



## Short notes on *Phleum* sect. *Achnodon* (Gramineae)

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**Short notes on *Phleum* sect. *Achnodon* (Gramineae)****Abstract**

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Micromorphological investigation of the lemma surface revealed that the Mediterranean annual and type of *Phleum* sect. *Achnodon*, *Ph. subulatum*, exhibits a hitherto neglected, unique character combination, which provides strong evidence for an isolated position of this species within the genus. In contrast to recent redefinitions of *Ph.* sect. *Achnodon*, the original concept of a monotypic section is consequently retained.

The circumscription and subdivision of *Phleum* L. is controversial to these days. Depending on the circumscription of both the genus and its species, *Phleum* comprises 15 (Doğan 1991) to 20 annual and perennial species (Cvelev 1989).

Based on macromorphological characters, *Phleum* was subdivided by most authors (see Doğan 1988: tab. 1) in three sections, viz. *Ph.* sect. *Phleum*, sect. *Chilochloa* (P. Beauv.) Griseb. and sect. *Achnodon* Griseb., the latter, following Grisebach (1853), regarded as monotypic, only comprising the Mediterranean annual *Phleum subulatum* (Savi) Asch. & Graebn. (= *Ph. tenue* (Host) Schrad.). Cvelev (1976) did not agree with this narrow circumscription of *Ph.* sect. *Achnodon* and added the annuals formerly placed in *Ph.* sect. *Chilochloa*. Doğan (1988) made a different approach, introducing micromorphological structures of the lemma surface and lemma hair type into the taxonomy of *Phleum*. He redefined *Ph.* sect. *Achnodon* as to comprise the species with clavate lemma hairs and added *Ph. exaratum* Hochst. ex Griseb. and *Ph. boissieri* Bornm. to *Ph. subulatum*. Later, Doğan & Us (1996) proposed a new infrageneric classification of *Phleum*, based on a numerical analysis including both macro- and micromorphological characters, in which *Ph.* sect. *Achnodon* comprises all annual species except for *Ph. crypsoides* (d'Urv.) Hackel and *Ph. echinatum* Host, which are placed in sections of their own. Unfortunately, the authors did not provide a data matrix with the character states assigned to the species so that an evaluation of their analysis is difficult.

The purpose of this contribution is to point out neglected micromorphological features of the lemma surface of *Phleum subulatum*, which provide additional evidence for the isolated taxonomic position of this species and against the expansion of *Ph.* sect. *Achnodon*, which is typified by this species.

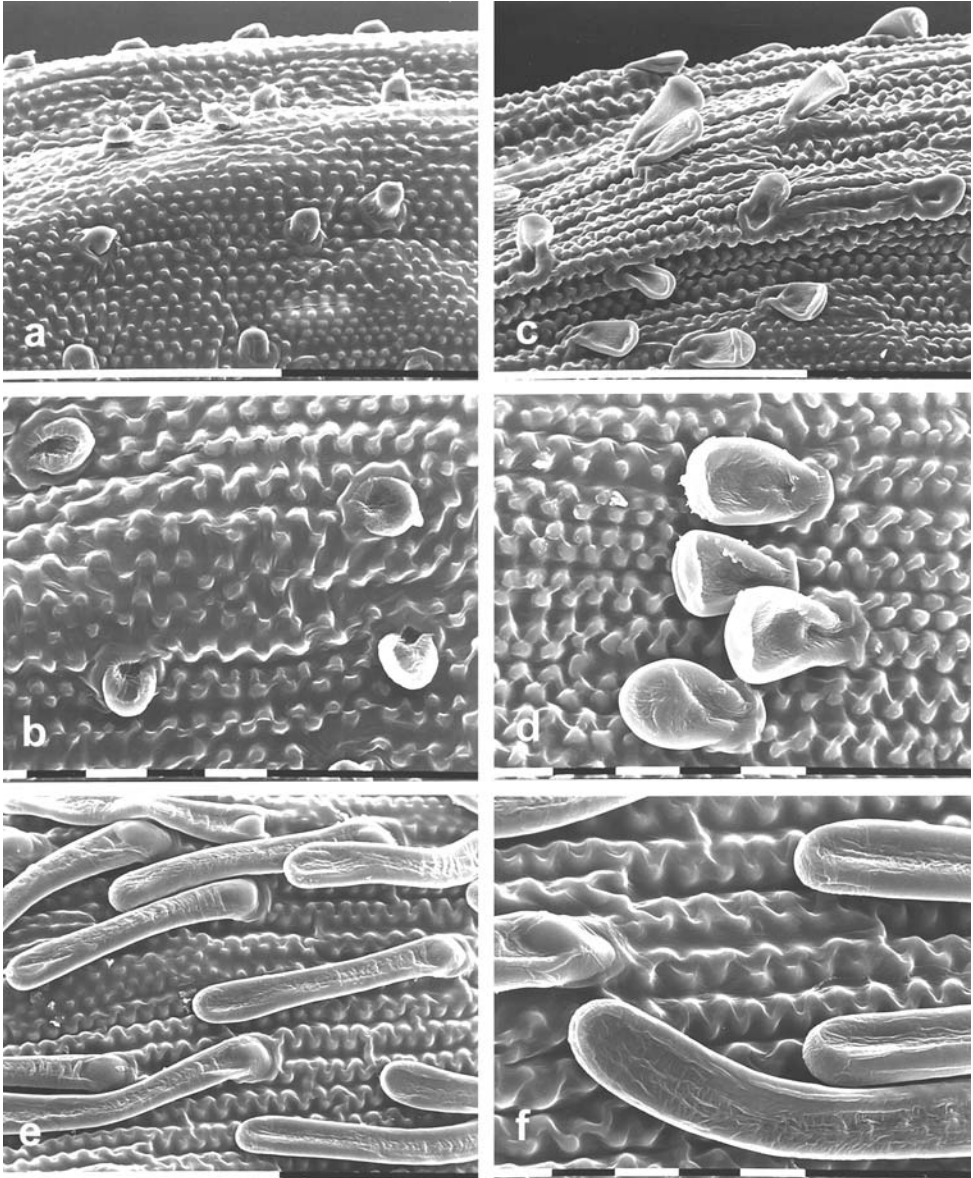


Fig. 1. Lemma surface of *Phleum* – a-d: *Ph. subulatum*, (a-b) Rodhos, *Böhling* 9721 (B), (c-d) *ibid.*, *Böhling* 9709 (B); e-f: *Ph. exaratum* subsp. *breviglume* (Bornm.) H. Scholz, holotypus (B). – Scale: a+c+e = 0.1 mm, b+d+f = 10  $\mu$ m.

Doğan (1988: 122) states that *Ph.* sect. *Achnodon* is characterized by clavate lemma hairs (see also Doğan 1985, 1991) in contrast to *Ph.* sect. *Phleum* and sect. *Chilochloa* with acute, tapering and *Ph.* sect. *Maillae* without lemma hairs. The lemma surface of *Ph. subulatum* is not illustrated by Doğan (1988), but is in contradiction to his aforementioned statement described as “roughly orbicular ... hair length 13-16  $\mu$ m” (Doğan 1988: 122). This description, in fact, is fully confirmed by my own SEM studies of the lemma surface (Fig. 1a-d). The hairs of *Ph. boisseri*

and *Ph. exaratum*, which were transferred by Doğan (1988) from *Ph. sect. Chilochloa* to *Ph. sect. Achnodon*, are described and illustrated as being clavate and 126-150 µm long (*Ph. exaratum*, Doğan 1988: 122 + fig. 2E) and cylindrical obtuse and 213-266 µm long (*Ph. boissieri*, Doğan 1988: 122 + fig. 2F). Obviously, the hair type of *Ph. subulatum* (Fig. 1a-d) stands quite apart from that of the two species added by him to *Ph. sect. Achnodon* as well as from all other members of the genus (compare Fig. 1e-f, Doğan 1988: fig. 1C-F, 2A-F, Scholz 1990: fig. 2A-D). This character state of the lemma hairs in *Ph. subulatum* is nevertheless completely omitted in the numerical analysis by Doğan & Us (1996: 162).

My SEM studies of the lemma epidermis of *Phleum* revealed a second feature, which emphasizes the isolated position of *Ph. subulatum* but has not been reported before. As can also be seen in Fig. 1a-d, the sinuate cell walls exhibit small globose projections at the corner of each fold. This feature is not present in any other species of *Phleum* but is one of the features discerning the segregate *Pseudophleum* Doğan with its single species *Ps. gibbum* (Boiss.) Doğan ( $\equiv$  *Phleum gibbum* Boiss.) as is illustrated by Doğan (1988: fig. 1B). Even in the light microscope this peculiar epidermal projections can impressively be seen as bright, shiny dots on the lemma cells.

To the unique combination of these micromorphological features in *Ph. subulatum* finally the laterally compressed caryopses of this species (not terete as in all other species of *Phleum*, see Humphries 1980, Clayton & Renvoize 1986) have to be added. Consequently, *Ph. sect. Achnodon* should be retained in its original circumscription and the inclusion of any other *Phleum* species be rejected.

***Phleum* sect. *Achnodon*** Griseb. in Ledebour, Fl. Ross. 4: 455. 1853

Type and only species: *Phleum subulatum* (Savi) Asch. & Graebn.

Fruiting spikelets with caryopses laterally compressed. Outer surface of lemma minutely papillose by globose projections at the folds of the sinuate cell walls and invested with globose to obovoid hairs up to c. 12-30 µm long.

***Phleum subulatum*** (Savi) Asch. & Graebn., Syn. Mitteleur. Fl. 2(1): 154. 1899  $\equiv$  *Phalaris subulata* Savi, Fl. Pis. 1: 67. 1798

Two subspecies of *Phleum subulatum* (here provisionally accepted) are distinguished but are not very sharply demarcated. Measurements of spikelet or glume length given for the species range from 2 mm (Ascherson & Graebner 1899) over 2.2-3 mm (Cvelev 1976) to 2-4 mm (Humphries 1980 and followed by other authors). The higher values represent subsp. *ciliatum*, in which the glumes are ciliate on the keel with 0.3-0.5 mm long hairs (Fig. 7) and the lemma hairs are globose to obovoid and 15(-30) µm long. In subsp. *subulatum*, the glumes are regularly glabrous, the lemma hairs are globose and c. 12 × 12 µm but reach up to 20 µm length in specimens with shortly ciliate glumes. In both subspecies the lemma hairs are often apiculate to various degrees.

***Ph. subulatum* subsp. *subulatum***

= *Phalaris tenuis* Host, Icon. Descr. Gram. Austriac. 2: 36. 1802 subsp. *tenuis*  $\equiv$  *Phleum tenue* (Host) Schrad., Fl. Germ.: 191. 1806 subsp. *tenue*

Widespread in the Mediterranean region.

Specimens examined (all in B):

GREECE: LAKONIA: Ep. Jithiou, SO Marathea, Ölbaumhain, 15 m, 21.4.1998, *Eisenblätter & Willing 65618*. — KARPATOS: SE Küste, Bucht 1 km südwestlich der Insel Prasonisi, am Strand, 7.5.1982, J. & W. Greuter, *Pleger & Raus 18884 (Raus 6196)*. — SARIA (DODEKANES): Nordteil der Insel bei Palatia und Argos, Kulturterrassen, 10-150 m, 28.4.1983, *Raus 7903*. — CRETE: Nomos Hanion, Aradena, etwas ruderaler, nitrotraphenter Intensiv-Weiderasen auf Kalkstein-Terra fusca, 600 m, 17.5.1999, *Böhling 9991*.

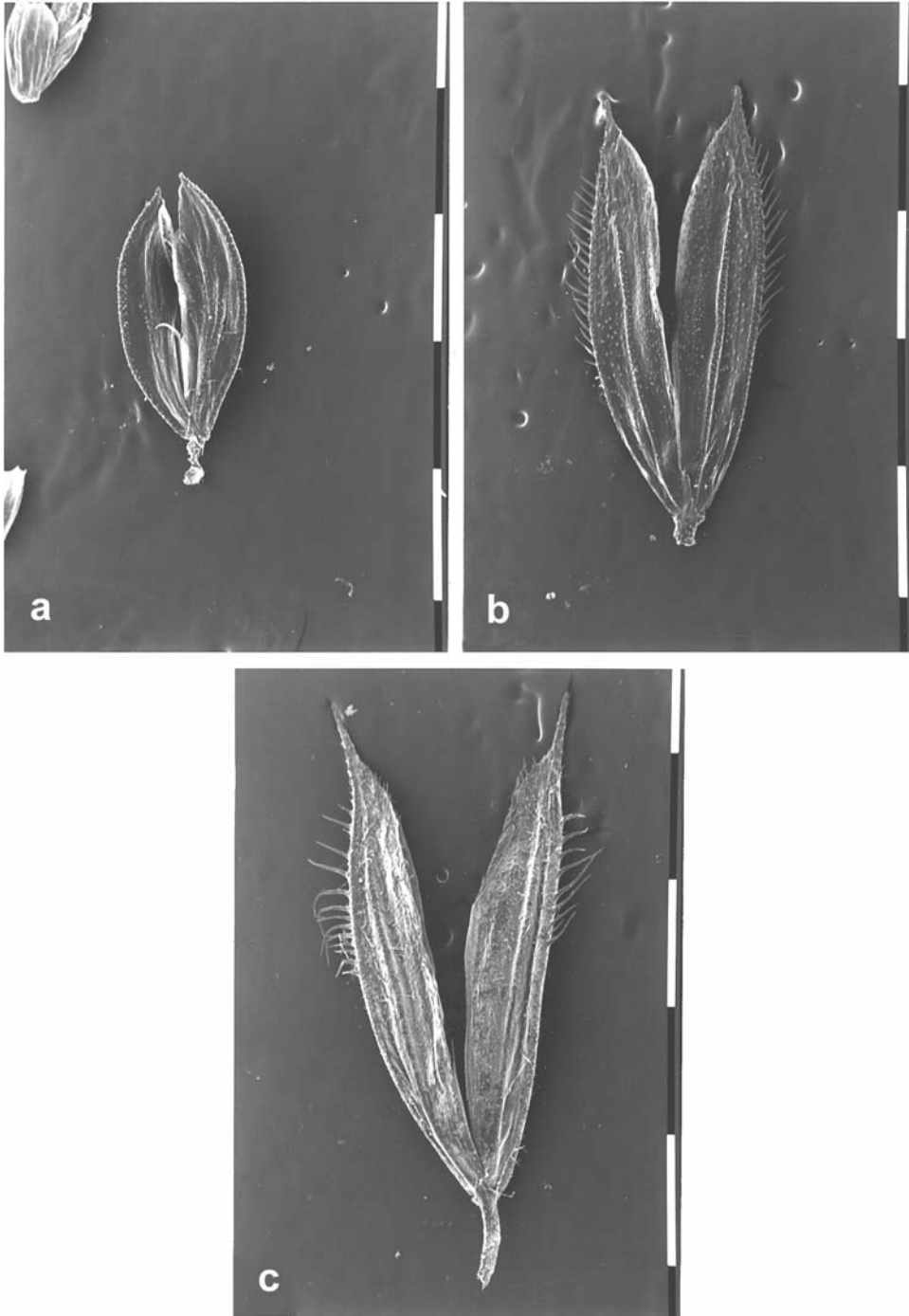


Fig. 2. Spikelets of *Phleum* – a: *Ph. subulatum* subsp. *subulatum*, Crete, Böhling 9991 (B); b: *Ph. subulatum* subsp. *ciliatum*, Rodhos, Böhling 9709 (B); c: *Ph. exaratum* subsp. *breviglume* (Bornm.) H. Scholz, holotypus (B). – Scale = 1 mm.

*Ph. subulatum* subsp. *ciliatum* (Boiss.) Humphries in Bot. J. Linn. Soc. 76: 339. 1978 ≡ *Ph. subulatum* var. *ciliatum* (Boiss.) Halácsy, Consp. Fl. Graec.: 348. 1876  
= *Ph. tenue* var. *ciliatum* Boiss., Fl. Orient. 5: 480. 1884

Distributed in the E Mediterranean region (Greece, Turkey, Cyprus).

Specimens examined (all in B):

GREECE: RODHOS: Bei Haraki, 15.4.1988, *Scholz*; auf Brachland bei Piona, 16.4.1988, *Scholz*; nordöstl. Koskinou beim Hotel Paradise, 22.4.1988, *Scholz*; Prof. Ilias, S-Flanke, sehr stark beweidete *Asphodelus ramosus*-Distelflur auf Kalkschutt-Rendzina in SE-Exposition unterhalb Kliff, 650 m, 5.5.1999, *Böhling 9709*; Ag. Isidoros, grasige Phrygana auf aufgelassenem Weinfeld mit *Pinus brutia* und *Olea* in südwestexponierter Auenlage auf Kalkrambla, unbeweidet, 450 m, 5.5.1999, *Böhling 9721*.

Note: *Phleum subulatum* subsp. *ciliatum* is often similar in the shape and length of the glumes to *Phleum exaratum* (see Fig. 2b-c) and can be easily confused. Decisive differential characters are the micromorphological structures of the spikelets and the compressed or terete caryopses.

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