Data Article

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

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A B S T R A C T

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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1. Data

Table 1 show for three mowing time categories, which species were present, incidence of reproduction, and their number of flowering 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 m² 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, Maramures, Romania. —: not registered in the mowing time category.

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

(continued on next page)
| Plant species               | Early Incidence of reproduction | Early Flowering reproductive units | Intermediate Incidence of reproduction | Intermediate Flowering reproductive units | Late Frequency | Late 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*     | —                               | —                                 | 0.00                                  | 0                                        | 0.67          | 0.67 ± 0.67                     |
| *Prunella vulgaris*        | —                               | —                                 | 0.00                                  | 0                                        | 0.33          | 0                               |
| *Ranunculus acris*         | 0.20                            | 0.30 ± 0.30                       | 0.00                                  | 0                                        | 1.00          | 0                               |
| *Rhinanthus minor*         | —                               | —                                 | 0.00                                  | 0                                        | 0.00          | 0                               |
| *Rumex acetosa*            | 0.00                            | 0                                 | 0.00                                  | 0                                        | 0.00          | 0                               |
| *Rumex acetosella*         | 0.00                            | 0                                 | 1.00                                  | 7.00                                     | —            | —                               |
| *Scabiosa ochroleuca*      | 0.00                            | 0                                 | 0                                     | —                                        | 0.50          | 3.50 ± 2.50                     |
| *Senecio vulgaris*         | 0.00                            | 0                                 | 0                                     | —                                        | 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                          | —                                     | —                                        | 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                                     | —                                        | 0.25          | 0                               |
| *Veronica officinalis*     | —                               | —                                 | 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

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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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