Nord. J. Bot. – Section of holarctic and general taxonomy

Revision of Taeniatherum (Poaceae)

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Three species are often accepted in *Taeniatherum* Nevski. Analysis of morphological characters show that indistinct limits occur between them. All taxa are found to be diploid (2n=14), with the same karyotype, but artificial hybridization shows genetical barrier to exist. For these reasons subspecific level is chosen for the taxa, viz. *T. caput-medusae* (L.) Nevski ssp. *caput-medusae*, *T. caput-medusae* ssp. *crinitum* (Schreb.) Melderis and *T. caput-medusae* ssp. *asperum* (Simk.) Melderis. Map showing known distribution of the subspecies is presented.

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Introduction

Taeniatherum is a small genus established by Nevski (1934), who described it as annual with dense spikes, with one terminal spikelet and otherweise with sessile spikelets in pairs.

Taeniatherum has previously been included in either *Elymus* L. (Linnaeus 1753, Schreber 1772), *Cuviera* Koeler non DC. (now *Hordelymus* (Jessen) Jessen) (Simonkai 1897) or *Hordeum* L. (Cosson & Durieu 1855, Ascherson & Graebner 1902). Although the genus shows morphological resemblances to these three genera, Nevski (1934) demonstrated essential differences. *Taeniatherum* differs from *Elymus* by the one-flowered spikelets with connate, subulate glumes, and in being annual. It differs from *Hordelymus* by the sessile spikelets with connate glumes, by the flattened lemma awns and in being annual. It differs from *Hordeum* by its tough rachis, rigid spike with a terminal spikelet and by the sessile spikelets in pairs.

Taeniatherum occurs in the Mediterranean area. It reaches eastwards in Asia to Kirgistan in USSR, and northwards in Europe to Budapest in Hungary. Outside this area it has been introduced as a weed in the northern and northwestern parts of Europe and in America.

Linnaeus (1753) considered the future genus *Taeniatherum* as a single species belonging to the genus *Elymus* (*E. caput-medusae* L.), but as early as 1772 Schreber described two (*E. caput-medusae* and *E. crinitus* Schreb.), and in 1827 Link accepted three species (*E. caput-medusae, E. crinitus* and *E. platatherus* Link). Nevertheless, most authors were only familiar with the taxa of Linnaeus and Schreber, and it was not before the turn of the last century that all three taxa were generally accepted.

Through the years the level of the taxa has been discussed, and a large number of combinations have been proposed. Thus the major task for this study has been to discuss the number of taxa and the taxonomic level.

The present investigation of *Taeniatherum* is a part in a joint study of the tribe *Triticeae* in progress in Copenhagen, Denmark, and Svalöv, Sweden.

Material and methods

Material from the following herbaria has been studied: BG, BP, BR, C, COI, E, FI, G, H, ISTE, JE, LE, LD, LISU, M, MA, MW, PAL, WU. A list of material studied will be sent on request.

Living material was grown in the greenhouses of the Botanical Garden, Copenhagen. As far as possible only spontaneous material of known origin was used. Voucher specimens of the cultivated material will be kept at C.

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Epidermis preparations were made according to Jørgensen (1982). SEM-studies on hair structures have been carried out on a Jeol P15. Mitotic observations were made on root-tips. The tips were pretreated in 1-bromonaphthalene for 2 h and hydrolyzed in 1 N HCl for 8 min at 60°C before stained in Feulgen and squashed (Östergren & Heneen 1962).

Morphology

Taeniatherum is most often divided into three taxa, but it is rather difficult to define the taxa morphologically. As distinguishing characters between the taxa most authors have used: glume length and spreading of glumes in seed stage, length of the body of the lemma, the scabrousity of the lemma and width of the base of lemma awn. Moreover the ratio culm length/spike length are sometimes used (Ascherson & Graebner 1902, Nevski 1934, 1936, Maire 1955, Humphries 1978).

The transition between the lemma and the lemma awn was found to be gradual, and the length of body of the lemma is therefore difficult to measure exactly. Accordingly the length of palea was chosen as a better character. The length of the palea is found to be a little longer than length of the body of the lemma. Both glumes in a spikelet have the same length, but variation in the length was found within the same spike, as is also the case with the length of the palea. To study the variation 15 collections were examined. The longest glume was found at the third node from below, the longest palea from the third to the fifth node. The measurements given here are found on vigorous spikes, thus representing the highest value in a specimen.

In seed stage the glumes are divergent from the rachis forming a more or less acute or obtuse angle. Most authors have distinguished between three groups: horizontal or even reflexed ascending glumes (angle right or obtuse), erect glumes (angle narrow) and between these extremes curved ascending glumes (Fig. 6 and Nevski 1936). It may rarely be difficult to define these positions.

Two types of elements are found on the surface of lemmas viz. conical cells and prickle hairs. As seen from Fig. 7 even on the smoothest lemma, small but rather scattered conical cells are found. Hairs are always found at least on the margins and the top of the lemma. Thus scabrousity is based on density and size of conical cells and hairs.

In *Taeniatherum* the lemma passes gradually into a long and flattened awn. The width of the base of the lemma awn is found, where the edges of the awn are parallel and just above the place, where the lemma is suddenly narrowed.

As seen, all the characters mentioned merely show differences in quantity than in quality.

A material of 100 collections representing variation in

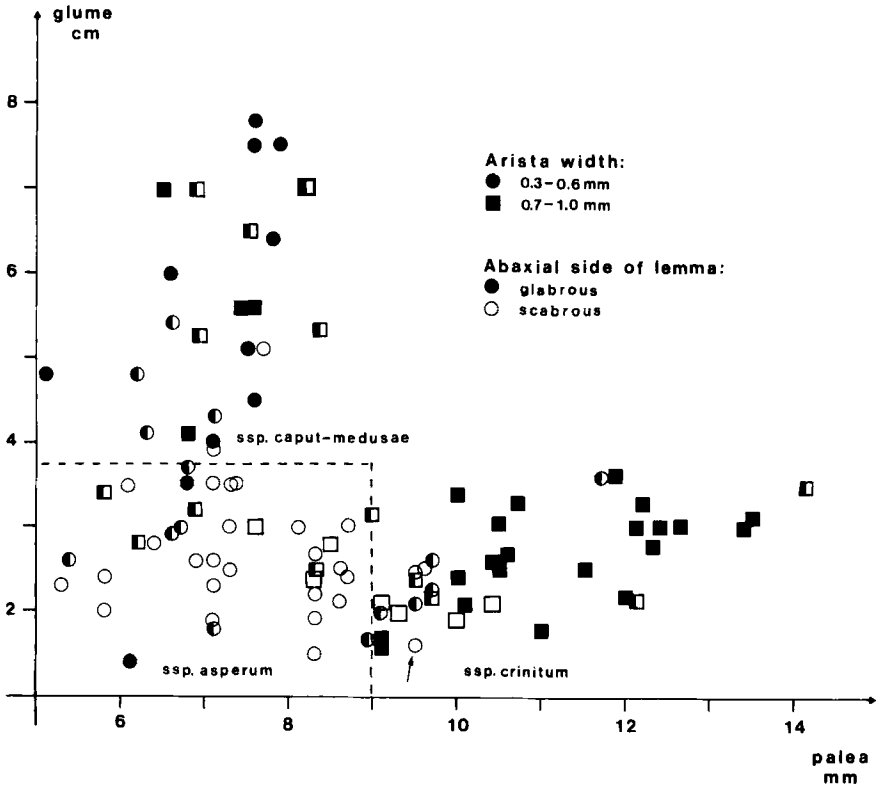


Fig. 1. *Taeniatherum caput-medusae*, variation in glume length, palea length, arista width and scabrousity of lemma based on 100 collections. Half filled symbols show sparse scabrousity. Limits between subspecies are marked. Arrow indicate lectotype of ssp. *crinitum*.

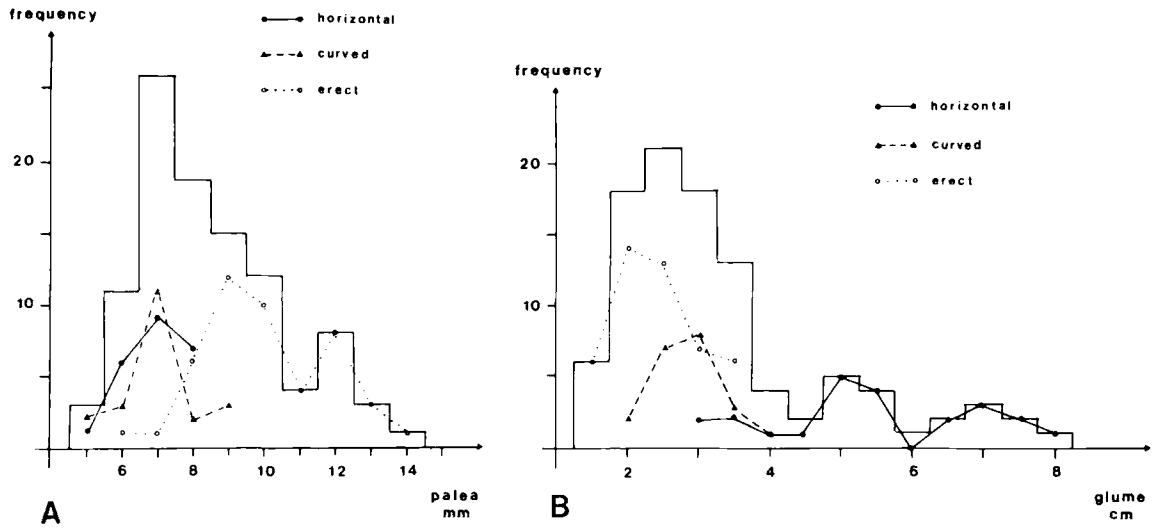


Fig. 2 *Taeniatherum caput-medusae*, correlation between spreading of glumes in seed stage and palea length (2A) and glume length (2B). The histograms show the distribution of palea and glume length respectively within 100 collections. The curves show the correlation between the different types of spreading of glumes and palea and glume length respectively. Only 90 of the collections are included here, the rest being too young.

the characters mentioned above and from different geographical localities were chosen to test the characters.

Fig. 1 shows three indistinct groups to exist based on palea length and glume length: group 1) plants with short paleas and long glumes, group 2) plants with short paleas and short glumes, and group 3) plants with long paleas and short glumes. There is a marked tendency for scabrous lemmas to occur in group 2, while a broad arista is characteristic of group 3.

Correlations between glume angle and length of paleas and glumes respectively were studied (Fig. 2). A distinct correlation was found between the length of palea and the glume angle, as curved and horizontal ascending glumes are only found in specimens with short paleas (9 mm or less), while erect glumes are found especially in specimens with long paleas (Fig. 2A). A distinct correlation was also found between length of glume and glume angle, as erect and curved ascending glumes are found only in specimens with short glumes (4 cm or less), while horizontal ascending glumes always are found in specimens with long glumes (Fig. 2B). That means: group 1 is too characterized by horizontal ascending glumes, group 2 by curved ascending glumes and group 3 by erect glumes.

The only recent examination of variation within *Taeniatherum* was made by Humphries (1978), who found a loose correlation between culm length/spike length ratio and glume angle. He only used two groups of glume angles: erect and divaricately ascending. He found plants with culm length twice the spike length or more showing tendency towards divaricately ascending glumes, while plants with culm and spike of equal length often were found to have erect glume. Based on this result he recognized two taxa on varietal level. The same analysis carried out on my material and with the above mentioned three groups of glume angles, likewise shows slight tendencies only. As seen from Fig. 3 horizontal and curved ascending glumes, corresponding to the divaricate glumes of Humphries, are mainly found in specimens with high culm length/spike length ratio, while specimens with a low culm length/spike length ratio have erect glumes. This is in accordance with the results found by Humphries (1978), but as most of the collections have a ratio between 1 and 2, this ratio seems not to be a very suitable character.

As seen from Fig. 4 variation in the above mentioned characters also show a correlation with the geographical distribution. Specimens with long, horizontal glumes, more or less glabrous lemmas and short paleas (group 1) are found in the western Mediterranean area, especially in Portugal, Spain and France. Specimens with short, erect glumes, and more or less glabrous lemmas with a broad arista base and long paleas (group 3) are found especially in Asia. Specimens with short, curved or nearly erect glumes, scabrous lemmas with narrow arista bases and short paleas (group 2) are found throughout most of the distribution area of the genus except the south-eastern parts.

Thus morphology and geography together seem to certify three taxa. The absence of discontinuities in the morphology supports a subspecific level.

Cytology and hybridization

All studied collections of *Taeniatherum* (33 coll., marked with arrow in Fig. 8) were found to be diploid (2n=14). This is earlier reported in Euro-Asiatic material from the Iberian peninsula (Fernandes & Querios

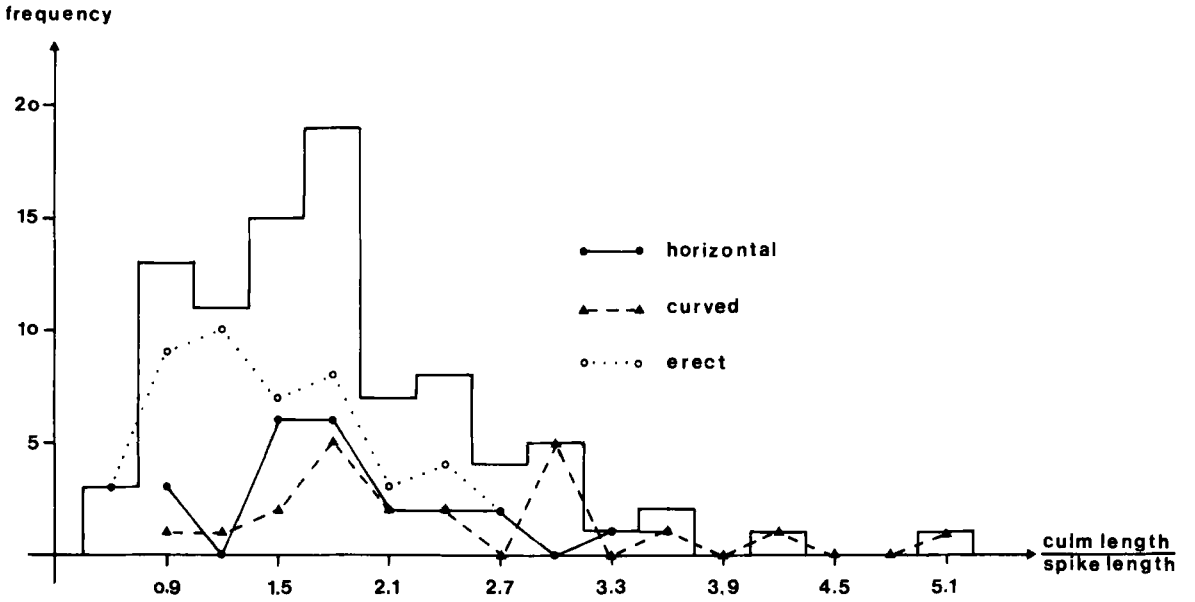


Fig. 3. *Taeniatherum caput-medusae*, correlation between spreading of glumes in seed stage and the ratio culm length/spike length. The histogram shows the distribution of the ratio within 100 collections. The curves show the correlation between the different types of spreading of glumes and the ratio. Only 90 of the collections are included here, the rest being too young.

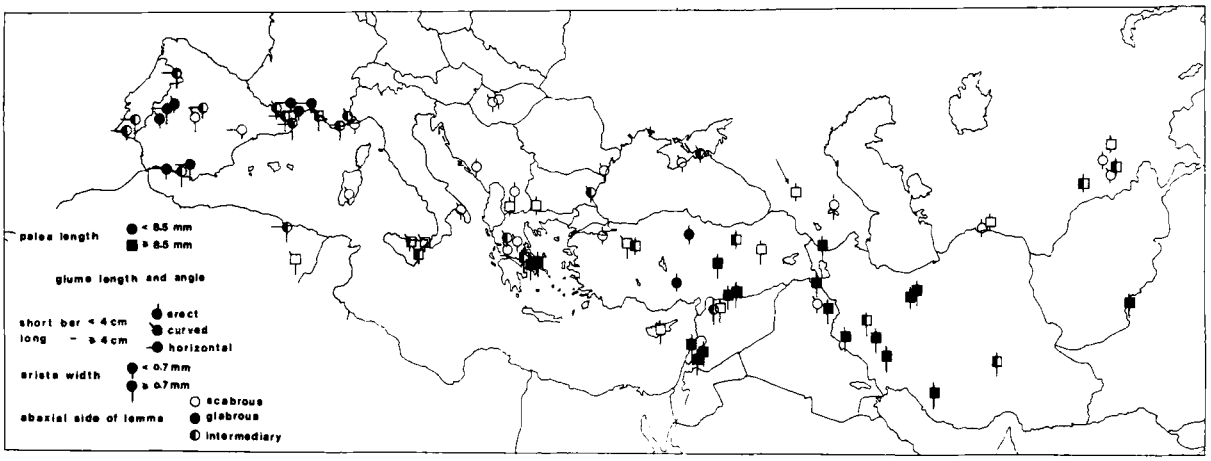


Fig. 4. *Taeniatherum caput-medusae*, variation in some morphological characters based on 100 collections. Arrow indicate lectotype of ssp. *crinitum*.

1969, Querios 1974, Talavera 1978), Greece (Coucoli & Symeonidis 1980, Strid & Franzen 1981), USSR (Chopanov & Yurtsev 1976, Sokolovskaya & Probalova 1979), Afghanistan (Podlech & Dieterle 1969) and from Africa (Humphries & al. 1978).

In order to study the karyotype some few collections of each taxon were chosen (Spain, cult. no. H 536; Turkey, cult. nos. H 5002, H 5003; Iran, cult nos. H 5017, H 5018). All 7 pairs of chomosomes were of nearly equal size. 5 of them were metacentric and impossible to identify with certainty. One pair was submetacentric, and the last, although metacentric, had a satellite of about half the length of the ajoining arm (Fig. 5). The same karyotype was found in all the selected collections, and the recognizable chomosomes could be identified in most slides from other specimens. The same karyotype was found in Greek material (Coucoli & Symeonides 1980).

It was easy to obtain artificial hybrids between the three taxa, but in the hybrid seeds the endosperm was partly degenerated, and special cultivation technique was necessary. The hybrid plants, although very vigorous, were almost completely pollen sterile, and they did not set seeds. Thus, a genetical barrier isolates the

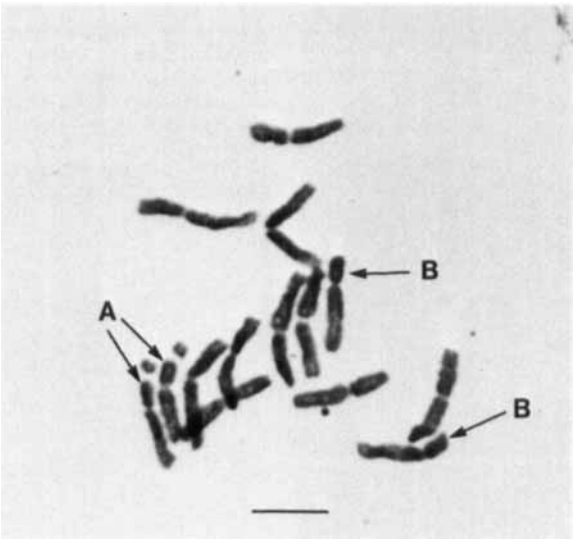


Fig. 5. Karyotype of *Taeniatherum caput-medusae* (Turkey, cult. no. H 5003). – A: satellited chromosomes. – B: chromosomes with submetacentric centromer. – Bar: 5 μm.

taxa from one another. However, the meiotic pairing shows the same basic genome to exist (Frederiksen & Bothmer, in press). Also these results indicate the taxonomic rank to be subspecific.

Taxonomy

Both morphological variation, geographical extension and the crossing experiments indicate a taxonomic differentiation to exist, most probably at subspecific level.

The morphological distinction between the subspecies is based on characters in spike and spikelets, variation in leaves and culms being of no or very little value.

Taeniatherum caput-medusae (L.) Nevski

Acta Univ. Asia Med., ser. 8b, Bot. 17: 38 (1934).

For synonymy see under *T. caput-medusae* ssp. *caput-medusae*.

T. caput-medusae consists of caespitose annuals. Culm length (5–)10–30(–55) cm. Most individuals have 2–4 leaves on the culm, and nodes are often covered by the leaf sheaths. The length of the internodes vary considerably, the length of the upper internode being 4–35 cm. The length of the sheath of the upper leaf is more constant 5–10(–13.5) cm. Ligule short, about 0.5 mm long, glabrous. Auricles small but distinct, glabrous. Leaves 1.5–5.5 mm wide, involute. The adaxial side of the lamina scabrous and often with long hairs on the ribs, the abaxial side of the lamina glabrous or pubescent, the leaf sheath looks like the abaxial side of the lamina. Spike having (4–)5–13(–20) nodes, each with 2 (rarely 3) identical spikelets, and a single spikelet at the end of the axis. The rachis is 1.0–5.5 cm long, tough. Spikelets are sessile and consist of one hermaphroditic floret and normally one strongly reduced one (rarely two reduced florets are observed). The glumes are connate at base, they are equal and awnlike, 1.5–8.0 cm long, divergent from rachis forming an acute or obtuse angle in seed stage (Fig. 6). Lemma with 5 inconspicuous nerves, lanceolate, with arista; back of lemma rounded, covered with more or less prominent conical cells, glabrous or more or less scabrous-hairy especially along the margins (Fig. 7). Arista is flattened, 0.4–1.5 mm wide at base, (3.5–)6.0–13.5 cm long (incl. lemma), with prickles and hairs along the edges, twisted when dry. Palea 5.0–14.5 mm long, a little longer than the body of the lemma. Matured caryopsis are firmly connected with lemma and palea, which are released from the glumes, that remain on the rachis. The floret contains two lodicules with one prominent lobe and sometimes with an indistinct lateral lobe, both cilicated especially at the margins. Anthers yellow, about 1 mm long.

Key to the subspecies of T. caput-medusae

1. Glumes 3.5–8.0 cm long, horizontal or reflexed. Palea 5.0–8.5 mm long. Lemma often nearly glabrous, somewhat glossy, with inconspicuous conical cells and sparse scabrous-hairy near the margins. Arista at base 0.5–0.8 mm wide ..... ssp. *caput-medusae*
1. Glumes 1.5–4.0 mm long, erect or curved. Palea 5.0–14.5 mm long. Lemma glabrous or scabrous. Arista at base 0.4–1.0 mm wide ..... 2.
2. Glumes curved. Palea 5.0–9.5 mm long. Lemma normally scabrous with many prominent conical cells and with hairs especially in the upper part. Arista at base 0.4–0.7 mm wide..... ssp. *asperum*
2. Glumes erect. Palea 8.5–14.5 mm long. Lemma often nearly glabrous, somewhat glossy, with inconspicuous conical cells, and sparse scabrous-hairy near the margins. Arista at base 0.6–1.0 mm wide . ..... ssp. *crinitum*

T. caput-medusae ssp. caput-medusae

Elymus caput-medusae L., Sp. Pl.: 84 (1753). – *Hordeum caput-medusae* (L.) Coss. & Dur., Expl. Sci. Alg. 2: 198 (1855). – *Cuviera caput-medusae* (L.) Simk., Pótfüz. Természettud. Közl. 24: 230 (1897). – *Hordeum caput-medusae* ssp. *bobartii* Asch. & Graebn., Syn. Mitteleur. Fl. 2: 743 (1902), nom. illeg. supperfl. (note: on account of an arrangement easy to misunderstand, Ascherson and Graebner (1902) are sometimes cited for other ranks than subspecies, but according to the text, this should be the correct one; the Linnaean type is by Ascherson & Graebner included in ssp. *bobartii*). – *Elymus caput-medusae* var. *typicus* Halácsy, nom. invalid., Consp. Fl. Graec. 3: 426 (1904) (note: the rank is indicated in the index). – *Elymus caput-medusae* ssp. *bobartii* (Asch. & Graebn.) Maire, Fl. Afr. Nord 3: 393 (1955). – *Hordelymus caput-medusae* (L.) Pign., Giorn. Bot. Ital. 111: 58 (1977). – *Taeniatherum caput-medusae* var. *caput-medusae* (established by Humphries, Bot. Journ.

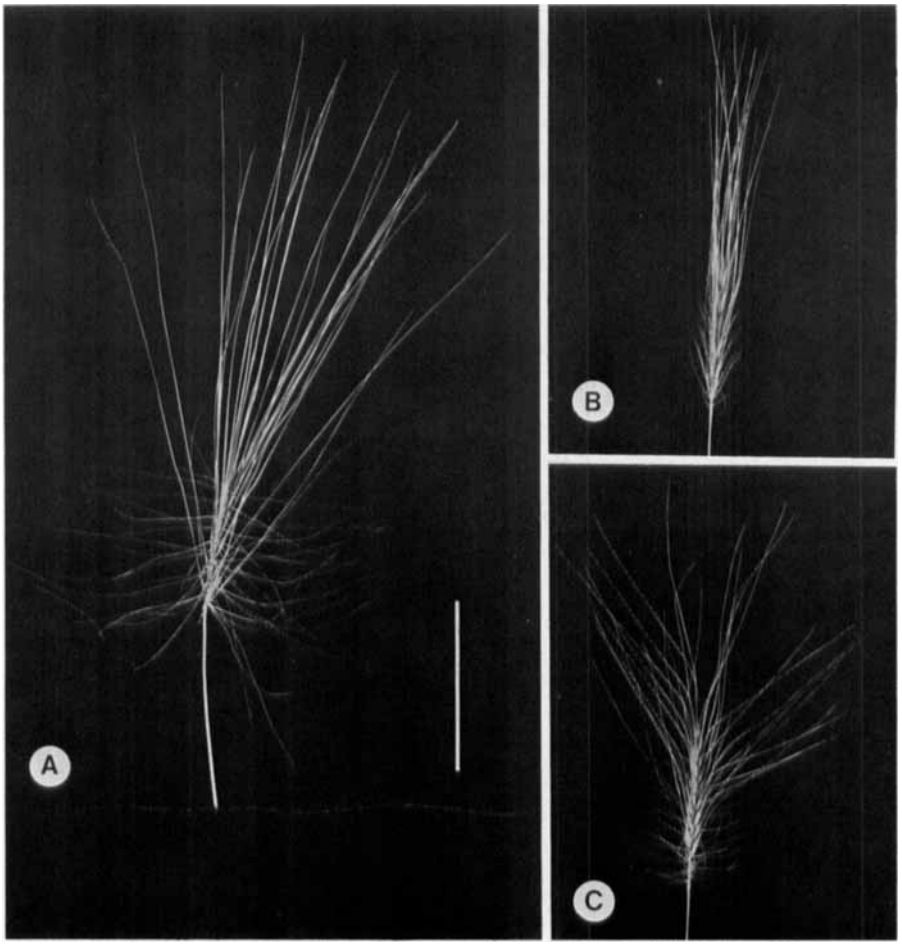


Fig. 6. Spikes in early seed stage of *Taeniatherum caput-medusae*, later the lemma awns become twisted. – A: ssp. *caput-medusae* (Spain, cult. no. H 536). – B: ssp. *crinitum* (Iran, cult. no. H 5011). – C: ssp. *asperum* (Turkey, cult. no. H 5002). – Bar: 5 cm.

Linn. Soc. 76: 342 (1978), p.p.) – Type: Sheet no. 100: 6 (LINN lectotype, selected by Humphries 1978, incorrectly cited as 106: 6); sheet no. 100: 7 (LINN paratype).

? *Elymus caput-medusae* var. *hordeaceus* Pau, Bol. Soc. Aragonesa Ci. Nat. 1: 29 (1902) not seen (note: no specimens cited by Pau. A specimen marked "Caroli Pau herbarium Hispanicum" (MA) and placed in this variety belongs to *T. caput-medusae* spp. *caput-medusae*).

Illustrations: Figs 6A, 7A, 8.

Characteristics: Glume length 3.5–8.0 cm, glumes horizontal or reflexed at base in seed stage. Abaxial side of lemma often glabrous, somewhat glossy, without prominent conical cells, sparse scabrous-hairy near the margins. Arista 6.5–11.5(–13.5) cm long (incl. lemma), at base 0.5–0.8 mm wide. Length of palea 5.0–8.5 mm.

Distribution: This subspecies is mostly restricted to Portugal, Spain and southernmost France in Europa, and Morocco and Algeria in Africa, outside this area it is probably adventitious (Fig. 8).

Variation: Within the area specimens are found, which morphologically form transitions to ssp. *asperum*.

T. caput-medusae ssp. crinitum (Schreb.) Melderis

Notes Roy. Bot. Gard. Edinburgh 42: 81 (1984).

Elymus crinitus Schreb., Beschr. Gräs. 2: 15 and t. 24,1 (1772). – *Hordeum crinitum* (Schreb.) Desf., Fl. Atlant. 1: 113 (1798) quoad nom. tant., non specim. – *Elymus caput-medusae* var. *crinitus* (Schreb.) Ball, Journ. Linn. Soc., Bot. 16: 732 (1878), p.p. – *Elymus caput-medusae* ssp. *crinitus* (Schreb.) Nyman, Consp. Fl. Eur.: 837 (1882), p.p. (quoad Greece, m. Oeta, Heldr.) (note: the rank is indirectly indicated). – *Hordeum caput-medusae* ssp. *crinitum* (Schreb.) Asch. & Graebn., Syn. Mitteleur. Fl. 2: 744 (1902). – *Taeniatherum crinitum* (Schreb.) Nevski, Acta Univ. Asia Med., ser. 8b, Bot. 17: 39 (1934). – *Hordelymus caput-medusae* ssp. *crinitus* (Schreb.) Pign., Giorn. Bot. Ital. 111: 59 (1977). – *Taeniatherum caput-medusae* var. *crinitum* (Schreb.) Humphries, Bot. Journ. Linn. Soc. 76: 343 (1978). – Type: Buxbaum in Georgia (M. lectotype, selected here); W. Scherard (Sherard) at Smyrna (paratype, not traced).

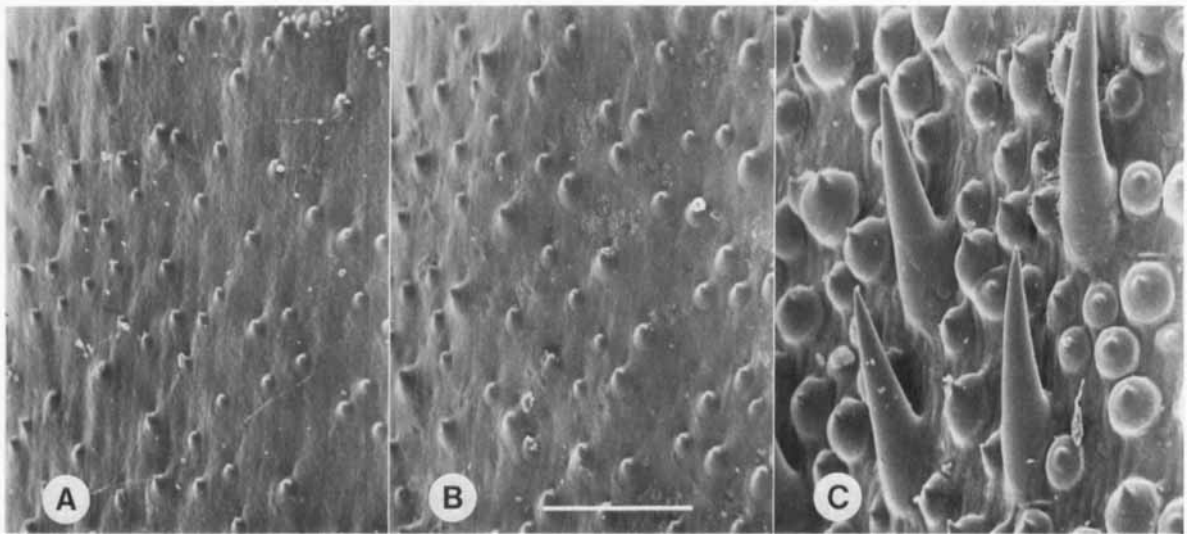


Fig. 7. SEM-photos of abaxial side of lemma of *Taeniatherum caput-medusae*. – A: ssp. *caput-medusae* (France, Rallet 6450, C). – B: ssp. *crinitum* (Iran, Køie 22. IV. 1937, C). – C: ssp. *asperum* (Hungaria, Degen 22. VI. 1913, C). – Bar: 0.1 mm.

Elymus crinitus var. *sinaicus* Fig. & de Not., Mem. Reale Accad. Sci. Torino ser. 2,12: 261 (1852). – Type: Herb. Figari, Arabia Petrea, Reg. del Sinai, april (FI holotype) (note: in the original publication no infraspecific rank is indicated, but the last epithet is in italics, rank is here attributed according to Art. 35.3).

Elymus intermedius M. Bieb. Fl. Taur.-Cauc. I: 82 (1808). – *Hordeum intermedium* (M. Bieb.) Hausskn., Mitt. Thur. Bot. Ver. 13: 60 (1899). – Type: Steven, in Iberiae (authors note: part of Gruzia SSR) deserto Karajoes (H holotype).

? *Elymus platatherus* Link, Hort. Reg. Bot. Berol. 1: 18 (1827). – Type: Ehrenberg in Egypt. Not seen. (According to Kukkonen & Viljamaa (1971) Link's herbarium has been destroyed).

Hordeum oligostachyum Flatt, Természetrajzi Füz. 18: 142 (1895). – Type: Bornmüller 476, Amasia, in collinis regionis validae, 22 May 1889 (BP lectotype, selected here; BR, G, JE, LD, M, WU isolectotypes), (note: when forming this species Flatt (1895) points out specimens collected by Bornmüller 22. April 1889 and numbered 176. The discrepancy between this quotation and the type selected above, undoubtedly is caused by the very indistinct print of the labels).

Note: When three taxa are recognized, most authors give all of them the same rank. Although Maire (1955) has three varieties, he recognizes only two subspecies, as he includes both var. *crinitus* and var. *asper* in *Elymus caput-medusae* ssp. *crinitum*.

Illustrations: Figs 6B, 7B, 8.

Characteristics: Glume length 1.5–3.5 cm, glumes erect from the base in seed stage. Abaxial side of lemma often glabrous, somewhat glossy, without prominent conical cells, sparse scabrous-hairy near the margins. Arista 7.5–11.5 cm long (incl. lemma), at base (0.5–)0.8–1.0 mm wide. Length of palea (7.0–)10.0–13.5 mm.

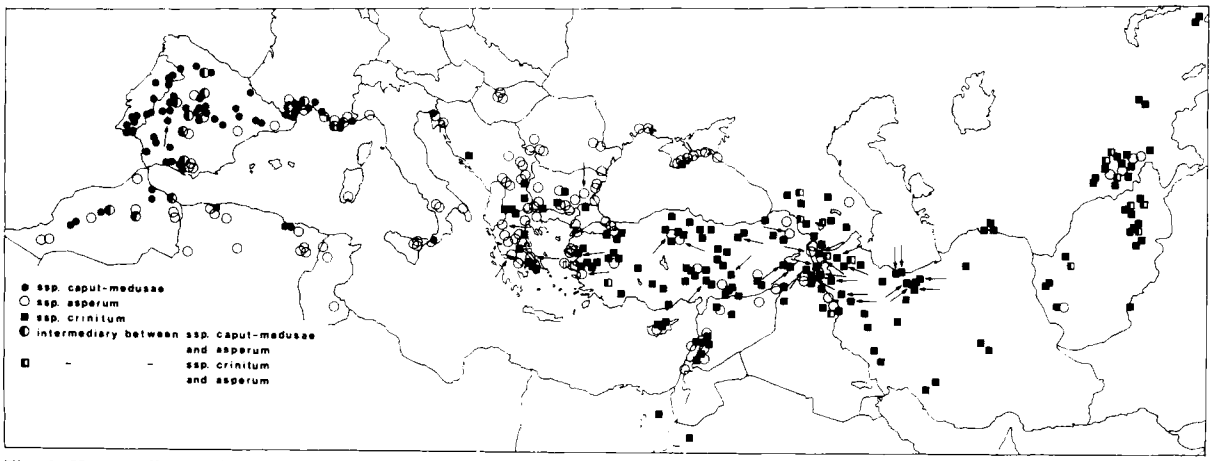


Fig. 8. Known distribution of *Taeniatherum*. Arrows indicate populations from which chromosome numbers (2n=14) have been determinated.

Distribution: This subspecies is found from Greece and Yugoslavia and eastwards into Asia, where it is the most common subspecies (Fig. 8). Recently *Taeniatherum* was reported from the Katharo plain in Crete, here identified as *T. crinitum* (Schreb.) Nevski (Greuter, Matthäs & Risse 1985).

Variation: Within a large part of the distribution area, morphological transitions between this subspecies and ssp. *asperum* are found.

T. caput-medusae ssp. asperum (Simk.) Melderis

Notes Roy. Bot. Gard. Edinburgh 42: 81 (1984) (as "*asper*").

Cuviera caput-medusae var. *aspera* Simk., Pótfüz. Természettud. Közl. 24: 232 (1897). – *Hordeum caput-medusae* ssp. *asperum* (Simk.) Degen in Asch. & Graebn., Syn. Mitteleur. Fl. 2: 744 (1902). – *Cuviera aspera* (Simk.) Simk., Magyar Bot. Lapok 3: 86 (1904). – *Elymus caput-medusae* var. *asper* (Simk.) Halácsy, Consp. Fl. Graec. 3: 426 (1904). – *Elymus asper* (Simk.) Brand in Hallier & Brand, Koch's Syn. Deutsch. Schweiz. Fl. ed. 3, vol. 3: 2800 (1907) non Nees ex Steudel (1855). – *Hordeum caput-medusae* var. *asperum* (Simk.) Fom. & Wor. ex Fedtsch., Bull. Jard. Imp. Bot. Pierre Grand, suppl. 2: 100: (1915). – *Taeniatherum asperum* (Simk.) Nevski, Acta Univ. Asia Med., ser. 8b, Bot. 17: 39 (1934). – *Elymus caput-medusae* ssp. *crinitus* var. *asper* (Simk.) Maire, Fl. Afr. Nord 3: 393 (1955). – *Hordelymus asper* (Simk.) Beldie in Savulescu, Fl. Rep. Soc. Romania XII: 583 and t. 117, 2–2a (1972). – *Hordelymus caput-medusae* ssp. *asper* (Simk.) Pign., Giorn. Bot. Ital. 111: 59 (1977). – Type: Simonkai, Hungaria, in campis aridis ad Orsova, 1. Aug. 1874 (BP lectotype, selected here), Simonkai; Hungaria, Pilis-Szt. Kerent et Csobanka, 1875 (BP 2 coll., paratypes); (note: in his paper Simonkai (1897) did not exactly point out a type, but he mentions the town Szent-Endre. In BP 3 collections exist, collected by Simonkai before the creation of the taxon, and annotated by him. All of them are from the area near Szent-Endre, but only on one of them (the one chosen as lectotype) Szent-Endre is mentioned ("Area: Szt. Endre – Izbeg –" etc.).

Elymus crinitus var. *siculus* Lojac. & Degen in Lojac., Fl. Sicul. 3: 366 (1909) – Type: Todaro Fl. Sicula exs. 732, Citarda, Bronte, May (PAL lectotype, selected here, BR, COI, JE, WU isolectotypes).

Elymus crinitus var. *major* Vel., Fl. Bulgarica, suppl. I: 301 (1898) – cited specimens not seen.

Elymus crinitus var. *minor* Vel., Fl. Bulgarica, suppl. I: 301 (1898) – cited specimens not seen.

Hordeum intermedium var. *intercedens* Hausskn., Mitt. Thur. Bot. Ver. 13: 60 (1899). – Type: Colombier, Batna in Algeria, 1894 (JE lectotype, selected here); Cosson, Port Juvenal pres Montpellier, 1857 (JE paratype).

Elymus crinitus var. *microstachys* Borbás, Balaton Flórája (1900) – not seen (note: according to Simonkai (1904) belonging to this subspecies).

Elymus caput-medusae var. *crinitus* f. *pubivaginatus* Maire, Bull. Soc. Hist. Nat. Afr. Nord 30: 370 (1939). – Type : Fauvel, Moyen Atlas vers l'Ari Hebbri – not seen (note: according to Maire (1955) belonging to this subspecies).

Note: Authors before Simonkai (1897) normally include this taxon in *T. caput-medusae* ssp. *crinitum*. Humphries (1978) in his study of *Taeniatherum* only accepts two varieties and includes this taxon in *T. caput-medusae* var. *caput-medusae*.

Illustrations: Figs 6C, 7C, 8.

Characteristics: Glume length 1.5–4.0 cm, glumes from base curved ascending or nearly erect in seed stage. Abaxial side of lemma normally scabrous with many prominent conical cells and close-set hairs. Arista (3.5–) 6.0–10.0 cm long (incl. lemma), at base 0.4–0.7 mm wide. Length of palea 5.0–9.5 mm.

Distribution: This subspecies has a very wide distribution, as it is found in most part of the distribution area of the species (Fig. 8).

Variation: Morphologically intermediary specimens between this subspecies and the others are found. Specimens coarser than the typical form are found especially in Africa and Sicily. In these areas the specimens too are less scabrous than typical or even glabrous.

Doubtful taxa

Elymus caput-medusae f. *acaulis* Sennen & Mauricio, Cat. Fl. Rif Oriental: 137 (1934) nom. nud. – collections cited not seen.

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