

Data Paper

Spider assemblages (Arachnida, Araneae) in conventionally managed versus extensively used or restored grass- and farmland sites in Mecklenburg-Vorpommern

Christoph Muster



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Abstract. The Ministry for Climate Protection, Agriculture, Rural Areas and the Environment in Mecklenburg-Vorpommern prepares a strategy for insect conservation. One module within the program “More respect for the insect” aimed to compare sites with completed or ongoing conservation measures with conventionally managed reference sites in order to obtain data-based recommendations for future actions. Study sites comprised organically managed arable land (vs. conventionally managed fields), stripes of grassland fallows (vs. used grassland), re-wetted and/or abandoned peatland meadows (vs. managed grassland on drained peatland), restoration of salt marshes by relocation of dikes (vs. diked grassland) and initial stages of xerothermic grassland as a substitute for management in protected areas (vs. later succession stages). The localities were in the surroundings of Greifswald, Anklam and Pasewalk. Arthropods were sampled with pitfall traps according to the guidelines for the nationwide insect monitoring which applied at that time. At each plot six pitfalls were positioned in linear transects with Renner solution as preservative. Carabid beetles and spiders were identified to species level and included in the assessment. Concerning spiders, a total of 22902 specimens (20765 adults) from 189 species were recorded. The study provided the first records of *Porrhomma campbelli*, *Prinerigone vagans* and *Robertus heydemanni* in Mecklenburg-Vorpommern. Further six species are critically endangered (category 1) according to the latest version of the Red list of spiders in Mecklenburg-Vorpommern: *Diplocephalus dentatus*, *Euryopis laeta*, *Micaria dives*, *Pellenes nigrociliatus*, *Psammitis sabulosus*, *Silometopus ambiguus*.

Keywords: arable land, grassland, habitat management, insect monitoring, organic farming, peatland meadows, restoration, salt marsh, Germany

The complete data sets and metadata corresponding to abstracts of a Data Paper are published electronically as Supporting Information in the online version of the article and through the ARAMOB data repository at <https://aramob.de/en/data/data-exploitation/> - Filter for Project.

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Introduction

The original study was realized within a program of action for the protection of insects of the Ministry for Climate Protection, Agriculture, Rural Areas and the Environment in Mecklenburg-Vorpommern (“Mehr Respekt vor dem Insekt”). Several arthropod groups were sampled with pitfall traps in 20 plots of five biotope types in Mecklenburg-Vorpommern: ecological managed arable land, set-aside strips in grassland, protected xerothermic grassland, renaturated wet grassland on peat soil, salt marsh; with a comparison of treated plots with reference plots. Pitfall traps were filled with Renner solution and were active from 3. Sep. to 17. Oct 2020 and from 1. May to 11. Jun. 2021, traps were emptied every 14 days. Six traps per site were used, distance between traps was 8-10 m. Traps had 8 cm opening width and were not protected against rain. Spiders were identified by the author with Heimer & Nentwig (1991), Roberts (1985, 1987, 1998), Nentwig et al. (2021). A total of 22902 (20765 adult) spiders were identified to 189 species in 19 families.

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Involved persons/Beteiligte Personen. Dr. Heike Ringel, Jureck Hampel

Contracting authority or source of funding. Ministerium für Landwirtschaft und Umwelt

Mecklenburg-Vorpommern

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Site description. Study sites (and plots) were situated in three regions in Mecklenburg-Vorpommern (North-East Germany):

- Greifswald (KG1, KG1a, AC2, AC2a, AC3, AC3a)
- Anklam (GL2, GL2a, MZ1, MZ1a, MZ1b)
- Pasewalk (AC1, AC1a, TM1, TM1a, TM1b, GL1, GL1a, TM2, TM2a)

20 plots of five biotope types: ecological managed arable land, set-aside strips in grassland, protected xerothermic grassland, renaturated wet grassland on peat soil, salt marsh; with a comparison of treated plots with reference plots.

Table 1: Studied plots (S – south of; N – north of; Coordinates in decimal degrees WGS 84)

Habitat	Management	Plot	Locality	Latitude	Longitude
arable land	organic farming	AC1	Dargitz	53.556343	13.928452
	conventional reference	AC1a	Dargitz	53.556363	13.929704
	organic farming	AC2	S Strellin	53.977516	13.495484
	conventional reference	AC2a	S Strellin	53.974243	13.494611
	organic farming	AC3	N Strellin	53.985082	13.491627
	conventional reference	AC3a	N Strellin	53.988533	13.483708
grassland	stripe of grassland fallow	GL1	Stolzenburg	53.526187	13.946878
	conventional reference	GL1a	Stolzenburg	53.526596	13.944349
	stripe of grassland fallow	GL2	Quilow	53.880454	13.575815
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salt marsh	restored salt marsh	KG1	Karrendorf	54.159928	13.388032
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peatland meadow	rewetted, mowed	MZ1	Relzow	53.877476	13.704126
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xerothermic grassland	early succession stage	TM1	Viereck	53.558774	14.00913
	intermediate succession	TM1a	Viereck	53.560007	14.007214
	late succession stage	TM1b	Viereck	53.557388	14.013389
	sheep grazing	TM2	Schanzberge	53.494994	13.894122
	late succession stage	TM2a	Schanzberge	53.487816	13.886833

Methods of data collection. Plastic cups with 8 cm opening diameter and 0.3 l holding capacity were used as pitfall traps. Six traps per group (plot) were positioned in line with 8-10 m distance between two traps. Renner solution (40 % ethanol, 20 % glycerine, 10 % acetic acid, 30 % water, detergent) was used as preservative. Traps were active in the periods September to October 2020 and May to June 2021 and emptied every 14 days.

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Vouchers/Material deposited. Voucher specimens are available in Coll. C. Muster.

Significance of data set. The data were analysed in Ringel et al. (2023) with respect to effects of conservation measures on arthropod diversity as compared to conventionally managed reference sites. For spiders, multiple quantitative and qualitative parameters of the communities were compared, including species richness, abundance, Shannon-H and several indices based on species rarity, conservation value, red list status and indicator species (classifications following Martin 2021). Particularly positive effects of conservation measures on spider communities were observed in restored salt marshes, rewetted grassland on peat soil, and through the preservation of xerothermic grasslands in early succession stages. On the other hand, organic farming did not result in positive effects on spider communities.

DATA SET STATUS AND ACCESSIBILITY

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Data submitted: 2023-11-01, **Data accepted:** 2023-12-01

Academic editor: Tobias Bauer

Data editors: Hubert Höfer & Florian Raub

Latest data update: November 2023

Latest metadata update: November 2023

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DATA STRUCTURAL DESCRIPTORS

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References

BfN 2019 Einheitlicher Methodenleitfaden "Insektenmonitoring". Bundesamt für Naturschutz. –

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Breitling R, Merches E, Muster C, Duske K, Grabolle A, Hohner M, Komposch C, Lemke M, Schäfer M & Blick T 2020 Liste der Populärnamen der Spinnen Deutschlands (Araneae). – Arachnologische Mitteilungen 59: 38-60 – doi: 10.30963/aramit5907

Heimer S & Nentwig W 1991 Spinnen Mitteleuropas. Parey, Berlin & Hamburg. 64 pp.

- Martin D 2021 Atlas zur Verbreitung und Ökologie der Spinnen (Araneae) Mecklenburg-Vorpommerns. 2 Bände. Landesamt für Umwelt, Naturschutz und Geologie Mecklenburg-Vorpommern, Güstrow. 588 + 592 pp.
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