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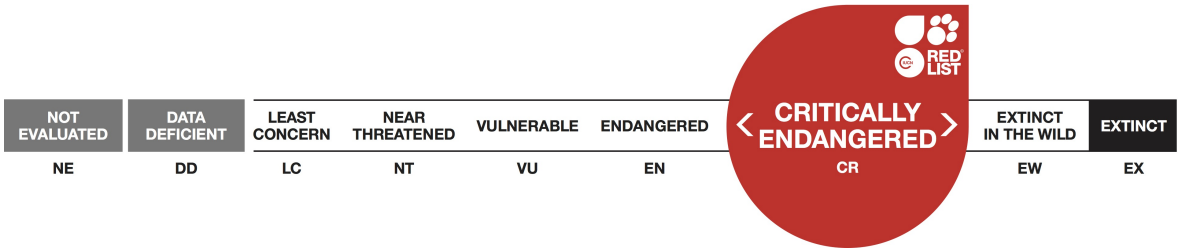
Scope: Global
Language: English

Calathus carvalhoi, Ground Beetle

Assessment by: Borges, P.A.V. & Vieira, V.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Insecta	Coleoptera	Carabidae

Taxon Name: *Calathus carvalhoi* Serrano & Borges, 1986

Common Name(s):

- English: Ground Beetle

Taxonomic Source(s):

GBIF. 2016. Global Biodiversity Information Facility database Data Portal. Available at: http://www.gbif.org/.

Identification Information:

Calathus carvalhoi was described from five individuals. A female (Holotype) was collected in Terra-Chã (Terceira island) in 15.X.1983-4.XI.1983 and deposited in the collection of A. Serrano. A male (Allotype) was collected in Terra-Chã (Terceira island) in 9.X.1983 and deposited in the collection of P. Borges. A male and two females (Paratypes) were collected in Terra-Chã (Terceira island) in 1.X.1984 and 9.X.1983, respectively, deposited in the collections of P. Borges and A. Serrano. According to morphology of aedeagus, *Calathus mollis* Marsh, is the closted species to *C. carvalhoi* Serrano & Borges, but according to the index, length: width of the pronotum, this species is more similar to *Calathus lundbladi* Colas (Serrano and Borges 1986).

Assessment Information

Red List Category & Criteria: Critically Endangered B1ab(i,ii,iii,v)+2ab(i,ii,iii,v) ver 3.1

Year Published: 2017

Date Assessed: July 16, 2016

Justification:

Calathus carvalhoi is endemic to Terceira (Azores, Portugal). It has a very small extent of occurrence (EOO = 4-8 km²) and area of occupancy (AOO = 4-8 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 only at one location (Terra Brava), since it is possibly considered extinct in Terra Chã. Therefore, we suggest as future measures of conservation: (1) regular monitoring of the species; and (2) control of invasive species namely *Hedychium gardnerianum*. Based upon the small geographic range of the species with only one location and continuing decline of its habitat area and quality, it is assessed as Critically Endangered.

Geographic Range

Range Description:

Calathus carvalhoi is a single island endemic species restricted to Terceira (Azores, Portugal) (Borges *et*

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al. 2010), known from Natural Forest Reserve of Terra Brava. The species is considered possibly extinct in Terra Chã. Its extent of occurrence (EOO) is 4-8 km² and its maximum estimated area of occupancy (AOO) is also 4-8 km².

Country Occurrence:

Native: Portugal (Azores)

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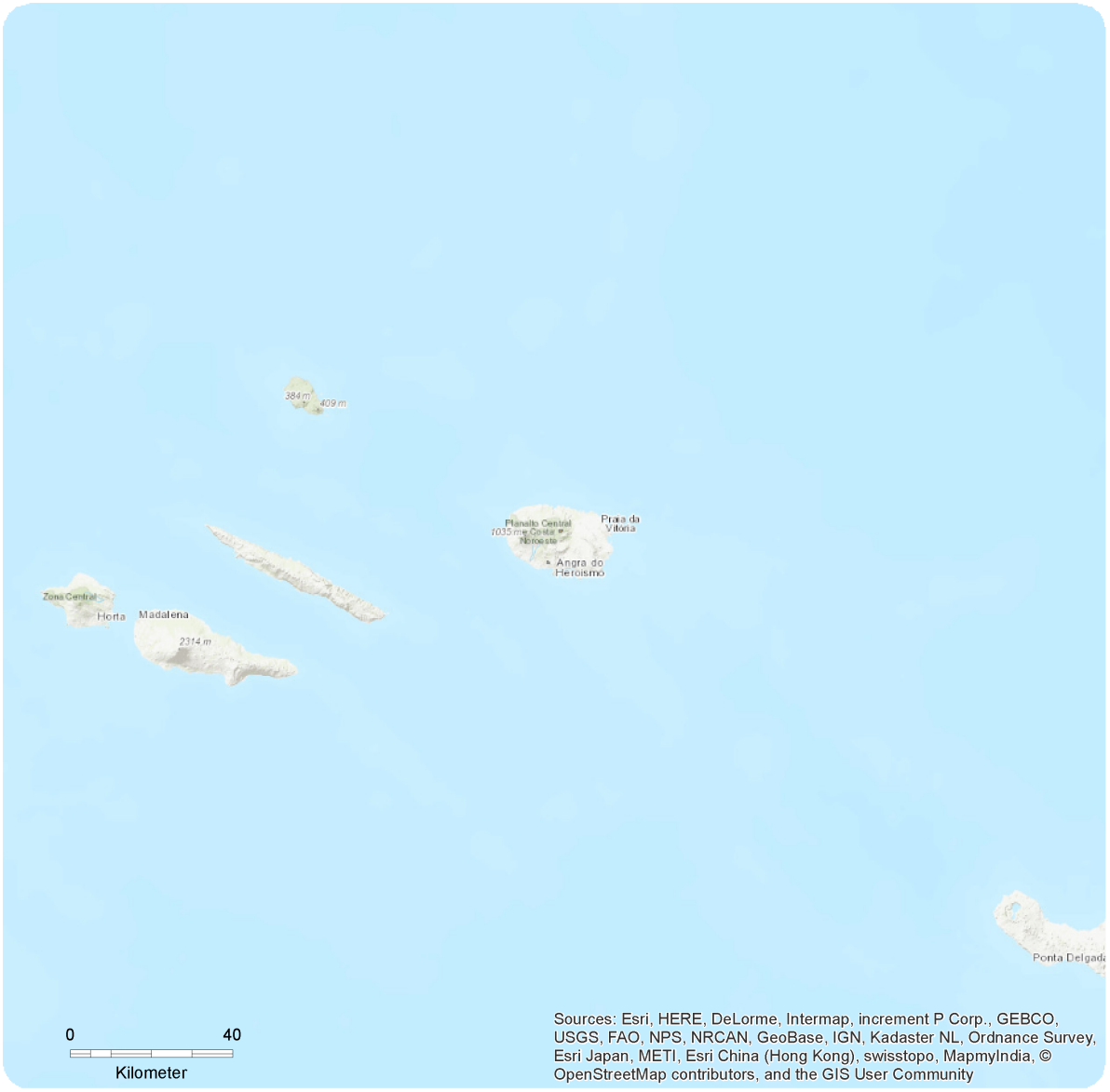
Distribution Map

Calathus carvalhoi



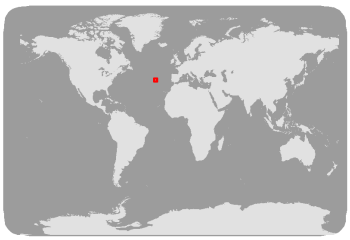
Range

Extant (resident)

Possibly Extinct

Compiled by:

Paulo Borges



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 very rare and only known from a single subpopulation. A continuing decline in the number of mature individuals is inferred from the ongoing recent habitat degradation due to invasions of alien plants.

Current Population Trend: Decreasing

Habitat and Ecology (see Appendix for additional information)

The species occurs in a native forests of the Azores (Terceira Island) dominated by *Ilex perado* ssp. *azorica*, *Laurus azorica* and *Juniperus brevifolia*, with an altitudinal range between 634 and 710 m. It is a night activity predator that lives under barks of native trees and in the soil.

Systems: Terrestrial

Use and Trade

The species is not utilised.

Threats (see Appendix for additional information)

In the past, the species has probably strongly declined due to deforestation. The species is considered extinct in Terra-Chã due to major historical land-use changes with clearing of original habitat. The most important ongoing threat to this species is the spread of invasive plants (*Hedychium gardnerianum*) that are changing the habitat structure. Based on Ferreira *et al.* (2016) the habitat will decline as a consequence of climate change (increasing number of droughts, and habitat shift and alteration), which may drive this species to extinction, because it is depending on humid forests. Since the Azores are located on the mid-Atlantic ridge, they are also prone to the effects of volcanoes and earthquakes with deleterious effects on the existing population.

Conservation Actions (see Appendix for additional information)

The species is protected by regional law (RAA 2012). Its habitat is in a regionally protected area (Natural Park of Terceira). The Terceira Natural Park administration is currently starting control measures of the invasive plants. Further spread of invasive plants needs to be stopped in order to avoid any future declines of the species. Degraded habitats should be restored and a strategy needs 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 restricted to the relict native Azorean forests, it is suggested that some awareness measures should be put in practice. Research is needed into its ecology and life history in order to learn about its current population size, distribution and trends. A general monitoring scheme for the invertebrate community in the habitat is in place, but the extant subpopulation of this particular species and its habitat in Terra Brava needs to be monitored in more detail. It is also necessary an area-based management plan for the species in Terra Brava. Monitoring every ten years using the BALA protocol will inform about habitat quality (Gaspar et al. 2011). Based on Borges *et al*. (2016) and Borges *et al*. (2017) the species is very rare and there is the need to invest in direct nocturnal surveys to evaluate the rarity status of the species.

Credits

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

Reviewer(s): Danielczak, A.

Contributor(s): Lamelas-López, L.

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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

Threats

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

Threat	Timing	Scope	Severity	Impact Score
10. Geological events -> 10.1. Volcanoes	Future	Whole (>90%)	Very rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
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 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
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 -> 2.2. Species disturbance		
2. Agriculture & aquaculture -> 2.2. Wood & pulp plantations -> 2.2.1. Small-holder plantations	Past, unlikely to return	Minority (50%)	Unknown	Past impact
	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 (Hedychium gardnerianum)	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		

Conservation Actions in Place

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

Conservation Actions in Place
In-Place Research, Monitoring and Planning

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Conservation Actions in Place
Action Recovery plan: No
Systematic monitoring scheme: Yes
In-Place Land/Water Protection and Management
Conservation sites identified: Yes, over entire range
Occur in at least one PA: Yes
Percentage of population protected by PAs (0-100): 91-100
Area based regional management plan: No
Invasive species control or prevention: Yes
In-Place Species Management
Harvest management plan: No
Successfully reintroduced or introduced beningly: No
Subject to ex-situ conservation: No
In-Place Education
Subject to recent education and awareness programmes: No
Included in international legislation: No
Subject to any international management/trade controls: No

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

Research Needed
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): 4-8
Continuing decline in area of occupancy (AOO): Yes
Extreme fluctuations in area of occupancy (AOO): Unknown
Estimated extent of occurrence (EOO) (km²): 4-8
Continuing decline in extent of occurrence (EOO): Yes
Extreme fluctuations in extent of occurrence (EOO): Unknown
Number of Locations: 1
Continuing decline in number of locations: No
Extreme fluctuations in the number of locations: No
Lower elevation limit (m): 634
Upper elevation limit (m): 710
Population
Continuing decline of mature individuals: Yes
Population severely fragmented: No
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

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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.