

## Impact of forest management on threatened epiphytic macrolichens: evidence from a Mediterranean mixed oak forest (Italy)

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## Supplementary Material

**Tab. S1** - Present status of *Lobaria pulmonaria* in several European countries and Russia: red list category and legal protection (if any). (\*): No listed lichens; (-): missing information.

Country	Red list category	Protected by law	Notes	References
Albania	no*	no*	The Red List serves as a legal document on which the protection is based	Red List of Wild Flora and Fauna, Albania, approved by ministerial order no. 1280, 20.11.2013 – available at: <a href="http://www.nationalredlist.org/files/2015/06/Red-list-of-Albanian-flora-and-fauna-2013-MO-1280-20-11-2013.pdf">http://www.nationalredlist.org/files/2015/06/Red-list-of-Albanian-flora-and-fauna-2013-MO-1280-20-11-2013.pdf</a> Document of Strategic Policies for the Protection of Biodiversity in Albania, 2015, Ministrija e Mjedisit, Tirana - available at: <a href="https://www.cbd.int/doc/world/al/al-nbsap-v2-en.pdf">https://www.cbd.int/doc/world/al/al-nbsap-v2-en.pdf</a>
Austria	3, r:1	-	3 = Gefährdet [endangered] r: 1 = outside the Alps: Vom Aussterben bedroht [threatened with extinction]	Türk R, Hafellner J (1999). Rote Liste gefährdeter Flechten (Lichenes) Österreichs, 2. Fassung. [Red list of endangered lichens of Austria. 2 <sup>nd</sup> version.] In: Niklfeld H. (ed.), Rote Listen gefährdeter Pflanzen Österreichs, 2. Auflage. [Red list of endangered plants of Austria. 2 <sup>nd</sup> version] Austria Medien Service, Graz, Austria. pp. 187–223.
Belgium	no*	no		Convention on biological diversity, Red lists of threatened species - available at: <a href="http://www.biodiv.be/biodiversity/threats/fol036020">http://www.biodiv.be/biodiversity/threats/fol036020</a>
Bosna and Hercegovina	no*	no*	The Red List serves as a legal document on which the protection is based	Crvena lista gljiva Federacije Bosne i Hercegovine [Red list of fungi of Bosnia and Herzegovina Federation], (2013) – available at: <a href="http://www.fmoit.gov.ba/ba/page/81/zascarontita-prirode#">http://www.fmoit.gov.ba/ba/page/81/zascarontita-prirode#</a> Zakon o zaštiti prirode [Nature Protection Act] Sl. nov F BiH 66-13
Bulgaria	no	no		Peev D et al. (eds.) (2015). Red Data Book of the Republic of Bulgaria: Volume 1 – Plants & Fungi. BAS & MoEW, Sofia – available at: <a href="http://e-ecodb.bas.bg/rdb/en/vol1/">http://e-ecodb.bas.bg/rdb/en/vol1/</a> Republic of Bulgaria, National Assembly, Biological Diversity Act, promulgated, State Gazette No. 77/9.08.2002
Croatia	EN	strongly protected		Zakon o zaštiti prirode [Nature Conservation Act] NN broj 80/2013, Pravilnik o strogo zaštićenim vrstama, Prilog [Ordinance on strictly protected species, Annex] – available at:

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				<a href="http://narodne-novine.nn.hr/clanci/sluzbeni/2013_12_144_3086.html">http://narodne-novine.nn.hr/clanci/sluzbeni/2013_12_144_3086.html</a>
Cyprus	no*	no		Tsintides T., Christodoulou C. S., Delipetrou P. & Georghiou K., 2007. The Red Data Book of the Flora of Cyprus. – available at <a href="http://zslsites.org/assets/nrl/Red_Data_Book_of_Cyprus_Flora.pdf">http://zslsites.org/assets/nrl/Red_Data_Book_of_Cyprus_Flora.pdf</a>
Czech Republic	CR	no*	Under evaluation for legal protection	Liška J, Palice Z, Slavíková Š (2008). Checklist and Red List of lichens of the Czech Republic. Preslia 80: 151–182 Vyhláška č. [Decree no.] 395/1992 Sb. – available at: <a href="https://www.zakonyproldi.cz/cs/1992-395">https://www.zakonyproldi.cz/cs/1992-395</a>
Denmark	VU	–		Wind P, Pihl S (eds.) (2004). The Danish Red List. The National Environmental Research Institute, Aarhus University. – available at: <a href="http://bios.au.dk/videnudveksling/til-jagt-og-vildtinteresserede/redlistframe/soegart/">http://bios.au.dk/videnudveksling/til-jagt-og-vildtinteresserede/redlistframe/soegart/</a>
Estonia	NT	protected	The lowest protection	Randlane T, Jüriado I, Suija A, Lõhmus P, Leppik E (2008). Lichens in the new Red Data List of Estonia. Folia Cryptog. Estonica 44: 113–120 Riigiteataja 2004: III kaitsekategooria liikide kaitse alla võtmine [Protection of species of category III] – available at: <a href="https://www.riigiteataja.ee/akt/13360720">https://www.riigiteataja.ee/akt/13360720</a>
Finland	NT	no		Jääskeläinen K, Pykälä J, Rämä H, Vitikainen O, Haikonen V, Högnabba F, Lommi S, Puolasmaa A (2010). Jäkälät – Lichens. In: Rassi P, Hyvärinen E, Juslén A, Mannerkoski I (eds.), The 2010 Red List of Finnish species, Ministry of the environment, Finnish environment institute, Edita Ltd. Helsinki, pp. 278–310 Nature Conservation Act 1096/1996, Sect. 47 and Nature Conservation Decree 160/1997, Appendix 4 – available at: <a href="http://www.finlex.fi/en/laki/kaannokset/1997/en19970160">http://www.finlex.fi/en/laki/kaannokset/1997/en19970160</a>
France	different at regional level	regionally protected		Inventaire National du Patrimoine Naturel [National inventory of natural heritage] – available at: <a href="https://inpn.mnhn.fr/espece/cd_nom/56613">https://inpn.mnhn.fr/espece/cd_nom/56613</a>
Germany	threatened with extinction	protected	All <i>Lobaria</i> species are protected	Ludwig G, Matzke-Hajek G (eds.) (2011). Rote Liste gefährdeter Tiere, Pflanzen und Pilze Deutschlands, Band 6: Pilze (Teil 2 – Flechten und Myxomyceten.) [Red list of endangered animals, plants and fungi of Germany, Volume 6: Mushrooms (Part 2) – Lichens and Myxomycetes] Bundesamt für Naturschutz [Federal Agency for Nature Conservation], Bonn - Bad Godesberg

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Greece	no*	no		Bundesartenschutzverordnung (BArtSchV), Anlage 1 [Federal Species Protection Regulations, Annex 1] (zu § 1) Schutzstatus wild lebender Tier- und Pflanzenarten [Protection status of wild animals and plants], available at: – <a href="https://www.buzer.de/s1.htm?g=BArtSchV&amp;a=Anlage+1">https://www.buzer.de/s1.htm?g=BArtSchV&amp;a=Anlage+1</a> Krause J, Wagner H-G, Otte V (2017). Rote Liste und Gesamtartenliste der Flechten (Lichenes) von Berlin. [Red list and species list of lichens of Berlin] In: DER LANDESBEAUFTRAGTE FÜR NATURSCHUTZ UND LANDSCHAFTSPFLEGE / SENATSVERWALTUNG FÜR UMWELT, VERKEHR UND KLIMASCHUTZ [Regional supervisor for nature and landscape / Senate management for environment, transport and climate protection] (Hrsg.): Rote Listen der gefährdeten Pflanzen, Pilze und Tiere von Berlin [Red Lists of Endangered Plants, Fungi and Animals of Berlin], 28 S. doi: <a href="https://doi.org/10.14279/depositonce-5841">10.14279/depositonce-5841</a>
Hungary	CR	protected		Phitos D, Constantinidis T, Kamari G (eds.) (2009). The Red Data Book of Rare and Threatened Plants of Greece, Vol. I and II, Hellenic Botanical Society, Patra (in Greek). Abbott BFM (2009). Checklist of the lichen and lichenicolous fungi of Greece. Bibliotheca Lichenologica 103: 1–368.
Iceland	no	–		Farkas E, Lökös L (2009). <i>Lobaria pulmonaria</i> (lichen-forming fungi) in Hungary. Mikológiai Közlemények, Clusiana 48(1): 11–18 "Zuzmók" [Lichens] in 83/2013 (IX.25) VM rendelet [VM Decree], 5th appendix (Magyar Közlöny 2013/156)
Ireland	no*	no		Ingadóttir Á, Einarsson E, Kristinsson H, Egilsson K (1996). Válisti 1. Plöntur. [Checklist 1. Plants] Náttúrafrædistofnun Íslands [The Icelandic Natural Resources Agency], Reykjavík, 82 pp.
Italy	no	no	Protection of species based on regional legislations	Nascimbene J, Nimis PL, Ravera S (2013). Evaluating the conservation status of epiphytic lichens of Italy: a red list. Plant Biosyst 147: 898–904 Alonzi A, Ercole S, Piccini C (2006). La protezione delle specie della flora e della fauna selvatica: quadro di riferimento legislativo regionale. [Protection of wild species of flora and fauna: regional legislative reference framework] APAT Rapporti 75/2006

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				Decreto del Presidente della Repubblica [Decree of the President of the Republic], March 12, 2003, n.120 in application of the EU Habitat Directive (43/92/CEE)
Lithuania	VU	protected	The Red Data Book serves as a legal document on which the protection is based	Rašomavičius V (ed.) (2007). Lietuvos Raudonoji knyga [Red Data Book of Lithuania]. Lututė, Vilnius.
Latvia	VU	protected		Piterāns A, Vimba E (1996). Red Data Book of Latvia. Rare and endangered species of plants and animals. Fungi and lichens. Riga, pp. 202. MK noteikumi Nr.396 "Noteikumi par īpaši aizsargājamo sugu un ierobežoti izmantojamā īpaši aizsargājamo sugu sarakstu" 1., 2. pielikums [Provisions on the list of specially protected species and restricted use of protected species, Annex 1., 2.] (14.11.2000.), saskaņā ar grozījumiem Nr.627, 27.07.2004
Netherlands	no	no		Aptroot A, van Herk CM, Sparrius LB (2012). Basisrapport voor de Rode Lijst korstmossen. [Basic report for the Red List of lichens]. Buxbaumella 92: 1-117 Staatscourant 2004, 218 – available at: <a href="http://minez.nederlandsesoorten.nl/soorten">http://minez.nederlandsesoorten.nl/soorten</a>
Norway	no (LC)	no		The Norwegian Red List of Species 2015 - available at: <a href="https://www.artsdatabanken.no/">https://www.artsdatabanken.no/</a>
Poland	EN	protected		Cieśliński S, Czyżewska K, Fabiszewski J (2003). Red List of extinct and threatened lichens in Poland. Monographiae Botanicae 91: 13–49 Rozporządzenie Ministra Środowiska z dnia 9 października 2014 r. w sprawie ochrony gatunkowej grzybów [Regulation of the Minister of the Environment of 9 October 2014 on the protection of species of fungi] – available at: <a href="http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20140001408/O/D20141408.pdf">http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20140001408/O/D20141408.pdf</a>
Portugal	no	no	Under evaluation for inclusion in Red List	listavermelha-flora.pt (last access 23.11.2017) pers. com. Paula Matos, PhD., Faculdade de Ciências da Universidade de Lisboa, Portugal
Romania	no	no*	Proposed as VU in prepared manuscript "Red List of Macrolichens from Romania"	Ardelean I. V., Keller C. & Scheidegger C. 2013. Lichen flora of Rodnei Mountains National Park (Eastern Carpathians, Romania) including new records for the Romanian mycoflora. Folia Cryptogamica Estonica 50: 101–115 Ordonanță de urgență nr. 57 din 20/06/2007 Publicat în Monitorul Oficial, Partea I nr. 442 din 29/06/2007 privind regimul ariilor naturale protejate, conservarea habitatelor

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Russia	VU	regionally protected	The Red Data Book serves as a legal document on which the protection is based	naturale, a florei și faunei sălbaticе [Emergency Ordinance no. 57 of 20/06/2007 Published in the Official Gazette, Part I no. 442 of 29/06/2007 on the regime of natural protected areas, conservation of natural habitats, wild flora and fauna] Red Data Book of Russian Federation (plants and fungi) (2008). Moscow, 885 pp. Iliashenko VY, Iliashenko EI (2000). Krasnaya kniga Rossii: pravovye akty [Red Data Book of Russia: legislative acts]. State committee of the Russian Federation for Environmental Protection. Moscow
Serbia	–	no		Ivančević BN, Matavulj MN, Karaman MA (2013). Lichens in Serbian Legislation. Jour. Nat. Sci, Matica Srpska Novi Sad 124: 355–365 Regulation on the declaration and protection of protected and strictly protected wild species of plants, animals and fungi, Službeni Glasnik RS, br. 5/10, February 2, 2010
Slovakia	CR	protected		Pišút I, Guttová A, Lackovičová A, Lisická E (2001). Červený zoznam lišajníkov Slovenska (december 2001). [Red list of the lichens of Slovakia (December 2001)] In: Baláz D, Marhold K., Urban P (eds.), Červený zoznam rastlín a živočíchov Slovenska [Red list of plants and animals of Slovakia], p. 23–30, Ochrana Prírody 20 (Suppl.), Banská Bystrica Vyhľáška Ministerstva životného prostredia SR [Decree of the Ministry of the Environment SR] č. 24/2003 Z. z., Appendix 5 – available at: <a href="http://www.sopsr.sk/files/24_2003_vyhlaska_OPaK_od_01_01_2015.pdf">http://www.sopsr.sk/files/24_2003_vyhlaska_OPaK_od_01_01_2015.pdf</a>
Spain	no	no*	Under evaluation for inclusion in Red List	pers. com. Paula Matos, PhD., Faculdade de Ciências da Universidade de Lisboa, Portugal Real Decreto 139/2011, de 4 de febrero, para el desarrollo del Listado de Especies Silvestres en Régimen de Protección Especial y del Catálogo Español de Especies Amenazadas [Royal Decree 139/2011, of 4 February, for the development of the List of Wild Species in Special Protection Regime and the Spanish Catalog of Endangered Species]
Sweden	NT	no		The 2015 Red List of Swedish Species – available at: <a href="https://artfakta.artdatabanken.se/">https://artfakta.artdatabanken.se/</a> Regler om fridlysning av mossor, lavar, svampar och alger - 8 § artskyddsförordningen [Rules on the release of mosses, lichens, fungi and algae - Section 8 of the Art.] (2007: 845)

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<b>Switzerland</b>	VU	protected	All <i>Lobaria</i> species are protected	Scheidegger C, Clerc P, Dietrich M, Frei M, Groner U, Keller C, Stofer S, Vust, M (2002). <i>Lista Rossa delle specie minacciate in Svizzera. Licheni epifiti e terricoli. Ambiente - Esecuzione.</i> [Red list of threatened species in Switzerland. Epiphytic and soil lichens. Environment - Execution] Berna; Birmensdorf: Ufficio federale dell'ambiente, delle foreste e del paesaggio UFAFP; Istituto federale di ricerca WSL, pp. 122. Verordnung über den Natur- und Heimatschutz [Ordinance on the Protection of Nature and Homeland Security], vom 16. Januar 1991 (Stand am 10. Juli 2001) – available at: <a href="https://www.admin.ch/opc/de/classified-compilation/19910005/200008010000/451.1.pdf">https://www.admin.ch/opc/de/classified-compilation/19910005/200008010000/451.1.pdf</a>
<b>United Kingdom</b>	no (LC) (VU in Wales)	regionally protected (partial protection in England and Wales)	The taxon of principal importance for biodiversity conservation in Scotland and Wales	Woods RG, Coppins BJ (2012). A Conservation Evaluation of British Lichens and Lichenicolous Fungi. Species Status 13. Joint Nature Conservation Committee, Peterborough, 156 pp. Woods RG (2010). A Lichen Red Data List for Wales. Plantlife, Salisbury, 69 pp. The Wildlife and Countryside Act 1981 (Variation of Schedules 5 and 8) (England and Wales) Order 2011 Scottish Biodiversity List 2005 (designed under Nature Conservation (Scotland) Act 2004, Section 2(4) – available at: <a href="https://www2.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL">https://www2.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL</a> Environment (Wales) Act 2016, Sect. 7 (designed under NERC Act 2006) – available at: <a href="https://www.biodiversitywales.org.uk/Environment-Wales-Act">https://www.biodiversitywales.org.uk/Environment-Wales-Act</a>
<b>Ukraine</b>	VU	protected	The Red Data Book serves as a legal document on which the protection is based	Didukh YA (ed.) (2009). Red data book of Ukraine, Vegetable kingdom. Globalconsalting, 912 pp. Law of Ukraine of February 7, 2002 No. 3055-14, revision on March 5, 2017, On the Red Book of Ukraine – available at: <a href="http://zakon2.rada.gov.ua/laws/show/3055-14?lang=uk">http://zakon2.rada.gov.ua/laws/show/3055-14?lang=uk</a>