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

By H. G. Schweickerdt, B.Sc., Ph.D., F.L.S.

(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 Steudel 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 Andrz. [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 Bentham 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 *Staff* [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 *Helicotrichum* 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.


*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. *Cespitose* 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 1–1.5 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 1–2 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.—Rhachilla-internodes 1.5–2.5 mm. long:

E.—Rhachilla-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 exserted beyond the glumes; glumes broadly lanceolate; outer surface of lemmas minutely scaberulous all over...................... 6. *Galpinii*.

GG.—Florets exserted 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; rhachilla-internodes long-hairy and usually evident............................................................ 10. longifolium.

KK.—Leaves not setaceous, often convolute. Rhachilla-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. quinquesetum (Steudel) Schweickerdt, comb. nov.


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 nervèd, the upper more terete and glabrous; ligule truncate, irregularly laciniate, 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 nervèd, 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, adpressed to the rhachis; the longest up to 5 cm. long. Spikelets 12-18 mm. long, very loosely 2-sub-3-flowered. Glumes narrow-lanceolate, acuminate, prominently nervèd, 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. Rhachilla-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 exserted, 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 1½ 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.


*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. *Pulea* 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.


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.


A densely caespitose perennial. *Culms* about 30 cm. long, slightly bulbous at the very base, glabrous, striate, slender, I-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, subglaucescent, 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. Rhachillo-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-scarbid 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 1½ mm. long, curved, bearded with hairs 2½–5 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 ciliolate. Anthers 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.

Steudel [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 Steudel'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. a, 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 Steudel 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. a.

As a result of misidentification Steudel thus inadvertently applied a new name to the wrong plant. Later authors, e.g. Dur. and Schinz, and Stapf in following Steudel 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.


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 exserted. 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, 1½–3 mm. wide, striate, scaberulous. Panicle very lax, few-flowered, about 8–10 cm. long, somewhat branched; branches filiform, unequal; the lowest up to 2½ 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 among the nerves, acute; upper 14 mm. long, 3-nerved, submembranous, acute, glabrous, somewhat scaberulous along the nerves. Rhachilla-internodes 3–3½ 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 ± 10 mm. long; bristles 15–17 mm. long. Palea 8 mm. long, not very conspicuously ciliolate. Anthers linear, 2–2½ mm. long. Ovary pubescent in upper half.


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.


Densely caespitose with numerous barren shoots. Culms up to 50 cm. high, usually somewhat shorter, glabrous, 2–3-noded, internodes included or exserted. 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 1½ 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 nerves. 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-spicate, scaberulous. Spikelets 3-5-flowered, 12-14 mm. long, greenish. Glumes lanceolate, acuminate, unequal, glabrous; margins and apex scarious; the lower 5½-7 mm. long, narrow; the upper 7½-9 mm. long. Rachilla-internodes 1½-2 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 scabrousness towards the lobes above the insertion of the awn; lobes 9-10 mm. long, with scarious margins. Aven inserted about 5½ mm. from the base of lemma; column 7-9 mm. long; bristle ± 13 mm. long. Callus 1 mm. long, clothed with short hairs. Palea conspicuously ciliolate. Anthers 2 mm. long. Ovary pubescent in the upper half.


On account of the glabrous acute rachilla-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 lem-matibus omnino scaberulis distinguitur.


Gramen perenne, dense caespitosum. Culmi erecti, usque ad 60 cm. alti, graciles; 2-3-nodes, paniculis et nodis superioribus exertis, glabri laevesque, striati, ad basin ramis foliatis. Vaginae pubescentes, infimae striatae, demum in fibras fissae, superiores striatae, vix glabrae. Ligula fere 1½ 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, sublatus 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 mm. longi, erecti, scaberuli, 2-4-spicatei. Spiculae 3-4-florae, floribus vix exertis, 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 lancelata; superior 10-5 mm. longa et 3 mm. lata, 3-nervis, late lancelata. Internodia rhachillae fere 1-25 mm. longa, apicem versus pilis 3 mm. longis valde barbata. Lemmata usque ad 8-5 mm. longa, 5-nervia; aristula 4 mm. basis lemmatis inserta, tota facie minute scaberula; lobi 4-4-5 mm. longi, scabri, in setas scabras producti. Callus pilis 2 mm. longis barbatis. 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. turgidulo (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. hirtula* (Steud.) Schweickerdt, sed paniculis laxioribus, spiculis majoribus, lemmate minus scabrido, rhachillae 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, 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 scaberula. *Lemmata* usque ad 12 mm. longa, lineari-lanceolata, pallida, firma, dorso valde leviter scabra; lobi fere 6 mm. longi, minute scaberuli, in setis scabris producti. *Arista* fere 5 mm. longa, lemnatis inserta; columna 4-5 mm. longa. *Internodia* rhachillae 2 mm. longa, apice 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.: Zoetmelkarvier, 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. hirtula* (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.


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 nervled, smooth or scaberulous. *Paniele* 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, 3½–6 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** 1½–2 mm. long, widened and flattened towards the apex, acute, clothed in the upper part with hairs 1½–2 mm. long, glabrous in the lower part. **Lemmas** exserted 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 3½–4½ 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** 1½–2 mm. long. **Ovary** pubescent in upper half.

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


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.


**Gramen** perenne. **Culmi** erecti, usque ad 1 m. alti, 4-nodes, infra nodes minute pube-ruli, graciles, nodis et paniculis exsertis. **Foliorum** vaginas striatae, minute scaberulae, pilis sparsis munitae. **Ligulae** breves, circiter 0·5 mm. longae. **Lamineae planae**, vix subflaccidae, usque ad 25 cm. longae et 4 mm. latae, perraro involutae, valde striatae, subitus scaberulae supra scaberulae et pilis sparsis munitae. **Panicula** 25 cm. longa, diffusa, laxa, rhachis scaberula, filiformis; rami fasciculati, valde inaequales, usque ad 3·5 mm. longi, simplices vel parce ramosi, filiformis, flexuosi, scaberuli vel hispiduli. **Spiculae** 7–8 mm. longae, laxe 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, linea-lanceolata, pallida, rigida, valde nervata, dorso infra aristam minute granulata; lobi 3 mm. longi vel breviore, 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 Dist.: 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 lachnanthum Pilger.

10. H. longifolium (Nees) Schweickerdt comb. nov.
Syn.: Avena caffra Stapf, in Kew Bull., 1897, 293.

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, subaeaceous, 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 sub-flaccid; rachis 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 5-5½ mm. long, scariosus, produced into short fine bristles. Callus 5-5½ 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.


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, subglaucescent, glabrous, more rarely scantly hairy, scabrous 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. **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 ½ mm. long, bearded with relatively short hairs about 1½ 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 ciliolate, 6 mm. long. **Anthers** ½–1 mm. long, occasionally a floret with anthers up to 2 mm. long, always included and florets thus very probably cleistogamous. **Caryopsis** 2½ mm. long.


**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,


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 i.e. represents such an infected and malformed plant.

Triewum imberbe cornutum Nees i.e. 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 i.e. and the type of this species is naturally also Stapf's plant, viz. Zeyher 463!.

12. H. Doidii (Stapf) Schweickerdt comb. nov.


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. Rachilla-internodes 2 mm. long, bearded upwards with hairs about 3-3½ mm. long. Lemmas distinctly exerted, 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 ½ 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.


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.

Desvaux [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. Desvaux 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 ambigum*” 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. quinquesetum (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).