

Emerging from Presumed Extinction: Updated Distribution and Conservation of *Uromenus annae* (Targioni-Tozzetti 1881), Endemism of Sardinia (Orthoptera, Tettigoniidae) [†]

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Abstract: *Uromenus annae* (Targioni-Tozzetti 1881) was listed as NT (Near Threatened) by IUCN in the Red List of European Orthoptera, possibly extinct since no individuals were collected in the last half century. The finding of a living couple in 2018 renewed the attention on the species, resulting in the male calling song description [1] and further scattered collections. The newest results instigated local institutions to pursue field research with the aim of understanding the distribution and ecology of the species, outline current threats and propose conservation actions.

Keywords: Endemism; extinction; species conservation; IUCN

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1. Introduction

After its description, *Uromenus annae* (Targioni-Tozzetti 1881), handsome Bradyporinae endemic from Sardinia, has passed more than a century through apparent disappearance, scattered collectings, redescription [2], generic name change [3] and an assessment as NT (Nearly Threatened) by IUCN [4]. Collecting of a living male and female from Crastazza in 2018 allowed the recording of the male calling song [1] and instigated a research plan led by the Fondazione Museo Civico di Rovereto (FMCR), with local institutions cooperating i.e. CNR IRET of Sassari, section of Entomology of the Department of Agriculture of the University of Sassari, Regional Agency FoReSTAS (Territorial Service of Nuoro) and World Biodiversity Association.

In 2019 and 2020 field surveys have been conducted, aiming to find more specimens in the known localities and to investigate new areas of possible presence.

2. New Distributional Data

Sardegna, Mamone (NU), Crastazza, 800 m, 40°35'42"N 9°24'30,7"E, 23 August 2020, 8 female, (6 CNR-IRET, 2 FMCR), leg. Buzzetti, Fiori, Loru; idem, 29 August 2020, 1 female, (CNR-IRET).

Sardegna, Torpè, Usinavà, August 2019, 1 female field observation (FoReSTAS), Figure 1, star 1 in Map 1.

Sardegna, Supramonte di Orgosolo, Foresta Demaniale di Montes, Punta Mandra de

Caia, 1300 m, 40°06'45.2"N 9°22'05.2"E, 1 female field observation (FoReSTAS), Figure 2, star 2 in Map 1.

Sardegna, Supramonte di Orgosolo, Foresta Demaniale di Montes, Località Campu Costaria, 1000m, 40°09'32.5"N 9°26'28.7"E, 1 November 2020, 1 female field observation (M. Manca, FoReSTAS), Figure 3, star 3 in Map 1.



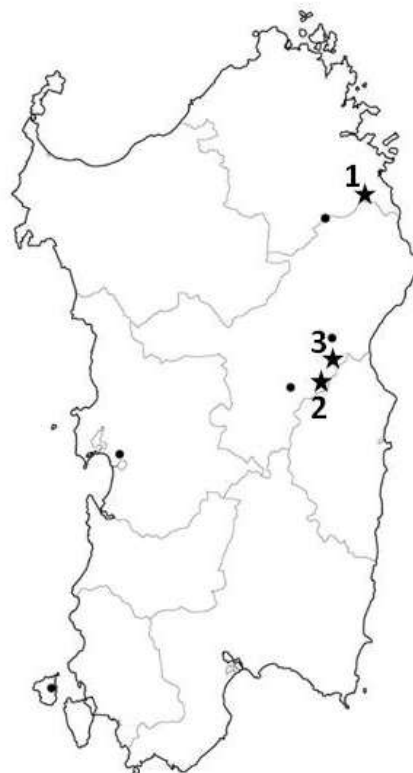
Figure 1. *Uromenus annae*, female from Usinavà (Picture FoReSTAS).



Figure 2. *Uromenus annae*, female from Foresta di Montes, Punta Mandra de Caia (Picture FoReSTAS).



Figure 3. *Uromenus annae*, female from Foresta di Montes, Campu Costaria (Picture FoReSTAS).



Map 1. Old (circle) and new (star) findings of *Uromenus annae*. For detailed previous localities, see [1].

3. Discussion

The new findings of *Uromenus annae* in new localities of Sardinia (Map 1) allow considerations on the distribution of the species. As assumed by [1], the presence of *U. annae* in Sardinia is more ample than thought before only on the basis of the description data. The current distribution is characterized by scattered subpopulations (according IUCN, populations that are so isolated that it is very unlikely or impossible any genetic interchange), these subpopulations constituting a metapopulation sensu [5].

After repeated surveys in known (new and old) sites of finding, the locality Crastazza resulted the one where have been found more specimens and more often, so it has to be considered as a stronghold of actual distribution of the species.

New findings of this species that, although stated as still existing in the nature, was so disappeared that even was supposed to be extinct by some specialists, demonstrates that extinct species of plants and animals can sometimes “resurrect” if actively searched in the field, as reported for *Zeuneriana marmorata* in NE Italy and Slovenia [6].

The finding of a living female in early November 2020 shows that the phenology of the species can last until mid Autumn, longer than previously supposed, while the various dwelling habitats are different but all grassy or shrubby, not arboreal.

Bioacoustic and genetic comparison between subpopulations can help in understanding the similarity of songs and history of population spreading in the region.

Uromenus annae could be a flagship of animal conservation in Sardinia. A regional workshop about this species and its situation with the participation of institutions, protected areas managers, government agencies, specialists and citizens could be organized with the aim of awakening public awareness.

The pictures presented in the present paper, although of not perfect quality, are undoubtedly identifiable as *U. annae*. Being the pictures made by non professional researchers, these are the reliable proof that “citizen science” can contribute to animal study.

Coordinated actions involving institutions (e.g. monitoring subpopulation size and extension) could add more data not only on the distribution of the species, but also on possible threats. These would be the preliminary steps to assess the state of this endemism and study active conservation actions. The ex situ (in institutional labs) and in situ (in the field) rearing could disclose the bioecology of *U. annae*, being this a key factor in species conservation.

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References

1. Buzzetti F.M.; Brizio C.; Fontana P; Massa B. A new voice from Sardinia: *Uromenus annae* (Targioni-Tozzetti, 1881 (Insecta: Orthoptera: Tettigoniidae: Bradyporinae: Ephippigerini). *Zootaxa*, **2019**, Vol 4560, 2: 311-320. DOI: <http://dx.doi.org/10.11646/zootaxa.4560.2.4>
2. Fontana P.; Buzzetti F. M. On the Identity of *Ephippigera annae* Targioni –Tozzetti, 1881 (Insecta Orthoptera Tettigoniidae). *Atti Acc. Rov. Agiati*, a. 251, **2001**, ser. VIII, vol. I, B: 53-66.
3. Barat, J. Revision preliminar de los géneros de Ephippigerini Brunner Von Wattenwyl, 1878 (Orthoptera, Tettigoniidae, Bradyporinae). *Boletín de la Sociedad Entomológica Aragonesa*, **2012**, 50, 1–71.
4. Buzzetti, F.M.; Hochkirch, A.; Massa, B.; Fontana, P.; Kleukers, R.; Odé, B. *Uromenus annae*. The IUCN Red List of Threatened Species 2016: <https://doi.org/10.2305/IUCN.UK.2016-3.RLTS.T47692483A47692497.en>.
5. Hambler, C. Conservation; Cambridge University Press. Cambridge, UK, 2004, 368 pp.
6. Buzzetti, F.M.; Bardiani, M.; Leandri, F. Managing protected areas benefits: new findings of *Zeuneriana marmorata*, endangered species as listed in IUCN Red List. (Insecta: Orthoptera). Proceedings of The 1st International Electronic Conference on Entomology, MDPI, online, 1st–15th July 2021.