

HILDEMAR SCHOLZ & THOMAS RAUS

Contribution to the flora of Greece: a new species of *Achnatherum* (*Poaceae*)

Abstract

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Achnatherum fallacinum is described as a new species from Greece related to *A. bromoides*, from which it differs in shorter glumes, lemmas and awns, in the indumentum of the lemma and, most importantly, in the presence of intravaginal innovations, lacking extravaginal branching. The new species, centred in the Aegean region, settles in more open habitats with bare soil and is only occasionally sympatric with its relative.

Key words: grasses, taxonomy, *Achnatherum fallacinum*, *Stipa*, Aegean region.

Introduction

In his monograph on the genus *Stipa* L. (incl. *Achnatherum*) in SW Asia, Freitag (1985: 402) mentions for *S. bromoides* (L.) Dörfel a great polymorphism in leaf indumentum and length of glumes, antherium and awn, and stresses the “most striking” variability of the lemma indumentum in the otherwise “well-defined species”. When checking the lemma variability in the material of *S. bromoides* at Berlin-Dahlem (B) and Patras (UPA), the authors were surprised to find another character in a certain portion of the material that obviously has been neglected by previous investigators of the section including *S. bromoides*, *Stipa* sect. *Aristella* (Trin.) Hack. (*Achnatherum* sect. *Aristella* (Trin.) Tzvelev), viz. the basal parts of the plants remarkably lacking the extravaginal young next-season shoots, which are stated by Freitag (1985: 401) to be always “already present” in *S. bromoides*, and, according to Tzvelev (1976), characterize *A.* sect. *Aristella*. The fact that the differing basal structures are tidily correlated with different glume and lemma lengths and a certain type of lemma indumentum, triggered a closer investigation, which resulted in the present contribution.

In our treatment we follow most recent authors (Tzvelev 1998, Barkworth 1993, Soreng 2003) and recognize *Achnatherum* P. Beauv. as a genus distinct from *Stipa*. s. str. Consequently we use the name *Achnatherum bromoides* (L.) P. Beauv. instead of *Stipa bromoides*. The circum-Mediterranean *A. bromoides* (eastwards extending to the Caucasus, N Iran and N Iraq) was described by Linnaeus in 1767 as *Agrostis bromoides* from S France (near Montpellier; lectotypus: LINN 84.4, designated by Vázquez & al. 1995).

Achnatherum fallacinum H. Scholz & Raus, **sp. nov.**

Holotype: Greece, Nomos Dodekanisou, Kasos island, Schlucht südl. Arvanitochori (35°23'10"N, 26°55'04"E), 150-200 m, Mergel-Steilküste und Geröll der Talsohle, 10.5.1983, *Raus 8152* (B; isotype: UPA).

Gramen perenne caespitosum *Achnathero bromoidi* simile sed partibus basalibus dense compactis innovationes extravaginales carentibus, lemmatibus dorso totaliter plusminusve laxe strigillosis atque glumis et lemmatibus et aristis minoribus distincte diversa.

Densely tufted perennial; innovation shoots intravaginal, with scale-like leaves (cataphylls) at base. *Culms* 30-80 cm high, smooth and glabrous, 3-5-noded; internodes up to 12 cm long, about as long as the leaf sheaths. *Leaves* ± glaucous; leaf sheaths glabrous or the lower minutely pubescent; leaf blades narrowly linear, 10-25 × 0.1 cm, convolute, acute, upper surface strongly ribbed, ± pubescent or scabrous, the basal ones often rather firm and stiffly erect; ligule 0.5-1.5(-2) mm long, blunt. *Panicle* erect, narrow, linear, loose, 10-15 cm long, with scabrous branches and pedicels. *Spikelets* shortly pedicelled; glumes subequal, 3-veined, 6-8 mm long, lanceolate, acute or cuspidate, greenish; lemma 4-6(-6.5) mm long, slightly shorter than the glumes, brownish, densely to loosely appressed, hairy throughout (hairs c. 0.5 mm long); callus short, 0.3-0.5 mm long, obtuse, densely bearded; awn terminal, indistinctly articulated at the base, 5-12 mm long, not geniculate, minutely scabridulous; palea a little shorter than the lemma. *Stamina* 3, anthers c. 3-4 mm long, yellow; caryopsis 4-5 mm long. – Flowering May-August.

Distribution and ecology. – The new species is known only from Greece, where it is almost restricted to the Aegean islands, with one record from Peloponnisos. *Achnatherum fallacinum* is well-adapted to open and dry habitats (see list of collections) in contrast to *A. bromoides*, which, according to Freitag (1985), chiefly grows in evergreen woodlands.

Additional specimens seen. – GREECE: PELOPONNISOS: Nomos Ilias, Eparchia Olimbias: Kaiafa NW Zaharo (37°31'32"N, 21°35'10"E), lichter *Pinus halepensis*-Braundünenwald, 20 m, 17.11.1998, *Böhling 9336* (B, specimen somewhat approaching *A. bromoides*). – WEST AEGEAN: Nomos Evvias, Eparchia Karistias: S Evvia, *Castanea* forest around S parts of Mt Ochi (38°03'N, 24°28'E), stony slopes with low vegetation (mainly phrygana), schists, 900-1000 m, 5.7.1997, *Phitos & Kamari 25784* (B, UPA). — CENTRAL AEGEAN: Nomos Kikladon, Eparchia Parou: Antiparos, Spileo Stalakititon (36°59'30"N, 25°04'E), phrygana with marble rock outcrops, 200 m, 17.6.1998, *Raus & Sipman 23671* (B); *ibid.*: Antiparos, SW part of the island, near Agios Georgios (36°58'30"N, 25°02'30"E), phrygana, schistose rock, 50 m, 16.6.1998, *Raus & Sipman 23663* (B); *ibid.*: Antiparos, S part of the island, near Cape Mastichi on the Petalida peninsula (36°58'N, 25°02'30"E), open phrygana, siliceous substrate, 100 m, 16.6.1998, *Raus & Sipman 23667* (B); *ibid.*: Paros, near Mt Profitis Ilias, pine forest with *Quercus coccifera* and *Pistacia lentiscus*, and grasses on forest floor, 22.5.1989, *Shay M144* (B); *ibid.*: Paros, Moni Christou Dasous (37°03'N, 25°08'E), phrygana on marble rocks, 200 m, 20.6.98, *Raus & Sipman 23723* (B); *ibid.*: Paros, 1 km E of Kostos (37°06'N, 25°14'E), phrygana on ultramafic rock, 50 m, 24.6.1998, *Raus & Sipman 23797* (B); *ibid.*: Paros, Mt Tripiti at southern tip of the island (36°59'N, 25°11'E), open *Juniperus phoenicea* scrub with limestone outcrops, c. 100 m, 15.6.1998, *Raus & Sipman 23634* (B); *id.*, Eparchia Naxou: Naxos, Zevs (37°01'27"N, 25°30'12"E), SSE-exponierte, offene Phrygana auf Dolomitmarmor, 720 m, 3.6.1992, *Böhling 1763* (B); *ibid.*: Naxos, Aperathou (37°04'16"N, 25°32'04"E), Felsen an unterer Talflanke, 400 m, 7.8.1990, *Böhling 1088* (B); *ibid.*: Naxos, Mt Koronos, siliceous substrate, phrygana, 900 m, 23.6.1998, *Raus & Sipman 23801* (B). — SOUTH AEGEAN: Nomos Chanion, Eparchia Kissamou: Vlathos-Milia (35°24'50"N, 23°39'40"E), offene Stelle am Rande einer *Platanus*-Aue, 500 m, 30.7.1998, *Böhling 8575* (B); *ibid.*: Vlathos (35°23'39"N, 23°40'07"), auf ehemaliger Brandfläche im Quarzitschiefer-Schotterbett, 300 m, 30.7.1998, *Böhling 8571* (B; Böhling & Scholz (2003) while recognising but not naming *A. fallacinum* as a distinct species cite erroneously this specimen under *A. bromoides*); *ibid.*: Topolia-Schlucht (35°24'50"N, 23°40'60"E), SE-exponierte Kalksteinwände, 350 m, 27.4.1998, *Böhling & Bäßler 7971b* (B); *id.*, Eparchia Selinou: Ana-

vos (35°21'38"N, 24°44'38"), offene *Arbutus andrachne*-Macchie mit artenreicher Phrygana auf Kalkstein-Ockerlehm, W-exponiert, ca. 580 m, 26.4.1998, *Böhling & Bäßler 7939* (B); *ibid.*: Anavos (35°21'20"N, 24°45'20"), auf Kalksteinblock mit *Ceterach officinarum* im lichten Auwald mit *Platanus*, *Pinus brutia*, *Pistacia terebinthus*, 480 m, 30.7.1998, *Böhling 8581* (B); *ibid.*: Dimitriana (Ag. Irini) (35°21'15"N, 23°48'42"E), *Sarcopoterium*-Phrygana mit *Verbascum spinosum* auf SE-exponiertem, grundfeuchtem Quarzitschiefer-Ranker-Kolluvium in Talrandlage, stark beweidet, 780-800 m, 1.8.1998, *Böhling 8609* (B); *id.*, Eparchia Kidonias: Moni Gouvernetou (Akrotiri) (35°34'58"N, 24°08'25"E), ältere, NE-exponierte, artenreiche *Cistus-Calicotome-Genista*-Phrygana mit *Tulipa cretica*, Kalkstein, 240-250 m, 11.1998, *Böhling & Scholz 9224* (B); *ibid.*: Mt Tourli (Prases-Omalos) (35°20'50"N, 23°51'10"E), massiv beweidetes Gneis-Schutt-Kolluvium mit schwach karbonatischem Solum, 950 m, 2.8.1998, *Böhling 8625* (B); *ibid.*: Omalos-Kalliergi (35°19'18"N, 23°55'18"E), S-exponierte Kalkstein-Terra fusca-Böschung, 1250 m, 3.8.1998, *Böhling 8653* (B); *ibid.*: Omalos (35°20'12"N, 23°54'38"E), Intensivweideflur auf Kalkstein-Terra fusca, mit *Carlina cf. curetum*, *Cichorium spinosum*, *Poa bulbosa*, *Lolium perenne* ("crassiculme"), 1050 m, 3.8.1998, *Böhling 8650* (B); *ibid.*: Lefka Ori/Pachi Armi, windgefegter Bergrücken, Dornpolster-, Schutt- u. Felsfluren, Kalk, wenig Boden, 1600-1700 m, 9.7.1982, *Hager 786* (B); *id.*, Eparchia Sfakion: Kalliergi (35°19'39"N, 23°57'05"E), *Berberis cretica*-Gebüsch in Schiefer- Kerbtälchen, SE-exponiert, 1475 m, 3.8.1998, *Böhling 8657* (B). – Nomos Rethimnis, Eparchia Rethimnis: Rethimno, open and dry habitat, 15.4.1982, *Damanakis 399* (B); *id.*, Eparchia Agiou Vasiliou: Assiderotas (35°09'18"N, 24°34'47"E), NW-exponierter Mittelhang mit karbonatischem, tiefgründigem Kolluvium, 950 m, 6.8.1998, *Böhling 8710* (B); *ibid.*, Assiderotas (35°34'50"N, 24°34'50"E), *Ptilostemon stellatus-Ononis spinosa* subsp. *diacantha*-Bestand an (Frühjahrs-) Quellhorizont (Gneisschiefer unter Kalkstein), grundfeuchter Pararendzina-Syrosem, 760 m, 6.8.1998, *Böhling 8714* (B); *id.*, Eparchia Myilopotamou: Nida (35°13'03"N, 24°49'54"E), SW-exponierte Kalksteinwand, 1450 m, 14.8.1998, *Böhling 8811* (B); *id.*, Eparchia Amariou: Gious Kambos (35°12'42"N, 24°34'19"), *Genista-Sarcopoterium*-Phrygana, sandiges Kalkstein-Kolluvium, W-exponiert, 780 m, 4.8.1998, *Böhling 8697* (B). – Nomos Irakliou, Eparchia Pirgiotissis: Lochria-Kamareas (35°09'31"N, 24°48'22"E), nach S geöffnete Kalksteinschlucht, mit *Staelhelina petiolata*, *Ferulago thysiflora*, 550-600 m, 5.8.1998, *Böhling 8706* (B); *ibid.*: Kali Limenes (34°55'42"N, 24°48'E), along dirt track, with *Lamyropsis cynaroides*, *Dactylis glomerata* subsp. *hispanica* and *Cistus creticus*, 22.5.1984, *Shay* (B); *id.*, Eparchia Maleviziou: Gonies (35°18'05"N, 24°55'40"E), WNW-exponierte Ophiolith-Phrygana, 600 m, 18.5.1998, *Böhling 8442* (B); *id.*, Eparchia Pediados: Dikti Oros, Schlucht von Xeniakos W des Berges Majerefta (35°06'30"N, 25°24'30"), Felswände und Schluchtgrund, 550-600 m, 29.9.1984, *Risse 1755* (B); *ibid.*: W Malia bei St. George of Selinari, 21.4.1994, *Scholz* (B); *ibid.*: Kera (35°14'18"N, 25°27'34"E), offene *Calicotome-Osyris-Genista acanthoclada-Rhamnus lycioides* subsp. *oleoides*-Phrygana mit *Olea* auf Kalkstein-Terra fusca, 550 m, 21.8.1998, *Böhling 8888* (B). – Nomos Lasithiou, Eparchia Lasithiou: Limnakaros-Dikti (35°07'06"N, 25°29'00"E), N-exponierter Schuttstrom, 1550 m, 23.8.1998, *Böhling 8932* (B); *ibid.*: Eparchia Ierapetras: Moni Panagias Exakoustis (35°04'11"N, 25°36'17"), *Cistus creticus*-Phrygana auf jüngerer *Pinus brutia*-Brandfläche, N-exponierter Oberhang, Kalksandstein/Konglomerat-Rendzina, wenig beweidet, 610 m, 13.5.1998, *Böhling 8334* (B); *ibid.*: Kato Chorio-Thripti, Seitental der Monastiraki-Schlucht (35°04'44"N, 25°50'18"E), sandig-steinige Alluvionen mit *Salvia fruticosa*, *Euphorbia characias*, 590 m, 24.3.1998, *Böhling & Raus 7200* (B); *ibid.*: Monastiraki, ruined maquis, 22.6.1993, *Kislev & Melamed 86* (B). – Nomos Dodekanisou, Eparchia Karpathou: Karpathos, Westküste 3 km südöstl. Lefkos bei der Kapelle Agia Kiriaki (35°32'50"N, 27°07'20"E), Kleinstrauchgarrige über verkarstetem Kalkgestein, 250 m, 24.5.1984, *Raus 9960* (B, UPA); *ibid.*: Karpathos, in oropedio Kato Lastos, in alveo calcuoso et in dumulosis, 600 m, 23.5.1963, *Greuter 5502* (UPA); *ibid.*: Karpathos, in summo montis Kalilimni, in lapidosis calcareis, 1150 m, 18.8.1982, *Greuter & Zimmer 19514* (B); *ibid.*: Karpathos, Levkos-Piles (35°33'55"N, 27°06'00"E), Kalksteinschutt, Straßenrand, 120 m, 5.5.1998, *Böhling 8190* (B); *ibid.*: Saria, Palatia (35°53'20"N, 27°13'50"E), N-exponierte Kalksteinwände in Schlucht, 50-90 m, 8.5.1998, *Böhling 8251* (B). — EAST AEGEAN: Nomos Dodekanisou, Eparchia Rhodou: Rhodos, Profitis Ilias (36°16'20"N/27°58'00"E), halboffener *Pinus brutia*-Wald in Passlage, Kalkstein-Ter-

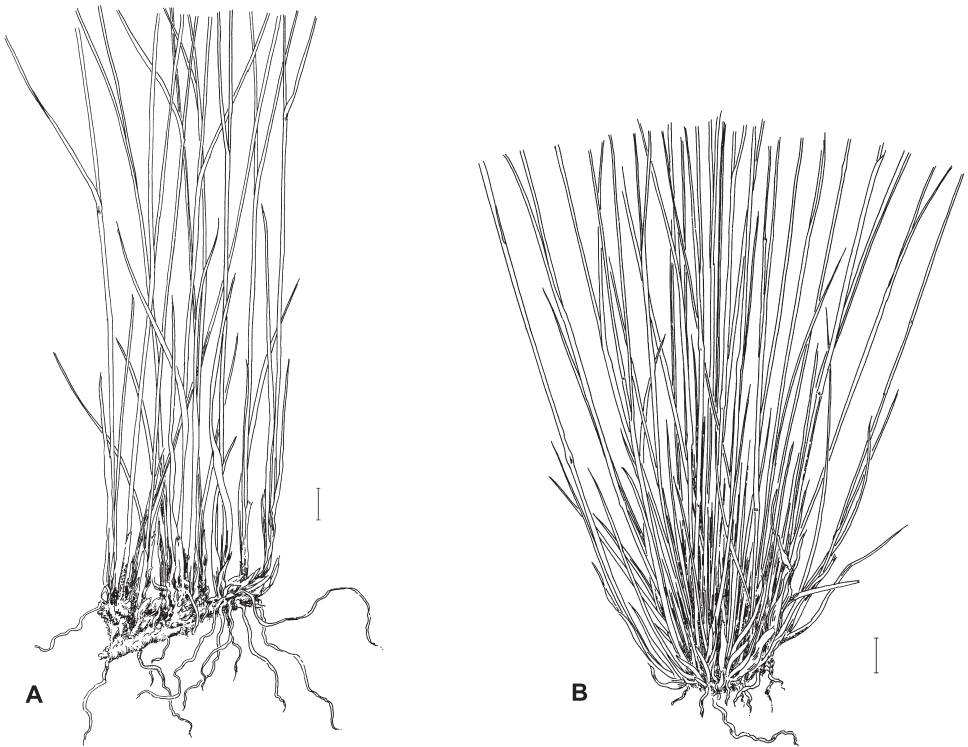


Fig. 1. Comparative diagnostic features of basal parts. – A: *Achnatherum bromoides* (W Crete, Böhling 7731, B); B: *A. fallacinum* (type collection, B). – Drawings by M. Rodewald.

ra fusca-Rendzina, 500-550 m, 17.8.1998, Böhling 8881 (B); *ibid.*: Rhodos, Attaviros, S-Flanke (36°12'31"N, 27°51'38"E), offene *Sarcopoterium-Euphorbia acanthothamnus*-Phrygana auf W-exponiertem Plattenkalk-Terra fusca-Oberhang, 20.10.1998, Böhling 9063 (B).

Delimitation. – The most relevant difference of *Achnatherum fallacinum* from *A. bromoides* is its densely tufted habit (Fig. 1A,B) resulting from a very rich intravaginal branching leading to a high number of vegetative shoots and a much smaller number of generative shoots (“rosette-forming grass”, “rosulate grass”; Serebryakova 1971, cited and discussed in the introduction chapter of Tzvelev 1976). The basal lateral buds grow vertically, parallel to the axes of the individual mother shoots (apogeotropically) and the newly formed branches remain inside the scaly leaves (cataphylls). This growth form contrasts sharply to that of *A. bromoides*. Here the buds begin to grow horizontally (plagiotropically or diageotropically) and pierce through the scaly leaves but soon bend upright (arcuately) forming numerous culms and only few vegetative shoots (“rosetteless grass”, “non-rosulate grass”). The repetition of such processes in the course of the years results in “small tufts, with short rhizomes” (Freitag 1985: 401), “lockere Horste ... mit kurzen unterirdischen Ausläufern” (Conert 1992: 407) (Fig. 1A), whereas *A. fallacinum* is a compact turf grass extending over the years with underground creeping shoots absent (Fig. 1B).

The second important character to delimit *Achnatherum fallacinum* from *A. bromoides* is the different lemma indumentum. The back of the lemma is appressed hairy throughout in *A. fallacinum* (Freitag 1985 mentions this feature in an annotation to *A. bromoides* for the “material from Rhodos”(!), without further discussion), and hairy mostly only in the lower $\frac{2}{3}$ in *A. bromoides*. Moreover, *A. fallacinum* exhibits conspicuously smaller dimensions of nearly all

Table 1. Diagnostic characters of *Achnatherum fallacinum* and *A. bromoides*, for the latter taken from (Freitag 1985).

	<i>Achnatherum fallacinum</i>	<i>Achnatherum bromoides</i>
Extravaginal shoots	absent	present
Culm height [cm]	30-80	40-80
Lamina length [mm]	10-25	15-30
Ligule length [mm]	0.5-2	up to 0.4
Panicle length [cm]	10-20	12-25
Upper glume length [mm]	6-8	8-11
Lemma length [mm]	4-6.5	6-8
Indumentum on lemma back	all over	± in lower 2/3
Awn length [mm]	5-12	12-23

structures, mainly the floral ones (Table 1), only the length of the ligule, up to 2 mm and up to 0.4 mm in *A. fallacinum* and *A. bromoides*, respectively, contravenes this “rule” (Freitag 1985 and Conert 1992 for *A. bromoides*). – The very rare presence of tiny tufts of stiff hairs on the apex of anthers (“penicillate anthers”), observed in *A. fallacinum* (Böhling 8190 from Karpathos), and unknown so far in *Achnatherum*, has surely no taxonomic value in the genus.

Concluding remarks

It seems rather unlikely that populations of *Achnatherum fallacinum* will be found outside its currently known Aegean area, in view of the abundant material which we have investigated from many Mediterranean countries in B. All appeared to belong to true *A. bromoides*, just as several specimens from Aegean islands (Böhling & Scholz 2003). Since *A. fallacinum* occurs amidst the distribution range of *A. bromoides*, the question arises whether or not *A. fallacinum* could be a young derivative of *A. bromoides*. We prefer with some reservation the first alternative (*A. bromoides* ancestral to the endemic *A. fallacinum*).

The description of *Achnatherum fallacinum* affects the sectional characterisation of *Achnatherum* P. Beauv. presented by Tzvelev (1976), who gives “aerial branches extravaginal, covered with coriaceous scaly leaves at the base” as character for one of the three sections, *A. sect. Aristella* (Trin.) Tzvelev. This comprises, i.a., *A. bromoides* and now also *A. fallacinum* which is undoubtedly the closest relative of *A. bromoides*. Since *A. fallacinum* has exclusively intravaginal branches, Tzvelev’s description of *A. sect. Aristella* has to be altered by deleting the sentence “aerial branches extravaginal”, thus more unequivocally and simply confirming *A. sect. Aristella* as a natural and monophyletic taxon; the members of the other two sections are without scaly leaves but have intravaginal or mixed intravaginal and extravaginal branches.

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Addresses of the authors:

Hildemar Scholz, Thomas Raus, Botanischer Garten und Botanisches Museum Berlin-Dahlem, Freie Universität Berlin, Königin-Luise-Str. 6-8, D-14195 Berlin; e-mail: hischo@zedat.fu-berlin.de, t.raus@bgbm.org