



S.Y. KONDRATYUK¹, B. ZAREI-DARKI²,
S.J. KHAJEDDIN³

¹ M.G. Kholodny Institute of Botany, National Academy
of Sciences of Ukraine
Tereshchenkivska str., 2, Kyiv, 01601, Ukraine
ksya_net@ukr.net

² Marine Biology Group, Faculty of Natural Resources
and Marine Sciences, Tarbiat Modares University Tehran, Iran
zareidarki@modares.ac.ir

³ Esfahan University of Technology, Natural Resources Faculty, Iran
khajedin@cc.iut.ac.ir

**NEW SPECIES AND COMBINATIONS
IN THE GENUS *PROTOPARMELIOPSIS*
(*LECANORACEAE*, *LICHENIZED ASCOMYCOTA*)**

Key words: Protoparmeliopsis, Lecanora, new species, Iran

Abstract. Two new species of the genus *Protoparmeliopsis* M. Choisy, *P. zareii* S.Y. Kondr. and *P. esfahanensis* S.Y. Kondr. & B. Zarei-Darki, are described, compared with closely related taxa, and illustrated.

Twenty three new combinations for the following taxa are proposed: *Protoparmeliopsis baicalensis* (for *Lecanora baicalensis* Zahlbr.), *P. baranowii* (for *Lecanora baranowii* Tomin), *P. bipruinosum* (for *Lecanora bipruinosa* Fink), *P. bogdoensis* (for *Lecanora bogdoensis* Tomin), *P. chlorophthalmum* (for *Lecanora chlorophthalma* Poelt & Tomin), *P. crustaceum* (for *Squamarina crustacea* Savicz), *P. degelii* (for *Squamarina degelii* Poelt), *P. dispersoareolatum* (for *Placodium dispersoareolatum* Körb.), *P. geisereae* (for *Lecanora geisereae* B.D. Ryan), *P. hieroglyphicum* (for *Lecanora hieroglyphica* Poelt), *P. kofae* (for *Lecanora kofae* B.D. Ryan & T.H. Nash), *P. kotovii* (for *Placodium kotovii* Oxner), *P. kukunorensis* (for *Lecanora kukunorensis* H. Magn.), *P. mazatzalensis* (for *Lecanora mazatzalensis* B.D. Ryan & T.H. Nash), *P. nashii* (for *Lecanora nashii* B.D. Ryan), *P. novomexicanum* (for *Lecanora novomexicana* H. Magn.), *P. orbicularis* (for *Lecanora polytropa* var. *orbicularis* Schaer.), *P. phaedrophthalmum* (for *Lecanora phaedrophthalma* Poelt), *P. sierrae* (for *Lecanora sierrae* B.D. Ryan & T.H. Nash), *P. sphaeroideum* (for *Placodium sphaeroideum* Oxner), *P. stramineum* (for *Parmelia straminea* Wahlenb.), *P. uzbekicum* (for *Lecanora uzbekica* Poelt) and *P. verruculiferum* (for *Placodium verruculiferum* Oxner).

During special studies of recent collection of lichens and lichenicolous fungi from the Mooteh Wildlife Refuge and Karkas Hunting-Prohibited Region, Esfahan Province of Iran, a number of new taxa as well as some rather common but not mentioned in the Iran Checklist taxa were found [3]. The Mooteh Wildlife Refuge (hereafter Mooteh), which is about 200 km to the south of Tehran, about 85 km to the north of Esfahan City, between Meymeh and Delijan settlements, along the Teheran-Esfahan highway 5, with the total area ca. 205302 ha, was formally created in 1990, while it was as protected area since 1964. Mooteh is characterized by very dry climate (annual rainfall ca. 275 mm and average temperature 12 °C), and situated in the range 1500–2900 m alt. Karkas Hunting-Prohibited Region (hereafter Karkas) is located about 250 km to the south of Tehran and about 80 km to the north of Esfahan City, to the E of suburbs of Natanz settlement, along the Teheran-Yezd highway 7. Karkas, with the total area ca. 92 100 ha, is the protected area since 1980. It is characterized by a wider range of altitudes (1389–3880 m alt.) and rainfall (between 153 and 328 mm per year) and lower average temperature (2.1 °C).

The genus *Protoparmeliopsis* has recently got the first molecular data confirming its generic status [2] and some taxonomical consequences i.e. taxonomical combinations for the European lichens were recently proposed [1]. The aim of our article is to provide diagnoses of two new taxa of the genus *Protoparmeliopsis* M. Choisy, i.e. *P. zareii* S.Y. Kondr. and *P. esfahanensis* S.Y. Kondr. & B. Zarei-Darki from Asia as well as the new combinations of the further 23 members of this genus from Asia and North America.

Materials

An extensive collection of lichens (more than 500 field packets) in Mooteh and Karkas of the Esfahan Province of Iran was done by B. Zarei-Darki & S.J. Khajeddin in cooperation with some colleagues of Natural Resources Faculty of Esfahan University of Technology during 2010.

New Taxa

Protoparmeliopsis esfahanensis S.Y. Kondr. & B. Zarei-Darki, **sp. nov.**

Similar to *P. mazatzalensis*, but differs in having much smaller and dark green thalli often aggregated in gall-lake formations and seem to be parasitic, in having somewhat smaller apothecia with dark brown discs, and in having much longer and wider ascospores.

Type: **Iran:** Esfahan Province, about 80 km to N of the Esfahan City, to the E of suburbs of Natanz settlement, Karkas Hunting-Prohibited Region, Labidak farm, 3 km to NW of the Mazdeh village and 6 km to N of Targh settlement, 51°49'11"E 33°24'26"N, 2410 m alt., on rocks, growing together with *Protoparmeliopsis garovaglii*, *Aspicilia* sp., and *Rhizoplaca melanophthalma*, 30.iv.2010 B. Zarei-Darki (3251, 3264, 3265, 3269, 3274), S.J. Khajeddin, Safavi, Naghipur, Jabbari (3264 *KW-L* — holotype; 3251 — *TEH*, 3265 — *H*, 3269 — *UPS*, 3274 — *BM* — isotypes).

Diagnosis:

Thallus very small, 3–5 mm across, forming very convex mounds without peripheral lobes and often densely covered by numerous apothecia, initially very often

growing among (or parasiting on?) thalli of *Protoparmeliopsis zareii* or *P. garovaglii* soon becoming independent and forming aggregations to several cm across; consisting of densely pressed, polyangle areoles 0.5–1.5(–2) mm across; upper surface dark green, matt sometimes slightly fissured and whitish in the centre.

Apothecia 0.3–0.7(–1) mm diam., (to 0.4 mm thick in section), usually numerous and aggregated, seem to cover the whole thallus mound, initially immersed, than sessile; initially 1–5(–6) per areoles while adult apothecia usually seen as 1–2 per areole, more or less rounded; lecanorine, with more or less entire and permanent dark green, concolorous with thallus thalline margin to 0.1 mm thick; disc dark brown, matt, entire or somewhat cracked. In section thalline margin to 100–150 µm wide, true exciple to (36–)48–100 µm thick in basal portion, but weakly developed in the lateral portion or to 48–72 µm wide in the uppermost lateral portion in the outer layer dark brown to black brown, pseudoprosoplectenchymatous with cell lumina to 3.6 µm diam./across (see [3]); epitecium brownish in K becoming hyaline, paraphyses ca. 2.4 µm diam. at the basis, distinctly widened towards the tips to 6–7 µm diam.; hymenium to 70–100 µm high in the lower portion somewhat grayish of numerous spherical oil droplets, to 4–7 µm diam.; subhymenium 20–30 µm thick, hyaline or somewhat grayish of numerous oil droplets, spherical to 4.5–7.0 µm diam.; asci 8-spored; ascospores widely ellipsoid with rounded ends or more or less narrowly ellipsoid with somewhat attenuated ends, (12–)13–18(–19.5) × 7–9(–9.5) µm*.

Ecology: plant community with *Astragalus glaucacanthus* Fisch., *Arrhenatherum kotschy* Boiss., *Andrachne telephioides*, *Centaurea iberica* Trev. ex Spreng., *Phalaris minor* Retz., on rocks at high elevation (2000–2500 m alt.), growing together with or sometimes in the centre of thallus of *Protoparmeliopsis garovaglii* or among lobes of *Protoparmeliopsis zareii* and together with *P. garovaglii* and *Aspicilia* sp. damaged by *Arthonia* sp., as well as *Rhizoplaca melanophthalma* damaged by *Zwackhiomyces zareii*.

Etymology: species epithet refers to Esfahan Province of Iran where the type collection has been done.

Distribution: It is so far known from two collections from distant localities in Karkas and Mooteh protected territories of Esfahan Province of Iran.

Taxonomic notes: Among the non-lobate members of the genus *Protoparmeliopsis*, *P. esfahanensis* differs from *P. crustaceum* (Savicz) S.Y. Kondr., *P. bolcanum* (Zahlbr.) S.Y. Kondr., and *P. laotokkaensis* (Räs.) Moberg & R. Sant. in the lack of black or brownish hypothallus.

Furthermore, *P. esfahanensis* is similar to Arctic Asian lichen *P. crustaceum*, but differs in having much thinner thallus (to 1 mm vs. 3–6 mm thick) consisting of thalline areole (vs. distinct squamules in *P. crustaceum*), in having matt dark green (vs. shiny yel-

* Specimen from Mooteh 1109 probably represents another taxon since it has much smaller and narrower ascospores 9.6–11.4 × 4.8–5.2 µm in water and 8.4–11.0 × 5.2 µm in K as well as in much weaker developed thallus not seen beyond of apothecia and in having zeorine apothecia with more or less blackish true exciple seen only in places and thalline exciple sometimes lip-like to 0.1 mm wide, whitish or more often not distinct. As specimens from Karkas as from Mooteh differs from host apothecia in having dark brown discs (in Mooteh in contrast to greenish brown host discs)

lowish green) thallus, in having apothecia which are distinctly smaller than thalline areoles (vs. apothecia much larger than areoles), in having matt dark brown discs (vs. shiny dull brown to reddish brown in *P. crustaceum*) and much larger ascospores ($13\text{--}18 \times 7\text{--}9$ vs. $6\text{--}11 \times 5.5\text{--}6.5$ μm), as well as in the lack of brown or black hypothallus.

Protoparmeliopsis esfahanensis is similar to *P. mazatzalensis*, but differs in having much smaller (3–5 mm vs. 1–3 cm across) and dark green (vs. pale yellow or greenish yellow in *P. mazatzalensis*) thalli often aggregated in gall-lake formations and seem to be parasitic, in having somewhat smaller (to 1 vs. to 1.5 mm diam.) apothecia with dark brown discs (vs. pale orangish yellow, pale yellow, yellowish gray in *P. mazatzalensis*), and in having much longer and wider ascospores ($13\text{--}19 \times 7\text{--}9$ vs. $12\text{--}13 \times 5\text{--}6$ μm) as well as in the lack of peripheral lobules and in the lack of black edges and thin black layer visible beyond the lobe tips.

Protoparmeliopsis esfahanensis is also similar to *P. degelii* (Poelt) S.Y. Kondr., but differs in having thalli often aggregated in gall-lake formations and seeming to be parasitic, much larger areoles (0.8–1.5 vs. to 0.5(–0.8) mm across in *P. degelii*) distinctly thinning towards the tips (vs. somewhat bent upwards and thickened in *P. degelii*), in having much darker brown discs (vs. pale to medium yellow or yellowish brown in *P. degelii*), thinner thalline margin (0.1–0.2 vs. 0.2–0.3 mm wide), much larger ascospores ($13\text{--}19 \times 7\text{--}9$ vs. $8.0\text{--}9.5\text{--}11 \times 5\text{--}6$ μm), as well as in the lack of peripheral lobules.

Protoparmeliopsis esfahanensis is similar to *P. dispersoareolatum* (Schaeer.) S.Y. Kondr., known from Mediterranean Eurasia (including Iran, see Steiner, 1916), but differs in having much smaller (3–5 mm vs. to 4 cm across) and distinctly convex thalli (vs. plane to convex in *P. dispersoareolatum*), often aggregated in gall-lake formations and seeming to be parasitic, in having dark green epruinose thallus (vs. yellow green often with dense whitish grayish pruinose in *P. dispersoareolatum*), smaller (0.5–0.8 vs. 2–4(–5) mm diam.) apothecia which are distinctly smaller of areoles (vs. often apothecia much larger of areoles in *P. dispersoareolatum*), in having matt thallus and discs of apothecia (vs. thallus slightly shiny and apothecium discs rather shiny in *P. dispersoareolatum*), much wider ascospores ($13\text{--}19 \times 7\text{--}9$ vs. $12\text{--}18 \times 3.4\text{--}7$ μm), as well as in the lack of peripheral lobules and in the lack of bluish-gray edges of areoles.

Protoparmeliopsis esfahanensis differs from lobate members of the genus *Protoparmeliopsis* growing on calcium containing substrates, i.e. *P. pruinosum* (Schaub.) S.Y. Kondr., *P. reuteri* (Schaeer.) S.Y. Kondr., *P. usbecicum* (Poelt) S.Y. Kondr. and *P. muralis* ssp. *valesiacum* (Nyl.) S.Y. Kondr. as well as from growing on silicate rock outcrops and closely attached to the substrate *P. baicalensis* (Zahlbr.) S.Y. Kondr., *P. configuratum* (Zahlbr.) S.Y. Kondr., *P. orbicularis* (Schaeer.) S.Y. Kondr., *P. stramineum* (Wahlenb.) S.Y. Kondr. in the lack of peripheral thalline lobes.

The newly described species differs from *Protoparmeliopsis muralis* (Schreb.) Moberg & R. Sant. in having much smaller and thicker, convex areoles forming very small mounds, and in having much longer and wider ascospores, as well as in the lack of peripheral lobes.

Protoparmeliopsis esfahanensis differs from *Protoparmeliopsis garovaglii* in having much smaller and thicker, convex areoles forming very small dark green mounds, and in

having much longer and wider ascospores, as well as in the lack of peripheral lobes.

Data on *Protoparmeliopsis dispersoareolatum* are provided after Kopachevskaya et al. (1971). Data on *P. degelii*, *P. geiserae*, and *P. mazatzalensis* are provided following Ryan et al. [5]. Data on *P. bolcanum*, *P. configuratum*, *P. garovaglii*, *P. pruinatum*, *P. reuterii*, *P. muralis* ssp. *valesiacum* are provided after Kondratyuk [1].

Other specimens examined: **Iran:** Esfahan Province, about 250 km to S of Tehran, about 80 km to N of the Esfahan City, to the E of suburbs of Natanz settlement, Karkas hunting-prohibited Region, to S of Abdaraz farm and 6 km to NE of Kalherud village, 51°36'58"E 33°24'38"N, 2530 m alt., community with *Malva sylvestris* L. var. *silvestris*, *Bromus tectorum* L., *Valeriana cymbicarpa* C.A. Mey., *Amygdalus communis* L., on rocks, growing together with or between lobes of *Protoparmeliopsis muralis* and *P. garovaglii* both damaged by *Zwackhiomyces* sp., 19.IV.2010 B. Zarei-Darki (1334), S.J. Khajeddin, Safavi, Barati, Golshahi (*KW-L*); Varguran village, 6 km to N of Targh settlement, towards Natanz settlement, 51°48'52"E 33°24'43"N, 2127 m alt., plant community with *Psychrogeton amorphoglossus* (Boiss.), *Melica persica* Kunth, *Lepidium persicum* Boiss., *Helichrysum polyphyllum* Ledeb., on rock 26.V.2010, 29.VIII.2010 B. Zarei-Darki (3202, 3204, 3208, 3214, 3217), S.J. Khajeddin, Safavi, Naghipur, Jabbari (*TEH, KW-L, H, UPS, BM*).

Iran, Esfahan and Markazi Province, about 200 km to S of Tehran, about 85 km to N of Esfahan City, between Meymeh and Delijan settlements, Mooteh Wildlife Refuge, 2 km to the SW of Laibeid village, Kooch Sookhteh highlands, 50°39'56"E 33°25'34"N, 2510 m alt., plant community *Fumaria asepala* Boiss., *Acinus graveolens* (M.B.), *Lithospermum officinale* L., *Pyrus communis* L., on rock, 28.V.2010 B. Zarei-Darki (1109), S.J. Khajeddin, Nooruzi, Jabbari (*TEH*).

***Protoparmeliopsis zareii* S.Y. Kondr. sp. nov.**

Ssimilar to *Protoparmeliopsis muralis*, but differs in having whitish reticulum on the upper surface of the central areoles as well as in having numerous immersed into thalline areoles apothecia, dull brown to greenish brown apothecium discs, prosoplectenchymatous true exciple, and much wider ascospores.

Type: **Iran:** Esfahan Province, about 80 km to N of the Esfahan City, to the E of suburbs of Natanz settlement, Karkas hunting-prohibited Region, to S of Abdaraz farm and 6 km to NE of Kalherud village, 51°36'58"E 33°24'38"N, 2530 m alt., on rocks, growing together with *Protoparmeliopsis garovaglii*, *Rhizoplaca melanophthalma* and *R. peltata*, 19.IV.2010 B. Zarei-Darki (1333, 1334), S.J. Khajeddin, Safavi, Barati, Golshahi (1333 — *TEH* — holotype, 1334 — *KW-L* — isotype).

Diagnosis:

Thallus in general similar to *Protoparmeliopsis muralis*, but somewhat larger, to 2.5—5.0 cm across, lobes (peripheral) to 4—5 mm long, 1—2 mm wide, somewhat widened towards the tips to 2.0—2.5 mm wide, often with transversal fissures, central areoles (0.5—) 0.7—1.5 mm wide/across; upper surface greenish-grayish often with whitish edges of thal-line lobes and areoles, usually whitish due to numerous fissures (better under large magnification), especially numerous in the central portions. Thallus in section to 1 mm thick; cortical layer to 50 µm thick, evenly divided from algal zone; algal zone to 50(—200) µm thick, while sometimes algal cluster vertically elongated to 200—250 µm thick.

Apothecia 0.5–1.5 mm diam., from immersed into areoles to somewhat verrucose than to slightly rising but without distinct stipa (as in *P. muralis*) or often highly lifted with rather narrowing stipa to 1 mm long; thalline margin greenish-grayish rounded by whitish edges the same as edge of thalline lobes and areoles, disc dull brown or greenish brown (often young apothecia seem to be similar to thalline areoles); thalline margin to 0.3–0.35 mm wide; in section thalline margin 190–210 μm wide, thalline exciple with cortical layer to 30–40 μm thick; true exciple rather thin to 50(–100) μm wide in the lateral portion and very thick (75–)100–200 μm thick in basal portion, lax; algal zone below true exciple in vertically elongated clusters to 50–200 (–250) μm thick; epihymenium dull grayish or dull brownish with pigment granules, in K becoming hyaline; hymenium 70–80 μm high; subhymenium 20–40 μm thick with numerous oil cells to 4.8–7.2 μm diam.; asci 8-spored, 48–60 \times 22–24 μm ; ascospores hyaline, ovoid to widely ellipsoid usually with large oil droplet, (8.4–)10.8–13.2 (–14.4) \times 8.4–9.6(–10.8) μm in water and becoming somewhat narrower (7.2–) 10.8–13.2 \times 7.2–9.6 μm in K.

Ecology: on silicate rocks in community with *Malva sylvestris* L. var. *silvestris*, *Bromus tectorum* L., *Valeriana cymbicarpa* C.A. Mey., and *Amygdalus communis* L.

Etymology: It is named after Dr. Behrouz Zarki-Darki who has provided us the type collection and provided other Iranian collections to our disposal.

Distribution: Known so far from scattered localities of Esfahan Province, Iran.

Taxonomic notes: *P. zareii* is similar to *Protoparmeliopsis muralis* (Schreb.) Moberg & R. Sant., but differs in having whitish reticulum (or distinctly fissured) on the upper surface of the central areoles as well as in having numerous immersed into thalline areoles apothecia, often aggregated in gall-lake formations, dull brown to greenish brown apothecium discs, prosoplectenchymatous true exciple, and much wider ascospores (11–13(–14.5) \times 8.5–9.5–11.0) μm vs. 7.5–15 \times 5–7 μm).

Results of our phylogenetic analysis of representatives of the genus *Protoparmeliopsis* after nuclear (ITS1/ITS2 genes) and mitochondrial (12S mtSSU gene) DNA so far available from the GenBank show the closest relation of new species *P. zareii* to *P. muralis* too (phylogenetic tree not included here and planned to be published in a separate paper).

Protoparmeliopsis zareii differs from *P. esfahanensis*, with which it grows side by side, in having much larger and much lighter grayish green to somewhat yellowish gray green thallus, much lighter pale brown apothecium discs and much thicker thalline margin as well as much smaller ascospores and whitish edges of areoles, and whitish edge of thalline margin of apothecia.

Protoparmeliopsis zareii differs from the other Asian taxa of this genus, i.e. *Protoparmeliopsis chlorophthalma* (Poelt & Tomin) S.Y. Kondr.** , *P. bogdoensis* (Tomin) S.Y. Kondr., *P. kukunorensis* (H. Magn.) S.Y. Kondr., *P. usbecicum* (Poelt) S.Y. Kondr. and *P. pruinatum* (Chaub.) S.Y. Kondr. in lack of white pruine as well as in having negative reaction of thallus with K, C, KC, and P.

Protoparmeliopsis zareii is somewhat similar to *P. verruculiferum* (Oxner) S.Y. Kondr., growing on soil in Central Asia (Uzbekistan), in having areolated verruculose surface

** see below chapter 'New combinations'.

in the central portion of thallus. However, it differs from *P. verruculiferum* in having more delicate whitish reticulum on surface in the centre of thallus, while the thallus of *P. verruculiferum* is areolated and verrucose throughout.

From brownish or yellow-brownish *P. baicaliensis* (Zahlbr.) S.Y. Kondr., *P. zareii* differs in having greenish or greenish-yellow thallus and in having negative reaction of thallus with P.

From a number of vagrant species of the genus *Protoparmeliopsis* growing on soil in Central Asia, i.e. *P. baranowii* (Tomin) S.Y. Kondr., *P. sphaeroideum* (Oxner) S.Y. Kondr. and others, *P. zareii* differs in having its thallus closely attached to the substratum, the lack of positive reaction with K, C, and P, as well as in its epilithic habit.

From another Asian endemic species, *P. hieroglyphicum* (Poelt) S.Y. Kondr. having rounded or elongated hieroglyph-like brownish formations of conidiomata, *P. zareii* differs in having smaller central areoles but much larger peripheral lobes, as well as in the lack of such type formations of conidiomata.

From a number of vagrant or attached species of the genus *Protoparmeliopsis* growing on soil in Central Asia, i.e. *P. kotovii* (Oxner) S.Y. Kondr., *P. verruculiferum* and *P. garovaglii* (Koerb.) S.Y. Kondr. (in Oxner 2010), *P. zareii* differs in the lack of positive reaction with K, C, and P, as well as in its epilithic habit.

Protoparmeliopsis zareii differs from *P. riparium* (Flot.) S.Y. Kondr. (in Oxner 2010), another Eurasian taxon growing often in periodically wet rock outcrops, in having greenish or greenish-yellow thallus (not being reddish-brown or with whitish pruine) and usually growing in dry well exposed localities.

Other specimens examined: Iran: Esfahan Province, about 250 km to S of Tehran, about 80 km to N of the Esfahan City, to the E of suburbs of Natanz settlement, Karkas hunting-prohibited Region, 1 km to the North of Kesheh village, 51°46'31"E 33°24'24"N, 2550 m alt., plant communities with *Malcolmia africana* (L.) R. Br., *Euphorbia bungei* Boiss., *Nonnea pulla* (L.) DC., *Tulipa biflora* Pall., on rock, 18.IV.2010 B. Zarei-Darki (1212), S.J. Khajeddin, Safavi, Naghipur, Jabbari (*KW-L*); 2 km to the South of Bidhend village, 14 km to the east of Natanz settlement, 51°46'60"E 33°29'20"N, 2465 m alt., plant communities with *Descurainia sophia* (L.) Webbex Prantl, *Myostis stricta* Link, *Nonnea pulla* (L.) DC, *Hyosyamus pusillus* L., *Adonis aestivalis* L., 29.VIII.2010 B. Zarei-Darki (2334), S.J. Khajeddin, Safavi, Jabbari, Naghipur (*TEH*); 13 Km to the North of Soh and Tajrepaen farm, 51°27'33"E 33°35'23"N, 2733 m alt., plant communities with *Anemone biflora* DC., *Pseudosedum multicaule*, *Bromus tomentellus* Boiss., *Tulipa biflora* Pall., *Euphorbia heteradenia* Jaub. & Spach, on rock, 29.VIII.2010 B. Zarei-Darki (2857, 2858), S.J. Khajeddin, Safavi, Naghipur, Jabbari (*KW-L*, *TEH*); Varguran village, 6 km to the North of Targh settlement, towards Natanz settlement, 51°48'52"E 33°24'43"N, 2127 m alt., plant communities with *Psychrogeton amorphoglossus* (Boiss.), *Melica persica* Kunth, *Lepidium persicum* Boiss., *Helichrysum polyphyllum* Ledeb., 26.V.2010, 29.VIII.2010 B. Zarei-Darki (3182, 3184, 3202, 3208, 3214, 3217), S.J. Khajeddin, Safavi, Naghipur, Jabbari (*TEH*, *KW-L*, *UPS*, *H*, *BM*); Labidak farm, 3 km to the NW of the Mazdeh village and 6 km to the N of Targh settlement, 51°49'11"E 33°24'26"N, 2410 m alt., plant community with *Astragalus glaucacathus* Fisch., *Arrhenatherum kotschyi* Boiss.,

Andrachne telephioides, *Centaurea iberica* Trev. ex. Spreng., *Phalaris minor* Retz., on rocks, growing together with *Protoparmeliopsis garovaglii* and *Rhizoplaca melanophthalma* damaged by *Zwackhiomyces*, 30.IV.2010 B. Zarei-Darki (3249, 3264, 3272, 3274), S.J. Khajeddin, Safavi, Naghipur, Jabbari (*KW-L*, *TEH*, *UPS*, *BM*); 12 km to the North of Soh and Tajrepaen farm, 51°27'11"E 33°35'5"N, 2664 m alt., plant communities with *Anemon biflora* DC., *Pseudosedum multicaule*, *Bromus tomentellus* Boiss., *Tulipa biflora* Pall., *Euphorbia heteradenia* Jaub. & Spach, on rock, 29.VI-II.2010 B. Zarei-Darki (3602, 3603, 3605, 3606), S.J. Khajeddin, Safavi, Naghipur, Jabbari (*TEH*, *KW-L*, *UPS*, *H*, *BM*); **Iran**, Esfahan and Markazi Province, about 200 km to the S of Tehran, about 85 km to the N of Esfahan City, between Meymeh and Delijan settlements, along the Teheran-Esfahan highway 5, Mooteh Wildlife refuge, 6 km to SW of Ghazidareh village, 50°39'56"E 33°25'35"N, 2608 m alt., plant communities with *Fumaria asepala* Boiss., *Acinos graveolens* Link, *Lithospermum officinale* L., *Pyrus communis*, *L. iberica* Trev. ex Spreng., *Phalaris minor* Retz., on rock, 21.VII.2010, 21.I.2011 B. Zarei-Darki (409), S.J. Khajeddin, Naghipur, Jabbari (*THE*); 2 km to SW of Laibeid village, 1 km to S of Ghazidareh village, 50°39'56"E 33°25'34"N, 2510 m alt., plant communities with *Fumaria asepala* Boiss., *Acinos graveolens* Link, *Lithospermum officinale* L., *Pyrus communis* L., on rock, 21.VII.2010, 21.I.2011 B. Zarei-Darki (1108, 1109, 1111), S.J. Khajeddin, Naghipur, Jabbari (*THE*, *KW-L*, *UPS*); 3.5 km to N of Abbaric check-point, 50°40' 36"E 33°38' 27"N, 2050 m alt., plant communities with *Artemisia sieberi* Besser, *Acanthophyllum spinosum* C.A.Mey., *Echinophora platyloba* DC., on rock, 21.VII.2010, 21.I.2011 B. Zarei-Darki (1185), S.J. Khajeddin, Naghipur, Jabbari (*THE*); 17 km to N of Laibeid village, 50°40'35"E 33°32'29"N, 2040 m alt., plant communities with *Artemisia sieberi* Besser, *Acanthophyllum spinosum* C.A.Mey., *Echinophora platyloba* DC., on rock, 21.VII.2010, 21.I.2011 B. Zarei-Darki (1688, 1689), S.J. Khajeddin, Naghipur, Jabbari (*THE*, *KW-L*).

New combinations:

New combinations for the European members of the genus *Protoparmeliopsis* have been recently proposed in the last issue of the 'Flora of lichens of Ukraine' [1]. Further new combinations for Asian and North American members of this genus are listed below.

1. *Protoparmeliopsis baicalensis* (Zahlbr.) S.Y. Kondr. comb. nov.

Basionym: *Lecanora baicalensis* Zahlbr., Trav. De la Sous-Sect. de Troitzkossawsk.-Khiakta, Sect. Du Pays d'Amour de la Soc. Imp. Russe de Georg. 12 : 85 (1909)[1911].

2. *Protoparmeliopsis baranowii* (Poelt) S.Y. Kondr. comb. nov.

Basionym: *Lecanora baranowii* Poelt, Mitt. bot. Staatssamml., München **19—20**: 522 (1958)

3. *Protoparmeliopsis bipruinosa* (Fink ex J. Hedrick) S.Y. Kondr. comb. nov.

Basionym: *Lecanora bipruinosa* Fink, in Hedrick, Mycologia **26**: 160 (1934).

4. *Protoparmeliopsis bogdoensis* (Tomin) S.Y. Kondr. comb. nov.

Basionym: *Lecanora bogdoensis* Tomin, Neue Frecht. Süd-Russl. 7 (1926).

5. *Protoparmeliopsis chlorophthalma* (Poelt & Tomin) S.Y. Kondr. comb. nov.

Basionym: *Lecanora chlorophthalma* Poelt & Tomin, in Poelt, Mitt. bot. Staatssamml., München **19—20**: 463 (1958)

- 6. *Protoparmeliopsis crustaceum*** (Savicz) S.Y. Kondr. **comb. nov.**
 Basionym: *Squamarina crustacea* Savicz in Bull. Jard. Bot. Imp. Pierre le Grand, **14**: 123 (1914),
- 7. *Protoparmeliopsis degelii*** (Poelt) S.Y. Kondr. **comb. nov.**
 Basionym: *Squamarina degelii* Poelt, Mitt. Bot. Staatssamml. München 20: 528 (1958).
 Syn: *Lecanora neodegelii* (Poelt) B.D. Ryan & T.H. Nash in Lichen Flora of the Greater Sonoran Desert Region (eds. T.H. Nash III, B.D. Ryan, P. Diederich, C. Gries and F. Bungartz, Tempe, Arizona: Lichens Unlimited, 2: 244 (2004).
- 8. *Protoparmeliopsis dispersoareolatum*** (Körb.) S.Y. Kondr. **comb. nov.**
 Basionym: *Parmelia muralis* var. *dispersoareolata* Schaer., Lich. Helvet. Spicil., sect. 9: 418 (1840).
 Syn.: *Placodium dispersoareolatum* (Schaer.) Körb., Syst. Lich. German. 117 (1855)
- 9. *Protoparmeliopsis geisereae*** (B.D. Ryan) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora geisereae* B.D. Ryan, in Lichen Flora of the Greater Sonoran Desert Region (eds. T.H. Nash III, B.D. Ryan, P. Diederich, C. Gries and F. Bungartz, Tempe, Arizona: Lichens Unlimited, 2: 224 (2004).
- 10. *Protoparmeliopsis hieroglyphicum*** (Poelt) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora hieroglyphica* Poelt, Mitt. bot. Staatssamml. München **19—20**: 485 (1958).
- 11. *Protoparmeliopsis kofae*** (B.D. Ryan & T.H. Nash III) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora kofae* B.D. Ryan & T.H. Nash III, Mycotaxon 53: 484 (1995).
- 12. *Protoparmeliopsis kotovii*** (Oxner) S.Y. Kondr. **comb. nov.**
 Basionym: *Placodium kotovii* Oxner in Journ. Bot. Acad. Sci. RSS Ukraine, **20**(28): 120 (1939).
- 13. *Protoparmeliopsis kukunorensis*** (H. Magn.) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora kukunorensis* H. Magn., Lich. Centr. Asia **1**: 117 (1940)
- 14. *Protoparmeliopsis mazatzalensis*** (B.D. Ryan & T.H. Nash) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora mazatzalensis* B.D. Ryan & T.H. Nash, Crypt. Bot. **3**: 268 (1993).
- 15. *Protoparmeliopsis nashii*** (B.D. Ryan) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora nashii* B.D. Ryan, in Lichen Flora of the Greater Sonoran Desert Region (eds. T.H. Nash III, B.D. Ryan, P. Diederich, C. Gries and F. Bungartz, Tempe, Arizona: Lichens Unlimited, 2: 242 (2004).
 Syn: *Lecanora saxicola* var. *flavida* de Lesd., Lich. Mexique: 13 (1914).
- 16. *Protoparmeliopsis novomexicana*** (H. Magn.) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora novomexicana* H. Magn., Ann. Crypt. Exot. **5**: 26 (1932).
- 17. *Protoparmeliopsis orbicularis*** (Schaer.) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora polytropa* var. *orbicularis* Schaer. Enumer. Critic. Lich. Europ. **81** (1850)
- 18. *Protoparmeliopsis phaedrophthalma*** (Poelt) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora phaedrophthalma* Poelt, Mitt. Bot. Staatssamml. München **19—20**: 483 (1958).
- 19. *Protoparmeliopsis sierrae*** (B.D. Ryan & T.H. Nash) S.Y. Kondr. **comb. nov.**
 Basionym: *Lecanora sierrae* B.D. Ryan & T.H. Nash, Bryologist **96**: 292 (1993).

20. *Protoparmeliopsis stramineum* (Wahlenb. ex. Ach.) S.Y. Kondr. **comb. nov.**
Basionym: *Parmelia straminea* Wahlenb. ex. Ach. Method. Lich., Suppl. 47 (1803),

21. *Protoparmeliopsis sphaeroideum* (Oxner) S.Y. Kondr. **comb. nov.**

Basionym: *Placodium sphaeroideum* Oxner, Ukr. Bot. Zhurn. **18** (3): 93 (1961).

22. *Protoparmeliopsis usbekica* (Poelt) S.Y. Kondr. **comb. nov.**

Basionym: *Lecanora usbekica* Poelt, Mitt. Bot. Staatssamml. München **19—20**: 467 (1958).

23. *Protoparmeliopsis verruculiferum* (Oxner) S.Y. Kondr. **comb. nov.**

Basionym: *Placodium verruculiferum* Oxner, Journal de l'Institut Botanique de l'Academie des Sciences de la RSS d'Ukraine **20**(28): 121 (1939) [non *Placodium verruculiferum* Vain. (1905)].

Acknowledgement

The authors express sincere thanks to the Isfahan Provincial Directorate of Environmental Protection for the help in rendering of collections realization in the protected territories. SK expresses his deep thanks to Dr. B. Zarei-Darki for the possibility to work with Iranian collection.

REFERENCES

1. Кондратюк С.Я. Протопармелиопсис — *Protoparmeliopsis* M. Choisy. // А.М. Окснер «Флора лишайників України у двох томах», том 2 випуск 3 / Відп. ред. С.Я. Кондратюк, О.Г. Ромс. — Київ: Наук. думка, 2010. — С. 130—149.
2. Arup U., Grube M. Is Rhizoplaca (Lecanorales, lichenized Ascomycota) a monophyletic genus? // Canadian Journal of Botany. — 2000. — **78**. — P. 318—327.
3. Kondratyuk S.Y., Kärnefelt I. *Josefpoeltia* and *Xanthomendoza* two new genera in the family *Teloschistaceae* (Ascomycotina) // Bibliotheca Lichenologica. — 1997. — **68**. — P. 19—44.
4. Kondratyuk S.Y., Zarei-Darki B. The first data on lichen diversity of Mooteh and Karkas protected areas (Esfahan Province, Iran) Botany and mycology: problems and perspectives for 2011—2020 years (Materials of All Ukrainian Scientific Conference, Kyiv, 6—8 April 2011) / Eds. I.A. Dudka & S.Ya. Kondratyuk. — Kyiv: M.G. Kholodny Institute of Botany, 2011. — P. 191—193.
5. Ryan B.D., Lumbsch H.T., Messuti M.I. et al. *Lecanora*. / In Lichen Flora of the Greater Sonoran Desert Region (eds. T.H. Nash III, B.D. Ryan, P. Diederich, C. Gries, F. Bungartz, Tempe, Arizona: Lichens Unlimited. — 2004. — **2**. — P. 176—286.

Recommended for publication
P.M. Tsarenko

Submitted 06.04.2011

С.Я. Кондратюк¹, Б. Зарей-Даркі², С. Хаседдін³

¹ Інститут ботаніки імені М.Г. Холодного НАН України, Київ, Україна

² Університет Тарбят Модарес, Тегеран, Іран

³ Есфаханський університет технології, Есфахан, Іран

НОВІ ВИДИ ТА КОМБІНАЦІЇ ЛИШАЙНИКІВ РОДУ *PROTOPARMELIOPSIS* (*LECANORACEAE*, *LICHENIZED ASCOMYCOTINA*)

Наведено описи, порівняння з близькосторідними видами двох нових для науки видів роду *Protoparmeliopsis* M. Choisy — *P. zarei* S.Y. Kondr. і *P. esfahanensis* S.Y. Kondr. & B. Zarei-Darki.

Крім того, запропоновані нові комбінації назв 23 лишайників, у тому числі: *Protoparmeliopsis baicalensis*, *P. baranowii*, *P. bipruinosum*, *P. bogdoensis*, *P. chlorophthalmum*, *P. crustaceum*, *P. de-*