sPlot: Vegetation-plot Database

sPlot: the first global vegetation-plot database and opportunities to contribute

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Background

Vegetation-plot data become increasingly available in regional and national vegetation-plot databases, particularly in Europe (Schaminée et al. 2009), but also on all other continents (Dengler et al. 2011). Access to such data has been facilitated through the global metadatabase GIVD (www.givd.info), set up in collaboration with the IAVS Working Group on Ecoinformatics, but until recently analyses of plot data across several continents were impeded by the fact that it is tedious and time-consuming to retrieve plot data from various different databases and to prepare them for common analyses, which requires standardisation of database format and structure, header data and species taxonomies.

To fill this gap, the European Vegetation Survey (EVS), a working group of IAVS, has initiated the first comprehensive continental plot database for Europe, called European Vegetation Archive (EVA), in 2012, which became live in spring 2014 (http://euroveg.org/eva-database; see Jiménez-Alfaro et al. 2013). Parallel to this European effort and in close collaboration with the European partners, an initiative for a global plot database, called "sPlot", was initiated by an **international Working Group at the Synthesis Centre (sDiv) of the German Centre for Integrative Biodiversity Research (iDiv)** in Halle-Jena-Leipzig (www.idiv.de) with the **first sPlot Workshop** in Leipzig in March 2013. Since then, the sPlot Team and Consortium, including many well-known IAVS members, was working on making this idea come true. Finally, in April 2014, a prototype of sPlot could be created by joining major parts of EVA (those whose owners had agreed to make their data available in both supra-national databases) with the first extra-European databases. This process was strongly facilitated through the use of the prototype of Turboveg 3, a software programmed by Stephan Hennekens, that is able to manage different Turboveg 2 database with different taxonomies and header data structures on a common platform, including the rights management, which becomes increasingly important when combining plots from many different sources.

Finally, in November 2014, we could release the version 1.0 of sPlot that now contains already data from various continents and all ecozones. From 2–5 December 2014 the **second sPlot Workshop** took place in Leipzig, in which **28 scientists from nine countries and four continents** participated. They were an exciting mixture of representatives of big plot databases (Czech National Database, GVRD and VegMV/Germany, AEKOS/Australia, BIOTA-Western Africa,

BIOTA-Southern Africa), trait databases (TRY), theoretical ecologists and specialists for elaborate statistical analyses that combine plot data, trait data, phylogenies, climate data and remote sensing products. The aim of this workshop was to screen the already available data and to plan papers for high-rank journals that make use of the unique data resource that became available with sPlot. Many of the planned papers focus on trait-environment relationships at community level across the world's biomes and do so through close collaboration with the global trait database TRY (Kattge et al. 2011). However, there are also other paper plans that focus on the plot data alone or intend to combine them with phylogenetic, environmental and remote sensing data, e.g. analyses concerning global patterns of plot-scale alpha diversity or plant invasions.

sPlot Rules, sPlot Consortium and access to the data

sPlot is a truly collaborative project. The **sPlot Consortium has currently 88 members from all continents** and is governed by an elected Steering Committee (currently: Helge Bruelheide [chair], Milan Chytrý, Valério Pillar, Brody Sandel & Jens Kattge). The **Governance and Data Property Rules of the sPlot Working Group** (http://www.idiv-biodiversity.de/sdiv/workshops/workshops-2013/splot/materials/content_56450/sPlot-Rules_approved.pdf) ensure a fair balance of the interests of researchers to do global-scale analyses and the rights of data contributors. Most important elements are that **(a) data contributors with their data contribution become members of the sPlot Consortium and (b) data in sPlot are not public but restricted to use by sPlot Consortium members**. Whenever a Consortium member has proposed a paper using the sPlot data, all Consortium members will be informed and can declare their interest of becoming co-authors (opt-in papers). Further, sPlot will ensure proper attribution and citation whenever data from a contributing database are used and explicitly excludes any analyses below continental level. Thus no data contributor needs to be concerned that data retrieved from sPlot could be used for national or regional analyses that might interfere with publications projects have planned themselves with their single database. Finally, contributed data to sPlot remain the property of the data contributor and can be withdrawn at any time.

Content of sPlot 1.0

sPlot 1.0 contains **52 databases and 659,000 plots from**

62 countries:
- Europe (including Turkey), contributed via EVA: 40 databases, 611,397 plots
- Africa, Asia, Australasia: 10 databases, 46,895 plots
- Americas: 1 database, 427 plots

For certain analyses, we can additionally rely on cooperation with the French SOPHY database (209,000 plots), which is not part of sPlot, so that **in total there are presently c. 840,000 plots worldwide, of which c. 700,000 are georeferenced** (see Figs. 1 and 2).
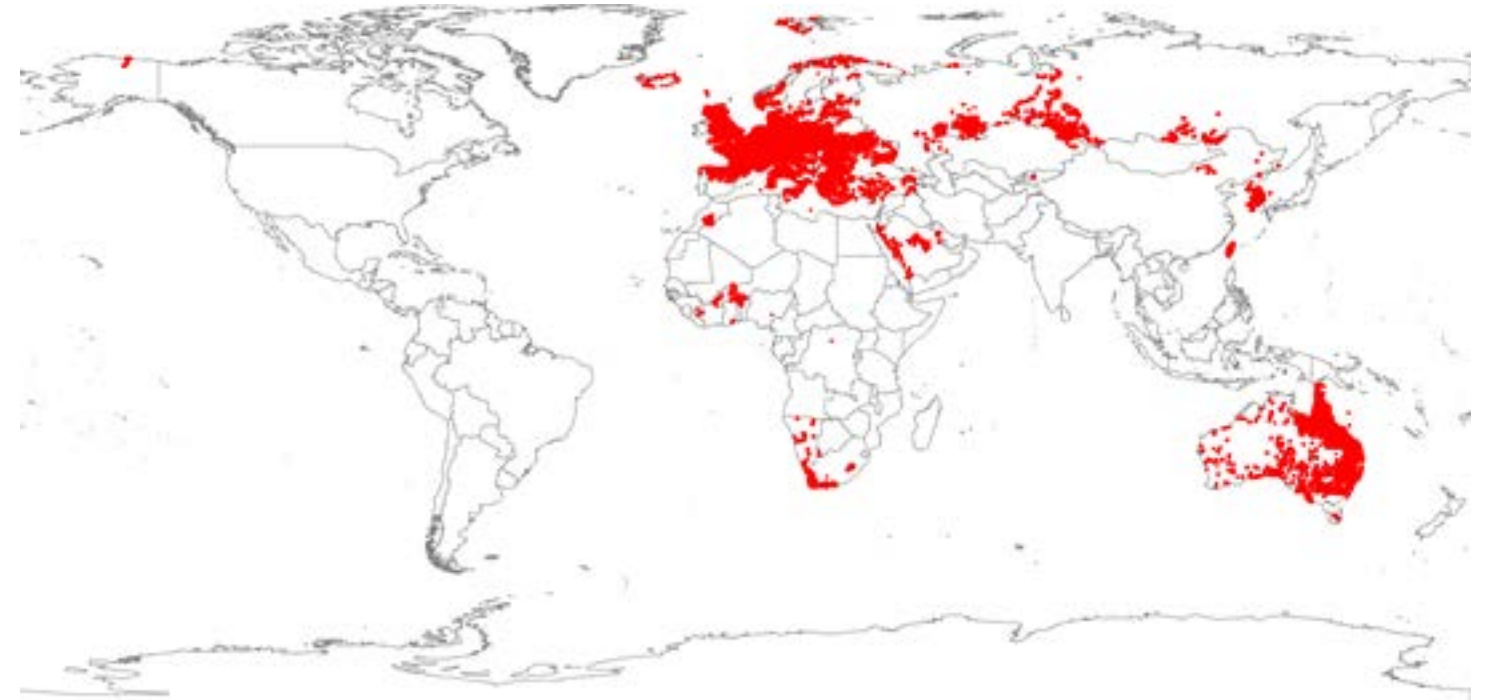

Fig. 1: Geographic distribution of vegetation plots in sPlot 1.0.

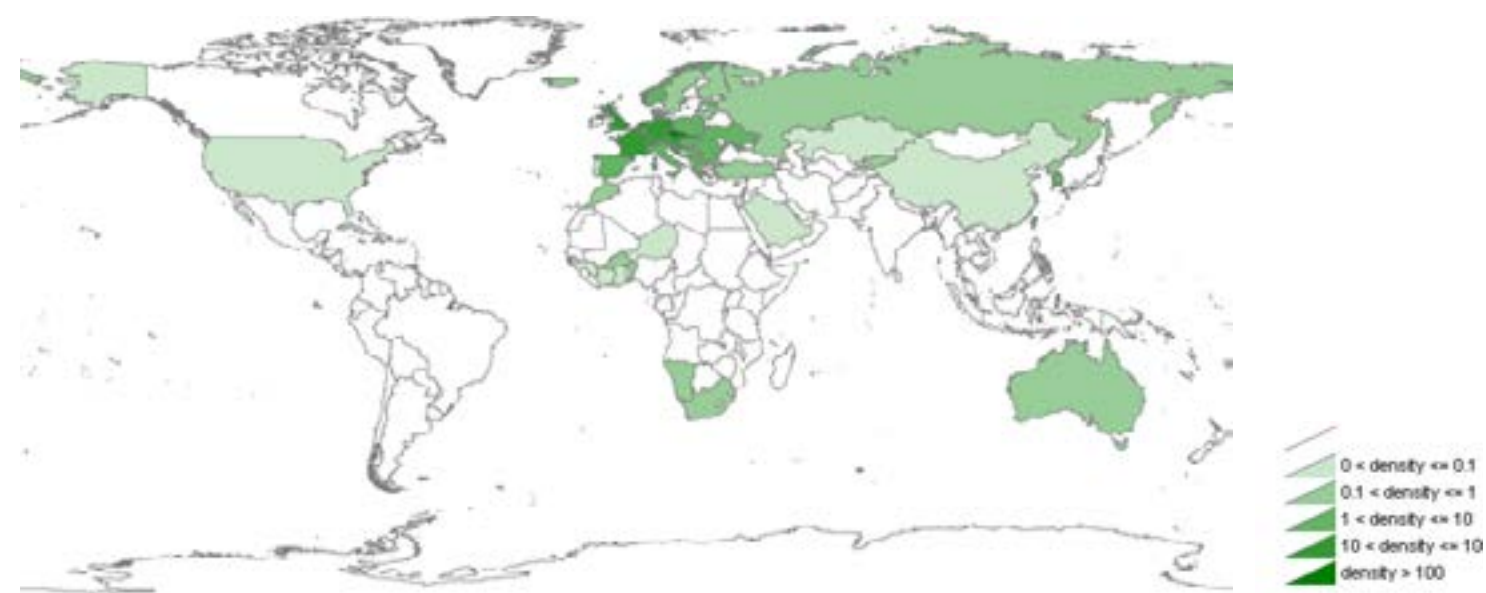|	
	0 < density <= 0.1
	0.1 < density <= 1
	1 < density <= 10
	10 < density <= 10
	density > 100

Fig. 2: Density of vegetation plots (number per 100 km²) per country as contained in sPlot 1.0 (note the log-scale; some countries in the lightest green have only 0.002 plots per 100 km², namely the USA and China).

Table 1: Distribution of vegetation plots in sPlot 1.0 across the nine ecozones (note that densities are multiplied by 10,000 compared to Fig. 2).

Ecozone (according to Schultz)	Number of plots	Plots per 1,000,000 km²	Coverage
1 – Tropics with year-round rain	1,358	109	Very poor
2 – Tropics with summer rain	5,394	220	Poor
3 – Dry tropics and subtropics	9,998	323	Poor
4 – Subtropics with winter rain	78,185	29,274	Good
5 – Subtropics with year-round rain	12,179	2,030	Moderate
6 – Temperate midlatitudes	588,419	40,581	Good
7 – Dry midlatitudes	5,644	342	Poor
8 – Boreal zone	8,133	417	Poor
9 – Polar and subpolar zone	1,378	230	Poor

In sPlot meanwhile all nine ecozones (zonobiomes) were represented so that we could reasonably conduct comparisons of trait-environment relationships across these. However, the coverage of six of the nine ecozones calls for improvement (Table 1).

Call to contribute data until 31 January 2015

Based on the imbalanced coverage between ecozones and regions, the sPlot Working Group decided in Leipzig to call for additional datasets to be delivered to until the **deadline of 31 January 2015**. The data available by that deadline will be used to prepare **version 2.0 of sPlot** to be released approx. February 2015. sPlot 2.0 is expected to be used for the sPlot publications scheduled for the first half of 2015. While sPlot plans to grow continuously also after this release, another major new version is not expected before end of 2015/early 2016. Therefore it is highly attractive to join sPlot with relevant datasets already in January 2015 because this will safeguard that you automatically become co-author for the planned paper describing the sPlot database (Dengler et al. in prep., similar to the highly-cited TRY database paper by Kattge et al. 2011) and will be invited to opt-in as co-author for the seven presently planned analytical papers.

Thus we ask now for contribution of additional medium to big vegetation-plot databases to reduce our geographical imbalance and to achieve a better coverage of all nine ecozones (zonobiomes; see Figs. 1-2 and Table 1). This means that we are **particularly looking for data from South America, North America, South Asia, Oceania and tropical and subtropical Africa.** In terms of ecozones, most urgently needed (in this sequence) are plots from the **(a) Tropics with year-round rain, (b) Tropics with summer rain, (c) Polar and subpolar zone, (d) Dry tropics and subtropics, (e) Dry midlatitudes and (f) Boreal zone.** For particularly underrepresented regions/biomes, joining will be possible even with small datasets (of a few hundred plots). Of course, we also accept data from the three already reasonably well-covered ecozones (Subtropics with winter rain = Mediterranean; Subtropics with year-round rain and Temperate midlatitudes) if they come from outside Europe (for data from European regions, please contribute them via EVA, see http://euroveg.org/eva-database).

Normally we require georeferenced plots with full species composition and percentage cover (or a comparable performance measure, such as Braun-Blanquet cover/abundance or basal area per hectare) of all species. However, in very underrepresented regions, we exceptionally also take plots where only presence/absence was recorded or only the woody species were sampled. If you have suitable plot data and wish to join the sPlot Consortium with them, please contact the sPlot Coordinator Jürgen Dengler (juergen.dengler@uni-bayreuth.de) as soon as possible to discuss details based on which sPlot will decide whether they invite you. To facilitate the process it would be good if you could already indicate in your first e-mail indicate how many plots you could contribute in total, from which geographic area and which vegetation types, whether they have coordinates, full species lists and a relative performance measure per species (such as % cover).

THANK YOU for considering joining this global initiative of vegetation scientists and for forwarding this call to colleagues who might have suitable data!

References

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