

Learning from the Tracks: Evidence of Long-Lasting Inhibitory Effects of Lichen Secondary Metabolites on the *Caestia* Pyramid (Rome) and Potential Applications to Stone Conservation

Giulia Caneva ¹, Maria Rosaria Fidanza ^{1,*}, Chiara Tonon ² and Sergio Enrico Favero-Longo ²

¹ Department of Science, Roma Tre University, viale Marconi 446, 00146, Roma, Italy

² Department of Life Sciences and Systems Biology, University of Torino, Viale Mattioli 25, 10125, Torino, Italy

* Correspondence: mariarosaria.fidanza@uniroma3.it; Tel.: +39 06 57336374

Received: date; Accepted: date; Published: date

Supplementary material 1

Complete list of lichens reported on carbonate rock substrates of archaeological sites of Latium [45], examined with respect to morphological and physiological traits potentially related with their recognition as aetiological factor for the development of the tracks of uncolonised surface.

Fruticose, soliose, leprose, squamulose lichens

Callome multipartita (Sm.) Otálora, P.M. Jørg. & Wedin; *Candelaria concolor* (Dicks.) Stein; *Dermatocarpon miniatum* (L.) W. Mann; *Enchylium polycarpon* (Hoffm.) Otálora, P.M. Jørg. & Wedin; *Fuscopannaria praetermissa* (Nyl.) P.M. Jørg.; *Lathagrium auriforme* (With.) Otálora, P.M. Jørg. & Wedin; *Lathagrium cristatum* (L.) Otálora, P.M. Jørg. & Wedin; *Lathagrium undulatum* (Flot.) Poetsch; *Lepraria crassissima* (Hue) Lettau; *Leproplaca chrysodeta* (Vain.) Ahti; *Leproplaca cirrochroa* (Ach.) Arup, Frödén & Söchting; *Leproplaca xantholyta* (Nyl.) Hue; *Lichinella iodopulchra* (Croz.) P.P. Moreno & Egea; *Lichinella nigritella* (Lettau) P.P. Moreno & Egea; *Peccania coralloides* (A. Massal.) Arnold; *Physcia adscendens* H. Olivier; *Physcia caesia* var. *caesiella* (B. de Lesd.) Clauzade & Cl. Roux; *Physcia leptalea* (Ach.) DC.; *Romjularia lurida* (Ach.) Timdal; *Scytinium schraderi* (Ach.) Otálora, P.M. Jørg. & Wedin; *Squamarina cartilaginea* (With.) P. James; *Squamarina gypsacea* (Sm.) Poelt; *Squamarina lentigera* (Weber) Poelt; *Synalissa ramulosa* (Bernh.) Fr.; *Xanthoria calcicola* Oxner.

Lichens with discontinuous thallus

Acrocordia conoidea (Fr.) Körb.; *Alyxoria subelevata* (Nyl.) Ertz & Tehler; *Caloplaca inconnexa* (Nyl.) Zahlbr.; *Candelariella aurella* (Hoffm.) Zahlbr.; *Flavoplaca citrina* (Hoffm.) Arup, Frödén & Söchting; *Flavoplaca coronata* (Körb.) Arup, Frödén & Söchting; *Myriolecis dispersa* (Pers.) Sliwa, Zhao Xin & Lumbsch; *Placocarpus schaeferi* (Fr.) Breuss; *Xanthocarpia ferrarii* (Bagl.) Frödén, Arup & Söchting; *Xanthocarpia lactea* (A. Massal.) A. Massal.

Small lichens (patches > 2 cm in diameter or not signalled in the species description)

Acarospora murorum A. Massal.; *Catillaria lenticularis* (Ach.) Th. Fr.; *Clauzadea chondrodes* (A. Massal.) Hafellner & Türk; *Clauzadea immersa* (Hoffm.) Hafellner & Bellem.; *Clauzadea monticola* (Schaer.) Hafellner & Bellem.; *Diplotomma alboatrum* (Hoffm.) Flot.; *Lecania erysibe* (Ach.) Mudd; *Lecania spadicea* (Flot.) Zahlbr.; *Lecidella stigmatea* (Ach.) Hertel & Leuckert; *Myriolecis agardhiana* (Ach.) Sliwa, Zhao Xin & Lumbsch; *Myriolecis albescens* (Hoffm.) Sliwa, Zhao Xin & Lumbsch; *Parabagliettoa cyanea* (A. Massal.) Gueidan & Cl. Roux; *Porina linearis*

(Leight.) Zahlbr.; *Protoblastenia incrustans* (DC.) J. Steiner; *Protoblastenia rupestris* (Scop.) J. Steiner; *Pseudoleptogium diffractum* (Körb.) Müll. Arg.; *Pyrenodesmia alociza* (A. Massal.) Arnold; *Pyrenodesmia variabilis* (Pers.) A. Massal.; *Rinodina immersa* (Körb.) J. Steiner; *Rinodina lecanorina* (A. Massal.) A. Massal.; *Rinodinella controversa* (A. Massal.) H. Mayrhofer & Poelt; *Verrucaria caerulea* DC.; *Verrucaria muralis* Ach.; *Verrucaria viridula* (Schrad.) Ach.

Lichens without secondary metabolites

Acarospora cervina A. Massal.; *Bagliettoa baldensis* (A. Massal.) Vězda; *Bagliettoa marmorea* (Scop.) Gueidan & Cl. Roux; *Bagliettoa parmigera* (J. Steiner) Vězda & Poelt; *Bagliettoa parmigerella* (Zahlbr.) Vězda & Poelt; *Catillaria chalybeia* (Borrer) A. Massal.; *Petractis clausa* (Hoffm.) Kremp.; *Placynthium nigrum* (Huds.) Gray; *Rinodina bischoffii* (Hepp) A. Massal.; *Verrucaria macrostoma* DC.; *Verrucaria nigrescens* Pers.; *Verrucaria pinguicola* Massal.

Occasional lichen species

Bagliettoa cazzae (Zahlbr.) Vězda & Poelt; *Candelariella medians* (Nyl.) A.L. Sm.; *Diploschistes diacapsis* (Ach.) Lumbsch; *Diplotomma venustum* (Körb.) Körb.; *Flavoplaca granulosa* (Müll. Arg.) Arup, Frödén & Søchting; *Lobothallia radiosa* (Hoffm.) Hafellner; *Myriolecis pruinosa* (Chaub.) Sliwa, Zhao Xin & Lumbsch; *Placolecis opaca* (Dufour) Hafellner; *Protoparmeliopsis versicolor* (Pers.) M. Choisy; *Solenopsora candicans* (Dicks.) J. Steiner; *Solenopsora grisea* (Bagl.) Kotlov.

Common lichen species

Calogaya pusilla (A. Massal.) Arup, Frödén & Søchting; *Caloplaca erythrocarpa* (Pers.) Zwackh; *Caloplaca teicholyta* (Ach.) J. Steiner; *Circinaria calcarea* (L.) A. Nordin, Savić & Tibell; *Circinaria hoffmanniana* (S. Ekman & Fröberg ex R. Sant.) A. Nordin; *Variospora aurantia* (Pers.) Arup, Frödén & Søchting; *Variospora flavescens* (Huds.) Arup, Frödén & Søchting; *Xanthocarpia ochracea* (Schaer.) A. Massal. & De Not.