Received: 2 November 2023 | Revised: 25 June 2024 | Accepted: 31 July 2024

DOI: 10.1002/ecy.4438

DATA PAPER

ECOLOGY
ECOLOGICAL SOCIETY OF AMERICA

A global database of soil seed bank richness, density, and abundance

Alistair G. Auffret[1] | **Emma Ladouceur**[2,3,4,5] | **Natalie S. Haussmann**[6] | **Eirini Daouti**[1,7] | **Tatiana G. Elumeeva**[8] | **Ineta Kačergytė**[1] | **Jonas Knape**[1] | **Dorota Kotowska**[9,10] | **Matthew Low**[1] | **Vladimir G. Onipchenko**[8] | **Matthieu Paquet**[1,11] | **Diana Rubene**[1,7] | **Jan Plue**[12]

[1]Department of Ecology, Swedish University of Agricultural Sciences, Uppsala, Sweden

[2]Department of Biology, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada

[3]Canadian Centre for Climate Change and Adaptation, University of Prince Edward Island, St. Peter's Bay, Prince Edward Island, Canada

[4]School of Climate Change and Adaptation, Faculty of Science, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada

[5]Biodiversity Synthesis, German Centre for Integrative Biodiversity Research (iDiv) Leipzig-Halle-Jena, Leipzig, Germany

[6]Department of Geography, Geoinformatics and Meteorology, University of Pretoria, Hatfield, South Africa

[7]Department of Crop Production Ecology, Swedish University of Agricultural Sciences, Uppsala, Sweden

[8]Department of Ecology and Plant Geography, Lomonosov Moscow State University, Moscow, Russia

[9]Institute of Nature Conservation, Polish Academy of Sciences, Kraków, Poland

[10]Lendület Landscape and Conservation Ecology, Centre for Ecological Research, Institute of Ecology and Botany, Vácrátót, Hungary

[11]Theoretical and Experimental Ecology Station (SETE), CNRS, Moulis, France

[12]Swedish Biodiversity Centre, Swedish University of Agricultural Sciences, Uppsala, Sweden

Correspondence
Alistair G. Auffret
Email: alistair.auffret@slu.se

Handling Editor: Hao Ye

Abstract

A soil seed bank is the collective name for viable seeds that are stored naturally in the soil. At the species or population level, the ability to form a seed bank represents a strategy for (re)colonization following a disturbance or other change in the local environmental conditions. At the community level, seed banks are thought to buffer local diversity during periods of environmental change and are often studied in relation to the potential for passive habitat restoration. The role that seed banks play in plant population and community dynamics, as well as their importance in the agricultural sector, means that they have been widely studied in ecological research. This database is the result of a comprehensive literature search, including all seed bank studies from the Web of Science from which data could be extracted, as well as an additional search of the Russian language literature. The database contains information on the species richness, seed

density, and/or seed abundance in 3096 records from at least 1929 locations across the world's seven continents, extracted from 1442 studies published between 1940 and 2020. Records are grouped into five broad habitat categories (aquatic, arable, forest, grassland—including shrubland—and wetland), including information relating to habitat degradation from, or restoration to other habitats (total 14 combinations). Sampling protocols were also extracted for each record, and the database was extensively checked for errors. The location of each record was then used to extract summary climate data and biome classification from external published databases. The database has several potential uses. The large geographical spread relative to many other global biodiversity datasets is relevant for investigating patterns of diversity in biogeographical or macroecological contexts. Habitat type and status (intact, degraded, and restored) can be used to provide insights for biodiversity conservation, while the potential effects of sampling method and effort can be used to inform optimized data collection for future seed bank studies. This database is released under the CC-BY license.

KEYWORDS
biodiversity, dispersal, global map, plants, seed bank, species richness

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data and code are available in Data S1 as Supporting Information. Data are also archived in the Swedish National Data Service at https://doi.org/10.5878/bvs7-gk47.

ORCID

Alistair G. Auffret https://orcid.org/0000-0002-4190-4423
Emma Ladouceur https://orcid.org/0000-0002-4943-4358
Natalie S. Haussmann https://orcid.org/0000-0002-0314-0266
Eirini Daouti https://orcid.org/0000-0001-8609-4391
Tatiana G. Elumeeva https://orcid.org/0000-0003-0589-830X
Ineta Kačergytė https://orcid.org/0000-0003-4756-8253
Jonas Knape https://orcid.org/0000-0002-8012-5131
Dorota Kotowska https://orcid.org/0000-0002-0358-3665
Matthew Low https://orcid.org/0000-0002-7345-6063
Vladimir G. Onipchenko https://orcid.org/0000-0002-1626-1171
Matthieu Paquet https://orcid.org/0000-0003-1182-2299
Diana Rubene https://orcid.org/0000-0001-5691-0378
Jan Plue https://orcid.org/0000-0002-6999-669X

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Auffret, Alistair G., Emma Ladouceur, Natalie S. Haussmann, Eirini Daouti, Tatiana G. Elumeeva, Ineta Kačergytė, Jonas Knape, et al. 2024. "A Global Database of Soil Seed Bank Richness, Density, and Abundance." *Ecology* 105(11): e4438. https://doi.org/10.1002/ecy.4438