**Supporting Information**

Additional Supporting Information may be found in the online version of this article:

Table S1: Leave-one out cross-validation results for different interpolation methods.

|  |  |
| --- | --- |
| Interpolation method | nRMSE |
| Simple kriging | 0.216 |
| Ordinary kriging | 0.218 |
| Universal kriging | 0.221 |
| Inverse distance interpolation | 0.228 |
| Nearest neighbor | 0.275 |

Table S2: Description and Sources of the traits that were identified as Services.

|  |  |  |
| --- | --- | --- |
| Trait | Description | Source |
| Insect families | Number of insect families recorded on individual weed species | (Marshall et al., 2003) |
| Insect species | Number of insect species recorded on individual weed species | (Marshall et al., 2003) |
| Host specific insects | Number of insect species recorded that are dependent to the weeds to complete their life cycle | (Marshall et al., 2003) |
| Natural enemies | Number of named links between field weed species and natural enemies of arthropods (enemies) | (Bosch et al., 2022) |
| Phytophages | Number of named associations between field weed species and phytophagous arthropods (phytophag). | (Bosch et al., 2022) |
| Pollinator | Number of named links between field weed species and pollinators | (Bosch et al., 2022) |
| Birds direct | Number of named links between field weed species and Birds direct. Birds that directly feed from the weed species. | (Bosch et al., 2022) |
| Birds indirect | Number of named links between field weed species and Birds indirect. So Birds of prey that feed on birds directly associated with the host plant. | (Bosch et al., 2022) |
| Flowering duration | Duration of flowering in month | (Font, 2016) |

Table S3: Description and Sources of the traits that were identified as disservices.

|  |  |  |
| --- | --- | --- |
| Trait name | Description | Source |
| Economic threshold | When weed density (plants/m2) is above this economic threshold, controlling these weeds result in higher economic net returns | (LfL, 2024) |
| Specific leaf area; SLA | Ratio between leaf area of the fresh leaf and leaf dry mass (mm2 mg−1) | (Pakeman et al., 2015) |
| Plant height  vegetative | Distance between the uppermost tip of photosynthetic tissue and the ground level | (Pakeman et al., 2015) |
| Pest arthropods | Number of named links between field weed species and pest arthropods | (Bosch et al., 2022) |
| RGRLa | Relative growth rate of green area in autumn | (Storkey et al., 2006) |
| RGRLs | Relative growth rate of green area in spring | (Storkey et al., 2006) |

Table S4: Number of Links between the weed species and the insect families, insect species, host specific insects, phytophages, pollinators, direct and indirect birds as well as the flowering duration in month

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Insect families  [Nr] | Insect species  [Nr] | Host specific insects  [Nr] | Natural enemies  [Nr] | Phytophages  [Nr] | Pollinators  [Nr] | Birds direct  [Nr] | Birds  indirect  [Nr] | Flowering duration  [month] |
| *M. arvensis* | 3.00 | 3.00 | 0.00 | 4.00 | 25.00 | 7.00 | 7.00 | 0.00 | 6.00 |
| *P.*  *annua* | 15.00 | 53.00 | 7.00 | 3.00 | 150.00 | 16.00 | 6.00 | 10.00 | 12.00 |
| *P. aviculare* | 15.00 | 61.00 | 4.00 | 2.00 | 139.00 | 24.00 | 9.00 | 30.00 | 7.00 |
| *S.*  *media* | 12.00 | 71.00 | 4.00 | 7.00 | 113.00 | 15.00 | 21.00 | 10.00 | 12.00 |
| *V. arvensis* | 2.00 | 2.00 | 0.00 | 2.00 | 49.00 | 8.00 | 13.00 | 0.00 | 7.00 |

Table S5: Economic threshold, Specific Leaf Area (SLA), vegetative plant height, Relative growth rate of the leaf in autumn (RGRLa) and spring (RGRLs) and number of links between the species and pest species

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Economic threshold [plants m-2] | SLA  [mm2 mg−1] | Plant height  vegetative [m] | RGRLa  [day-1] | RGRLs  [day-1] | Pest species  [Nr.] |
| *M. arvensis* | 25.00 | 42.79 | 0.41 | 0.11 | 0.10 | 0.00 |
| *P. annua* | 20.00 | 75.56 | 0.09 | 0.12 | 0.11 | 4.00 |
| *P. aviculare* | 15.00 | 37.41 | 0.42 | 0.11 | 0.11 | 3.00 |
| *S. media* | 10.00 | 52.82 | 0.41 | 0.14 | 0.12 | 3.00 |
| *V. arvensis* | 5.00 | 42.28 | 0.60 | 0.06 | 0.07 | 0.00 |