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PALUDI CULTURE
RRR2021

Sphagnum farming in north-west Germany: is it offering a secondary habitat for bog-typical dragonfly species?

RRR2021
Session 3.3 Biodiversity at ecosystem level

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J. Packmor, R. Buchwald

9th of March 2021

Image: Black darter (*Sympetrum danae*) (own photograph, August 2020)

Why Dragonflies?

- Reliable indicator for ecological quality of (semi-)aquatic ecosystems
- Proxy for ecosystem health (e.g. TERMAAT et al. 2015)
- Dispersal capabilities (e.g. JAESCHKE et al. 2013)

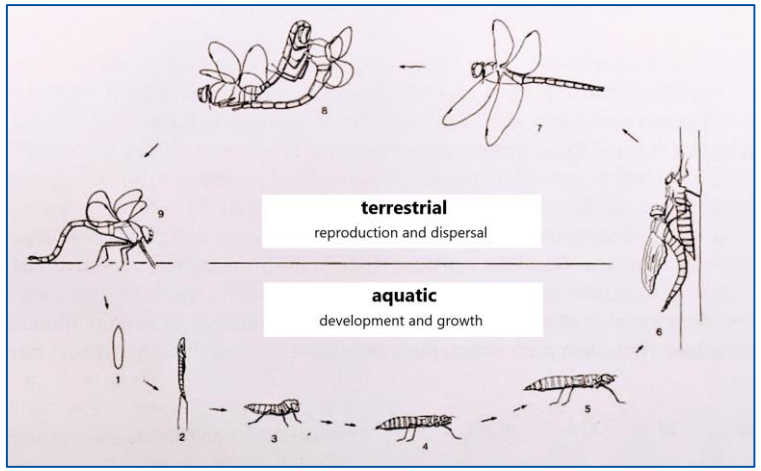

Fig. 1: Life-cycle of dragonflies (mod. after WILDERMUTH & MARTENS 2019)

Fig. 2: Sphagnum overgrowing irrigation ditch (own photograph), Hankhausen, August 2020

Fig. 3: Northern white-faced darter (*Leucorrhinia rubicunda*) own photograph, Neudorfer Moor, May 2020

Fig. 4: Location: Hankhausen (Lower Saxony)

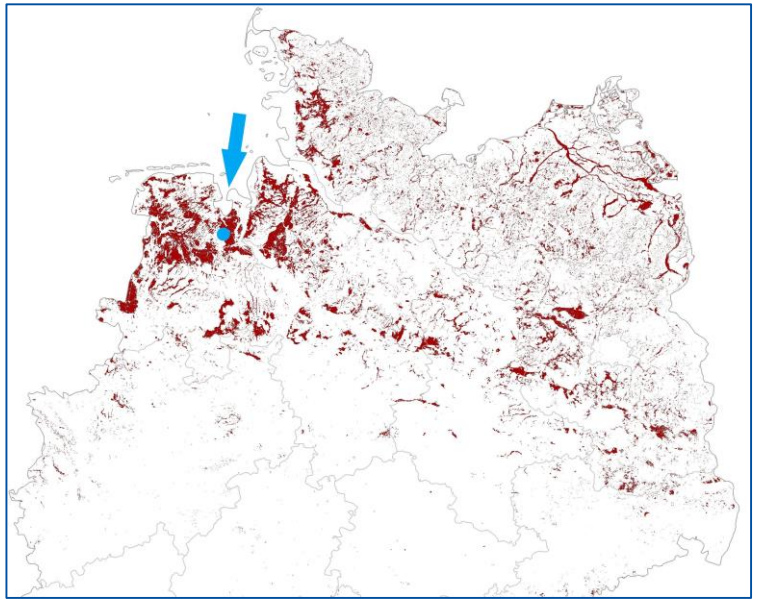

Fig. 5: Map of organic soils in Germany (TEGETMEYER et al. 2020)

Fig. 6: Hankhausen study area, aerial photograph (lensescape.org 2017)

Fig. 7: Sphagnum harvest (Hankhauser Moor) (lensescape.org 2017)

Study Area

Areas 1 and 2

- established **2011**
  partly harvested / harvested 2016

Area 4

- expanded in **2016**
  not harvested

20 sampling sites

- 50 m length each,
  inner ditches (red), outer ditches (yellow)

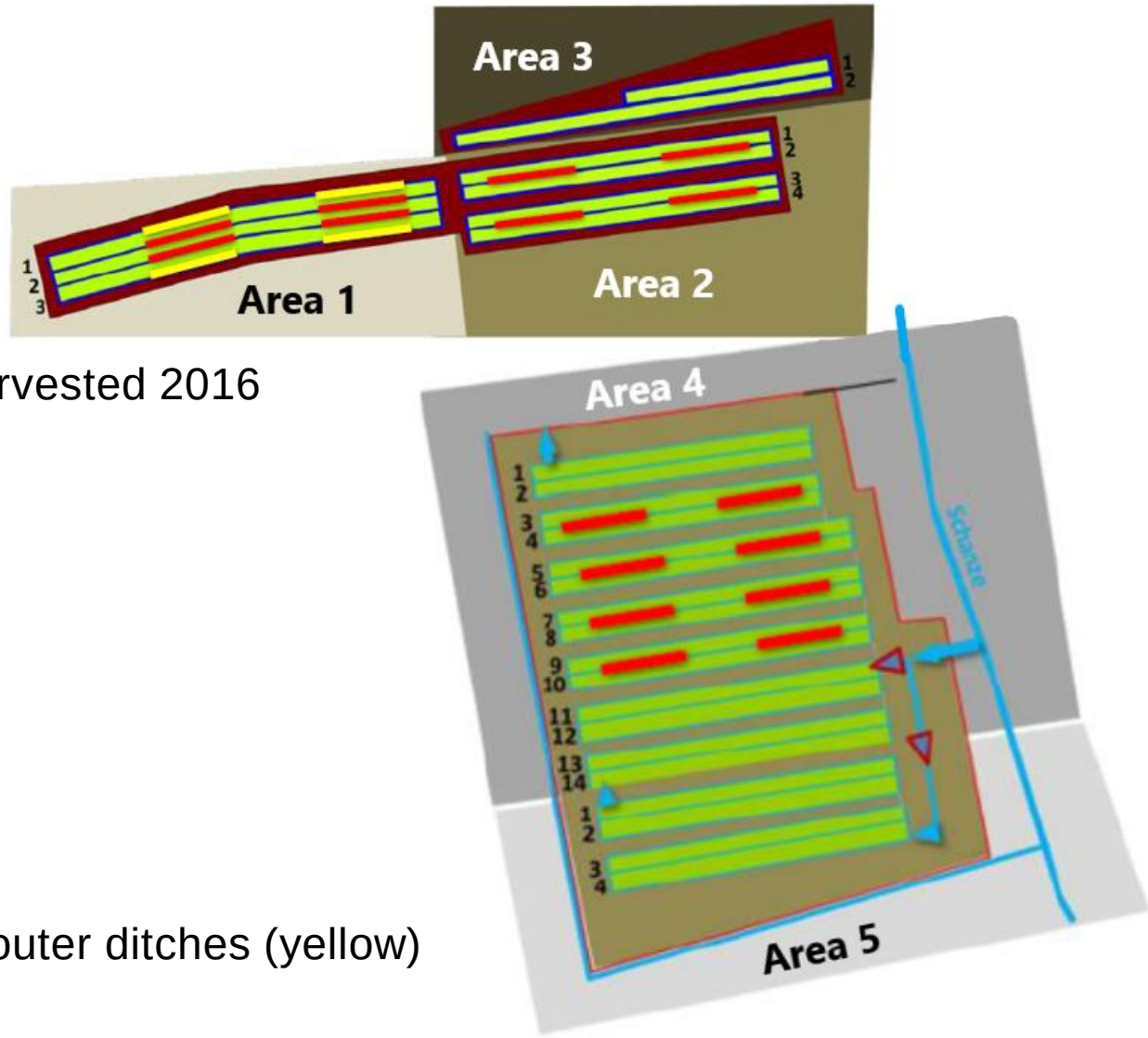

Fig. 8: Schematic view of the study area (OptiMOOS Project)

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Aim and Methods

- Assessment of dragonfly fauna
  observation of imagines, collection of exuviae
  - Species inventory: development, degree of establishment
  - Evaluation: comparison with near-natural bogs

- Recommendations for management of sphagnum farming sites

Fig. 9: Four-spotted chaser (*Libellula quadrimaculata*) (own photograph, May 2020)

	2017	2018	2019	2020
Surveys for imagines	11	9	-	12
Surveys for exuviae	10	9	10	12

Tab.1: Number of surveys carried out per year

Data collected by

- V. Gräpel (2016)
- J. Packmor (2017, 2018)
- S. Behne (2017)
- K. Hilgenböker (2019)
- D. Brötzmann (2020)

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Results

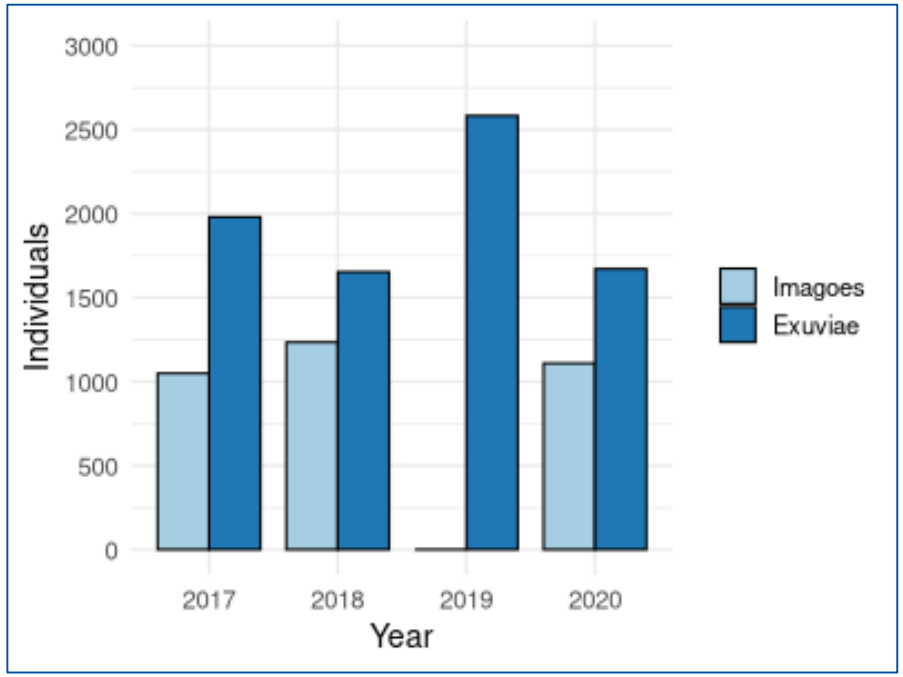

Fig. 10: Total individuals counted per year

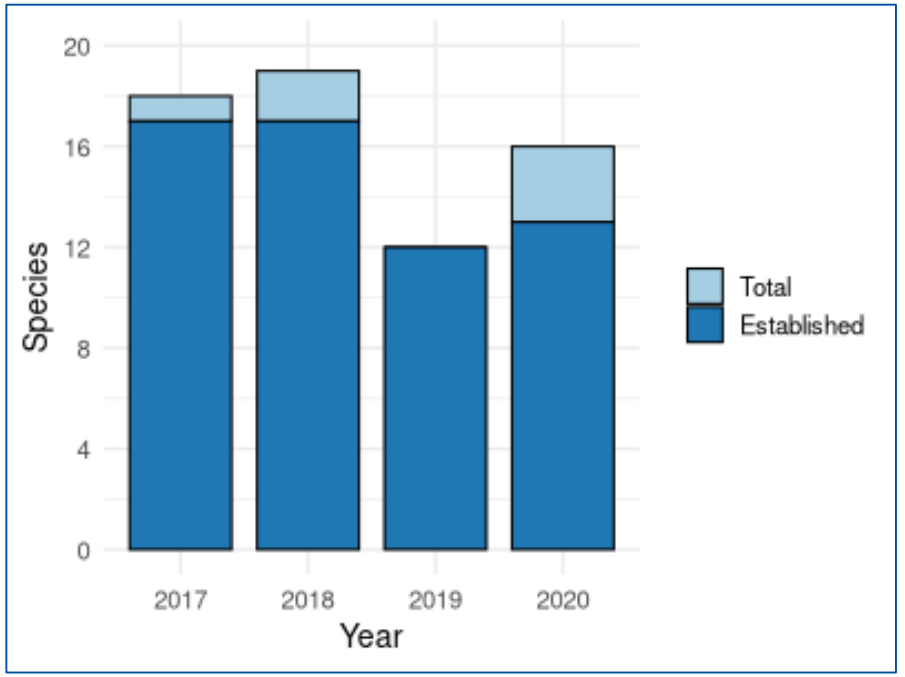

Fig. 11: Number of species observed per year

But: "*the proportion of characteristic species in peatlands exceeds that of dryland areas within the same biogeographic zone*" (MINAYEVA et al. 2008)

Results / Discussion

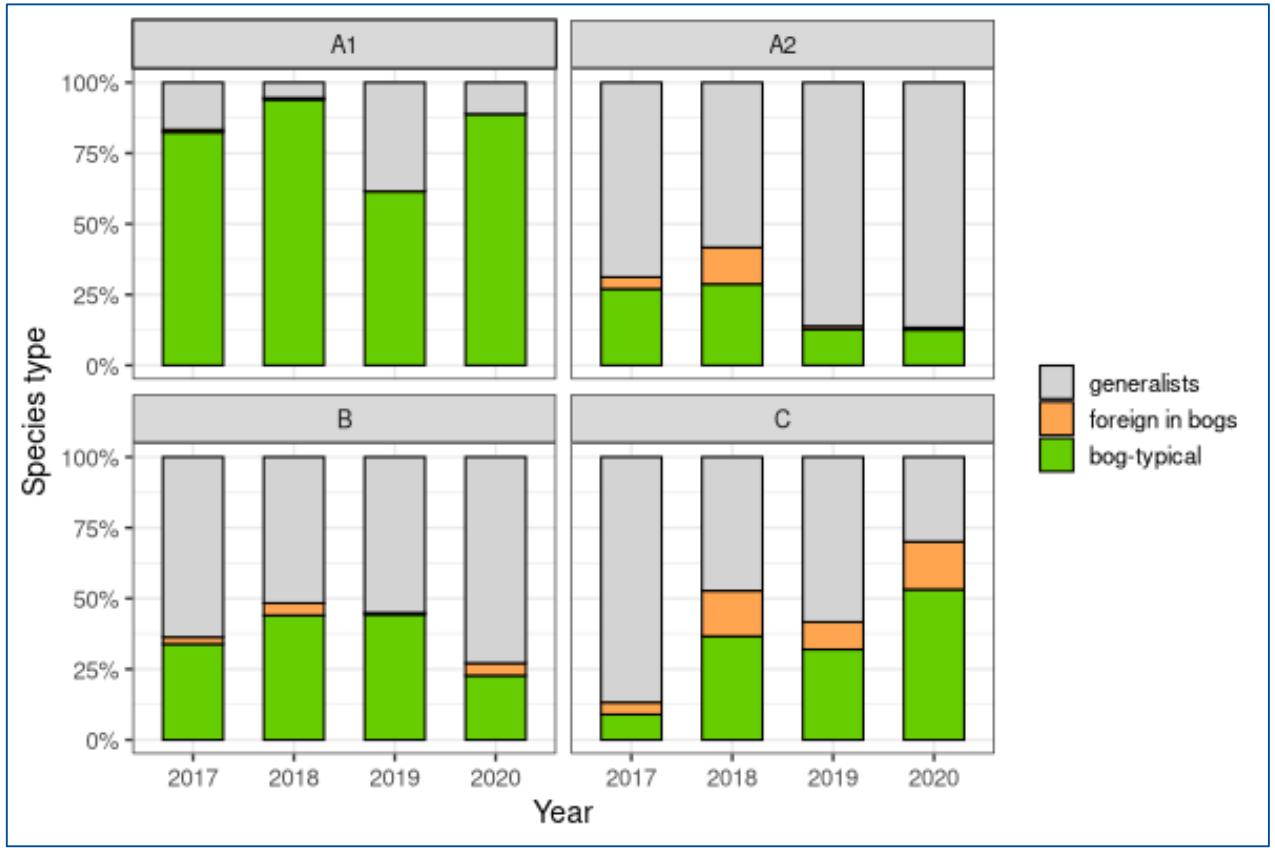

Fig. 12: Percentage of species types per area and year based on exuviae count

Area 1

- **A1**: inner ditches, est. 2011, not / partly harvested, n=4
- **A2**: outer ditches, est. 2011, not / partly harvested, n=4

Area 2

- **B**: inner ditches, est. 2011, harvested 2016, n=4

Area 4

- **C**: inner ditches, est. 2016, not harvested, n=8

Conclusions

- 24 species in total
- 9 species typical for bogs, some strongly tied to bogs
  - Northern white-faced darter (*Leucorrhinia rubicunda*)
    Red List Germany and Lower Saxony: vulnerable
    few imagines in area 4 (2018), without proof of establishment
  - Subarctic darner (*Aeshna subarctica*)
    Red List Germany and Lower Saxony: critically endangered
    exuviae in area A1 (2017, 2018, 2020), area B (2018), and area C (2020)

Red Lists (Odonata)

Germany:
OTT et al. (2015)

Lower Saxony/Bremen:
BAUMANN et al. (in press)

Fig. 13: Northern white-faced darter (*Leucorrhinia rubicunda*), own photograph, Neudorfer Moor, May 2020

Fig. 14: Subarctic darner (*Aeshna subarctica*), own photograph, Bockhorner Moor, August 2020

Conclusions / Outlook

- Impact of maintenance?
- Filter ponds add another element to the wetland mosaic

Fig. 15: New filter ponds (own photograph, August 2020)

First observations

- Willow emerald damselfly (*Chalcolestes viridis*)
- Blue-tailed damselfly (*Ischnura elegans*)
- Migrant hawker (*Aeshna mixta*)
- Emperor dragonfly (*Anax imperator*)
- Black-tailed skimmer (*Orthetrum cancellatum*)
- Ruddy darter (*Sympetrum sanguineum*)

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Figures

- Fig. 1: Modified after WILDERMUTH & MARTENS (2019)
- Fig. 4: Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under ODbL.
- Fig. 5: TEGETMEYER et al. (2020)
- Figs. 6, 7: lensescape.org (Greifswald): http://lensescape.org/luftbilder/
- Fig. 8: OptiMOOS Project
- Figs. 2, 3, 9, 13-15, title image: Own photographs (D. Brötzmann)