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Data Article

Community weighted mean trait data of Italian forest understories

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ABSTRACT

Plant functional trait data aggregated at the community level (i.e., community weighted mean, CWM) are fundamental to study plant-environment relationships. Here, we provide a large database of CWM values of twelve traits reflecting several plant functions, including leaf, seed, whole-plant, clonal and bud bank traits. The CWMs were calculated in 201 forest stands (a statistically representative sample of all the Italian forests) across three biogeographic regions: Alpine, Continental, and Mediterranean.

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1. Data

In this article we provide a large database (Appendix A) of community weighted mean (CWM) values of twelve traits reflecting several plant functions (Table 1), calculated in the understory of 201 forest stands that constitute a representative sample of all the Italian forests across the Alpine,

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Specifications Table

Subject	Plant sciences
Specific subject area	Plant ecology
Type of data	Table
How data were acquired	Database sources, field measurements, laboratory analyses, elaboration of community weighted mean values. The leaf area was measured using a Canon CanoScan LiDE 110 electronic scanner (Canon Inc., Lake Success, NY, USA), and calculated using the Leaf Area Measurement software version 1.3
Data format	Raw data
Parameters for data collection	Forest understories, data collected in 400 m^2 plots
Description of data collection	The dataset includes twelve plant functional traits related to leaf, seed, whole-plant, clonal and bud bank.
Data source location	Italian forests
Data accessibility	Raw data are provided with the article
Related research article	S. Chelli, G. Ottaviani, E. Simonetti, C. Wellstein, R. Canullo, S. Carnicelli, N. Puletti, S. Bartha, M. Cervellini, G. Campetella. Climate is the main driver of clonal and bud bank traits in Italian forest understories. Perspect. Plant Ecol., 40 (2019), pp. 125478.

Value of the Data

- These data are key for functional biogeography studies assessing community-level trait variation along environmental gradients.
- Plant ecologists and biogeographers can benefit from using these data.
- These data can be used for meta-analyses targeting whole-plant (multi-functional) responses to complex environmental gradients

Continental, and Mediterranean biogeographic regions. For each data we provide additional information, including plot coordinates, biogeographic region and forest type (according to European Forest Type Classification, Appendix A).

The following twelve traits have been considered [1,2]: 1) *specific leaf area*, a proxy of plant growth and a good surrogate for ability to use light efficiently; 2) *leaf dry matter content*, related to the resource use and determining the rate of leaf turnover and litter decomposability; 3) *seed mass*, having implications for the space/time dispersal ability and indicative of seedling establishment; 4) *seed releasing height*, informative on seed dispersal capacity; 5) *canopy height*, related to competitive ability and access to vertical light gradient; 6) *clonality*, that is the ability to reproduce vegetatively by means of clonal growth organs; 7) *belowground clonal growth organ*, informative on the ability to store and share resources among ramets, and potential to recover after disturbance (if carrying buds); 8) *length of connections between ramets*, related to the capacity to share resources among ramets; 9) *lateral spread*, having implications on space occupancy; 10) *bud protection*, 11) *large bud bank*, and 12) *belowground perennial bud bank*, all related to plant resprouting capacity after biomass removal.

2. Experimental design, materials, and methods

The data were collected in the Italian forests, estimated to be around 9 million hectares, mainly concentrated along the Apennines and Alps mountain chains. Annual mean temperature ranges from −1.2 °C to 17.5 °C; annual average rainfall varies between 458 mm and 1437 mm. Latitude is comprised between 37.1°N and 46.9°N, including Mediterranean, Continental and Alpine biogeographic regions.

The sampling design was systematic and probabilistic and was based on a grid superimposed onto the whole Italian country (16 km × 16 km cells), with each corner of the grid being included as a sample area if a forest larger than 1 ha was found there after a field assessment [3]. The sampling design is part of the ICP Forests Level I network having as the main objective to monitor the health status of the European forests (http://icp-forests.net/). For the entire country, it resulted in a dataset of 201 sampling areas, 45% of which belonging to termophilous deciduous forests, 24% to alpine coniferous forests, 17%

Table 1
Summary of the plant functional traits included in the database.

Trait group	Plant Functional Trait	Unit of CWM	Mean value	Range of values (min-max)	Major functions
Leaf traits	Specific leaf area	$mm^{2*}mg^{-1}$	23.75	2.88–61.49	Resource use; Growth potential.
	Leaf dry matter content	$mg^{*}g^{-1}$	223.72	36.05–375.03	
Seed traits	Seed mass	mg	18.70	0.01–163.71	Dispersal; On-spot persistence;
	Seed releasing height	m	1.12	0.02–7.62	Seedling establishment.
Whole-plant traits	Canopy height	m	1.15	0,14–5.00	Competitive ability; Space occupancy.
Clonal traits	Clonality	%	74.15	0–100	Space occupancy; Resource storage, foraging and sharing; Recovery after damage; Competitive ability.
	Belowground clonal growth organ	%	63.17	0–100	
	Length of connections between ramets	%	65.06	0–100	
	Lateral spread	%	33.31	0–100	
Bud bank traits	Bud protection	%	5.99	0–69.44	Recovery after damage; Space occupancy; On-spot persistence;
	Large bud bank	%	70.91	0–100	
	Belowground perennial bud bank	%	33.50	0–100	Competitive ability; Protection of vital tissues.

to beech forests, 5% to broadleaved evergreen forests, 4% to native and exotic plantations, 5% to other type of forests. In each sampling area, we sampled a 400 m^2 area within which we recorded the presence and abundance (%) of all understory vascular plants. The sampling was performed during the 2007 growing season, following standard protocols, with ten surveyor teams which have been previously trained and intercalibrated according to Quality Assurance guidelines [4]. In each sampling area we selected the species contributing to reach a relative cumulative coverage of 80% [5]. Seedlings of tree species were excluded from the selection. We attributed to these species trait values obtained from available databases and literature (see Refs. [6,7]). Trait values were available for ~75% of the species [6]. We weighted trait values according to species coverage (in each of the 400 m^2 sampling areas) in order to obtain community weighted mean (CWM) values for each trait [5].

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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dib.2019.104947.

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