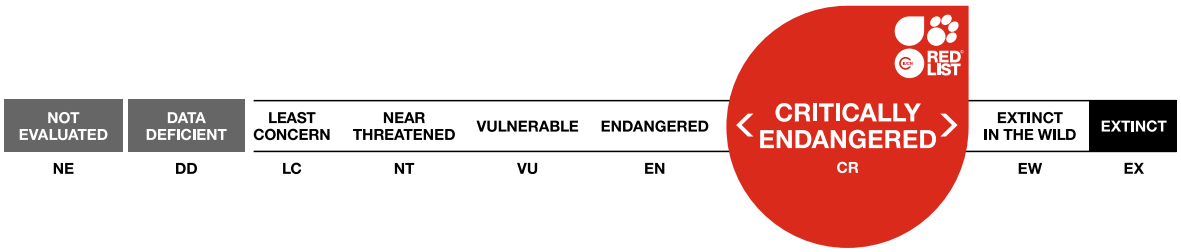
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Teloschistes peruensis, Peruvian Orange-bush Lichen

Amendment version

Assessment by: Ramos, D., Vargas, R., Herrera-Campos, M., Moat, J., Whaley, O., Parrinello, C. & Bungartz, F.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Fungi	Ascomycota	Lecanoromycetes	Teloschistales	Teloschistaceae

Scientific Name: *Teloschistes peruensis* (Ach.) J.W. Thomson

Synonym(s):

- *Borrera pubera* Ach. var. *peruensis* Ach.

Common Name(s):

- English: Peruvian Orange-bush Lichen
- Spanish; Castilian: Liquen Amarillo, Liquen Anaranjado Arbustivo de la Atacama

Taxonomic Source(s):

Index Fungorum Partnership. 2020. Index Fungorum. Available at: http://www.indexfungorum.org.

Taxonomic Notes:

This species is very poorly known. Specimens from Chile were sent by R. Vargas to P. Frödén in Sweden – the world specialist in the genus *Teloschistes*. Fröden confirmed that the taxon corresponds to a phylogenetically well-defined lineage, which must be considered a well delimited species. A detailed description was published by Thomson and Iltis (1968).

Assessment Information

Red List Category & Criteria: Critically Endangered A2bce ver 3.1

Year Published: 2021

Date Assessed: August 13, 2020

Justification:

Teloschistes peruensis is a bright orange lichen with a narrow distribution in Peru and Chile. Its AOO is 8 km^2 and it is extant at only two locations. Its population size, area of occupancy (AOO), extent of occurrence (EOO), habitat quality, and the number of locations where it occurs have declined substantially due to development, off-road recreational vehicles, air pollution, introduced domestic species, and overall habitat destruction (when comparing the current status to historic reports, it is likely that the species has declined by at least 80% over the past three generations). The threats it faces are ongoing and the species could quickly become extinct without substantial and rapid conservation actions. Therefore, it is listed as Critically Endangered, A2bce.

Previously Published Red List Assessments

2020 – Critically Endangered (CR)
https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T175710031A175710697.en

Geographic Range

Range Description:

Teloschistes peruensis has been reported from four sites in Peru, though the existence of one inland site is doubtful, and one site in Chile.

Sites in Peru:

- Otuzco (La Libertad): exact locality unknown, reports doubtful. A specimen collected by Pennell (Pennell 14825, MIN 881527) lacks detailed coordinate data, and no specific geographical reference other than the province Otuzco is cited; the habitat is given as “on sandy soil”. However, Otuzco is an inland province of Peru and not located near the coast, so the typical sandy soil habitat is not present in the area (D. Ramos *pers. obs.*). *Teloschistes peruensis* is a rare, occasionally epiphytic lichen, adapted to coastal areas that are regularly inundated by an abundance of fog. It appears unlikely that the species would have been found so far inland. R. Vargas examined the specimen (Pennell 14825, MIN 881527) and confirmed it is correctly identified, but we consider the report from this site nevertheless doubtful. It seems likely that the collection site was erroneously reported by Pennell. There is, however, also one recent report from La Libertad (Peru) published in Rodriguez *et al.* (2017); two specimens are cited: R. Rodríguez R. and S. Arroyo A. 2729a (HUT) and Rodríguez R., E. Alvítez I. and L. Pollack V. 4135 (HUT). The image included in the publication (Fig. 4D) shows a specimen with densely ciliate apothecia, most likely a misidentification of *T. chrysophtalmus* (the material needs confirmation). We consider the original reports by Pennell (1948) and the recent ones by Rodriguez *et al.* (2017) as doubtful. No extant subpopulations could be confirmed in the area. If the species ever existed here, its populations must now be considered extirpated.

- Callao (Lima); Population extirpated (based on extensive searches by D. Ramos), original reports are based on specimens collected by Anderson (s.n., UPS:BOT:L-018824); the material were collected in 1852 at coastal sites where the habitat has since been replaced by an airport and the maritime port of Callao.

- Camaná (Arequipa): Population extirpated (based on extensive searches by D. Ramos), original report by Thompson and Iltis (1968).

- Lomas of Amara and Ullujaya (Ica): The only extant population in Peru was re-discovered during intensive surveys in 2015, but specimens at the time were not collected due to concern about the species' rarity. The site was subsequently surveyed using aerial drones, and the species was collected by a team of botanists from Kew Gardens (Moat and Wilkinson 2018) and reported in Whaley *et al.* (2019). They documented that the species inhabits two closely connected mound sites (together around 80 x 60 meters), covering an area considerably less than 1 km^2.

In Chile, the only confirmed extant subpopulation is located at a site at Pan de Azúcar (Chile). It is very small, with just 10 to 15 functional individuals, the total area inhabited by that subpopulation covers less than 100 m^2.

Country Occurrence:

Native, Extant (resident): Chile; Peru

Population

The original reports by Thompson and Iltis (1968) show very extensive “meadows” of this species at the three confirmed sites in Peru. All of these sites, except one, at the lomas of Amara and Ullujaya (southwest of Ica), have been extirpated (extensive searches done at the sites by D. Ramos). That means there are only two extant subpopulations known. The subpopulation at Pan de Azúcar (Chile) is very small, consisting of 10 to 15 functional individuals, the total subpopulation covering less than 100 m^2. The lomas at Ica (Peru) currently harbour the largest known subpopulation (up to 100 functional individuals), which is less than 1 km^2. There is one additional report published by Rodriguez *et al.* (2017) from La Libertad (Peru), which needs confirmation. The larger population at lomas of Ica is completely terrestrial, whereas the much smaller one at Pan de Azúcar is epiphytic (on shrubs).

Current Population Trend: Decreasing

Habitat and Ecology **(see Appendix for additional information)**

Teloschistes peruensis grows in open, arid, sandy habitats (lomas in Peru or oasis de Niebla in Chile formations) in the coastal fog-desert of south-central Peru and north-central Chile. These coastal areas are most influenced by fog, particularly during May-November. The dominant vascular plant species at the documented sites in Peru are *Tillandsia* spp. (Bromeliaceae), much other vegetation is largely ephemeral, i.e. desert annuals such as *Nolana* spp. and *Leptoglossis* spp. (Solanaceae) (in Ica) that briefly appear only during, sporadic rainfall events, but also includes isolated perennial clumps of *Haageocereus* and *Eriosyce* (Cactaceae). *Teloschistes peruensis* is only known from this particular habitat. It grows loosely on its sandy substrate, yet is unattached to anything so it can roll. However, it can also be found overgrowing vascular plants (shrubs) and other lichens. The very small population known from Chile is essentially only epiphytic, growing with the common *Ramalina usnea* on different species of shrubs. Whaley *et al.* (2019) state that the species in Ica grows “in a few extremely rare locations at 550 m elev., on loose powdery substrates (a desert loess with a thin crust or pavement), where microclimatic conditions permit the formation of monotypic lichen meadows where no vascular plants are found”.

Systems: Terrestrial

Threats **(see Appendix for additional information)**

There are no subpopulations in any protected area in Peru; but the species is found in “Pan de Azúcar” National Park in Chile (Vargas *pers. com.*), which is well protected, even the access road to the site has recently been closed. There are some discussions on infrastructure development in this area however, which might affect this Chilean population in the future. In Peru the last remaining subpopulation is directly threatened by:

- Development and habitat fragmentation/destruction: there have been proposals for development of mines, housing and holiday home complex near to the site, although not directly on the site. This will increase traffic exposure and likely threaten the entire population; making this development prospect highly problematic. Some mining commissions are located in immediate vicinity to the area (to the west) where the species is found, while there is the possibility for the change of land use for agriculture. The fishermen from the region use the sites for access to the sea, developing dirt roads very close to the population area inhabited by this vagrant lichen.

- 4x4 races: the population is only a few meters from a 4x4 transit route, the Paris Dakar rally ran through in 2013 and was metres away from the population on adjacent small mounds. By luck the very soft caliche and sand substrate prevented 4x4 driving through the site from below. There is one set of stopped tracks that just reached into the main mount, but the car must have bottomed out and they had to reverse or get pushed out. For further Dakar impacts see Hesse (2013).

- Air pollution: air pollutants negatively affecting the area are derived from combustible engines (traffic), and possible chemicals (derived from mining in Marcona mine).

- Presence of exotic species: Goats and cows use the Lomas along the southern coast of Peru as extensive grazing areas, artificial meadows created by irrigation result in displacement and destruction of the original habitat sites.

Conservation Actions **(see Appendix for additional information)**

The extant population site at the lomas of Amara and Ullujaya in southern Peru is in urgent need of permanent protection from further habitat destruction, and effective management. Conservation designation action is also required. The population site known from Chile appears to be relatively well protected as part of the National Park, but by comparison with the Peruvian population, the one in Chile is only very small and could be extirpated rapidly by accident unless the authorities are aware of the importance of this species. R. Vargas is working with the Chilean authorities to recognise the species as threatened on the national level (in Chile). In Peru the last national meeting to establish Red Listing on a national level was three years ago. Raising awareness of the species presence and threatened status with local land mangers is essential to improve the conservation prospects of *Teloschistes peruensis;* while further research and monitoring is required to gain a clearer idea of the status of the species.

Credits

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Citation

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External Resources

For Supplementary Material, and for Images and External Links to Additional Information, please see the Red List website.

Appendix

Habitats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Habitat	Season	Suitability	Major Importance?
8. Desert -> 8.3. Desert - Cold	-	Suitable	-

Plant Growth Forms

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Plant Growth Form
LC. Lichen
M. Fungus

Threats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Whole (>90%)	Slow, significant declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.2. Commercial & industrial areas	Ongoing	Whole (>90%)	Slow, significant declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.3. Tourism & recreation areas	Ongoing	-	-	Low impact: 3
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.3. Agro-industry farming	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.3. Livestock farming & ranching -> 2.3.1. Nomadic grazing	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
3. Energy production & mining -> 3.2. Mining & quarrying	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion		

		1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		
4. Transportation & service corridors -> 4.1. Roads & railroads	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
9. Pollution -> 9.5. Air-borne pollutants -> 9.5.4. Type Unknown/Unrecorded	Ongoing	Whole (>90%)	Slow, significant declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		

Conservation Actions in Place

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action in Place
In-place land/water protection
Conservation sites identified: Yes, over entire range
Percentage of population protected by PAs: 0
Area based regional management plan: No
Occurs in at least one protected area: Yes

Conservation Actions Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action Needed
1. Land/water protection -> 1.1. Site/area protection
1. Land/water protection -> 1.2. Resource & habitat protection
2. Land/water management -> 2.1. Site/area management
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.1. Legislation -> 5.1.1. International level
5. Law & policy -> 5.1. Legislation -> 5.1.2. National level
5. Law & policy -> 5.2. Policies and regulations

Research Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

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Research Needed
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
1. Research -> 1.5. Threats
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Estimated area of occupancy (AOO) (km²): 8
Continuing decline in area of occupancy (AOO): Yes
Extreme fluctuations in area of occupancy (AOO): No
Estimated extent of occurrence (EOO) (km²): 8
Continuing decline in extent of occurrence (EOO): Yes
Extreme fluctuations in extent of occurrence (EOO): No
Number of Locations: 2
Continuing decline in number of locations: Yes
Extreme fluctuations in the number of locations: No
Population
Number of mature individuals: 115
Continuing decline of mature individuals: Yes
Extreme fluctuations: No
Population severely fragmented: Unknown
No. of subpopulations: 2
Continuing decline in subpopulations: Yes
Extreme fluctuations in subpopulations: No
All individuals in one subpopulation: No
No. of individuals in largest subpopulation: 100
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes

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Habitats and Ecology
Generation Length (years): 35

Amendment

Amendment reason: A correction in spelling has been made to the author string.

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