Supplementary Material for

Soil biodiversity knowledge and use worldwide: Results from a global survey

George G. Brown, Talita Ferreira, Maria Elizabeth F. Correia, Cintia C. Niva, Ederson C. Jesus, Maria Inês L. Oliveira, Luiz Fernando S. Antunes, Lucília Parron Vargas, Marcia R. Coelho, Guilherme M. Chaer, Juaci V. Malaquias, Ozanival Dario D. Silva, Ieda C. Mendes, Peter de Ruiter, Carlos Guerra, Zoe Lindo, Jeff Battigelli, Gian Luca Bagnara, Giulio Malorgio, Rosalina González, Luca Montanarella, Diana Wall, Isabelle Verbeke, Julia Mousquer, Natalia Rodriguez Eugenio, Ronald Vargas, Rosa Corona-Cuevas, John Jacob Parnell

DOI https://doi.org/10.25674/410

Supplementary Table S1. Major groups (topics) used as search terms in the literature review in two major online bibliographic databases (Web of Science and Scopus) considering the time-period between 2011-2022. Topics were separated into four major groups: Invertebrates, Megafauna (vertebrates), Prokaryotes and soil functions or uses of soil biodiversity. Although not invertebrates, protists were included in this category as they have been historically associated with soil microfauna research.

Invertebrates	**Megafauna**	**Prokaryotes**	**Functions or uses**
Macrofauna	Urodela	Bacteria	Bioindicators
Ants	Gymnophiona	Rhizobia	Enzymes
Chilopoda	Rodentia	Cyanobacteria	Economic valuation
Coleoptera	Soricidae	Actinobacteria	
Diplopoda	Talpidae	PGPR (plant-growth promoting rhizobacteria)	
Earthworms	Cingulata	Archaea	
Spiders	Pholidota	Eukaryotes	
Termites	Squamata	Fungi	
Oligochaeta	Aves	General fungi	
Mesofauna		Mycorrhiza	
Collembola		Virus	
Enchytraeidae		Bacteriophage	
Soil mites		Algae	
Symphyla		Lichen	
Microfauna		Microbiome	
Nematodes		Microbiota	
Protista		Microbes	

Supplementary Table S2. Number of respondents and the proportion of those who work with various taxa, groups or functional assessments of the soil biota or various other topics related to soil biodiversity (inventories, mapping, monitoring, communication, education, ecosystem services) provided in the survey. Proportions over 50% are highlighted in bold.

Field/Topic of work	**Respondents**	**Yes (%)**
Microbiota	2,005	**65**
Microbial activity and processes	1,217	**73**
Microbial biomass	1,199	**53**
Microfauna	1,883	19
Mesofauna	1,852	22
Macrofauna	1,841	28
Megafauna	1,826	5
Community level and functional assessments	1,822	**53**
Inventory and monitoring activities	1,798	38
Mapping exercises	682	34
Ecosystem services	1,791	**52**
Education and communication	1,778	**51**
Public policies	161	8

Supplementary Table S3. Proportion of survey respondents (% of total) using different molecular platforms for genomic characterization of culture-dependent and culture-independent microbes.

Method	**Culture-dependent (n=458)**	**Culture-independent (n=721)**
Illumina	85	92
454	12	12
IonTorrent	6	8
MinIon	12	12
PacBio	19	12
Other (specify)	11	3

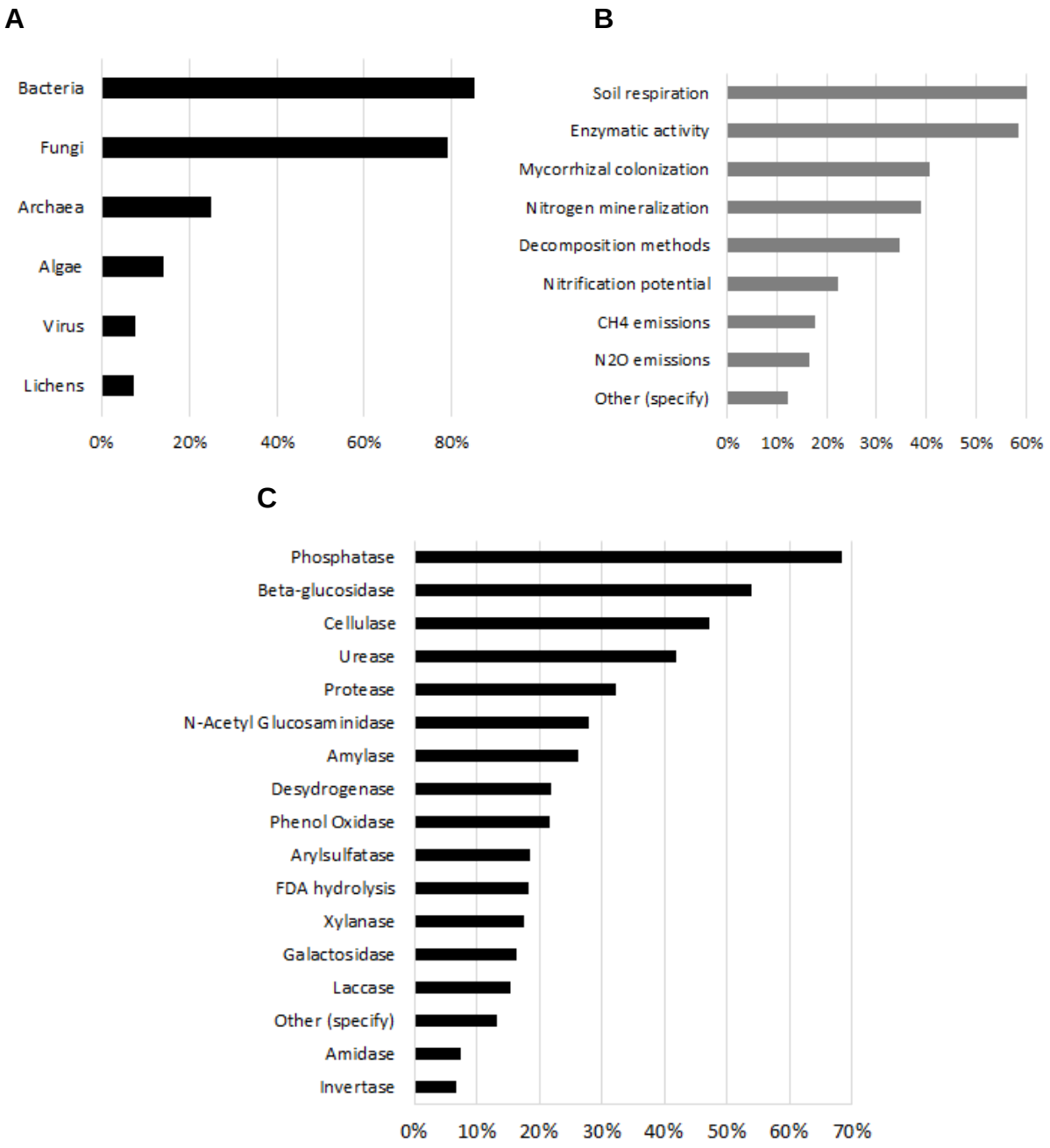
Supplementary Table S4. Proportion of survey respondents using various direct and indirect methods (or both) to collect soil meso- and macrofauna. The number of respondents for each main method and subsequent extraction/sampling techniques are shown in parentheses (mesofauna, macrofauna). NA = not applicable.

Methods	Mesofauna	Macrofauna
Direct and indirect (n=182, 212)	**44**	**43**
Direct (n=113, 227)	28	46
Hand sorting	74	91
Wet sieving	46	21
Flotation	27	11
Indirect (n= 111, 187)	28	11
Berlese or Tüllgren funnels	82	58
Kempson apparatus	11	10
Pitfall traps or Provid	36	79
Winkler	1	28
Wet funnel	10	NA
Wet sieving	4	NA

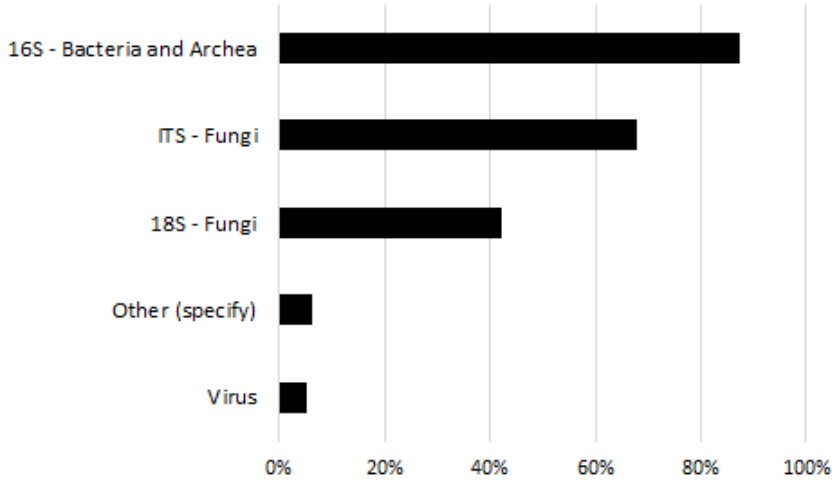
Supplementary Table S5. Main methods currently used to assess soil microfauna populations. Values represent proportions of the respondents (n= 314).

Methods	Proportion
Molecular techniques (e.g., 18S, ITS)	33.1%
Direct counting	33.1%
Decanting and Sieving	31.2%
Centrifugal-flotation/sucrose solution; sieving and sugar centrifugation; density flotation	30.9%
Baermann funnel technique	26.8%
Soil suspension	24.8%
Modified Baermann	22.3%
Root incubation technique	15.0%
In vitro culture	14.0%
Dilution	11.8%
Blender	10.8%
Wet funnels	10.2%
Functional approach	10.2%
Filtering	9.2%
Other (specify)	8.0%
Direct wet extraction	7.3%
Misting or Mist chamber	6.1%
Maceration/Filtration technique	6.1%
Elutriation	5.7%
Maceration/Flocculation/Flotation	4.1%
Light-cooling extraction	2.9%

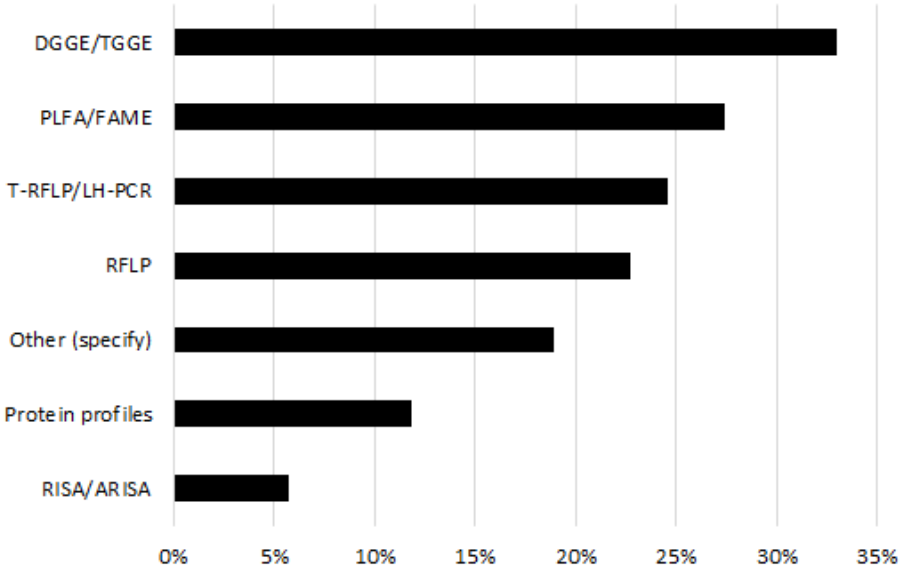
Supplementary Figure S1. Type of institution (A), foci of research (B), soil biodiversity-related activities (C), and main land uses evaluated (D) by survey respondents. Values represent proportions (variable n) of respondents, where n = 2024 (A, C); n = 1871 (B), n = 2003 (D).



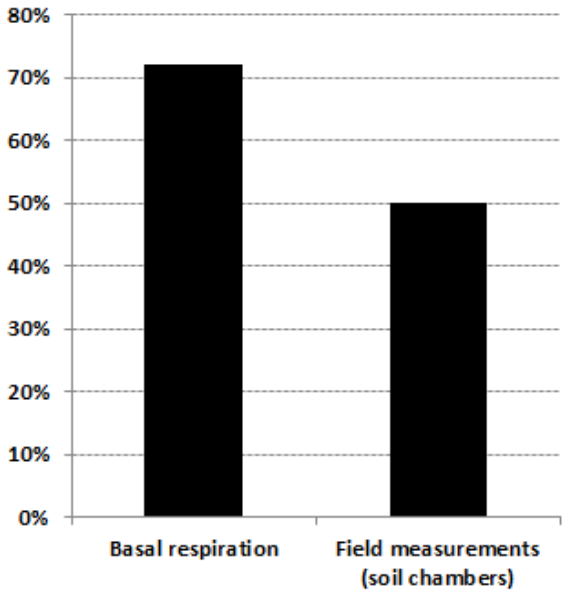
Supplementary Figure S2. Main groups of microbes studied by the respondents (A). Main functional and/or process measurements evaluated with microbes (B). Main soil enzymes studied (C). Values represent proportions relative to the total number (variable n) of respondents, where A, n = 1318; B, n = 868; and C, n = 544 respondents.



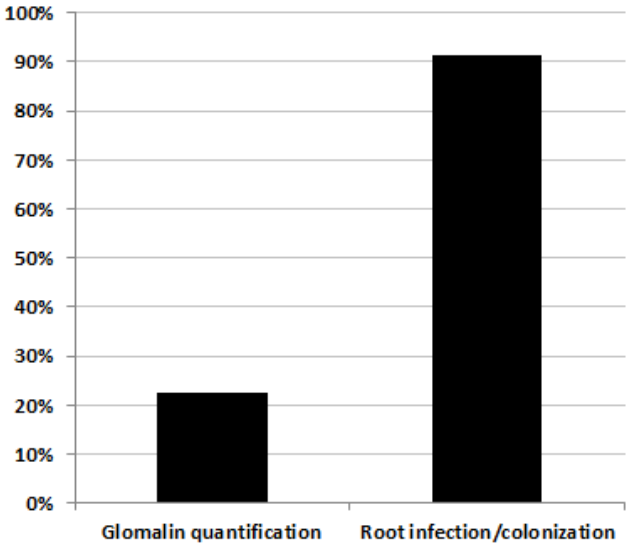
Supplementary Figure S3. Main markers used in high-throughput sequencing/metabarcoding/metataxonomics to describe culture-independent microbial diversity by the respondents. Values represent proportions of the respondents (n= 802).



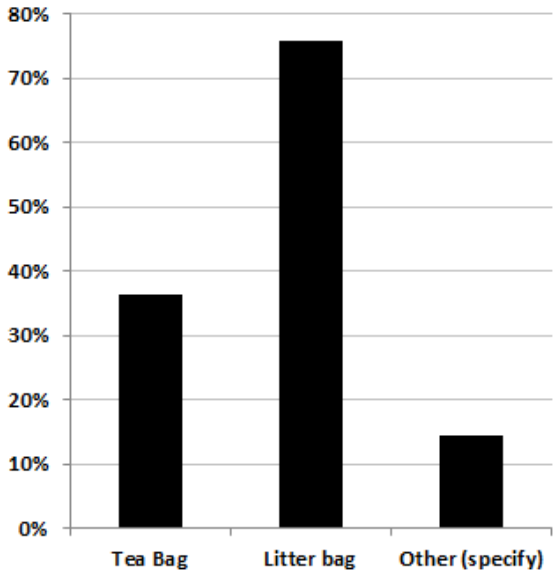
Supplementary Figure S4. Main methods of fingerprinting used to evaluate the diversity of culture-independent microbial communities. Values represent proportions of the respondents (n= 633).



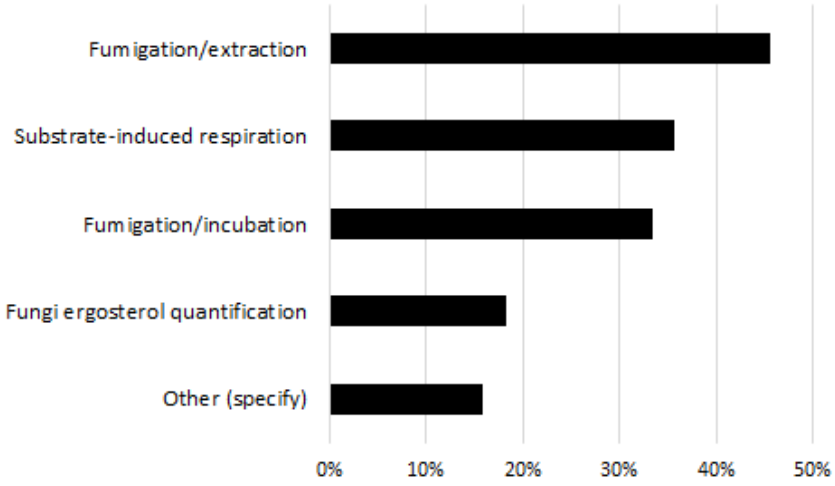
Supplementary Figure S5. Main methods used to evaluate microbial soil respiration. Values represent proportions of the respondents (n= 535).



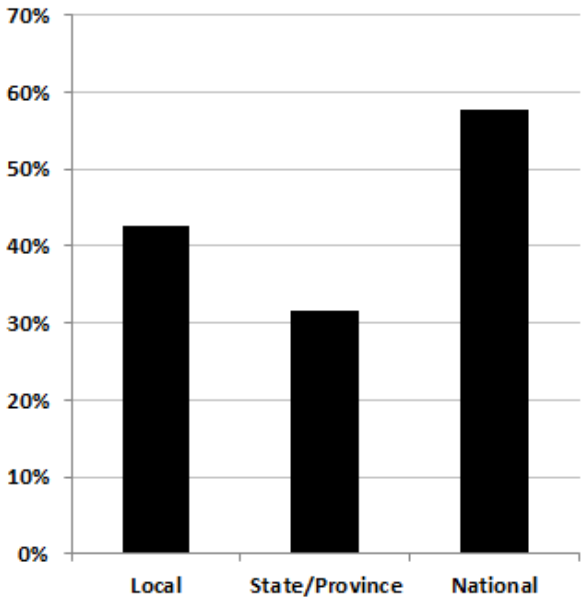
Supplementary Figure S6. Main methods used for work with soil mycrorrhizae. Values represent proportions of the respondents (n= 468).



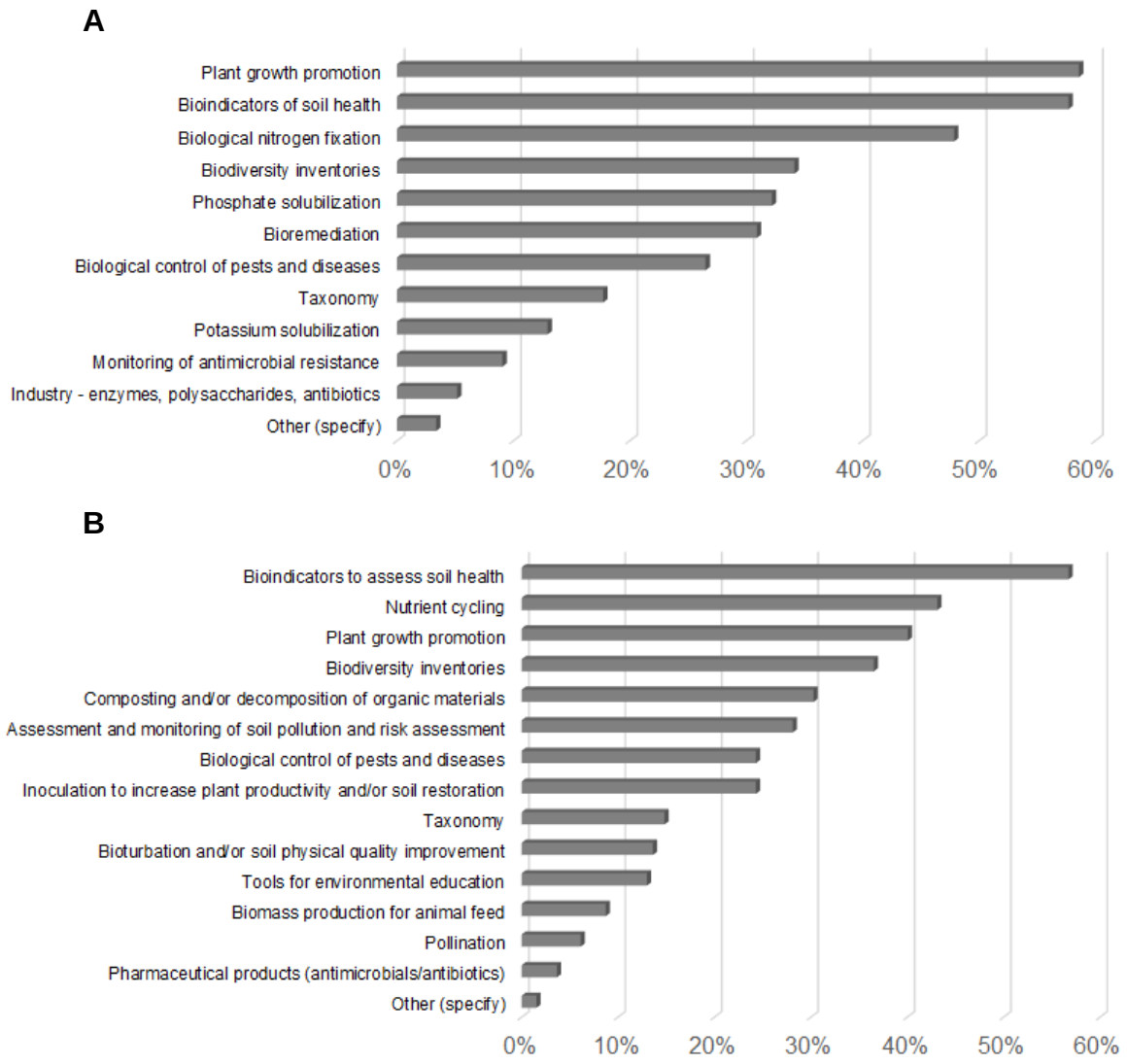
Supplementary Figure S7. Main methods used to measure organic matter decomposition rates. Values represent proportions of the respondents (n=426).



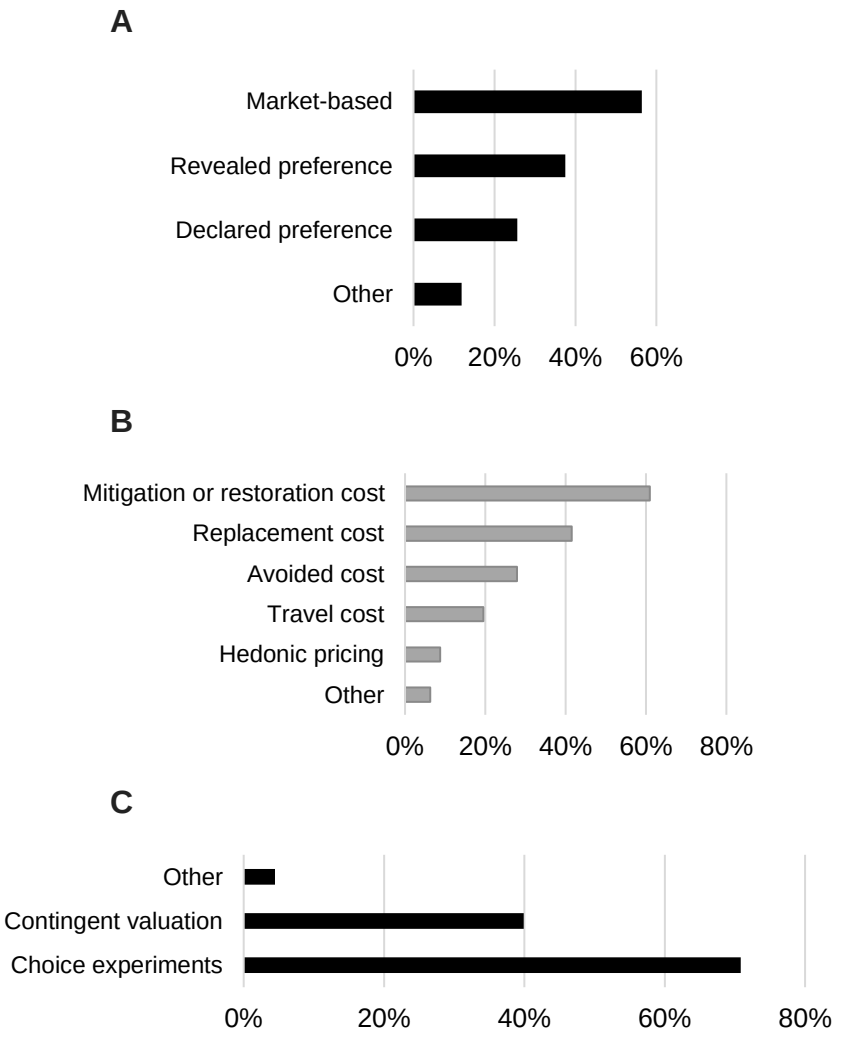
Supplementary Figure S8. Main methods used to evaluate microbial biomass. Values represent proportions of the respondents (n= 569).



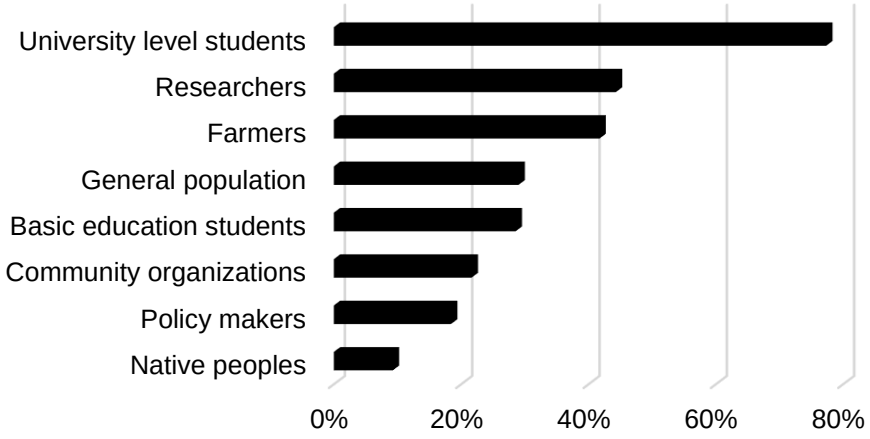
Supplementary Figure S9. Level of knowledge regarding soil biodiversity monitoring in the countries of the respondents of the soil biodiversity survey. Values represent proportions of the respondents (n=307).



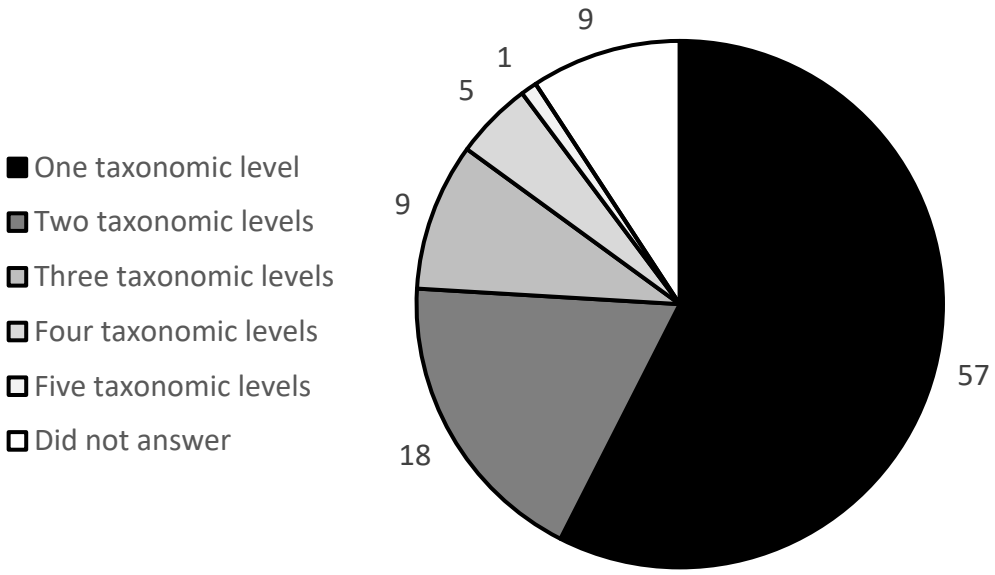
Supplementary Figure S10. Main uses and applications of soil biodiversity related to soil microbes (A) and fauna (B). Values represent proportions relative to the total number (variable n) of respondents, with n = 773 (A) and n = 654 (B) respondents.



Supplementary Figure S11. Main methods applied for the valuation of ecosystem services (A), and the specific methods used for revealed (B) and declared (C) preference techniques. Values represent proportions relative to the total number (variable n) of respondents, with n = 318 (A), n = 287 (B), and n = 223 (C).



Supplementary Figure S12. Main target audiences of the communication activities performed by the survey recipients. Values represent proportions of the respondents (n = 896).



Supplementary Figure S13. Proportion of survey respondents (n = 2016) who worked with one or more taxonomic groups or levels in their research.