Title: **ReSurveyGermany: Vegetation-plot time-series over the past hundred years in Germany**

Authors:

Ute Jandt[1,2,3], Helge Bruelheide[1,2,3,4], Christian Berg[5], Markus Bernhardt-Römermann[6,2], Volker Blüml[7], Frank Bode[8], Jürgen Dengler[9,2,10], Martin Diekmann[11], Hartmut Dierschke[12], Inken Doerfler[13], Ute Döring[14], Stefan Dullinger[15], Werner Härdtle[16], Sylvia Haider[1,2], Thilo Heinken[17], Peter Horchler[18], Florian Jansen[19], Thomas Kudernatsch[20], Gisbert Kuhn[21], Martin Lindner[22,2], Silvia Matesanz[23], Katrin Metze[24], Stefan Meyer[25], Frank Müller[26], Norbert Müller[27], Tobias Naaf[28], Cord Peppler-Lisbach[29], Peter Poschlod[30], Christiane Roscher[31,2], Gert Rosenthal[32], Sabine B. Rumpf[33,15], Wolfgang Schmidt[34], Joachim Schrautzer[35], Angelika Schwabe[36], Peter Schwartze[37], Thomas Sperle[38], Nils Stanik[32], Hans-Georg Stroh[39], Christian Storm[40], Winfried Voigt[41], Andreas von Heßberg[42], Goddert von Oheimb[43], Eva-Rosa Wagner[44], Uwe Wegener[45], Karsten Wesche[46,2,47], Burghard Wittig[48,11], Monika Wulf[28,49]

1 Institute of Biology/Geobotany and Botanical Garden, Martin Luther University Halle-Wittenberg, Am Kirchtor 1, 06108 Halle, Germany

2 German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Puschstr. 4, 04103 Leipzig, Germany

3 These authors contributed equally to this work

4 Corresponding author, helge.bruelheide@botanik.uni-halle.de

5 Karl-Franzens-Universität Graz, Institute for Biology, Holteigasse 6, 8010 Graz, Austria

6 Institute of Ecology and Evolution, Friedrich Schiller University Jena, Dornburger Str. 159, 07743 Jena, Germany

7 BMS - Umweltplanung, Freiheitsweg 38A, 49086 Osnabrück, Germany

8 Abteilung Forschungsförderung, Karlsruher Institut für Technologie (KIT), Kaiserstraße 12, 76131 Karlsruhe

9 Vegetation Ecology Group, Institute of Natural Resource Sciences (IUNR), Zurich University of Applied Sciences (ZHAW), Grüentalstr. 14, 8820 Wädenswil, Switzerland

10 Plant Ecology, Bayreuth Center of Ecology and Environmental Research (BayCEER), Universitätsstr. 30, 95447 Germany

11 Vegetation Ecology and Conservation Biology, Institute of Ecology, FB 2, University of Bremen, Bremen, Germany

12 Vegetation Analysis and Phytodiversity, Albrecht-von- Haller-Institute of Plant Sciences, Georg-August- University of Göttingen, Untere Karspüle 2, D-37073 Göttingen, Germany

13 Vegetation Science and Nature Conservation Group, Institute for Biology and Environmental Sciences, University of Oldenburg, 2611 Oldenburg, Germany

14 Auf der Wessel 47, 37085 Göttingen, Germany

15 Department of Botany and Biodiversity Research, University of Vienna, Rennweg 14, 1030 Vienna, Austria.

16 Leuphana University of Lüneburg, Institute of Ecology, Universitätsallee 1, 21335 Lüneburg, Germany

17 General Botany, Institute of Biochemistry and Biology, University of Potsdam, Maulbeerallee 3, 14469 Potsdam, Germany

18 Federal Institute of Hydrology, Department Vegetation Studies, Landscape Management, Am Mainzer Tor 1, 56068 Koblenz, Germany

19 Faculty of Agricultural and Environmental Sciences, Rostock University, Justus-von-Liebig-Weg 6, 18059 Rostock, Germany

20 Bavarian State Institute of Forestry, Hans-Carl-von-Carlowitz-Platz 1, 85354 Freising, Germany

21 Institut für Ökologischen Landbau, Bodenkultur und Ressourcenschutz, AG Vegetationskunde, Bayerische Landesanstalt für Landwirtschaft, Lange Point 12, 85354 Freising

22 Institute of Biology/Biology Education, Martin Luther University Halle-Wittenberg, Weinbergweg 10, 06120 Halle, Germany

23 Universidad Rey Juan Carlos, Area de Biodiversidad y Conservación, Móstoles, Madrid 28933, Spain

24 Ministerium für Wissenschaft, Energie, Klimaschutz und Umwelt des Landes Sachsen-Anhalt, Leipziger Straße 58, 39112 Magdeburg

25 Plant Ecology and Ecosystems Research, Albrecht von Haller Institute of Plant Sciences, University of Göttingen, Untere Karspüle 2, 37073 Göttingen, Germany;

26 Institute of Botany, TU Dresden, Mommsenstr. 13, 01062 Dresden, Germany

27 Dep. Landscape Management & Restoration Ecology, Fachhochschule Erfurt, Leipzigerstr. 77, 99085 Erfurt, Germany

28 Leibniz Centre for Agricultural Landscape Research (ZALF), Eberswalder Straße 84, 15374 Müncheberg, Germany

29 Landscape Ecology Group, Institute for Biology and Environmental Sciences, University of Oldenburg, Carl von Ossietzky Str. 9-11, 26129 Oldenburg, Germany

30 Ecology and Conservation Biology, Institute of Plant Sciences, Faculty of Biology and Preclinical Medicine, University of Regensburg, Universitaetsstrasse 31, 93053 Regensburg, Germany

31 Department of Physiological Diversity, UFZ, Helmholtz Centre for Environmental Research, Puschstr. 4, 04103 Leipzig, Germany

32 Department of Landscape and Vegetation Ecology, University of Kassel, Gottschalkstrasse 26a, 34127 Kassel, Germany

33 University of Basel, Department of Environmental Sciences, Bernoullistrasse 32, 4056 Basel, Switzerland

34 Department of Silviculture and Forest Ecology of the Temperate Zones, Georg-August-University Göttingen, Büsgenweg 1, D-37077 Göttingen, Germany

35 Institute for Ecosystem Research, Kiel University, Olshausenstraße 75, 24118 Kiel, Germany

36 Faculty of Biology, Technical University Darmstadt, Schnittspahnstraße 4, 64287 Darmstadt, Germany

37 Biologische Station Kreis Steinfurt e.V., Bahnhofstraße 71, 49545 Tecklenburg, Germany

38 Vogtsstr. 3, 79183 Waldkirch, Germany

39 büro áchero Vegetation and Environmental Consulting, Friedländer Straße 17a, 37133 Friedland

40 Fachgebiet Chemische Pflanzenökologie, Fachbereich Biologie, Technische Universität Darmstadt, Schnittspahnstr. 10, D-64287 Darmstadt, Germany

41 Institute of Ecology and Evolution, University of Jena, Dornburger Str. 159, 07743 Jena, Germany

42 Bayceer - Uni Bayreuth, Universitätsstr. 30, 95447 Bayreuth

43 Technische Universität Dresden, Institute of General Ecology and Environmental Protection, Pienner Straße 7, 01737 Tharandt, Germany

44 Engbertsheide 9, 49324 Melle

45 Meisenweg 27, 38820 Halberstadt, Germany

46 Botany Department, Senckenberg Museum of Natural History Görlitz, Am Museum 1, 02826 Görlitz, Germany

47 International Institute Zittau, Technische Universität Dresden, Markt 23, 02763 Zittau, Germany

48 Lower Saxony Water Management, Coastal Protection and Nature Conservation Agency, Betriebsstelle Lüneburg, Standort Verden, Bürgermeister Münchmeyer Str. 6, 27283 Verden, Germany

49 Institute of Biochemistry and Biology, University of Potsdam, Maulbeerallee 3, 14469 Potsdam, Germany

Design Type(s): time series, vegetation-plot data

Measurement Type(s): biodiversity, cover of vascular plant species in vegetation-plot records

Technology Type(s): (semi-)permanent plots, resurveys

Factor Type(s): year of vegetation record, geographic location, EUNIS habitat type

Sample Characteristic(s): cover records for 1,794 vascular plant species in 7,738 (semi-)permanent vegetation plots from Germany, resurveyed from 2 to 54 times, in total resulting in 23,641 vegetation records and 458,311 species cover records, comprising the years from 1927 to 2020 and 97 EUNIS habitat types

Abstract

Vegetation-plot resurvey data are a main source of information on terrestrial biodiversity change, with records reaching back more than one century. Although more and more data from re-sampled plots have been published, there is not yet a comprehensive open-access dataset available for

analysis. Here, we compiled and harmonised vegetation-plot resurvey data from Germany covering almost 100 years. We show the distribution of the plot data in space, time and across habitat types of the European Nature Information System (EUNIS). In addition, we include metadata on geographic location, plot size and vegetation structure. The data allow calculating temporal biodiversity change at the community scale and reach back further into the past than most comparable data yet available. They also enable tracking changes in the incidence and distribution of individual species across Germany. In summary, the data come at a level of detail that holds promise for broadening our understanding of the mechanisms and drivers behind plant diversity change over the last century.

Background & Summary

The current biodiversity crisis threatens an estimated one million species with extinction [1]. The nature and rate of observed changes depend on the spatial scale at which they are observed [2]. At the finest scale, i.e. the local scale of plant communities, vegetation-plot records have been found to become sometimes richer, sometimes poorer in species [3], while a considerable temporal species turnover is apparent in the majority of cases [4].

Vegetation-plot time series have mainly been collected for particular habitats, such as forests [5–17], hedgerows[18], wet grasslands[19–22], mesic grasslands[23–29], dry grasslands[22,30–35], acid grasslands and heathlands[36–38], alpine grasslands[39,40], rivers[41], riverbanks[42], peatlands[43–46], roadsides[47] or arable land[48–50]. Sometimes, they were recorded to assess the changes in species composition across all communities that occur in a certain area[51–55]. So far, vegetation-plot time series have not been accessible without restrictions. In contrast, open access biodiversity time-series data such as BioTIME[56], comprise all different types of taxonomic groups, ranging from plants, plankton and terrestrial invertebrates to vertebrates, but include only a few vegetation-plot time series. Thus, our database closes a gap for a particular region, which is Germany.

Vegetation-plot resurvey data have been extensively used to assess biodiversity changes by means of monitoring certain vegetation types in local studies, such as managed grassands [24]and rivers [41]. More recently, time series have been collected across regions, exploring the contribution of local biodiversity change [3] to that observed at broader spatial scales [1,57,58]. While these analyses often failed to detect changes in species richness [3,59,60], they were able to relate the observed trends to changes in land use and climate [61,62]. Although these studies have compiled databases on vegetation-plot time series, they are currently not openly available. This is also the case for the current initiative of ReSurveyEurope, which collates and mobilizes vegetation-plot data with repeated measurements over time (http://euroveg.org/eva-database-re-survey-europe). Our aim is to provide a comprehensive and taxonomically standardised database of vegetation-plot time series for Germany. We confined the geographical extent to Germany because of a long tradition of German vegetation scientists carrying out temporal observations on permanent plots (e.g.[28]), the large amount of available data, our familiarity with the regional literature, and of recent initiatives to mobilize retrospective biodiversity data for trend analyses (www.idiv.de/smon).

Vegetation-plot time series differ in some fundamental ways from other biodiversity time series. Since the advent of phytosociology in the early 20th century[63,64], vegetation surveys were carried out in a standardised way. Plot sizes of vegetation relevés can vary considerably and depend on the vegetation type considered (e.g. forest plots usually have plot sizes between 100 and 1000 m^2, while non-forest plots mostly range from 4 to 100 m^2 [65]). In addition, sampling protocols might vary between studies, but they all include complete lists of species occurring at the plot at the time of sampling. In consequence, vegetation-plot records provide information on both presences and

absences of species in a community. As sampling is usually done by professionals, absences of a previously occurring species in a time series strongly indicates local extinction, or vice versa, the presence of a species that had not been recorded previously is a robust indication of colonization. However, even with experts carrying out the survey, it is possible that some species may remain undetected in the record because of their phenology or taxonomic uncertainties [65]. Yet, such vegetation-plot data are much more reliable than vegetation surveys at larger scales, such as floristic grid mapping, where false absence data are the rule [66,67]. In contrast to time series at broader spatial scales, vegetation-plot time series contain information on species co-occurrence at scales relevant for direct biotic interactions among individuals [68]. An additional advantage of vegetation-plot records is that they report the relative abundance of species, in the case of vegetation records from Germany, typically assessed as cover values [69,65]. Thus, vegetation-plot records allow testing key theories of biogeography, such as the abundance–range size relationship [70] or the relationship between local abundance and niche breadth [71,72]. Most importantly, several vegetation-plot time series precede the onset of any other systematic plant species monitoring programme, such as for example the monitoring of Natura 2000 sites in Europe, which only started in 2001[73]. This is particularly important because severe biodiversity loss may have already happened in the second half of the 20th century, mainly brought about by shifts in the type and intensity of landuse as the consequence of technical progress and societal changes [74]. Finally, species-abundance data in plots can be linked to functional information on species [65], which allows the interpretation of the underlying ecological drivers of the changes observed and the consequences for ecosystem functioning[75].

Based on the data described here we analysed for the first time the dynamics of losses and gains of plant species[76]. We showed that the difference in cover changes between decreasing and increasing species results in biodiversity change even if species richness at the plot scale remains unchanged. Two mechanisms are responsible for these changes. First, losses at the plot scale were more evenly distributed among losing species than gains among winning species. Second, gains and losses in cover were concentrated in different species, resulting in a higher number of losers than winners at the spatial scale of Germany. The temporal extent of the data allowed us to demonstrate that most species losses occurred already in the 1960s, affecting mostly species from mires and spring fens, grasslands and arable land. Thus, these data already helped to shed light on the most important mechanisms underlying biodiversity change in the second half of the 20th century.

Data Records

ReSurveyGermany is the most comprehensive compilation of repeated long-term vegetation plot records from Germany to date, including published studies as well as surveys from grey literature and nature conservation assessments. A list of all 92 projects included in the study is provided in Table 1. A project might comprise one or several studies and focus on one or several vegetation types, but typically carried out the surveys at the same times and with the same methodology. In total, the projects comprise 1,794 vascular plant species recorded in 7,738 vegetation plots. The plots were either marked with poles or magnets (permanent) or recovered from exact descriptions (semi-permanent). In addition, there were also studies where plots were not matched in time but a set of plots at a site was compared within another set of plots at the same site in the resurvey (community comparison, Fig. 1). We only considered records with complete lists of vascular plants and information on their relative abundance, which was mostly expressed as percentage cover[77]. A further important criterion for including a study was the existence of vegetation data for at least two points in time, although the number of visits (i.e. vegetation records) per site ranged between two and 54. The time span covered by each project is shown in Fig. 1. All records were made between

1927 and 2020. In total, ReSurvey Germany comprises 23,641 vegetation-plot records and 458,311 species cover records.

Plot locations are not evenly spread across Germany (Fig. 2). We assigned the individual plot locations to the grid cells of the quadrants of German ordnance maps ("MTBQ," 0°10' × 0°6', approximately 5.6 km × 5.9 km in the centre of Germany), and tested whether the grid cells with vegetation-plot time-series records differed from those without observations with respect to population density, road density, urban cover, cropland cover and protected areas. This revealed that the sampled grid cells were not representative for the whole area of Germany. Surprisingly, the sampled grid cells showed significantly higher human population densities, road densities and urban cover, while cover of cropland and the amount of protected area was lower (Table 2), which indicates that the majority of time series was made in regions with higher human pressures. The lack of spatial representativeness also becomes obvious when plotting maps of plot locations by the decade of the times when they were visited (Fig. 3).

While we did not deliberately exclude certain habitat types, the data mainly consist of semi-natural to intensively managed grasslands and forests. Thus, the time series in ReSurveyGermany are biased with respect to habitat types. We assigned EUNIS habitat types to each plot record. This was accomplished by using the expert system EUNIS-ESy[78] and the corresponding R code[79]. Plot records covered a total of 92 EUNIS habitat types out of the 150 ones distinghished for Germany. About 63% of the 23,641 plot records came from grasslands (level 1 EUNIS habitat R, n=14,849), followed by forests and other wooded lands (T, n= 5,440, 23%). In contrast, arable land (V, vegetated man-made habitats), which makes up more than 36% of the land cover in Germany, was only represented by 3% (816 plot records).

Database organisation

A separate database was created for each project that contributed data, using the data-management software Turboveg 2[80]. The database is composed of two main tables, following the structure of Turboveg and common practice in vegetation science. The plot-species-abundance table contains six fields as described in Table 3. It is linked to the plot metadata (header file) through PROJECT_ID_RELEVE_NR, which is a unique Plot observation ID of a combination of PROJECT_ID (see Table 1) and the plot observation ID (called RELEVE_NR), the name of the observed taxon (TaxonName), the vertical layer (tree layer, shrub layer, herb layer, moss layer) in which the species was observed (LAYER) and the taxon's cover in the plot (Cover_Perc). The latter was obtained by transforming the original cover classes in per cent cover. For example, the seven cover classes of theBraun-Blanquet scale, r, +, 1, 2, 3, 4, 5 were transformed to 1%, 2%, 3%, 13%, 38%, 63%, 88%, respectively. The other table is the so-called header file, which holds all important plot-level information, such as plot sizes, geographic location and vegetation structure for each plot observation ID (Table 4).

The taxon names in the plot-species-abundance table were standardised using German SL 1.3[81]. The nomenclature for vascular plants followed Wisskirchen et al.[82], with additional aggregations to higher taxonomic levels according to German SL 1.3. As some authors recorded subspecies and other infraspecific taxa, species were aggregated at the species level, using vegdata[83]. Some closely related species that, from our experience, are often mistaken in the field were merged at the aggregate or genus level. Species aggregates were also used when different taxon names of the same aggregate occurred in different projects, to prevent that the same taxon might appear under different taxon names. We used our own R code to merge taxon names and the notation of the ESy expert system[78] to protocol all steps. The species harmonisation forms the first section of the ESy system and shows

which taxon names were aggregated under the name of a broader taxonomic concept (Table 5). In addition, within single projects, we used customised aggregations and segregations when the same taxa were reported with different taxonomic levels at different points in time in the same plot resurvey IDs (Table 6). For example, in all years of a time series of a specific plot *Orchis militaris* was reported but in one year *Orchis* spec. was recorded at the genus level. Unaccounted for, such a leap between taxonomic levels within a time series would result in incorrect species change observations. To avoid losing the predominating information at the species level by aggregating all records to *Orchis*, we assumed that the taxon was also *Orchis militaris* in the particular year when only the genus level was reported. If more than one taxon occurred in previous years, we equally distributed the cover values among those taxa. This happened for example when a record was taken late in spring when the two species *Anemone nemorosa* and *A. ranunculoides* could no longer be distinguished.

The percentage cover values of the same aggregated taxon name of the same plot were merged, assuming a random overlap of their cover values and making sure that the combined cover values cannot exceed 100%[78]. As not all projects had recorded cryptogams, we removed bryophytes and lichens in all projects, using the vegdata package in R[83]. As a result, the original list of 3,280 taxon names that included bryophytes and lichens was reduced to 1,794 taxon names of vascular plants. However, if data on lichens and bryophytes are required, they are available on request from the respective dataset custodians (see Table 1).

The data structure of the header file of ReSurveyGermany follows the Turboveg 2 standard[80] and in addition holds the fields of ReSurveyEurope (http://euroveg.org/eva-database-re-survey-europe) (Table 4). The fields relevant for the resurvey are RS_PROJECT, which refers to the resurvey project in Table 1. The header field RS_SITE holds the location name of plots and allows for a local geographical scale aggregation of resurvey plots within projects. LOCALITY provides more details on the locality in German

Within each project, the field RS_PLOT holds a plot resurvey ID that connects plot observations from different times made on the same plot. In resurveys, there are also cases, where the previously provided location was not precise enough. In these cases, resurveys often used several plots to match one previous plot, resulting in a one-to-many relationship. If a set of plots at the same site was compared with plot records from another point in time, this field is empty and the unique identifier indicating which plots have to be matched is found in the field RS_SITE. We still keep the original observation ID that a plot received when it was surveyed (RS_OBSERV). We report the exact DATE when a record was made (if available). In addition, the field YEAR lists the year in which the plot was (re)surveyed. If available, we also report the year of the underlying publication (YEAR_PUBL).

Plot area (SURF_AREA) ranges from 0.5 to 2500 m^2, with 25, 100 and 400 m^2 being the most frequently used plot sizes (Fig. 4). Plot sizes larger than 100 m^2 were typical of forest sites (with a very few exceptions).

Geographic information is given by LONGITUDE, LATITUDE and ALTITUDE. Current monitoring programs and data protection of land owners do not allow us to provide location information at the highest available precision. In addition, some records contain occurrence data of rare and protected species. Thus, information on longitude and latitude was rounded to two decimal digits. Compared to the coordinates at highest available precision, rounding resulted in a mean uncertainty of 371 m (± 138 m standard deviation), and thus, is within the somewhat limited range of accuracy provided by many custodians in the first place (see field PRECISION). If more precise coordinates are required for certain analysis we recommend to contact the respective data owners (as shown in Table 1). Vegetation-plot time series differ with respect to the accuracy of the plot relocation during the

resurvey. In the ideal case, plots are permanently marked, using poles, metal tent pegs or magnets and metal detectors to retrieve their position (shown as "01" in the LOC_METHOD field, Table 4). In other cases, plots only have exact coordinates (using GPS coordinates, "03" or "04") or other ways of descriptions of the exact locality (such as from maps, "05"), but are not marked on the ground, which we refer to as semi-permanent plots. In addition, there is information on the cover scale used for the record, a reference to the data source (or, if published, the publication ID), including the table and column from which the data were taken.

The orientation of the plot can be taken from SLOPE (inclination) and slope ASPECT (compass directions). Vegetation structure is described by the height and cover of the different layers, ranging from tree layer to moss layer and including information on cover of litter and bare soil (if available).

Some of our projects included experimental treatments with different management of habitats (e.g. abandonment or establishment of grazing, succession and disturbance). Plots with experimental manipulation contain "Y" in the MANIPULATE) field. The type of manipulation can be taken from MANIPTYPE. When projects involved treatments that are not representative for biodiversity change in the study, we included only the control plots [44], plots that reflected the predominant land use at the site (e.g. mowing for a grassland to counteract natural succession) [20], that were unfenced [84] or were subjected to continuous grazing [85].

Usage notes

The data of the ReSurveyGermany dataset as described above is available https://doi.org/10.25829/idiv.3508-c17blk under the terms specified by CC BY 4.0.

[Please note that the link is not yet activiated, which will happen around May 25th, 2022. In the meantime you can already access the metadata via https://idata.idiv.de/ddm/Data/ShowData/3508?version=0 and the full dataset here: https://cloud.uni-halle.de/s/wei1ljqnq2Wet0A

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Users are urged to cite the original sources when using ReSurveyGermany in addition to the present paper (see Table 1). As some of the time series will be continued, it might be useful to contact the respective data owners. As described above, the dataset cannot be considered representative of Germany's vegetation, neither spatially, nor temporally, which is typical of vegetation-plot time series[86]. As plots were established with different objectives in different habitats at different points in time, analysis of vegetation-plot resurveys faces various methodological challenges[60]. Yet, we note that ReSurveyGermany covers about 60% of the 2,988 vascular plant species that occur in Germany (without subspecies and segregates[82]) and includes rare habitats which often harbour rare plant species. This means that even if our sites are not fully representative of the vegetation of Germany and its change over the last century, the data nevertheless give important insights into biodiversity change at the level of local communities and individual species.

Code availability

The R code to read the plot-species-abundance file (ReSurveyGermany.csv) and combine it with the header data (Header_ReSurveyGermany.csv) is provided on https://github.com/idiv-biodiversity/Read_ReSurveyGermany.

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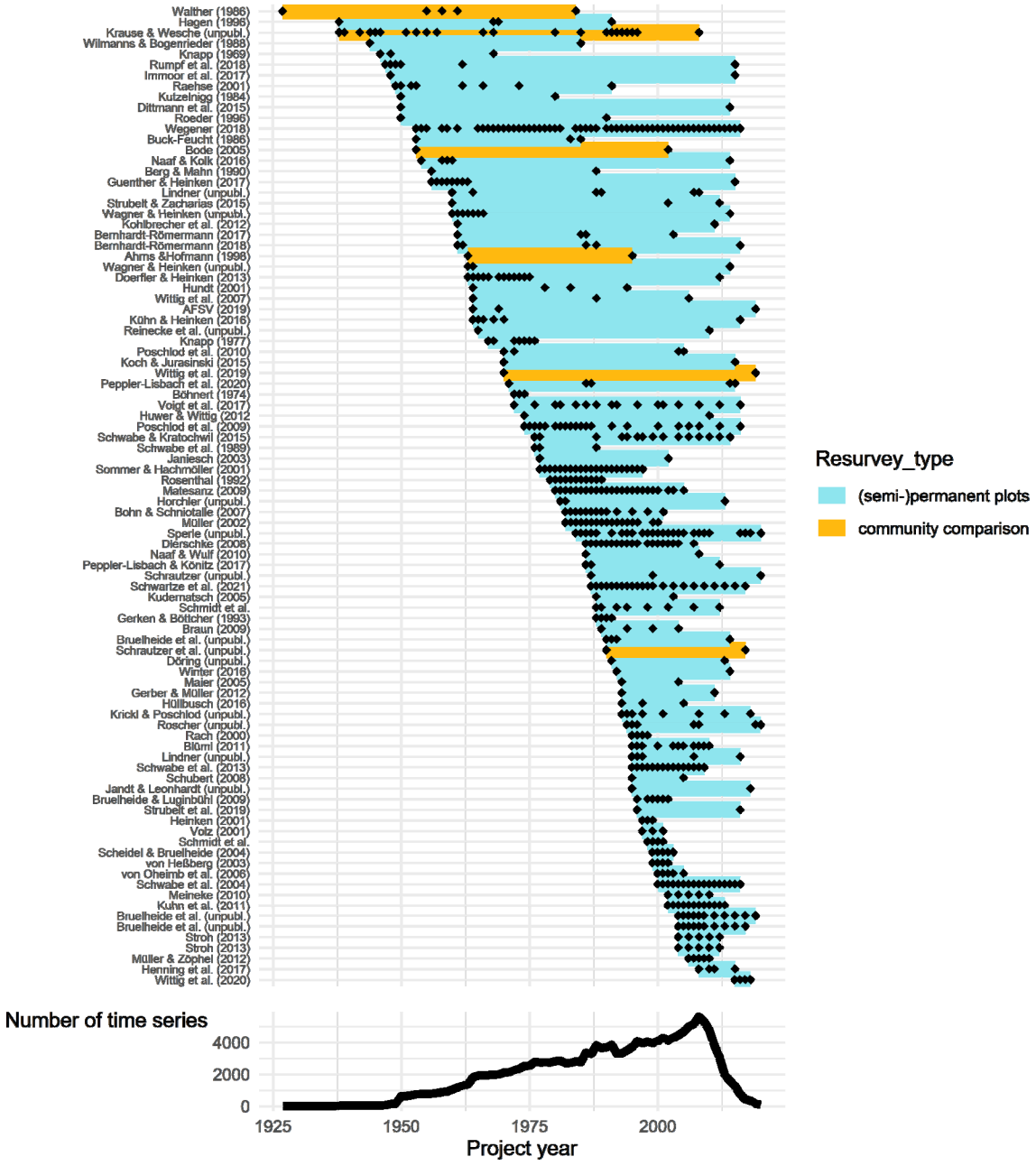
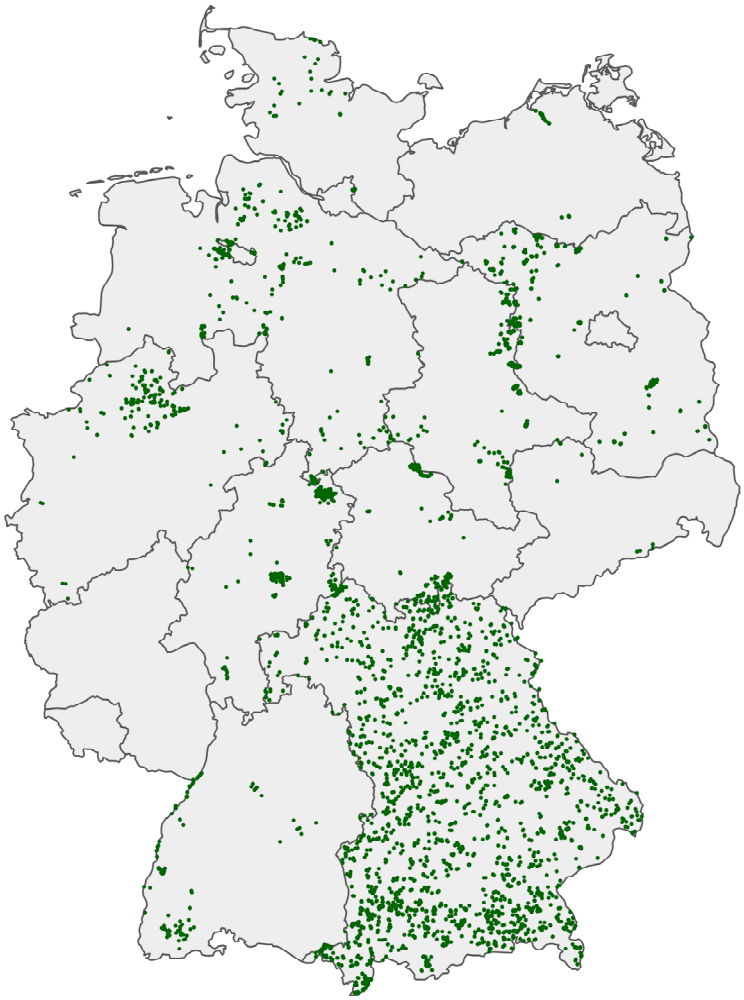


566

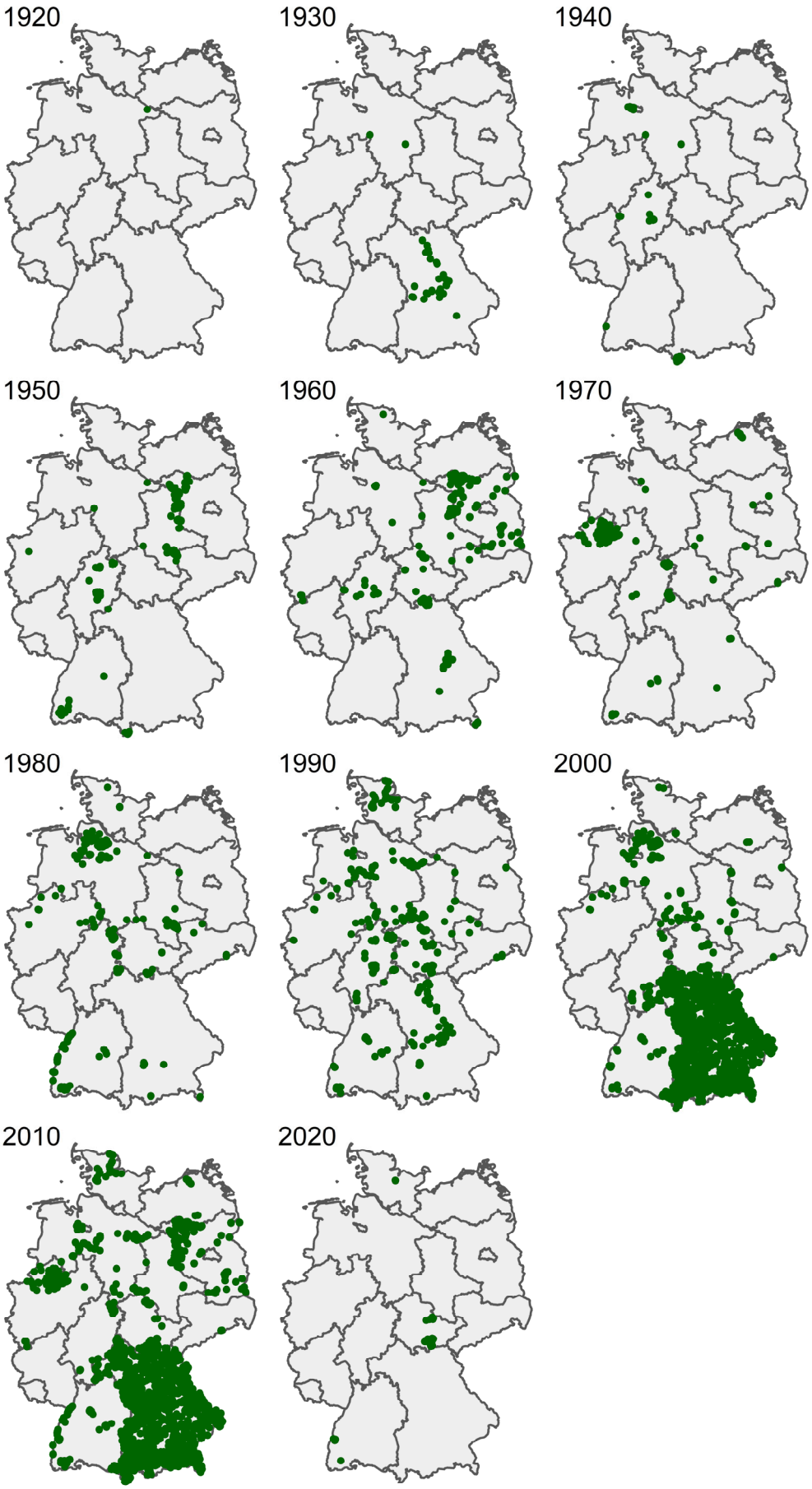
567 Fig. 1: Temporal coverage of the 92 projects included in the study. The coloured lines indicate the
568 start and the end of a project, black diamonds show in which years surveys were made. Resurvey
569 type refers to either studies that were repeated within a particular community across a site without
570 attempts to match plots (community comparison), or were carried out on matched plots, which were
571 either permanently marked or retrieved from exact descriptions (semi-permanent). The lower graph
572 shows the number of times a particular year was included in the covered time span of any of the
573 projects. For a list of projects see Table 1.

574



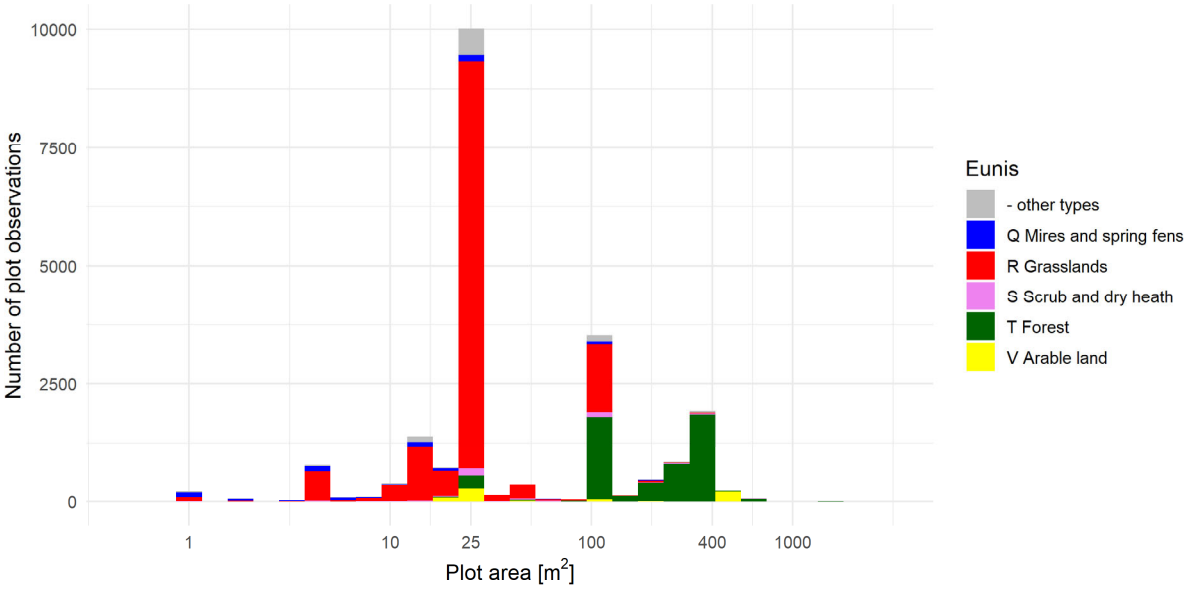
575

576 Fig. 2: Map of all plots of all projects (n=23,641). Note that green dots may represent one or several
577 plots whih were summarised under the same plot resurvey ID (n=7,738). The more complete
578 coverage of Bavaria resulted from including the grassland monitoring Bavaria which started in 2002
579 [24].



580

581 Fig. 3: Map of plot visits by decade, with the year showing the begin of the decade.



582

583 Fig. 4: Histogram ofplot size across all records (n=23,641). Colours show Eunis level 1 habitat types.

584

585 Table 1: List of all projects included in this study. PROJECT_ID: internal reference number.
586 EUNIS habitat types of time series were assigned to the habitat type by using the earliest
587 plot record that resulted in level 3 EUNIS classification. The classification was based on the
588 EUNIS-ESy expert system[78] using the R code implementation[79]. If a project included several
589 habitat types, they are shown in decreasing numbers of plot records. Code for habitat types
590 are ?: plots not assigned to any level 3 EUNIS habitat type, +: assigned to more than one
591 level 3 EUNIS habitat type, A: Marine habitats, C: Inland surface waters, H: Inland sparsely
592 vegetated habitats or devoid of vegetation, N: Coastal habitats, Q: Wetlands, R: Grasslands
593 and lands dominated by forbs, mosses or lichens, S: Heathlands, scrub and tundra, T: Forests
594 and other wooded land, V: Vegetated man-made habitats, including arable land.

PROJECT_ ID	Project Name	Reference	EUNIS habitat type
77	AFSV (2019)	Arbeitsgemeinschaft Forstliche Standorts- und Vegetationskunde (AFSV) (2019) Nordwest-Eifel - Standorte, Waldgesellschaften, Nutzungen gestern und heute. Exkursionsführer der AFSV-Tagung 2019 in der Nordwesteifel. Verlag Dr. Kessel, Remagen-Oberwinter.	T17
1	Ahrns & Hofmann (1998)	Ahrns, C. & Hofmann, G. (1998) Vegetationsdynamik und Florenwandel im ehemaligen mitteldeutschen Waldschutzgebiet "Hainich" im Intervall 1963 - 1995. Hercynia N.F. 31: 33-64.	T17
4	Berg & Mahn (1990)	Berg, C. & Mahn, E.-G. (1990) Anthropogene Vegetationsveränderungen der Strassenrandvegetation in den letzten 30Jahren-die Glatthaferwiesen des Raumes Halle Saale. Tuexenia 10: 185-195.	R22, R
2	Bernhardt-Römermann (2017)	(Echinger Lohe)	T1F, T1E, T13, T
3	Bernhardt-Römermann (2018)	(Sonneberg)	T35, T32, T1F, T18, T17, T, S42, R57, R, ?
5	Blüml (2011)	Blüml, V. (2011) Langfristige Veränderungen von Flora und Vegetation des Grünlandes in der Dümmerniederung (Niedersachsen) unter dem Einfluss von Naturschutzmaßnahmen. Dissertation, Universität Bremen.	R55, R36, R35, R21, R, Qb, Q52, Q51
6	Bode (2005)	Bode, F. (2005) Subrezenter Vegetations- und Landschaftswandel im Südschwarzwald. Dissertation, Albert-Ludwigs-Universität Freiburg.	S42
92	Bohn & Schniotalle (2007)	Bohn, U. & Schniotalle, S. (2007) Hochmoor-, Grünland- und Waldrenaturierung im Naturschutzgebiet "Rotes Moor", Hohe Rhön 1981 - 2001: Ergebnisse 20-jähriger wissenschaftlicher	T12, S92, R37, R35, R23!, R23, R1M, Qa, Q24, Q22, ?

		Begleituntersuchungen im Rahmen und im Anschluss an ein E+E-Vorhaben des Bundes. Bundesamt für Naturschutz, Bonn.	
78	Böhnert (1974)	Böhnert, W. (1978) Ökologische Untersuchungen auf den Kreidesandsteinhöhen der Harslebener Berge bei Quedlinburg. Naturschutz und naturkundliche Heimatforschung in den Bezirken Halle und Magdeburg 15 (2): 11-23	S42, R
7	Braun (2009)	Braun, W. (2009) Ein Niedermoor wächst über Hochmoortorf. Ber. d. Bayerischen Botanischen Gesellschaft 79: 127-146. München.	Qb, Qa, Q25, Q24, H26a
88	Bruelheide & Luginbühl (2009)	Bruelheide, H. & Luginbühl, U. (2009) Peeking at ecosystem stability: making use of a natural disturbance experiment to analyze resistance and resilience. Ecology 90 (5): 1314-1325.	T1F, T1E, T17, T, H25
17	Bruelheide et al. (unpubl.)	(Bergwiesen)	R55, R37, R35, R23!, R22, R1M, R, Q24, ?
90	Bruelheide et al. (unpubl.)	(Preuk)	T35, T1B, T, Sa
91	Bruelheide et al. (unpubl.)	(Schiessplatz)	T35, R
8	Buck-Feucht (1986)	Buck-Feucht, G. (1986) Vergleich alter und neuer Vegetationsaufnahmen im Forstbezirk Kirchheim unter Teck. Mittelungen des Vereins für forstliche Standortskunde und Forstpflanzenzüchtung (32): 43-49.	T1E, T18, T17, T13, T
76	Dierschke (2008)	Dierschke, H. (2008) Dynamik und Konstanz an naturnahen Flussufern -27 Jahre Dauerflächenuntersuchungen am Oderufer (Harzvorland). Braunschweiger Geobotanische Arbeiten 9: 119-138.	R55
10	Dittmann et al. (2015)	Dittmann, T., Heinken, T. & Schmidt, M. (2018) Die Wälder von Magdeburgerforth (Fläming, Sachsen-Anhalt) – eine Wiederholungsuntersuchung nach sechs Jahrzehnten. Tuexenia 38: 11-42.	T35, T1E, T1B, T18, T17, T15, T13, T12, T
11	Doerfler & Heinken (2013)	Vegetation change of wet and moist forests in NE German nature reserves	T3M, T3J, T35, T1E, T17, T16, T15, T13, T12, T, S92, Qb, Qa, Q53, +, ?
12	Döring (unpubl.)	Feuchtwälder in den Landkreisen Diepholz und Uelzen; Wiederholungsaufnahmen von PD Dr. Wilfried	T1E, T16, T15, T13, T12, T

		Hakes [NW-FVA] im Rahmen des Forschungsvorhabens “NaLaMa-nT” erhoben	
62	Gerber & Müller (2012)	Gerber, L. & Müller, F. (2012) Flora und Vegetation den Naturschutzgebietes Am Galgenteich Altenberg. Berichte der Arbeitsgemeinschaft sächsischer Botaniker N.F. 21: 65-123.	S42, S32, R1M, R
13	Gerken & Böttcher (unpubl.)	Abschlußbericht, unpubl.	V38, R22, R1A, R, H26a, ?
15	Günther et al. (2021)	Günther, K., Schmidt, M., Quitt, H. & Heinken, T. (2021): Veränderungen der Waldvegetation im Elbe-Havelwinkel von 1960 bis 2015. Tuexenia 41: 53-85.	T3M, T35, T1B, T16, T15, T13, T12, T, S92, S42
16	Hagen (1996)	Hagen, T. (1996) Vegetationsveränderungen in Kalk-Magerrasen des Fränkischen Jura. Laufener Forschungsbericht 4. Bayerische Akademie f. Naturschutz u. Landschaftspflege, Laufen, Salzach. 218 S.	R1A, R16, R13
79	Heinken (2001)	Heinken, A. (2001) Vegetationsentwicklung von Auengrünland nach Wiederüberflutung. Diss. Math.-Nat. Fak. Humboldt-Universität Berlin. 161 S.	R36, R22, R21, R, Qb, Q52, Q51
43	Heinrich, Marstaller & Voigt (2012)	Eine Langzeitstudie zur Sukzession in Halbtrockenrasen - Strukturwandlung in einer Dauerbeobachtungsfläche im Naturschutzgebiet “Leutratal und Cospoth” bei Jena (Thüringen). Artenschutzreport Jena 30: 1-80.	T36, T1H, T19, T17, T, Sa, S35, R51!, R22, R1A, R16, H26a, ?
68	Henning et al. (2017)	Henning, K.; Lorenz, A.; von Oheimb, G.; Härdtle, W.; Tischew, S. Year-round cattle and horse grazing supports the restoration of abandoned, dry sandy grassland and heathland communities by supressing Calamagrostis. Journal for Nature Conservation 40: 120-130.	V38, S42, R1P, R1A, N19, N15
54	von Heßberg (2003)	Von Heßberg, A. (2003) Landschafts- und Vegetationsdynamik entlang renaturierter Flussabschnitte von Obermain und Rodach. Dissertation, Universität Bayreuth.	V15, T13, S91, R55, R21, H25
74	Horchler (unpubl.)	Horchler, P., Henrichfreise, A. Vollmer, I. (2013) Wiederholungsaufnahme von 54 Auenwald-Vegetationsaufnahmen am Oberrhein.	T1H, T1F, T1E, T13, T11, T, Sa, S35, R55, Q52, C23, ?
19	Hüllbusch et al. (2016)	Hüllbusch, E., Brandt, L.M., Ende, P. & Dengler, J. (2016) Little vegetation change during two decades in a dry grassland complex in the Biosphere Reserve Schorfheide-Chorin (NE Germany). Tuexenia 36: 395-412.	R22, R1P, R1B, R1A, R, N15!!

20	Hundt (2001)	Hundt, R. (2001) Ökologisch-geobotanische Untersuchungen an den mitteldeutschen Wiesengesellschaften unter besonderer Berücksichtigung ihres Wasserhaushaltes und ihrer Veränderung durch die Intensivbewirtschaftung. Mitteilungen aus dem Biosphärenreservat Rhön/Thüringen. 3. Monographie. 366 S.	V37, R55, R37, R36, R35, R23!, R22, R1M, R1A, R, Q53, Q43, +
48	Huwer & Wittig (2012)	unpublished data for: Huwer, A. & Wittig, R. (2012) Changes in the species composition of hedgerows. Tuexenia 32: 31-53. Göttingen.	T1E, T1B, T13, T12, T11, T, Sa, S37, ?
21	Immoor et al. (2017)	Immoor, A., Zacharias, D., Müller, J. & Diekmann, M. (2017) A re-visitation study (1948–2015) of wet grassland vegetation in the Stedinger Land near Bremen, North-western Germany. Tuexenia 37: 271-288.	R36, R35, R21, R, Qb
23	Jandt & Leonhardt (unpubl.)	(Kyffhäuser)	S42, R1B!, R1B, R1A, R16, R13
22	Janiesch (2003)	Janiesch, P. (2003) Vegetationsökologische Untersuchungen in einem Erlenbruchwald im nördlichen Münsterland - 25 Jahre im Vergleich. Abhandlungen aus dem Westfälischen Museum für Naturkunde: Vegetation und Fauna in Westfalen (ed Westfälisches Museum für Naturkunde), pp. 71-80, Münster.	T15, T13
70	Knapp (1969)	Knapp, R. (1969) Änderungen in der Vegetation Hessischer Gebirge in den letzten Jahrzehnten. Mitteilungen der Floristisch-Soziologischen Arbeitsgemeinschaft N.F. 14: 274-286	R35, R22, R1M, R
71	Knapp (1977)	Knapp, R. (1977) Dauerflächen-Untersuchungen über die Einwirkung von Haustieren und Wild während trockener und feuchter Zeiten in Mesobromion-Halbtrockenrasen in Hessen. Mitteilungen der Floristisch-Soziologischen Arbeitsgemeinschaft N.F. 19: 269-274	R1A
87	Koch & Jurasinski (2015)	Koch, M. & Jurasinski, G. (2015) Four decades of vegetation development in a percolation mire complex following intensive drainage and abandonment. Plant Ecology & Diversity 8: 49-60	T16, T12, T, R55, R35, Qb, Qa, Q53, Q52, Q51, Q43, Q42, Q41, Q24, C35a, ?
59	Kohlbrecher et al. (2012)	unpublished data for: Kohlbrecher, C., Wesche, K., Hilbig, W., Leuschner, C., Meyer, S. (2012) Veränderungen der Segetalvegetation am Kyffhäusergebirge in den letzten 50 Jahren. Landschaftspflege und Naturschutz in Thüringen 49: 1-9.	V15

24	Krause & Wesche (2011)	unpublished data for: Krause, B., Culmsee, H., Wesche, K., Bergmeier, E. & Leuschner, C. (2011) Habitat loss of floodplain meadows in north Germany since the 1950s. Biodiversity and Conservation 20 (11): 2347-2364.	R22, R21, R1P, R, C35a, A25c
84	Krickl & Poschlod (unpubl.)	(calcareous grasslands SW-Germany)	R1A, R16, H26a
65	Kudernatsch (2005)	Kudernatsch, T. (2005) Auswirkungen der globalen Erwärmung auf die Vegetation alpiner Kalk-Magerrasen im Nationalpark Berchtesgaden. Dissertation TU München, Department für Ökologie, Fachgebiet Geobotanik Weihenstephan. 151 S.	S22, R44, R43!, R
25	Kühn & Heinken (2017)	unpublished data for: Kühn, S.L., Heinken, T. (2017): Vegetationsveränderungen im NSG Bredower Forst im Verlauf von 50 Jahren – Analyse anhand historischer Vegetationsaufnahmen. Natursch. Landschaftspfl. Brandenbg. 26(4): 4-16.	T35, T1E, T1B, T18, T17, T, ?
14	Kuhn et al. (2011)	unpublished data for: Kuhn, G.; Heinz, S.; Meyer, F. (2011) Grünlandmonitoring Bayern, Ersterhebung der Vegetation 2002 - 2008. LfL Schriftenreihe Bayerische Landesanstalt für Landwirtschaft 3.	V38, V37, V15, V, S22, R55, R44, R37, R36, R35, R23!, R23, R22, R21, R1M, R1A, R16, R, Qb, Q53, Q52, Q51, Q43, Q41, C35d, ?
26	Kutzelnigg (1984)	Kutzelnigg, H. (1984) Veränderungen der Ackerwildkrautflora im Gebiet um Moers/Niederrhein seit 1950 und ihre Ursachen. Tuexenia (4): 81-102.	V37, V15
58	Lindner (unpubl.)	(Hechtmoor)	T1B, T16, T, Sb, S92, S41, R, Qb, Qa, Q51, Q42, Q25, Q24, Q21, ?
60	Lindner (unpubl.)	(Süderbrarup)	R55, R52, R22, R1M, R
27	Maier (2005)	Maier, M. (2005) Untersuchung zur Entwicklung von Flora und Fauna in einem Feuchtwiesenschutzgebiet (Naturschutzgebiet Bornhorster Huntewiesen). Diplomarbeit Landschaftsökologie an der Carl von Ossietzky Universität Oldenburg.	R36, R35, Qb, Q53, Q51
28	Matesanz (2009)	Matesanz, S., Brooker, R.W., Valladares, F. & Klotz, S. (2009) Temporal dynamics of marginal steppic vegetation over a 26-year period of substantial environmental change. Journal of Vegetation Science 20 (2): 299-310.	R16

55	Meineke & Menge (2010)	Meineke, T, & Menge, K. (2010) Wirkungskontrolle zum PROFIL Kooperationsprogramm Naturschutz, Teilbereich Besondere Biotoptypen im FFH-Gebiet Bergwiesen und Wolfsbachtal bei Hohegeiß. Im Auftrag des Niedersächsischen Landesbetriebs für Wasserwirtschaft Küsten- und Naturschutz, Hannover.	R23!, R21, R
63	Müller & Zöphel (2012)	Müller, F. & Zöphel, B. (2012) Bestandssituation, Biologie und Ökologie von Gentianella lutescens im Osterzgebirge. Berichte der Arbeitsgemeinschaft sächsischer Botaniker N.F. 21: 139-184	R23!
29	Müller (2002)	Müller, N. (2002) Auswertung der Langzeituntersuchungen von Dauerflächen im Augsburger Stadtgebiet zur Renaturierung von Lechhaiden. Ber. Bayer. Landesamt Umweltschutz (Hrsg.): 97 S.	V38, V, R55, R37, R22, R1A, R16, N15, H26a
30	Naaf & Kolk (2016)	unpublished data for: Naaf, T. & Kolk, J. (2016) Initial site conditions and interactions between multiple drivers determine herb-layer changes over five decades in temperate forests. For Ecol Manag 366: 153-165.	T1H, T1E, T1B, T18, T17, T15, T13, T12, T, Q51, ?
31	Naaf & Wulf (2010)	Naaf, T. & Wulf, M. (2010) unpublished data for: Habitat specialists and generalists drive homogenization and differentiation of temperate forest plant communities at the regional scale. Biol Conserv 143: 848-855.	T1F, T1E, T17, T13, T12, T, Sa
32	Peppler-Lisbach & Könitz (2017)	Peppler-Lisbach, C. & Könitz, N. (2017): Vegetationsveränderungen in Borstgrasrasen des Werra-Meißner-Gebietes (Hessen, Niedersachsen) nach 25 Jahren – Tuexenia 37: 201-228.	S42, R37, R22, R21, R1M, R
44	Peppler-Lisbach et al. (2020)	Peppler-Lisbach, C, Stanik, N, Könitz, N, Rosenthal, G. (2020) Long-term vegetation changes in *Nardus* grasslands indicate eutrophication, recovery from acidification, and management change as the main drivers. Applied Vegetation Science 23: 508-521. https://doi.org/10.1111/avsc.12513	Sb, Sa, S42, R37, R35, R23!, R23, R22, R1M, R
83	Poschlod et al. (2009)	unpublished data for: Poschlod, P., Schreiber, K.-F., Mitlacher, K., Römermann, C. & Bernhardt-Römermann, M. (2009): Entwicklung der Vegetation und ihre naturschutzfachliche Bewertung. In: Schreiber, K.-F., Brauckmann, H.-J., Broll, G., Krebs, S. & Poschlod, P. (Hrsg.): Landschaftspflege und Naturschutz im Extensivgrünland. 30 Jahre Offenhaltungsversuche Baden-Württemberg. – Naturschutz-Spectrum Themen 97: 243-288.	T1E, R22, R21, R1M, R1A, N19
85	Poschlod et al. (2010)	unpublished data for: Poschlod, P., Kos, M., Roauer, S., Seemann, A., Wiesmann, O., Zeltner, G., Kohler, A. (2006) Long-term monitoring in rivers of south	Qb, Q52, Q51, C23, C22b, ?

		Germany since the 1970ies - macrophytes as indicators for the assessment of water quality. In: Müller, F., Baessler, C., Schubert, H. & Klotz, S. (Eds.): Long-term ecological research. Between Theory and Application. Berlin: Springer, pp. 189-199.	
64	Rach (2000)	Rach, C. (2000) Charakterisierung von Renaturierungsprozessen in Bruchwäldern - Ökologische Untersuchungen in zwei Landschaftsräumen Nordwestdeutschlands. Dissertation Fachbereich Biologie, Geo- und Umweltwissenschaften Universität Oldenburg. 201 S.	T15, T12, T
36	Raehse (2001)	Raehse, S. (2001) Veränderungen der hessischen Grünlandvegetation seit Beginn der 50er Jahre am Beispiel ausgewählter Tal- und Bergregionen Nord- und Mittelhessens. Kassel, University Press GmbH. 222 S.	V15, S42, R55, R37, R36, R35, R22, R21, R1M, R1A, R, Qb, Q53, Q51, N19
37	Reinecke et al. unpubl.	unpublished data for: Reinecke, J., Klemm, G., Heinken, T. (2014): Vegetation change and homogenization of species composition in temperate nutrient-deficient Scots pine forests after 45 yr. J. Veg. Sci. 25: 113-121.	T35, T1B, T, S42, R54, ?
80	Roeder et al. (1996)	Röder, H., Fischer, A., Klöck, W. (1996) Waldentwicklung auf Quasi-Dauerflächen im Luzulo-Fagetum der Buntsandsteinrhön (Forstamt Mittelsinn) zwischen 1950 und 1990. Forstw. CB1. 115, 321-335	T35, T1H, T18, T, S42, R, ?
86	Roscher (unpubl.)	(East Thuringia)	R51!, R22, R1A, R16, R
38	Rosenthal (1992)	Rosenthal, G. (1992) Erhaltung und Regeneration von Feuchtwiesen. Vegetationsökologische Untersuchungen auf Dauerflächen. Diss. Bot. 182: 1-283. Berlin, Stuttgart.	V15, R55, R36, R35, R, Q51
67	Rumpf et al. (2018)	unpublished data for: Rumpf, S., Hülber, K., Klonner, G, Moser, D., Schütz, M., ;Wessely, J., Willner, W., Zimmermann, N., Dullinger, S. (2018) Range dynamics of mountain plants decrease with elevation. PNAS 115(8):1848-1853.	Sb, S42, S22, R56, R55, R44, R43, R41, R23!, R21, R, H32c, H26b, H24, H23
39	Scheidel & Bruelheide (2004)	Scheidel, U. & Bruelheide, H. (2004) Versuche zur Beweidung von Bergwiesen im Harz. Hercynia N.F. 37: 87-101	S32, R35, R, ?
33	Schmidt et al.	Garbitz, D. (1990): Vegetation und Standortsbedingungen im Naturwald "Staufenberg". Dipl.-Arb. Syst.-Geobot. Institut, Universität Göttingen. Melcher. S. (1999): Flora und Vegetation im Naturwald "Großer Staufenberg" (Forstamt	T3M, T35, T1F, T1E, T18, T17, T, Sa, +, ?

		Walkenried, Revier Staufenberg). Dipl.-Arb. Institut f. Waldbau, Abt. I, Universität Göttingen. Mölder, A., Streit, M., Schmidt, W. (2014): When beech strikes back: How strict nature conservation reduces herb-layer diversity and productivity in Central European deciduous forests. Forest Ecology and Management 319: 51-61. Kohls, K. (1994): Geobotanische Untersuchungen in Wäldern des Forstamtes Sellhorn (Lüneburger Heide). Dipl.-Arb. Syst.-Geobot. Institut, Universität Göttingen. Albrecht, B. (2000): Vegetationskundliche Untersuchungen im Naturwaldreservat "Meninger Holz" unter besonderer Berücksichtigung der Vegetationsentwicklung. Dipl.-Arb. FG Naturschutz, FB Biologie, Universität Hamburg. Happe, E. (1995): Vegetation und Standortsverhältnisse im Naturwald und Naturschutzgebiet "Totenberg" (Bramwald).Dipl.-Arb. Institut f. Waldbau, Abt. I, Universität Göttingen. Fischer, C., Parth, A., Schmidt, W. (2009): Vegetationsdynamik in Buchen-Naturwäldern. Ein Vergleich aus Süd-Niedersachsen. Hercynia 42: 45-68.	
34	Schmidt et al.	Kompa T., Schmidt, W. (2005): Buchenwald-Sukzession nach Windwurf auf Zechstein-Standorten des südwestlichen Harzvorlandes. Hercynia N.F. 38: 233-261. Schmidt, W. (2002): Die Naturschutzgebiete Hainholz und Staufenberg am Harzrand – Sukzessionsforschung in Buchenwäldern ohne Bewirtschaftung. Tuexenia 22: 151-213. Schmidt, W., Heinrichs, S. (2012) 13 Jahre nach dem Sturm - Vegetationsentwicklung im Buchen-Naturwald "Königsbuche" (südwestliches Harzvorland, Niedersachsen). Hercynia 45: 81-110.	V39, T1F, T1E, T18, T17, T13, T12, T, Sa, S32, R57, R55, R, ?
73	Schrautzer (unpubl.)	Resurvey Eidertal	R55, R35, Q53, Q52
72	Schrautzer et al. (unpubl.)	Resurvey of Härdtle - Beckmann	T17, T13, T12, T
40	Schubert (2008)	Schubert, R. (2008) Vegetationsdynamik in einigen Naturschutzgebieten Sachsen-Anhalts. Mitteilungen florist. Kart. Sachsen-Anhalt (Halle 2008) 13: 53-75.	V38, T, S42, S38, R55, R35, R22, R1A, R, Q51, ?

42	Schwabe & Kratochwil (2015)	Schwabe, A, & Kratochwil, A. (2015) Pflanzensoziologische Dauerflächen-Untersuchungen im Bannwald "Flüh" (Südschwarzwald) unter besonderer Berücksichtigung der Weidfeld-Sukzession. standort.wald 49: 5-49	T18, T, S42, R52
41	Schwabe et al. (1989)	Schwabe, A., Kratochwil, A. & Bammert, J. (1989) Sukzessionsprozesse im aufgelassenen Weidfeld-Gebiet des "Bannwald Flüh" (Südschwarzwald) 1976-1988 - Mit einer vergleichenden Betrachtung statistischer Auswertungsmethoden. Tuexenia 9: 351-370. Göttingen.	S42, R52, R1M, R, ?
89	Schwabe et al. (2004)	(Grundaufnahmen) unpublished data for: Schwabe, A.; Zehm, A., Nobis, M., Storm, C., Suess, K. (2004) Auswirkungen von Schaf-Erstbeweidung auf die Vegetation primär basenreicher Sand-Ökosysteme. Ber. NNA 1:/2004: 39-54.	V38, V37, V34, V, R1P, R1B, R1A, R13, R, N15!!
57	Schwabe et al. (2013)	unpublished data for Schwabe, A., Suess, K., Storm, C. (2013) What are the long-term effects of livestock grazing in steppic sandy grassland with high conservation value? Results from a 12-year field study. Tuexenia 33: 189-212. Göttingen.	V38, R1P, R1B, R1A, R16, R13, R11, R
69	Schwartze et al. 2021	Schwartze, P., Birkner, L., Velbert, F. & Hölzel, N. (2021) Vielfalt durch extensive Grünlandnutzung. – 30 Jahre Dauermonitoring auf unterschiedlich bewirtschafteten Feuchtgrünlandflächen. Natur in NRW, 1/2021, 16-21. Paderborn. part of unpublished data for: Poptcheva, K., Schwartze, P., Vogel, A., Kleinebecker, T. & Hölzel, N. (2009) Changes in wet meadow vegetation after 20 years of different management in a field experiment (North-West Germany). Agriculture, Ecosystems & Environment, 134 (1-2), 108–114.	R55, R37, R36, R35, R21, R, Q53
61	Sommer & Hachmöller (2001)	Sommer, S. & Hachmöller, B. (2001) Auswertung der Vegetationsaufnahmen von Dauerbeobachtungsflächen auf Bergwiesen im NSG Oelsen bei varierter Mahd im Vergleich zur Brache. Berichte der Arbeitsgemeinschaft sächsischer Botaniker N.F. 18: 99-135	R23!
9	Sperle (unpubl.)		V39, V11, T3K, T12, Sb, S42, S38, R56, R55, R37, R35, R22, R1A, R, Qb, Qa, Q51, Q42, Q41, Q25, Q24, ?
45	Stroh (2013)	Stroh, H.-G. (2013) Wiederholung der vegetationskundlichen Erfassungen an den Dauerbeobachtungsflächen der Kalkmagerrasen des	R1A, ?

		Altendorfer Berges. Bericht für das Jahr 2012. Im Auftrag des Niedersächsischen Landesbetriebs für Wasserwirtschaft Küsten- und Naturschutz, Hannover.	
46	Stroh (2013)	Stroh, H.-G. (2013) Wiederholung der vegetationskundlichen Erfassungen an den Dauerbeobachtungsflächen der Kalkmagerrasen der Weper und des Gladebergs. Zwischenbericht für das Jahr 2012. Im Auftrag des Niedersächsischen Landesbetriebs für Wasserwirtschaft Küsten- und Naturschutz, Hannover.	Sa, R1A, ?
47	Strubelt & Zacharias (2015)	Strubelt, I., Diekmann, M. & Zacharias, D. (2015) Langzeitmonitoring der Vegetation über 52 Jahre im Hartholzauenwald (Querco-Ulmetum minoris Issler 1924) im Haseder Busch (Landkreis Hildesheim). Braunschweiger Geobotanische Arbeiten 11: 173-247	T3M, T1F, T1E, T17, T13, T
66	Strubelt et al. (2019)	Strubelt, I., Diekmann, M., Peppler-Lisbach, C., Gerken, A. & Zacharias, D. (2019) Vegetation changes in the Hasbruch forest nature reserve (NW Germany) depend on management and habitat type. Forest Ecology and Management, 444, 78–88.	T1E, T1B, T18, T17, T13, T
56	Volz (2001)	Volz, H. (2001) Vegetationskundliches Monitoring im NSG Lange Rhön Gebiet Leitgraben. Bearbeitungszeitraum 2001. Gutachten Umweltplanung Volz, Giessen, 62 S.	R57, R35
35	von Oheimb et al. (2006)	v. Oheimb, G., Eischeid, I., Finck, P., Grell, H., Härdtle, W., Mierwald, U., Riecken, U., Sandkühler, J. (2006) Halboffene Weidelandschaft Höltigbaum. Perspektiven für den Erhalt und die naturverträgliche Nutzung von Offenlandlebensräumen. Naturschutz und Biologische Vielfalt 36: 1-280. Landwirschaftsverlag Münster.	V39, T13, T, R55, R52, R36, R35, R22, R21, R1P, R1M, R, Qb, Q53, Q52, N15, C35a, ?
50	Wagner & Heinken (unpubl.)		T3M, T35, T1H, T1E, T1B, T18, T13, T, S42, R, ?
51	Wagner & Heinken (unpubl.)		T35, T1F, T1E, T1B, T18, T17, T13, T12, T, R55, R51, R1M, R, ?
49	Walther (1986)	Walther, K. (1986) Die Vegetation des Maujahn 1984. Wiederholung der vegetationskundlichen Untersuchung eines wendländischen Moores. Tuexenia 6: 145-193. Göttingen.	T1B, R37, R35, R1P, Q51
52	Wegener (2018)	Wegener, U. (2018) Vegetationswandel des Berggrünlands nach Untersuchungen von 1954 bis 2016. Wege zur Erhaltung der Bergwiesen. Abh. und Ber. aus dem Museum Heineanum 11: 35-101.	R23

53	Wilmanns & Bogenrieder (1988)	Wilmanns, O. & Bogenrieder, A. (1986) Veränderungen der Buchenwälder des Kaiserstuhls im Laufe von vier Jahrzehnten und ihre Interpretation - pflanzensoziologische Tabellen als Dokumente. Abhandlungen aus dem westfälischen Museum für Naturkunde 48(2): 55-80	T18, T, ?
81	Winter (unpubl.)	Winter, R. (2016) Flora und Vegetationsentwicklung der Sukzessionsfläche "Wildnis am Bunker Valentin" in der Bremer Weseraue bei Farge. Bachelorthesis Hochschule Bremen, Studiengang Technische und angewandte Biologie, 61 S.	T, S42, Q51
18	Wittig et al. (2007)	unpublished data for: Wittig, B., Waldmann, T., Diekmann, M. (2007) Veränderungen der Grünlandvegetation im Holtumer Moor über vier Jahrzehnte. Hercynia N.F. 40: 285-300.	V38, V37, V15, V11, V, T16, T15, T13, T12, S92, S41, R55, R52, R37, R36, R35, R22, R21, R, Qa, Q53, Q51, Q22
75	Wittig et al. (2019)	Wittig, B., Müller, J., Mahnke-Ritoff, A. (2019) Talauen-Glatthaferwiesen im Verdener Wesertal (Niedersachsen). Tuexenia 39: 249-265. Göttingen	R22
82	Wittig et al. (2020)	Wittig, B., Müller, J., Quast, R., Miehlich, H. (2020) Arnica montana in Calluna-Heiden auf dem Schießplatz Unterlüß (Niedersachsen). Tuexenia 40: 131-146. Göttingen.	S42, R1M

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Table 2: Representativeness of grid cells ("MTBQ," 0°10' × 0°6') with time series. The estimates were obtained from linear models comparing samples with unsampled MTBQs with respect to population density, road density, urban cover, cropland cover and protected area.

	Population density			**Road density**			**Urban cover**			**Cropland cover**			**Protected area**		
Predictors	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p
(Intercept)	30547	30128 – 309645	<0.001	1.59	1.55 – 1.63	<0.001	0.07	0.06 – 0.07	<0.001	0.45	0.44 – 0.45	<0.001	0.01	0.01 – 0.01	<0.001
type [unsampled]	-6686	-7447 – -5925	<0.001	-0.52	-0.59 – -0.45	<0.001	-0.03	-0.03 – -0.03	<0.001	0.01	0.00 – 0.02	0.029	0.01	0.01 – 0.01	<0.001
Observations	11226			25303			12024			12024			29535		
R^2/R^2 adjusted	0.026 / 0.026			0.008 / 0.008			0.019 / 0.019			0.000 / 0.000			0.038 / 0.038		

Table 3: Data structure of the Plot-species-abundance file of ReSurveyGermany. For Type: C = character, N = numeric, I = integer (n=23,641)

Field name	**Type**	**Description**
PROJECT_ID	I	Number of the resurvey project in ReSurveyGermany; see Table 1
RELEVE_NR	I	Plot observation ID, only unique within a RS_PROJECT, usually the original plot observation ID from the underlying Turboveg 2 database
PROJECT_ID _RELEVE_NR	C	Unique Plot observation ID, by which the project's plot-species-abundance file is linked to the header file, combination of PROJECT_ID and RELEVE_NR
LAYER	I	0: No layer, 1: Tree layer (uppermost), 2: Tree layer (middle), 3: Tree layer (lowest), 4: Shrub layer (uppermost), 5: Shrub layer (low), 6: Herb layer, 7: Juveniles, 8: Seedling (< 1 year), 9: Moss layer.
TaxonName	C	Harmonized taxon name
Cover_Perc	C	Cover of the taxon in per cent

Table 4: Data structure of the header file of ReSurveyGermany. For Type: C = character, N = numeric, I = integer. Per cent of NA values is given by dividing the number of NAs by (n=23,641)

Field name	Type	Description	Number of NAs
RS_PROJECT	C	Unique name of the resurvey project; for the list of the 92 projects and the underlying references see Table 1	0
PROJECT_ID	I	Number of the resurvey project in ReSurveyGermany; see Table 1	0
RS_PLOT	C	Unique (within the site) code of the resurveyed plot; it is used to pair observations from different times recorded in the same plot; gives a unique identifier for the resurveyed plot or set of plots in time if combined with RS_PROJECT. Several plots in the same year might have the same RS_PLOT code if they have to be summarised for temporal comparisons. In these cases, they might also contain the community name.	0
RS_SITE	C	Name of the resurveyed site. For further details see LOCALITY.	0
LOCALITY	C	More detailed description of the locality of the resurveyed site (in German and if available)	8,499
RS_OBSERV	C	Unique code of the one-time observation; combination of RS_SITE, RS_PLOT, YEAR	0
RELEVE_NR	I	Plot observation ID, only unique within a RS_PROJECT, usually the original plot observation ID from the underlying Turboveg 2 database	0
PROJECT_ID _RELEVE_NR	C	Unique Plot observation ID, by which the project's plot-species-abundance file is linked to the header file, combination of PROJECT_ID and RELEVE_NR	0
DATE	C	Date of the record (YYYYMMDD); the exact date if provided by the author, otherwise only the year and month or only year; if the year was not provided by the author, we took the year of the publication	0
YEAR	I	Year of the record (YYYY), extracted from DATE	0
SURF_AREA	N	Plot size [m^2] (only stated if available)	2064

MANIPULATE	C	Binary information (Y/N) about whether the plot was part of a manipulative experiment ("Y") or not ("N"). If "Y", we chose the treatments representing the ambient land use. Observations with NA were to our knowledge not part of an experiment, and thus, can be treated as "N".	15,020
MANIPTYPE	C	Shows the type of treatment in the plot manipulation (partly in German and only if available).	20,255
LAND_USE	C	Land use, often identical with MANIPTYPE (mostly in German, also using the abbreviations used in the particular study, and only if available)	18,149
LOC_METHOD	C	Method of plot (re-)location, 1: Permanently marked plot isolated (i.e. somewhere within the site), 2: Marked plot in a grid (i.e. with regularly spaced neighbor plots), 3: Location with differential GPS, 4: Location with GPS, 5: Location from accurate map, 6; Location from a description, 7: Other	12,607
LOC_METH_COMMENT	C	Detailed description of the location method (if available)	20,163
LONGITUDE	N	Longitude of the plot in decimal degrees, coordinate system WGS-84; this coordinate should refer to the centre of the plot; coordinates were rounded to 2 digits of decimal degrees.	0
LATITUDE	N	Latitude of the plot in decimal degrees, rounded to 2 digits as LONGITUDE	0
PRECISION	I	Uncertainty in m, of coordinates for geographic position of plots, provided by the author or estimated if coordinates were taken from a topographic map. PRECISION refers to the true coordinates, not to those rounded to two digits.	13,034
GEO_LEV	C	Method of how the geographic location was obtained: GPS = Geographical positioning system, MTB = center of the German ordnance map, MTB_4 = center of a quadrant of the German ordnance map, POINT = all other	0
ALTITUDE	I	Elevation [m] (if available)	14,723
ASPECT	N	Compass direction of the slope in degrees [°], 0° = N, 90°=E etc. NA shows plot records either without aspect information or with aspect information when SLOPE is 0.	16,572
SLOPE	I	Inclination of the slope in degrees [°]	18,962

COUNTRY	C	DE for Germany	0
EUNIS		EUNIS level 3 code of the habitat, as obtained by applying the expert system EUNIS-ESy[78] and the corresponding R code[79].	0
COVERSCALE	C	Cover scale used for the plot record. 00 = no scale, cover estimated in per cent (%), 01 = Braun/Blanquet (old), 02 = Braun/Blanquet (new), 03 = Londo, 04 = Presence/Absence, 10 = Reichelt & Wilmanns 1973 (short), 26 = Londo (short), 29 = Londo per cent classes, 30 = Londo (modified, in project 9, Sperle et al. unpublished), 31 = Maas & Kohler 1983 (in project 86, Poschlod et al. 2010), 50 = Londo (modified, in project 89, Bruelheide & Luginbühl 2009)	0
REFERENCE	C	Reference number in GVRD, 6 digits referring to the bibliographic reference, found in ReSurveyGermanyReference.csv	51
YEAR_PUBL	I	Year of the publication (if available)	18,057
TABLE_NR	C	Number of the table in the original publication	12,659
TABNAME		Name of the table in the orginal publication	8,402
NR_IN_TAB	C	Column name in the TABLE_NR	3,789
ORIG_NR		Name of the plot given by the author in the original publication	10,172
ORIG_DB		Name of original Turboveg file, to be used internally for backtracking changes	19,700
COV_TOTAL	I	Total cover of all layers [%] (if available)	18,704
COV_TREES	I	Cover of the tree layer [%] (if available)	20,554

COV_SHRUBS	I	Cover of the shrub layer [%] (if available)	20,520
COV_HERBS	I	Cover of the herb layer [%] (if available)	11,964
COV_MOSSES	I	Cover of the moss layer (bryophytes and lichens) [%] (if available)	17,512
COV_LITTER	I	Cover of the litter layer on the ground [%] (if available)	20,786
COV_ROCK	I	Cover of the rocks on the plot surface [%] (if available)	21,697
TREE_HIGH	I	Height of the upper tree layer [m] (if available)	22,317
TREE_LOW	I	Height of the lower tree layer [m] (if available)	23,107
SHRUB_HIGH	N	Height of the upper shrub layer [m] (if available)	22,848
SHRUB_LOW	N	Height of the lower shrub layer [m] (if available)	23,478
HERB_HIGH		Mean height of the upper herb layer [cm] (if available)	20,311
HERB_LOW		Mean height of the lower herb layer [cm] (if available)	22,317
HERB_MAX		Maximum height of the herb layer [cm] (if available)	22,627

Table 5: List of all taxa that were harmonised across all projects. The format of the list follows the rules of the ESy system[78]. The taxon names that were aggregated below a broader concept name are indented using five blanks. The number to the right shows the German SL 1.3[81] number for each taxon.

Achillea atrata agg.	18
Achillea atrata	19
Achillea atrata agg.	18
Achillea millefolium agg.	27
Achillea millefolium	31
Achillea millefolium agg.	27
Achillea millefolium subsp. collina	20096
Achillea millefolium subsp. millefolium	32
Achillea pannonica	34
Achillea setacea	36
Acinos arvensis	49
Acinos arvensis	49
Calamintha acinos	976
Satureja acinos	23760
Aconitum lycoctonum	14242
Aconitum lycoctonum	14242
Aconitum lycoctonum subsp. vulparia	20209
Aconitum vulparia	68
Adonis aestivalis	76
Adonis aestivalis	76
Adonis aestivalis var. citrinus	27247
Agrimonia eupatoria	99
Agrimonia eupatoria	99
Agrimonia eupatoria subsp. eupatoria	100
Agrostis canina agg.	120
Agrostis canina	121
Agrostis coarctata	20180
Agrostis stricta	122
Agrostis vinealis	20684
Agrostis capillaris	20178
Agrostis capillaris	20178
Agrostis capillaris subsp. oreophila	7086
Agrostis tenuis	130
Agrostis vulgaris	20179
Agrostis stolonifera agg.	127
Agrostis alba var. stolonifera	27181
Agrostis gigantea	128
Agrostis stolonifera	129
Agrostis stolonifera agg.	127
Agrostis stolonifera subsp. stolonifera	6550
Aira caryophyllea	26920
Aira caryophyllea	26920
Aira caryophyllea subsp. caryophyllea	20218
Alchemilla conjuncta agg.	154
Alchemilla conjuncta agg.	154
Alchemilla hoppeana	166
Alchemilla nitida	10027
Alchemilla fissa agg.	177
Alchemilla fallax	179
Alchemilla fissa	180
Alchemilla fissa agg.	177
Alchemilla hybrida agg.	190
Alchemilla flabellata	194
Alchemilla glaucescens	195
Alchemilla hybrida agg.	190
Alchemilla mollis	200

Alchemilla acutiloba var. mollis	20237
Alchemilla vulgaris agg.	209
Alchemilla acutiloba var. stellata	11694
Alchemilla crinita	219
Alchemilla glabra	235
Alchemilla micans	20278
Alchemilla monticola	245
Alchemilla subcrenata	265
Alchemilla vulgaris	26467
Alchemilla vulgaris agg.	209
Alchemilla vulgaris auct.	20289
Alchemilla xanthochlora	273
Alisma plantago-aquatica agg.	275
Alisma gramineum	276
Alisma lanceolatum	277
Alisma plantago-aquatica	278
Alisma plantago-aquatica agg.	275
Allium scorodoprasum	12756
Allium rotundum	310
Allium scorodoprasum	12756
Allium scorodoprasum subsp. rotundum	20326
Allium senescens	6583
Allium montanum	294
Allium senescens	6583
Allium senescens subsp. montanum	20321
Allium senescens var. montanum	12712
Alopecurus pratensis agg.	334
Alopecurus pratensis	336
Alopecurus pratensis agg.	334
Alyssum alyssoides	345
Alyssum alyssoides	345
Alyssum calycinum	20351
Alyssum montanum	350
Alyssum montanum	350
Alyssum montanum subsp. gmelinii	26457
Alyssum montanum subsp. montanum	26456
Anagallis arvensis	393
Anagallis arvensis	393
Anagallis arvensis subsp. arvensis	394
Anemone narcissiflora	434
Anemonastrum narcissiflorum	20423
Anemone narcissiflora	434
Anthoxanthum aristatum	20071
Anthoxanthum aristatum	20071
Anthoxanthum puelii	466
Anthoxanthum odoratum agg.	463
Anthoxanthum alpinum	464
Anthoxanthum odoratum	465
Anthoxanthum odoratum agg.	463
Anthriscus sylvestris agg.	469
Anthriscus sylvestris	473
Anthriscus sylvestris agg.	469
Anthriscus sylvestris subsp. alpestris	20460
Anthriscus sylvestris subsp. sylvestris	20463
Anthyllis vulneraria	477
Anthyllis vulneraria	477
Anthyllis vulneraria subsp. carpatica	479
Anthyllis vulneraria subsp. pseudovulneraria	14783
Aphanes inexspectata	494
Aphanes inexspectata	494
Aphanes microcarpa	6554
Aquilegia vulgaris agg.	507
Aquilegia atrata	508

Aquilegia vulgaris	510
Arabis bellidifolia	20511
Arabis bellidifolia subsp. bellidifolia	20512
Arabis glabra	520
Arabis glabra	520
Turritis glabra	24405
Arabis hirsuta agg.	521
Arabis hirsuta	523
Arabis nemorensis	20072
Arctium minus	13702
Arctium minus	13702
Arctium minus agg.	547
Lappa communis	14348
Arenaria serpyllifolia agg.	563
Arenaria serpyllifolia	13703
Arenaria serpyllifolia agg.	563
Armeria maritima	581
Armeria elongata	577
Armeria maritima	581
Armeria maritima agg.	575
Armeria maritima subsp. elongata	20584
Armeria maritima var. elongata	20590
Armeria vulgaris	26026
Artemisia campestris agg.	594
Artemisia campestris	596
Artemisia campestris agg.	594
Artemisia campestris subsp. campestris	6466
Artemisia vulgaris agg.	616
Artemisia vulgaris	618
Artemisia vulgaris agg.	616
Arum maculatum agg.	622
Arum maculatum	625
Arum maculatum agg.	622
Asplenium ruta-muraria	674
Asplenium ruta-muraria	674
Asplenium ruta-muraria subsp. ruta-muraria	676
Aster lanceolatus agg.	15106
Aster lanceolatus	693
Aster parviflorus	15085
Atriplex prostrata agg.	20706
Atriplex calotheca	756
Atriplex hastata	20693
Atriplex hastata agg.	755
Atriplex latifolia	760
Atriplex prostrata	762
Atriplex sagittata	754
Atriplex nitens	20702
Aurinia saxatilis	777
Alyssum saxatile	354
Betonica officinalis	826
Betonica officinalis	826
Stachys officinalis	24165
Betula alba agg.	99014
Betula pendula	829
Betula verrucosa	20786
Betula pubescens	830
Betula pubescens	830
Betula pubescens subsp. carpatica	6472
Betula pubescens subsp. pubescens	6471
Bidens frondosa	834
Bidens frondosa	834
Bidens melanocarpa	20788
Bidens tripartita	836

Bidens tripartita	836
Bidens tripartita subsp. tripartita	838
Biscutella laevigata	844
Biscutella laevigata	844
Biscutella laevigata subsp. kerneri	6652
Bistorta officinalis	27744
Bistorta officinalis	27744
Persicaria bistorta	23029
Polygonum bistorta	4420
Bistorta vivipara	20801
Bistorta vivipara	20801
Persicaria vivipara	23045
Polygonum viviparum	4437
Bolboschoenus maritimus	852
Bolboschoenus maritimus	852
Schoenoplectus maritimus	23820
Bothriochloa ischaemum	854
Andropogon ischaemum	20417
Bothriochloa ischaemum	854
Dichanthium ischaemum	21538
Brachypodium pinnatum agg.	862
Brachypodium pinnatum	863
Brachypodium pinnatum agg.	862
Brachypodium rupestre	864
Bromus arvensis	883
Bromus arvensis	883
Bromus arvensis subsp. arvensis	7191
Bromus hordeaceus agg.	895
Bromus hordeaceus	896
Bromus hordeaceus agg.	895
Bromus hordeaceus subsp. hordeaceus	897
Bromus mollis	901
Bromus racemosus agg.	908
Bromus commutatus	909
Bromus racemosus	910
Bromus ramosus agg.	911
Bromus benekenii	912
Bromus ramosus	913
Bromus ramosus agg.	911
Callitriche palustris agg.	999
Callitriche obtusangula	1003
Callitriche palustris	1004
Callitriche palustris agg.	999
Callitriche stagnalis	1006
Campanula rotundifolia agg.	1057
Campanula rotundifolia	1072
Campanula rotundifolia agg.	1057
Campanula scheuchzeri	1073
Cardamine bulbifera	20944
Cardamine bulbifera	20944
Dentaria bulbifera	1896
Cardamine heptaphylla	20951
Dentaria heptaphyllos	91015
Cardamine pratensis agg.	1105
Cardamine dentata	20945
Cardamine palustris	1109
Cardamine pratensis	15133
Cardamine pratensis agg.	1105
Cardaminopsis arenosa	1114
Arabis arenosa	20509
Cardaminopsis arenosa	1114
Cardaminopsis halleri	1116
Arabis halleri	20518

Cardaminopsis halleri	1116
Cardaminopsis petraea	1117
Arabis hispida	20526
Carduus nutans agg.	1140
Carduus nutans	1143
Carduus nutans agg.	1140
Carex acuta agg.	26775
Carex acuta	20989
Carex acuta subsp. tricostata	6685
Carex gracilis	1230
Carex arenaria agg.	1159
Carex arenaria	1160
Carex ligerica	1161
Carex pseudobrizoides	1162
Carex atrata agg.	1164
Carex atrata	14018
Carex atrata agg.	1164
Carex elata	1204
Carex elata	1204
Carex elata subsp. elata	1205
Carex flacca	1216
Carex flacca	1216
Carex glauca	21026
Carex flava agg.	1219
Carex demissa	20011
Carex flava	1220
Carex flava agg.	1219
Carex flava var. oederi	25010
Carex lepidocarpa	1222
Carex oederi	1223
Carex serotina	21070
Carex tumidicarpa	1225
Carex viridula	6693
Carex muricata agg.	1249
Carex divulsa	1250
Carex leersiana	1251
Carex muricata	6687
Carex muricata agg.	1249
Carex muricata subsp. muricata	6689
Carex pairae	1252
Carex spicata	1253
Carex nigra agg.	1254
Carex fusca	21024
Carex nigra	1256
Carex nigra agg.	1254
Carex ornithopoda agg.	1262
Carex ornithopoda	1263
Carex ornithopoda agg.	1262
Carex ovalis	21055
Carex leporina	1240
Carex ovalis	21055
Carex vulpina agg.	1301
Carex otrubae	1302
Carex vulpina	1303
Carex vulpina agg.	1301
Carex × elytroides	10122
Carex × elytroides	10122
Carex acuta × nigra	90526
Carex × figertii	90596
Carex davalliana × dioica	90549
Carex × xanthocarpa	10137
Carex flava × hostiana	90562
Carlina acaulis	1306

Carlina acaulis	1306
Carlina acaulis subsp. simplex	1308
Carlina vulgaris	1312
Carlina vulgaris	1315
Carlina vulgaris subsp. vulgaris	21094
Castanea sativa	1323
Castanea sativa	1323
Castanea vesca	21097
Caucalis platycarpos	1329
Caucalis lappula	21108
Caucalis platycarpos	1329
Centaurea jacea	1347
Centaurea angustifolia	21122
Centaurea jacea	1347
Centaurea jacea agg.	24981
Centaurea jacea subsp. amara	21132
Centaurea jacea subsp. angustifolia	1348
Centaurea nigra	26577
Centaurea nemoralis	21138
Centaurea nigra	26577
Centaurea nigra subsp. nemoralis	1370
Centaurea scabiosa	1390
Centaurea scabiosa	1390
Centaurea scabiosa subsp. scabiosa	1397
Centaurea stoebe	25004
Centaurea maculosa subsp. rhenana	21134
Centaurea rhenana	21146
Centaurea stoebe	25004
Centaurium erythraea	1406
Centaurium erythraea	1406
Centaurium erythraea subsp. erythraea	1407
Centaurium umbellatum	21156
Centaurium littorale	1409
Centaurium littorale	1409
Centaurium minus	7104
Cerastium arvense	1431
Cerastium arvense	1431
Cerastium arvense subsp. arvense	1432
Cerastium fontanum agg.	1449
Cerastium caespitosum	21178
Cerastium fontanum	1450
Cerastium fontanum agg.	1449
Cerastium fontanum subsp. triviale	21187
Cerastium holosteoides	1451
Cerastium triviale	25269
Cerastium vulgare	21213
Cerastium pumilum agg.	1460
Cerastium glutinosum	1461
Cerastium pallens	21198
Cerastium pumilum	1462
Cerastium pumilum agg.	1460
Ceratocapnos claviculata	21221
Ceratocapnos claviculata	21221
Corydalis claviculata	1670
Cerinthe glabra	1473
Cerinthe alpina	21227
Chaerophyllum hirsutum	26947
Chaerophyllum hirsutum	26947
Chaerophyllum hirsutum agg.	1490
Chaerophyllum villarsii	1493
Chamaecytisus ratisbonensis	1504
Chamaecytisus ratisbonensis	1504
Cytisus ratisbonensis	21484

Chamaecytisus supinus	1506
Chamaecytisus supinus	1506
Cytisus supinus	21486
Chamaespartium sagittale	1509
Chamaespartium sagittale	1509
Genista sagittalis	21992
Genistella sagittalis	2615
Chenopodium album agg.	1514
Chenopodium album	1515
Chenopodium album agg.	1514
Chenopodium strictum subsp. striatiforme	6482
Cirsium acaule	1556
Cirsium acaule	1556
Cirsium acaulon	21327
Cirsium heterophyllum	1569
Cirsium helenioides	21329
Cirsium heterophyllum	1569
Cirsium vulgare	1579
Cirsium lanceolatum	21330
Cirsium vulgare	1579
Cirsium × rigens	26068
Cirsium acaule × oleraceum	90817
Clinopodium vulgare	1593
Calamintha clinopodium	978
Consolida regalis	1627
Consolida regalis	1627
Delphinium consolida	21510
Convolvulus	60816
Convolvulus	60816
Convolvulus arvensis	1632
Conyza canadensis	1638
Conyza canadensis	1638
Erigeron canadensis	21687
Crataegus	61165
Crataegus curvisepala	1697
Crataegus laevigata agg.	1701
Crataegus laevigata	1701
Crataegus lindmanii	1699
Crataegus monogyna	1707
Crataegus monogyna subsp. monogyna	1708
Crataegus monogyna subsp. nordica	1709
Crataegus monogyna var. monogyna	90937
Crataegus oxyacantha	21400
Crataegus rhipidophylla	26677
Crataegus × macrocarpa	1705
Crataegus × media	50021
Crataegus calycina	6733
Crepis bocconi	21408
Crepis pontana	1735
Cruciata laevipes	1766
Cruciata laevipes	1766
Galium cruciata	21963
Cystopteris fragilis agg.	1825
Cystopteris alpina	21473
Cystopteris fragilis	1827
Cytisus nigricans	21483
Cytisus nigricans	21483
Lembotropis nigricans	3333
Cytisus scoparius	1837
Cytisus scoparius	1837
Sarothamnus scoparius	5245
Dactylis glomerata agg.	1842
Dactylis	397

Dactylis aschersoniana	21487
Dactylis glomerata	1843
Dactylis glomerata agg.	1842
Dactylis glomerata subsp. glomerata	13464
Dactylis polygama	1846
Dactylorhiza maculata agg.	1852
Dactylorhiza fuchsii	1853
Dactylorhiza fuchsii × maculata	90986
Dactylorhiza maculata	1857
Dactylorhiza maculata agg.	1852
Dactylorhiza majalis agg.	1861
Dactylorhiza majalis	1862
Dactylorhiza majalis agg.	1861
Dactylorhiza majalis subsp. majalis	1866
Dactylorhiza traunsteineri	1871
Dactylorhiza × carnea	13760
Dactylorhiza maculata × incarnata	90995
Danthonia decumbens	1874
Danthonia decumbens	1874
Danthonia decumbens subsp. decumbens	1876
Sieglingia decumbens	24019
Daucus carota	1886
Daucus	61271
Daucus carota	1886
Daucus carota subsp. carota	6753
Deschampsia cespitosa agg.	1903
Deschampsia cespitosa	1904
Deschampsia cespitosa agg.	1903
Deschampsia flexuosa	20725
Aira flexuosa	20226
Avenella flexuosa	783
Deschampsia flexuosa	20725
Dianthus gratianopolitanus	1934
Dianthus caesius	21522
Dianthus gratianopolitanus	1934
Dianthus superbus	1949
Dianthus superbus	1949
Dianthus superbus subsp. superbus	1952
Digitalis grandiflora	1960
Digitalis ambigua	21540
Dipsacus fullonum	1980
Dipsacus fullonum	1980
Dipsacus sylvestris	20021
Draba aizoides agg.	2000
Draba aizoides	2001
Draba aizoides agg.	2000
Drosera longifolia	21588
Drosera anglica	2025
Drosera longifolia	21588
Dryopteris carthusiana agg.	2030
Dryopteris × deweveri	50029
Dryopteris carthusiana	2032
Dryopteris carthusiana × dilatata	91118
Dryopteris carthusiana agg.	2030
Dryopteris dilatata	2033
Dryopteris expansa	2031
Dryopteris spinulosa	21604
Dryopteris filix-mas agg. s. l.	94728
Dryopteris affinis	2038
Dryopteris filix-mas	2037
Dryopteris filix-mas agg.	2035
Eleocharis palustris agg.	2087
Eleocharis palustris	2091

Eleocharis palustris agg.	2087
Eleocharis uniglumis	2094
Scirpus palustris	23856
Elymus arenosus	27779
Elymus repens subsp. arenosus	6543
Elymus athericus	27782
Elymus pungens	27905
Elymus caninus	20145
Agropyron caninum	103
Elymus caninus	20145
Roegneria canina	23598
Elymus repens	27778
Agropyron repens	27914
Agropyron repens subsp. caesium	6541
Elymus repens	27778
Elymus repens subsp. repens	27781
Elytrigia repens	21639
Triticum repens	24393
Empetrum nigrum agg.	2103
Empetrum nigrum	2105
Empetrum nigrum agg.	2103
Epilobium angustifolium	2113
Chamaenerion angustifolium	21237
Epilobium angustifolium	2113
Epilobium ciliatum	21642
Epilobium adenocaulon	2109
Epilobium ciliatum	21642
Epilobium tetragonum	2126
Epilobium tetragonum	2126
Epilobium tetragonum subsp. lamyi	2127
Epilobium tetragonum subsp. tetragonum	2128
Epipactis atrorubens	2130
Epipactis atropurpurea	21653
Epipactis atrorubens	2130
Epipactis rubiginosa	21664
Epipactis helleborine agg.	2131
Epipactis helleborine	2134
Epipactis latifolia	21660
Equisetum fluviatile	2143
Equisetum fluviatile	2143
Equisetum limosum	21674
Equisetum × mildeanum	91305
Equisetum pratense × sylvaticum	91302
Erica carnea	21680
Erica carnea	21680
Erica herbacea	2163
Erigeron acris	2167
Erigeron acris	2167
Erigeron acris subsp. acris	2168
Erigeron annuus	2178
Erigeron annuus	2178
Erigeron strigosus	21695
Erigeron glabratus	21689
Erigeron glabratus	21689
Erigeron polymorphus	2186
Erodium cicutarium agg.	2197
Erodium cicutarium	2199
Erodium cicutarium agg.	2197
Erophila verna	12356
Draba verna	21586
Erophila verna	12356
Erophila verna agg.	2205
Erophila verna subsp. verna	21715

Erysimum maschallianum	2229
Erysimum durum	21726
Erysimum odoratum	2234
Erysimum erysimoides	21727
Erysimum odoratum	2234
Euphorbia verrucosa	2309
Euphorbia brittingeri	21740
Euphorbia verrucosa	2309
Euphrasia officinalis	13816
Euphrasia officinalis	13816
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Ranunculus montanus agg.	4743
Ranunculus polyanthemos agg.	4758
Ranunculus nemorosus	4759
Ranunculus nemorosus subsp. polyanthemophyllus	23501
Ranunculus polyanthemoides	4760
Ranunculus polyanthemophyllus	4761
Ranunculus polyanthemos	4762
Ranunculus polyanthemos agg.	4758
Raphanus raphanistrum agg.	4778
Raphanus raphanistrum	4780
Raphanus sativus	4781

Rhinanthus angustifolius	23544
Rhinanthus angustifolius	23544
Rhinanthus angustifolius subsp. angustifolius	23545
Rhinanthus angustifolius subsp. grandiflorus	6569
Rhinanthus serotinus	4832
Rhinanthus aristatus agg.	4817
Rhinanthus aristatus	23551
Rhinanthus glacialis	4819
Rhinanthus minor	4828
Alectorolophus minor	20304
Rhinanthus minor	4828
Ribes rubrum agg.	4850
Ribes rubrum	4851
Ribes rubrum agg.	4850
Rosa canina agg. s. l.	94740
Rosa canina	26665
Rosa canina agg.	4872
Rosa canina agg. s. l.	94740
Rosa corymbifera	26666
Rosa obtusifolia	4897
Rosa rubiginosa agg. s. l.	92752
Rosa elliptica	4887
Rosa micrantha	4893
Rosa rubiginosa	4902
Rosa rubiginosa agg. s. l.	92752
Rosa spinosissima	23649
Rosa pimpinellifolia	4899
Rosa tomentosa agg. s. l.	92754
Rosa tomentosa	4912
Rosa tomentosa agg.	4907
Rosa villosa agg.	4908
Rubus canescens	4952
Rubus canescens	4952
Rubus tomentosus	25709
Rubus grabowskii	7078
Rubus thyrsanthus	5056
Rubus latiarcuatus	24749
Rubus vulgaris var. mollis	11374
Rubus montanus	24778
Rubus candicans	4951
Rubus montanus	24778
Rubus plicatus	5024
Rubus affinis	4931
Rubus plicatus	5024
Rubus sect. Rubus	11351
Rubus fruticosus s. l.	11886
Rubus sect. Rubus	11351
Rumex acetosa agg.	92799
Rumex acetosa	5073
Rumex thyrsiflorus	5108
Rumex acetosella	26619
Rumex acetosella	26619
Rumex acetosella agg.	5074
Rumex acetosella subsp. acetosella	26618
Rumex acetosella subsp. tenuifolius	27201
Rumex tenuifolius	5077
Rumex arifolius	20080
Rumex alpestris	5078
Rumex arifolius	20080
Rumex pseudoalpinus	23661
Rumex alpinus	5079
Rumex × pratensis	50156
Rumex × pratensis	50156

Rumex crispus × obtusifolius	92814
Salix fragilis agg.	5167
Salix × rubens	5169
Salix fragilis	5168
Salix myrsinifolia	5185
Salix myrsinifolia	5185
Salix nigricans	23730
Salix repens agg.	27193
Salix repens	27194
Salix repens agg.	27193
Salix repens s. l.	5191
Salix repens subsp. repens	5193
Salix retusa agg.	5196
Salix retusa	5198
Salix retusa agg.	5196
Salix serpillifolia	5199
Salix × multinervis	27195
Salix × multinervis	27195
Salix aurita × cinerea	92857
Salix × smithiana	27196
Salix × smithiana	27196
Salix caprea × viminalis	92873
Salix × wimmeriana	50108
Salix caprea × purpurea	92872
Salsola kali	5208
Salsola kali subsp. tragus	5211
Salsola tragus	23749
Sanguisorba minor	5231
Sanguisorba minor	5231
Sanguisorba minor subsp. minor	5232
Scabiosa columbaria agg.	5337
Scabiosa columbaria	5338
Scabiosa columbaria agg.	5337
Scabiosa lucida	5342
Scleranthus annuus agg.	5376
Scleranthus annuus	5377
Scleranthus annuus agg.	5376
Scleranthus polycarpos	5378
Scleranthus × intermedius	92980
Scleranthus annuus × perennis	92978
Securigera varia	21382
Coronilla varia	1662
Securigera varia	21382
Sedum rupestre agg.	5429
Sedum reflexum	5433
Sedum rupestre	23907
Sedum rupestre subsp. reflexum	23910
Sedum sexangulare	5437
Sedum boloniense	23894
Sedum mite	23901
Sedum sexangulare	5437
Sedum telephium agg.	5440
Hylotelephium maximum	7126
Sedum maximum	5441
Sedum telephium	27746
Sedum telephium agg.	5440
Sedum telephium subsp. maximum	23912
Senecio alpinus	5467
Senecio alpinus	5467
Senecio cordatus	23945
Senecio aquaticus agg.	5468
Senecio aquaticus	5469
Senecio aquaticus agg.	5468

Senecio erraticus	5470
Senecio incanus	5485
Senecio carniolicus	23942
Senecio jacobaea	5494
Jacobaea vulgaris	25789
Senecio jacobaea	5494
Senecio nemorensis agg.	5496
Senecio fuchsii	5498
Senecio hercynicus	5499
Senecio nemorensis	94860
Senecio nemorensis agg.	5496
Senecio ovatus	23947
Senecio ovatus subsp. alpestris	7006
Serratula tinctoria	27047
Serratula tinctoria	27047
Serratula tinctoria agg.	5524
Seseli libanotis	5540
Libanotis montana	22460
Libanotis sibirica	22463
Seseli libanotis	5540
Sesleria varia agg.	5558
Sesleria albicans	23996
Sesleria albicans subsp. albicans	27051
Sesleria albicans var. albicans	15414
Sesleria caerulea	25028
Sesleria caerulea subsp. calcaria	13441
Sesleria varia	24991
Setaria pumila	24008
Setaria glauca	5563
Setaria pumila	24008
Silene	60691
Lychnis	60681
Silene	60691
Silene acaulis agg.	5578
Silene acaulis	5579
Silene acaulis agg.	5578
Silene coronaria	11625
Lychnis coronaria	3551
Silene flos-cuculi	24031
Lychnis flos-cuculi	3552
Silene flos-cuculi	24031
Silene latifolia	7012
Melandrium album	22627
Silene alba	5581
Silene latifolia	7012
Silene latifolia subsp. alba	22546
Silene pratensis	20058
Silene noctiflora	5603
Melandrium noctiflorum	22630
Silene noctiflora	5603
Silene nutans agg.	5604
Silene nutans	5606
Silene nutans agg.	5604
Silene viscaria	11627
Lychnis viscaria	3554
Silene viscaria	11627
Viscaria vulgaris	24569
Silene vulgaris	5629
Silene cucubalus	24029
Silene inflata	25277
Silene vulgaris	5629
Silene vulgaris agg.	20067
Silene vulgaris subsp. vulgaris	5634

Silene vulgaris var. humilis	24046
Soldanella alpicola	24100
Soldanella pusilla s. l.	5678
Solidago virgaurea	5682
Solidago virgaurea	5682
Solidago virgaurea subsp. virgaurea	5684
Sonchus asper	5690
Sonchus asper	5690
Sonchus asper subsp. asper	5691
Sorbus aria agg.	5696
Sorbus aria	5697
Sorbus aria agg.	5696
Sorbus aucuparia	5700
Sorbus aucuparia	5700
Sorbus aucuparia subsp. aucuparia	5701
Spergula pentandra agg.	5730
Spergula morisonii	5731
Spergula vernalis	24154
Spergularia media	5734
Spergularia maritima	24145
Spergularia media	5734
Stellaria alsine	5769
Stellaria alsine	5769
Stellaria uliginosa	5782
Stellaria aquatica	24917
Myosoton aquaticum	3805
Stellaria aquatica	24917
Stellaria media agg.	5774
Stellaria media	5775
Stellaria media agg.	5774
Stellaria pallida	5777
Stellaria nemorum	5778
Stellaria nemorum	5778
Stellaria nemorum subsp. nemorum	5780
Stellaria palustris	11573
Stellaria glauca	24184
Stellaria palustris	11573
Stipa calamagrostis	24197
Achnatherum calamagrostis	47
Stipa pennata agg.	5787
Stipa joannis	5797
Stipa pennata	24203
Stipa pennata var. mediterranea	13411
Stipa pulcherrima	13746
Symphytum officinale	26629
Symphytum officinale	26629
Symphytum officinale agg.	5823
Tanacetum corymbosum agg.	5841
Chrysanthemum corymbosum	21294
Tanacetum corymbosum	5843
Tanacetum parthenium	5845
Chrysanthemum parthenium	21315
Tanacetum parthenium	5845
Tanacetum vulgare	5846
Chrysanthemum vulgare	21314
Tanacetum vulgare	5846
Taraxacum sect. Alpina et Hamata et Ruderalia	93219
Taraxacum sect. Alpina	7424
Taraxacum officinale agg.	7442
Taraxacum sect. Alpina et Hamata et Ruderalia	93219
Taraxacum sect. Ruderalia	7434
Taraxacum officinale	14513
Taraxacum sect. Erythrosperma	7428

Taraxacum erythrospermum	14460
Taraxacum laevigatum	14457
Taraxacum levigatum agg.	14458
Taraxacum sect. Erythrosperma	7428
Taraxacum sect. Palustria	7433
Taraxacum palustre	25514
Taraxacum sect. Palustria	7433
Tephroseris helenitis	23949
Senecio helenitis	5482
Tephroseris helenitis	23949
Tephroseris integrifolia	23953
Senecio integrifolius	5492
Tephroseris integrifolia	23953
Teucrium scorodonia	5889
Teucrium scorodonia	5889
Teucrium scorodonia subsp. scorodonia	5891
Thalictrum minus agg.	5896
Thalictrum minus	5898
Thalictrum minus agg.	5896
Thalictrum minus subsp. saxatile	5902
Thlaspi caerulescens	5928
Noccaea caerulescens	22785
Thlaspi cepaeifolium	25000
Thlaspi rotundifolium	5940
Thlaspi perfoliatum	5938
Microthlaspi perfoliatum	22667
Thlaspi perfoliatum	5938
Thymus praecox agg.	5955
Thymus praecox	5957
Thymus praecox agg.	5955
Thymus praecox subsp. polytrichus	5959
Thymus praecox subsp. praecox	5960
Thymus serpyllum subsp. praecox	13239
Thymus pulegioides agg.	5964
Thymus pulegioides	5965
Thymus pulegioides agg.	5964
Thymus pulegioides subsp. pulegioides	7053
Thymus serpyllum subsp. chamaedrys	13255
Thymus serpyllum agg.	6456
Thymus angustifolius	24265
Thymus serpyllum	5966
Thymus serpyllum agg.	6456
Tragopogon pratensis	7141
Tragopogon minor	5999
Tragopogon orientalis	6000
Tragopogon pratensis	7141
Tragopogon pratensis agg.	5998
Tragopogon pratensis subsp. orientalis	24325
Tragopogon pratensis subsp. pratensis	7100
Trichophorum cespitosum	27072
Trichophorum cespitosum	27072
Trichophorum cespitosum subsp. germanicum	24330
Trifolium dubium agg.	6028
Trifolium dubium	6029
Trifolium dubium agg.	6028
Trifolium minus	24352
Trifolium pratense	6057
Trifolium pratense	6057
Trifolium pratense subsp. pratense	6061
Tripleurospermum maritimum agg.	6096
Matricaria inodora	22000
Matricaria maritima	22580
Matricaria perforata	22003

Tripleurospermum inodorum	20061
Tripleurospermum maritimum	6098
Tripleurospermum perforatum	6097
Ulmus glabra	6137
Ulmus glabra	6137
Ulmus montana	24424
Ulmus scabra	24425
Ulmus minor agg.	6139
Ulmus campestris	24420
Ulmus minor	6140
Utricularia minor agg.	6152
Utricularia minor	6154
Utricularia minor agg.	6152
Vaccinium oxycoccos agg.	6161
Oxycoccus palustris	4070
Vaccinium oxycoccos	6163
Vaccinium oxycoccos agg.	6161
Vaccinium uliginosum	6166
Vaccinium uliginosum	6166
Vaccinium uliginosum agg.	6164
Valeriana officinalis agg.	6177
Valeriana officinalis	6178
Valeriana officinalis agg.	6177
Valeriana pratensis	6179
Valeriana procurrens	6180
Valeriana wallrothii	6183
Veronica agrestis agg.	93432
Veronica agrestis	6226
Veronica persica	6271
Veronica polita	6272
Veronica anagallis-aquatica agg.	6231
Veronica anagallis-aquatica	6232
Veronica anagalloides	6233
Veronica catenata	6234
Veronica austriaca agg.	6237
Veronica austriaca	13751
Veronica austriaca subsp. dentata	24471
Veronica austriaca subsp. teucrium	25019
Veronica prostrata	13869
Veronica teucrium	6243
Veronica chamaedrys	13752
Veronica chamaedrys	13752
Veronica chamaedrys agg.	6248
Veronica hederifolia	26766
Veronica hederifolia	26766
Veronica hederifolia agg.	6257
Veronica hederifolia subsp. hederifolia	7101
Veronica sublobata	6259
Veronica verna agg.	6292
Veronica dillenii	6293
Veronica verna	6294
Veronica verna agg.	6292
Vicia cracca agg.	6301
Vicia cracca	6302
Vicia cracca agg.	6301
Vicia tenuifolia	6306
Vicia sativa agg.	6328
Vicia angustifolia	6329
Vicia sativa	6334
Vicia sativa agg.	6328
Vicia sativa subsp. nigra	24521
Vicia sativa var. nigra	24518
Vicia tetrasperma agg.	6338

Vicia tenuissima	6340
Vicia tetrasperma	6341
Vicia tetrasperma agg.	6338
Vincetoxicum hirundinaria agg.	6349
Cynanchum vincetoxicum	21465
Vincetoxicum hirundinaria	6351
Vincetoxicum officinale	24536
Viola canina agg.	24994
Viola canina	6367
Viola canina subsp. canina	6368
Viola persicifolia	6386
Viola persicifolia	6386
Viola stagnina	6394
Viola silvatica agg.	94746
Viola × bavarica	7420
Viola reichenbachiana	6390
Viola reichenbachiana × riviniana	93487
Viola riviniana	6391
Viola silvatica	24559
Viola tricolor agg.	6397
Viola arvensis	6398
Viola arvensis × tricolor	93457
Viola arvensis subsp. arvensis	7208
Viola tricolor	6402
Viola tricolor subsp. tricolor	6405
Viola tricolor var. arvensis	12796
x Festulolium krasanii	93548
Festuca arundinacea × Lolium multiflorum	91392

Table 6: List of all taxon names that were adapted within projects, in addition to the harmonisation across all projects, as shown in Table 4. PROJECT_ID and Project_Name refer to the project in Table 1, RS_PLOT is the plot resurvey ID, which identifies the groups of plots compared in time, RELEVE_NR is the plot observation ID in the Turboveg 2 database (Table 4). Taxon_name_old is the name given by the original author, while Taxon_name_new_1 and Taxon_name_new_2 refer to newly assigned taxon names. In case of two new names the cover values of the old taxon were equally divided among the two new taxa.

PROJECT_ID	Project_Name	RS_Plot	RELEVE_NR	Taxon_name_old	Taxon_name_new_1	Taxon_name_new_2
6	Bode (2005)	HEIDE	331	Cuscuta	Cuscuta epithymum	
6	Bode (2005)	HEIDE	270	Fagus	Fagus sylvatica	
6	Bode (2005)	HEIDE	271	Fagus	Fagus sylvatica	
23	Jandt & Leonhardt (unpubl.)	32	138	Tragopogon	Tragopogon pratensis	
23	Jandt & Leonhardt (unpubl.)	61	186	Tortula	Tortula ruralis agg.	
23	Jandt & Leonhardt (unpubl.)	63	190	Pulsatilla	Pulsatilla pratensis	
23	Jandt & Leonhardt (unpubl.)	56	182	Anthericum	Anthericum ramosum	
23	Jandt & Leonhardt (unpubl.)	80	214	Epipactis	Epipactis atrorubens	
23	Jandt & Leonhardt (unpubl.)	123	6	Trifolium	Trifolium repens	
23	Jandt & Leonhardt (unpubl.)	138	36	Epipactis	Epipactis atrorubens	
23	Jandt & Leonhardt (unpubl.)	146	38	Achillea	Achillea millefolium agg.	
23	Jandt & Leonhardt (unpubl.)	146	38	Tragopogon	Tragopogon pratensis	
23	Jandt & Leonhardt (unpubl.)	205	118	Tragopogon	Tragopogon pratensis	
23	Jandt & Leonhardt (unpubl.)	246	120	Epipactis	Epipactis atrorubens	
23	Jandt & Leonhardt (unpubl.)	251	128	Epipactis	Epipactis atrorubens	
23	Jandt & Leonhardt (unpubl.)	367	166	Tragopogon	Tragopogon pratensis	
23	Jandt & Leonhardt (unpubl.)	373	176	Tragopogon	Tragopogon pratensis	
23	Hagen (1996)	G04	180	Festuca	Festuca rupicola	
23	Hagen (1996)	G09	171	Anemone	Pulsatilla vulgaris	
23	Hagen (1996)	G15	183	Anemone	Pulsatilla vulgaris	
23	Hagen (1996)	G23	290	Epipactis	Epipactis atrorubens	

16	Hagen (1996)	Z20	377	Epipactis	Epipactis atrorubens
16	Heinrich, Marstaller & Voigt (2012)	A_CF5	857	Orchis	Orchis militaris
16	Heinrich, Marstaller & Voigt (2012)	CAT_16A	2014	Orchis	Orchis x hybrida
16	Heinrich, Marstaller & Voigt (2012)	CAT_14C	2004	Orchis	Orchis militaris
16	Heinrich, Marstaller & Voigt (2012)	CAT_16B	2015	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	CAT_18A	2026	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	CAT_18D	2029	Orchis	Orchis purpurea
43	Heinrich, Marstaller & Voigt (2012)	CAT_18E	2030	Orchis	Orchis purpurea
43	Heinrich, Marstaller & Voigt (2012)	CAT_19A	2032	Orchis	Orchis purpurea
43	Heinrich, Marstaller & Voigt (2012)	CAT_19B	2033	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	CAT_19D	2035	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	CAT_20A	2038	Platanthera	Platanthera chlorantha
43	Heinrich, Marstaller & Voigt (2012)	CAT_20C	2040	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	CAT_20D	2041	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	CAT_21B	2045	Orchis	Orchis x hybrida
43	Heinrich, Marstaller & Voigt (2012)	CAT_21C	2046	Orchis	Orchis purpurea
43	Heinrich, Marstaller & Voigt (2012)	CAT_22A	2050	Orchis	Orchis purpurea
43	Heinrich, Marstaller & Voigt (2012)	CAT_22B	2051	Platanthera	Platanthera chlorantha
43	Heinrich, Marstaller & Voigt (2012)	CAT_22E	2054	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	CAT_23A	2056	Orchis	Orchis purpurea

43	Heinrich, Marstaller & Voigt (2012)	CAT_23B	2057	Platanthera	Platanthera chlorantha
43	Heinrich, Marstaller & Voigt (2012)	CAT_28A	2086	Orchis	Orchis militaris
43	Heinrich, Marstaller & Voigt (2012)	M_CF3	471	Ulmus	Ulmus glabra
43	Heinrich, Marstaller & Voigt (2012)	M_CF3	495	Ulmus	Ulmus glabra
43	Heinrich, Marstaller & Voigt (2012)	M_CF3	519	Ulmus	Ulmus glabra
43	Heinrich, Marstaller & Voigt (2012)	M_CF4	568	Orchis	Orchis x hybrida
43	Heinrich, Marstaller & Voigt (2012)	M_CF6	570	Orchis	Orchis militaris
43	Horchler (unpubl.)	67	93	Callitriche	Callitriche palustris agg.
43	Horchler (unpubl.)	68	94	Callitriche	Callitriche palustris agg.
43	Hüllbusch et al. (2016)	MW9	28	Tragopogon	Tragopogon pratensis
43	Kuhn et al. (2011)	4350724.00_5487257.00	1608	Campanula	Campanula rapunculoides
74	Kuhn et al. (2011)	4365134.20_5531963.60	1300	Primula	Primula veris
74	Kuhn et al. (2011)	4365183.00_5532063.00	1301	Campanula	Campanula rapunculoides
19	Kuhn et al. (2011)	4365308.00_5532308.00	1302	Campanula	Campanula rapunculoides
14	Kuhn et al. (2011)	4377860.10_5547643.00	1357	Primula	Primula veris
14	Kuhn et al. (2011)	4395362.00_5271657.00	2024	Primula	Primula elatior
14	Kuhn et al. (2011)	4415784.00_5532303.00	832	Primula	Primula veris
14	Kuhn et al. (2011)	4420009.00_5433917.00	3580	Agrimonia	Agrimonia eupatoria
14	Kuhn et al. (2011)	4421750.00_5573096.00	34	Ajuga	Ajuga reptans
14	Kuhn et al. (2011)	4450612.00_5509207.00	769	Ajuga	Ajuga reptans
14	Meineke & Menge (2010)	DBF 4	16	Alchemilla	Alchemilla vulgaris agg.
14	Meineke & Menge (2010)	DBF 4	17	Alchemilla	Alchemilla vulgaris agg.

14	Meineke & Menge (2010)	DBF 4	18	Alchemilla	Alchemilla vulgaris agg.
14	Meineke & Menge (2010)	DBF 4	19	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 8	36	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 8	37	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 8	38	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 8	40	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 10	46	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 10	47	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 10	48	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 10	50	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 11	51	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 11	52	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 11	53	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 11	55	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 13	61	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 13	62	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 13	63	Alchemilla	Alchemilla vulgaris agg.
55	Meineke & Menge (2010)	DBF 13	65	Alchemilla	Alchemilla vulgaris agg.
55	Müller (2002)	K/SH1	119	Thymus	Thymus praecox agg.
55	Peppler-Lisbach & Könitz (2017)	N 86-106	239	Dicranum	Dicranum scoparium
55	Peppler-Lisbach & Könitz (2017)	N 86-192	56	Euphorbia stricta	Euphrasia stricta

55	Peppler-Lisbach & Könitz (2017)	N 86-193	57	Euphorbia stricta	Euphrasia stricta	
29	Peppler-Lisbach et al. (2020)	B_S69	13	Polytrichum	Polytrichum commune	
32	Peppler-Lisbach et al. (2020)	B_S70	14	Polytrichum	Polytrichum commune	Polytrichum formosum
32	Peppler-Lisbach et al. (2020)	B_S82	19	Polytrichum	Polytrichum formosum	
32	Raehse (2001)	M546/50	880	Fragaria	Fragaria vesca	
44	Schmidt et al. (unpubl.)	Hünstollen_KF1_37	1825	Anemone	Anemone nemorosa	
44	Schmidt et al. (unpubl.)	Hünstollen_KF1_40	1828	Anemone	Anemone nemorosa	
44	Schmidt et al. (unpubl.)	Hünstollen_KF1_41	1829	Anemone	Anemone nemorosa	Anemone ranunculoides
36	Schmidt et al. (unpubl.)	Hünstollen_KF1_42	1830	Anemone	Anemone nemorosa	Anemone ranunculoides
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_43	1831	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_44	1832	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_45	1833	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_46	1834	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_47	1835	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_48	1836	Anemone	Anemone nemorosa	Anemone ranunculoides
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_49	1837	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_50	1838	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF1_51	1839	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_30	1869	Anemone	Anemone nemorosa	Anemone ranunculoides
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_32	1871	Anemone	Anemone nemorosa	Anemone ranunculoides
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_34	1873	Anemone	Anemone nemorosa	Anemone ranunculoides
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_35	1874	Anemone	Anemone nemorosa	Anemone ranunculoides
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_37	1876	Anemone	Anemone nemorosa	Anemone ranunculoides
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_41	1880	Anemone	Anemone nemorosa	
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_42	1881	Anemone	Anemone nemorosa	

33	Schmidt et al. (unpubl.)	Hünstollen_KF2_43	1882	Anemone	Anemone nemorosa
33	Schmidt et al. (unpubl.)	Hünstollen_KF2_44	1883	Anemone	Anemone nemorosa
33	Stroh (2013)	DBF_11	55	Tortella tortuosa	Tortella inclinata
33	Strubelt & Zacharias (2015)	8	41	Campanula	Campanula trachelium
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33					
46					
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