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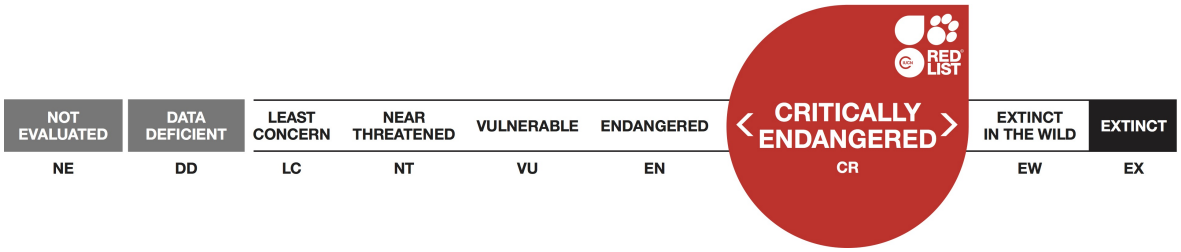
Tarphius floresensis, Ironclad Beetle

Assessment by: Borges, P.A.V. & Lamelas-López, L.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Insecta	Coleoptera	Zopheridae

Taxon Name: *Tarphius floresensis* Borges & Serrano, 2017

Synonym(s):

- *Tarphius wollastoni*

Common Name(s):

- English: Ironclad Beetle

Taxonomic Source(s):

Borges, P.A.V., Amormin, I.R., Terzopoulou, S. Rigal, F., Emerson, B.C. and Serrano, A.R.M. 2017. Cryptic diversity in the Azorean beetle genus *Tarphius* Erichson, 1845 (Coleoptera: Zopheridae): An integrative taxonomic approach with description of four new species. *Zootaxa* 4236(3): 401-449 DOI: http://dx.doi.org/10.11646/zootaxa.4236.3.1.

Taxonomic Notes:

Tarphius wollastoni in Borges (1990, p. 112) (Flores Isl.) *Tarphius wollastoni* in Borges (1991, p. 2) (Flores Isl.) *Tarphius wollastoni* in Borges *et al.* (2005, p. 207) (Flores Isl.) *Tarphius wollastoni* in Oromí *et al*. (2010, p. 232) (Flores Isl.) *Tarphius wollastoni* in Amorim *et al.* (2012, Fig. 2) (Flores Isl.)

Assessment Information

Red List Category & Criteria: Critically Endangered B1ab(i,ii,iii,iv,v) ver 3.1

Year Published: 2018

Date Assessed: April 5, 2017

Justification:

Tarphius florensis is a single-island endemic species restricted to Flores island (Azores, Portugal) (Borges *et al.* 2017). It has an extent of occurrence of 90 km² and an area of occupancy of 72 km². There is a continuing decline in the EOO, AOO, extent and quality of habitat as well as the number of mature individuals as a result of the invasions of non-native plants. The species occurs mainly in the soil of native forests, but also under the bark of endemic and exotic trees (e.g. *Cryptomeria japonica* and *Acacia* sp.). In the past, the species has probably strongly declined due to changes in habitat size. Therefore, we suggest as future measures of conservation: (1) a long-term monitoring plan of the species; and (2) control of invasive species, namely *Hedychium gardnerianum*. The species is assessed as Critically Endangered CR).

Geographic Range

Range Description:

Tarphius florensis is a single-island endemic species restricted to Flores island (Azores, Portugal) (Borges

et al. 2017), known from Natural Forest Reserves of Morro alto e Pico da Sé and Caldeiras Funda e Rasa. The extent of occurrence (EOO) is *ca* 90 km² and the maximum estimated area of occupancy (AOO) is 72 km².

Country Occurrence:

Native: Portugal (Azores)

Distribution Map

Tarphius floresensis

Range

Extant (resident)

Compiled by:

Paulo Borges

NE DD LC NT VU EN CR CRITICALLY ENDANGERED EW EX

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

The species is abundant, particularly in the well preserved patches of native forests of Flores island (Borges *et al.* 2017). A continuing decline in the number of mature individuals is inferred from monitoring schemes and from the ongoing habitat degradation due to invasions of alien plants (*Hedychium gardnerianum* and *Hydrangea macrophylla*) (Borges *et al.* 2017). This species is assessed here as severely fragmented as at least 50% of its population can be found in subpopulations that are 1) smaller than would be required to support a viable population, and 2) separated from other habitat patches by a large distance. In fact, the species occurs in fragments that are isolated in a matrix of pastures.

Current Population Trend: Decreasing

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

The species is particularly abundant, namely this species lives in the soil and occurring in some of the larger and well preserved patches of native forests of Flores island. It also occurs under the bark of endemic and exotic trees (Borges *et al.* 2017). This species has an altitudinal range between 300 and 1000 m. It is a nocturnal fungivorous species.

Systems: Terrestrial

Use and Trade

This species is not utilised.

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

In the past, the species has probably strongly declined due to changes in habitat size and quality (Triantis et al. 2010). Currently, the rapid advance and expansion of invasive plants species is the major threat (Borges et al. 2017), particularly *Hedychium gardnerianum* and Hydrangea macrophylla since are changing the habitat structure, namely decreasing the cover of bryophytes and ferns in the soil and promoting the spread of other plants. The management of *Cryptomeria japonica* plantations could be also a problem for the subpopulations living in this habitat. Based on Ferreira *et al.* (2016) the habitat will further decline as a consequence of climate change (increasing number of droughts and habitat shifting and alteration).

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

The species is not protected by regional law. Its habitat is in a regionally protected area (Natural Forest Reserves of Morro alto e Pico da Sé and Caldeiras Funda e Rasa, in Flores island). Degraded habitats should be restored with the removal of invasive species. A strategy needs also to be developed to address the future threat by climate change. A habitat management plan is needed and anticipated to be developed during the coming years. Since this species is an icon of the relict native Azorean forests, it is suggested that some awareness measures should be put in practice. Further research is needed into its ecology and life history in order to find extant specimens in more patches of native vegetation but also at lower elevation modified exotic forests and obtain information on population size, distribution and trends. It is also necessary an area-based management plan and a monitoring plan for the invertebrate community in the habitat in order to contribute to perform a species potential recovery

plan. Monitoring every ten years using the BALA protocol will inform about habitat quality (see e.g. Gaspar *et al.* 2011).

Credits

Assessor(s): Borges, P.A.V. & Lamelas-López, L.

Reviewer(s): Danielczak, A.

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External Resources

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?
1. Forest -> 1.4. Forest - Temperate	Resident	Suitable	Yes
14. Artificial/Terrestrial -> 14.3. Artificial/Terrestrial - Plantations	Resident	Suitable	No
0. Root -> 16. Introduced vegetation	Resident	Suitable	No

Threats

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

Threat	Timing	Scope	Severity	Impact Score
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Future	Whole (>90%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
11. Climate change & severe weather -> 11.2. Droughts	Ongoing	Whole (>90%)	Slow, significant declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality		
2. Agriculture & aquaculture -> 2.2. Wood & pulp plantations -> 2.2.1. Small-holder plantations	Ongoing	Minority (50%)	Causing/could cause fluctuations	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species (Hedychium gardnerianum)	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.2. Species disturbance		
8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species (Hydrangea macrophylla)	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.2. Species disturbance		

Conservation Actions in Place

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

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Conservation Actions in Place
In-Place Land/Water Protection and Management
Conservation sites identified: Yes, over part of range
Occur in at least one PA: Yes
Percentage of population protected by PAs (0-100): 71-80

Conservation Actions Needed

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

Conservation Actions Needed
2. Land/water management -> 2.1. Site/area management
2. Land/water management -> 2.2. Invasive/problematic species control
2. Land/water management -> 2.3. Habitat & natural process restoration
4. Education & awareness -> 4.1. Formal education
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.3. 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
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): 72
Continuing decline in area of occupancy (AOO): Yes
Extreme fluctuations in area of occupancy (AOO): Unknown
Estimated extent of occurrence (EOO) (km²): 90
Continuing decline in extent of occurrence (EOO): Yes

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Distribution
Extreme fluctuations in extent of occurrence (EOO): Unknown
Number of Locations: 10
Continuing decline in number of locations: Yes
Extreme fluctuations in the number of locations: Unknown
Lower elevation limit (m): 300
Upper elevation limit (m): 1000
Population
Continuing decline of mature individuals: Yes
Extreme fluctuations: Unknown
Population severely fragmented: Yes
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes
Generation Length (years): 1
Movement patterns: Not a Migrant

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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.