

Monitoring invertebrates included in the Habitats Directive in South Tyrol: First results and future strategies.

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Introduction

The Birds Directive (2009) and the Habitats Directive (1992) require Member States, as well as their autonomous regions and provinces, to report on protected species every six years. The fifth Habitats Directive report planned for 2025 mandates detailed data on distribution ranges, population trends, and conservation measures for species listed in Annexes II, IV and V.

In this context, the “Species Monitoring” project was launched in 2023, bringing together regional partners such as the University of Bolzano, the Museum of Nature South Tyrol, Eurac Research, and the Office of Nature of the Autonomous Province of Bolzano-South Tyrol, which acts as the project coordinator. The primary aim of this project is to monitor and update the distribution of species listed in the two directives, filling knowledge gaps and taking the first steps towards the development of a long-term monitoring strategy for their conservation in South Tyrol. This contribution will outline the initial results of the project, focusing on invertebrate species listed in the Habitats Directive.

Monitoring and first results

Butterflies

Butterfly species listed in the Habitats Directive are monitored across various sites in South Tyrol and include *Euphydryas aurinia* monitored at three sites and *Parnassius apollo* and *Phengaris arion* monitored at four sites. These locations were selected before the “SpeciesMonitoring” project began, based on existing knowledge of the species presence and the availability of suitable larval habitat (Figure 1). Additional sites will

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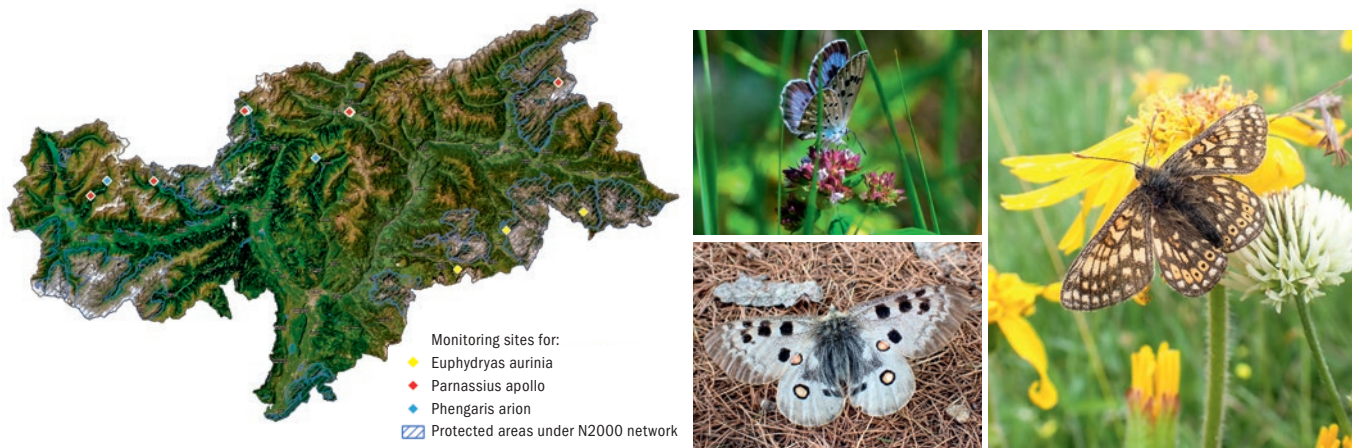


Figure 1: Monitoring sites within the SpeciesMonitoring project for the three butterfly species; *Phengaris arion* © E. Repetto, *Parnassius apollo* and *Euphydryas aurinia*, © A. Marsy (from top to bottom and left to right)



Figure 2: *Vertigo moulinsiana* found in upper vegetation during the monitoring of the Castelfeder sites. © A. Marsy

be identified and included in the coming years to increase the number of monitoring locations. The entire study area was monitored exhaustively over a set time interval (which varies depending on the site). Following national recommendations (STOCH et al. 2016), monitoring is carried out in the selected sites for two consecutive years. While most focus is on adults, larval habitats are also investigated to assess habitat conservation status. The two-year monitoring cycle has been completed only for *Euphydryas aurinia*, confirming a single population in Val Gardena, with 5 and 6 adult individuals observed in 2023 and 2024, respectively.

Snails/Vertigo

Four *Vertigo* species included in the Habitats Directive occur in South Tyrol: *Vertigo moulinsiana*, *V. angustior*, *V. genesii*, and *V. geyeri*, with the latter two being exclusive to South Tyrol within Italy. Monitoring efforts carried out so far (in 2023 and 2024) involved sampling of 13 sites with known *Vertigo* occurrences (KISS et al. 2011); additional sites will be surveyed in the future. The methodology, following German national recommendation (BFN 2017), included collecting four litter samples from suitable microhabitat at each site and analyzing them in the laboratory. Only *V. moulinsiana* (Figure 2) was monitored by visual survey along a 30 m transect. (MOORKENS et al. 2011; KSIĄŻKIEWICZ-PARULSKA et al. 2017). *Vertigo* species were confirmed at 9 of the 13 surveyed sites. Individual densities varied greatly depending on the site and species.

Beetles

In 2023, *Osmoderma eremita* and *Cerambyx cerdo* populations at the Castelfeder site were monitored following standardised protocols (CAMPANARO et al. 2011; MAURIZI et al. 2017; REDOLFI DE ZAN et al. 2017a) and ISPRA recommendations (STOCH et al. 2016). The use of pheromone traps for *O. eremita* and mainly visual encounter surveys for *C. cerdo*



Figure 3: From left to right: *Osmoderma eremita* ©G. V. Mörl, *Cerambyx cerdo* and pheromone trap for *O. eremita* monitoring at Castelfeder © A. Marsy.

(Figure 3) resulted in the detection of 6 and 42 individuals, respectively, which underlines the site’s significance for their conservation. In 2024, the expert entomologist Georg von Mörl assisted in discovering a new *O. eremita* population near Brixen/Bressanone during an explorative survey using pheromone traps.

Other species

Further directive invertebrate species with well-documented distributions are present in South Tyrol, such as *Lucanus cervus*, *Helix pomatia*, and *Euplagia quadripunctaria*. For these species, most records were obtained and validated through citizen science initiatives and the online platform iNaturalist, further enriching the distribution data. This approach proved effective: in 2024 alone, 38 new records of *Lucanus cervus* were collected through these channels.

Conclusions

These preliminary findings underscore the importance of continued monitoring and conservation efforts for invertebrate species listed in the Habitats Directive. The “Species Monitoring” project provides crucial baseline data that will contribute to the 2025 Habitats Directive report.

References

- BFN, 2017: Bewertungsschemata für die Bewertung des Erhaltungsgrades von Arten und Lebensraumtypen als Grundlage für ein bundesweites FFH-Monitoring. Teil I: Arten nach Anhang II und IV der FFH-Richtlinie. BfN Schriften, 480. [Accessed 19.03.2025]. Available at: <https://www.bfn.de/publikationen/bfn-schriften/bfn-schriften-480-bewertungsschemata-fuer-die-bewertung-des>
- CAMPANARO A., BARDIANI M., SPADA L., CARNEVALI L., MONTALTO F., ANTONINI G., MASON F. & AUDISIO P., 2011: Linee guida per il monitoraggio e la conservazione dell'entomofauna saproxilica. Quaderni Conservazione Habitat, 6, Cierre Grafica, Verona, 218 pp.
- KISS Y. & KOPF T., 2011. Die *Vertigo*-Arten (Gastropoda: Vertiginidae) des Anhang II der FFH Richtlinie in Südtirol: 3. Erhebungsjahr (2010). Gredleriana, 11: 115–144.
- KSIĄŻKIEWICZ-PARULSKA Z. & GOŁDYN B., 2017: Can you count on counting? Retrieving reliable data from non-lethal monitoring of micro-snails. Perspectives in Ecology and Conservation, 15: 124–128. <https://doi.org/10.1016/j.pecon.2017.03.005>
- MAURIZI E., CAMPANARO A., CHIARI S., MAURA M., MOSCONI F., SABATELLI S., ZAULI A., AUDISIO P. & CARPANETO G. M., 2017: Guidelines for the monitoring of *Osmoderma eremita* and closely related species. Nature Conservation, 20: 79–128. <https://doi.org/10.3897/natureconservation.20.12658>
- MOORKENS E. & KILLEEN I., 2011: Monitoring and condition assessment of populations of *Vertigo geyeri*, *Vertigo angustior* and *Vertigo moulinsiana* in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
- REDOLFI DE ZAN L., BARDIANI M., ANTONINI G., CAMPANARO A., CHIARI S., MANCINI E., MAURA M., SABATELLI S., SOLANO E., ZAULI A., PEVERIERI G. S. & ROVERSI P. F., 2017: Guidelines for the monitoring of *Cerambyx cerdo*. Nature Conservation, 20: 129–164. <https://doi.org/10.3897/natureconservation.20.12703>
- STOCH F. & GENOVESI P. (eds.), 2016: Manuali per il monitoraggio di specie e habitat di interesse comunitario (Direttiva 92/43/CEE) in Italia: specie animali. ISPRA, Serie Manuali e Linee Guida.