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Two new species of *Seseli* (*Umbelliferae*) from Turkey

Abstract

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Two species, *Seseli paphlagonicum* and *S. phrygium*, are described and illustrated from Northern (Ilgaz Dağı) and Central (Sakarya valley) Turkey, respectively. Both species belong to *Seseli* sect. *Seseli*. They are limestone chasmophytes. The differences and distribution in Turkey of the species of *Seseli*, closely related to *S. gummiferum* and *S. petraeum*, are discussed.

Key words: *Seseli paphlagonicum*, *S. phrygium*, *Apiaceae*.

Introduction

As a part of the Mediterranean, and the part with the richest flora, Turkey belongs to one of the biodiversity centres of the first order for *Umbelliferae*. However, in *Seseli*, the specific diversity is moderate, despite the of abandance of available habitats (limestone, rocks, crevices, etc.). Now only nine species of Seseli, including four endemic species (*S. andronakii, S. corymbosum, S. hartvigii*, and *S. resinosum*) are recorded in the Turkish flora, according the ASIUM database of Moscow State University. This count does not include *S. peucedanoides* (M.Bieb.) Koso-Pol. and *S. foliosum* (Sommier & Levier) Manden., which we regard as the species of a separate genus, *Gasparrinia* Bertol. The number of known Turkish species may reach ten, if *S. rubellum* Post is a separate species, as Southam (1999) believed.

Using a classification of *Seseli* species, distributed in the adjacent territory of the former Soviet Union (Pimenov & Sdobnina 1975; Pimenov 1978) and enlarging it to include the related Turkish species, the local species can be attributed to following three sections:

Sect. *Libanotis* (Haller ex Zinn) Gren. & Godr.
S. libanotis (L.) W.D.J.Koch
S. transcaucasicum (Schisck.) Pimenov & Sdobnina
Sect. *Seseli*
S. petraeum M. Bieb.
S. corymbosum Boiss. & Heldr. ex Boiss.
S. resinosum Freyn & Sint.

S. tortuosum L.
S. andronakii Woronow
S. hartvigii Parolly & Nordt
Sect. *Seselinia* (Beck) Pimenov
S. grandivittatum (Sommier & Levier) Schischk.

The species of the type section can be divided into several subgroups, using some small differences, mainly in leaf dissection and the number of umbel rays.

The first group is formed by two species, *S. corymbosum* and *S. resinosum*, closely related to the Crimean *S. gummiferum* Pall. ex Sm. After critically checking some taxa of this group from the Aegean region as the subspecies of *S. gummiferum*, P.H.Davis (1953) treated *S. corymbosum* also as a further subspecies of it – *S. gummiferum* subsp. *corymbosum* (Boiss.) P.H.Davis. P.W.Ball (1968) followed Davis in the treatment of the Aegean subsp. *crithmifolium* (DC.) P.H.Davis and subsp. *aegaeum* P.H.Davis. *Seseli resinosum*, although also equally similar, was not regarded and commented by Davis. The three subspecies of *S. gummiferum* accepted by Davis form a vicariant series from the Crimea to Aegean Greece. Following a narrow species concept in the Umbellifrae, we prefer to treat similar geographical races as monotypic species and, in particular, with regard to *S. corymbosum*, as a separate species. The usage within the hierarchy of the subspecies or other infraspecific ranks with differences, based on unclear criteria, is not of much benefit for the evaluation of natural diversification, creating at the same time further nomenclatural difficulties. As to the Greek taxa of the *S. gummiferum* complex, their status can be clarified by more intensive field collection and observations. Probably, it would be correct to return to Boissier's treatment of *S. crythmifolium* as a separate species (perhaps with subsp. *aegaeum*).

The second group is formed by *S. tortuosum*, a polymorphic species, scattered in Turkey, and two more locally distributed species, *S. andronakii* from the Çoruh basin in NW Turkey and *S. hartvigii* from Toros Dağlari.

S. petraeum, a species distributed mainly outside Turkey (Crimea and the Caucasus), with an isolated locality in the Pontic Mts, has no close relatives among known Turkish *Seseli*.

The fruit anatomy is similar in all these species. It was studied previously for *S. tortuosum* (Klan 1947; Pimenov & Sdobnina 1975), and we have additionally studied the carpoanatomy for *S. gummiferum*, *S. petraeum* and S.*resinosum.*

Fruits of *S. gummiferum* (Fig. 1 A) are covered by very short hairs; they are hardly divided into mericarps. The carpophore is very reduced. The calyx teeth lanceolate to linear, stylopodia short conic, styles to 1.4 mm long, reflexed to the dorsal side of the mericarp. The mericarps are 3.5-4.0 mm long, 1.5-1.8 mm broad, elliptic in outline, slightly compressed dorsally, pentagonal in cross section; the ribs filiform; exocarp of small cells, interrupted near the bases of the marginal ribs; commissure broad; mesocarp of parenchyma cells, partly with pitted walls; vittae solitary in valleculae, 2 on commissural side; endosperm almost flat.

The fruits of *S. petraeum* (Fig. 1 B) are covered by short solitary or clustered hairs. The carpophore is very reduced. Calyx teeth triangular-lanceolate , stylopodia conical, styles 1.0-1.2 mm long, reflexed to the dorsal side of the mericarp. Mericarps 3.8-4.0 mm long, 1.1-1.3 mm broad, lanceolate in outline, slightly compressed dorsally, pentagonal in cross section; ribs filiform; exocarp of small cells, interrupted near the bases of the marginal ribs; commissure broad; mesocarp of parenchyma cells; vittae mainly solitary in valleculas, 2 on commissural side; rib secretory ducts solitary, small; endosperm almost flat.

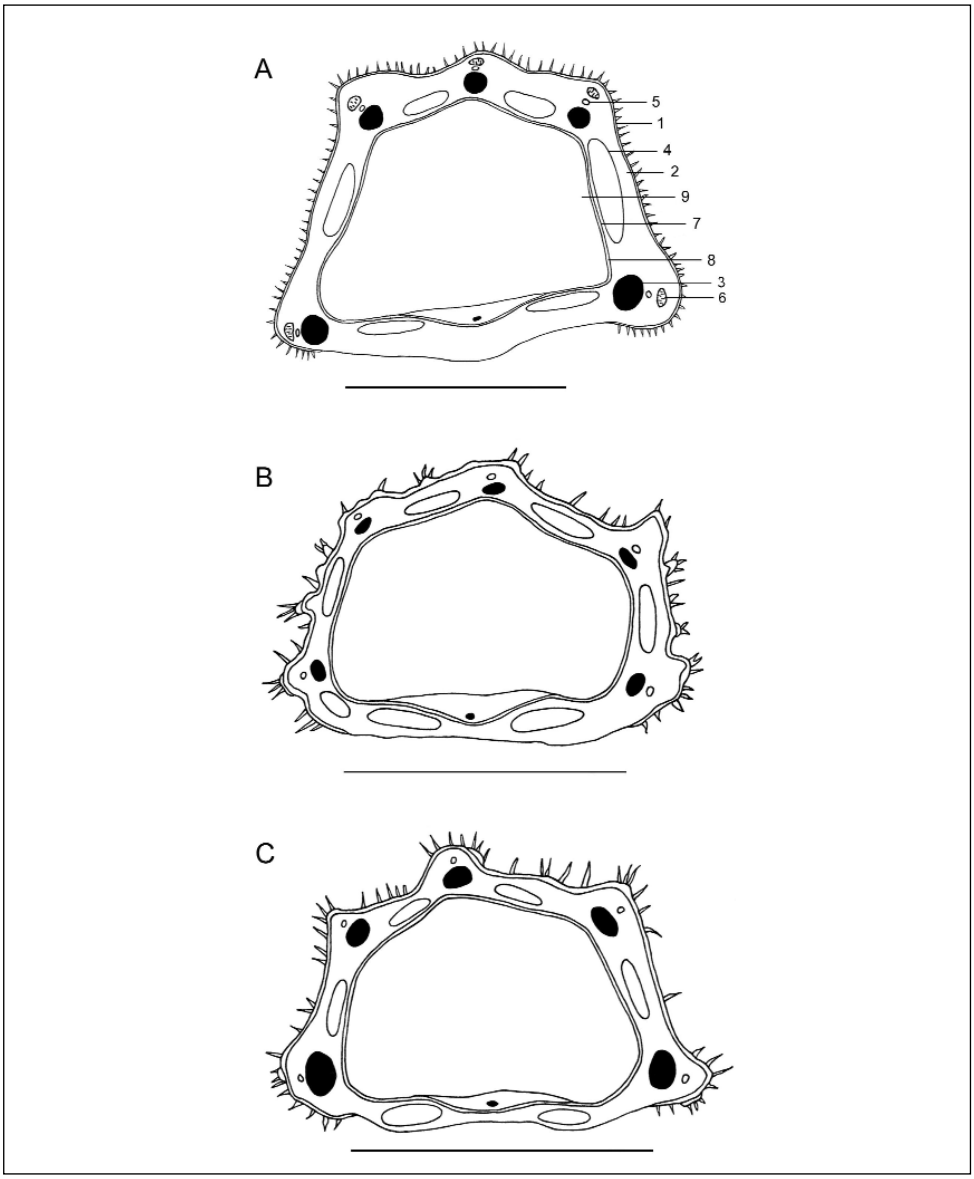

Fig. 1. Mericarp transactions of some species of *Seseli*.
A – *S. gummiferum* (specimen examined: Ukraine, E Crimea, near settlement Morskoe, W slope of Mt. Panak-kaja, rocks. 0.6.09.1985, N.K.Schvedczikova, MW); B – *S. petraeum* (specimen examined: Russia, N Caucasus, Kabardino-Balkaria, Zol district, Valley of Narsanes, bank of Chasaut River, rocks. 29.08.1988. N.V.Kostyleva & T.Ju.Konovalova, MW); C – *S. resinosum* (specimen examined: Turkey, A4 Karabük, vicinity of Safranboly, Peijir Mts., near Burak Magaras, limestone rocks, 41º16'N, 32º37'E, h= 750-900 m. 23.08.2008, M.G.Pimenov & E.V.Kljuykov, 120, MW)
1 – exocarp; 2 – mesocarp; 3- vascular bundles; 4 – vallecular vittae; 5 – rib secretory ducts; 6 – cells with pitted walls; 7 – endocarp; 8 – seed coat; 9 – endosperm.

The fruits of *S. resinosum* (Fig. 1 C) are densely covered by short solitary or clustered hairs. Carpophore bifid with thin branches. Calyx teeth linear, stylopodia short conic, styles 0.8-1.0 mm long, reflexed to the dorsal side of the mericarp. Mericarps 2.5-3.2 mm long, 1.0-1.5 mm broad, elliptic in outline, slightly compressed dorsally, pentagonal in cross section; ribs short, keeled; exocarp of small cells, interrupted near the bases of the marginal ribs; commissure broad; mesocarp of parenchyma cells; vittae solitary in vallecullae, 2 on the commissural side; rib secretory ducts solitary, small; endosperm almost flat.

The new species

During our trips in Turkey, we found two new species of *Seseli* with an affinity to *S. petraeum, S. corymbosum* and *S. resinosum*, i.e. belonging to the type section of the genus.

Seseli paphlagonicum Pimenov & Kljuykov **sp. nov. - Fig. 2.**

Type: Turkey, A4 Kastamonu, Ilgaz Dağı, Ilgazdağı Milli Park, 41º00'N, 33º44'E, h= 2200 m, limestones, 19.08.2008, *Pimenov & Kljuykov,104* (Holo – MW).

Plantae perennes, monocarpicae, glaucescentes, totae praeter petala breviter pubescentes, radicibus palaribus. Caules solitarii, recti, 5-20 cm alti, basi 3-7 mm in diam., in parte media violacei, costati, a basi ramosi. Folia radicalia numerosa, rosulata, vaginis angustis, petiolis 1-3.5 cm longis, laminis 3-10 cm longis, ambitu ovatis, triplo pinnatisectis, segmentis basalibus primariis petiolulis 5-10 mm longis, lobis terminalibus foliorum anguste linearibus, acutis, 1-1.5 cm longis, ca. 1-1.1 mm latis. Folia caulina foliis radicalibus similia, sed minora, vaginis dilatatis, triangulato-lanceolatis. Folia ramis lateralium valde simplificata. Umbella centralis umbellis lateralibis latiora, 6-10 cm in diametro, radiis 13-30, parum inaequilongis, 2-4 cm longis, leviter incrassatis, costulatis; involucrum nullum vel e bracteis solitariis lanceolatis compositum. Umbellulae densae, 1-1.3 cm in diametro, multiflorae (50 flores et ultra), bracteolis 15-20, integris, biseriatis, basi pro tertia parti connatis, subtus viridibus, margine anguste albomarginalibus, apice violaceis, umbellas leviter superantibus, lanceolatis, floribus subsessilibus. Dentes calycini lanceolati, acuti, violacei, scabriduli. Petala initio rosea, dein alba, ad 1.5 mm longa, oblanceolata, exunguiculata, apice vix emarginata, incurva et attenuata, canaliculis secretoriis solitariis praedita. Stylopodia plano-conica, costata, styli ad 2 mm longi, violacei. Ovaria sub anthesi breviter pubescentia, leviter costata. Fructus ignoti.

Affinitas: Species haec e S. petraeo M.Bieb. proxima est, sed foliis pubescentibus, non glabris, lobis terminalibus foliorum angustis, ad 1-1.1 mm, non 2-3.5 mm latis, caulibus imprimis basi (non plus minusve regulariter) ramosis, radiis umbellis crassis, sectione rotundatis (non tenuibus et conspicue costatis), bracteolis 15-20, latis, biseriatis, lanceolatis, umbellulas leviter superantibus (non 10-12, linearibus, uniseriatis, umbellulas vix brevioribus), pedicellis brevibus, crassis (non tenuibus, umbellulis duplo-triplo longioribus), petalis sub efflorescentiam roseis, non albis bene differt.

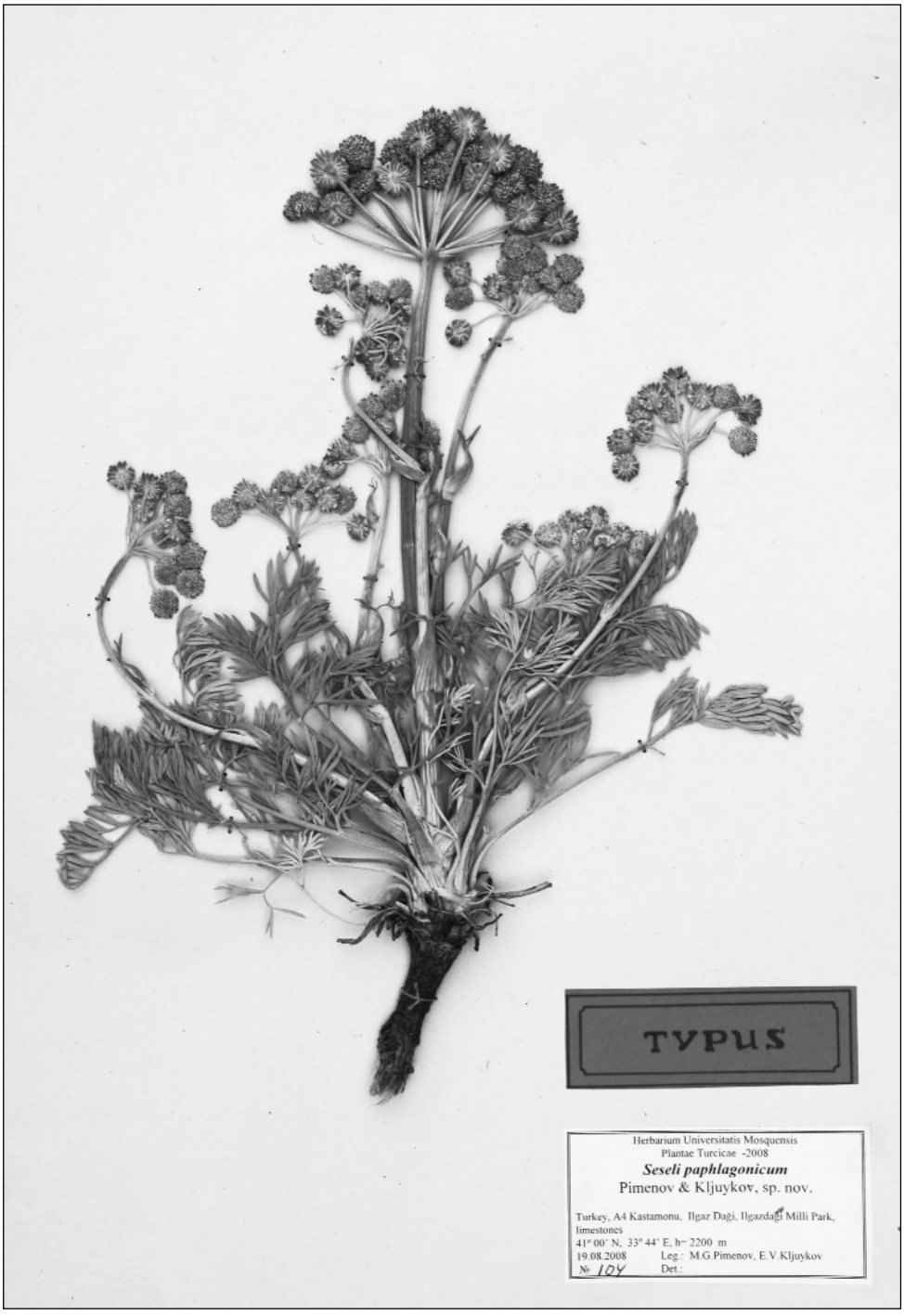

Fig. 2. *Seseli paphlagonicum* Pimenov & Kljuykov, sp. nov (type specimen).

Seseli phrygium Pimenov & Kljuykov, sp. nov. - **Fig. 3.**

Type: Turkey, A3 Eskişehir, Sakarya valley, Mayislar, 40º02'N, 30º39'E, 250 m, in cracks of limestone cliffs. 30.06.2007. *Pimenov & Kljuykov, 29* (Holo - MW).

Plantae perennes, fortasse monocarpicae, breviter pubescentes, caudicis integris vel pauciramosis, radicibus palaribus, leviter incrassatis. Caules solitarii, 17-25 cm alti, basi 5-6 mm in diam., in nodis curvati, teretes, tenuiter sulcati, eramosi. Folia radicalia numerosa, rosulata, vaginis lanceolato-triangularibus, petiolis 1-3 cm longis, indurescentibus, laminis 4-8 cm longis, 3-6 cm latis, ambitu lateovatis, bipinnatisectis, segmentis basalibus primariis petiolulis 7-15 mm longis, segmentis terminalibus foliorum profunde incisis, lobis ellipticis vel lanceolatis, 5-10 mm longis, 2.5-3 mm latis. Folia caulina foliis radicalibus similia, apice decrescentia, vaginis lanceolatis, superiora ad vaginas subreducta. Umbellae anthesis initio ad 7 cm in diametro, radiis 13-23, parum inaequilongis, tenuibus, teretes, indistincte sulculatis; involucrum nullum. Umbellulae densae, bracteolis 12-14, herbaceis, integris, ovatis, inaequalibus, exterioris majoribus, basi leviter connatis, margine anguste albomarginalibus, umbellulis subaequalibus. Dentes calycini anguste lanceolati. Petala alba. Fructus ignoti.
Affinitas: Species haec e *S. corymboso* Boiss. & Heldr. ex Boiss. proxima est, sed lobis terminalibus latioribus, lanceolatis vel ellipticis 5-10 mm longis, 2.5-3 mm latis (non linearibus, 5-7 mm longis, 0.7-0.8 mm latis) et caulibus in nodis geniculatis, non rectis differt. Ad *S. resinoso* Boiss. ambo species novae foliis caulibusque basi pubescentibus, non glabris, biomorphis monocarpicis (non polycarpicis), bracteolis ovatis vel lanceolatis, umbellulis aequalibus vel leviter superantibus (non subulatis, umbellulis brevioribus) discernuntur.

The differences amongst the Turkish and extra-Turkish species related to *S. gummiferum* and *S. petraeum* are summarized in following key:

1. Leaves almost glabrous.....**2**
1. Leaves pubescent **3**
2. Stems densely puberulent; main stem usually shortened, 5-7 (40) cm tall, lateral branches considerably exceeding central umbel; umbels 25-80-rayed; umbelets condensed, with 50 or more flowers; pedicels equal to two-three times longer than flowers .....***S. petraeum***
2. Stems glabrous; main stem well-developed, 40-60 cm high; lateral branches shorter than central umbel; umbels 20-25-rayed; umbelets with 20-25 flowers; pedicels shorter than flowers .....***S. resinosum***
3. Stems violet in the lower part; leaves and lateral branches situated near the stem base; peduncles of umbels long; petals at anthesis pink, later white .....***S. paphlagonicum***
3. Stems green; leaves and branches are distributed more or less evenly along stem; peduncles short; petals white.....**4**
4. Umbelets 28-50-rayed; bracteoles 15-20, connate at the base for one third length, slightly longer than umbelets ..... ***S. gummiferum***
4. Umbelets 13-25-rayed; bracteoles 12-14, very shortly connate at the base, shorter or equal to the umbelets **5**
5. Terminal leaf lobes lanceolate to elliptic, 5-10 mm long, 2.5-3.0 mm broad; stems geniculate at the nodes ..... ***S. phrygium***
5. Terminal leaf lobes linear, 5-7 mm long, 0.7-0.8 mm broad; stems not geniculate at the nodes .....***S. corymbosum***

Fig. 3. *Seseli phrygium* Pimenov & Kljuykov, sp. nov. (type specimen).

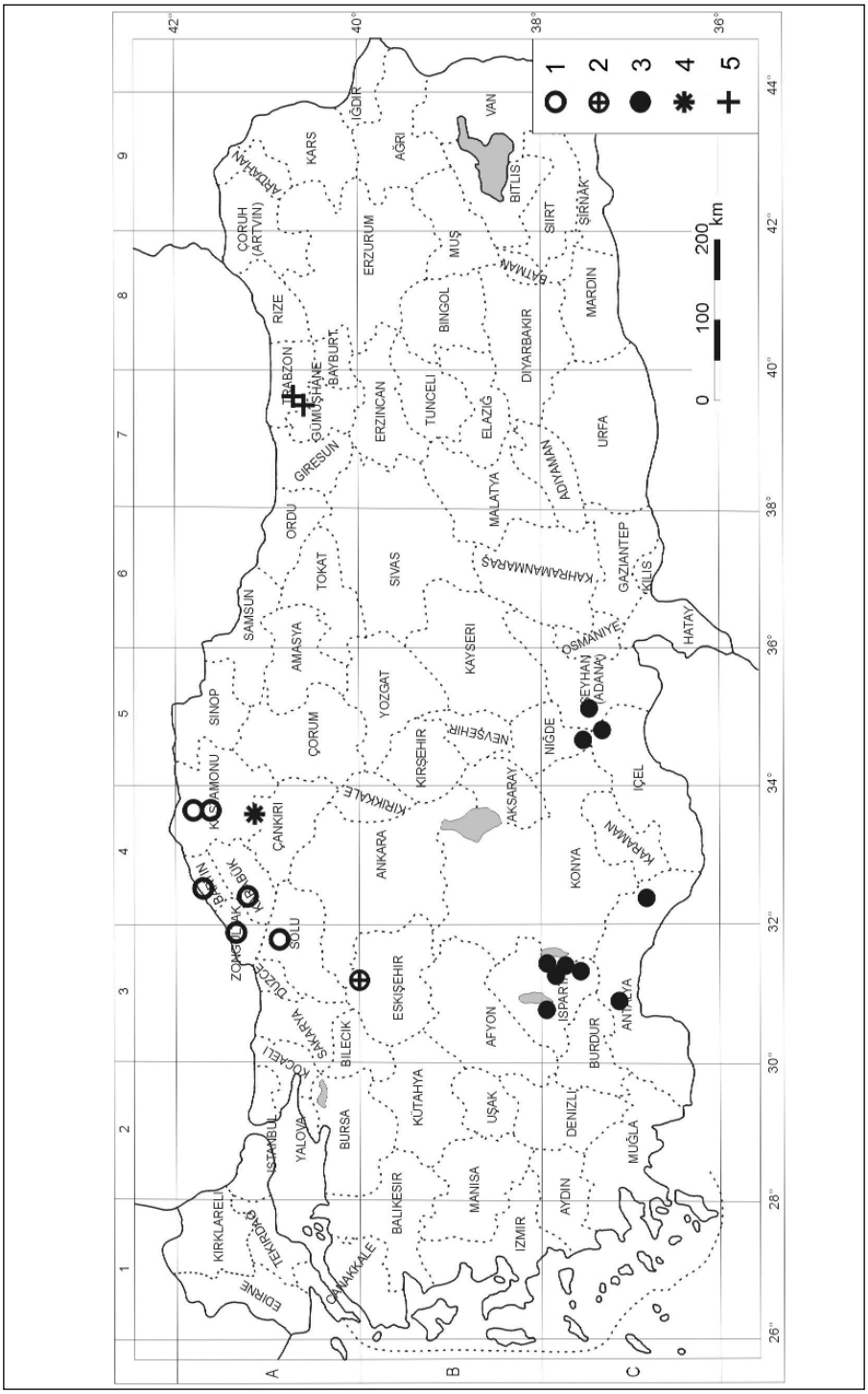

Fig. 4. Distribution map of Turkish species, related to *Seseli gummiferum* and *S. petraeum*:
1 – *S. resinosum*, 2 – *S. phrygium*, 3 – *S. corymbosum*, 4 – *S. paphlagonicum*, 5 – *S. petraeum*.

Five closely related Turkish species of *Seseli*, belonging to the type section – *S. petraeum, S. corymbosum, S. paphlagonicum, S. phrygium*, and *S. resinosum*, form a geographical vicariant series (Fig. 4).

Acknowledgements

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