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Parmelioid lichens of Iran and the Caucasus Region

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Abstract. Fourteen parmelioid species, *Cetrelia cetrarioides*, *Hypogymnia physodes*, *H. austerodes*, *H. vittata*, *Melanelixia subaurifera*, *Melanohalea elegantula*, *Parmelia saxatilis*, *Xanthoparmelia camtschadalis*, *X. delisei*, *X. loxodes*, *X. pokorny*, *X. stenophylla*, *X. tinctina* and *X. verruculifera*, are reported as new to Iran. The taxonomy, nomenclature and distribution of the 76 parmelioid lichen species reported from Iran and Caucasus (Russian Caucasus, Azerbaijan Republic, Georgia and Armenia) are briefly reviewed. *Menegazzia subsimilis* is reported for the first time from the Caucasus Region.

Key words: Armenia, Azerbaijan, Caucasus, Georgia, Iran, lichens, *Parmeliaceae*, Russia

Introduction

The *Parmeliaceae* constitute one of the largest families of lichen-forming ascomycetes. Most of the foliose members of the family were traditionally placed in the genus *Parmelia*, but in recent decades it has been subdivided into numerous segregate genera, and, in light of continuing molecular studies, are being rearranged (e.g. Blanco *et al.* 2004a, b). Wherever possible, the current paper uses updated taxonomy and nomenclature.

Floristic knowledge of lichens in Iran and the Caucasus Region is still rather deficient, even for the parmelioid lichens. The lichen catalogue for the Caucasus region by Barkhalov (1983) lists almost 1300 taxa for Armenia, Azerbaijan Republic, Georgia and the Russian Caucasus. Seaward *et al.* (2004) reported 396 species in their checklist for Iran, but since their review did not include many specimens from the forested mountain areas in the northwest of Iran, we have been able to add 14 parmelioid taxa in the following account.

The Caucasus Region, encompassing the whole of Georgia and parts of neighboring Turkey (Anatolia), Russia, Armenia, Azerbaijan and Iran (Hyrcanian region, Arasbaran and Talish)

has been selected by Conservation International as one of the world's 25 biodiversity hotspots and the Caucasus has been identified by the WWF International as one of its 238 globally outstanding ecoregions in terms of its biodiversity and by Conservation International as one of the globally most diverse and endangered biodiversity regions (Kremer *et al.* 2001). It is located at a biological cross-roads where species from central and northern Europe, Central Asia and the Middle East mix with endemics found nowhere else, and supports over 6500 plant species, of which 1600 are endemic. Many of these endemic, rare, threatened or vulnerable plants are at risk if adequate conservation measures are not undertaken to protect them and their ecosystems. However, relatively little is known of the lichen flora of the Caucasus; it is probably composed of more than 2000 species and is in need of considerably further study.

The Caspian broadleaved deciduous temperate forests, also called the Hyrcanian forests, are located on the south coast of the Caspian Sea and the northern slopes of the Elburz mountain range from sea level to 2800 m altitude. They are the most valuable forests in Iran and cover about 1.9 million ha, being 800 km in length and about 25 km in width. About 60 % of these forests are commercial and the remainder are

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more or less degraded. Average annual precipitation ranges from 600 to 2000 mm, with a maximum in the west and a minimum in the east. The Arasbaran subhygrophilous forest, located in north-western Iran (Lesser Caucasus), is similar to the Hyrcanian forests but lacks such species as *Fagus orientalis*, *Quercus castaneifolia* and *Parrotia persica*.

Materials and Methods

The present report is based primarily on lichen collections made by M. Sohrabi in the provinces of East Azerbaijan, Golestan and Mazandaran during several field trips in 1999-2004. A stereomicroscope, light microscope, colour tests and thin-layer chromatography (TLC), according to the methods of Orange *et al.* (2001), were used in their identification. Specimens from the above collections have been deposited in the Herbarium of Facultad de Farmacia of Universidad Complutense, Madrid (MAF), the Botanical Museum, University of Helsinki (H) and private herbarium of M. Sohrabi. Collections by P. Uotila in H have also been investigated. Caucasian specimens from the herbaria of Baku (BAK), St. Petersburg (LE) Moscow (MW), Tartu (TU), Kirovsk (KPABG) and the private herbarium of G. Urbanavichus were also examined. Taxa new to Iran are indicated by an asterisk. The Caucasian distribution data of the 76 species reported from the area are based mainly on Barkhalov (1983), Inashvili (1986), Urbanavichus & Urbanavichene (2004) and Novruzov (1990), but some literature relating to studies conducted in Armenia, Azerbaijan, Georgia or Russian Caucasus (cf. Alverdieva 1993, Khanov 2006) were unobtainable.

List of taxa

Arctoparmelia centrifuga (L.) Hale (*Parmelia centrifuga* (L.) Ach.)

Novruzov & Onipchenko (1985: 881), Krivorotov (1997: 17), Urbanavichus & Urbanavichene (2004: 34-35)

Distribution: Russian Caucasus.

Brodoa atrofusca (Schaer.) Goward (*Parmelia atrofusca* (Schaer.) Cromb.)

Barkhalov (1983: 171 as *Hypogymnia encausta* with f. *textilis*), Inashvili (1986: 736), Urbanavichus (2001: 203), Blinkova (2004: 193), Urbanavichus & Urbanavichene (2004: 48-49)

Distribution: Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Brodoa intestiniformis (Vill.) Goward (*Parmelia intestiniformis* (Vill.) Ach., *P. encausta* (Sm.) Ach.)

Barkhalov (1983: 172), Inashvili (1986: 736), Novruzov (1990: 242), Krivorotov (1997: 20), Urbanavichus (2001: 204), Blinkova (2004: 193), Urbanavichus & Urbanavichene (2004: 48)

Distribution: Azerbaijan Republic, Georgia, Russian Caucasus.

Cetrelia alaskana (W.L. Culb. & C.F. Culb.) W.L. Culb. & C.F. Culb.

Eskin *et al.* (2004: 209)

This record is surprising in view of its Beringian distribution (cf. Randlane & Saag 2004: 367), although it has also been recently reported further west in the Russian Arctic.

**Cetrelia cetrarioides* (Duby) W.L. Culb. & C.F. Culb. (*Parmelia cetrarioides* (Duby) Nyl.)

Barkhalov (1983: 177), Inashvili (1986: 739), Otte (2001: 571), Blinkova (2004: 193), Urbanavichus & Urbanavichene (2004: 66-67), Blinkova & Urbanavichus (2005: 29)

Mazandaran: Nour, Kojdur & Kodir villages, 1000-1500 m, 2002, Sohrabi & Mofid 474, 937, 954.

Distribution: Iran (Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

This species is provisionally recognized here following molecular analysis by Thell *et al.* (2002), although it can only be distinguished from *C. olivetorum* by secondary chemistry. Distribution maps by Randlane & Saag (2004) show the Caucasian ranges of the two taxa.

Cetrelia monachorum (Zahlbr.) W.L. Culb. & C.F. Culb. (*Parmelia monachorum* Zahlbr.)

Randlane & Saag (1991: 115)

Distribution: Russian Caucasus.

Cetrelia olivetorum (Nyl.) W.L. Culb. & C.F. Culb. (*Parmelia olivetorum* Nyl., *P. olivaria* auct.)

Barkhalov (1983: 185), Novruzov (1990: 251), Randlane & Saag (1991: 115), Krivorotov (1997: 29), Otte (2001: 571), Seaward *et al.* (2004: 552), Urbanavichus & Urbanavichene (2004: 69), Blinkova & Urbanavichus (2005: 29)

East Azerbaijan: Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4468, 4611, 4713, 4722. **Mazandaran:** Nour, Kojdur & Kodir villages, 1000-1500 m, 2002, Sohrabi & Mofid 330.

Distribution: Iran (East Azerbaijan, Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Some earlier authors may have treated this species collectively with *C. cetrarioides*.

Flavoparmelia caperata (L.) Hale (*Parmelia caperata* (L.) Ach.)

Barkhalov (1983: 175 as *Parmelia caperata* with f. *musciola*, f. *sorediosa*, f. *subglauca*, f. *submonophylla*), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 739 as *Parmelia caperata* with f. *subglauca*, f. *sorediosa*), Novruzov (1990: 244 as *Parmelia caperata*, with f. *sorediosa*), Krivorotov (1997: 46), Otte (2001: 572), Himelbrant & Kuznetsova (2002: 157), Urbanavichus & Urbanavichene (2002: 183), Blinkova (2004: 195), Seaward *et al.* (2004: 555), Paşayev (2004a: 346), Urbanavichus & Urbanavichene (2004: 92), Blinkova & Urbanavichus (2005: 30)

East Azerbaijan: Jolfa, Jolfa to Khoda-afarin, around Missan village & in adjacent forest, 1000-1500 m, corticolous, 2003, Sohrabi 1552; Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa, Aynaloo road; 38°50'03" N, 46°47'29" E, 2005, Sohrabi & Ghobadnejhad 4175; Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected

area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 2005, Sohrabi 4470, 4565, 4683. **Mazandaran:** Nour, Nour to Amol road, Lavij village, 800 m, 2002, Sohrabi & Mofid 975, 995, 1003; Nour, Kojdur & Kodir villages, 1000-1500 m, 2002, Sohrabi & Mofid 336; Nour, ca 1 km to Nour, forest park, 1 m, 2002, Sohrabi & Mofid, 2094; Amol, ca 15 km from Amol, Haraz road, Kelerd village, 200-600 m, on calcareous rocks, 2004, Sohrabi & Mofid 2785.

Distribution: Iran (East Azerbaijan, Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Flavoparmelia soledians (Nyl.) Hale (*Parmelia soledians* Nyl.)

Barkhalov (1983: 191), Krivorotov (1997: 67)

Distribution: Azerbaijan Republic, Russian Caucasus.

Flavopunctelia darrowii (J.W. Thomson) Hale

Hadji Moniri (2005: 35)

Distribution: Iran (Khorassan, in the Irano-Turanian region)

The occurrence of this American species in Eurasia is doubtful.

Flavopunctelia flaventior (Stirt.) Hale (*Parmelia flaventior* Stirt.)

Barkhalov (1983: 181), Krivorotov (1997: 66)

Distribution: Azerbaijan Republic, Armenia, Russian Caucasus.

Flavopunctelia soledica (Nyl.) Hale (*Parmelia ulophyllodes* (Vain.) Savicz, *P. soledica* Nyl.)

Barkhalov (1983: 195 as *Parmelia ulophyllodes*, with f. *solediosa*), Inashvili (1986: 744), Krivorotov (1997: 68), Otte (2001: 572), Blinkova & Urbanavichus (2005: 30)

Armenia: In the vicinity of Dilidzhan, ca 1700 m, on the base and trunk of *Quercus macranthera*, 25 May 1965, V. Masing 5 (TU).

Distribution: Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

**Hypogymnia austerodes* (Nyl.) Räsänen (*Parmelia austerodes* Nyl.)

Barkhalov (1983: 171), Inashvili (1986: 736), Krivorotov (1997: 48), Urbanavichus & Urbanavichene (2004: 100), Blinkova & Urbanavichus (2005: 30)

East Azerbaijan: Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4646, 4479, 4616.

Distribution: Iran (East Azerbaijan), Georgia, Russian Caucasus.

Hypogymnia bitteri (Lyng.) Ahti (*Parmelia bitteri* Lyng.)

Barkhalov (1983: 171), Inashvili (1986: 736), Otte (2001: 572), Blinkova & Urbanavichus (2005: 30)

Distribution: Georgia, Russian Caucasus.

Hypogymnia farinacea Zopf (*Hypogymnia bitteriana* Räsänen, *nom. illeg.*, *Parmelia bitteriana* Zahlbr., *nom. illeg.*)

Barkhalov (1983: 171), Krivorotov (1997: 49), Otte (2001: 572), Urbanavichus & Urbanavichene (2004: 102)

Distribution: Georgia, Russian Caucasus.

Note the corrected author citation of *H. bitteriana*.

**Hypogymnia physodes* (L.) Nyl. (*Parmelia physodes* (L.) Ach.)

Barkhalov (1983: 172 as *Hypogymnia physodes*, with f. *labrosa*, and var. *platyphylla*, with f. *stigmata*, f. *vittatoides*), Inashvili (1986: 736), Novruzov (1990: 242), Krivorotov (1997: 49), Otte (2001: 572), Himelbrant & Kuznetsova (2002: 157), Urbanavichus & Urbanavichene (2004: 102), Blinkova & Urbanavichus (2005: 30)

East Azerbaijan: Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4635, 4519, 4600, 4716.

Distribution: Iran (East Azerbaijan), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Hypogymnia tubulosa (Schaer.) Hav. (*Parmelia tubulosa* (Schaer.) Bitt.)

Barkhalov (1983: 172), Inashvili (1986: 736), Novruzov (1990: 242), Krivorotov (1997: 49), Otte (2001: 572), Himelbrant & Kuznetsova (2002: 158), Urbanavichus & Urbanavichene (2004: 102), Blinkova & Urbanavichus (2005: 30)

Distribution: Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

**Hypogymnia vittata* (Ach.) Parrique (*Parmelia vittata* (Ach.) Nyl.)

Inashvili (1986: 736 as *Hypogymnia duplicata*, with var. *hypotrypanea*; 737), Krivorotov (1997: 49), Otte (2001: 573), Urbanavichus & Urbanavichene (2004: 102), Blinkova & Urbanavichus (2005: 30)

East Azerbaijan: Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4519.

Distribution: Iran (East Azerbaijan), Georgia, Russian Caucasus.

Hypotrachyna endochlora (Leight.) Hale (*Parmelia endochlora* Leight.)

Otte (2001: 573, 2004: 159)

Distribution: Russian Caucasus.

Hypotrachyna laevigata (Sm.) Hale (*Parmelia laevigata* (Sm.) Ach.)

Barkhalov (1983: 184), Inashvili (1986: 741), Novruzov (1990: 247), Krivorotov (1997: 50), Urbanavichus & Urbanavichene (2004: 102), Blinkova & Urbanavichus (2005: 30)

Distribution: Azerbaijan Republic, Russian Caucasus.

Hypotrachyna pseudosinuosa (Asahina) Hale (*Parmelia pseudosinuosa* Asahina)

Barkhalov (1983: 186), Inashvili (1986: 741)

Distribution: Georgia.

These records need confirmation.

Hypotrachyna revoluta (Flörke) Hale. (*Parmelia revoluta* Flörke)

Himelbrant & Kuznetsova (2002: 158), Otte (2004: 159), Urbanavichus & Urbanavichene (2004: 104), Blinkova & Urbanavichus (2005: 30)

Distribution: Russian Caucasus.

Imshaugia aleurites (Ach.) S.L.F. Meyer (*Parmeliopsis aleurites* (Ach.) Nyl., *Cetraria aleurites* (Ach.) Th. Fr., *Parmeliopsis pallescens* (Hoffm.) Zahlbr.)

Barkhalov (1983: 171), Inashvili (1986: 744 as *Parmeliopsis pallescens* with f. *coralloidea*), Krivorotov (1997: 50), Otte (2001: 573), Urbanavichus & Urbanavichene (2004: 104), Blinkova & Urbanavichus (2005: 30)

Distribution: Georgia, Russian Caucasus.

Melanelia commixta (Nyl.) Thell (*Cetraria commixta* (Nyl.) Th. Fr.)

Inashvili (1986: 738), Eskin *et al.* (2004: 209), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 31)

Distribution: Russian Caucasus.

These records represent a major range extension (cf. Otte *et al.* 2005: 1224). This species, which is actually cetrarioid, is so widespread in the boreal zone that the arctic-alpine areal formula given by Otte *et al.* (2005: 1224) is in need of revision.

Melanelia disjuncta (Erichsen) Essl. (*Parmelia disjuncta* Erichsen)

Inashvili (1986: 739), Novruzov (1990: 249), Krivorotov (1997: 68), Otte (2001: 573), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 31)

Distribution: Georgia, Russian Caucasus.

Otte *et al.* (2005: 1224) noted the Caucasian outlier of this species in their distribution map.

Melanelia hepatizon (Ach.) Thell (*Cetraria hepatizon* (Ach.) Vain.)

Barkhalov (1983: 198), Eskin *et al.* (2004: 209), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 32)

Distribution: Russian Caucasus.

Otte *et al.* (2005: 1229) give the Caucasian outlier on their distribution map, but the species is extremely common throughout much of the boreal zone of Northern Europe and Canada so that their arctic-alpine areal formula is in need of revision.

Melanelia panniformis (Nyl.) Essl. (*Parmelia panniformis* (Nyl.) Vain.)

Inashvili (1986: 741)

Distribution: Georgia.

If correct, then this record represents a distinct extension of its range (cf. Otte *et al.* 2005: 1231).

Melanelia sorediata (Ach.) Goward & Ahti (*Parmelia sorediata* (Ach.) Th. Fr., *P. sorediata* Almb.)

Barkhalov (1983: 191, 328), Inashvili (1986: 743), Krivorotov (1997: 60)

Distribution: Russian Caucasus.

Early records may also refer to *M. disjuncta*; if correct, these represent a considerable extension to its range (cf. Otte *et al.* 2005: 1233).

Melanelia stygia (L.) Essl. (*Parmelia stygia* (L.) Ach.)

Barkhalov (1983: 193), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 743), Novruzov (1990: 250), Krivorotov (1997: 60), Paşayev (2004b: 62), Blinkova (2004: 196), Eskin *et al.* (2004: 209),

Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 32)

Distribution: Azerbaijan Republic, Georgia, Russian Caucasus.

This species is actually a cetrarioid rather than a parmelioid lichen (Thell *et al.* 2002; Blanco *et al.* 2004a). The Caucasian outlier is missing in the distribution map by Otte *et al.* (2005).

Melanelia tominii (Oxner) Essl. (*Parmelia tominii* Oxner, *P. borisorum* Oxner, *P. substygia* Räsänen)

Krivorotov (1997: 60, 66), Urbanavichus & Urbanavichene (2004: 130)

Distribution: Russian Caucasus.

Also noted from the Caucasus (Turkey?) in the distribution map by Otte *et al.* (2005: 1235).

Melanelixia fuliginosa (Fr. ex Duby) O. Blanco *et al.* (*Parmelia fuliginosa* (Fr. ex Duby) Nyl., *P. laetevirens* (Flot. ex Körb.) F. Rosend., *P. glabratula* Lamy, *Melanelia glabratula* (Lamy) Essl., *M. fuliginosa* (Fr. ex Duby) Essl.)

Barkhalov (1983: 181, 183 as *Parmelia laetevirens*, with var. *glabratula*), Inashvili (1986: 740, 741), Novruzov (1990: 246, 247), Krivorotov (1997: 59, 67), Otte (2001: 573), Himelbrant & Kuznetsova (2002: 159), Urbanavichus & Urbanavichene (2004: 128), Otte (2005: 221)

Distribution: Azerbaijan Republic, Georgia, Russian Caucasus.

This species seems to be represented by both subsp. *fuliginosa* (mainly on rocks) and subsp. *glabratula* (Lamy) J.R. Laundon (see Guzow-Krzeminska & Węgrzyn 2003; Laundon 2006), but all authors cited above have not distinguished them (cf. Esslinger 1977). The southern limit of *M. fuliginosa* is in Caucasia (see Otte *et al.* 2005: 1227).

Melanelixia glabra (Schaer.) O. Blanco *et al.* (*Parmelia glabra* (Schaer.) Nyl., *Melanelia glabra* (Schaer.) Essl.)

Barkhalov (1983: 182 as *Parmelia glabra*, with var. *epilosa*), Inashvili (1986: 740 as *Parmelia glabra*, with var. *epilosa*), Novruzov (1990: 246), Krivorotov (1997: 66), Otte (2001: 573), Seaward *et al.* (2004: 561), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 31), Sohrabi (2005: 106)

East Azerbaijan: Jolfa, Jolfa to Khoda-afarin, around Missan village & in adjacent forest, 1000-1500 m, corticolous, Sohrabi 160, 163, 177, 1406, 1521, 1555; Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo; 38°50'03" N, 46°47'29" E, 2005, Sohrabi & Ghobadnejhad 3743, 4062, 4019, 4042; Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4483, 4520, 4612, 4741, 4738.

Distribution: Iran (East Azerbaijan, Golestan, Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Records from Iran and the Caucasus are included in the distribution maps by Ahti (1966) and Otte *et al.* (2005).

Melanelixia subargentifera (Nyl.) O. Blanco *et al.* (*Parmelia subargentifera* Nyl., *Melanelia subargentifera* (Nyl.) Essl.)

Barkhalov (1983: 193), Inashvili (1986: 743), Novruzov (1990: 249), Krivorotov (1997: 60), Paşayev (2004b: 62), Urbanavichus & Urbanavichene (2002: 184), Eskin *et al.* (2004: 209), Seaward *et al.*

(2004: 561), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 32), Otte (2005: 221), Sohrabi (2005: 106)

East Azerbaijan: Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4663, 4566; Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo; 38°50'03" N, 46°47'29" E, 2005, Sohrabi & Ghobadnejhad 3800; Ahar, Varzeg, ca 26 km west of Varzeg and ca 6 km to Joshin, village (Kharvana), on high mountain, Joshin Castle, 1700-2000 m, 38°39' N, 46°21' E, 18 Jun 2005, Sohrabi 3574, 3556; Jolfa, Jolfa to Khoda-afarin, around Missan & in adjacent forest, 1000-1500 m, 2003, Sohrabi 156.

Distribution: Iran (East Azerbaijan, Golestan), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

The southern limit of *M. subargentifera* is in Caucasia and Iran, as noted on the distribution map by Otte *et al.* (2005: 1234).

**Melanelixia subaurifera* (Nyl.) O. Blanco *et al.* (*Parmelia subaurifera* Nyl., *Melanelia subaurifera* (Nyl.) Essl.)

Barkhalov (1983: 191 as *Parmelia subaurifera*, with f. *fuliginoides*), Inashvili (1986: 743), Novruzov (1990: 249), Krivorotov (1997: 60), Otte (2001: 573), Urbanavichus & Urbanavichene (2004: 128), Otte (2005: 221)

East Azerbaijan: Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4429, 4705. **Mazandaran:** Nour, Kojdur & Kodir villages, 1000-1500 m, 2002, Sohrabi & Mofid 304, 329.

Distribution: Iran (East Azerbaijan, Mazandaran) Azerbaijan Republic, Russian Caucasus.

The Iranian records represent an extreme southeastern extension of the range of *M. subaurifera* as presented by Otte *et al.* (2005: 1235).

**Melanohalea elegantula* (Zahlbr.) O. Blanco *et al.* (*Parmelia elegantula* (Zahlbr.) Szatala, *Melanelia elegantula* (Zahlbr.) Essl.)

Barkhalov (1983: 180), Novruzov (1990: 245), Krivorotov (1997: 59), Blinkova (2004: 196), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 31), Otte (2005: 221)

East Azerbaijan: Jolfa, Hadishahr, Daran village, near road towards Kiamakidagh, 1500-2700 m, on calcareous rock, 2001, Sohrabi 885, 749, 812. **Golestan:** Golestan National Park, Allmeh valley, 7-8 km from Mirza-Baylu Station, 1300-1500 m, 37°21' N, 56°11' E, 2003, corticolous, on *Juniperus* sp., Sohrabi 1295; Golestan National Park, Sharleg, 1000-1200 m, 37°20' N, 56°03' E, 2003, corticolous on *Crataegus* sp., Sohrabi 4500.

Distribution: Iran (East Azerbaijan, Golestan), Azerbaijan Republic, Armenia, Russian Caucasus.

We have not followed the concepts of *Melanelia elegantula* and *M. infumata* adopted by Esslinger (1977) and Otte *et al.* (2005); however, most of the epilithic material appears to belong to *M. infumata*, but *M. elegantula* is primarily epiphytic and epixylic.

Melanohalea exasperata (De Not.) O. Blanco *et al.* (*Parmelia exasperata* De Not., *Melanelia exasperata* (De Not.) Essl., *Parmelia aspera* A. Massal., *P. aspidota* (Ach.) Poetsch)

Barkhalov (1983: 180 as *Parmelia exasperata*, with f. *pruinosa*), Inashvili (1986: 739, as *Parmelia aspera*, with f. *pruinosa*), Novruzov (1990: 245),

Krivorotov (1997: 59), Otte (2001: 573), Blinkova (2004: 196), Eskin *et al.* (2004: 209); Paşayev (2004b: 62), Seaward *et al.* (2004: 561), Blinkova & Urbanavichus (2005: 31)

Distribution: Iran (Golestan), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Melanohalea exasperatula (Nyl.) O. Blanco *et al.* (*Parmelia exasperatula* Nyl., *Melanelia exasperatula* (Nyl.) Essl.)

Barkhalov (1983: 181), Inashvili (1986: 740), Novruzov (1990: 245), Krivorotov (1997: 59), Otte (2001: 573), Seaward *et al.* (2004: 561), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 31)

East Azerbaijan: Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo; 38°50'03" N, 46°47'29" E, 2005, Sohrabi & Ghobadnejhad 4043.

Distribution: Iran (East Azerbaijan, Mazandaran), Azerbaijan Republic, Georgia, Russian Caucasus.

Melanohalea infumata (Nyl.) O. Blanco *et al.* (*Parmelia infumata* Nyl., *Melanelia infumata* (Nyl.) Essl.)

Barkhalov (1983: 183), Inashvili (1986: 740), Novruzov (1990: 245), Krivorotov (1997: 59), Seaward *et al.* (2004: 561), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 32)

East Azerbaijan: Ahar, Varzeg, ca 26 km west of Varzeg & ca 6 km to Joshin, village (Kharvana), Joshin Castle, 1700-2000 m, 18 Jun 2005, 46°21' E, 38°39' N, Sohrabi 3509. **Tehran:** ca 6 km NE of Ab-e-Ali on the road from Tehran to Amol, wet meadow near a snow-lay Silt, 2320 m, 27 Apr 1972 Uotila 14837, 15906.

Distribution: Iran (East Azerbaijan, Golestan, Tehran), Azerbaijan Republic, Georgia, Russian Caucasus.

See note under *M. elegantula*.

Melanohalea olivacea (L.) O. Blanco *et al.* (*Parmelia olivacea* (L.) Ach., *Melanelia olivacea* (L.) Essl.)

Barkhalov (1983: 184), Inashvili (1986: 741), Novruzov (1990: 247), Krivorotov (1997: 59), Blinkova (2004: 196), Urbanavichus & Urbanavichene (2004: 128), Blinkova & Urbanavichus (2005: 32)

Distribution: Azerbaijan Republic, Armenia, Georgia, Russian Caucasus. Although Barkhalov (1983) and others have reported numerous localities for *M. olivacea* in the Caucasus, we expect that almost all the records refer to *Melanelixia glabra*. However, recent records from timberline areas of the Russian Caucasus are apparently correct. The distribution maps by Ahti (1966) and Otte *et al.* (2005) do not report *M. olivacea* from the Caucasus region.

Melanohalea septentrionalis (Lynge) O. Blanco *et al.* (*Parmelia septentrionalis* (Lynge) Ahti, *Melanelia septentrionalis* (Lynge) Essl.)

Inashvili (1986: 743)

Distribution: Georgia.

The record is highly doubtful (cf. distribution maps in Ahti 1966 and Otte *et al.* 2005).

Menegazzia subsimilis (H. Magn.) R. Sant.

Russian Caucasus: Republic Adygeya, Kavkazskii zapovednik, neighbourhood of valley Guseripl', 43°59'33.6" N, 40°08'32.07" E, alt.

724 m, Broad-leaved forest on bank of river Philimonov Klyuch, 18 Jun 2005, G. Urbanavichus (Herb. Urbanavichus).

Distribution: Russian Caucasus.

New to the Caucasian Region.

Menegazzia terebrata (Hoffm.) A. Massal. (*Menegazzia pertusa* (Schrank) Stein, *Parmelia pertusa* (Schrank) Schaer.)

Barkhalov (1983: 174), Inashvili (1986: 737), Krivorotov (1997: 61), Otte (2001: 574), Urbanavichus & Urbanavichene (2004: 130)

Distribution: Georgia, Russian Caucasus.

Myelochroa aurulenta (Tuck.) Elix & Hale

Seaward *et al.* (2004: 561)

Mazandaran: Nour, Kojdur & Kodir villages, 1000-1500 m, 2002, Sohrabi & Mofid 943.

Distribution: Iran (Mazandaran).

Parmelia fraudans (Nyl.) Nyl.

Barkhalov (1983: 181), Krivorotov (1997: 66), Urbanavichus & Urbanavichene (2004: 144)

Distribution: Russian Caucasus.

Parmelia omphalodes (L.) Ach. s. lat.

Barkhalov (1983: 185), Inashvili (1986: 741), Novruzov (1990: 247), Krivorotov (1997: 67), Blinkova (2004: 196), Paşayev (2004b: 62), Urbanavichus & Urbanavichene (2004: 144), Blinkova & Urbanavichus (2005: 32)

Distribution: Azerbaijan Republic, Georgia, Russian Caucasus.

Skult (1987) reported only subsp. *omphalodes* "strain I" from the Caucasus, which is common in Central Europe.

**Parmelia saxatilis* (L.) Ach.

Barkhalov (1983: 189), Inashvili (1986: 742), Novruzov & Onipchenko (1985: 881), Novruzov (1990: 248), Krivorotov (1997: 67), Otte (2001: 574), Blinkova (2004: 196), Urbanavichus & Urbanavichene (2004: 144), Blinkova & Urbanavichus (2005: 32)

East Azerbaijan: Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, 38°52'07" N, 46°58'06" E; 1750-2000 m, 19 Aug 2005, on silicate rocks, Sohrabi 4446, 4672. Jolfa to Khoda-afarin, around Missan village & in adjacent forest, 1000-1500 m, 2003, on silicate rocks, Sohrabi 129.

Distribution: Iran (East Azerbaijan), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Common on trees as well as rocks; arboreal populations may also contain other closely related species.

Parmelia submontana Nádv. ex Hale

Otte (2001: 574), Blinkova *et al.* (2003: 177), Urbanavichus & Urbanavichene (2004: 144), Blinkova & Urbanavichus (2005: 32)

Distribution: Russian Caucasus.

Parmelia sulcata Taylor

Barkhalov (1983: 194), Inashvili (1986: 743), Novruzov (1990: 249), Krivorotov (1997: 68), Otte (2001: 574), Himelbrant & Kuznetsova (2002: 160), Urbanavichus & Urbanavichene (2002: 184), Blinkova (2004: 196), Paşayev (2004b: 62), Seaward *et al.* (2004: 562),

Urbanavichus & Urbanavichene (2004: 144), Blinkova & Urbanavichus (2005: 32)

East Azerbaijan: Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo; 38°50'03" N, 46°47'29" E, 2005, Sohrabi & Ghobadnejhad 3788, 4087; Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4465, 4587.

Mazandaran: Nour, Nour to Amol road, Lavij village, 800 m, 2002, Sohrabi & Mofid 483.

Distribution: Iran (East Azerbaijan, Golestan, Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Parmelina carporrhizans (Taylor) Poelt & Vězda (*Parmelia carporrhizans* Taylor)

Barkhalov (1983: 177), Inashvili (1986: 740), Krivorotov (1997: 66), Eskin *et al.* (2004: 209), Urbanavichus & Urbanavichene (2004: 144)

Distribution: Azerbaijan Republic, Armenia, Georgia, Russian Caucasus

Recognition of this species as distinct from *P. quercina* is supported by molecular analyses (Argüello *et al.* 2005).

Parmelina pastillifera (Harm.) Hale (*Parmelia pastillifera* (Harm.) R. Schub. & Klem.)

Barkhalov (1983: 191), Inashvili (1986: 742), Otte (2001: 574)

Distribution: Georgia, Russian Caucasus.

Parmelina quercina (Willd.) Hale (*Parmelia quercina* (Willd.) Vain.)

Barkhalov (1983: 188), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 742), Novruzov (1990: 245), Krivorotov (1997: 67), Otte (2001: 574), Seaward *et al.* (2004: 562), Urbanavichus & Urbanavichene (2004: 144), Otte (2005: 222)

Distribution: Iran (Golestan), Azerbaijan Republic, Georgia, Russian Caucasus.

Parmelina tiliacea (Hoffm.) Hale (*Parmelia tiliacea* (Hoffm.) Ach., *P. scortea* (Ach.) Ach.)

Barkhalov (1983: 190), Inashvili (1986: 742), Novruzov (1990: 250), Krivorotov (1997: 69), Otte (2001: 574), Blinkova (2004: 196), Eskin *et al.* (2004: 209), Seaward *et al.* (2004: 562), Urbanavichus & Urbanavichene (2004: 144), Otte (2005: 222), Sohrabi (2005: 106)

East Azerbaijan: Jolfa to Khoda-afarin, around Missan village & in adjacent forest, 1000-1500 m, on bark, 2003, Sohrabi 108, 1440, 1507, 1514, 1542, 1554; Jolfa, Hadishahr, Geshlag village, around the road to Maharan, 1700-2500 m, 2000, on calcareous rocks & granite stone, Sohrabi 1817; Kalibar, ca 10 km from Aras river and Khoda-afarin to Jolfa road, Daraghzi village, unprotected area, 450 m, 39°05' N, 46°53' E; 19 Aug 2005, Sohrabi 3648; Ahar, Varzezan, ca 26 km west of Varzezan and ca 6 km from Joshin, village (Kharvana), on high mountain, Joshin Castle, 1700-2000 m, 38°39' N, 46°21' E, 18 Jun 2005, Sohrabi 3545; Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4480, 4455.

Distribution: Iran (East Azerbaijan, Golestan), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Parmeliopsis ambigua (Wulfen) Nyl. (*Parmelia ambigua* (Wulfen) Ach.)

Barkhalov (1983: 171), Inashvili (1986: 744), Novruzov (1990: 243), Krivorotov (1997: 69), Otte (2001: 574), Blinkova (2004: 196), Urbanavichus & Urbanavichene (2004: 146), Blinkova & Urbanavichus (2005: 32)

Distribution: Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Parmeliopsis hyperopta (Ach.) Arnold (*Parmelia hyperopta* Ach.)

Barkhalov (1983: 171), Inashvili (1986: 744), Krivorotov (1997: 69), Blinkova (2004: 196), Urbanavichus & Urbanavichene (2004: 144), Blinkova & Urbanavichus (2005: 32)

Distribution: Georgia, Russian Caucasus.

Parmotrema arnoldii (Du Rietz) Hale (*Parmelia arnoldii* Du Rietz)

Otte (2001: 574)

Distribution: Russian Caucasus.

Parmotrema cetratum (Ach.) Hale (*Parmelia cetrata* Ach.)

Barkhalov (1983: 178), Inashvili (1986: 740), Novruzov (1990: 244)

Distribution: Azerbaijan Republic, Georgia.

Parmotrema perlatum (Huds.) M. Choisy (*P. chinense* auct., *Parmelia perlata* (Huds.) Ach., *P. trichotera* Hue)

Barkhalov (1983: 185 as *Parmelia perlata* and var. *ciliata*, with f. *sorediifera*), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 741 as *Parmelia perlata*, and var. *ciliata*, with f. *sorediifera*), Novruzov (1990: 248), Krivorotov (1997: 69), Otte (2001: 574), Himelbrant & Kuznetsova (2002: 160), Urbanavichus & Urbanavichene (2002: 184), Blinkova (2004: 196), Seaward *et al.* (2004: 562), Urbanavichus & Urbanavichene (2004: 146), Blinkova & Urbanavichus (2005: 32)

Mazandaran: Nour, Nour to Amol road, Lavij village, 800 m, 2002, Sohrabi & Mofid 965, 984.

Distribution: Iran (Mazandaran), Azerbaijan Republic, Georgia, Armenia, Russian Caucasus.

Although open to criticism, we have followed Hawksworth (2004) in the interpretation of the name *P. perlatum*.

Parmotrema reticulatum (Taylor) M. Choisy (*Parmelia reticulata* Taylor; *Rimelia reticulata* (Taylor) Hale & A. Fletcher)

Barkhalov (1983: 185 as *Parmelia perforata*, and var. *ulophylla*; 188 as *Parmelia reticulata*), Inashvili (1986: 741 as *Parmelia perforata*, and var. *ulophylla*), Novruzov (1990: 248), Krivorotov (1997: 67), Otte (2004: 161 as *Rimelia reticulata*)

Distribution: Azerbaijan Republic, Georgia, Russian Caucasus.

Parmotrema stuppeum (Taylor) Hale (*Parmelia stuppea* Taylor)

Barkhalov (1983: 192), Inashvili (1986: 743), Novruzov (1990: 250), Krivorotov (1997: 68), Otte (2001: 574), Urbanavichus & Urbanavichene (2004: 146), Blinkova & Urbanavichus (2005: 32)

Distribution: Armenia, Georgia, Russian Caucasus.

Pleurosticta acetabulum (Neck.) Elix & Lumbsch (*Parmelia acetabulum* (Neck.) Duby)

Barkhalov (1983: 174), Inashvili (1986: 739), Novruzov (1990: 243), Eskin *et al.* (2004: 209), Urbanavichus & Urbanavichene (2004: 164), Otte (2005: 222), Sohrabi (2005: 107)

East Azerbaijan: Jolfa to Khoda-afarin, around Missan village & in adjacent forest, 1000-1500 m, terricolous, 2003, Sohrabi 146, 148, 1487, 1484; Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo; 38°50'03" N, 46°47'29" E, 2005, Sohrabi & Ghobadnejhad 4005.

Distribution: Iran (East Azerbaijan, Golestan), Azerbaijan Republic, Georgia, Russian Caucasus.

Pleurosticta koflerae (Clauzade & Cl. Roux) Elix & Lumbsch (*Parmelia koflerae* Clauzade & Cl. Roux)

Vězda (1978: 5); Vězda (1983: 2); Inashvili (1986: 741)

Distribution: Armenia, Georgia, Russian Caucasus.

Pseudevernia furfuracea (L.) Zopf (*Parmelia furfuracea* (L.) Ach.)

Barkhalov (1983: 201), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 737), Novruzov (1990: 243), Krivorotov (1997: 84), Otte (2001: 575), Blinkova (2004: 197), Urbanavichus & Urbanavichene (2004: 170), Blinkova & Urbanavichus (2005: 32)

Distribution: Azerbaijan Republic, Georgia, Russian Caucasus.

Punctelia borreeri (Sm.) Krog (*Parmelia borreeri* (Sm.) Turn.)

Barkhalov (1983: 175), Inashvili (1986: 739), Novruzov (1990: 244), Seaward *et al.* (2004: 567)

Golestan: Gorgan, Minoodasht, Dahneh Chehel chây, around road of Zangolab village, 110-1000 m, 2004, Sohrabi & Mofid 2191.

Distribution: Iran (Golestan, Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Punctelia subrudecta (Nyl.) Krog (*Parmelia dubia* (Wulfen) Schaer., *P. subrudecta* Nyl.)

Barkhalov (1983: 194), Inashvili (1986: 743), Krivorotov (1997: 85), Otte (2004: 161), Seaward *et al.* (2004: 567)

Distribution: Iran (Mazandaran), Georgia, Russian Caucasus.

Some records possibly refer to *P. ulophylla* (van Herk & Aptroot 2000).

Punctelia ulophylla (Ach.) van Herk & Aptroot

Otte (2004: 161)

Distribution: Russian Caucasus.

****Xanthoparmelia camtschadalis*** (Ach.) Hale (*Parmelia vagans* s. auct.)

Barkhalov (1983: 195), Inashvili (1986: 744), Novruzov (1990: 251), Krivorotov (1997: 68), Paşayev (2004b: 62), Urbanavichus & Urbanavichene (2004: 212)

East Azerbaijan: Kalibar, ca 10 km from Kalibar town, Hejrandoost village, 38°52'07" N, 46°58'06" E, 1750-1850 m, terricolous, 20 Aug 2005, Sohrabi 4284, 4309, 4268.

Distribution: Iran (East Azerbaijan), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

This vagrant soil lichen, widespread in arid Eurasia and western North America, has traditionally been called *Parmelia vagans*, especially in

Russia, but that name belongs to an American species ranging from Chile to western North America (Follmann 1967; Hale 1990).

Xanthoparmelia conspersa (Ach.) Hale (*Parmelia conspersa* (Ach.) Ach.)

Barkhalov (1983: 178), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 740, 741), Novruzov (1990: 244), Krivorotov (1997: 101), Otte (2001: 576), Paşayev (2004b: 62), Seaward *et al.* (2004: 572), Urbanavichus & Urbanavichene (2004: 212)

East Azerbaijan: Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo, 38°50'03" N, 46°47'29" E; 2005, Sohrabi & Ghobadnejhad 4015, 4147.

Distribution: Iran (East Azerbaijan, Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

**Xanthoparmelia delisei* (Duby) O. Blanco *et al.* (*Parmelia delisei* (Duby) Nyl., *Neofuscelia delisei* (Duby) Essl.)

Barkhalov (1983: 180), Urbanavichus & Urbanavichene (2004: 138), Blinkova & Urbanavichus (2005: 32)

East Azerbaijan: W of Seyah Chaman, ca 20 km NW of Miyaneh, rock outcrop, 1720 m, 20 Apr 1972, Uotila 15 681. **West Azerbaijan:** ca 15 km SE of Maku, valley with rock outcrops, 1000 m, 19 Apr 1972, Uotila 15 671.

Distribution: Iran (East Azerbaijan, West Azerbaijan), Russian Caucasus.

**Xanthoparmelia loxodes* (Nyl.) O. Blanco *et al.* (*Parmelia isidiotyta* Nyl., *P. loxodes* Nyl., *Neofuscelia loxodes* (Nyl.) Essl.)

Barkhalov (1983: 183), Novruzov (1990: 247), Krivorotov (1997: 62), Paşayev (2004b: 62), Urbanavichus & Urbanavichene (2004: 138)

East Azerbaijan: Kalibar, ca 10 km from Aras river & Khoda-afarin to Jolfa road, Daraghzi village, unprotected area, 450 m, 39°05' N, 46°53' E; 19 Aug 2005, Sohrabi 3605. **Tehran:** ca 6 km NE of Ab-e-Ali on the road from Tehran to Amol, wet meadow near a snow-lay. Silt, 2320 m, 27 Apr 1972 Uotila 15897.

Distribution: Iran (East Azerbaijan, Tehran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Xanthoparmelia perrugata (Nyl.) O. Blanco *et al.* (*Parmelia perrugata* Nyl., *Neofuscelia perrugata* (Nyl.) Essl.)

Barkhalov (1983: 186), Elix (2002: 4), Seaward *et al.* (2004: 561), Moniri *et al.* (2005: 56)

Distribution: Iran (Khorassan), Georgia.

**Xanthoparmelia pokornyi* (Körb.) O. Blanco *et al.*

Barkhalov (1983: 187), Inashvili (1986: 742)

East Azerbaijan: Jolfa, Jolfa to Khoda-afarin, adjacent forest of Missan village, 1000-1500 m, 2003, Sohrabi 1433.

Distribution: Iran (East Azerbaijan), Azerbaijan Republic, Georgia.

Xanthoparmelia pulla (Ach.) O. Blanco *et al.*, s. lat. (*Parmelia proluxa* (Ach.) Carroll, *Neofuscelia pulla* (Ach.) Essl., *Parmelia pulla* Ach.)

Barkhalov (1983: 187), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 742), Novruzov (1990: 248), Krivorotov (1997: 62), Paşayev

(2004b: 62), Seaward *et al.* (2004: 562), Urbanavichus & Urbanavichene (2004: 138), Otte (2005: 221)

East Azerbaijan: Jolfa, Jolfa to Khoda-afarin, around Missan village & in adjacent forest, 1000-1500 m, saxicolous, 2003, Sohrabi 97, 144, 1430, 1433, 1503; Jolfa, Hadishahr, Daran village, around road towards Kiamakidagh, 1500-2700 m, on calcareous rock, 2001, Sohrabi 524, 803, 893; Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 46°58'06" E, 38°52'07" N, 19 Aug 2005, Sohrabi 4436, 4472, 4523, 4638, 4669, 4734; Ahar, Varzeghan, ca 26 km west of Varzeghan and ca 6 km from Joshin, village (Kharvana), on sharp mountains, Joshin Castle, 1700-2000 m, 18 Jun 2005, 46°21' E, 38°39' N, Sohrabi 3598; Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo, 38°50'03" N, 46°47'29" E; 2005, Sohrabi & Ghobadnejhad 3790, 4197. **Azerbaijan Republic:** Kirovabad area (Gäncä), 1964, Mikkelsaar 15 (TU). **Armenia:** Gerda, in crevices, 1983, Trass (TU).

Distribution: Iran (East Azerbaijan, Mazandaran), Azerbaijan Republic, Armenia, Georgia, Russian Caucasus.

Thin-layer chromatography for the identification of the chemotypes and chemical species of *X. pulla* s. lat. has not been undertaken.

Xanthoparmelia ryssolea (Ach.) O. Blanco *et al.* (*Parmelia ryssolea* (Ach.) Nyl., *Neofuscelia ryssolea* (Ach.) Essl.)

Barkhalov (1983: 189), Inashvili (1986: 742), Novruzov (1990: 248), Krivorotov (1997: 67)

Distribution: Azerbaijan Republic, Georgia, Russian Caucasus.

**Xanthoparmelia stenophylla* (Ach.) Ahti & D. Hawksw. (*Parmelia stenophylla* (Ach.) Heug., *Xanthoparmelia somloënsis* (Gyeln.) Hale, *Parmelia taractica* auct., *P. molliuscula* auct.)

Barkhalov (1983: 191), Novruzov & Onipchenko (1985: 881), Inashvili (1986: 743, 743), Novruzov (1990: 250), Krivorotov (1997: 101), Paşayev (2004b: 62), Urbanavichus & Urbanavichene (2004: 212), Blinkova & Urbanavichus (2005: 34), Otte (2005: 223)

East Azerbaijan: Jolfa, Jolfa to Khoda-afarin, around Missan village and in adjacent forest, 1000-1500 m, saxicolous, 2003, Sohrabi 143, 158, 1384, 1400, 1416, 1438, 1460, 1492, 1498; Kalibar, ca 10 km from Aras river and Khoda-afarin to Jolfa road, Daraghzi village, unprotected area, 450 m, 46°53' E, 39°05' N; 19 Aug 2005, Sohrabi 3618, 3668; Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo, 38°50'03" N, 46°47'29" E; 2005, Sohrabi & Ghobadnejhad 3723, 3750, 4030, 4108, 4159; Kalibar, ca 4 km from Kalibar town, Galadarasi, towards Babak Castle, unprotected area, 1750-2000 m, 38°52'07" N, 46°58'06" E; 19 Aug 2005, Sohrabi 4463, 4488, 4490, 4579, 4581, 4586, 4748. **Mazandaran:** Amol, Amol to Tehran, Haraz road, Larijan area, 15 km from Larijan, Vana & Akha villages, 1200-1600 m, on Calcareous rocks, 2004, Sohrabi 2620.

Distribution: Iran (East Azerbaijan, Mazandaran), Azerbaijan Republic, Georgia, Russian Caucasus.

Ahti & Hawksworth (2005) demonstrated that the earlier much used epithet *stenophylla* should be re-adopted for this species.

**Xanthoparmelia tinctina* (Maheu & Gillet) Hale (*Parmelia tinctina* Maheu & Gillet)

Krivorotov (1997: 101), Urbanavichus & Urbanavichene (2004: 212)

East Azerbaijan: Jolfa to Khoda-aftrin, around Missan village & in adjacent forest, 1000-1500 m, saxicolous, 2003, Sohrabi 1391, 1393, 1414, 1490, 1496, 1548.

Distribution: Iran (East Azerbaijan), Russian Caucasus.

**Xanthoparmelia verruculifera* (Nyl.) O. Blanco *et al.* (*Parmelia glomellifera* (Nyl.) Nyl., *P. verruculifera* Nyl., *Neofuscelia verruculifera* (Nyl.) Essl.)

Barkhalov (1983: 183, 196), Inashvili (1986: 740, 744), Novruzov (1990: 251), Urbanavichus & Urbanavichene (2004: 138), Blinkova & Urbanavichus (2005: 32)

East Azerbaijan: Kalibar, ca 10 km from Aras river & Khoda-aftrin to Jolfa road, Daraghzi village, unprotected area, 450 m, 39°05' N 46°53' E; 19 Aug 2005, Sohrabi 3663; Kalibar, Arasbaran, 21 km from Khoda-afarin to Jolfa road, Aynaloo, 38°50'03" N, 46°47'29" E; 2005, Sohrabi & Ghobadnejhad 4242.

Distribution: Iran (East Azerbaijan), Azerbaijan Republic, Georgia, Russian Caucasus.

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