Caloplaca scythica, a new species from southern Ukraine

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Caloplaca scythica Khodosovtsev & Søchting is described from Ukrainian *Artemisia - Festuca* steppes near the Black Sea. It grows on twigs of small shrubs of *Halocnemum strobilaceum* and *Limonium* sp. on salty soils, and is characterized by greenish grey areoles or squamules with punctiform to confluent soralia and zeorine apothecia with a conspicuous white pruina.

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The southernmost part of Ukraine is situated within the steppe zone which is characterized by a number of taxa belonging to the *Asteraceae*, *Caryophyllaceae*, *Chenopodiaceae*, and *Poaceae*. The lichen vegetation is not abundant in this particular steppe habitat. Only 234 lichen species, belonging to 75 different genera, have been recorded (Kondratyuk 1995). However, the very unique environmental conditions have resulted in a number of lichen species that are adapted to and restricted to this territory. Species such as *Dermatocarpon borysthenicum, Endocarpon obscuratum, Lecania zinaidae, Staurothele columellaris, Thrombium cretaceum, Umbilicaria subpolyphylla, Verrucaria cretophila*, and *V. pontica* were described from this southern part of Ukraine by Oxner (1931, 1936, 1955, 1956, 1968). Most of these species have so far only been found in this region and are generally only known from the type localities. For some of the species, e.g. *Lecania zinaidae*, *Verrucaria cretophila*, *V. pontica*, new data on the ecology and distribution in Ukraine have been published recently (Kondratyuk & Navrotskaya 1992, Khodosovtsev 1995). In connection with a special study on the ecology and distribution of *Lecania zinaidae*, a species of *Caloplaca* characterized by greenish grey soredia was collected at several localities in the southern part of the Ukrainian steppe zone. It is described here as new to science as *Caloplaca scythica*.

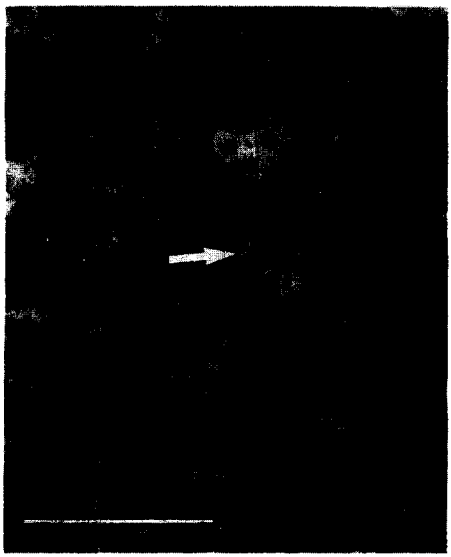

Figure 1. *Caloplaca scythica*. 7.V.1995 Khodosovtsev (KW). Thallus areoles with punctiform soralia (arrow). Scale ½ mm.

Caloplaca scythica Khodosovtsev & Søchting *sp. nov.*

Caloplacae cerinae var. *stillicidiorum* similis sed differt thallo soraliis punctiformibus vel confluentibus instructo. Cortex excipuli thallini tenuis et ab initio pruina crassa vestitus. Figures 1-3.

Type: Ukraine, Kherson Region, Genichesk District, Chongar Peninsula, near transition to Kuyuk-Tuk Island, alt. 5 m, on debris of plants, 8 May 1995, R. I. Mishustin (KW, holotype; C, herbarium of Kherson Pedagogical Institute, isotypes).

Thallus crustose, areolate to minutely squamiform, sometimes invisible, greenish grey to white, K-, slightly pruinose. Areolae dispersed, more or less convex, small, 0.1-0.2 mm in diameter. Soralia concolorous with the areoles, sometimes punctiform, erumping from areoles, mostly irregular (Figure 1), often becoming confluent and forming a thin sorediate crust. Apothecia zeorine, few or numerous, dispersed or grouped, sessile, 0.3-0.7 mm in diameter, produced isolated or in between the areolae (Figure 2). Disc urceolate to later flat or rarely slightly convex, pale, yellowish-orange to orange, K+ purple, initially with whitish pruina. Exciples initially folded over the disc. Proper exciple concolorous with disc. Thalline exciple 90-130(-150) µm thick, covered by a persistant, thick, irregular, white pruina consisting of fine crystals. The pruina eventually cracks and becomes thinner exposing a rugged surface.

Thallus cortex poorly developed, consisting of a two to four cells thick tissue of ± isodiametric cells, which are covered by a layer of fine crystals (Figure 3a). Soredia of the consorediate type (Tønsberg 1992), greyish to greenish, K-, (30-)40-60(-90) µm in diameter, with rough surface. Thalline exciple densely packed with algae, and with a poorly developed, 10-12(-25) µm thick cortex consisting of a thick layer of a paraplectenchymatous tissue or of small strands of anticlinally arranged hyphae with polygonal or rounded lumina. By disintegration of the cortical tissue aggregates of algae and hyphae from the underlying tissue are formed and eventually released as consoredia. Proper exciple in exposed part 130 µm thick, in lateral and basal part 10-15(-30) µm thick, consisting of a prosoplectenchymatous tissue. Epihymenium bright yellow to yellowish brown, 8-10 µm thick, with fine anthraquinone crystals. Hymenium hyaline, 50-60(-70) µm high. Hypothecium hyaline, 20-45 µm thick. Asci clavate, (40-)42-47(-50) × (10-)11-13(-15) µm, 8-spored. Paraphyses 1.5-1.7 µm thick, mainly simple, but sometimes somewhat branched. One or two apical cells inflated, spherical, up to 5-6(-7) µm diam (Figure 3b). Ascospores hyaline, ellipsoid, 11-13 × 4.5-6(-7) µm, with 3-4(-5) µm thick septa (Figure 3c). Conidiomata not seen. Algal cells spherical, 9-15 µm in

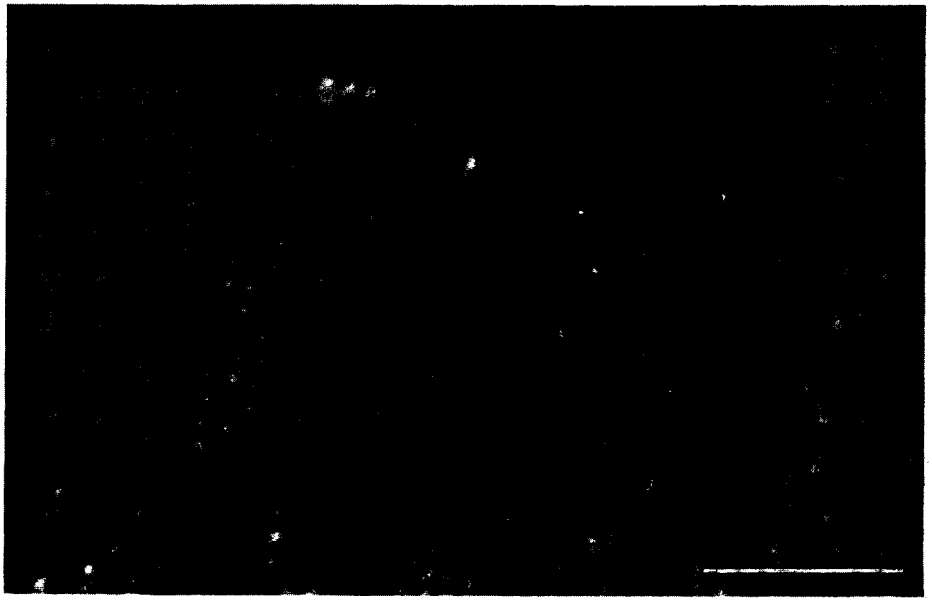

Figure 2. *Caloplaca scythica.* Holotype. Apothecia. Scale ½ mm.

diameter. Chemistry not analyzed due to sparse material.

Ethymology. The specific epithet "*scythica*" refers to the scythian people, that roved the southern steppes of Ukraine in seventh to third century BC.

Variability

In young thalli the soralia are mostly distinct and darker than the whitish areoles. The very strong and rough white pruina of particularly the apothecial margin disappears with age and the margin often ends up being sorediate. When occurring on plant debris *C. scythica* forms distinct areoles with white pruina and numerous apothecia, while it is heavily sorediate and with very few apothecia when it grows on twigs of small shrubs.

Discussion

Caloplaca scythica has a superficial resemblance to *C. cerina* var. *stillicidiorum* (Vahl) Th. Fr., with which it has several characters in common, e.g. a thallus and a thalline exciple without anthraquinones, and the presence of crystalline pruina on disc and exciples. However, *C. cerina* var. *stillicidiorum* has lecanorine apothecia and a well-differentiated, thick cortex on the apothecial margin. Even though soralia and soralia-like structures are known within the *C. cerina* complex, e.g. in *C. chlorina* (Flot.) Sandst. and *C. jemtlandica* var. *cerinosora* Hansen, Poelt & Søchting, the anatomical characters rule out a close taxonomic relationship with that group. Other sorediate species of *Caloplaca* with greenish grey thallus and soralia are *C. ahtii* Søchting, *C. obscurella* (J. Lahm.) Th. Fr., *C. ulcerosa* Coppins & P. James, and *C. virescens* (Sm.) Coppins, but those species all have very different apothecia none of which are pruinose (Laundon 1992, Søchting 1994).

The heavy white cover of the thallus and apothecia appears to be a feature of a number of species growing in arid environments

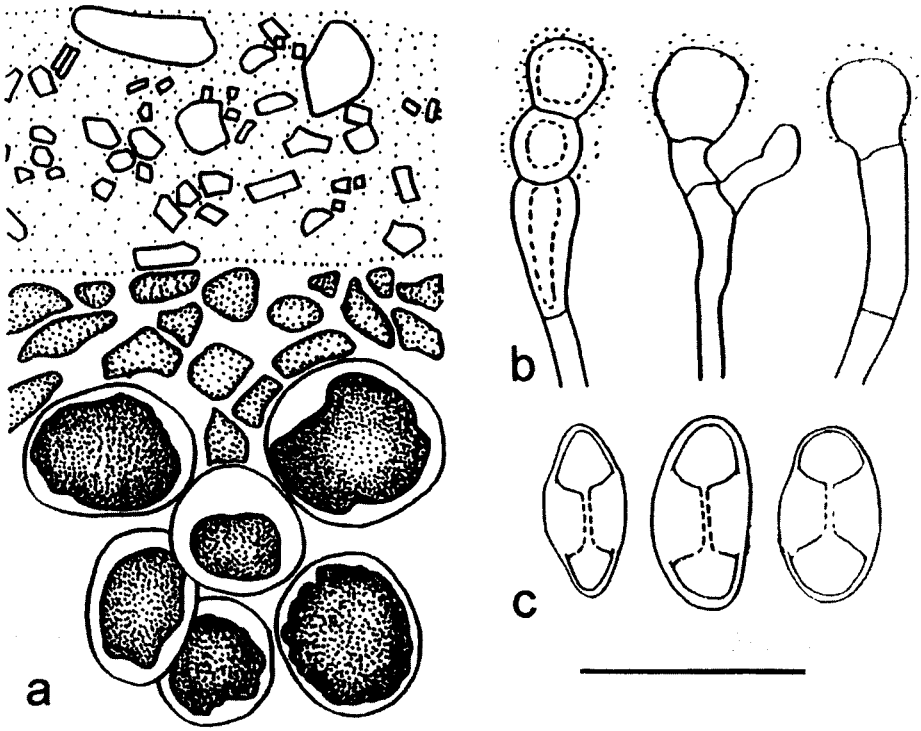

Figure 3. *Caloplaca scythica*. Holotype. **a**. Cross section of thallus cortex showing crystalline pruina, form of cortical cells (middle layer), and algal layer. **b**. Paraphyse tips. **c**. Spores. Scale 15 µm.

(Büdel 1990, Llimona 1981). It is generally assumed to protect against strong insolation. The cover can be either a epinecral layer as in *Peltula* (Büdel op. cit.) or consist of crystals, e.g. calcium oxalate. The chemical nature of the crystals in *C. scythica* is presently unknown.

Ecology

Caloplaca scythica is so far only known from the *Artemisia-Festuca* steppe habitat near the Black Sea, where it occurs on twigs of small shrubs, e.g. *Halocnemum strobilaceum* and *Limonium* sp., and on remains of plants on salty soils. It is often associated with *Caloplaca holocarpa* coll., *Collema* sp., *Lecania koerberiana, L. zinaidae, Lecanora* sp., *Mycomicrothelia* sp., *Physcia adscendens,* and *Xanthoria parietina.*

Additional specimens examined: **Ukraine**. *Kherson region*: Black Sea Reservation, site Soloozerna, on *Halocnemum strobilaceum*, VII.1992, O. Khodosovtsev (KW); Peninsula "Yagorlitsky Kut", on *H. strobilaceum*, VII.1993, O. Khodosovtsev (KW); Island Tendrovska Kosa, on debris of plant, VII.1993, O. Khodosovtsev (KW); Scadovsk district, near Scadovsk town, on *Limonium* sp., V.1993, O. Khodosovtsev (KW); Genichesk district, peninsula Churyuk, near transition to island Kuyuk-Tuk, on soil and

plant debris, 18.IX.1994, O. Khodosovtsev (KW, UPS); 2 km from railway station Sivash, on *Halocnemum strobilaceum* and on plant debris, 7.V.1995, O. Khodosovtsev (KW, C, LE, herbarium of Kherson Pedagogical Institute). *Nikolaev region*: Ochakiv district, peninsula Kinburnskaya Kosa, left part of Right Kosa, in steppes on twigs of *Limonium* sp. together with *Lecania zinaidae*, *Lecanora* sp., *Physcia adscendens*, *and Xanthoria parietina*, 24.I.1994, O. Khodosovtsev (KW, BM).

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