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Data Article

Data on flower resources for pollinators in Romanian semi-natural grasslands mown at different times

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ABSTRACT

Semi-natural grasslands are hotspots of biodiversity in Europe and provide amounts of flower resources for pollinators. We present data on composition and spatial turnover of herb species and flower resources in and between semi-natural grasslands in Romania mown at different times during the growth season (early, intermediate, late). The data include herb species occurrences, their phenological stage, flower resources, and measures of spatial turnover of the species occurrences and flower resources based on Detrended Correspondence Analyses (DCA), in the start of August. The dataset is provided as supplementary material and associated with the research article "Traditional semi-natural grassland management with heterogeneous mowing times enhances flower resources for pollinators in agricultural landscapes" [1] Johansen et al.. See Johansen et al. for data interpretation.

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Specifications table

Subject area	*Ecology*
More specific subject area	*Semi-natural grassland management, vegetation ecology, flower resources, biodiversity, hay meadows.*
Type of data	*Tables and figures.*
How data was acquired	*Botanical survey, ordination analyses.*
Data format	*Raw, processed and analyzed.*
Experimental factors	*Composition proxies were developed by performing Detrended Correspondence Analyses (DCA).*
Experimental features	*Plots ($1 \times 1\ m^2$) in semi-natural hay meadows were surveyed and abundance of flower resources were registered in the beginning of August in 2016 ($n = 31$). The hay meadows were selected to represent the variation in mowing time in the region: early (late June, $n_{early} = 10$), intermediately (late July: $n_{intermediately} = 11$), or late (after mid-August, $n_{late} = 10$).*
Data source location	*Botiza, Maramureș in the Romanian Carpathians (47°40′05.30″N, 24°09′04.27″E).*
Data accessibility	*Data is with this article.*
Related research article	*Johansen, L., Westin, A., Wehn, S., Iuga, A., Ivascu, C.M., Kallioniemi, E., & Lennartsson, T. 2019. Traditional semi-natural grassland management with heterogeneous mowing times enhances flower resources for pollinators in agricultural landscapes.*

Value of the data

- Semi-natural grasslands are hotspots of biodiversity [2,3] and provide amounts of flower resources for pollinators [4]. However, the grassland ecosystems are threatened by land use changes and pollinators has a global decline. Therefore, data are needed about how grasslands management can contribute to pollinator sustainability and be used to inform conservation management and policy.
- The sampling design and presented data allows for analyses on the relations between species diversity and traditional agricultural practices in semi-natural grasslands.
- Due to the sampling design, the dataset is suitable to investigate the role of varying mowing times across semi-natural grasslands in a landscape on the composition and spatial turnover of species and flower resources for pollinators.
- The dataset can be integrated into meta-analyses and studies that compare species composition and flower resources for pollinators among grasslands in the world.

1. Data

Table 1 show for three mowing time categories, which species were present, incidence of reproduction, and their number of flower units (mean ± se) in early August. Fig. 1 show the species composition in the plots and spatial turnover for three species composition proxies (i) presence/absence of herb species (species occurrence); ii) herb species in bloom/not in bloom (species in bloom); iii) number of flowering reproductive units per herb species (number of flowers per species)). Table 2 show the results of Detrended Correspondence Analyses (DCAs), one for each of three species composition proxies (i, ii, and iii). The dataset is given as supplementary material.

2. Experimental design, materials, and methods

The raw data was collected in the village Botiza in Maramureș, Romania from 31 semi-natural hay meadows that represent the variation of mowing times in the region [1]. The survey took place on August 3 in 2016. Ten of the hay meadows had been cut early (late June), eleven intermediately (late July), and ten would be cut at a later occasion (after mid-August). We registered occurrence, whether the species were in bud-, flowering-, fruit stage, or neither of these three stages, and number of flowering reproductive units of all herb species in one 1×1 m plot in each semi-natural hay meadow. A total of 67 herb taxa (58 species and 9 genera) were registered.

We summarized the data to visualize which herb species were present, the incidence of reproduction, and number of flowering reproductive units in the start of August in hay meadows cut in different times during the growth season (Table 1). Incidence of reproduction for each species was calculated as number of plots where the species was in the bud-, flowering- or fruit-stage divided on the number of plots the species was registered.

Table 1
Plant species, incidence of reproduction, and number of flowering reproductive units (mean ± se) registered in early, intermediate, and late mowed semi-natural grasslands (n = 31) in early August 2016 in Botiza, Maramureș, Romania. —: not registered in the mowing time category.

Plant species	Early		Intermediate		Late	
	Incidence of reproduction	Flowering reproductive units	Incidence of reproduction	Flowering reproductive units	Frequency	Flowering reproductive units
Achillea millefolium	0.00	0	0.00	0	0.18	0.27 ± 0.19
Alchemilla sp.	0.33	0.33 ± 0.33	0.00	0	—	—
Angelica sylvestris	0.00	0	0.00	0	—	—
Astrantia major	0.00	0	0.00	0	0.00	0
Betonica officinalis	0.25	1.86 ± 1.32	0.00	0	0.83	0
Campanula patula	0.67	4.00 ± 2.00	1.00	5.00 ± 0	1.00	0.50 ± 0.50
Campanula rotundifolia	—	—	0.00	0	—	—
Carlina acaulis	0.00	0	0.00	0	1.00	0
Carum carvi	0.00	0	—	—	—	—
Centaurea sp.	0.50	2.75 ± 2.14	0.00	0.25 ± 0.25	1.00	7.20 ± 1.95
Centaurium sp.	—	—	—	—	1.00	0
Cruciata glabra	0.00	0	0.00	0	0.00	0
Cuscuta sp.	—	—	—	—	0.67	14.33 ± 7.31
Daucus carota	0.83	13.17 ± 8.36	1.00	8.00 ± 5.00	1.00	2.67 ± 1.45
Dianthus carthusianorum	1.00	1.00 ± 0	—	—	1.00	0
Erigeron annuus	1.00	30.00 ± 0	—	—	1.00	10.00 ± 0
Euphrasia rostkoviana	0.83	87.50 ± 55.24	0.80	25.80 ± 21.22	0.80	7.60 ± 0.93
Fragaria vesca	—	—	0.00	0	—	—
Galium verum	0.00	0	0.00	0	0.50	0
Genista tinctoria	0.00	0	0.00	0	0.60	12.60 ± 9.50
Gladiolus sp.	1.00	0	0.00	0	1.00	0
Heracleum sp.	—	—	1.00	1.00 ± 0	—	—
Hieracium auricula	0.00	0	0.00	0	0.33	0
Hieracium pilosella	0.00	0	0.00	0	1.00	0
Hypericum perforatum	0.33	2.00 ± 2.00	0.33	0.67 ± 0.67	0.00	0
Knautia arvensis	1.00	5.00 ± 2.12	0.33	0	0.88	1.75 ± 0.59
Lathyrus pratensis	1.00	0	0.00	0	—	—
Leontodon autumnalis	0.75	7.00 ± 4.14	0.50	2.00 ± 2.00	0.60	1.00 ± 1.00
Leontodon hispidus	1.00	4.50 ± 0.50	0.20	0	0.00	0.50 ± 0.50
Leucanthemum vulgare	0.71	28.14 ± 14.98	0.00	0	1.00	0.80 ± 0.58
Linum catharticum	—	—	0.00	1.00 ± 0	—	—
Lotus corniculatus	0.90	29.60 ± 10.11	0.71	5.71 ± 3.06	0.75	4.00 ± 1.97
Lysimachia nummularia	0.00	0	—	—	0.00	0
Lysimachia vulgaris	0.00	0	0.00	0	0.00	0
Lythraceae salicaria	—	—	—	—	1.00	1.00 ± 0
Ononis arvensis	1.00	7.00 ± 0	0.00	0	0.50	25.50 ± 15.00

(*continued on next page*)

Table 1 (*continued*)

Plant species	Early		Intermediate		Late	
	Incidence of reproduction	Flowering reproductive units	Incidence of reproduction	Flowering reproductive units	Frequency	Flowering reproductive units
Oxalis dillenii	1.00	0	0.00	0	–	–
Peucedanum oreoselinum	0.50	0.75 ± 0.48	0.33	0	0.00	0
Pimpinella saxifraga	0.22	0.75 ± 0.53	0.00	0	0.33	0
Plantago lanceolata	0.22	5.89 ± 3.53	0.11	0.11 ± 0.11	0.50	0
Plantago major	1.00	9.50 ± 4.50	–	–	0.50	0
Plantago media	0.50	2.50 ± 1.50	0.25	0.25 ± 0.25	1.00	0
Polygala comosa	1.00	4.00	–	–	–	–
Polygala vulgaris	0.75	3.50 ± 1.94	0.00	0	0.33	0.67 ± 0.67
Potentilla erecta	0.78	9.22 ± 2.98	1.00	9.20 ± 7.00	0.91	17.55 ± 5.72
Prunella grandiflora	–	–	–	–	1.00	47.00
Prunella vulgaris	–	–	0.00	0	0.67	0.67 ± 0.67
Ranunculus acris	0.20	0.30 ± 0.30	0.00	0	0.33	0
Rhinanthus minor	–	–	0.00	0	1.00	0
Rumex acetosa	0.00	0	–	–	0.00	0
Rumex acetosella	0.00	0	1.00	7.00	–	–
Scabiosa ochroleuca	0.00	0	–	–	0.50	3.50 ± 2.50
Senecio vulgaris	0.00	0	–	–	–	–
Solidago virgaurea	0.00	0	0.17	0	0.00	0
Stellaria graminea	1.00	11.00	–	–	0.75	0
Succisa pratensis	–	–	–	–	1.00	1.00 ± 0
Taraxacum sp.	0.00	0	0.00	0	0.00	0
Thymus sp.	0.86	1.86 ± 0.86	0.25	2.63 ± 2.35	0.63	1.00 ± 0.76
Tragopogon pratensis	1.00	1.00 ± 0	–	–	1.00	1.00 ± 0
Trifolium medium	1.00	6.17 ± 2.29	–	–	0.83	3.33 ± 1.26
Trifolium aureum	1.00	8.50 ± 8.50	–	–	0.67	1.00 ± 1.00
Trifolium montanum	0.00	0	0.00	0	1.00	0
Trifolium pratense	0.60	2.00 ± 0.84	0.50	0.25 ± 0.25	1.00	0
Trifolium repens	0.78	5.11 ± 3.74	0.00	0	0.57	0.57 ± 0.57
Veronica chamaedrys	0.00	0	0.00	0	0.25	0
Veronica officinalis	–	–	0.00	0	–	–
Viola sp.	0.29	0	0.13	0	0.88	0

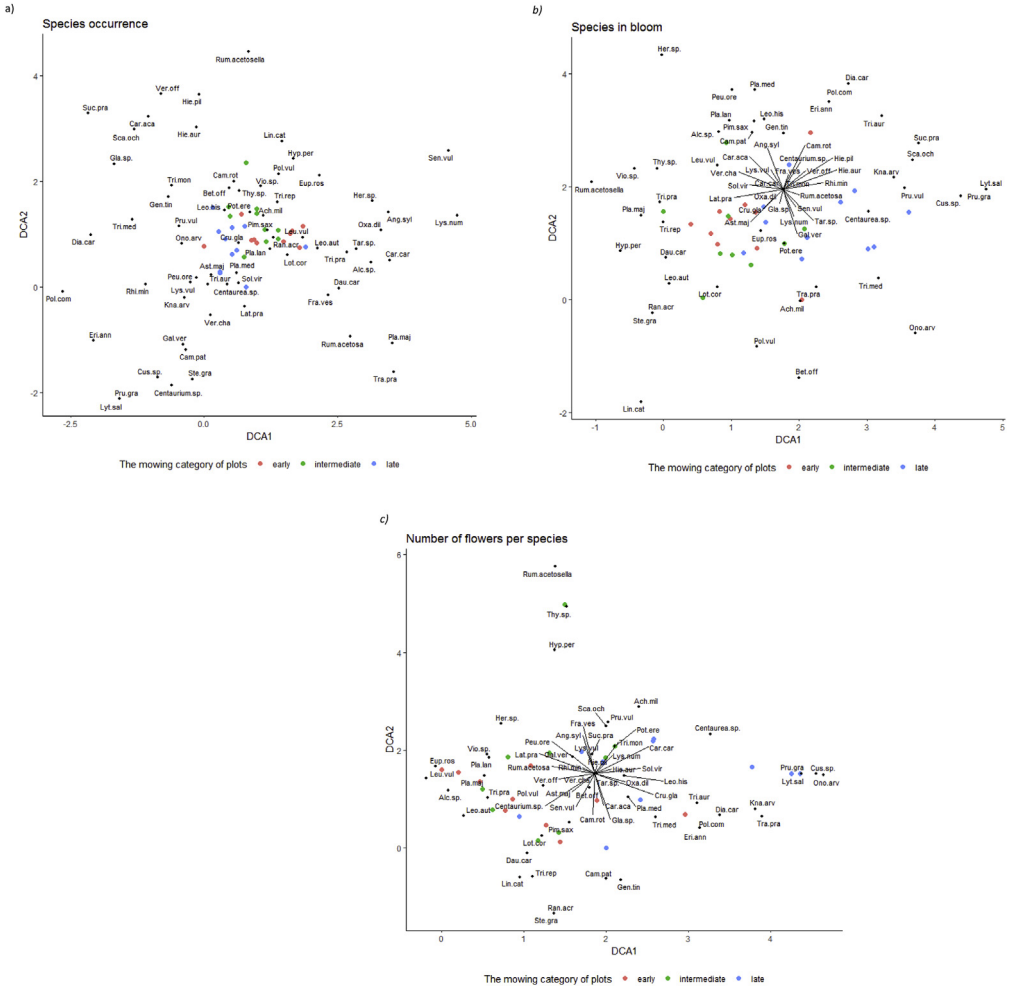

Fig. 1. Two dimensional plots of species (black dots) and surveyed plots (colored points) of the Detrended Correspondence Analyses (DCAs) based on a) presence/absence of herb species (species occurrence); b) herb species in bloom/not in bloom (species in bloom); c) number of flowering reproductive units per herb species (number of flowers per species).

Table 2
Results of detrended correspondence analyses (DCAs).

Composition proxy	DCA axis 1	DCA axis 2
Species occurrence		
Eigenvalues	0.2167	0.1540
Length of axis	1.8946	2.3504
Species in bloom		
Eigenvalues	0.4577	0.3445
Length of axis	3.6071	2.9578
Number of flowers per species		
Eigenvalues	0.7327	0.5134
Length of axis	4.3610	4.9720

To develop data on species composition and spatial turnover we performed Detrended Correspondence Analysis (DCAs) using the package Vegan 2.5–3 [5] in the R 3.5.1 software [6]. Based on the data on the registered herbs species' presence or absence (species occurrence) in each of the surveyed plots, we calculated species turnover among the hay meadows as the length of the DCA axis (Fig. 1a, Table 2). To identify whether different herb species contribute to the flower resources in the three time categories, we developed data (species- and plot-scores and length of DCA axis) based on herb species in bloom/not in bloom (species in bloom) and number of flowering reproductive units per herb species (number of flowers per species; Fig. 1b and c; Table 2).

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Transparency document

Transparency document associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2019.104065.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dib.2019.104065.

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