

Short scientific noteSubmitted: February 14th, 2020 - Accepted: March 18th, 2020 - Published: April 15th, 2020**Rediscovery of a species considered to be extinct in the Pollino massif (Calabria, Italy): *Erebia gorge* (Hübner, [1804]) (Lepidoptera: Nymphalidae)**Sandro PIAZZINI¹, Leonardo FAVILLI^{1,*}¹ Dipartimento di Scienze Fisiche della Terra e dell'Ambiente - Via Mattioli 4, I-53100 Siena, Italy - piazzini5@unisi.it; leonardo.favilli@unisi.it

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Abstract

After about 40 years, the presence of *Erebia gorge* (Hübner, [1804]) has been reconfirmed in the Pollino massif (Calabria, Italy). In July 2019, two specimens (1 ♂ and 1 ♀) were captured in the zone of Monte Pollino cliffs on the east face of the massif at a height of 1990 m. Given the isolation of the population at the southernmost limit of the species' range, and the fact that this population is seriously threatened by global climate change, it would be of great value to conduct an exhaustive study of the distribution of the species throughout Pollino and of the genetic characteristics of this local population that could differ substantially from other Italian and European populations.

Key words: Lepidoptera, *Erebia gorge*, rediscovery, Pollino, Calabria, Italy.**Introduction**

Erebia gorge (Hübner, [1804]) is a species widespread in Europe but localised in the main mountainous regions: Cantabrians, Pyrenees, Alps, central Apennines, the mountains of the Balkan Peninsula as far as Albania, the Carpathians and the Tatras (Tshikolovets 2011; Varga 2014). As with most of the species belonging to the genus *Erebia*, *E. gorge* is an orophilous species, found in rocky areas and screes with herbaceous xerophilous vegetation and plants favoured by caterpillars, mostly including species of the genera *Poa*, *Sesleria* and *Festuca* (Balletto et al. 2007).

In Italy, *E. gorge* is commonly found in the Alps and Maritime Alps eastwards as far as the Julian Alps whilst on the peninsula, three unconnected populations exist in the Apuane Alps (Tuscany), along the central Apennines from the Sibillini mountains to the Maiella and in the Pollino (Balletto et al. 2007; Villa et al. 2009). In this last area, the species was found for the first time towards the end of the 1970's along the escarpment above the Gaudolino plain (Gallo & Della Bruna 1977) and the top of Monte Pollino (at 2200 m) (Balletto et al. 1977). However, subsequent research has not confirmed this, meaning the species is considered extinct (Scalercio et al. 2006; Scalercio 2014; Balletto et al. 2016).

During 2018 and 2019 a member of our research team (S. Piazzini), has conducted accurate research on the rhopaloceran fauna of the Calabrian side of the National Park of Pollino. The Environmental and Territorial Department

of the Region of Calabria and the National Park of Pollino has promoted this study of the species of insects present in the areas protected by Natura 2000, which are of particular interest to the European Community.

This research, as well as enabling the collection of substantial data relating to a considerable number of species, has led to the rediscovery of *E. gorge*.

Material and methods*Study area*

The Calabrian side of the Pollino National Park extends over 103915 hectares of the 192565 hectares that are protected, part of which are in Basilicata. It is a vast territory within the province of Cosenza reaching from – in the north – the top of the valley of the River Lao (Laino Borgo) and from the Ciagola mountain range, as far as the ridge of Pollino range to the Orsomarso mountains in the south between Orsomarso and Serra La Vriglia at Belvedere Marittimo. This sparsely populated area extends from 125 m above sea level in the lower valley of the Raganello creek in Francavilla Marittima (Cosenza) to 2267 m at the highest summit of the Pollino-The Serra Dolcedorme.

Geologically, the substrate consists almost entirely of limestone originating from three carbonate deposits that of Lungro-Verbicaro, of Pollino-Ciagola and that of Cetraro (Iannace et al. 2005; 2007).

As far as vegetation is concerned, the area is largely



Fig. 1 – *Erebia gorge* (Hübner, [1804]): Monte Pollino, cliffs (Morano Calabro, Cosenza), 1 ♂, S. Piazzini leg., 9 Jul 2019 (Photo by S. Piazzini).

covered by forest; above 1300-1400 m mesophilic and microthermic beech, between 1300 m and 700 m mesophilic woods (mixed deciduous forest, oak, downy oak) and below 600-700 m by mediterranean scrub. There are also extensive grasslands from high mountain xeric pasture to mesophilic mountain pastures; from low meadows to rock vegetation. Of particular interest are the stands of coniferous trees at high altitude, mostly on the ridges and the steepest slopes with rocky substrate with present of the common juniper (*Juniperus communis*) and sporadic examples of Bosnian pine (*Pinus heldreichii*) (Avena & Bruno 1975; Gargano et al. 2012).

Sampling methods - Between July 2018 and August 2019, lepidopteran samples were identified in 120 different areas. They were observed during the hours of peak activity (between midday and 4 pm), in dry conditions and with a wind factor between 0 and 2 on the Beaufort Scale (Pollard & Yates 1993), with the help of an entomological net.

All the butterflies captured were identified on site and released immediately.

Results and discussion

Of the 120 areas visited, only 14 proved to be potentially suitable habitats for the species (Tab. 1). On 9 Jul 2019, on

Monte Pollino cliffs (province of Cosenza), on the eastern side of the mountain at 1900 m (geographic coordinates: 39.902N, 16.180E) and included in the SAC IT9310004 Rupi del Monte Pollino, in conditions made difficult by the steep rockface, a male example of *E. gorge* (Fig. 1) was captured. A 40 minute search was made in the area for other examples, during which just one other example of a female specimen, was captured. In all the other potentially hospitable areas, no other specimens were found.

Our findings show that after almost forty years since the last sightings, *E. gorge* continues to survive on the Pollino. From currently available data, the population is isolated and consists of just a few individuals limited to an extremely reduced area (about 2 hectares) characterized by alpine juniper (*Juniperus communis* subsp. *alpina*), sporadic Bosnian pine (*Pinus heldreichii*) and grasslands. Considering the isolation of the population, which is situated in the southern limit of the geographic range of the species, and considering the fact that this population is seriously threatened by global climate changes (Scalercio et al. 2006), it would be desirable to promote an exhaustive study on the effective distribution of *E. gorge* throughout the Pollino (the Lucanian side is not included in this research) and on the genetic characterization of the population, which could consistently differentiate from other Italian and European populations.

Table 1 – Potentially hospitable areas visited and presence of *Erebia gorge* (Hübner, [1804]).

Locality	Geographic coordinates	Altitude	Date	Presence
Monte Sparviere, near the summit (Cerchiara di Calabria, Cosenza)	39.917N, 16.359E	1718 m	25 Jun 2019	—
			15 Jul 2019	—
Serra del Prete, slope S (Morano Calabro, Cosenza)	39.911N, 16.162E	2000 m	26 Aug 2018	—
			26 Jun 2019	—
			9 Jul 2019	—
			24 Jul 2019	—
Serra del Prete, near the summit (Morano Calabro, Cosenza)	39.917N, 16.157E	2170 m	26 Aug 2018	—
			26 Jun 2019	—
			9 Jul 2019	—
			24 Jul 2019	—
Monte Pollino, 750 m at SSE (Castrovillari, Cosenza)	39.899N, 16.189E	1975 m	26 Aug 2018	—
			14 Jun 2019	—
			26 Jun 2019	—
			9 Jul 2019	—
			24 Jul 2019	—
Monte Pollino, cliffs (Morano Calabro, Cosenza)	39.902N, 16.180E	1990 m	26 Aug 2018	—
			14 Jun 2019	—
			26 Jun 2019	—
			9 Jul 2019	1 ♂, 1 ♀
			24 Jul 2019	—
Monte Pollino, near the summit (Castrovillari, Cosenza)	39.904N, 16.188E	2230 m	26 Aug 2018	—
			14 Jun 2019	—
			26 Jun 2019	—
			9 Jul 2019	—
			24 Jul 2019	—
Serra Dolcedorme, ridge S (Castrovillari, Cosenza)	39.887N, 16.224	2050 m	8 Aug 2018	—
			14 Jun 2019	—
			27 Jul 2019	—
			13 Aug 2019	—
Serra Dolcedorme, near the summit (Castrovillari-Cerchiara di Calabria, Cosenza)	39.892N, 16.216E	2260 m	8 Aug 2018	—
			14 Jun 2019	—
			27 Jul 2019	—
			13 Aug 2019	—
Timpa of Vallepiana (Castrovillari, Cosenza)	39.895N, 16.207E	2140 m	8 Aug 2018	—
			14 Jun 2019	—
			27 Jul 2019	—
			13 Aug 2019	—
Serra delle Ciavole, ridge S (Cerchiara di Calabria, Cosenza)	39.907N, 16.219E	2000 m	27 Jul 2018	—
			8 Aug 2018	—
			6 Sep 2018	—
			14 Jun 2019	—
			27 Jul 2019	—
			9 Aug 2019	—
Serra delle Ciavole, near the summit S (Cerchiara di Calabria, Cosenza)	39.910N, 16.218E	2100 m	27 Jul 2018	—
			8 Aug 2018	—

continued

Locality	Geographic coordinates	Altitude	Date	Presence
Monte Manfriana, near the summit (Castrovillari-Frascineto, Cosenza)	39.875N, 16.247E	1975 m	6 Sep 2018	—
			14 Jun 2019	—
			27 Jul 2019	—
			9 Aug 2019	—
			26 Aug 2018	—
			26 Jun 2019	—
			9 Jul 2019	—
Monte Manfriana, the Afforcata (Castrovillari, Cosenza)	39.874N, 16.245E	1900 m	24 Jul 2019	—
			13 Jul 2019	—
			27 Jul 2019	—
			8 Jul 2019	—
Timpa of Principe (Frascineto, Cosenza)	39.868N, 16.269E	1738 m	25 May 2019	—
			13 Jul 2019	—
			27 Jul 2019	—
			10 Aug 2019	—

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