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Supplementary data S3. Potential sources of bias in floristic data and the countermeasures for their minimization.

Data on taxa occurrences obtained from both Pladias and NDOP databases have a comparable structure, containing the taxa names, geographic coordinates, original data source and additional data (e.g. accuracy of coordinates, names of the author, locality specification or description, date or year of record), if they are available from an original source (see Wild et al. 2019 for a general description of databases).

Main potential sources of bias can be summarised in the following points:

1) Source of bias: Bias caused by taxonomical shifts.

Inconsistent use of plant names due to shifts in taxonomic concepts is a well-recognized source of bias in various analyses (Jansen & Dengler 2010). Changes in the application of taxonomic concepts to the same entity are often connected with complicated determination. For example, records of *Empetrum nigrum* without specification of taxonomical concept may refer either to *E. hermaphroditum* (treated as *E. nigrum* subsp. *hermaphroditum* in the former concept) or to *E. nigrum* s. str. (*E. nigrum* subsp. *nigrum* in the former concept). By analogy, older records of *Scorpidium revolvens* may comprise either *S. cossonii* or *S. revolvens* s.str. When these species are sterile (e.g. *Scorpidium cossonii* vs. *S. revolvens* s.str., or *Rhizomnium magnifolium* vs. *R. pseudopunctatum*), they cannot be reliably distinguished based on morphology alone and can be separated only through molecular analysis).

Countermeasures: This potential source of bias applies mostly to bryophytes and to vascular plant records not yet revised within the Pladias database (in the context of the Distribution of vascular plants in the Czech Republic project; Kaplan et al. 2015 and subsequent papers). For taxa particularly problematic in this respect, we used only aggregate-level data for mapping analyses, provided such aggregates retain indicative value for mires: *Arrhenia gerardiana* agg., *Campylium stellatum* agg. (see also reasoning in the Nomenclature and taxonomic notes chapter), *Cephaloziella elachista* agg., *Empetrum nigrum* agg. (records of *E. hermaphroditum* were not considered), *Salix repens* agg. (see also reasoning in the Nomenclature and taxonomic notes chapter), *Scorpidium revolvens* agg., *Sphagnum auriculatum* agg., *Sphagnum magellanicum* agg., *Sphagnum palustre* agg., *Vaccinium oxycoccos* agg. Other aggregates were not used for mapping because either revised data on the occurrence of subordinate species are available (e.g. species from *Carex flava* agg.), or reliable identifications at the species level prevail over determinations at the aggregate level (species from *Sphagnum recurvum* agg.).

Records of *Dactylorhiza incarnata* and *Pinguicula vulgaris*, not determined at the subspecies level, were treated as *Dactylorhiza incarnata* subsp. *incarnata* and *Pinguicula vulgaris* subsp. *vulgaris*, respectively, because these subspecies are more common in the Czech Republic than the other subspecies of the same species. These nominate subspecies also have a lower value of specialism (i.e. they are partial specialists, whereas the other subspecies are strict specialists).

2) Source of bias: Bias caused by confusion of closely related critical taxa or other determination errors (including also mistakes during digitization and other processing of data). For a general description of this source of bias and its consequences, see for example Rocchini et al. (2011) or Morisson (2016).

Countermeasures:

2.1. Vascular plants.

(i) For the critical taxa whose records have already been revised within the Pladias database, only records approved by taxonomic experts were used. This applies to *Calamagrostis purpurea*, *Calamagrostis stricta*, *Calamagrostis varia*, *Carex lepidocarpa*, *Carex oederi*, *Dactylorhiza carpatica*, *Dactylorhiza incarnata* subsp. *pulchella*, all subspecies of *Dactylorhiza maculata*, *Dactylorhiza traunsteineri* subsp. *traunsteineri*, *Dactylorhiza traunsteineri* subsp. *turfosa*, *Dryopteris cristata*, *Eriophorum gracile*, *Pinus* × *ascendens* nothosubsp. *skalickyi*, *Utricularia bremii*, *U. intermedia*, *U. ochroleuca*.

(ii) Critical taxa whose records have not yet been revised within Pladias and for which there is a risk of confusion with other closely related specialist taxa were used for mapping analyses at the aggregate level (see note 1).

(iii) For taxa whose records have not yet been revised, unrevised maps of their distribution in Pladias database were visually assessed in order to detect potential sources of bias caused by systematic confusions. Specifically, these maps were compared with distributional characteristics of individual species as described in the Flora of the Czech Republic (Hejný et al. 1988, 1990, 1992, Slavík et al. 1995, 1997, 2000, 2004, Štěpánková et al. 2010, 2024). Based on these studies, we decided to exclude records of *Luzula sudetica* due to the high amount of obviously erroneous records of this mountain species in lower altitudes.

(iv) For other taxa, all records (including unrevised ones) were used except for the records marked as incorrect or uncertain in the Pladias database.

2.2 Bryophytes.

Records of bryophytes stored in the NDOP database have not yet been revised to the extent analogous to the revision of vascular plants in the Pladias database. Therefore, we performed a systematic review of these data with special attention to strict specialists. The control steps included visualisation of records of each taxon in the map and subsequent inspection of outlying localities and other questionable records in terms of species ecology and distributional range. Besides potential determination errors, this procedure was also focused on the detection of imprecisely localised or too broadly localised records (see point 4). Data on the distribution of the rarest species (with < 100 records) underwent complete control, i.e. control of all the records. Database records were also compared with the publications dealing with the distribution of selected species (Štechová et al. 2013, 2016, Bradáčová et al. 2015, Hájková et al. 2018). Specifically, we adopted the following steps to minimize the presence of incorrect records in the dataset:

(i) The small number of records that had been identified by experts as not reliable already in the NDOP database were excluded.

(ii) Critical taxa for which there is a risk of confusion with other closely related specialists were used for mapping analyses at the aggregate level (see note 1).

(iii) For the critical taxa with very rare and scattered distribution, only records revised by taxonomical experts in specialised publications were finally used. This applies for *Campyliadelphus elodes* (Bradáčová et al. 2015, Dřevojan et al. 2021), *Rhizomnium pseudopunctatum* (Štechová et al. 2013, 2016).

(iv) We excluded occurrence records of specialists that are frequently misidentified or cannot always be reliably distinguished from closely related non-mire species (i.e. non-specialists). This applies to the species *Calypogeia neesiana* (a morphologically difficult-to-identify species, frequently misidentified and often confused with *C. integristipula* and *C. muelleriana*; Duda & Váňa 2017), *Chiloscyphus pallescens* (problematic identification due to confusion with *C. polyanthos*, with which it was formerly synonymised under a single species), *Plagiomnium ellipticum* (part of a complex of similar species together with *P. affine* and *P. elatum*), and *Dicranum undulatum* (species that can be easily mistaken with *D. scoparium*). By analogy, we did not include records of *Polytrichum commune*. Although it is not a critical species and its identification in mire habitats is generally unproblematic, the database contains a substantial number of doubtful records. *Polytrichum commune* was often recorded in vegetation plots sampled in habitats where its occurrence is very unlikely (e.g. mesophilous and dry forests); many of these records are probably based on other species of the genus *Polytrichum*.

(v) Other individual records were excluded if the review indicated that they might have involved identification errors (in some cases already documented and published), probable misidentification, or mistakes arising during data digitization. Selected examples are listed below; numbers refer to unique ID numbers in the NDOP database.

ID 47812089, *Paludella squarrosa*. Suspicious record of the moss from the alluvium of Chrudimka river, with no other reliable records known from this region (cf. Hájková et al. 2018). However, the original paper (Gutzerová 2006) does not contain any information about the occurrence of the species; the record most likely resulted from a digitization error, whereby *Paludella squarrosa* was erroneously entered into the database instead of *Palustriella commutata*.

ID 47837528, *Paludella squarrosa*. The record originates from a vegetation plot published in a classical study on the vegetation of the Krkonoše Mountains (Zlatník 1928; table VII, plot n. 29). The plot was recorded in subalpine spring vegetation, including species such as *Bartsia alpina*, *Philonotis fontana*, *Scapania uliginosa*, *S. undulata*, *Swertia perennis*. The record was likely confusion with *Dicranella palustris*; this common spring specialist species was not reported in the same vegetation table.

ID 47890043, *Cephalozia loitlesbergeri.* The record originates from a phytosociological relevé recorded at the Dářko (Padrtiny) bog in the Bohemian-Moravian Highlands (Peterka 2013). The species is not known from the region (cf. Novotný & Bureš 1996) and was not recorded during a detailed bryological survey of the locality (Holá et. al 2023). It most likely represents a misidentification of not-well developed plants of *C. connivens*, which is common at this locality.

ID 47911639, *Meesia uliginosa*. The record comes from a vegetation plot stored in the Czech National Phytosociological Database. The plot was sampled in 1997, it is localised as “Stráž pod Ralskem, uranium chemical mining site” and comprises vegetation dominated by *Carex acuta* and *Sphagnum squarrosum*. With respect to the known ecology of *Meesia uliginosa* (Váňa 2006, Hájková & Široká 2022), occurrence at such a habitat is unlikely. In a study on the distribution of species of the *Meesia* genus, Váňa (2006) does not report this locality or any other site in the surrounding area.

ID 47933552, *Drepanocladus lycopodiodes*. The moss was reported once in the Vílánecké rašeliniště fen in the Bohemian-Moravian Highlands (Rybníček & Rybníčková 1961). In the inheritance of Kamil Rybníček, however, there was found a handwritten note that refutes finding of *D. lycopodioides* in the Vílanecké rašeliniště fen and declares the observed moss as a “submerged form of *Drepanocladus revolvens* [*Scorpidium revolvens* agg.]” (Peterka et al. 2021).

IDs 47935887 and 47935605, *Sphagnum cuspidatum*. The record of the occurrence of this species originates from a permanent plot established in a rich fen in the Bohemian-Moravian Highlands (Veleba 2010). During repeated surveys of the same plot (Hájková et al. 2022), the species was not recorded; the record likely represents a misidentification with *S. fallax*.

3) Source of bias: Intentional or unintentional introduction of specialists at sites where the respective taxon did not previously occur. Deliberate plantings are carried out for aesthetic reasons, for agricultural or other economic purposes, or with the controversial aim of enhancing local biodiversity

(Kaplan et al. 2007). Unintentional introduction may occur, for example, during the transport of tree seedlings, as argued by Jehlík et al. (2012) for *Erica tetralix*.

Countermeasures: We assume that this problem is of minor importance for the majority of mire species, with respect to their specific ecological demands. To minimise this kind of bias, we nevertheless excluded:

(i) Clearly non-native records of *Primula farinosa* in the Českomoravské mezihoří phytogeographical district (cf. Kovanda in Hejný et al. 1992: 246–252).

(ii) Non-native populations of *Salix myrsinifolia* (according to Kaplan et al. 2022), which is sometimes planted as a nectar source for honeybees, and non-native populations of *Pinus uncinata* subsp. *uliginosa* (according to Kaplan et al. 2023), which is sometimes used in forestry and planted.

(iii) Populations of *Erica tetralix* introduced by forestry activities and having a frequently temporary character (according to Jehlík et al. 2012).

(iv) All records localised to the Recreational garden of the West Bohemian branch of the Czech Botanical Society in Kamenec near Radnice and to the Botanical garden of the Secondary agricultural school in Tábor.

4) Source of bias: Imprecise or wrong localisation of floristic records.

A further potential source of bias represents erroneous or imprecise coordinates, which may apply especially to unverified records of vascular plant species in the Pladias database, as well as for records of bryophytes in the NDOP database.

Erroneous coordinates (e.g. resulting from typographical errors during coordinate digitization) are rare in databases, however, they cannot be entirely excluded (McEachern & Niessen 2009). The degree of spatial accuracy of floristic records is often registered in the databases, because geographic coordinates are often, but not always, accompanied with their spatial accuracy expressed in meters. In the Pladias database, coordinate accuracy is a standard component of each record, whereas the accuracy of localization is less common for records in the NDOP database. In such cases, coordinates may be highly accurate (i.e. to the scale of meters), but they may also represent arbitrarily chosen geographic points generated for rather broad or imprecise locality descriptions (i.e. localization only to the nearest town or larger village). For such broad (mostly historical) records, random coordinates corresponding to the centre of the particular town or village may have been set. If such records are not accompanied with precision of coordinates, this may theoretically lead to the false mapping of mire habitats in the centres of towns or villages. We assume that this type of bias is negligible for general maps due to the relatively large size of mapping quadrants (5 longitudinal × 3 latitudinal minutes corresponding to approximately to 5.5 × 5.9 km). However, the spatial inaccuracy becomes more problematic for detailed maps for which smaller grid cells are used.

Countermeasures:

4.1 Wrong geographic coordinates. The search for potentially erroneous geographical coordinates was conducted simultaneously with a search for suspicious records (see point 2), during which (i) existing unpublished maps of vascular plants in the Pladias database were examined and (ii) occurrences of taxa of bryophytes were visualised on the map and systematically revised. If obviously incorrect or imprecise coordinates were identified, they were either corrected, or the records were disregarded. If records of other species also corresponded to the same location, the coordinates were corrected for all the records connected to a particular location, or all occurrences at the same questionable location were disregarded.

4.2 Imprecise geographic coordinates. In the Pladias database, records localized only to the standard grid quadrant have an accuracy of 2,500 m. In accordance with this concept, we set the maximum coordinate accuracy for the acceptance of the records at 2,500 m for general maps and 1,250 m for detailed maps. All records for which this coordinate accuracy exceeded 2,500 m and 1,250 m, respectively, were excluded from the preparation of the maps.

4.3. Geographic coordinates with missing accuracy. For unrevised records lacking information on the accuracy of coordinates, it was virtually not possible to verify all occurrences individually (i.e. to check whether coordinates match original localization or the appropriate site in the landscape). To reduce potential bias in detailed maps caused by records georeferenced to the centers of towns or large villages, we used land-use information. However, current land use cannot be applied, since mires may have been located in areas that are now urbanized zones. For this reason, historical land-use types (Skokanová et al. 2012, Sychrová et al. 2024) from the periods 1870 and 1950 were assigned to the coordinates of unrevised records. Records whose coordinates fell within urbanized areas already in these time periods were finally excluded, with the exception of cases for which individual assessment revealed location in a small settlement surrounded by grassland or wetlands (e.g. in the Šumava Mountains) or villages with sparse housing development (e.g. settlements in the Bohemian-Moravian Highlands or White Carpathians). In these areas, the historical occurrence of small mires in the vicinity of isolated dwellings can be reasonably assumed.

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