

Contribution to the knowledge of the lichen flora of Crete (Kriti), Greece

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Abstract

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71 lichen taxa are reported from Crete. Five species, *Caloplaca furfuracea*, *Koerberia biformis*, *Ochrolechia macrospora*, *Placidiopsis tenella* and *Xanthomendoza aphrodites*, are new to Greece and further 34 taxa are new to Crete. Additional 13, 1, 6 and 10 taxa are reported for the first time for the Nomi Chanion, Rethimnion, Irakliou and Lassithi, respectively.

Key words: lichen diversity, lichenized fungi, Mediterranean region.

Introduction

Despite a relatively large number of published papers (see Christensen 1989), the Greek lichen flora is comparatively unexplored. The checklists of the Greek mainland (Steiner 1898) and of the Aegean Islands (Rechinger 1943) are outdated. Only Crete (Grube & al. 2001) and the Paros and Santorini archipelagos in the central Aegean Sea (Sipman & Raus 1999) have modern checklists. Though not intended as a checklist, the floristic report of Kos and nearby islands in the E Aegean Sea (Sipman & Raus 2002) may serve the purpose.

The checklist of Crete (Grube & al. 2001), comprising 440 taxa, is far from exhaustive, reflecting the scant floristic work done on the island. A recent contribution by Spribille & al. (2006), reporting 102 lichen taxa new to Crete, underlines the need for further floristic work on the island.

Recently, the lichen herbarium of Aarhus University (AAU) was transferred to the Botanical Museum of Copenhagen (C). The filing process offered the opportunity to extract the Cretan specimens, mainly collected by S. Svane, and to update our knowledge of the lichen diversity of Crete.

Material and methods

The studied material includes the Cretan specimens of AAU, now deposited at C, mainly collected by the second author, and specimens collected by the first author, deposited at C, at the

Botanical Museum Berlin-Dahlem (B) or in his private herbarium. The localities of the Nomos (county) Chanion were investigated by the first author, while the material from AAU was collected in three Nomi (counties) east of Chanion, i.e. Rethimnion, Irakliou and Lassithi.

Geography, geology and climate of Crete are briefly treated by Grube & al. (2001).

The lichens collected come from the following 15 localities:

Nomos Chanion

1. Korikos peninsula, E slope of Mt Gerkoskinos, along the path at the E coast; phrygana with *Sarcopoterium spinosum*, *Phlomis fruticosa* and other shrubs on E facing slope; bedrock: limestone; about 100 m, 9.4.1986.
2. About 6 km N of the S coast town of Palaeochora, about 1 km S of the village of Sarakina; olive grove in ravine with river, on *Olea europaea* trees along road, about 400 m, 8.4.1986.
3. About 4 km N of the S coast town of Palaeochora, about ½ km N of the village of Kalamos; *Quercus pubescens* trees along road in arable land, trees about 30 m from rivulet; bedrock: limestone; about 300 m, 8.4.1986.
4. About 6 km WNW of the village of Omalos, about 1½ km N of the village of Agia Irini; *Cupressus sempervirens-Quercus coccifera* forest with scattered *Pinus brutia* on NNW slope; bedrock: limestone; on *Quercus coccifera*, 975-1050 m, 10.4.1986.
5. About 20 km SW of the town of Chania, near the village of Nea Roumata; *Castanea* trees in NW-SE running ravine; bedrock: lime-rich slate; on *Castanea sativa*, 560 m, 10.4.1986.
6. About 24 km SSW of the town of Chania, about 3 km S of the village of Omalos, just N of Xyloskalo; degraded *Cupressus sempervirens-Quercus coccifera* forest on SW slope; bedrock: limestone; 1200-1360 m, 3.4.1986.
7. About 13 km SW of the town of Chania, just S of the village of Hliaro; vertical NNW facing limestone rock wall in ravine, 260 m, 10.4.1986.
8. About 35 km SSE of Chania, the S coast, just N of Chora Sfakion; on almost vertical soil patch on W facing limestone rock wall in phrygana dominated by *Euphorbia acanthothamos*, *Satureja thymbra* and *Sarcopoterium spinosum*, about 100 m, 5.4.1986.

Nomos Rethimnion

9. On the lower slopes of Mt Psiloritis (Ida), 3.5.1987.

Nomos Irakliou

10. Just S of Hersonnissou (Chersonissos), Piscopiano, hills W of the village, 150 m, 11.4.1993.
11. Just S of Hersonnissou, near Koutouloufari, in ravine, 180 m, 11.4.1993.
12. About 10 km SE of Hersonnissou, along the road Hersonnissou to Tzermiado, above Avdou c. 1 km E of the village, 550 m, 7.4.1993.

Nomos Lassithi

13. About 19 km SE of Hersonnissou, the cave Dikteon Andron by the village Psichro, in ravine E of the cave, 920 m, 7.4.1993.
14. About 20 km W of Ierapetra, above Mirtos, by Mournies, 160 m, 8.4.1993.
15. Along the main road about 12 km SE of Agios Nikolaos, Gournia, maquis, sea level, 7.4.1993.

List of lichen taxa

The following list includes five taxa new to Greece, preceded by two asterisks (**), 34 taxa new to Crete, preceded by one asterisk (*), and further 32 taxa new to one or more of the Nomi Chanion (13 taxa), Rethimnion (1), Irakliou (6) and Lassithi (10). The hitherto known distribution of the taxa on Crete is indicated by the first letter of each of the four Nomi and based on Grube & al. (2001) unless otherwise indicated. The numbers in brackets refer to the collection localities given in the section "Material and methods".

The collection numbers of the second author are preceded by the initials SS and those of the first author by SNC.

**Anema nummularium* (Durieu & Mont.) Nyl. – (11) SS 9410 A.

**Arthonia radiata* (Pers.) Ach. – (4) on *Quercus coccifera*, with *Lecanora rugosella* SNC 3226.

**Buellia triphragmia* (Nyl.) Arnold [syn.: *B. lauricassiae* auct. eur., non (Fée) Müll. Arg., cf. Nimis (1993)] – (4) on *Quercus coccifera*, with *Lecanora meridionalis* SNC 3238e, with *Xanthoria parietina* SNC 3240.

**Caloplaca cerinella* (Nyl.) Flagey – (4) on *Quercus coccifera*, with *Xanthoria parietina* SNC 3240.

Caloplaca ferruginea (Huds.) Th. Fr. – (5) on *Castanea sativa*, SNC 3176. – L; new to C.

Caloplaca flavescens (Huds.) J. R. Laundon – (12) SS 9387 A. – C; new to I.

**Caloplaca flavorubescens* var. *quercina* (Flagey) Giralt & al. – (3) on *Quercus pubescens*, SNC 3088, 3094; (4) on *Quercus coccifera*, SNC 3238d, 3247, 3248, on unidentified deciduous shrub, SNC 3228b; (5) on *Castanea sativa*, SNC 3164; (6) on *Quercus coccifera*, SNC 3010; (13) SS 9396 A. – Distinguished from var. *flavorubescens* by the more aggregated apothecia and the zeorine margin (Giralt & al. 1992).

***Caloplaca furfuracea* H. Magn. – (6) on *Quercus coccifera*, SNC 2985 det. U. Søchting. – Distinguished from *C. herbidella* by the negative K-reaction and the non-corticate “isidia”.

Caloplaca velana (A. Massal.) Du Rietz (incl. var. *schaereri* (Arnold) Clauzade & Cl. Roux) – (13) SS 9399 B. – C, R, I; new to L.

Caloplaca sp. – (6) on *Quercus coccifera*, SNC 3003b. – Disc black, thallus margin grey, thallus grey, spores broadly ellipsoidic with broad septum. Appears to be undescribed.

Catillaria nigroclavata (Nyl.) Schuler – (4) on *Quercus coccifera*, with *Rinodina* cf. *pyrina* SNC 3245; (5) on *Castanea sativa*, with *Candelariella xanthostigma* SNC 3146, with *Lecanora rugosella* SNC 3163, with *Lecanora argentata* SNC 3185; (9) on *Quercus ilex*, 3.5.1987, A. D. Poulsen. – R; new to C.

**Cladonia chlorophaea* (Sommerf.) Spreng. – (5) on *Castanea sativa* SNC 3196, on a vertical earth brink, SNC 3199. – Both containing atranorin and fumarprotocetraric acid by tlc.

**Cladonia cyathomorpha* Stirton – (4) on mosses on limestone outcrop, SNC 3259.

Cladonia firma (Nyl.) Nyl. – (1) on soil in open spot between bushes in phrygana, SNC 3112. – L; new to C.

Cladonia rangiformis Hoffm. – (7) on limestone rock wall, SNC 3142. – L; new to C.

Clauzadea immersa (Weber) Hafellner & Bellemère – (11) SS 9407 A. – C, L; new to I.

**Collema auriforme* (With.) Coppins & J. R. Laundon – (4) on limestone outcrop, SNC 3259a.

Collema crispum (Huds.) Wigg. – (11) SS 9413 B; (14) on shallow soil and dust on sandstone in ESE sloping gully, SS 9404 B; (15) on soil in maquis, SS 9402 A. – C, I; new to L.

Collema nigrescens (Huds.) DC. – (2) on *Olea europaea*, SNC 3066; (3) on *Quercus pubescens*, SNC 3107 conf. G. Degelius. – R; new to C.

**Collema tenax* var. *ceranoides* (Borr.) Degel. – (10) SS 9416 B; (15) on soil in maquis, SS 9401 C.

**Degelia atlantica* (Degel.) P. M. Jørg. & P. James – (3) on *Quercus pubescens*, SNC 3085 conf. P. M. Jørgensen; (5) on *Castanea sativa*, SNC 3156 det. P. M. Jørgensen.

Diploschistes candidissimus (Kremp.) Zahlbr. [syn.: *D. actinostomus* var. *farinosus* (Anzi) Zahlbr.] – (14) SS 9504 A. – I; new to L.

Endocarpon pusillum Hedw. – (8) on soil, with *Squamarina conrescens* SNC 3029. – R; new to C.

Fulgensia bracteata (Hoffm.) Räs. – (4) on shallow soil on limestone outcrop, SNC 3253. – L; new to C.

Fuscopannaria ignobilis (Anzi) P. M. Jørg. – (5) on *Castanea sativa*, with *Fuscopannaria olivacea* SNC 3203 det. P. M. Jørgensen. – I; new to C.

***Koerberia biformis* A. Massal. – (3) on *Quercus pubescens*, with *Collema subnigrescens* SNC 3095. – The species is also known from Peloponnisos where it was erroneously published as *Vestergrenopsis isidiata* (Christensen 1994).

**Lecania cyrtella* (Ach.) Th. Fr. – (4) on *Quercus coccifera*, SNC 3238f.

Lecanora chlarotera Nyl. – (2) on *Olea europaea*, SNC 3056; (4) on *Quercus coccifera*, SNC 3237, with *Pertusaria albescens* var. *corallina* SNC 3215, with *Physcia leptalea* SNC 3221; (5) on *Castanea sativa*, SNC 3161, 3165, 3194; (6) on *Quercus coccifera*, with *Melanelia exasperata* SNC 3011; (13) SS 9398 B. – C, R, I; new to L.

**Lecanora chlarotera* subsp. *chlarotera* f. *crassula* (H. Magn.) Poelt – (4) on *Quercus coccifera*, SNC 3221a; (5) on *Castanea sativa*, SNC 3171a. – Distinguished from *L. chlarotera* s.str. and *L. rugosella* Zahlbr. by the more even thallus and the resemblance with *L. glabrata* (Ach.) Malme (Clauzade & Rouz 1985). Poelt & Vězda (1981), however, regard both *L. crassula* and *L. rugosella* as synonyms of *L. chlarotera*. In agreement with Poelt & Vězda (1981), it is our experience that *L. rugosella* (with prominent thallus margin) occur in more nutrient enriched situations than *L. chlarotera* s.str. (with less prominent thallus margin). It is conceivable, therefore, that the three taxa may be ecological modifications. As recent authors (Nimis 1993, Grube & al. 2001, Spribille & al. 2006) have recognized entities of the complex, we find it best to keep them apart until the taxonomy is finally settled.

Lecanora hagenii (Ach.) Ach. – (6) on *Quercus coccifera*, with *Lecidella euphoria* SNC 2995, with *Xanthoria parietina* SNC 3004, with *Caloplaca cerina* SNC 3006; (13) SS 9397 B. – C, I; new to L.

**Lecanora leptyroides* (Nyl.) Degel. – (6) on *Quercus coccifera*, SNC 3003; (9) on *Quercus ilex*, 3.5.1987, A. D. Poulsen.

**Lecanora meridionalis* H. Magn. – (4) on *Quercus coccifera*, SNC 3238e.

**Lecidea lurida* (Ach.) DC. – (12) SS 9389 A.

**Lecidella achristotera* (Nyl.) H. Hertel – (4) on *Quercus coccifera*, with *Caloplaca flavo-rubescens* SNC 3248; (5) on *Castanea sativa*, with *Fuscopannaria olivacea* SNC 3203.

Lecidella euphoria (Flörke) H. Hertel – (2) on *Olea europaea*, SNC 3065; (3) on *Quercus pubescens*, with *Melanelia glabra* SNC 3084; (4) on *Quercus coccifera*, SNC 3235a, 3238a; (5) on *Castanea sativa*, with *Candelariella xanthostigma* SNC 3146, with *Collema furfuraceum* SNC 3160, with *Caloplaca flavo-rubescens* SNC 3164, with *Physconia distorta* SNC 3169, with *Physcia leptalea* SNC 3177, with *Lecanora argentata* SNC 3185; (6) on *Quercus coccifera*, SNC 2995, 3021; (9) on *Quercus ilex*, 3.5.1987, A. D. Poulsen. – C; new to R.

**Leptogium massiliense* Nyl. – (12) SS 9383 A.

**Leptogium microphylloides* auct. – (3) on *Quercus pubescens*, with *Physconia distorta* SNC 3104. – Broad-lobed specimens with marginal and sometimes also laminal isidia are referred to *L. microphylloides* by European authors. They do not belong to *L. microphylloides* Nyl. but are regarded as a growth form of *L. teretiusculum* by Jørgensen (1994) and Jørgensen & Tønsgaard (1999). However, as we have never observed any intermediate specimens, we are inclined to agree with Nimis & Tretiach (1999) who regard such specimens as belonging to a distinct taxon.

**Leptogium plicatile* (Ach.) Leighton – (13) SS 9392 A.

**Leptogium* cf. *subaridum* P. M. Jørg. – (5) on *Castanea sativa*, SNC 3157a. – This record is based on a tiny specimen, hence the cf. specification. The specimen has the characteristic dentate lobe margins and the clavate to dactyliform, shining, laminal isidia. The species was described from western North America (Jørgensen & Goward 1994) and later found on the Iberian Peninsula, Sardinia and Kerkira (Corfu) (Aragón & al. 2004).

**Ochrolechia alboflavescens* (Wulfen) Zahlbr. – (2) on *Olea europaea*, SNC 3054b.

**Ochrolechia arborea* (Kreyer) Almb. – (2) on *Olea europaea*, SNC 3064, 3076; (5) on *Castanea sativa*, SNC 3157.

***Ochrolechia macrospora* Vers. – (2) on *Olea europaea*, SNC 3063. – The spores are rather large: 68-100 × c. 36 µm (compared to 65-75 × 30-40 µm, according to Clauzade & Roux 1985).

**Ochrolechia subviridis* (Høeg) Erichsen – (5) on *Castanea sativa*, SNC 3191.

**Parmelia submontana* Nád. – (6) on *Quercus coccifera*, SNC 2984. – Schindler (1997) mapped the known Greek distribution.

**Parmelia quercina* (Willd.) Hale – (5) on *Castanea sativa*, SNC 3166, 3184.

**Peccania coralloides* (Massal.) Massal. – (12) SS 9384 A.

- Peltigera rufescens* (Weis) Humb. – (6) on the ground below a *Quercus coccifera* bush, SNC 2990. – R; new to C.
- **Pertusaria albenscens* var. *corallina* (Zahlbr.) J. R. Laundon – (4) on *Quercus coccifera*, SNC 3215, 3249.
- **Pertusaria pertusa* var. *meridionalis* Zahlbr. – (2) on *Olea europaea*, with *Ochrolechia macrospora* SNC 3063; (4) on *Quercus coccifera*, SNC 3224; (6) on *Quercus coccifera*, SNC 3018.
- Physcia leptalea* (Ach.) DC. [syn.: *Physcia semipinnata* (J. F. Gmel.) Moberg] – (2) on *Olea europaea*, SNC 3068, 3073; (3) on *Quercus pubescens*, with *Caloplaca flovorubescens* SNC 3094; (4) on *Quercus coccifera*, SNC 3221, 3236, 3238, 3238b, on unidentified deciduous shrub, SNC 3228; (5) on *Castanea sativa*, SNC 3147, 3148a, 3173, 3177, 3190, 3204; (6) on *Quercus coccifera*, SNC 2979, 3013, 3023; (13) SS 9395 B. – C, R; new to L.
- Physcia stellaris* (L.) Nyl. – (2) on *Olea europaea*, with *Tephromela atra* SNC 3060, with *Physconia distorta* SNC 3067; (6) on *Quercus coccifera*, SNC 2987, 3015; (13) SS 9395 A. – C, R/I and R (Spribille & al. 2006); new to L.
- **Physcia tenella* (Scop.) DC. – (2) on *Olea europaea*, with *Physconia distorta* SNC 3067; (3) on *Quercus pubescens*, SNC 3081, with *Collema furfuraceum* SNC 3101, with *Collema subnigrescens* SNC 3099a; (4) on *Quercus coccifera*, with *Physcia leptalea* SNC 3221, with *Lecanora chlarotera* SNC 3237, on unidentified deciduous shrub, SNC 3228a; (6) on *Quercus coccifera*, SNC 3024a.
- Physconia perisidiosa* (Erichsen) Moberg – (5) on *Castanea sativa*, SNC 3158. – R (Spribille & al. 2006); new to C.
- Physconia servitii* (Nádv.) Poelt – (2) on *Olea europaea*, SNC 3054a, 3072; (5) on *Castanea sativa*, SNC 3149, 3150, 3181, 3207. – R; new to C.
- ***Placidopsis tenella* (Nyl.) Zahlbr. – (11) SS 9411 A; (13) SS 9394 A. – Specimens conf. O. Breuss; seems to be the first confirmed report of the species outside NW Africa (Breuss 1994).
- **Placidium tenellum* (Breuss) Breuss – (6) on soil, SNC 2926 det. O. Breuss.
- Polycoccum marmoratum* (Kremp.) D. Hawksw. – (12) parasitic on sterile crustose lichen on limestone, SS 9386 A conf. V. Alstrup. – C, R/I; new to I (outside the border area).
- **Psora crenata* (Th. Tayl.) Reinke – (10) SS 9416 D; (15) SS 9401 B. – Whether this taxon is really distinct from *P. decipiens* (Poelt & Vězda 1981, Llimona & Hladun 2001) or is conspecific with *P. decipiens* (Schneider 1979, Clauzade & Roux 1985), is at present unclear.
- Ramalina farinacea* (L.) Ach. – (5) on *Castanea sativa*, SNC 3205 (cf.), 3207a. – I and R (Spribille & al. 2006); new to C.
- Ramalina fraxinea* var. *calicariformis* Nyl. – (6) on *Quercus coccifera*, SNC 3002. – R (Spribille & al. 2006); new to C.
- Rinodina exigua* (Ach.) Gray – (9) on *Quercus ilex*, 3.5.1987, A. D. Poulsen; (13) SS 9397 A. – R; new to L.
- Rinodina* spp. with *Physcia* type ascospores – (4) on *Quercus coccifera*, SNC 3238c, 3245, with *Physcia leptalea* SNC 3236; (6) on *Quercus coccifera*, with *Lecanora rugosella* SNC 2989 (isidiate). – All specimens det. H. Mayrhofer.
- **Scoliosporum umbrinum* var. *corticola* (Anzi) Clauzade & Roux – (4) on *Quercus coccifera*, with *Physcia leptalea* SNC 3221, with *Lecanora chlarotera* SNC 3237; (6) on *Quercus coccifera*, with *Physcia stellaris* SNC 3015. – *S. umbrinum* var. *umbrinum* is reported from C by Spribille & al. (2006).
- Synalissa symphorea* (Ach.) Nyl. – (11) on compact soil in ravine, SS 9410 B. – C; new to I.
- Toninia diffracta* (Massal.) Zahlbr. – (13) SS 9392 C; (15) on soil in maquis, 9401 A. – C, R, I; new to L.
- Toninia opuntoides* (Vill.) Timdal – (11) SS 9414 A. – C, R, L; new to I.
- Toninia tristis* subsp. *pseudotabacina* Timdal – (11) SS 9415 A. – R, L; new to I.
- **Verrucaria glaucina* Ach. – (11) SS 9408 B; (13) SS 9399 C.
- **Verrucaria hochstetteri* Fr. – (11) SS 9407 C. – Var. *mastodiea* (A. Massal.) Clauzade & Cl. Roux is known from I.

- ***Xanthomendoza aphrodites* (Kalb & al.) Søchting & al. – (3) on *Quercus pubescens*, SNC 3093; (5) on *Castanea sativa*, SNC 3173a conf. U. Søchting, parasitic on *Physconia perisidiosa* SNC 3158 and *Physconia venusta* SNC 3178.
- Xanthoria parietina* (L.) Th. Fr. – (2) on *Olea europaea*, SNC 3057, 3062; (3) on *Quercus pubescens*, SNC 3091; (4) on *Quercus coccifera*, SNC 3240; (5) on *Castanea sativa*, SNC 3170; (6) on *Quercus coccifera*, SNC 3004, 3005; (13) SS 9395 C. – C, I, R (Spribille & al. 2006); new to L.

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