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Abstract

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Three S Anatolian Poaceae species, Oreopoa anatolica, Secale leptorhachis and Stipa cacuminis are described as new to science, illustrated and mapped. To accommodate the first, perennial species, a new genus, Oreopoa, with unsettled affinities within the Poeae, is established. The synecology, distribution patterns and relationships of all species are outlined. In addition, considerable range extensions of five grasses, Bromopsis tomentella subsp. nivalis, Festuca catasonica, F. karsiana, F. punctoria and Koeleria brevis, towards the S Anatolian Taurus Mts are reported.

Introduction

Despite the achievements of the recent decades (Davis & al. 1985, 1988, Güner & al. 2000), many groups of the Poaceae are fairly under-recorded in Turkey and remain poorly understood. Due to the substantial taxonomic difficulties they often provide and the sometimes cryptic characters that have to be used in the field, many local floristic inventories seem to be rather incomplete in their coverage of the grasses. Interesting discoveries and additions to the Poaceae flora of Turkey are thus to be expected from nearly everywhere, and all the more from, at least partly, remote mountain areas.

The present contribution is based on the 1999 and 2000 gatherings of the PONTAURUS project run by the first author and funded by the Deutsche Forschungsgemeinschaft (DFG). The project and forerunning studies focused, on a phytosociological basis, on the species differentiation and vegetational subdivision in the Anatolian Taurus and Pontus mountain chains (e.g., Eren & al. 2004, Parolly 2000, 2004, Parolly & Hein 2000, Parolly & Nordt 2001, Parolly & al. 2002). Establishing phytosociological relevés again proved to be an appropriate mean in detecting novelties that are otherwise easily overlooked in pure floristic studies.

We describe here three species new to science; one of them has such an isolated taxonomic position that it requires a new unispecific genus, Oreopoa, rising the number of endemic Turkish genera to 17 (Güner & al. 2000). Additionally, we report range extensions of five taxa of Bromopsis Fourr., Festuca L. and Koeleria Pers.
Oreopoa H. Scholz & Parolly, gen. novum
[non Oreopoa Gand., Fl. Eur. 26: 186. 1891, nomen nudum = Poa alpina L.]

Type: Oreopoa anatolica H. Scholz & Parolly

Oreopoa anatolica H. Scholz & Parolly, sp. nova

Holotype: Turkey, C2 Antalya, Beydağları, Kızılarsivrisi, glacially sculptured range between the main summit and the Aktepe, 36°35′76″N, 30°06′97″E, 2650-2700 m, limestone, wind-swept cushion community (Drabo-Androsacetalia), 3.7.1999, M. Döring, G. Parolly & D. Tolimir P6358 (B; isotypes: E, ISTE, herb. Parolly) – Fig. 1.

Gramen perenne dense caespitosum. Culmi humiles, usque ad 15 cm alti, glabri laevesque. Foliorum laminae lineares, (10-)15-30(-45) × 0.5-1 mm, convolutae rigidiusculaeae, apice acuminate; ligulae 0.2-0.6 mm longae, dentatae. Panicula erecta pyramidalis, 3-6 × 2-6 cm ramis 1-3 cm longis, 1-2(-3)-natis, late patentibus 1-2-spiculatis, inferne nudis, laevibus. Spicaeae purpureae 3-5(-6)-florae, 4-8 mm longae, glabrae. Glumae elliptico-acutae; gluma inferior 2-2.5 mm longa, oblongo-acuta, 1(-3)-nervata, superior 2.5-3.5 mm longa, 3-nervata. Lemnata fere dorso rotundata (vix carinata) 2.5-3.5 mm longa, 5(-7)-nervata, acuto-apiculata, margine indistincte hyalina. Palea in ½ superiore nervis scabris. Lodiculae 2, c. 1.5 mm longae, bilobae. Antherae c. 1.5 mm longa. Ovarii apex glabri.

Densely tufted, caespitose perennial. Culmi more or less erect, 9-13(-15) cm high and 0.5-0.8 mm in diam. at base. Distinctly striate, completely glabrous, shining pale greyish green; nodes fairly inoperciuous. Leaves predominantly basal, stem leaves (0-)1-2, of about the same dimension as the basal ones; leaf blades narrowly linear, (10-)15-30(-45) × 0.5-1 mm, convolute, rigid, (pale) greyish green, apex acuminate; ligule 0.2-0.6 mm, broadly hyaline-margined, dentate; leaf sheath 0.4-0.8 mm, basal-most ones somewhat inflated, shining whitish, older ones turning pale brownish and weathering to a weak but distinct tunic. Inflorescence a lax, erect pyramidal panicle; 3-6 × 2-5 cm. Branches single, in pairs or rarely in whorls of three (especially in the lower half of inflorescence), 1-2.5 cm long, spreading to erecto-patent, slender, flexuous, angled, glabrous, scabrid below the spikelets. Spikelets (4-)5-7(-8) mm long, all alike, with 3-5(-6) florets, glabrous, loosely spaced, 1-3 per branch, dark purple. Glumes elliptico-acute, unequal, greenish, partly with purple markings, margins hyaline, very finely denticulate in upper half; lower glume 2-2.5 mm long, oblong-acute, 1(-3)-veined, upper glume 2.5-3.5 mm long, oblong-acute, 3-veined. Lemma awnless, dorsally rounded (weakly keeled) 2.5-3.5 mm long, acute-apiculate, 5(-7)-veined, purple, with indistinct hyaline to yellowish white margins, denticulate above. Palea with veins scabrid in upper half. Lodiculae 2, c. 1.5 mm long, bilobed. Stamens 3, anthers c. 1.5 × 0.4 mm, yellowish. Ovary obconical, c. 1.2 mm, shining brownish, apex glabrous, stigma lobes about as 2 times as long as ovary. Caryopsis unknown.

Relationship. – This grass, undoubtedly belonging to the tribe Poeae (sensu Clayton & Renvoize 1986), could not be identified with any known genus, even its relationship is difficult to determine. Creating a new, unspecific genus to accommodate our species, accords with the narrower generic concepts in this group established in recent studies (Scholz 2003, Tzvelev 1989, Watson & Dallwitz 1994) on account that Poa L., as circumscribed in earlier works, actually is a conglomerate of fairly distantly related groups.

The convolute leaf blades in combination with the nearly rounded lemma back in Oreopoa contradicts a closer relationship to Poa s. str., which is well characterised by leaf blades folded along the mid-nerve, at least in young shoots (i.e. vernation conduplicate, never convolute; see, among others, Tzvelev 1976, Dore & McNeill 1980, Soreng 1998) and the more or less prominent lemma keel-nerve.

Likewise distantly related are the following four high altitude Old World genera comprising perennial species (see Tzvelev 1976): Colpodium Trin. (incl. Keniochloa Meld.; Tzvelev 1989), Catabrosella (Tzvel.) Tzvel. (C. variegata (Boiss.) Tzvel. with fairly long and patent panicle
Fig. 1. Oreopoa anatolica – A: habit; B: spikelet. – From the holotype (B); drawings by Horst Lünser.
branches), *Hyalopoa* (Tzvel.) Tzvel. and *Paracolpodium* (Tzvel.) Tzvel. They were all lumped by Clayton & Renvoize (1986) under the name *Colpodium*, but kept separate by other authors (e.g., Edmondson 1985, Mill 1985a-d, Watson & Dallwitz 1994). They show affinities to *Poa* L. (in which the segregated *Eremopoa* was included formerly), especially to the *P. alpina* L. group, but clearly differ in fewer florets, thinner lemmas and the non-scaprid palea keels (Clayton & Renvoize 1986). Members of *Poa* sect. [or subg.] *Ochlopoa* (Asch. & Graebn.) Hylander constitute a genus of their own, *Ochlopoa* (Asch. & Graebn.) H. Scholz, for their soft-hairy or smooth palea keels and other peculiarities (Scholz 2003).

Our new species shows considerable resemblance in spikelet configuration with the Old World genus *Eremopoa* Roshev., but this genus is quite different from *Oreopoa* in many other features (those of *Oreopoa* in brackets): annual (perennial); culms solitary or loosely tufted (densely tufted); panicle with many florets (few florets); panicle branches whorled on nodes (branches 1-2, rarely 3); many evenly spaced spikelets (few spikelets and naked below); leaf blades flat or weakly convolute (strongly convolute), usually >1 mm wide (expanded 0.5-1 mm wide); walls of intercostal long-cells of the abaxial side “straight or only gently” undulate (strongly undulate; see Watson & Dallwitz 1994) and, finally, ligule 0.8-4 mm long (0.2-0.5 mm).

*Oreopoa*, with its densely caespitose, low-statured habit and xerophytic leaf structure, fits neatly into the morphological syndromes found in species of alpine, wind-swept places. It may be a relic genus.

**Distribution.** – Sampling more than 200 plots of subalpine to subnival cushion community vegetation in all of the Western and Central Taurus, *Oreopoa anatolica* was recorded only from the Kızlar Sivrisi (3086 m), which is the highest summit area of both the Beydağları massif and the Western Taurus, at altitudes of about 2670-2700 m. It obviously represents a local endemic of the Western Taurus.

**Site conditions and synecology.** – *Oreopoa anatolica* is an alpine species. The records come from the glacially sculptured area additionally subjected to karstic weathering between the Kızlar Sivrisi main summit and the Aktepe. The landscape between steep scree slopes and towering rock walls is a patchwork of roche moutonnée, rocky flats, moraines, mounds, fine-soil rich depressions, dolines and meltwater runnels. It is notable that there are no observations higher up from the Kızlar Sivrisi and the Aktepe summits proper.


**Recommended IUCN threat category.** – Although there appears to be a healthy population with more than 200 mature individuals and abundant seedlings and young plants, its extremely narrow range and the grazing pressure by goats constitutes a clear risk of extinction. Hence, *Oreopoa anatolica* should be classified as “Critically endangered (CR)” according to criterion D of the IUCN Red List Categories (2001).
Secale leptorhachis H. Scholz & Parolly, sp. nova
Holotype: Turkey, C3 Antalya, Bakır Dağı, Saklıkent, thorn-cushion community, 1820 m, 14.7.1999, M. Döring, G. Parolly & D. Tolimir T 591 (B; isotype: herb. Parolly) – Fig. 2.

A Secale vavilovii Grossh. foliorum laminis et spicae internodiis angustioribus, c. 2 mm resp. 1 mm latis, differt.

Biennial(?). Stems tufted, erect, 60-70 × 0.1-0.2 cm, smooth and glabrous throughout. Leaf blades 1-2(-3) mm wide; sheaths and blades of lower leaves hirsute to shortly tomentose, those of upper leaves glabrous. Spike erect, 5-6 × 0.5(-0.7) cm. Rhachis semi-fragile, joints (rhachis segments) 0.9-1 mm wide. Spikelets 2-flowered. Glumes subequal, 7-9 mm, keels minutely scabrid, awn short, 1-2 mm. Lemmas 10-12 mm, smooth, awn 7-30 mm. Palea c. 10 mm. Anthers 5-6 mm, yellow. Caryopsis 6-7 mm.

Relationship. – Klaus Hammer (Witzenhausen) remarks on the two sheets of the plants here named Secale leptorhachis (in lit., 29.11.2000): “Eine solche Sippe [habe ich] bisher noch nicht gesehen” [such a taxon I have never seen before; see also Hammer & al. (1987)]

The unique set of characters tells Secale leptorhachis readily apart from all other Secale species and relegates it into a somewhat isolated position. From no other taxon such narrow leaf blades and only 0.9-1 mm broad rachis segments are known. Usually the rachis segments in Secale are 1.3-1.5 mm wide (Tan 1985). A special study on the morphological variation in Secale taxa, mainly of spikes and spikelets, was published by Frederiksen & Petersen (1997); width measurements of rachis segments are missing therein, apparently no variation was found.

Secale leptorhachis is to all appearance a biannual, which forms dense tussocks in the second year, somewhat resembling those of true perennials such as S. strictum (C. Presl) C. Presl s.lat. (S. montanum Guss.).

Distribution. – Hitherto only known from the type locality, the Bakır Dağı, a summit area in the eastern Beydağları in the Western Taurus (Fig. 4; for a monograph of this mountain range see Eren & al. 2004).

Site conditions and synecology. – Secale leptorhachis was recorded only once at elevations of c. 1800 m in a gappy, secondary thorn-cushion community with abundant Acantholimon lycaonicum Boiss. & Heldr. and Astragalus angustifolius Lam. var. angustifolius, replacing the vanishing, very localised and strongly cleared to degraded oreal needle-leaved mountain forests. The limestone grasslands and thorn-cushion communities, whether primary or secondary, are classified within the Tanacetion praeteriti Quézel 1973 alliance (Quézel 1973, Parolly 2004). The stands on the lower slopes of the Bakır Dağı are rich in Poaceae such as Bromopsis cappadocica (Boiss. & Bal.) Holub, Elytrigia divaricata (Boiss. & Bal.) Nevski, Festuca elwesiana Markgr.-Dann., Koeleria macrantha (Lede.) Schult. and Secale anatolicum Boiss., and moderately disturbed due to the situation above the skiing resort of Saklıkent. Other important associated species include, among many others, Alyssum erosulum Clementi, Dianthus anatolicus Boiss., Antheniscretica subsp. anatolica (Boiss.) Grierson, Crucia taurica (Pall. ex Willd.) Ehrend., Cynus bourgaei (Boiss.) Wagenitz & Greuter, Cynoglossum lithospermifolium subsp. carente (Boiss.) Greuter & Burdet, Euphorbia kotschyan a Fenzl, Marrubium bourgaei, Minuartia pestalozzae (Boiss.) Bornm., Papaver pilosum Sm. subsp. pilosum, Salvia pisidica Benth., Thymus sipleus var. davisi anus Ronninger and var. sipleus Boiss., and especially Tanacetum praeteritum (Horw.) Heywood subsp. praeteritum.

Recommended IUCN threat category. – There are no reliable field observations available; however, Secale leptorhachis seems to appear only very locally and with scattered individuals. All other Secale records from that mountain range between 1750 and 2550 m represent S. anatolicum Boiss. (Eren & al. 2004). This constitutes a serious risk of extinction. Hence, it should preliminarily be classified as “Critically Endangered (CR)” according to criterion D of the IUCN Red List Categories (2001).
Fig. 2. Secale leptorhachis (A-D) and S. anatolicum (E) – A: basal part; B: upper part, culms and inflorescence; C: spikelet, dorsal view; D: spikelet, ventral view; E: spikelet of S. anatolicum, ventral view. – A-D from the holotype (B), E from Döring, Parolly & Tolimir T 639; drawings by Horst Lünser.
**Stipa cacuminis** H. Scholz & Parolly, sp. nova

Holotype: Turkey, C2 Muğla, Sandras Dağ, Altinsivri, 2100 m, dwarf-shrub community, peridotite, 20.6.1999, M. Döring, G. Parolly & D. Tolimir T 76a (B; isotype: herb. Parolly) – Fig. 3.

Differs a *Stipa hohenackeriana* Trin. & Rupr. arista indistincte bigeniculata, columna aristae laevi, pilis setae longioribus usque ad 5 mm (nec 2 mm) longis et apice lemmatis coronula destituta.

Tufted perennial. Stems 30-40 cm tall. Leaf blades setaceous, c. 0.5 mm in diam., grey-green, scabridulous beneath (sometimes with additional single, short and stiff hairs), hairy above. Leaf sheaths glabrous to puberulent, ligule to 6 mm long. Inflorescence a contracted panicle, at least lower part enveloped by upper sheath. Glumes subequal, long-acuminate, up to 40 mm long. Lemma with naked callus, c. 15 mm, uniformly hairy below, above middle with a row of hairs not reaching apex, apically (at base of awn) without a ring of hairs. Awn c. 18 cm, indistinctly unigeniculate, column smooth and glabrous, bristle weakly arcuate, plumose, hairs c. 5 mm long.

Relationship. – To all appearance, *Stipa cacuminis* links *S.* sect. *Barbatae* Junge with *S.* sect. *Smirnovia* Tzvel., which according to Freitag (1985) does not represent a monophyletic taxon. At present, about six species of *S.* sect. *Barbatae* are known from Turkey (Freitag 1985, Scholz 1985, 2000), including *S. hohenackeriana* Trin. & Rupr. as the closest relative of *S. cacuminis*, but no members of *S.* sect. *Smirnovia, S. cacuminis*, rather unique within the genus, combines the absence of a ring of short hairs (coronula) at the top of the lemma with the weakly geniculate or unigeniculate awn with a long (4-5 mm) plumose seta (only up to 2.5 mm in *S.* sect. *Barbatae*). It thus somewhat approaches *S.* (sect. *Smirnovia*) *caucasica* Schmalh. s. str. with a distribution range from the Caucasus to Afghanistan (Freitag 1985).


Distribution. – The two occurrences of *Stipa cacuminis* presently known a rather wide range between the Sandras Dağ (records from two different summits) in the SW edge of the Western Taurus and the Çamlık area in the western Central Taurus (Fig. 4). There is much evidence to assume that *S. cacuminis* is a hitherto overlooked serpentinophyte with a much wider distribution in the Taurus range and even occurrences outside Turkey.

The following specimen from N Iran, first reported as *S. pennata* L. β minor Boiss. (Bornmüller & Gauba 1939), then identified as *S. hohenackeriana* and later as *S.* (sect. *Stipa*) *turkestanae* Hack. (Freitag 1985) comes close to our species and may belong to *S. cacuminis*: Persia borealis, Hes[β]s[i bard] [bei Haasnak Dar], 3000 m, 24.8.1935, Gauba 1234 (B).

Fig. 3. *Stipa cacuminis* – A: habit; B: caryopsis. – From the holotype (B); drawings by Horst Lünser.
Werderm.) t’Hart, Verbascum cariense Hub.-Mor. and Viola sandrasea Melchior. Phytosociologically, these stands can be placed in the western race of the serpentinophytic Thuryon capitatae Quézel 1973 alliance of the Astragalo-Brometalia Quézel 1973 (Parolly 2004).

The record near Çamlık comes from a distinctly lower elevation (1340 m), where Stipa cacuminis colonises W-exposed serpentine slopes covered by rather open black pine forests with an unusually dense, but species-poor herb layer. Robert Ulrich (in lit.) noted besides the abundant Stipa the following few associates: Cochlearia sempervivum Boiss. & Heldr., Eryngium palmito Boiss. & Heldr., Ferulago sp. and Thlaspi aff. cariense Carlström. A phytosociological classification of these stands is presently not possible.

Recommended IUCN threat category. – There are no reliable data about the population size of Stipa cacuminis. Nevertheless, a preliminary classification as “Vulnerable (VU)” according to criterion D of the IUCN Red List Categories (2001) seems justified.

Additional remarkable records

Bromopsis tomentella subsp. nivalis (Bornm.) H. Scholz

Hitherto known to occur in Iran and very locally in the NE edge of Anatolia (Scholz & Byfield 2000, as Bromus tomentellas subsp. nivalis H. Scholz & A. Byfield). The taxon has obviously a surprisingly wide distribution in the Taurus Mts as revealed by our gatherings. In NE Anatolia, it occurs in dry acidophytic alpine pasture grassland. In the Taurus Mts it grows mainly on limestone and dolomite. Typical substrates in the Bolkar Dağları include moraine talus partly with considerable proportions of ultramafic gravel. The sites in the high subalpine to subnival belts are often damp, sometimes close to damp screes or snow-fields. Phytosociologically it is linked to the Drabo-Androsacetalia vegetation.

Turkey: C3 Antalya: Beydağları, Bakırli Dağı above Sakıkent, summit region, 36°49'60"N, 30°20'22"E, 2350-2550 m, rocky slopes, limestone, wind-swept cushion community on rocky flats and along ridges, 11.7.1999, M. Döring, G. Parolly & D. Tolimir P 6519 (B, herb. Parolly). — C3 Isparta: Davras Dağları, Büyük Davras Dağı, N-facing cirque and summit region above Kır Yayla, 37°45'77"N, 30°44'64"E [cirque], 2150-2550 m, limestone and dolomite, wind-swept cushion communities (Drabo-Androsacetalia) on damp moraines and along the rocky summit ridge, 28.6.2000, Ö. Eren & G. Parolly P 7635b (AKDU, B, herb. Parolly). — C3 Isparta/ Konya: Dedegöl Dağları, Dipoyraz (Dedegöl) Dağı (ascent from Yenişarbademli village), area...

_Festuca cataonica_ (Hackel ex Boiss.) Markgr.-Dannenb.
So far known only from the Cataonian and Cilician Taurus westward to the Pozanti area (Markgraf-Dannenberg 1985), the following record extends the range considerably to the west. The species is an important component of the limestone swards on raw soil along the summit crest of Honaz Dağı.

**Turkey:** C2 Denizli: Honaz Dağ, summit region (main ridge and saddle between the two major peaks), 37°03'18''N, 30°09'45''E, 2550 m, rocky slopes, limestone and dolomite, steep, scree-rich limestone swards, 20.6.2000, Ö. Eren & G. Parolly P 7497 (AKDU, B, herb. Parolly).

**Festuca karsiana** E. Alexeev
In Turkey, this Euxine taxon has been only known from the type (A9; cf. Markgraf-Dannenberg 1985).

**Turkey:** A8 Artvin (Çoruh): Doğu Karadeniz Dağları, central Kaçkar Dağları near Yaylalar (Hevec), Büyük Çay valley 0.6-2 km above Olgunlar, 40°50'94''N, 41°13'85''E, 2150-2250 m, granite, flushes, low-sedge fens, and hygrophytic vegetation along small tributary creeks of the Büyük Çay, N-exp., 20.8.1999, M. Döring, G. Parolly & D. Tolimir P 7205 (B, herb. Parolly).

**Festuca punctoria** Sm.
Believed to be endemic to the NW Anatolian Ulu Dağ, where it is known from many gatherings (Markgraf-Dannenberg 1985). This remarkable range extension towards the S Anatolian Honaz Dağı spotlights a highly unusual distributional pattern previously restricted to vicarious taxa such as _Galium olympicum_ Boiss. (Ulu Dağ) and _G. aretioides_ Boiss. (Honaz Dağ and neighbouring mountains).

**Turkey:** C2 Denizli: Honaz Dağ, summit region (main ridge and saddle between the two major peaks), 37°03'18''N, 30°09'45''E, 2530 m, rocky slopes, limestone and dolomite, wind-swept cushion communities (Drabo-Androsacetalia), dolomite and marble, 28.6.2000, Ö. Eren & G. Parolly P 7473 (AKDU, B, herb. Parolly); ibid., 2550 m, steep, scree-rich limestone swards on raw soil, 20.6.2000, Ö. Eren & G. Parolly P 7498 (AKDU, B, herb. Parolly).

**Koeleria brevis** Stev.
Given in Flora of Turkey (Doğan 1985) only from Turkey-in Europe and central W Anatolia from “dry calcareous places, s.l.-1000 m”, the new localities of this putative Euxine species in the western half of the Taurus range are somewhat surprising. All records come from low subalpine to alpine elevations, often from wind-swept sites, and although limestone rock predominates, from nearly all substrates occurring there, including ophiolites and mica schist.

**Turkey:** B3 Afyon: Sultan Dağları, ascent from Yakasinek, range between the two main summits, 38°28'62''N, 31°09'29''E, c. 1900-2100 m, micaceous schist, wind-swept, open thorn-cushion communities, 3.7.2000, Ö. Eren & G. Parolly P 7723 (AKDU, B, herb. Parolly). — C2 Muğla: Sandras Dağ above Ağla, Altinsivri summit, 37°03’N, 28°48’E, 1950-2024 m, summit plateau and gently sloping rocky inclines, boulder-rich, ophiolitic soils, dwarf-shrub communi-

Concluding remarks

A good deal of the new taxa and records come from well botanized mountain ranges, often already with a local flora available, such as Honaz Dağları (Tuzlaçiz 1983, Huber-Morath 1947), Sandras Dağları (Özhatay 1981, 1987, Hartvig & Strid 1987) and Bakırı Dağları (Eren & al. 2004), underlining the introductory statement.

Stipa cacuminis belongs to a complex of closely related Irano-Anatolian taxa. This S Anatolian endemic (but see above) stands out as the first Anatolian Stipa obviously confined to ultramafic soils, but with a wider range to be expected. It was found growing together with the substrate-vague S. holosericea.

By contrast, the other two species described new to science, Secale leptorhachis and Oreo- poa anatolica, seem to be taxonomically isolated and show an extremely localised distribution. While the never glaciated eastern Beydağları (with the Bakırı Dağı at its northern end) are well-known for its paleo-endemics especially concentrated in the coastal foot-hills, but occasionally also dwelling in the subalpine belt (Davis 1971, Eren & al. 2004, Parolly & Hein 2000, Parolly & Nordt 2001), the situation deviates in the western, high inland part of that chain (Kızlar sıvrisi). The single locality of O. anatolica is a formerly glaciated area, with a block glacier in the Aktepe cirque still present. A permanent in-situ-overlast since the Pleistocene is not conceivable, but a shift to lower elevations easily possible. An adaptation to cold upland climates provided, an immigration during pluvial times from the N and NE and a subsequent dramatic shrinking of its range in warmer periods is a likely assumption. The penetration of Euro-Siberian elements especially along the Anatolian Diagonal (Davis 1971, Kürschner 1982) to the Taurus Mts is today widely accepted; many of these plants of Euro-Siberian origin possess today relic occurrences in the E Mediterranean and Irano-Anatolian areas of Turkey. The situation of O. anatolica seems parallelled by Poa akmanii Soreng & al., with three scattered occurrences in the western Taurus from high mountain sites, preferably close to snow fields (see Soreng & al. 1997 and for its ecology and new localities, especially Eren & al. 2004).

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