The IUCN Red List of Threatened Species™
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Scope(s): Global
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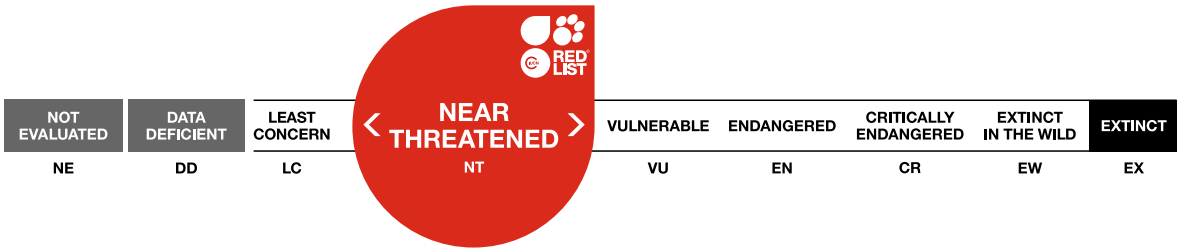
Pseudosinella azorica

Assessment by: Nunes, R. & Borges, P.A.V.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Entognatha	Collembola	Entomobryidae

Scientific Name: *Pseudosinella azorica* Gama, 1988

Assessment Information

Red List Category & Criteria: Near Threatened B1ab(iii)+2ab(iii) ver 3.1

Year Published: 2021

Date Assessed: March 31, 2018

Justification:

Pseudosinella azorica is an Azorean-endemic, cave-adapted species from the islands of Pico, S. Jorge, Terceira and S. Miguel (Azores, Portugal). It has a small Extent of Occurrence (EOO = 9,840 km²) and a very small Area of Occupancy (AOO = 48 km²). The species is relatively common and known from eleven subpopulations, in lava tubes of the four islands. The area surrounding some caves is heavily impacted by human activities. Further research is needed into its population, ecology and life history, and a habitat management plan is also needed, with one anticipated to be developed during the coming years. We also suggest future conservation measures the regular monitoring of the species (every ten years) and limiting access to the caves. Overall, the species has a restricted range, is experiencing an ongoing decline in habitat quality, and is found at a small number of locations. This number of locations, however, is not low enough to warrant listing under a threatened category. Therefore, *P. azorica* is assessed as Near Threatened.

Geographic Range

Range Description:

Pseudosinella azorica is an Azorean-endemic, cave dwelling springtail species known from Pico, S. Jorge, Terceira and S. Miguel islands (Azores, Portugal) (Borges *et al.* 2010). It is known from several caves and lava tubes in Pico (Furna dos Montanheiros, Gruta da Agostinha, Gruta do Henrique Maciel, Gruta do Soldão); in S. Jorge (Algar das Bocas do Fogo); in Terceira (Gruta das Agulhas, Gruta do Caldeira) and in S. Miguel (Gruta da Água de Pau, Gruta do Enforcado, Gruta do Esqueleto, Gruta do Pico da Cruz). The Extent of Occurrence (EOO) is *ca* 9,840 km² and the estimated Area of Occupancy (AOO) is 48 km².

Country Occurrence:

Native, Extant (resident): Portugal (Azores)

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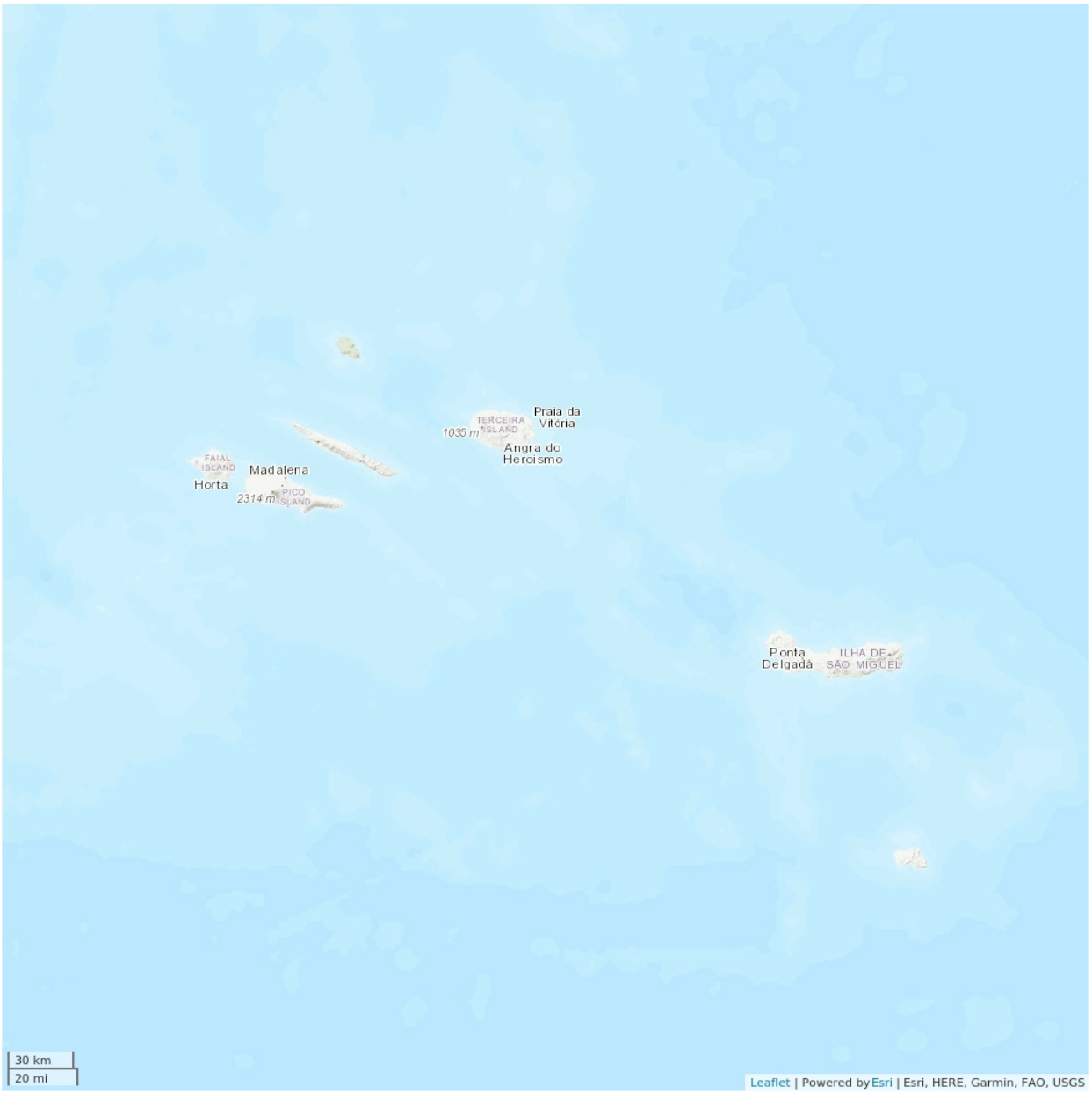
Distribution Map



Legend

EXTANT (RESIDENT)

Compiled by:

Azorean Biodiversity Group 2018

The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

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Population

No current population size estimates exist for this species, but it seems to be relatively widespread through several caves on four islands, with might indicate a stable population. It is possible that this species also occurs outside the caves.

Current Population Trend: Stable

Habitat and Ecology (see Appendix for additional information)

There is limited information regarding this species' ecology and life-history. It occurs in eleven volcanic caves, some in protected areas (Natural parks of Pico and Terceira) and others surrounded by disturbed habitats. *Pseudosinella azorica* was found in the dark and humid part of caves. Nevertheless, this species shows no obvious adaptations to a troglobiont life-style, and is likely an eutroglophile (i.e. epigean species able to maintain a permanent subterranean population).

Systems: Terrestrial

Threats (see Appendix for additional information)

The main current threats to this species are the degradation of its habitat quality due to human activities like agriculture, urbanisation and construction, and recreational cave visitation. There are also several future potential threats: climatic changes (Ferreira *et al.* 2016) that can change the conditions inside the caves, changes in the nearby infrastructures, changes in land use, potential human recreational activities with cave visitation, and geological events (volcanic activity and earthquakes).

Conservation Actions (see Appendix for additional information)

The species is not protected by regional law, although part of its habitat is in regionally protected areas (Natural Parks of Pico and Terceira). Land-use changes are one of the main current and future threats, and conservation and restoration measures should be extended beyond the caves. Further research is needed into its population, ecology and life history; and a monitoring plan for the invertebrate community is necessary in order to contribute to the conservation of this species. As a future conservation measure, the restriction of visits to the caves could be considered. A habitat management plan is needed and one is anticipated to be developed during the coming years.

Credits

Assessor(s): Nunes, R. & Borges, P.A.V.

Reviewer(s): Danielczak, A.

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Ferreira, M.T., Cardoso, P., Borges, P.A.V., Gabriel, R., Azevedo, E.B., Reis, F., Araújo, M.B. and Elias, R.B. 2016. Effects of climate change on the distribution of indigenous species in oceanic islands (Azores). *Climate Change* 138(3-4): 603-615.

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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?
7. Caves and Subterranean Habitats (non-aquatic) -> 7.1. Caves and Subterranean Habitats (non-aquatic) - Caves	Resident	Suitable	Yes

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	Minority (50%)	Rapid declines	Medium impact: 6
	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 -> 2.1.2. Small-holder farming	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.2. Wood & pulp plantations -> 2.2.1. Small-holder plantations	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.3. Livestock farming & ranching -> 2.3.2. Small-holder grazing, ranching or farming	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
4. Transportation & service corridors -> 4.1. Roads & railroads	Future	Minority (50%)	Rapid declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	Majority (50-90%)	Causing/could cause fluctuations	Medium impact: 6
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.3. Herbicides and pesticides	Ongoing	Minority (50%)	Very rapid declines	Medium impact: 7
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
10. Geological events -> 10.1. Volcanoes	Future	Majority (50-90%)	Very rapid declines	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.1. Species mortality		

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10. Geological events -> 10.2. Earthquakes/tsunamis	Future	Majority (50-90%)	Slow, significant declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Future	Majority (50-90%)	Slow, significant declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		
11. Climate change & severe weather -> 11.2. Droughts	Future	Majority (50-90%)	Slow, significant declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.1. Species mortality		

Conservation Actions in Place

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

Conservation Action in Place
In-place research and monitoring
Action Recovery Plan: No
Systematic monitoring scheme: No
In-place land/water protection
Conservation sites identified: No
Occurs in at least one protected area: Yes

Conservation Actions Needed

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

Conservation Action Needed
2. Land/water management -> 2.1. Site/area management
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.1. Legislation -> 5.1.3. Sub-national level

Research Needed

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

Research Needed
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology

Research Needed
2. Conservation Planning -> 2.2. Area-based Management Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Estimated area of occupancy (AOO) (km²): 48
Continuing decline in area of occupancy (AOO): No
Estimated extent of occurrence (EOO) (km²): 9840
Continuing decline in extent of occurrence (EOO): No
Number of Locations: 11
Continuing decline in number of locations: No
Lower elevation limit (m): 5
Upper elevation limit (m): 800
Population
Continuing decline of mature individuals: Unknown
Extreme fluctuations: Unknown
Population severely fragmented: Unknown
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes

The IUCN Red List Partnership

The IUCN Red List of Threatened Species™ is produced and managed by the IUCN Global Species Programme, the IUCN Species Survival Commission (SSC) and The IUCN Red List Partnership.

The IUCN Red List Partners are: Arizona State University; BirdLife International; Botanic Gardens Conservation International; Conservation International; NatureServe; Royal Botanic Gardens, Kew; Sapienza University of Rome; Texas A&M University; and Zoological Society of London.