sheet (1) and remounted it on sheet (2). This would mean that the name *Avena antarctica* Thunb. was based on a fragment of the isotype of *Aira antarctica* Forst., which is a New Zealand plant. Accordingly this name is not applicable to a South African species. It was cited in Thunb. Prodr. and Fl. Cap. merely as a result of an error. Since *Thunberg* was acquainted with *Forster*, *Forster's* Prodr. and plants, it is highly improbable that he would have applied the epithet "*antarctica*" to a species from the Cape. [Although the epithet was used by *Linn. fil.* to designate a Cape species, viz. *Scirpus antarcticus*, also mentioned by Thunb. Prodr. Pl. Cap. (1794)]. It is thus possible that the name *Avena antarctica* Thunb. found its way into South African literature by mistake and does not

refer to any species from the Cape but to *Forster's* New Zealand *Aira antarctica*. On the other hand it is quite possible that Thunberg's *Avena antarctica* was definitely a species from the Cape and that both specimen and name had nothing to do with Forster's *Aira antarctica*. If this is assumed, the type of *Avena antarctica* Thunb. has probably been lost since all attempts to trace its existence have failed. The absence of a type specimen is in itself not a very serious matter if the descriptions given by *Thunberg* [Prodr. Pl. Cap. l.c. or Fl. Cap. 436 (1818)] were adequate to identify a South African species by means of them. But several Cape species of *Helictotrichon* are so closely allied that it is impossible to say with certainty which of these *Thunberg* may have had before him at the time and to which particular species the name could at the present time be applied.

A study of the literature regarding *Aira antarctica* Forst. and *Avena antarctica* Thunb. has shown that these names have been the cause of some confusion.

For example *Sprengel* [Syst. Veg. 331 (1825)] under *Danthonia antarctica* cites among others as synonyms "*Aira antarctica* Forst. and *Avena* Thunb." Furthermore, *Hooker* [Fl. New Zeal. 335 (1864)] quotes *Danthonia antarctica* Spreng. under *Trisetum antarcticum* (Forst.) Trin. and consequently this name also includes the Cape species. *Juel* [Pl. Thunb. 89 (1918)] cites "*Avena antarctica* (Forst.) Thunb. Prodr. 1794, 22; Fl. Cap. 1818, 436. Siehe unter *Bromus bifidus*" for the Cape species and thus assumes that *Thunberg* based *Avena antarctica* on Forster's New Zealand species. Although this assumption may be correct, stress must be laid on the fact that *Thunberg* nowhere indicated that his *Avena antarctica* was actually based on Forster's plant. The combination *Avena antarctica* (Forst.) Thunb. is thus not justified.

Desvoux [in G. Jay, Fl. Chilen. VI. 350 (1853)] suggests that the epithet "*antarcticum*" should be retained for the New Zealand *Trisetum antarcticum* (Forst.) Trin. He creates the name *Trisetum Thunbergii* for the species from the Cape to which *Nees* applied the name *Trisetum antarcticum* based on *Avena antarctica* Thunb. *Desvoux* evidently realised that the New Zealand plant had been confused with the species from South Africa. His epithet "*Thunbergii*," however, is superfluous, as older specific epithets are available for the complex of species which *Nees* had placed under *Trisetum antarcticum* (Thunb.) *Nees*. Further information is to be found in studying the synonymy of the species enumerated in this paper.

Since two names which probably refer to related but distinct plants bearing the same specific epithet have been confused in the literature cited above and since in the absence of the type specimen the identity of the Cape plant cannot be made out with certainty, it is suggested that the name *Avena antarctica* Thunb. be regarded both as a "*nomen ambiguum*" and a "*nomen dubium*" and consequently should be rejected. The name *Aira antarctica* Forst., however, should be retained for the New Zealand species of which the type and isotype specimens are extant!

VII.—ACKNOWLEDGEMENTS.

For the kind loan of material I beg to tender my thanks to the Directors or Curators of all the South African Herbaria and the following European Herbaria: Kew, British Museum, Berlin-Dahlem, Oxford, Paris, Stockholm and Uppsala. My special thanks are due to Sir Arthur Hill, Director of the Royal Botanic Gardens, Kew, for the facilities offered during the preparation of this paper. To Mr. C. E. Hubbard, F.L.S., I am very much indebted for many kind suggestions and helpful advice.

VIII.—EXPLANATION OF FIGURES.

- I. *H. quinquasetum* (Steud.) Schweickerdt
- II. *H. longum* (Stapf) Schweickerdt
- III. *H. namaquense* Schweickerdt
- IV. *H. barbatum* (Nees) Schweickerdt
- V. *H. leoninum* (Steud.) Schweickerdt
- VI. *H. Galpinii* Schweickerdt
- VII. *H. capense* Schweickerdt
- VIII. *H. hirtulum* (Steud.) Schweickerdt
- IX. *H. natalense* Schweickerdt
- X. *H. longifolium* (Nees) Schweickerdt
- XI. *H. turgidulum* (Stapf) Schweickerdt
- XII. *H. Dodii* (Stapf) Schweickerdt

The above figures show :—

1. Lower Glume.
2. Upper Glume.
3. Lemma.
4. Rhachilla-internode, anterior view (and lateral view).



Fig. I.



Fig. II.



Fig. III.

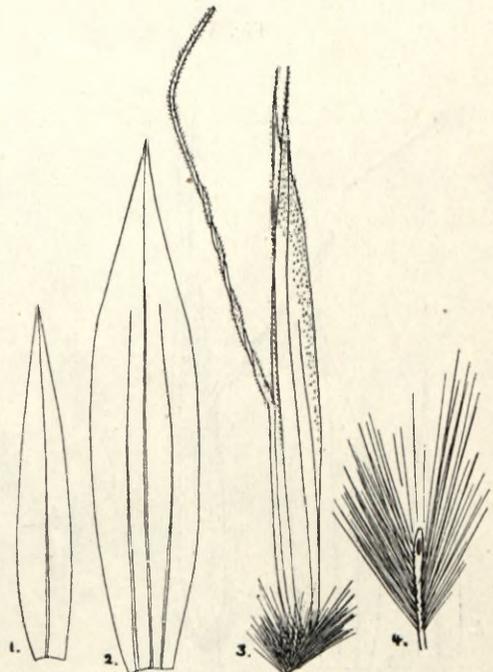


Fig. IV.

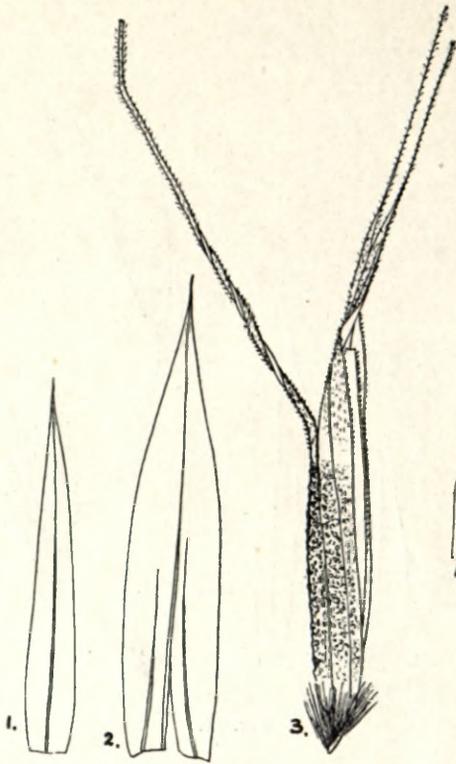


Fig. V.

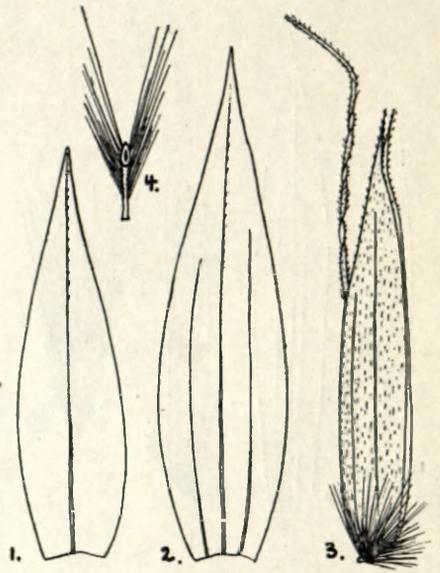


Fig. VI.



Fig. VII.



Fig. VIII.

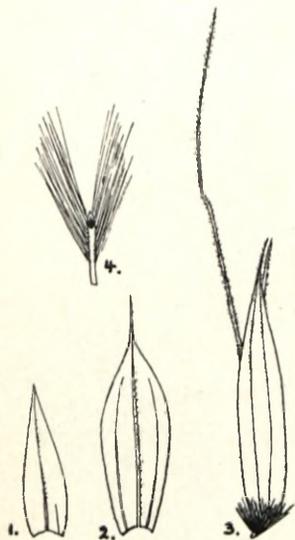


Fig. IX.



Fig. X.

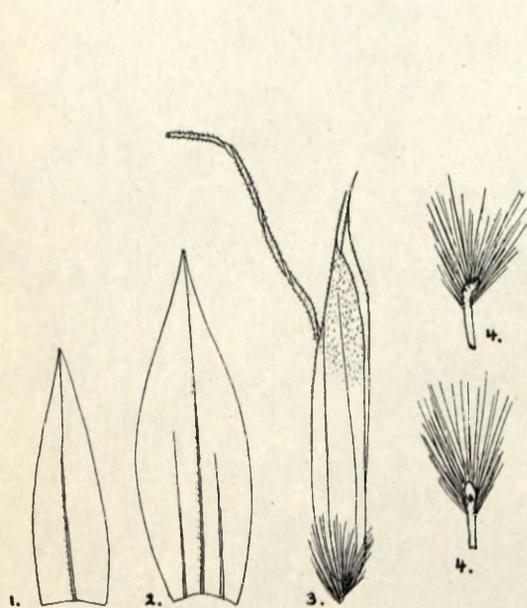


Fig. XI.



Fig. XII.

