

Recent literature on lichens—259

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- Abas, A., N. Sulaiman, N. R. Adnan, S. A. Aziz & W. N. S. W. Nawang. 2019. Using lichen (*Dirinaria* sp.) as bio-indicator for airborne heavy metal at selected industrial areas in Malaysia. *EnvironmentAsia* 12(3): 85–90.
- Albright, M. B. N., R. C. Mueller, L. V. Gallegos-Graves, J. Belnap, S. C. Reed & C. R. Kuske. 2019. Interactions of microhabitat and time control grassland bacterial and fungal composition. *Frontiers in Ecology and Evolution* 7: 367.
- Alexandrino, C. A. F., N. K. Honda, M. D. F. C. Matos, L. C. Portugal, P. R. B. de Souza, R. T. Perdomo, R. D. C. A. Guimarães, M. C. T. Kadri, M. C. B. L. Silva & D. Bogo. 2019. Antitumor effect of depsidones from lichens on tumor cell lines and experimental murine melanoma. *Brazilian Journal of Pharmacognosy* 29(4): 449–456.
- Antoninka, A., M. A. Bowker, N. N. Barger, J. Belnap, A. Giraldo-Silva, S. C. Reed, F. Garcia-Pichel & M. C. Duniway. 2019. Addressing barriers to improve biocrust colonization and establishment in dryland restoration. *Restoration Ecology*. doi:10.1111/rec.13052.
- Araújo, H. D. A., N. H. Silva, M. C. P. A. Albuquerque, A. L. Aires & V. L. M. Lima. 2020[2019]. Potassium usnate, a water-soluble usnic acid salt, shows enhanced activity against *Schistosoma mansoni* in vitro. *Experimental Parasitology* 208: 107779.
- Araújo, H. D. A., J. G. Silva Jr., J. R. S. Oliveira, M. H. M. L. Ribeiro, M. C. B. Martins, M. A. C. Bezerra, A. L. Aires, M. C. P. A. Albuquerque, M. R. Melo Jr. N. T. P. Filho, E. C. Pereira, D. J. R. Silva, J. V. dos Anjos, E. P. S. Falcão, N. H. Silva & V. L. M. Lima. 2019. Usnic acid potassium salt: Evaluation of the acute toxicity and antinociceptive effect in murine model. *Molecules* 24: 2042.
- Bacaro, G., E. Tordoni, S. Martellos, S. Maccherini, M. Marignani, L. Muggia, F. Petruzzellis, R. Napolitano, D. Da Re, T. Guidi, R. Benesperi, V. Gonnelli & L. Lastrucci. 2019. Cross taxon congruence between lichens and vascular plants in a riparian ecosystem. *Diversity* 11(8): 133.
- Backhaus, T., J. Meeßen, R. Demets, J.-P. Paul de Vera & S. Ott. 2019. DNA damage of the lichen *Buellia frigida* after 1.5 years in space using randomly amplified polymorphic DNA (RAPD) technique. *Planetary and Space Science* 177: 104687.
- Ballová, Z., L. Pekárik, V. Píš & J. Šibík. 2019. How much do ecosystem engineers contribute to landscape evolution? A case study on Tatra marmots. *Catena* 182: 104121.
- Barbosa-Silva, A. M., A. C. Silva, E. C. G. Pereira, M. L. L. Buril, N. H. Silva, M. E. S. Cáceres, A. Aptroot & M. A. Bezerra-Gusmão. 2019. Richness of lichens consumed by *Constrictotermes cyphergaster* in the semi-arid region of Brazil. *Sociobiology* 99: 154–160.
- Bargagli, R., S. Ancora, N. Bianchi & E. Rota. 2019. Deposition, abatement and environmental fate of pollutants in urban green ecosystems: Suggestions from long-term studies in Siena (Central Italy). *Urban Forestry and Urban Greening* 46: 126483.
- Behera, M. D., S. K. Behera & S. Sharma. 2019. Recent advances in biodiversity and climate change studies in India. *Biodiversity and Conservation* 28(8–9): 1943–1951.
- Belinchón, R., C. J. Ellis & R. Yahr. 2018. Climate-woodland effects on population genetics for two congeneric lichens with contrasting reproductive strategies. *FEMS Microbiology Ecology* 94(11): fty159.
- Belyaev, V., K. Bogolytsyn, O. Brovko, Y. Kutinov, N. Neverov, I. Palamarchuk, T. Boytsova, D. Chukhchin, D. Zhiltsov & N. Gorshkova. 2019. Influence of tectonic faults on the conditions and properties of some components of a biogeocenosis in a subarctic area. *European Journal of Environmental Sciences* 9(1): 5–10. [Includes *Cladonia stellaris* and *Usnea subfloridana*.]
- Benatti, M. N. & M. P. Marcelli. 2019. Foliose Physciaceae from the Parque Estadual da Cantareira, São Paulo state. III. Species of the genus *Physcia* [Physciaceae foliosas do Parque Estadual da Cantareira, estado de São Paulo. III. Espécies do Gênero *Physcia*]. *Rodriguésia* 70: e00642018. [In Portuguese with English abstract. Includes key.]
- Benítez, Á., G. Aragón & M. Prieto. 2019. Lichen diversity on tree trunks in tropical dry forests is highly influenced by host tree traits. *Biodiversity and Conservation* 28(11): 2909–2929.
- Berger, F. & S. LaGreca. 2014. Contributions to the lichen flora of Bermuda — Part I. New records, new combinations, and interesting collections of lichenized ascomycetes. *Evansia* 31(2): 41–68. [New: *Bacidina brittoniana* (Riddle) LaGreca & Ekman (\equiv *Bilimbia brittoniana* Riddle), *Muellerella thalamita* (Nyl.) D.Hawksw., F. Berger & LaGreca (\equiv *Endococcus thalamita* Nyl.). *Bacidina varia* Ekman synonymized with *B. brittoniana*, *Lecidea caliginosa* Stirton synonymized with *Malmidea vinosa* (Eschw.) Kalb, Rivas Plata & Lumbsch. Includes key to *Caloplaca* in Bermuda.]
- Berkdemir, V., Ş. Tokalioğlu, S. Yildiz & Ş. Patat. 2019. Dispersive solid phase extraction of copper and lead from water and lichen

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- samples with an activated carbon@Fe/Mn/O composite derived from sucrose-based activated carbon. *Analytical Methods* 11(4): 5311–5319.
- Bernardo, F., P. Pinho, P. Matos, F. Viveiros, C. Branquinho, A. Rodrigues & P. Garcia. 2019. Spatially modelling the risk areas of chronic exposure to hydrothermal volcanic emissions using lichens. *Science of the Total Environment* 697: 133891.
- Bertrand, R. L. & J. L. Sorensen. 2019. Lost in Translation: Challenges with heterologous expression of lichen polyketide synthases. *ChemistrySelect* 4(21): 6473–6483.
- Bianchi, E., R. Benesperi, I. Colzi, A. Coppi, L. Lazzaro, L. Paoli, A. Papini, S. Pignattelli, C. Tani, P. Vignolini & C. Gonnelli. 2019. The multi-purpose role of hairiness in the lichens of coastal environments: Insights from *Seiophora villosa* (Ach.) Frödén. *Plant Physiology and Biochemistry* 141: 398–406.
- Blanár, D., A. Guttová, I. Mihál, V. Plášek, T. Hauer, Z. Palice & K. Ujházy. 2019. Effect of magnesite dust pollution on biodiversity and species composition of oak-hornbeam woodlands in the Western Carpathians. *Biologia* 74(12): 1591–1611.
- Boch, S., A. Martins, S. Ruas, S. Fontinha, P. Carvalho, F. Reis, A. Bergamini & M. Sim-Sim. 2019. Bryophyte and macrolichen diversity show contrasting elevation relationships and are negatively affected by disturbances in laurel forests of Madeira island. *Journal of Vegetation Science* 30(6): 1122–1133.
- Bragazza, L., B. J. M. Robroek, V. E. J. Jassey, M. S. Arif, R. Marchesini, M. Guglielmin & N. Cannone. 2019. Soil microbial community structure and enzymatic activity along a plant cover gradient in Victoria Land (continental Antarctica). *Geoderma* 353: 144–151.
- Brunbjerg, A. K., H. H. Bruun, L. Brøndum, A. T. Classen, L. Dalby, K. Fog, T. G. Frøslev, I. Goldberg, A. J. Hansen, M. D. D. Hansen, T. T. Høye, A. A. Illum, T. Læssøe, G. S. Newman, L. Skipper, U. Søchting & R. Ejrnæs. 2019. A systematic survey of regional multi-taxon biodiversity: Evaluating strategies and coverage. *BMC Ecology* 19(1): 43.
- Burkin, A. A. & G. P. Kononenko. 2019. Mycotoxins and usnic acid in the thalli of *Hypogymnia physodes* of different ages. *Mikologiya i Fitopatologiya* 53(2): 90–94.
- Cañón, E. R. P., M. P. D. Albuquerque, R. P. Alves, A. B. Pereira & F. D. C. Victoria. 2019. Morphological and molecular characterization of three endolichenic isolates of *Xylaria* (Xylariaceae), from *Cladonia curta* Ahti & Marcelli (Cladonia-ceae). *Plants* 8(10): 399.
- Capozzi, F., M. C. Sorrentino, A. Di Palma, F. Mele, C. Arena, P. Adamo, V. Spagnuolo & S. Giordano. 2020[2019]. Implication of vitality, seasonality and specific leaf area on PAH uptake in moss and lichen transplanted in bags. *Ecological Indicators* 108: 105727.
- Cardós, J. L. H., M. Prieto, M. Jylhä, G. Aragón, M. C. Molina, I. Martínez & J. Rikkinen. 2019. A case study on the re-establishment of the cyanolichen symbiosis: Where do the compatible photobionts come from? *Annals of Botany* 124(3): 379–388.
- Carter, O., B. Kropp, N. Noell, J. Hollinger, G. Baker, A. Tittle, L. L. St. Clair & S. D. Leavitt. 2019. A preliminary checklist of the lichens in Great Basin National Park, Nevada, USA. *Evansia* 36(3): 72–91.
- Černajová, I. & P. Škaloud. 2019. The first survey of Cystobasidiomycete yeasts in the lichen genus *Cladonia*; with the description of *Lichenzyma pisutiana* gen. nov., sp. nov. *Fungal Biology* 123(9): 625–637. [New: *Lichenzyma* Černajová & Škaloud (type: *L. pisutiana*), *L. pisutiana* Černajová & Škaloud (on many *Cladonia* species from Czech Republic, Germany, Hungary, Norway, Spain, Slovakia, Sweden).]
- Cipro, C. V. Z., P. Bustamante, R. C. Montone, L. C. Oliveira & M. V. Petry. 2019. Do population parameters influence the role of seabird colonies as secondary pollutants source? A case study for Antarctic ecosystems. *Marine Pollution Bulletin* 149: 110534.
- Clyne, A. B., N. L. Cleavitt & T. J. Fahey. 2019. Terrestrial gastropod grazing on macrolichens in a northern broadleaf-conifer forest. *Northeastern Naturalist* 26(2): 261–274.
- Colbert, J. T., M. Blackledge, A. Drahos, L. T. Haffner, C. H. Lee, L. Malek & K. M. Thompson. 2019. Surveying the lichen diversity of Gitchie Manitou State Preserve using problem-based learning pedagogy. *Evansia* 36(3): 92–100.
- Coleine, C., J. E. Stajich, N. Pombubpa, L. Zucconi, S. Onofri, F. Canini & L. Selbmann. 2019. Altitude and fungal diversity influence the structure of Antarctic cryptoendolithic bacteria communities. *Environmental Microbiology Reports* 11(5): 718–726.
- Concostrina-Zubiri, L., J. M. Arenas, I. Martínez & A. Escudero. 2019. Unassisted establishment of biological soil crusts on dryland road slopes. *Web Ecology* 19(1): 39–51.
- Condon, L. A., N. Pietrasiak, R. Rosentreter & D. A. Pyke. 2019. Passive restoration of vegetation and biological soil crusts following 80 years of exclusion from grazing across the Great Basin. *Restoration Ecology*. doi:10.1111/rec.13021.
- Cuong, T. V., S.-Y. Cho, J. Kwon & D. Kim. 2019. Elucidation of the inhibitory mechanisms of *Nipponoparmelia laevior* lichen extract against influenza A (H1N1) virus through proteomic analyses. *Journal of Microbiology and Biotechnology* 29(7): 1155–1164.
- Cwane, A., J. W. Mietelski, E. Łokas, M. A. Olech, R. Anczkiewicz & R. Misiak. 2020[2019]. Sources and variation of isotopic ratio of airborne radionuclides in Western Arctic lichens and mosses. *Chemosphere* 239: 124783.
- Czernjadjeva, I. V., O. M. Afonina, D. V. Ageev, E. Z. Baisheva, T. M. Bulyonkova, N. N. Cherenkova, G. Ya. Doroshina, S. I. Drovkina, O. D. Dugarova, N. A. Dulepova, A. P. Dyachenko, N. V. Filippova, E. G. Ginzburg, R. M. Gogorev, D. E. Himelbrant, M. S. Ignatov, O. A. Kataeva, V. M. Kotkova, N. S. Kuragina, L. E. Kurbatova, E. V. Kushnevskaya, E. Yu. Kuzmina, A. V. Melekhin, A. A. Notov, Yu. K. Novozhilov, S. Yu. Popov, N. N. Popova, A. D. Potemkin, I. S. Stepanchikova, V. A. Stepanova, D. Ya. Tubanova, A. V. Vlasenko, V. A. Vlasenko, O. G. Voronova & Kh. Kh. Zhalov. 2019. New cryptogamic records. 4. *Novosti sistematiki nizshikh rastenii* 53(2): 431–479.
- Darnajoux, R., N. Magain, M. Renaudin, F. Lutzoni, J.-P. Bellenger & X. Zhang. 2019. Molybdenum threshold for ecosystem scale alternative vanadium nitrogenase activity in boreal forests. *Proceedings of the National Academy of Sciences of the U.S.A.* 116(49): 24682–24688.
- Davidson, C. J., K. R. Foster & R. N. Tanna. 2020[2019]. Forest health effects due to atmospheric deposition: Findings from long-term forest health monitoring in the Athabasca Oil Sands Region. *Science of the Total Environment* 699: 134277.
- Davydov, E. A., O. B. Blum, G. P. Kashevarov & V. P. Grakhov. 2019. *Umbilicaria subpolyphylla* Oxner: The correct name for *U. iberica* Sancho & Krzewicka and its bipolar distribution pattern. *The Lichenologist* 51(3): 205–220.
- Davydov, E. A., G. P. Urbanavichus, I. N. Urbanavichene & A. E. Selivanov. 2019. *Umbilicaria freyi* – A new lichen species for Russia and other noteworthy records of *Umbilicaria* from the

- Elbrus region (Central Caucasus, Kabardino-Balkaria). *Turczaninowia* 22(2): 94–109.
- de Moura Baptista, L. R., A. L. Gasper, M. L., Lorscheitter & C. Scherer. 2019. Physiognomic and multivariate phytosociological analyses of a subtropical peat bog located on the Eastern Plateau in southern Brazil. *Wetlands* 39: 1069–1077.
- Değerli, E., S. Yangın & D. Cansaran-Duman. 2019. Determination of the effect of RBRR on laccase activity and gene expression level of fungi in lichen structure. *3 Biotech* 9(8): 297.
- Degtjarenko, P., I. Jürjado, T. Mandel, T. Tõrra, A. Saag, C. Scheidegger & T. Randlane. 2019. Microsatellite based genetic diversity of the widespread epiphytic lichen *Usnea subfloridana* (Parmeliaceae, Ascomycota) in Estonia: Comparison of populations from the mainland and an island. *MycKeys* 58: 27–45.
- Del-Prado, R., K. Buaruang, H. T. Lumbsch, A. Crespo & P. K. Divakar. 2019. DNA sequence-based identification and barcoding of a morphologically highly plastic lichen forming fungal genus (*Parmotrema*, Parmeliaceae) from the tropics. *The Bryologist* 122(2): 281–291.
- Demková, L., J. Árvay, L. Bobuľská, M. Hauptvogel & M. Hrstková. 2019. Open mining pits and heaps of waste material as the source of undesirable substances: Biomonitoring of air and soil pollution in former mining area (Dubník, Slovakia). *Environmental Science and Pollution Research* 26: 35227–35239.
- Demková, L., J. Árvay, L. Bobuľská & J. Obona. 2018. The risk elements biomonitoring in the ambient air of an underground parking lot. *Polish Journal of Natural Sciences* 33(4): 545–559.
- Demková, L., L. Bobuľská & I. Jančo. 2019. Air quality inside university building environment. *International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM* 19(4.1): 829–826.
- Dengler, J., T. J. Matthews, M. J. Steinbauer, S. Wolfrum, S. Boch, A. Chiarucci, T. Conradi, I. Dembicz, C. Marcenò, I. Garcia-Mijangos, A. Nowak, D. Storch, W. Ulrich, J. A. Campos, L. Cancellieri, M. Carboni, G. Ciaschetti, P. De Frenne, J. Dolezal, C. Dolnik, F. Essl, E. Fantinato, G. Filibeck, J.-A. Grytnes, R. Guarino, B. Güler, M. Janišová, E. Klichowska, L. Kozub, A. Kuzemko, M. Manthey, A. Mimet, A. Naqinezhad, C. Pedersen, R. K. Peet, V. Pellissier, R. Pielech, G. Potenza, L. Rosati, M. Terzi, O. Valkó, D. Vynokurov, H. White, M. Winkler & I. Biurrun. 2020[2019]. Species–area relationships in continuous vegetation: Evidence from Palearctic grasslands. *Journal of Biogeography* 47(1): 72–86.
- Dengler, J., S. Widmer, E. Staubli, M. Babbi, J. Gehler, D. Hepenstrick, A. Bergamini, R. Billeter, S. Boch, S. Rohrer & I. Dembicz. 2019. Dry grasslands of the central valleys of the Alps from a European perspective: The example of Ausserberg (Valais, Switzerland). *Hacquetia* 18(2): 155–177.
- Divya Reddy, S., B. Siva, K. Kumar, V. S. Phani Babu, V. Sravanthi, J. Boustie, V. Lakshma Nayak, A. K. Tiwari, C. H. V. Rao, B. Sridhar, P. Shashikala & K. Suresh Babu. 2019. Comprehensive analysis of secondary metabolites in *Usnea longissima* (Lichenized Ascomycetes, Parmeliaceae) using UPLC-ESI-QTOF-MS/MS and pro-apoptotic activity of barbatic acid. *Molecules* 24(12): 2270.
- Elsakov, V. V. & V. M. Shchanov. 2019. Current changes in vegetation cover of Timan tundra reindeer pastures from analysis of satellite data. *Sovremennye Problemy Distantionnogo Zondirovaniya Zemli iz Kosmosa* 16(2): 128–142.
- Emmer, A., A. Juřicová & B. K. Veettil. 2019. Glacier retreat, rock weathering and the growth of lichens in the Churup Valley, Peruvian Tropical Andes. *Journal of Mountain Science* 16(7): 1485–1499.
- Emsen, B. 2019. The antioxidant and antigenotoxic potential of *Peltigera canina* and *Umbilicaria nylanderiana* based on their phenolic profile. *Farmacia* 67(5): 912–921.
- Emsen, B., O. Ozdemir, T. Engin, B. Togar, S. Cavusoglu & H. Turkez. 2019. Inhibition of growth of U87MG human glioblastoma cells by *Usnea longissima* Ach. *Anais da Academia Brasileira de Ciências* 91(3): e20180994.
- England, J. K., C. J. Hansen, J. L. Allen, S. Q. Beeching, W. R. Buck, V. Charny, J. G. Guccion, R. C. Harris, M. Hodges, N. M. Howe, J. C. Lendemer, R. T. McMullin, E. A. Tripp & D. P. Waters. 2019. Checklist of the lichens and allied fungi of Kathy Stiles Freeland Bibb County Glades Preserve, Alabama, U.S.A. *Opuscula Philolichenum* 18: 420–434.
- Evans, D. J. A., S. Guðmundsson, J. L. Vautrey, K. Fernyough & W. G. Southworth. 2019. Testing lichenometric techniques in the production of a new growth-rate (curve) for the Breiðamerkurjökull foreland, Iceland, and the analysis of potential climatic drivers of glacier recession. *Geografiska Annaler, Series A: Physical Geography* 101: 225–248.
- Evans, P. M., A. C. Newton, E. Cantarello, N. Sanderson, D. L. Jones, N. Barsoum, J. E. Cottrell, S. W. A'Hara & L. Fuller. 2019. Testing the relative sensitivity of 102 ecological variables as indicators of woodland condition in the New Forest, UK. *Ecological Indicators* 107: 105575. [Epiphytic lichens were an effective composition indicator.]
- Evgrafova, S., V. Kadutskiy, L. Mukhortova & S. Prudnikova. 2019. Methanotrophic ability of mosses and lichens associated bacteria in permafrost ecosystems of eastern Siberia. *International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM* 19(3.2): 293–300.
- Evstafeva, E. V., A. M. Bogdanova, T. S. Bolshunova, N. V. Baranovskaya & N. A. Osipova. 2019. Mercury content in the epiphytic lichens of Crimea Republic. *Bulletin of the Tomsk Polytechnic University, Geo Assets Engineering* 330(7): 93–103.
- Expósito, J. R., A. J. Coello, E. Barreno, L. M. Casano & M. Catalá. 2019. Endogenous NO is involved in dissimilar responses to rehydration and Pb(NO₃)₂ in *Ramalina farinacea* thalli and its isolated phycobionts. *Microbial Ecology*. doi:10.1007/s00248-019-01427-2.
- Expósito, J. R., S. M. S. Román, E. Barreno, J. Reig-Armiñana, F. J. García-Breijo & M. Catalá. 2019. Inhibition of NO biosynthetic activities during rehydration of *Ramalina farinacea* lichen thalli provokes increases in lipid peroxidation. *Plants* 8(7): 189.
- Fačkovcová, Z., A. Guttová, R. Benespero, S. Loppi, E. Bellini, L. S. di Toppi & L. Paoli. 2019. Retaining unlogged patches in Mediterranean oak forests may preserve threatened forest macrolichens. *IForest* 12(2): 187–192.
- Fabritius, H., A. Singer, J. Pennanen & T. Snäll. 2019. Estimation of metapopulation colonization rates from disturbance history and occurrence-pattern data. *Ecology* 100(10): e02814.
- Faluaburu, M. S., R. Nakai, S. Imura & T. Naganuma. 2019. Phylotypic characterization of mycobionts and photobionts of rock tripe lichen in east Antarctica. *Microorganisms* 7(7): 203.
- Fatima, A., M. Ramdani & T. Lograda. 2019. Relationship between lichen diversity and air quality in urban region in Bourdj Bou Arridj, Algeria. *Biodiversitas* 20(8): 2329–2339.
- Fick, S. E., N. Barger, J. Tatarko & M. C. Duniway. 2020[2019]. Induced biological soil crust controls on wind erodibility and dust (PM₁₀) emissions. *Earth Surface Processes and Landforms* 45(1): 224–236.

- Foster, K. R., C. Davidson, R. N. Tanna & D. Spink. 2019. Introduction to the virtual special issue monitoring ecological responses to air quality and atmospheric deposition in the Athabasca Oil Sands region the wood Buffalo environmental Association's Forest health monitoring program. *Science of the Total Environment* 686: 345–359. [Discusses lichen monitoring.]
- Fryday, A. M. 2019. Eleven new species of crustose lichenized fungi from the Falkland Islands (Islas Malvinas). *The Lichenologist* 51(3): 235–267. [New (all from the Falkland Islands unless otherwise noted): *Bacidia marina* Fryday, *Bacidia pruinata* Fryday, *Buellia gypsysensis* Fryday, *Cliostomum albidum* Fryday, *Cliostomum longisporum* Fryday, *Coccotrema rubromarginatum* Fryday (from Falklands and Argentina), *Hymenelia microcarpa* Fryday, *Lecania vermisporea* Fryday, *Leptra argentea* Fryday, *Rhizocarpon malviniae* Fryday, *Tephromela lignicola* Orange & Fryday. Includes keys to each genus in the region.]
- Fryday, A. M., A. Orange, T. Ahti, D. O. Øvstedal & D. E. Crabtree. 2019. An annotated checklist of lichen-forming and lichenicolous fungi reported from the Falkland Islands (Islas Malvinas). *Glalia* 8(1): 1–100. [New: *Lambiella andreaeicola* (Fryday) Fryday (\equiv *Rimularia andreaeicola* Fryday), *L. subsephota* (Fryday) Fryday (\equiv *R. subsephota* Fryday), *Notoparmelia kerguelensis* (F.Wilson) Fryday (\equiv *Parmelia kerguelensis* F.Wilson), *N. lindsayana* (Øvstedal & Elix) Fryday (\equiv *P. lindsayana* Øvstedal & Elix), *Palicella xantholeuca* (Müll. Arg.) Fryday & Orange (\equiv *Lecidea xantholeuca* Müll. Arg.), *Pseudophebe mariensis* (Øvstedal, Common & Fryday) Øvstedal & Fryday (\equiv *Bryoria mariensis* Øvstedal).]
- Fryday, A. M. & P. P. G. van den Boom. 2019. *Lecidea phaeophysata*: A new saxicolous lichen species from western and southern Europe with a key to saxicolous lecideoid lichens present on Atlantic coasts. *The Lichenologist* 51(3): 193–204. [New: *L. phaeophysata* Fryday, van den Boom & M.Brand (from France, Ireland, Italy and Portugal). Includes key to Atlantic coastal saxicolous lecideoid lichens in Europe.]
- Gamrat, R., M. Gałczyńska, Z. Sotek & M. Stasińska. 2019. The impact of neighbouring ecosystems on species composition in the ecotone of small forest plots: Case study in Choszczno Forest Inspectorate in NW Poland. *Russian Journal of Ecology* 50(5): 465–473.
- Gandhi, A. D., K. Murugan, K. Umamahesh, R. Babujanarthanam, P. Kavitha & A. Selvi. 2019. Lichen *Parmelia sulcata* mediated synthesis of gold nanoparticles: An eco-friendly tool against *Anopheles stephensi* and *Aedes aegypti*. *Environmental Science and Pollution Research*. doi:10.1007/s11356-019-05726-6.
- García Martínez, S. 2016. [Thesis] Briófitos y líquenes: una contribución a la biota del bosque seco tropical, subregión montes de maría (Sucre Colombia). Universidad de Sucre, Colombia. 1–85 pages. [In Spanish with English abstract.]
- Garwood, R. J., H. Oliver & A. R. T. Spencer. 2020[2019]. An introduction to the Rhynie chert. *Geological Magazine* 157(Special Issue 1): 47–64.
- Gauslaa, Y., S. Johlander & B. Nordén. 2019. *Lobaria amplissima* thalli with external cephalodia need more rain than thalli without. *The Lichenologist* 51(3): 281–286.
- Geiser, L. H., P. R. Nelson, S. E. Jovan, H. T. Root & C. M. Clark. 2019. Assessing ecological risks from atmospheric deposition of nitrogen and sulfur to US forests using epiphytic macrolichens. *Diversity* 11(6): 87.
- Ghiyasi, A., A. Ahmadimoghadam & M. Sohrabi. 2019. Floristic study and diversity of lichen species in highlands of Kuh-Asiab protected area in Kuhbanan (Kerman province, Iran). *Rostaniha* 20(1): 44–61.
- González, Y., G. Aragón & M. Prieto. 2019. New records of terricolous lichens in Ecuadorian páramos [Nuevos registros de líquenes terrícolas en los páramos ecuatorianos]. *Caldasia* 41(2): 445–449. [In Spanish with English abstract.]
- Grishkan, I. & M. Temina. 2019. Interior of saxicolous lichens on different types of rocks as a habitat for microfungus communities in upper Galilee, Israel. *Acta Mycologica* 54(1): 1123.
- Gutiérrez-Larruga, B., B. Estébanez-Pérez & R. Ochoa-Hueso. 2019. Effects of nitrogen deposition on the abundance and metabolism of lichens: A meta-analysis. *Ecosystems*. doi:10.1007/s10021-019-00431-4.
- Habib, K. & A. N. Khalid. 2019. New records of lichens from the State of Azad Jammu and Kashmir, Pakistan corroborated by ITS sequences. *Nova Hedwigia* 109(3–4): 457–473.
- Halbwachs, H. 2019. Fungi trapped in amber—a fossil legacy frozen in time. *Mycological Progress* 18(7): 879–893.
- Haldeman, M. 2019. New and interesting records of lichens and lichenicolous fungi from Northwestern USA II. *Evansia* 36(3): 63–71.
- Han, S.-R., D. W. Kim, B. Kim, Y. M. Chi, S. Kang, H. Park, S.-H., Jung, J. H. Lee & T.-J. Oh. 2019. Complete genome sequencing of *Shigella* sp. PAMC 28760: Identification of CAZyme genes and analysis of their potential role in glycogen metabolism for cold survival adaptation. *Microbial Pathogenesis* 137: 103759.
- Hanedar, A., E. Güneş, G. Kaykioğlu, S. Ö. Çelik & E. Cabi. 2020[2019]. Determination of polycyclic aromatic hydrocarbons in the soil, atmospheric deposition and biomonitor samples in the Meric-Ergene River Basin, Turkey. *Environment, Development and Sustainability* 22: 3389–3406.
- Hansson, S. V., T. T. Høye, L. Bach, C. Mielec, A. Mosbech & J. Søndergaard. 2019. Spiders as biomonitors of metal pollution at Arctic mine sites: The case of the Black Angel Pb-Zn-mine, Maarmorilik, West Greenland. *Ecological Indicators* 106: 105489. [Study sampled lichens.]
- Haq, M. U., Z. A. Reshi & D. K. Upreti. 2019. Three new records of lichenized fungi from India. *Check List* 15(3): 461–464.
- Hämäläinen, A., J. Strengbom & T. Ranius. 2020[2019]. Low-productivity boreal forests have high conservation value for lichens. *Journal of Applied Ecology* 57(1): 43–54.
- Hargis, H., S. G. Gotsch, P. Porada, G. W. Moore, B. Ferguson & J. T. van Stan II. 2019. Arboreal epiphytes in the soil-atmosphere interface: How often are the biggest “buckets” in the canopy empty? *Geosciences (Switzerland)* 9(8): 342.
- Hasairin, A. & R. Siregar. 2018. The analysis of level of lead (Pb) on lichens as a bioindicator of air quality in Medan Industrial Area and Pinang Baris Integrated Terminal in Medan, Indonesia. *IOP Conference Series: Earth and Environmental Science* 187(1): 012029.
- Hassan, S. T. S., M. Šudomová, K. Berchová-Bímová, K. Šmejkal & J. Echeverría. 2019. Psoromic acid, a lichen-derived molecule, inhibits the replication of HSV-1 and HSV-2, and inactivates HSV-1 DNA Polymerase: Shedding light on antiherpetic properties. *Molecules* 24(16): 2912.
- Haugan, R. & E. Timdal. 2019. *Peltigera wulingensis* new to Europe. *Graphis Scripta* 31(6): 47–53.
- Havrilla, C. A., V. B. Chaudhary, S. Ferrenberg, A. J. Antoninka, J. Belnap, M. A. Bowker, D. J. Eldridge, A. M. Faist, E. Huber-Sannwald, A. D. Leslie, E. Rodríguez-Caballero, Y. Zhang & N. N. Barger. 2019. Towards a predictive framework for biocrust

- mediation of plant performance: A meta-analysis. *Journal of Ecology* 107(6): 2789–2807.
- He, M., R. Hu & R. Jia. 2019. Biological soil crusts enhance the recovery of nutrient levels of surface dune soil in arid desert regions. *Ecological Indicators* 106: 105497.
- Heatwole, H. & W. R. Miller. 2019. Structure of micrometazoan assemblages in the Larsemann Hills, Antarctica. *Polar Biology* 42: 1837–1848.
- Hell, A. F., F. Gasulla, M. A. Gonzā Lez-Hourcade, E. M. Del Campo, D. C. Centeno & L. M. Casano. 2019. Tolerance to cyclic desiccation in lichen microalgae is related to habitat preference and involves specific priming of the antioxidant system. *Plant & Cell Physiology* 60(8): 1880–1891.
- Hendricks, P. 2018. Clark's Nutcrackers (*Nucifraga columbiana*) caching Whitebark Pine (*Pinus albicaulis*) seeds in trees. *Canadian Field-Naturalist* 132(3): 285–288. [The birds stash seeds in *Letharia* clumps.]
- Horvath, P., R. Halvorsen, F. Stordal, L. M. Tallaksen, H. Tang & A. Bryn. 2019. Distribution modelling of vegetation types based on area frame survey data. *Applied Vegetation Science* 22(4): 547–560.
- Hou, X.-Q., W.-K. Jiang, P.-L. Song, S.-H. Wei, Q.-W. Sun, C.-G. Hu, T. Zhou, Q. Zhou, M.-C. Wang & C.-H. Xiao. 2019. Analysis of medicinal resources diversity of 33 pilots (districts) in Guizhou Province. *Zhongguo Zhongyao Zazhi* 44(2): 265–269.
- Husnunnisa, F. Ismed, M. Taher, S. J. A. Ichwan, A. Bakhtiar & D. Arbain. 2019. Screening of some Sumatran medicinal plants and selected secondary metabolites for their cytotoxic potential against MCF-7 and HSC-3 cell lines. *Journal of Research in Pharmacy* 23(4): 770–776.
- Ignatovich, L. S., E. V. Ginter, A. S. Lykov, I. Y. Kuzmina & S. B. Kustova. 2019. The use of non-conventional supplementary feeds in cattle and layer diet. *Periodico Tche Quimica* 16(32): 668–687. [Lichens were fed to cows.]
- Ivanova, G. A., E. A. Kukavskaya, V. A. Ivanov, S. G. Conard & D. J. McRae. 2019. Fuel characteristics, loads and consumption in Scots pine forests of central Siberia. *Journal of Forestry Research*. doi:10.1007/s11676-019-01038-0.
- Jackisch, R., Y. Madriz, R. Zimmermann, M. Pirttijärvi, A. Saartenoja, B. H. Heincke, H. Salmirinne, J.-P. Kujasalo, L. Andreani & R. Gloaguen. 2019. Drone-borne hyperspectral and magnetic data integration: Otanmäki Fe-Ti-V deposit in Finland. *Remote Sensing* 11(18): 2084.
- Jatnika, M. F., G. Weerakoon, O. Arachchige, I. S. Noer, A. Voytsekhovich & R. Lücking. 2019. Discoveries through social media and in your own backyard: Two new species of *Allographa* (Graphidaceae) with pigmented lirellae from the Palaeotropics, with a world key to species of this group. *The Lichenologist* 51(3): 227–233. [New: *A. kamojangensis* Jatnika, Noer & Lücking (from Indonesia), *A. jayatilakana* Weerakoon, Arachchige & Lücking (from Sri Lanka). Includes key to the species of *Allographa* with pigmented lirellae.]
- Ji, X., E. Abakumov, V. Polyako, X. Xie & W. Dongyang. 2019. The ecological impact of mineral exploitation in the Russian Arctic: A field-scale study of polycyclic aromatic hydrocarbons (PAHs) in permafrost-affected soils and lichens of the Yamal-Nenets Autonomous Region. *Environmental Pollution* 255(1): 113239.
- Jia, R., M. Wang & C. Wang. 2019. Growth, survival and physiological response of food lichens *Usnea longissima* of *Rhinopithecus roxellana* to simulated nitrogen deposition. *Linye Kexue/Scientia Silvae Sinicae* 55(7): 17–26.
- Jia, S., X. Zhang, Q. Liu, Q. Chen, X. Li, X. Pang, J. Li, Q. Wu, L. Zhao & H. Liu. 2020[2019]. Spatial-temporal patterns of element concentrations in *Xanthoparmelia camtschadalis* transplanted along roads. *Polish Journal of Environmental Studies* 29(1): 121–129.
- Jiang, T., D. Wang, B. Meng, J. Chi, H. Laudon & J. Liu. 2020[2019]. The concentrations and characteristics of dissolved organic matter in high-latitude lakes determine its ambient reducing capacity. *Water Research* 169: 115217.
- Jørgensen, P. M. 2019. The troublesome genus *Thamnolia* (lichenized Ascomycota). *The Lichenologist* 51(3): 221–226. [New: *T. vermicularis* subsp. *taurica* (Wulfen) P.M.Jørg. (≡ *Lichen tauricus* Wulfen; lectotypified), *T. vermicularis* subsp. *tundrae* (Onut-Brännström & Tibell) P.M.Jørg. (≡ *T. tundrae* Onut-Brännström & Tibell). Neotypified: *Lichen vermicularis* Sw. (≡ *T. vermicularis* (Sw.) Schaer.).]
- Joshi, T., P. Sharma, T. Joshi & S. Chandra. 2019. In silico screening of anti-inflammatory compounds from lichen by targeting cyclooxygenase-2. *Journal of Biomolecular Structure and Dynamics*. doi:10.1080/07391102.2019.1664328.
- Jung, P., K. Baumann, L. W. Lehnert, E. Samolov, S. Achilles, M. Schermer, L. M. Wraase, K.-U. Eckhardt, M. Y. Bader, P. Leinweber, U. Karsten, J. Bendix & B. Büdel. 2020[2019]. Desert breath—How fog promotes a novel type of soil biocenosis, forming the coastal Atacama Desert's living skin. *Geobiology* 18(1): 113–124.
- Kaarakka, L., A. Smolander, A.-J. Lindroos, P. Nöjd, L. Korpela, T. M. Nieminen & H.-S. Helmisaari. 2019. Sprinkling infiltration as an artificial groundwater recharge method – Long-term effects on boreal forest soil, tree growth and understory vegetation. *Forest Ecology and Management* 448: 240–248.
- Kaczmarek, L., D. Grobys, A. Kulpa, T. Bartylak, H. Kmita, M. Kepel, A. Kepel & M. Roszkowska. 2019. Two new species of the genus *Milnesium* Doyère, 1840 (Tardigrada, Apochela, Milnesiidae) from Madagascar. *ZooKeys* 884: 1–22. [The tardigrades were found in lichen samples.]
- Kaganov, V. V., A. V. Kordukov & A. K. Ezhkin. 2019. Monitoring of recreational areas of Yuzhno-Sakhalinsk and its surroundings. *IOP Conference Series: Earth and Environmental Science* 324(1): 012034.
- Keepers, K. G., C. S. Pogoda, K. H. White, C. R. Anderson-Stewart, J. R. Hoffman, A. M. Ruiz, C. M. McCain, J. C. Lendemer, N. C. Kane & E. A. Tripp. 2019. Whole genome shotgun sequencing detects greater lichen fungal diversity than amplicon-based methods in environmental samples. *Frontiers in Ecology and Evolution* 7: 484.
- Khanov, Z. M., G. P. Urbanavichus & I. N. Urbanavichene. 2019. New species for the lichen flora of Kabardino-Balkaria (Central Caucasus). *Botanicheskii Zhurnal* 104(5): 803–810.
- Kibby, G. 2019. When giant fungi (or lichens) ruled the world - the latest discovery about Prototaxites. *Field Mycology* 20(4): 128.
- Kidron, G. J. 2019. The enigmatic absence of cyanobacterial biocrusts from the Namib fog belt: Do dew and fog hold the key? *Flora: Morphology, Distribution, Functional Ecology of Plants* 257: 151416.
- Kim, B., S.-R. Han, J. Lamichhane, H. Park & T.-J. Oh. 2019. Draft genome analysis of antimicrobial *Streptomyces* isolated from Himalayan lichen. *Journal of Microbiology and Biotechnology* 29(7): 1144–1154.
- Kim, K.-J., Y. Lee, M.-H. Jeong, J.-S. Hur & Y.-J. Son. 2019. Extracts of *Flavoparmelia* sp. inhibit receptor activator of nuclear factor-

- κB ligand-mediated osteoclast differentiation. *Journal of Bone Metabolism* 26(2): 113–121.
- Klapstein, S. J., A. K. Walker, C. H. Saunders, R. P. Cameron, J. D. Murimboh & N. J. O'Driscoll. 2020[2019]. Spatial distribution of mercury and other potentially toxic elements using epiphytic lichens in Nova Scotia. *Chemosphere* 241: 125064.
- Komendova, R. 2020[2019]. The HR-CS-GF-AAS determination and preconcentration of palladium in contaminated urban areas, especially in lichens. *Environmental Pollution* 256: 113468.
- Konoreva, L. A., S. S. Kholod, S. V. Chesnokov & M. P. Zhurbenko. 2019. Lichens of Franz Josef Land archipelago. *Polish Polar Research* 40(2): 139–170.
- Konovalov, V. N., L. V. Zarubina & A. D. Goreva. 2019. Peculiar influence of nitrogen on the daily growth and photosynthesis of Scots Pine in the Far North. *IOP Conference Series: Earth and Environmental Science* 263(1): 012011.
- Kousehlar, M., E. Widom & D. Kuentz. 2019. Sources of atmospheric pollution in the rust belt, Ohio, USA. *E3S Web of Conferences* 98: 12010.
- Kroukamp, E. M., T. W. Godeto & P. B. C. Forbes. 2019. Optimized extraction of inorganic arsenic species from a foliose lichen biomonitor. *Environmental Science and Pollution Research* 26: 29896–29907.
- Kuhn, V., T. Geisberger, C. Huber, A. Beck & W. Eisenreich. 2019. A facile in vivo procedure to analyze metabolic pathways in intact lichens. *New Phytologist* 224(4): 1657–1667.
- Kushnevskaia, E. V., E. A. Borovichev & E. V. Shorokhova. 2019. Dependence of epixylic species on substrate in old-growth spruce forest in Krvach Nature Reserve. *Russian Journal of Forest Science* 2019(3): 228–240.
- Latkowska, E., J. Bialczyk, M. Węgrzyn & U. Erychleb. 2019. Host species affects the phenolic compounds content in *Hypogymnia physodes* (L.) Nyl. thalli. *Allelopathy Journal* 47(2): 221–231.
- Launis, A. & L. Myllys. 2019. *Micarea fennica*, a new lignicolous lichen species from Finland. *Phytotaxa* 409(3): 179–188. [New: *M. fennica* Launis & Myllys (from Finland).]
- Lauriault, P. & Y. F. Wiersma. 2019. Reducing the rate of false absences of cryptic species in inventory and sampling work. *The Bryologist* 122(4): 578–585.
- Lendemer, J. C. & E. A. Tripp. 2014. Discovery of *Gyalideopsis mexicana* in the United States. *Pacific Northwest Fungi* 9(7): 1–4.
- Letendre, A.-C., D. S. Coxson & K. J. Stewart. 2019. Restoration of ecosystem function by soil surface inoculation with biocrust in mesic and xeric alpine ecosystems. *Ecological Restoration* 37(9): 101–112.
- Liu, D. & J.-S. Hur. 2019. Revision of the lichen genus *Phaeophyscia* and allied atranorin absent taxa (Physciaceae) in South Korea. *Microorganisms* 7(8): 242.
- Liu, D., X. Yu Wang, L.-S. Wang, N. Maekawa & J.-S. Hur. 2019. *Sulzbacheromyces sinensis*, an unexpected basidiolichen, was newly discovered from Korean Peninsula and Philippines, with a phylogenetic reconstruction of genus *Sulzbacheromyces*. *Mycobiology* 47(2): 2019PMC6691760.
- Löffler, J. & Pape, R. 2020[2019]. Thermal niche predictors of alpine plant species. *Ecology* 101(1): e02891.
- Londoño-Bailon, P., C. Sánchez-Robinet & G. Alvarez-Guzman. 2019. In vitro antibacterial, antioxidant and cytotoxic activity of methanol-acetone extracts from Antarctic lichens (*Usnea antarctica* and *Usnea aurantiaco-atra*). *Polar Science* 22: 100477.
- Lopes, R. D. S., M. P. Martins, R. L. Oliveira & F. P. Gurgel do Amaral. 2019. Monitoring air pollution with living organisms: Case study use of lichens as bioindicators in the Miguel Pereira City, Rio de Janeiro, Brazil. *Chemical Engineering Transactions* 74: 253–258.
- Loppi, S., S. Ravera & L. Paoli. 2019. Coping with uncertainty in the assessment of atmospheric pollution with lichen transplants. *Environmental Forensics* 20(3): 228–233.
- Lorite, J., D. Agea, H. García-Robles, E. M. Cañadas, S. Rams & P. Sánchez-Castillo. 2019. Plant recovery techniques do not ensure biological soil-crust recovery after gypsum quarrying: A call for active restoration. *Restoration Ecology*. doi:10.1111/rec.13059.
- Lu, H.-Z., R. Brooker, L. Song, W.-Y. Liu, L. Sack, J.-L. Zhang & F.-H. Yu. 2020[2019]. When facilitation meets clonal integration in forest canopies. *New Phytologist* 225(1): 135–142.
- Lucadamo, L., L. Gallo & A. Corapi. 2019. Power plants: The need for effective bio-monitoring of the contribution of bio(wood) fuelled stations to atmospheric contamination. *Atmospheric Pollution Research* 10(6): 2040–2052.
- Lucheta, F., N. Mossmann Koch, M. I. Käffer, R. Plangg Riegel, S. M. de Azevedo Martins & J. L. Schmitt. 2019. Lichens as indicators of environmental quality in southern Brazil: An integrative approach based on community composition and functional parameters. *Ecological Indicators* 107: 105587.
- Lücking, R., B. Moncada, N. Llerena & S. Huhtinen. 2018. Saving the name *Lobaria peltigera* with new authorship and a new type from the TUR-Vainio herbarium, and its transfer to the genus *Yoshimuriella*. *Graphis Scripta* 30(2): 12–19. [New: *Yoshimuriella Peltigera* (Vain.) Lücking & Moncada (\equiv *Lobaria peltigera* Vain.). Lectotypified: *Lichen dissectus* Sw., *Lobaria peltigera* Vain.]
- Lücking, R., B. Moncada, M. C. Martínez-Habibe, B. E. Salgado-Negret, M. Celis, O. Rojas-Zamora, G. M. Rodríguez-M., G. Brokamp & T. Borsch. 2019. Lichen diversity in Colombian Caribbean dry forest remnants [Diversidad líquénica en remanentes de bosques secos caribeños]. *Caldasia* 41(1): 194–214. [New (from Colombia): *Fissurina linoana* Lücking, Moncada & G.Rodr., *Graphis lurizana* Lücking, Moncada & Celis, *Graphis mokanarum* Lücking, Moncada & M.C.Martínez, *Phaeographis galeanae* Lücking, Moncada & B.Salgado-N.]
- Lupachev, A. V., S. V. Gubin & E. V. Abakumov. 2020[2019]. Levels of biogenic-abiogenic interaction and structural organization of soils and soil-like bodies in Antarctica. Pages 481–500. In: O. V. Frank-Kamenetskaya, D. Yu. Vlasov, E. G. Panova & S. N. Lessovaia (eds), *Lecture Notes in Earth System Sciences*. Springer Nature Switzerland, Cham.
- Maliček, J., Z. Palice, J. Vondrák, M. Kostovčík, V. Lenzová & J. Hofmeister. 2019. Lichens in old-growth and managed mountain spruce forests in the Czech Republic: Assessment of biodiversity, functional traits and bioindicators. *Biodiversity and Conservation* 28(13): 3497–3528.
- Maliniemi, T., K. Happonen & R. Virtanen. 2019. Site fertility drives temporal turnover of vegetation at high latitudes. *Ecology and Evolution* 9(23): 13255–13266.
- Mallavadhani, U. V., R. S. Tirupathamma, G. Sagarika & S. Ramakrishna. 2019. Isolation, chemical modification, and anticancer activity of major metabolites of the lichen *Parmotrema mesotropum*. *Chemistry of Natural Compounds* 55(5): 825–831.
- Marshall, A. J., D. J. Blanchon, A. Aptroot & P. J. de Lange. 2020[2019]. Five new records of *Pyrenula* (Pyrenulaceae) for New Zealand. *New Zealand Journal of Botany* 58(1): 48–61.

- Martín, S. F. 2019. Nuevas aportaciones a la flora líquénica de la Comunitat Valenciana (E de España). *Collectanea Botanica* 38: e006. [In Spanish with English abstract.]
- Martínez-Alberola, F., E. Barreno, L. M. Casano, F. Gasulla, A. Molins, P. Moya, M. González-Hourcade & E. M. del Campo. 2020[2019]. The chloroplast genome of the lichen-symbiont microalga *Trebouxia* sp. Tr9 (Trebouxiophyceae, Chlorophyta) shows short inverted repeats with a single gene and loss of the rps4 gene, which is encoded by the nucleus. *Journal of Phycology* 56(1): 170–184.
- Martínez Pastur, G. J., Y. M. Rosas, M. Toro Manríquez, A. Huertas Herrera, J. A. Miller, J. M. Cellini, M. D. Barrera, P. L. Peri & M. V. Lencinas. 2019. Knowledge arising from long-term research of variable retention harvesting in Tierra del Fuego: Where do we go from here? *Ecological Processes* 8(1): 24.
- Masumoto, H. & Y. Degawa. 2019. The effect of surface sterilization and the type of sterilizer on the genus composition of lichen-inhabiting fungi with notes on some frequently isolated genera. *Mycoscience* 60(6): 331–342.
- Mayrhofer, H., E. Mašić & P. O. Bilovitz. 2019. Additions and corrections to the “Catalogue of Lichenized and Lichenicolous Fungi from Bosnia and Herzegovina”. *Phyton* 59(1–2): 55–67.
- McCune, B. 2019. Cortical windows in *Stereocaulon*. *Evansia* 36(3): 104–112.
- McMullin, R. T. 2019. New and interesting Canadian lichens and allied fungi II: Reports from British Columbia, New Brunswick, Nova Scotia, Nunavut, Prince Edward Island, Ontario, and Quebec. *Opuscula Philolichenum* 18: 396–419.
- Melekhin, A. V., D. A. Davydov, E. A. Borovichev, S. S. Shalygin & N. A. Konstantinova. 2019. CRIS - Service for input, storage and analysis of the biodiversity data of the cryptogams. *Folia Cryptogamica Estonica* 56: 99–108.
- Mendili, M., M. Bannour, M. E. M. Araújo, S. Aschi-Smiti, R. D. S. Mark & A. Khadhria. 2019. Secondary metabolites and antioxidant capacity of the Tunisian lichen *Diploschistes ocellatus* (Ascomycota). *International Journal of Medicinal Mushrooms* 21(8): 817–823.
- Méric, J.-C., É. Lebreton & C. Roux. 2019. Lichénologie à Mirabeau (84): 27 octobre 2018. *Bulletin de la Société linnéenne de Provence* 70: 26–35. [Includes checklist.]
- Mesta, A. R., N. Rajeswari & V. S. Kanivebagilu. 2019. Distribution of bioactive compounds in usneoid lichens from Western Ghats. *Plant Archives* 19(2): 2163–2168.
- Metz, S., D. Singer, I. Domaizon, F. Unrein & E. Lara. 2019. Global distribution of Trebouxiophyceae diversity explored by high-throughput sequencing and phylogenetic approaches. *Environmental Microbiology* 21(10): 3885–3895.
- Miki, K., S. Kawashima, Y. Takahashi & S. Yonemura. 2019. Potential survival of the lichen *Caloplaca flavovirescens* under high helium-beam doses. *Radiation and Environmental Biophysics* 58(3): 449–454.
- Moeslund, J. E., A. Zlinszky, R. Ejrnæs, A. K. Brunbjerg, P. K. Bøcher, J.-C. Svenning & S. Normand. 2019. Light detection and ranging explains diversity of plants, fungi, lichens, and bryophytes across multiple habitats and large geographic extent. *Ecological Applications* 29(5): e01907.
- Mohammadi, P., P. Gholami-Nejad, R. Asghari-Daryasari & E. Asgarani. 2020[2019]. The study of microbial communities of Rudkhan Castle. *Geomicrobiology Journal* 37(2): 119–129.
- Morando, M., E. Matteucci, J. Nascimbene, A. Borghi, R. Piervittori & S. E. Favero-Longo. 2019. Effectiveness of aerobiological dispersal and microenvironmental requirements together influence spatial colonization patterns of lichen species on the stone cultural heritage. *Science of the Total Environment* 685: 1066–1074.
- Moreira-Grez, B., K. Tam, A. T. Cross, J. W. H. Yong, D. Kumaresan, P. Nevill, M. Farrell & A. S. Whiteley. 2019. The bacterial microbiome associated with arid biocrusts and the biogeochemical influence of biocrusts upon the underlying soil. *Frontiers in Microbiology* 10: 2143.
- Nascimbene, J., V. Di Cecco, L. Di Martino, F. Frascaroli, P. Giordani, C. Lelli, C. Vallese, P. Zannini & A. Chiarucci. 2019. Epiphytic lichens of the sacred natural site “Bosco di Sant’Antonio” (Majella National Park - Abruzzo). *Italian Botanist* 7: 149–156.
- Ndlovu, N. B., M. V. Frontasyeva, R. T. Newman & P. P. Maleka. 2019. Active biomonitoring of atmospheric pollution in the Western Cape (South Africa) using INAA and ICP-MS. *Journal of Radioanalytical and Nuclear Chemistry* 322: 1549–1559.
- Nelsen, M. P., R. Lücking, C. K. Boyce, H. T. Lumbsch & R. H. Ree. 2020[2019]. No support for the emergence of lichens prior to the evolution of vascular plants. *Geobiology* 8(1): 3–13.
- Nikolin, E. G. 2019. Local flora of Nelkan pass (Tas-Kystabyt Range, northeastern Yakutia). *Botanicheskii Zhurnal* 104(3): 414–431.
- Nyenda, T., W. Gwenzi, T. T. Piyo & S. M. Jacobs. 2019. Occurrence of biological crusts and their relationship with vegetation on a chronosequence of abandoned gold mine tailings. *Ecological Engineering* 139: 105559.
- Nystuen, K. O., K. Sundsdal, Ø. H. Opedal, H. Holien, G. R. Strimbeck & B. J. Graae. 2019. Lichens facilitate seedling recruitment in alpine heath. *Journal of Vegetation Science* 30(5): 868–880.
- Oh, S.-Y., J.-J. Woo & J.-S. Hur. 2019. Distribution of foliicolous lichen *Strigula* and genetic structure of *S. multiformis* on Jeju island, South Korea. *Microorganisms* 7(10): 430.
- Olise, F. S., L. T. Ogundele, M. A. Olajire, O. K. Owoade, F. A. Oloyede, O. G. Fawole & G. C. Ezech. 2019. Biomonitoring of environmental pollution in the vicinity of iron and steel smelters in southwestern Nigeria using transplanted lichens and mosses. *Environmental Monitoring and Assessment* 191(11): 691.
- Öztürk, Ş., Ş. Güvenç & S. Oran. 2019. The determination of the changes in epiphytic lichen diversity at microclimatic conditions the *Quercus petraea* (Mattuschka) Liebl. forest in the Uludag Mountains (Bursa, Turkey). *Nova Hedwigia* 109(3–4): 475–487.
- Pacé, M., B. Gadet, J. Beguin, Y. Bergeron & D. Paré. 2019. Drivers of boreal tree growth and stand opening: The case of Jack Pine on sandy soils. *Ecosystems*. doi:10.1007/s10021-019-00425-2.
- Palacios-Moreno, J., C. Rubio, W. Quilhot, M. F. Cavieres, E. De La Penã, N. V. Quinõnes, H. Díaz, F. Carrión, C. F. Henríquez-Roldán & C. R. Weinstein-Opppenheimer. 2019. Epanorin, a lichen secondary metabolite, inhibits proliferation of MCF-7 breast cancer cells. *Biological Research* 52(1): 55.
- Paoli, L., R. Benesperi, Z. Fačková, J. Nascimbene, S. Ravera, M. Marchetti, B. Anselmi, M. Landi, S. Landi, E. Bianchi, L. Di Nuzzo, A. Lackovičová, A. Vannini, S. Loppi & A. Guttová. 2019. Impact of forest management on threatened epiphytic macrolichens: Evidence from a Mediterranean mixed oak forest (Italy). *IForest* 12(4): 383–388.
- Paquette, H. A. 2019. [Thesis] Macrolichen and Calicioid Flora of Forillon National Park, Quebec, Canada: The Big and Little Lichens and their Associates. Carleton University, Ottawa. i–x, 1–127 pages.
- Pavan Kumar, P., B. Siva, A. Anand, A. K. Tiwari, C. Vekata Rao, J. Boustie & K. Suresh Babu. 2019. Isolation, semi-synthesis, free-

- radicals scavenging, and advanced glycation end products formation inhibitory constituents from *Parmotrema tinctorum*. *Journal of Asian Natural Products Research*. doi:10.1080/10286020.2019.1628024.
- Pelletier, M., M. Allard & E. Levesque. 2019. Ecosystem changes across a gradient of permafrost degradation in subarctic Québec (Tasiapik Valley, Nunavik, Canada). *Arctic Science* 5(1): 1–26.
- Pérez-López, R., J. L. Giner-Robles, M. A. Rodríguez-Pascua, P. G. Silva, E. Roquero, T. Bardaji, J. Elez & P. Huerta. 2019. Lichenometric dating of coseismic rockfall related to the great Lisbon earthquake in 1755 affecting the archaeological site of “tolmo de minateda” (Spain). *Zeitschrift für Geomorphologie* 62: 271–293.
- Peterson, E. B. 2019. Macrophotogrammetry: Structure-from-Motion photogrammetry for three-dimensional structure of lichens and change over time. *The Bryologist* 122(2): 325–339.
- Peterson, M. L., W. Morris, C. Linares & D. Doak. 2019. Improving structured population models with more realistic representations of non-normal growth. *Methods in Ecology and Evolution* 10(9): 1431–1444.
- Pižňak, M. & M. Bačkor. 2019. Lichens affect boreal forest ecology and plant metabolism. *South African Journal of Botany* 124: 530–539.
- Poornima, S., N. Nagarjun, P. Ponnuragan, B. M. Gnanamangai & S. Narasimman. 2019. Toxicity and anti-inflammatory study of *Parmotrema austrosinense* extract against oxozalone induced intestinal inflammation in zebrafish (*Danio rerio*) model. *Biocatalysis and Agricultural Biotechnology* 21: 101278.
- Príncipe, A., P. Matos, D. Sarris, G. Gaiola, L. do Rosário, O. Correia & C. Branquinho. 2019. In Mediterranean drylands microclimate affects more tree seedlings than adult trees. *Ecological Indicators* 106: 105476.
- Printzen, C. & T. Tønberg. 2007. *Bacidia lobarica* (Bacidaceae, Lecanorales) sp. nov., a sorediate lichen from the southeastern U.S.A. *The Bryologist* 110(3): 487–489. [New: *B. lobarica* Printzen & Tønberg (from U.S.A.).]
- Prokop'ev, I. A. & G. V. Filippova. 2019. Antioxidant activity of secondary metabolites from *Cladonia* lichens. *Chemistry of Natural Compounds* 55(5): 945–947.
- Puglisi, M. & D. Cataldo. 2019. A comparative study on the bryophyte and lichen flora for monitoring the conservation status of protected areas of Sicily (Italy). *Nova Hedwigia* 109(3–4): 321–343.
- Putri, C. B., Sutriyo & H. Suryadi. 2019. Effect of beta glucosidase inhibitor from lichen extract in microcrystalline cellulose preparation from water hyacinth (*Eichhornia crassipes*). *Pharmacognosy Journal* 11(6): 1199–1203.
- Pyakurel, D., C. Smith-Hall, I. Bhattarai-Sharma & S. K. Ghimire. 2019. Trade and conservation of Nepalese medicinal plants, fungi, and lichen. *Economic Botany* 73: 505–521.
- Pyrzszak-Felczykowska, A., R. Narlawar, A. Pawlik, B. Guzow-Krzemińska, D. Artymiuk, A. Hać, K. Ryś, L. M. Rendina, T. A. Reekie, A. Herman-Antosiewicz & M. Kassiou. 2019. Synthesis of usnic acid derivatives and evaluation of their antiproliferative activity against cancer cells. *Journal of Natural Products* 82(7): 1768–1778.
- Rajeswari, N., A. R. Mesta, V. S. Kanivebagilu & H. N. Ramesh Babu. 2019. Medicinal importance of usneoid lichens in Western Ghats, southern India. *Plant Archives* 19(2): 2540–2542.
- Ranjit, R., R. Shrestha, S. Paudel, J. Maharjan, B. D. Devkota, S. Bhattarai & B. P. Pandey. 2019. Evaluation of biological properties and isolation of metabolites of lichens of Parmeliaceae family from Himalayan Region of Nepal. *Tropical Journal of Natural Product Research* 3(8): 265–271.
- Raudabaugh, D. B., P. B. Matheny, K. W. Hughes, T. Iturriaga, M. Sargent & A. N. Miller. 2020[2019]. Where are they hiding? Testing the body snatchers hypothesis in pyrophilous fungi. *Fungal Ecology* 43: 100870.
- Ravera, S., M. Puglisi, A. Vizzini, C. Totti, M. Aleffi, G. Barberis, R. Benesperi, W. Brackel, D. Dagnino, A. B. De Giuseppe, Z. Fačková, G. Gheza, P. Giordani, A. Guttová, P. Mair, H. Mayrhofer, J. Nascimbene, P. L. Nimis, L. Paoli, N. G. Passalacqua, E. Pittao, S. Poponessi, F. Prosser, M. Ottonello, D. Puntillo, M. Puntillo, G. Sicoli, F. Sguazzin, D. Spitale, W. Tratter, C. Turcato & C. Vallese. 2019. Notulae to the Italian flora of algae, bryophytes, fungi and lichens: 7. *Italian Botanist* 7: 69–91.
- Raynolds, M. K., D. A. Walker, A. Balsler, C. Bay, M. Campbell, M. M. Cherosov, F. J. A. Daniëls, P. B. Eidesen, K. A. Ermokhina, G. V. Frost, B. Jedrzejek, M. T. Jorgenson, B. E. Kennedy, S. S. Kholod, I. A. Lavrinenko, O. V. Lavrinenko, B. Magnússon, N. V. Matveyeva, S. Metúsalemsson, L. Nilsen, I. Olthof, I. N. Pospelov, E. B. Pospelova, D. Pouliot, V. Razzhivin, G. Schaeppman-Strub, J. Šibík, M. Y. Telyatnikov & E. Troeva. 2019. A raster version of the Circumpolar Arctic Vegetation Map (CAVM). *Remote Sensing of Environment* 232: 111297. [Includes lichen dominated vegetation.]
- Reding, J. 2019. [Thesis] Rock Climbing or Lichen Climbing? How Rock Climbing Impacts Bryophyte and Lichen Communities Within the Red River Gorge. The Ohio State University, Columbus, Ohio. i–xi, 1–99 pages.
- Reed, S. C., M. Delgado-Baquerizo & S. Ferrenberg. 2019. Biocrust science and global change. *New Phytologist* 223(3): 1047–1051.
- Rocha, B., P. Pinho, C. Branquinho, M. Boeiro & P. Matos. 2019. Bringing the concept of ammonia critical levels into managing cork-oak woodland for conservation. *Forest Ecology and Management* 453: 117566.
- Rodríguez-Caballero, E., J. R. Román, S. Chamizo, B. Roncero Ramos & Y. Cantón. 2019. Biocrust landscape-scale spatial distribution is strongly controlled by terrain attributes: Topographic thresholds for colonization in a semiarid badland system. *Earth Surface Processes and Landforms* 44(14): 2771–2779.
- Rodríguez-Peñate, A. E., A. Escudero, I. Martínez & J. Madrigal-González. 2019. Unveiling annual growth chronologies from inter-nodal branch elongations in a fruticose lichen in southern Europe. *Fungal Biology* 123(11): 824–829.
- Roos, R. E., K. van Zuijlen, T. Birkemoe, K. Klanderud, S. I. Lang, S. Bokhorst, D. A. Wardle & J. Asplund. 2019. Contrasting drivers of community-level trait variation for vascular plants, lichens and bryophytes across an elevational gradient. *Functional Ecology* 33(12): 2430–2446.
- Root, H. T., J. E. D. Miller & R. Rosentreter. 2020[2019]. Grazing disturbance promotes exotic annual grasses by degrading soil biocrust communities. *Ecological Applications* 30(1): e02016.
- Roszkowska, M., M. Ostrowska, D. Grobys, H. Kmita & L. Kaczmarek. 2019. Some tardigrades from Italy, with an updated checklist of limno-terrestrial species from the country. *Acta Zoologica Bulgarica* 71(2): 167–174. [Lichens were sampled.]
- Roux, C. & M. Bertrand. 2019. Validation des nouvelles espèces *Caloplaca epirodens* Cl. Roux et M. Bertrand et *Aspicilia serenensis* Cl. Roux et M. Bertrand, et des nouvelles combinai-

- sons *Aspicilia hoffmanniana* (S. Ekman et Fröberg ex R. Sant) Cl. Roux et M. Bertrand et *A. reagens* (Zahlbr.) Cl. Roux et M. Bertrand. Bulletin d'informations de l'Association française de lichénologie 44(1): 1–6. [New: *A. hoffmanniana* (S. Ekman & Fröberg ex R. Sant) Cl. Roux & M. Bertrand (\equiv *A. contorta* subsp. *hoffmanniana* S. Ekman & Fröberg ex R. Sant.), *A. reagens* (Zahlbr.) Cl. Roux & M. Bertrand (\equiv *Lecanora calcarea* f. *reagens* Zahlbr.), *A. serenensis* Cl. Roux & M. Bertrand (from France), *C. epierodens* Cl. Roux & M. Bertrand.]
- Roux, C., C. Coste, P. Navarro-Rosinés, H. Vänskä, P. Uriac, J.-Y. Monnat & S. Poumarat. 2019. *Lecanora lecideopsis* Cl. Roux et C. Coste sp. nov. Bulletin de la Société linnéenne de Provence 70: 91–105. [New: *L. lecideopsis* Cl. Roux & C. Coste (from France). Lectotypified: *L. subfusca* var. *lecideoides* Nyl. In Esperanto and French with English abstract.]
- Roux, C., S. Poumarat, C. Gueidan, P. Navarro-Rosinés, J.-Y. Monnat & J.-M. Houmeau. 2019. La Acarosporaceae de Okcidenta Eŭropo. Bulletin de la Société linnéenne de Provence 70: 107–167. [In Esperanto with English abstract. New: *Acarospora adscendens* Cl. Roux & Poumarat (from France), *A. epiaspicilia* Cl. Roux & M. Bertrand (from France), *A. episulphurata* Cl. Roux & Poumarat (from France), *A. pseudosuzae* Cl. Roux & J.-Y. Monnat (from France), *A. ubayensis* C. Roux & M. Bertrand, *Myriospora benedarensis* (M. Knowles) Cl. Roux (\equiv *A. benedarensis* M. Knowles).]
- Ručová, D., M. Goga, M. Sabovljević, M. Vilková, V. Petrušlová & M. Bačkor. 2019. Insights into physiological responses of mosses *Physcomitrella patens* and *Pohlia drummondii* to lichen secondary metabolites. Protoplasm 256(6): 1585–1595.
- Sahin, E., S. Psav, I. Avan, M. Candan, V. Sahinturk & A. Koparal. 2019. Cytotoxic, apoptotic and cell migration inhibitory effects of atranorin on SPC212 mesothelioma cells. Asian Pacific Journal of Tropical Biomedicine 9(7): 299–306.
- Sahu, N., S. N. Singh, P. Singh, S. Mishra, N. Karakoti, R. Bajpai, S. K. Behera, S. Nayaka & D. K. Upreti. 2019. Microclimatic variations and their effects on photosynthetic efficiencies and lichen species distribution along elevational gradients in Garhwal Himalayas. Biodiversity and Conservation 28: 1953–1976.
- Salehi, S. 2019. Hyperspectral analysis of lithologies in the Arctic in areas with abundant lichen cover. Geological Survey of Denmark and Greenland Bulletin 41: 51–55.
- Samir, H. A., B. Hachemi, M. M. Djamel, A. H. Mohammed & H. Oussama. 2019. Species diversity, chorology and conservation of the lichen flora in Tessala Mountains forest (North-West Algeria). Flora Mediterranea 29: 75–91.
- Sanders, W. B. & A. de los Ríos. 2019. Cell wall dynamics under conditions of diffuse growth in the thick-walled cortical tissue (prosoplectenchyma) of *Ramalina usnea*. The Lichenologist 51(3): 269–280.
- Santos, V. M., M. E. S. Cáceres & R. Lücking. 2020[2019]. Diversity of foliicolous lichens in isolated montane rainforests (Brejos) of northeastern Brazil and their biogeography in a neotropical context. Ecological Research 35(1): 182–197.
- Sarlej, M. I. 2019. The genus *Pyxine* (Lecanorales, Physciaceae) in the Yaboty Biosphere Reserve (Misiones, Argentina) [El género *Pyxine* (Lecanorales, Physciaceae) en la Reserva de la Biosfera Yaboty (Misiones, Argentina)]. Boletín de la Sociedad Argentina de Botánica 54(2): 161–168. [In Spanish with English abstract.]
- Schmitz, D., C. E. R. G. Schaefer, J. Putzke, M. R. Francelino, F. R. Ferrari, G. R. Corrêa & P. M. Villa. 2020[2019]. How does the pedoenvironmental gradient shape non-vascular species assemblages and community structures in maritime Antarctica? Ecological Indicators 108: 105726.
- Sedov, S., E. Zazovskaya, D. Fedorov-Davydov & T. Alekseeva. 2019. Soils of East Antarctic oasis: Interplay of organisms and mineral components at microscale. Boletín de la Sociedad Geológica Mexicana 71(1): 43–63.
- Şenol, Z. M., Ü. D. Gül & S. Şimşek. 2019. Assessment of Pb²⁺ removal capacity of lichen (*Evernia prunastri*): Application of adsorption kinetic, isotherm models, and thermodynamics. Environmental Science and Pollution Research 26(26): 27002–27013.
- Sevgi, E., O. Y. Yilmaz, G. Ç. Özyiğitoğlu, H. B. Tecimen & O. Sevgi. 2019. Factors influencing epiphytic lichen species distribution in a managed Mediterranean *Pinus nigra* Arnold forest. Diversity 11(4): 59.
- Shefferson, R. P. 2019. History sets the stage: Macroevolutionary influence on biotic interactions. Journal of Ecology 107(4): 1550–1556.
- Shelyakin, M. A., M. P. Andreev, G. N. Tabalenkova & T. K. Golovko. 2019. Respiratory activity of some lichen species—representatives of Antarctic flora. Contemporary Problems of Ecology 12(4): 332–338.
- Sichaem, J., H.-H. Nguyen & T.-H. Duong. 2019. Hopane-6 α ,16 α ,22-triol: A new hopane triterpenoid from the lichen *Parmotrema sancti-angelii*. Natural Product Communications 14(6): 1–4.
- Siela, A. C. & S. A. Smith. 2019. Habitability of Mars: How welcoming are the surface and subsurface to life on the red planet? Geosciences (Switzerland) 9(9): 361.
- Silva, H. A. M. F., J. L. F. Sá, W. N. de Siqueira, M. D. V. Lima, M. C. B. Martins, A. D. L. Aires, M. C. P. D. A. Albuquerque, E. P. D. S. Falcão, M. D. L. L. Buriel, E. C. Pereira, A. M. M. D. A. Melo & N. H. D. Silva. 2019. Toxicological effects of *Ramalina aspera* (lichen) on *Biomphalaria glabrata* snails and *Schistosoma mansoni cercariae*. Acta Tropica 196: 172–179.
- Skoko, B., D. Babić, G. Marović & S. Papić. 2019. Environmental radiological risk assessment of a coal ash and slag disposal site with the use of the ERICA Tool. Journal of Environmental Radioactivity 208–209: 106018.
- Smith, R. J., S. Jovan & B. McCune. 2020[2019]. Climatic niche limits and community-level vulnerability of obligate symbioses. Journal of Biogeography 47(2): 382–395.
- Sokolova, I. V. & T. V. Makryi. 2019. Cryptogamic nomenclatural notes. 4. Novosti sistematiki nizshikh rastenii 53(2): 429–430. [Lectotypified: *Dermatocarpon ferganense* Tomin, *D. terrigenum* Tomin.]
- Song, J. F., J. X. Ru, X. P. Liu, X. Y. & Cui. 2019. Oxalic acid and succinic acid mediate the weathering process of granite in the cold-temperate forest regions of northeast China. Eurasian Soil Science 52(8): 903–915.
- Spribile, T. 2019. Lichen symbionts outside of symbiosis: How do they find their match? A commentary on: 'A case study on the re-establishment of the cyanolichen symbiosis: where do the compatible photobionts come from?'. Annals of Botany 124(3): vi–vii.
- Stoykov, D. Y. 2018. Addition to the lichenized fungi (Ascomycota) of Central Rilski Reserve (Rila Mts.). Ecologia Balkanica 10(2): 213–221.
- Strack, M., T. M. Munir & B. Khadka. 2019. Shrub abundance contributes to shifts in dissolved organic carbon concentration and chemistry in a continental bog exposed to drainage and warming. Ecohydrology 12(5): e2100.

- Susanti, A. E., S. Ratnakomala, W. Mangunwardoyo & P. Lisdiyanti. 2019. Antimicrobial activity of lichens-associated actinomycetes strain LC-23. *ACM International Conference Proceeding Series*. pp. 91–96.
- Sveshnikova, N., T. Yuan, J. M. Warren & M. D. Piercey-Normore. 2019. Development and validation of a reliable LC-MS/MS method for quantitative analysis of usnic acid in *Cladonia uncialis*. *BMC Research Notes* 12(1): 550.
- Tarasova, V. N., T. Ahti, O. Vitikainen, A. V. Sonina & L. Mylly. 2019. The revision of lichens, lichenicolous and non-lichenized fungi from the Vodlozersky National Park (Republic of Karelia, Russia) in the Herbarium of the Botanical Museum, University of Helsinki. *Novosti sistematiki nizshikh rastenii* 53(2): 337–348.
- Tarasova, V. N., T. N. Pystina, V. I. Androsova, A. V. Sonina, A. A. Valekzhanin & A. A. Konoreva. 2019. New records of lichens and allied fungi from Vodlozersky National Park within Arkhangelsk Region (NW Russia). *Folia Cryptogamica Estonica* 56: 87–98.
- Tatipamula, V. B. & G. S. Vedula. 2019. Antimicrobial and anti-tubercular activities of isolates and semi-synthetic derivatives of lichen *Ramalina leiodea* (Nyl.) Nyl. *Journal of the Serbian Chemical Society* 84(6): 555–562.
- Telyatnikov, M. Y., E. I. Troeva, K. A. Ermokhina & S. A. Pristyazhnyuk. 2019. Vegetation of the middle reaches of Yakhadiyaha River (the southern part of the arctic tundras of Yamal Peninsula). *Turczaninowia* 22(2): 58–79.
- Temu, S. G., P. Clerc, L. Tibell, D. D. Tibuhwa & S. Tibell. 2019. Phylogeny of the subgenus *Eumitria* in Tanzania. *Mycology* 10(4): 250–260.
- Tilk, M., K. Ots, T. Tullus & M. Mandre. 2018. Ground vegetation diversity and geobotanical analysis in dune pine forests in southwest Estonia. *Forestry Studies* 69(1): 63–74.
- Tolpysheva, T. Y. & E. G. Suslova. 2019. Specks of *Usnea* Dill. ex. Adans. (Lecanoromycetes, Ascomycota) in protected areas of Moscow oblast. *Russian Journal of Forest Science* 2019(1): 57–63.
- Trefilova, O. V. & E. F. Vedrova. 2018. Flux from mineralization of carbon in post-fire pine forests in midstream of Yenisey. *Russian Journal of Forest Science* 2018(3): 210–224.
- Tripp, E. A. & J. C. Lendemer. 2019. Highlights from 10+ years of lichenological research in Great Smoky Mountains National Park: Celebrating the United States National Park Service Centennial. *Systematic Botany* 44(4): 943–980. [New: *Fuscopannaria frullaniae* (Maass) E.Tripp & Lendemer (≡ *Moelleropsis nebulosa* subsp. *frullaniae* Maass), *F. nebulosa* (Hoffm.) E.Tripp & Lendemer (≡ *Patellaria nebulosa* Hoffm.), *Heterodermia langdoniana* Lendemer & E.Tripp (from U.S.A.), *Lecanora darlingiae* Lendemer & E.Tripp (from U.S.A.), *Lecanora sachiana* E.Tripp & Lendemer (from U.S.A.), *Leprocaulon nicholsiae* Lendemer & E.Tripp (from Canada & U.S.A.), *Pertusaria superiana* Lendemer & E.Tripp (From Canada & U.S.A.).]
- Tsurykau, A. G. 2019. Dynamics of the geographic structure of lichen biota of Belarus as indicator of modern bioclimatic conditions. *Botanical Magazine* 104(8): 1167–1188. [In Russian with English abstract.]
- Tufan-çetin, Ö. 2019. Determination of lichen diversity variations in habitat type of Mediterranean maquis and arborescent matorral. *Applied Ecology and Environmental Research* 17(4): 10173–10193.
- Tumur, A. & D. E. S. Richardson. 2019. The lichens of Point Pleasant Park, Halifax, Nova Scotia. *Northeastern Naturalist* 26(1): 63–80.
- Tuong, T. L., T. Aree, L. T. M. Do, P. K. P. Nguyen, P. Wonganan & W. Chavasiri. 2019. Dimeric tetrahydroxanthones from the lichen *Usnea aciculifera*. *Fitoterapia* 137: 104194.
- U'Ren, J. M., F. Lutzoni, J. Miadlikowska, N. B. Zimmerman, I. Carbone, G. May & A. E. Arnold. 2019. Host availability drives distributions of fungal endophytes in the imperilled boreal realm. *Nature Ecology & Evolution* 3(10): 1430–1437.
- Ullah, S., A. A. Khalil, F. Shaukat & Y. Song. 2019. Sources, extraction and biomedical properties of polysaccharides. *Foods* 8(8): 304.
- Urbanavichene, I. N. & G. P. Urbanavichus. 2019. Contributions to the lichen flora of the North Ossetia Nature Reserve (Republic of North Ossetia — Alania). I. Cluster “Shubi”. *Novosti sistematiki nizshikh rastenii* 53(2): 349–368. [In Russian with English abstract.]
- Urbanavichus, G. P. & I. N. Urbanavichene. 2019. Epiphytic lichens and non-lichenized fungi of spruce in the northernmost distribution limit (Murmansk Region). *Botanicheskii Zhurnal* 104(2): 191–205.
- Valina, Y., N. Widiani & A. Laksono. 2019. Identification of lichen as an air quality bio-indicator in the campus of the State Islamic Institute Raden Intan Lampung. *Journal of Physics: Conference Series* 1155(1): 012066.
- Varol, M. 2019. Parietin as an efficient and promising anti-angiogenic and apoptotic small-molecule from *Xanthoria parietina*. *Brazilian Journal of Pharmacognosy* 29(6): 728–734.
- Vaz, A. S., H. Hespanhol, C. Vieira, P. Alves, J. P. Honrado & J. Marques. 2019. Different responses but complementary views: Patterns of cross-taxa diversity under contrasting coastal dynamics in secondary sand dunes. *Plant Biosystems*. doi:10.1080/11263504.2019.1651778.
- Vitali, M., A. Antonucci, M. Owczarek, M. Guidotti, M. L. Astolfi, M. Manigrasso, P. Avino, B. Bhattacharya & C. Protano. 2019. Air quality assessment in different environmental scenarios by the determination of typical heavy metals and persistent organic pollutants in native lichen *Xanthoria parietina*. *Environmental Pollution* 254(A): 113013.
- Vorobyova, E. V. & E. L. Prykhodzka. 2019. Stabilization of polyethylene by natural fillers and their extracts. *Khimiya Rastitel'nogo Syr'ya* 2: 213–223.
- Wan, S. & C. J. Ellis. 2020[2019]. Are lichen growth form categories supported by continuous functional traits: Water-holding capacity and specific thallus mass? *Edinburgh Journal of Botany* 77(1): 65–76.
- Wang, M., C. Wang & R. Jia. 2019. The impact of nitrogen deposition on photobiont-mycobiont balance of epiphytic lichens in subtropical forests of central China. *Ecology and Evolution* 9(23): 13468–13476.
- Wang, S., J. Zang, M. Huang, L. Guan, K. Xing, J. Zhang, D. Liu & L. Zhao. 2019. Discovery of novel (+)-usnic acid derivatives as potential anti-leukemia agents with pan-pim kinases inhibitory activity. *Bioorganic Chemistry* 89: 102971.
- Wang, Y. L., X. R. Li, J. C. Zhao, L. C. Liu, H. Y. Yang & Y. Y. Zhou. 2019. Population dynamics of *Echinops gmelinii* Turcz. at different successional stages of biological soil crusts in a temperate desert in China. *Plant Biology* 21(6): 1140–1149. [Lichen biological soil crusts were one of the successional stages studied.]

- Warren, S. D., L. L. St. Clair, L. R. Stark, L. A. Lewis, N. Pombubpa, T. Kurbessoian, J. E. Stajich & Z. T. Aanderud. 2019. Reproduction and dispersal of biological soil crust organisms. *Frontiers in Ecology and Evolution* 7: 344.
- Węgrzyn, M. H., P. Wietrzyk-Pelka, A. Galanty, B. Cykowska-Marzencka & M. A. Sundset. 2019. Incomplete degradation of lichen usnic acid and atranorin in Svalbard reindeer (*Rangifer tarandus platyrhynchus*). *Polar Research* 38: 3375.
- Whinray, J. 2019. Some records of the lichen genus '*Caloplaca*', (Teloschistaceae), for Banks and eastern Bass Straits. *Victorian Naturalist* 136(1): 24–28.
- Wieczorek, A. 2019. The lichen genus *Opegrapha* s.l. in Poland: Morphological variability, ecology, and distribution. *Monographiae Botanicae* 107: 1–163.
- Winkler, A., C. Caricchi, M. Guidotti, M. Owczarek, P. Macri, M. Nazzari, A. Amoroso, A. Di Giosa & S. Listrani. 2019. Combined magnetic, chemical and morphoscopic analyses on lichens from a complex anthropic context in Rome, Italy. *Science of the Total Environment* 690: 1355–1368.
- Xu, H., Y. Zhang, B. Kang, F. Qin, X. Liu, H. Zhou & X. Shao. 2019. Different types of biocrusts affect plant communities by changing the microenvironment and surface soil nutrients in the Qinghai-Tibetan Plateau. *Arid Land Research and Management*. doi:10.1080/15324982.2019.1683915.
- Yavuz, M. & G. Çobanoğlu. 2019. Active monitoring of airborne elements in Isparta Province (Turkey) with the epiphytic lichen *Physcia aipolia* (Erh. ex Humb.) Fűrnr. *Journal of Elementology* 24(3): 1115–1128.
- Zarco, A., V. V. Benítez, L. Fasola, G. Funes & M. L. Guichón. 2018. Feeding habits of the Asiatic red-bellied squirrel *Callosciurus erythraeus* introduced in Argentina. *Hystrix* 29(2): 223–228. [The squirrel consumes lichens incidentally.]
- Zavarzina, A. G., T. N. Nikolaeva, V. V. Demin, P. V. Lapshin, M. I. Makarov, A. A. Zavarzin & N. V. Zagoskina. 2019. Water-soluble phenolic metabolites in lichens and their potential role in soil organic matter formation at the pre-vascular stage. *European Journal of Soil Science* 70(4): 736–750.
- Zhang, G., C. Gong, J. Gu, Y. Katayama, T. Someya & J.-D. Gu. 2019. Biochemical reactions and mechanisms involved in the biodeterioration of stone world cultural heritage under the tropical climate conditions. *International Biodeterioration and Biodegradation* 143: 104723.
- Zhang, Y. Y., X. Y. Wang, L. J. Li, U. Søchting, A. C. Yin, S. Q. Wang & L. S. Wang. 2019. *Upretia squamulosa*, a new lichen species from the arid valley of Jinsha-Jiang river, China. *Phytotaxa* 402(6): 288–294. [New: *U. squamulosa* Y.Y.Zhang & Li S.Wang (from China).]
- Zhao, Y., Jia, R. L. & J. Wang. 2019. Towards stopping land degradation in drylands: Water-saving techniques for cultivating biocrusts in situ. *Land Degradation and Development* 30(18): 2336–2346.
- Zhu, S., B. Sun, Y. Chen, T. Li, G. Zhou, H. Zhao, W. Mao & Y. Zhao. 2019. An excellent pH-controlled resistive switching memory device based on self-colored (C7H7O4N): N extracted from a lichen plant. *Journal of Materials Chemistry C* 7(25): 7593–7600.
- Zhurbenko, M. P. 2019. A new finding of an enigmatic lichenicolous 'lichen' from the Arctic. *Novosti sistematiki nizshikh rastenii* 53(2): 333–335.