

Data Paper

Spider assemblages (Arachnida, Araneae) in five common pastures in the Black Forest Biosphere Reserve (Baden-Württemberg, Germany)

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Introduction

Spiders were sampled with pitfall traps from April to June 2021 and August to September 2021 in five common pastures, locally known as Allmendweiden, in the Black Forest Biosphere Reserve located in the southern Black Forest. These extensively used grasslands are characterised by a structurally rich composition of dry and moist mat-grass meadows and dwarf shrub heaths in the montane to subalpine zone. Pitfall traps with an opening diameter of 65 mm were filled with 5 % acetic acid as a capture preservative with a drop of detergent to dissolve the surface tension. A total of 180 traps were placed in 30 different plots in representative locations of appr. 2,000 m² within the five pasture areas. Six pitfall traps were installed in two rows in each plot, with 5 m distance in between. The traps were operated for a total of 84 days and emptied every two weeks. Samples from each plot row were pooled. Identification of spider specimen was conducted using Nentwig et al. (2024), Oger (2024), Heimer & Nentwig (1991), Roberts (1987), Grimm (1985) and Le Peru (2011). The dataset contains 12,536 (9,877 adult) spiders representing 149 species from 21 families. Two records of single specimens of species that have not yet been recorded in Baden-Württemberg were found: *Improphantes improbulus* (Linyphiidae) and *Lathys heterophthalma* (Dictynidae). Several other species are remarkable due to their conservation status or rarity, at least in Baden-Württemberg. Notable examples are *Peponocranium orbiculatum* (Linyphiidae), *Pardosa bifasciata*, *Pardosa nigriceps*, *Arctosa figurata* (Lycosidae), *Pellenes tripunctatus* and *Talavera thorelli* (Salticidae). All of these species prioritise xerothermic open habitats. The spiders were the by-catch of the project „Allmendweiden im Biosphärengebiet Schwarzwald – Insektendiversität, Struktur-reichtum und Folgerungen für das Management“ (unpublished report of Harry et al. 2021) carried out on behalf of the Black Forest Biosphere Reserve Office of the Regional Council of Freiburg and funded by the Foundation Nature Conservation Fund Baden-Württemberg. As part of a master thesis of M. Schindler (2025), the spiders were identified and the (dis)similarity among the spider assemblages of different habitat types within the pastures was analysed.

Keywords: conservation, diversity, dry grassland, grazing, heaths, montane, new records, sub-alpine

Metadata

Data set identity. Data on spider assemblages (Arachnida, Araneae) in five common pastures in the southern Black Forest, Baden-Württemberg, Germany

Overall project description

Objectives of original study. 1. Assess the diversity and structure of spider assemblages in five common pastures in the Black Forest Biosphere Reserve. 2. Analyse the influence of management, habitat characteristics and vegetation structure and identify habitat types relevant to spiders. 3. Contribute to an evaluation of the conservation status and potential of the common pastures. 4. Identification of vegetation structures from drone images and comparison with habitat structures/types surveyed in situ.

Principal Investigator. Matthis Schindler, M. Sc.

Involved persons. Julian Eberhardt, M. Sc., Dr. Hubert Höfer

Data Source Institution. Staatliches Museum für Naturkunde Karlsruhe (SMNK), Germany

Period of study or time extent. 21./22.04.2021 to 16.06.2021, 19./20.08.2021 to 16.09.2021

Survey design

Site description. The study areas are located in the Black Forest Biosphere Reserve (established in 2017), in the southern part of the Black Forest (Baden-Württemberg, Germany). The five common pastures are allocated to either their neighbouring settlement (Herrenschwand, Menzenschwand, Tunau) or local points of interest (Kresselberg, Ungendwieden). In each pasture a large number of habitat characteristics (such as exposition, inclination, altitude, thermal class, soil humidity, nutrient availability, livestock and grazing intensity) and many variables of vegetation structure were assessed in each plot (Harry et al. 2021). A total of 30 plots were examined, distributed across four to seven plots per study area (see Table 1).

Table 1: Characteristics of our study areas (Lat/Long - coordinates in decimal degrees, WGS 84; Alt - altitude in standard elevation zero)

Study area/ Pasture	Size	Lat	Long	Alt	Habitat types/ Vegetation	Management
Herrenschwand (6 plots)	49 ha	47.7684	7.9451	990 – 1120	mostly dry grassland	Rotation pastures of 5-15 ha, cattle
Kresselberg (7 plots)	31 ha	47.8132	7.9277	815 – 870	mostly heaths	20 ha sheep meadow and large rotation pas- tures
Men- zenschwand (7 plots)	45 ha	47.8360	8.0695	900 – 1045	dry & wet grassland, heaths	Rotation pastures of 1-4 ha, goats
Tunau (4 plots)	24 ha	47.7815	7.9187	710 – 840	mostly dry grassland	Rotation pastures of 3-4 ha, goats, cattle
Ungendwieden (6 plots)	55 ha	47.8501	7.9029	980 – 1080	mostly dry grassland	Rotation pastures of 2-5 ha, cattle

Methods of data collection. The pitfall traps (plastic cups, white) had an opening diameter of 65 mm and were filled with 5 % acetic acid as a preserving liquid with a drop of detergent to reduce the surface tension. The traps were protected against rain and flying insects by transparent roofs. Traps were emptied at fourteen-day intervals during trapping periods. The first period commenced on 21-22 April and concluded on 16 June 2021, while the second period spanned from 19-20 August to 16 September 2021, coinciding with the late summer/autumn season. In each of the 30 sampling areas, six traps were placed at a representative location within the plot in two rows of three traps, with 5 m distance between both rows and traps. Catches from the six pitfall traps in each row were pooled after sampling.

Methods of sample processing, storage and identification. Spiders were sorted out from original samples by Ingmar Harry and were subsequently stored in 75 % ethanol. Adult spiders were identified to species level, if possible, by M. Schindler, with some help from J. Eberhardt,

H. Höfer and F. Meyer, using Nentwig et al. (2024), Oger (2024), Grimm (1985), Heimer & Nentwig (1991), Roberts (1987) and Le Peru (2011). Nomenclature follows the World Spider Catalog (WSC 2024).

Vouchers/Material deposited. Voucher specimens are in the collections of the State Museum of Natural History Karlsruhe SMNK-ARA and SMNK-STUD.

Significance of data set. The data was used in a master thesis assessing the spider communities of the common pastures (Schindler 2025). As previously unidentified by-catch for the diversity analysis of Harry et al. (2021), the species and distribution lists add to the conservation status of the common pastures. Sample completeness, species richness and diversity were remarkably high in all five pastures. The spider assemblages of the plots corresponded with four previously defined habitat types by Harry et al. (2021) with a high degree of clarity. Additionally, the study provides records of several rarely or previously undocumented species in Baden-Württemberg: *Improphantes improbulus*, Linyphiidae (first record), *Lathys heterophthalma*, Dictynidae (first record), *Peponocranium orbiculatum* (Linyphiidae), *Pardosa bifasciata*, *Pardosa nigriceps*, *Arctosa figurata* (Lycosidae), *Pellenes tripunctatus*, *Talavera thorelli* (Salticidae).

DATA SET STATUS AND ACCESSIBILITY

STATUS

Data submitted: 2025-08-05, **Data accepted:** 2025-08-20

Academic editor: Tobias Bauer

Data editor: Florian Raub

Latest data update: August 2025

Latest metadata update: August 2025

ACCESSIBILITY

Storage location and medium. Metadata and data files are stored by Arachnologische Gesellschaft, data are included in the ARAMOB database using the database framework Diversity

Workbench (<https://diversityworkbench.net/>), data are accessible via <https://aramob.de/en/data/data-exploitation/> Filter: Project ARAMIT_Schindler2025

Copyright or proprietary restrictions. This data set is freely available for non-commercial scientific use, given the appropriate citation. There are no copyright or proprietary restrictions for research or teaching purposes.

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DATA STRUCTURAL DESCRIPTORS

Data Set Files

Schindler2025_obsdata.csv, 682 KB, Spider abundance data set

Schindler2025_plotdata.csv, 9 KB, locations and characteristics of the sampling sites

Authentication procedures

MD5 hash checksums generated by WinHash v. 1.6.6787:

Schindler2025_obsdata.csv: 7E8FB7A999798338E6260CC40B9F04D2

Schindler2025_plotdata.csv: 3A88A909A5DE74BAF293DBBE88F01528

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References

- Grimm U 1985 Die Gnaphosidae Mitteleuropas (Arachnida: Araneae). Abhandlungen des Naturwissenschaftlichen Vereins in Hamburg 26: 1-318.
- Harry I, Loritz H, Schaefer M, Behrens M, Hermann S & Lang A 2021 Allmendweiden im Biosphärengebiet Schwarzwald – Insektendiversität, Struktureichtum und Folgerungen für das Management. Ein Projekt des Biosphärengebiets Schwarzwald, gefördert mit Mitteln der Stiftung Naturschutzfonds Baden-Württemberg (Projekt-Nummer 54791-2118 GL). Unpublished report of Bürogemeinschaft ABL – Arten | Biotope | Landschaft, Freiburg to Regierungspräsidium Freiburg.
- Heimer S & Nentwig W 1991 Spinnen Mitteleuropas. Verlag Paul Parey, Berlin; Hamburg. 543 pp.

- Nentwig W, Blick T, Bosmans R, Gloor D, Hänggi A & Kropf C 2024 Spinnen Europas. Version 9.2024 – Online at <https://www.araneae.nmbe.ch>, accessed on 24. Oct. 2024. <https://doi.org/10.24436/1>
- Oger P 2024 Photo albums: Les Araignées de Belgique et de France. – Online at <https://arachno.piwigo.com>, accessed on 24. Oct. 2024
- Le Peru B 2011 The spiders of Europe, a synthesis of data: Volume 1. Atypidae to Theridiidae. 2nd ed. Mémoires de la Société Linnéenne de Lyon. 522 pp.
- Roberts MJ 1987 The Spiders of Great Britain and Ireland. Harley Books. 204 pp.
- Schindler M 2025 Spider assemblages and structural analyses from multispectral drone images of five common pastures in the Black Forest Biosphere Reserve. Master thesis, presented 01/2025, Karlsruher Institut für Technologie (KIT)
- WSC 2024 World Spider Catalog. Version 25.5. Natural History Museum Bern – Online at <http://wsc.nmbe.ch>, accessed on 24. Oct. 2024. doi: 10.24436/2