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Towards a clarification in the taxonomy of Sino-Himalayan species of *Selinum* s.l. *(Umbelliferae)*. 2. Further studies in *Oreocome* in the Himalayas and adjacent areas

Abstract

Pimenov M. G. & Kljuykov E.: Towards a clarification in the taxonomy of Sino-Himalayan species of *Selinum* s.l. *(Umbelliferae)*. 2. Further studies in *Oreocome* in the Himalayas and adjacent areas. – Willdenowia 39: 93-99. – Online ISSN 1868-6397; © 2009 BGBM Berlin-Dahlem.
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Oreocome sect. *Evittatae* is described as new to science to accommodate the former *Selinum vaginatum* from India and Pakistan and a newly described species, *O. aegopodioides,* from Uttarakhand, India, both without vittae in their mericarps. *O.* sect. *Oreocome* is enlarged by two species from Afghanistan, the newly described *O. nuristanica,* which is related to *O. candollei,* and *O. duriuscula,* which is transferred from *Selinum. S. stewartii* from Afghanistan and Pakistan is transferred to *Seseli*. Correspondingly three new nomenclatural combinations, *O. arguta* (for *S. vaginatum* and the conspecific *Levisticum argutum*), *O. duriuscula* and *Seseli stewartii,* are validated. Our analyses revealed, that the genus *Selinum* is entirely absent from the Sino-Himalayan region and adjacent Afghanistan. *Oreocome* in its revised circumscription comprises nine species in two sections.

Additional key words: *Apiaceae,* carpology, India, Pakistan, Afghanistan

This is a follow-up of our previous publication (Pimenov & al. 2001) on the *Umbelliferae* taxa related to *Ligusticum* and *Selinum* and distributed in the Himalayas and adjacent areas. In the first part we considered mainly Sino-Himalayan species, in the present we also include taxa distributed in adjacent regions of Afghanistan.

1. Taxonomy of *Selinum vaginatum* and *Levisticum argutum*

In our previous contribution (Pimenov & al. 2001), *Selinum vaginatum* was not included in *Oreocome* in spite of some morphological similarity, because the species has fruits without vallecular and commissural vittae (secretory ducts). This character is rather essential in the *Umbelliferae* taxonomy, because vittae are absent in several genera as, e.g., in *Conium, Echinophora, Hohenackeria* and *Symphyoloma*. On the other hand it varies during fruit development in some taxa: mature fruits in *Aegopodium,* e.g., have no vittae, but vittae can be observed in young fruits of the same species (Alexandrov & Klimochkina 1947); similarly, in *Heracleum* sect. *Wendia* the commissural vittae present in young fruits disappear in mature fruits (Briquet 1924). In other genera vittae are present in some but absent in other species: *Coriandrum sativum* has and *C. tordylium* does not have commissural vittae; in *Scandix* the presence of vittae varies among its species (Tamamschjan 1945); in *Conioselinum* Hoffm., a genus related to the taxa under study, two Chinese and one Nepalese species have no vittae in mature fruits, whereas the others have a usual fruit secretory system (Pimenov & al. 2003).

Our latest molecular phylogenetic studies of the *"Foeniculinae"* (Valiejo-Roman & al. 2006) placed *Selinum vaginatum* in spite of the lack of vittae in the same clade as other Himalayan species of *Selinum* s.l. that we transferred to *Oreocome*. Hence, the molecular evidence, together with overall similarity, enables us to relate also *S. vaginatum* to *Oreocome,* while concurrently separating it to a new section within that genus.

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Fig. 1. Type specimens – A: *Levisticum argutum* Lindl. (K); B: *Cortia vaginata* Edgew. (K).

The name *Selinum vaginatum,* widely accepted at present, is based on *Cortia vaginata* Edgew. (Edgeworth 1845). However, *Levisticum argutum* Lindl. (Lindley 1835) refers to the same species, as a comparison of their type specimens, both kept in Kew (Fig. 1), revealed. *Levisticum* is a genus completely absent from the Himalayan flora. The description of *L. argutum* is rather short, and it is not surprising that the name was almost completely forgotten. Edgeworth (1845) and Clarke (1879) suggested (the latter with some hesitation) *L. argutum* was conspecific with *Cortia elata* Edgew. (≡ *Ligusticum elatum* (Edgew.) C. B. Clarke). Mukherjee & Constance (1993), however, did not confirm this synonymy.

Oreocome* sect. *Evittatae Pimenov & Kljuykov, **sect. nov.** – Type: *Oreocome arguta* (Lindl.) Pimenov & Kljuykov

A sectio typica mericarpiis evittatis, bracteolis pinnatifidis (non integris, breviter dentatis vel lobatis) valde distinguitur.

The section comprises two species, one of them being new to science.

Key to the species of *Oreocome* sect. *Evittatae*

1. Terminal leaf lobes lobate; bracteoles pinnate or with numerous teeth; mericarps elongate, 4-5(-6) × 1.9-2.5 mm . . . . . ***O. arguta***
– Terminal leaf lobes entire, with small teeth on margins; bracteoles tridentate or entire; mericarps broadly ovate, 5-5.5 × 3.5-4 mm . . ***O. aegopodioides***

Oreocome arguta (Lindl.) Pimenov & Kljuykov, **comb. nov.** ≡ *Levisticum argutum* Lindl. in Royle, Ill. Bot. Himal. Mts: 232. 1835. – Holotype: India, "Mussooree", *Royle* (K!).
= *Cortia vaginata* Edgew. in Trans. Linn. Soc. London 20(1): 55. 1846 ≡ *Selinum vaginatum* (Edgew.) C. B. Clarke in Hooker, Fl. Brit. India 2: 700. 1879. – Lectotype (designated here and by M. F. Watson in sched.): India, "Himalaya, ad alt. ped. 8-9000', in apricis graminosis, Chur [Choor]", *Edgeworth 178* (K!).

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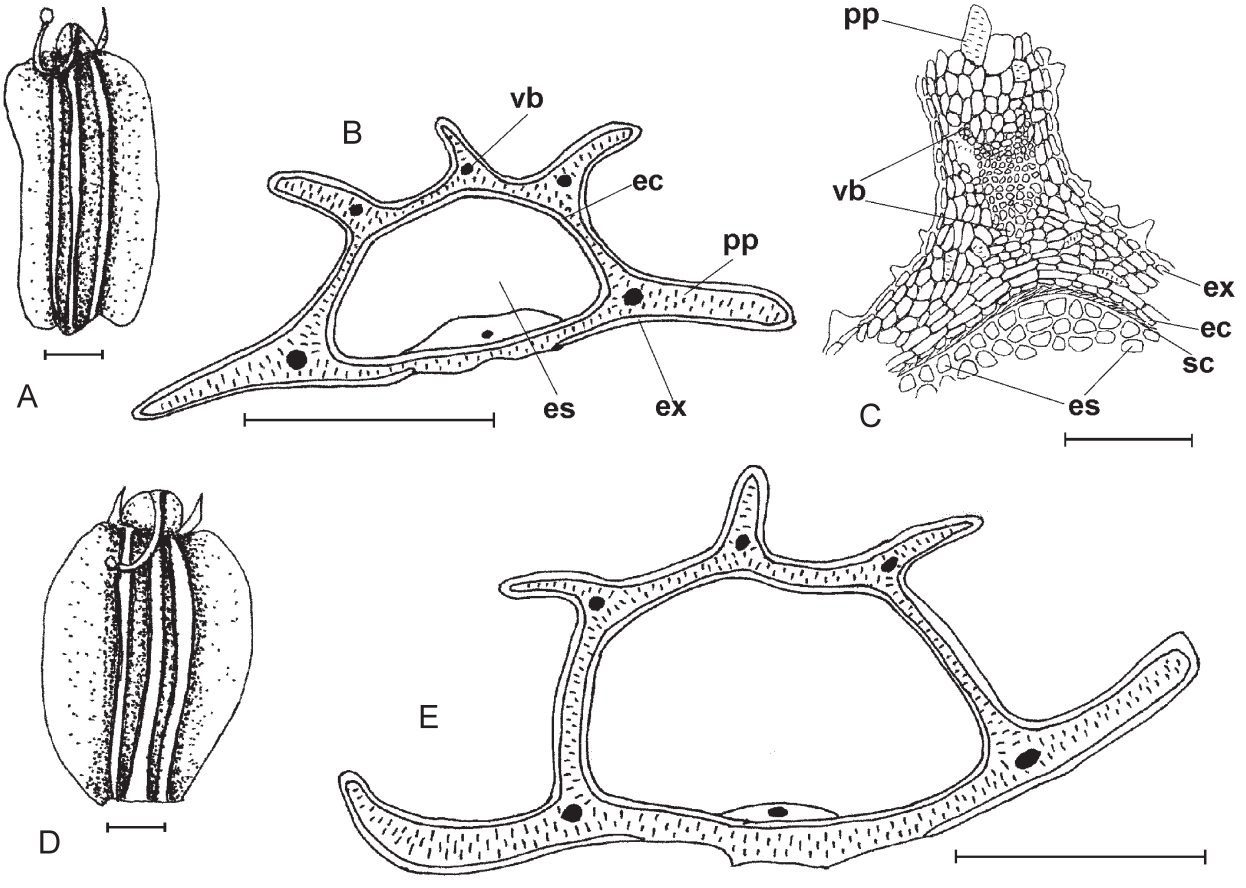


Fig. 2. Fruit structure: A-C: *Oreocome arguta* (India, Himachal Pradesh, Pir Punjal range, Chandra valley, between Khoksar and Sissu, 27.8.2000, *Pimenov & Kljuykov 39,* MW); D-E: *O. aegopodioides* (type specimen). – A, D: dorsal view of mericarp; B, E: transect of mericarp; C: dorsal rib of mericarp. – ec = endocarp, ex = exocarp, pp = parenchyma cells of mesocarp with lignifed pitted walls, vb = vascular bundles. – Scale bars: A, B, D, E = 1mm; C = 0.1 mm.

= *Selinum vaginatum* var. *garhwalensis* C. R. Babu & Chandra in J. Bombay Nat. Hist. Soc. 68(2): 497. 1971. – Holotype: "India, Uttar Pradesh, Garhwal, Ramara, 3000 m, 29.9.1958, *Rau 8728*" (CAL; isotype: BSI).

Distribution. — India (W Himalaya: Jammu & Kashmir, Himachal Pradesh, Uttarakhand), Pakistan.

Ref. — Under *Cortia vaginata:* Leute 1969: 84; Hedge & Rechinger 1987: 363 – Under *Selinum vaginatum:* Bamber 1916: 397; Collett 1921: 213; Hiroe 1958: 153; Rau 1962: 229; Nasir 1972: 116; Stewart 1972: 526; Kaul 1975: 713; Hiroe 1979: 1306; Dhar & Kachroo 1983: 211; Chowdhery & Wadhwa 1984: 328; Mukherjee & Constance 1993: 178; Aswal & Mehrotra 1994: 296; Khanna & al. 1999: 169; Gaur 1999: 401; Dickore & Nusser 2000: 190 – Under *S. vaginatum* var. *garhwalensis:* Naithani 1990: 191; Khanna & al. 1999: 169.

Fruit structure. — Fig. 2A-C.

Oreocome aegopodioides Pimenov & Kljuykov, **sp. nov.** – Holotype: India, "Uttaranchal, Chamoli distr., Main Himalayan range, basin of Alaknanda river, valley of Hem ganga near Ghangaria", 30°37'N, 79°34'E, 3000-3300 m, 18.9.2000, *Pimenov & Kljuykov 232* (MW).

Ab *Oreocome argutae,* qui proxima est, lobis terminalibus foliorum plus minusve integris, margine denticulatis (non lobatis), bracteolis apice tridentatis vel integris (non pinnatis vel margine cum dentibus pluribus), mericarpiis lateovalibus 5-5.5 mm longis et 3.5-4 mm latis (non elongatis 4.5-6 mm longis et 1.9-2.5 mm latis) differt.

Plantae perennes, monocarpicae, ad 130 cm, rhizomatis crassis, ramosis, brevibus, interdum e collo stolones elongatos emittentes, caulibus in sectione rotundis, basi 5-10 mm in diam., fistulosis, in parte superiore corymbiforme ramosis, sub umbellis sulculatis, pilis tenuibus tectis. *Folia radicalia* cito emarcida, petiolo 8-18 cm longo, lamina ambitu ovata, 8-12 cm longa, 5-8 cm lata, pinnatisecta vel bipinnatisecta, segmentis primariis basalibus brevepetiolulatis, petiolulis ad 5 mm longis, lobo terminali 1.5-5 cm longo, 0.5-3.5 cm lato, ovato, margine denticulato. *Vagina foliorum* tubulosa, foliis superioribus elongata, patens, in parte media vel superiore dilatata. *Umbellae* 5-9 cm in diam., radiis 14-25, inae-

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quilongis, 3-5 cm longis, sulcatis, plus minusve dense breviter pubescentibus, in fructu arcuatim reflexis, bracteis nullis vel 2-3, pinnatis. *Umbellulae* 25-30-flores, radiolis ad 6 mm longis, pubescentibus, bracteolis 10-11, vulgo tridentatis, dentibus lanceolato-linearibus vel linearibus, raro indivisis, pubescentibus. *Dentes calycis* longi, lineares, stylopodiis aequilongis vel superantibus. *Petala* alba, 1.1-1.2 mm longa, obovata, apice vix emarginata, incurva et longe attenuata, basi breviter unguiculata. *Stylopodia* breveconica, stylodia 1-2 mm longa, initio recta, dein reflexa. *Fructus* (Fig. 2D-E) glabri, ambitu ovati, mericarpiis lateovalibus, 5-5.5 mm longis, 3.5-4 mm latis, vix dorsaliter compressis; *carpophorum* bifidum; *juga* mericarpiorum anguste alata, subaequalia vel marginalia vix latiora; *exocarpium* e cellulis minutis leptodermaticis, interruptum prope basin jugis marginalibus; *mesocarpium* e cellulis membranis lignescentibus, porosis; *vittae* deficientes; *endocarpium* 1-2-stratosum e cellulis membranis tenuibus, vix lignescentibus; *endospermium* ventre fere planum.

Additional collections studied. — INDIA: UTTARAKHAND (former Uttaranchal): Chamoli distr., Main Himalayan Range, basin of Alaknanda river, Bhyundar valley, 30°37'N, 79°34'E, 3600-3800 m, 18.9.2000, *Pimenov & Kljuykov 245* (MW)*;* Chamoli distr., W Himalaya, valley of upper Mandakini river, near Kedarnath, 30°43'N, 79°03'E, 3500 m, 7.10. 2003, *Pimenov & Kljuykov 32* (MW).



Fig. 3. *Oreocome aegopodioides* Pimenov & Kljuykov, holotype at MW.

2. A new species of *Oreocome* from Afghanistan, closely related to *O. candollei*

Rechinger & Riedl (1963) described *Ligusticum irramosum* Rech. f. & Rield from Afghanistan with *Neubauer 475* designated as holotype ("Typus"). Fig. 60 of that publication represents a schematic fruit cross section. These authors cited under the new species another collection from E Afghanistan (Nuristan: Minjan, Ptili, 2700 m, *Edelberg 2130*). Leute (1970) later explicitly designated *Neubauer 475* at W as holotype and published a photo of this sheet. Rechinger (1987) reproduced a fruit cross section of *L. irramosum* (from *Neubauer 475*) combined with a picture of the sheet *Edelberg 2130.*

The plants on the sheets *Neubauer 475* and *Edelberg 2130* are not conspecific; in particular, their fruit structure is different, as is clear from a comparison of the illustration by Rechinger & Riedl (1963: fig. 60) with our Fig. 4C from *Edelberg 2130*. The collection *Edelberg 2130* in fact represents a hitherto undescribed species of *Oreocome* closely related to *O. candollei*. It is here described a new to science:

Oreocome nuristanica Pimenov & Kljuykov, **sp. nov.**
Holotype: Afghanistan, "Nuristan, Minjan, Ptili, 2700 m", *Edelberg 2130* (W!; isotype: C)

Ab *Oreocome candollei* planta omnis glabra, caulibus irramosis, umbellis pauciradiatis (radiis c. 15, non 20-45), dentibus calycis nullis differt.

Plantae perennes, omnino glabrae, 50-60 cm, rhizomatis palaribus, brevibus, vix incrassatis. *Caulis* rectus, irramosus. *Folia caulina inferiora* vagina lanceolata, petiolo ad 2 cm longo, lamina ambitu triangulata, 7-9 cm longa, 3.5-4 cm lata, tripinnatisecta, segmentis primariis basalibus petiolulatis, petiolulis ad 3 cm longis, lobo terminali 8-12 mm longo, 5-8 mm lato, ovato vel ovato-lanceolato, margine grosse dentato. *Folia caulina media et superiora* 3, sensim sursum simplificata. *Umbellae* radiis c. 15, inaequilongis, 10-15 mm longis, bracteolis 4-5, lanceolatis. *Umbellulae* 9-14-flores, radiolis 3-5 mm longis, bracteolis 5-7, linearis-lanceolatis, integris. *Flores* ignoti. *Fructus* (Fig. 4B-C) vix dorsaliter compressi; *stylopodia* breveconica, stylodia c. 0.6 mm longa, reflexa, dentibus calycis fructificatione nullis; mericarpiis ovalibus, 7 mm longis, 4 mm latis, *jugis* mericarpiorum tenuibus alatis, marginalibus vix latioribus; *exocarpium* e cellulis minutis

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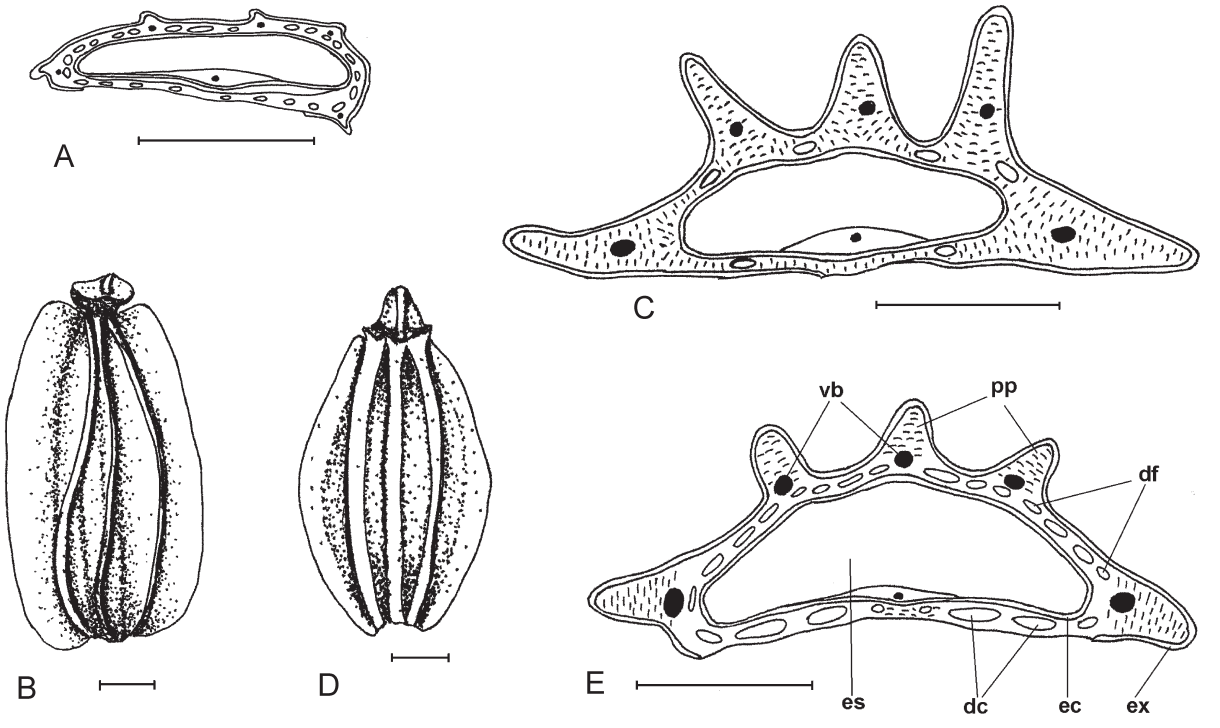


Fig. 4. Fruit structure: A: *Seseli stewartii* (≡ *Selinum stewartii*) (type specimen); B- C: *Oreocome nuristanica* (type specimen); D-E: *Oreocome duriuscula* (≡ *Selinum durisculum*) (*Anders 5057,* W); A, C, E: transect of mericarps; B, D: dorsal view of mericarps. – dc = commissural secterory ducts, df = secretory ducts in furrows; other abbreviations *see* caption of Fig. 2. – Scale bars = 1 mm.

leptodermaticis, interruptum prope carpophorum; commissura angusta; *mesocarpium* e cellulis membranis lignescentibus, porosis; *vittae* valleculares solitariae, commissurales 2-3; *endocarpium* 1-2-stratosum e cellulis membranis tenuibus, vix lignescentibus; *endospermium* a facie commissurali vix emarginatum.

Distribution. — Known only from the type locality.

Ligusticum irramosum, as is evident from the holotype, belongs to *Seseli* and was transferred to the latter genus previously as *S. irramosum* (Rech. f. & Riedl) Pimenov & Sdobnina (1975). As we know today, it is, however, conspecific with *Selinum stewartii* (Hiroe 1958), also treated as *L. stewartii* (Nasir 1972), this epithet having priority:

Seseli stewartii (M. Hiroe) Pimenov & Kljuykov, **comb. nov.** ≡ *Selinum stewartii* M. Hiroe in Umbell. Asia 1: 155. 1958 ≡ *Ligusticum stewartii* (M. Hiroe) Nasir, Fl. W Pakistan 20: 121, fig. 34, D-F. 1972. – Holotype: Pakistan, "Swat State, below Kalam", 19.8.1952, *Stewart 24598* (UC!; isotypes: BM!, RAW).
= *Ligusticum irramosum* Rech. f. & Riedl in Kongel. Danske Vidensk. Selsk. Skr. 13(4) [= Symb. Afghan. 5]: 94. 1963 ≡ *Seseli irramosum* (Rech. f. & Riedl) Pimenov & Sdobnina in Bot. Zhurn. (Moscow & Leningrad) 60: 1118. 1975. – Holotype: Afghanistan, "Bamian: Band-i Amir, Munar Schakrie, ad lacum infimum", 6.7. 1951, *Neubauer 475* (W!).

Distribution. — Pakistan, Afghanistan (E).

3. *Selinum duriusculum (Ligusticum duriusculum)*

A further species to be transferred to *Oreocome* is *Selinum duriusculum* Rech. f. & Riedl (1963; Rechinger 1987: 360, t. 292) also from E Afghanistan. Its carpo-anatomical structure (Fig. 4D-E) and other characters are in full accord with *Oreocome* in our emended circumscription (Pimenov & al. 2001):

Oreocome duriuscula (Rech. f. & Riedl) Pimenov & Kljuykov, **comb. nov.** ≡ *Selinum duriusculum* Rech. f. & Riedl in Kongel. Danske Vidensk. Selsk. Skr. 13(4) [Symb. Afghan. 5]: 127, fig. 88. 1963 ≡ *Ligusticum duriusculum* (Rech. f. & Riedl) Leute in Ann. Naturhist. Mus. Wien 74: 491, t. 15, fig. 2. 1970. – Holotype: Afghanistan, "Nuristan, Pashki, 2300 m", 25.7.1948, *Edelberg 2132* (C; isotype: W).

Additional collections studied. — AFGHANISTAN: Prov. Kunar, Nuristan, Bashgol-Tal, Seiten-Tal westlich von Barge Bodol, 2200 m, 22.8.1969, *Podlech 16178* (M); Konar, Berge Matal, Osttal, 2300-2450 m, 23.8.1970, *Anders 5057* (W); prov. Baghlan, Anderob-Tal, 6 km N Doabi, 920 m, 19.6.1968, *Freitag 3056* (M).

Distribution. — Afghanistan (Central, E).

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Note. — The species is closely related to *Oreocome hindukushensis* Pimenov & Kljuykov; it differs from the latter in calyx teeth morphology (in *O. hindukushensis* filiform or linear-filiform, in *O. duriuscula* short-triangular) and the fruit secretory system (in *O. hindukushensis* vittae in furrows solitary and on the commissural side by 4; in *O. duriuscula* by 3-4 and 6-8 correspondingly).

4. Conclusions

(1) *Oreocome* comprises nine species, distributed in the Sino-Himalayan region and adjacent Afghanistan. They can be divided into two sections:

Oreocome sect. *Oreocome*
- *O. candollei* (Wall. ex DC.) Edgew.
- *O. depauperata* Pimenov & Kljuykov
- *O. duriuscula* (Rech. f. & Riedl) Pimenov & Kljuykov
- *O. hindukushensis* Pimenov & Kljuykov
- *O. involucellata* Pimenov & Kljuykov
- *O. limprichtii* (H. Wolff) Pimenov & Kljuykov
- *O. striata* (DC.) Pimenov & Kljuykov

Oreocome sect. *Evittata* Pimenov & Kljuykov
- *O. arguta* (Lindl.) Pimenov & Kljuykov
- *O. aegopodioides* Pimenov & Kljuykov

Species excludendae:
- *O. cicutaria* (Lindl.) Edgew. = ***Ligusticopsis coniifolia*** (DC.) Pimenov & Kljuykov
- *O. filicifolia* Edgew. = ***Ligusticopsis coniifolia*** (DC.) Pimenov & Kljuykov
- *O. stelliphora* Cauwet & Farille ≡ ***Oreocomopsis stelliphora*** (Cauwet & Farille) Pimenov & Kljuykov

(2) As a result of our analyses presented in Pimenov & al. (2001) and the present contribution, all species of *Selinum* reported from the Sino-Himalayan region and adjacent Afghanistan are excluded from that genus. *Selinum* is thus entirely absent from that area.

Acknowledgements

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