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Supplementary Information for
The abundance, biomass and distribution of ants on Earth

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Supporting text
Figures S1 to S4
Tables S1 to S5
SI References

Other supplementary materials for this manuscript include the following:

Datasets S1 to S6

Extended description of methods

Literature search (epigaeic ants dataset)

We searched the Scopus database for literature on February 28th, 2020, using the search term "Formicidae" and limiting results to 2014 or later. We did not use additional search terms, so as not to limit our results to certain languages. The year 2014 was chosen as studies from earlier years were identified from existing datasets (1-3). The Scopus search returned around 4000 results. Additional searches were performed on the same date in Google Scholar to find relevant studies published in regional scientific journals, foreign languages not well represented in Scopus, academic theses, and government and consultancy reports. As Google Scholar limits the display of results to 1000, we performed these searches year by year from 2014 onwards, leading to a total of 7000 results. Searches for Chinese literature in the China National Knowledge Infrastructure (CNKI) and Airiti Library led to a further 936 results. Overall, we scanned around 12000 results from these literature searches for relevant data, and a further 9300+ publications from before 2014.

Data acquisition (epigaeic ants dataset)

A study was deemed relevant for our purposes if epigaeic ants were collected with leaf litter extractions or pitfall traps, and if sufficient details were provided to quantify both ant abundance and sampling effort. Studies that collected ants using multiple methods (e.g., leaf litter extractions and pitfall traps, or pitfall traps and hand collections) but did not report separate abundance values for each collection method, could not be used. Data from leaf litter samples were only retained if standard methods were used for ant extraction, (i.e., Winkler or Berlese extractors) and only if the leaf litter was collected without soil. Similarly, pitfall trap data were only retained if standard trapping liquids were used (i.e., alcohol, water with alcohol, detergent, antifreeze or saltwater); they were not retained if the pitfall cups contained attractive substances, only water or no liquid. We also removed data from unusually large (> 12 cm diameter) pitfall cups or from pitfall traps that were left in the field for less than 24 h, as these will not provide representative samples (4, 5).

To obtain a dataset with the highest possible resolution, studies that covered different locations, habitats or methods were conserved as separate entries in our dataset if separate values were provided for ant abundances and sampling effort. In a small number of cases, ant abundances were estimated from data figures if the study did not provide numerical values. Great care was taken to ensure that values reported as abundances were in fact total abundance values, and not based on partial datasets, abundance categories, weighted datasets or occurrences. If a study reported abundances multiple times but the values did not match (e.g., the sum of separate site abundances did not match the reported overall abundance), it was not retained. Geographic location information was entered at the resolution provided in the study. If site locations were only provided in the form of a map or a detailed verbal description, we extracted the approximate geographic coordinates from Google Earth. All coordinates were converted to decimal degrees.

Data analysis (epigaeic ants dataset)

Entries were assigned to biomes using ArcGIS version 10.2 (6), based on their geographic location and the biome classification of Dinerstein et al. 2017 (7). Our dataset did not contain any entries for the biomes "flooded grassland and savannas", "tundra", and "mangroves", although it should be noted that ants do occur in such habitats (8). For the sake of convenience, we have modified the biome names as listed in Table S1. Nearly all studies provided some additional information on the habitat of sampling sites, and the descriptive terms used by each study were compiled into the dataset. As the terminology of habitat descriptions varied widely, these were later assigned to one of ten habitat categories as summarized in Table S2. Wherever available, descriptions of habitat structure (e.g., height, density or type of vegetation) or site photographs were taken into consideration when assigning habitat categories. Each habitat was split into two sub-categories based on latitude: entries with latitude values between -23.5° and 23.5° were classified as "tropical", with the remaining entries classified as "extra-tropical".

For pitfall trap data entries, we assessed whether pitfall trap diameter is a confounding factor. Previous studies have shown that pitfall trap diameter can influence species richness estimates and, to a lesser degree, ant abundance estimates (4, 9). We did not find a significant correlation between pitfall trap diameter and standardized abundance (Figure S2; Pearson's $r = -0.023$, $P = 0.381$), and therefore did not consider this measure in any of our analyses. We did, however, limit the opening size of the pitfall traps included in our study to a maximum of 12 cm.

The epigaeic dataset was used to calculate biome-level and habitat-level epigaeic ant abundances, which are shown in Figs. 3 and 4, respectively, in the main manuscript; Table S3 gives the numerical values of weighted means and standard errors of the mean for each category. Only leaf litter-derived biome means were used for extrapolations to global biome area.

Extrapolation to global ant abundance and biomass

The global abundance of epigaeic ants, actively foraging in the leaf litter stratum, was extrapolated from biome-wide mean densities of leaf litter ants as laid out in the main manuscript. To arrive at a total global ant abundance, we additionally estimated the density of foraging ants in the arboreal stratum, and the proportion of ants that are not actively foraging.

The ant faunas from other vegetation strata have received much less research attention, and few studies directly compare ant abundances of different strata at the same location (but see (10-12)). Published values of arboreal ant densities are presented in Table S4, grouped by regional categories (tropical, subtropical, temperate) and including sampling effort and weighted means. Data on subterranean ant abundances were judged too scarce and lacking in standardization of sampling methods for inclusion in this study (13).

The sampling methods considered here (leaf litter extractions and arboreal fogging) only capture ants that have left the nest to forage, while the majority of individuals remain inside the nest. The proportion of workers performing foraging duties varies between species and can change with season and colony size (14, 15). Published estimates of the forager force in different species are compiled in Table S5.

To calculate global ant biomass, we compiled measurements of mean individual dry weight from 534 species from the published literature. Where these were reported as wet weight, we converted them to dry weight by assuming a water content of 70% (16). These values are presented in the supplementary Dataset S4.

Alternative calculations of global ant abundance and biomass

Our estimate of global epigaeic ant abundance is based on a large empirical dataset. The estimate of global arboreal abundance is based on a smaller, but likewise empirical dataset. Following the methods described above (and in the main manuscript), we arrive at the two estimates

global epigaeic ant abundance = 3.02×10^{15} ($\pm0.74\times10^{15}$)

global arboreal ant abundance = 1.34×10^{15} ($\pm0.36\times10^{15}$).

However, to extrapolate from these values to total global ant abundance and biomass, we use two assumptions that are difficult to verify and might introduce a considerable amount of uncertainty to our estimates. Here, we aim to show how modifying these assumptions within boundaries that could be considered realistic will affect our final estimates.

Our first assumption is that only ~22% of individual ants in a colony are involved in foraging and are captured by our sampling methods. Thus, using

global ant abundance = (epigaeic abundance + arboreal abundance) × 100/22

we estimate

global ant abundance = ($3.02\times10^{15} + 1.34\times10^{15}$) × 4.55 = $\mathbf{19.8\times10^{15}}$ ($\pm5\times10^{15}$).

While our estimated proportion of ~22% foragers is based on published values (Table S5) it remains unclear how representative these values are for the following reasons. The proportion of an ant colony performing foraging duties varies not only between species, but can also fluctuate greatly over time, the colony life cycle and the seasons (14, 15). In addition, the methods of forager force estimation vary between studies, but commonly involve the marking of all foraging ants over several days; in contrast, the sampling methods considered for abundance estimates in this study (leaf litter extractions and arboreal fogging) provide more or less instantaneous ‘snapshots’ of the active ant community. Our average value of ~22% foragers may therefore reflect the upper limit, as these foragers will not be outside of the nest at the same time. If one were to consider a lower forager proportion of ~5% as more realistic, our abundance estimate would be raised considerably to

global ant abundance = $(3.02\times10^{15} + 1.34\times10^{15}) \times 20 = \mathbf{87.2\times10^{15}}$ ($\pm22\times10^{15}$).

Our second assumption is that a single average (and representative) ant has a dry carbon weight of 0.62 mg C. Thus, using

biomass [Mt C] = abundance $\times\ 0.62\times10^{-15}$

we estimate

global ant biomass [Mt C] = $19.8\times10^{15} \times 0.62\times10^{-15}$ = **12.3 Mt C** (±3.1)

or, if we follow the alternative assumption of a 5% forager proportion

global ant biomass [Mt C] = $87.2\times10^{15} \times 0.62\times10^{-15}$ = **54.1 Mt C** (±13.6).

Our estimated body weight of 0.67 mg C for each ant is derived by taking the arithmetic mean of 534 species-level mean dry body mass values we have collated (see supplementary Dataset S1), but again it remains unclear whether this value is representative of the global ant fauna. First, our list of species represents a small subset of all ant species on Earth (about 16 000 named species and subspecies with possibly as many undescribed ones (17)). Second, small-bodied ants may be much more abundant than large-bodied ants (18). And third, within a community there are often more small ant species than large ones. Should this last assumption apply to our global ant abundance dataset, a reasonable alternative method of biomass estimation could use the geometric mean of species-level body mass values, rather than the arithmetic mean we use above. From our ant body mass dataset, we calculate the geometric mean of 399 species-level values (one study only reports an overall arithmetic mean of 135 species (19) and cannot be used) as 0.36 mg dry weight, or 0.18 mg dry carbon weight. Thus, our original biomass estimate would be amended to

global ant biomass [Mt C] = $19.8\times10^{15} \times 0.18\times10^{-15}$ = **3.6 Mt C** (±0.9)

or, if we follow the alternative assumption of a 5% forager proportion

global ant biomass [Mt C] = $87.2\times10^{15} \times 0.18\times10^{-15}$ = **15.8 Mt C** (±4).

Overall, these calculations provide a range of estimates (abundance: ~20–87×10^{15}, biomass: ~4–54 Mt C) which are based on our current knowledge and available data. The upper range of the global ant biomass estimates is on a level with the estimated global human biomass of ~60 Mt C (16). Nonetheless, our study clearly highlights several knowledge gaps in the basic biology of ants (e.g., in terms of body weight and foraging activity patterns) and of their ecological coverage (particular biomes, habitats or strata that are poorly covered). Most likely, similar knowledge gaps exist for other insect groups as well.

Previous estimates of global ant abundance and biomass

The global abundance of ants has previously been estimated by Hölldobler and Wilson (20, 21), along with their biomass. Recently, a further ant biomass estimate has been published by Tuma et al. (22). The methods of estimation in these studies deviate considerably from the method employed here and are briefly outlined below for better ease of comparison. It is worth noting that biomass estimates are variously reported as wet (live) weight, dry weight, or dry carbon weight. Insects are generally considered to have a dry weight of 30% wet weight, and a carbon weight of 50% dry weight (16). We have recalculated most biomass estimates in the section below to be in megatons of dry carbon, or Mt C.

Hölldobler and Wilson’s aim is to provide a very rough estimate; this is not intended to reflect accurate values, but rather a general understanding of the global importance and ecological pervasiveness of ants. Their starting point is an estimate of the entire global insect population by C. B. Williams (23). Williams’ estimate is also intended as a thought experiment, rather than an accurate reflection of reality.

Citing data from a series of insect extractions from the top few inches of soil at Rothamsted Experimental Station in southeast England, which provide a possible population density of about 5 to 10 insects / cm^2, Williams performs a simple extrapolation to the entire global land surface and arrives at a final value of about 10^{18} total insects on Earth. In their ant estimate from 1994 (20), Hölldobler and Wilson suggest that globally, about 1% of these insects are ants (10^{16}), and that ants have an average weight of 1–5 mg, although they do not specify if this is dry or wet weight. Considering it to be dry weight, these calculations lead to a global ant dry biomass of 10–50 Mt, equivalent to 5–25 Mt C (if wet weight was intended, these values would be 70% lower). They continue that "all ants in the world taken together weigh about as much as all human beings", without stating any specific value. Global human biomass has recently been estimated at ~43 Mt C (2005, adults only) (24), and at ~60 Mt C (2015, all humans) (16). Thus, we see that the estimates of ant biomass range from 10% to about 50% of human biomass, even when adjusted to the human population in 1994, which was 77% of the population in 2015 (25).

In a revised estimate from 2009 (21), Hölldobler and Wilson assume a global ant population of 10^{15} to 10^{16} (again based on Williams' estimate (23)), an average ant dry weight of 0.5 – 1 mg and an average human dry weight of about 10 kg. Following these calculations through for a suggested ant population of 10^{16}, we arrive at a range for global ant dry biomass from 5 Mt (0.5-mg ants) to 10 Mt (1-mg ants), or 2.5–5 Mt C. Using the estimated global population in 2009 (25) and the stated 10 kg dry weight per human, we arrive at a global human dry biomass of 69 Mt, or 35 Mt C. A more recent estimate puts this value at ~60 Mt C for 2015 (16). We see that using the values provided by Hölldobler and Wilson (2009), global ant biomass would encompass only around 7–15% of human biomass; using the more recent estimate of human biomass, the proportion of ants to humans shrinks to about 5–10%. Admittedly, Hölldobler and Wilson themselves highlight that their stated value for global ant abundance of 10^{16} individuals is not empirical, and that values from as low as 10^{15} to as high as 10^{17} (i.e., spanning two orders of magnitude) may be just as realistic (21). So while their summarizing statement that "ants and people have (again, very roughly) the same global biomass" (21) is – in a way – validated, it is easily misrepresented when taken out of context. We note that the estimated values for ant biomass are in fact lower than human biomass, and that it would be more truthful to add the qualifier that the two may be *within the same order of magnitude*.

More recently, Tuma et al. published an estimate of ant dry biomass in 2020 (22), using an entirely different approach. They perform a straightforward calculation in the following manner: "Biomass of ants was assessed by first estimating the average proportion of arthropod biomass that is ant biomass from Dial et al. (2006) and Stork (1996) [(0.52 + 0.20)/2 = 0.36]. This value was then multiplied by the biomass of all terrestrial arthropods taken from Bar-On, Phillips & Milo (2018) [0.36 × 200 Mt = 70 Mt]", which is dry carbon biomass. Their estimate for the proportion of ant biomass is thus derived from two empirical studies (26, 27). However, both were performed in lowland rainforests of Indonesia and it remains doubtful if this proportion is representative of other parts of the world, especially since Dial et al. (26) investigated tropical tree canopies where ants are known to be particularly abundant (28). The biomass estimate of all terrestrial arthropods is taken directly from the study of Bar-On et al. (16). This provides a census of all biomass on Earth, of which terrestrial arthropods form a very small part. Bar-On et al. follow two different approaches for their estimate, which they term the average biomass densities method and the average carbon content method. For the first, they compile a list of values from the literature, estimate mean biomass densities of arthropods in litter, soil, and canopies, sum these densities and apply them to the entire global ice-free land area. For the second method, they calculate the carbon content of a characteristic arthropod and multiply this value by an estimate for the total number of arthropods which, for want of alternatives, is the (highly uncertain) extrapolation of English insect densities published by C. B. Williams (23). The results of the two methods are then averaged to form the final 'best estimate' of terrestrial arthropod biomass, which is reported as 200 Mt of dry carbon. Bar-On et al. highlight that available biomass data on terrestrial arthropods is limited and that comprehensive datasets are lacking. Indeed, all their arthropod biomass values are derived from a total of 10 studies, encompassing a variety of sampling methodologies, sampling efficiencies and geographical biases. As a result of this lack of more comprehensive data, Bar-On et al. gauge the uncertainty of their terrestrial arthropods estimate to be around 15-fold (16). Therefore, this uncertainty applies equally to the estimate of ant biomass in Tuma et al. (22), as their calculations are directly based on the value from Bar-On et al.

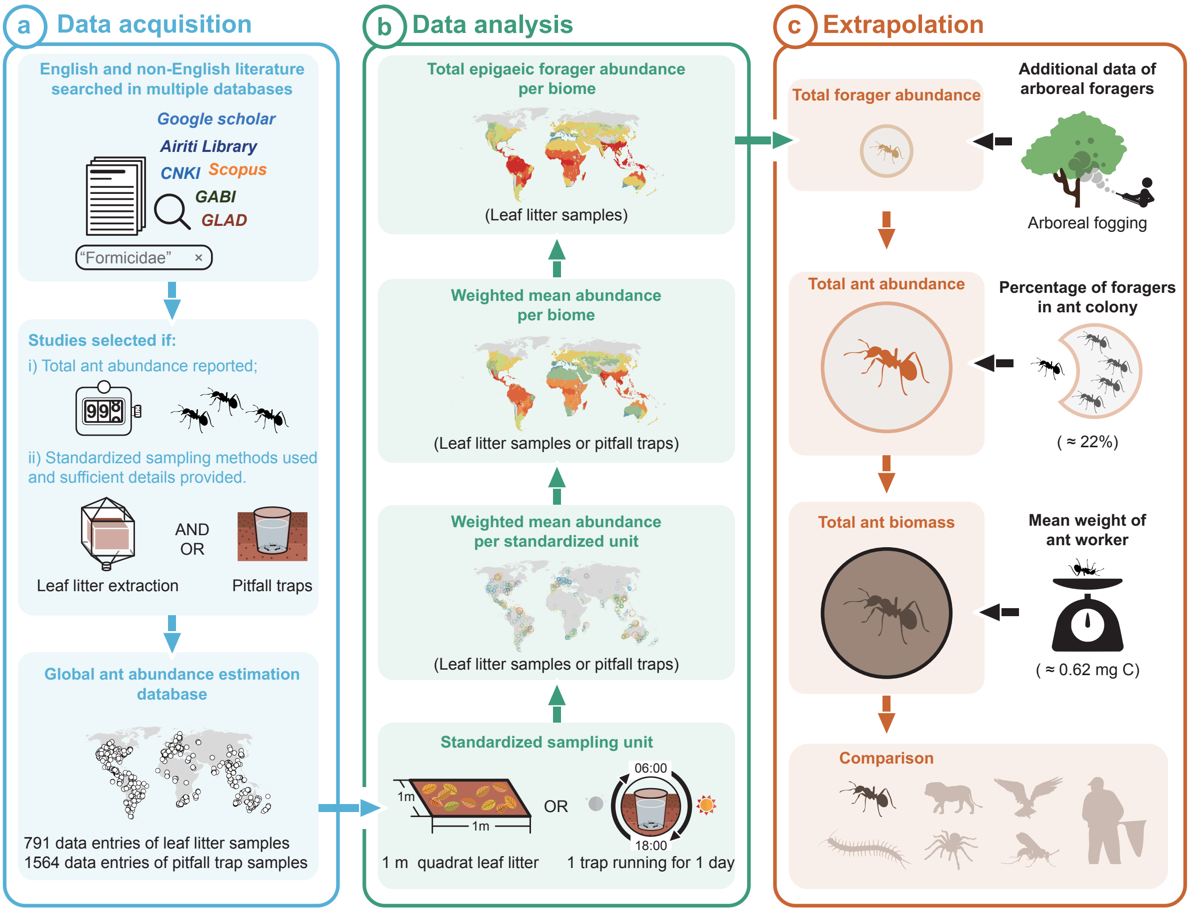


Fig. S1. A graphical description of the methods, summarizing the acquisition of published ant abundance values, the analysis of biome- and habitat-wide abundances, and the extrapolation for estimating the global ant population and their biomass.

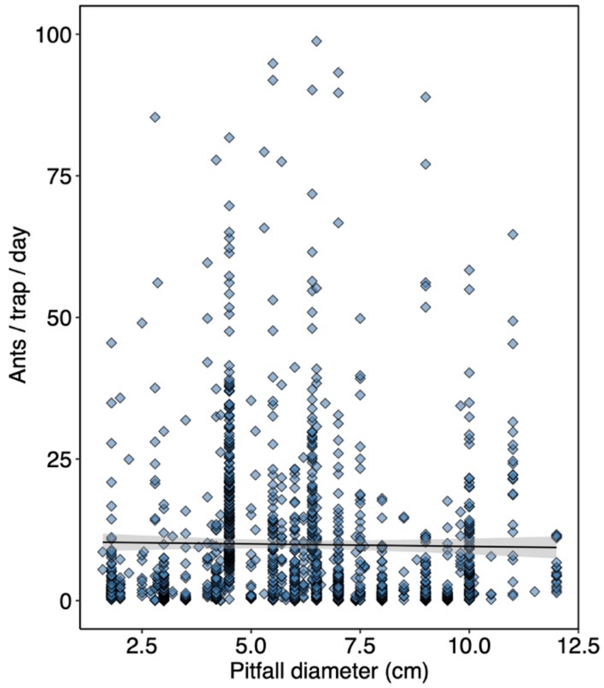
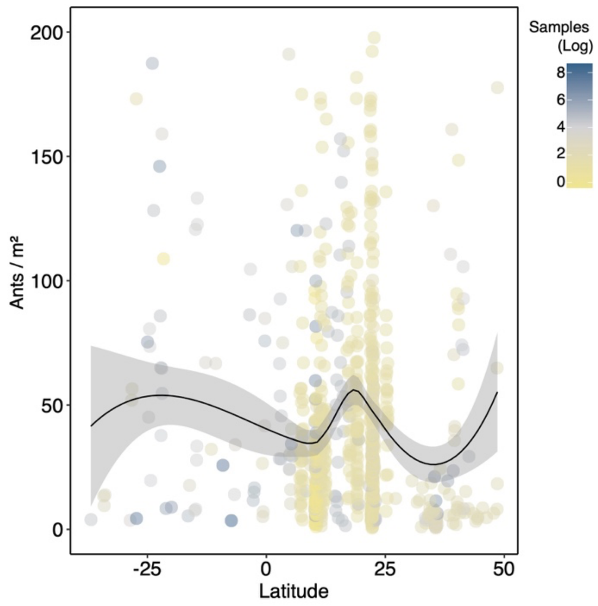


Fig. S2. Plot showing the pitfall trap diameter and the mean abundance per sampling unit for each data entry. Entries with diameter > 12 cm have been excluded, the *y*-axis has been truncated for readability, the black line shows the best linear fit and the gray shaded area the 95% confidence interval. No correlation is evident.

(a) Leaf litter samples



(b) Pitfall traps

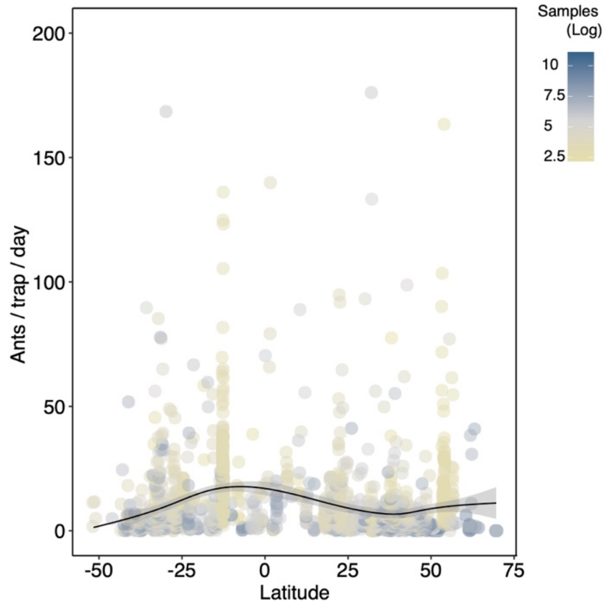


Fig. S3. Plots showing ant abundances derived from (a) leaf litter samples and (b) pitfall traps, in relation to latitudinal position. Datapoints show values per entry colored by sample size (natural log scale), the black line shows the smoothed conditional means (using ‘geom_smooth’ in ‘ggplot2’), and the gray shaded area indicates the 95% confidence intervals.

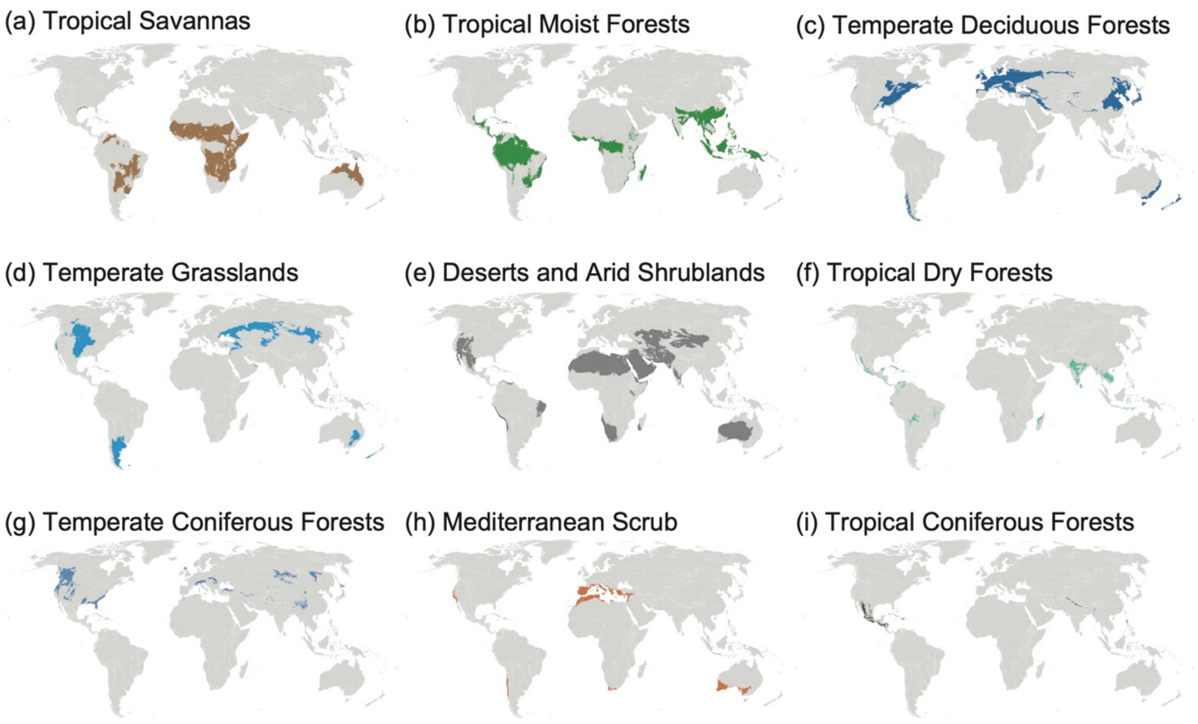


Fig. S4. Reference maps showing the global distribution of the biomes considered in our study. The biome definition follows Dinerstein et al. 2017 (7).

Table S1. Renaming of biomes for simplification within our text and figures. The original biome names and the area of each biome are taken from Dinerstein et al. 2017 (7).

Original biome	**Renamed as:**	**Area (km^2)**
Tropical and subtropical moist broadleaf forests	Tropical Moist Forests	19,774,647
Tropical and subtropical dry broadleaf forests	Tropical Dry Forests	3,010,214
Tropical and subtropical coniferous forests	Tropical Coniferous Forests	707,967
Temperate broadleaf and mixed forests	Temperate Deciduous Forests	12,830,687
Temperate coniferous forests	Temperate Coniferous Forests	4,084,509
Boreal forests/Taiga	Boreal Forests	15,126,637
Tropical and subtropical grasslands, savannas, and shrublands	Tropical Savannas	20,178,128
Temperate grasslands, savannas, and shrublands	Temperate Grasslands	10,101,955
Flooded grasslands and savannas	(no data)	-
Montane grasslands and shrublands	Montane Grasslands	5,187,278
Tundra	(no data)	-
Mediterranean forests, woodlands, and scrub	Mediterranean Scrub	3.221,359
Deserts and xeric shrublands	Deserts and Arid Shrublands	27,888,601
Mangroves	(no data)	-

Table S2. Grouping of habitat descriptions into habitat categories.

Habitat category	**Examples of habitat as described in study**
Forest	Primary forest, secondary forest, oak forest, woodland, rainforest, Jarrah, pine forest (natural), gallery forest
Savanna	Pine barren, open savanna woodland, aspen parkland, Cerrado
Shrubland	Scrubland, thicket, young forest succession, bushland, heath, Chaparral
Grassland	Prairie, meadow, pasture, steppe, grass
Wetland	Swamp, bog, marsh
Plantation forest	Pine forest (planted), rubber plantation, *Eucalyptus* (planted), orchard
Plantation crop	Cropland, rice field, agriculture
Urban greenspace	Urban park, urban golf course, garden
No vegetation	Bare ground, rock, bare sand
Multiple habitats	Any combination of above categories

Table S3. Ant densities from leaf litter and pitfall trap samples for (A) biomes and (B) habitats, showing weighted mean per standard unit (unit) and weighted standard error of the mean (SEM). A standard unit is 1 m^2 for leaf litter samples, and 1 24-h pitfall cup for pitfall trap samples.

	Leaf litter				**Pitfall traps**			
(A) Biome	***n* entries**	***n* units**	**weighted mean**	**weighted SEM**	***n* entries**	***n* units**	**weighted mean**	**weighted SEM**
Boreal Forest	-	-	-	-	63	262451	2.32	0.81
Deserts and Arid Shrublands	12	120	7.51	1.29	150	96975	11.09	1.68
Mediterranean Scrub	5	80	10.28	1.73	269	237255	6.65	0.60
Montane Grasslands	-	-	-	-	22	59758	4.89	1.66
Tropical Savannas	8	370	49.23	26.11	304	120480	7.12	0.69
Temperate Deciduous Forests	61	2379	24.46	4.26	315	911053	1.86	0.61
Temperate Coniferous Forests	29	406	21.77	3.54	58	231325	2.12	0.77
Temperate Grasslands	5	375	23.88	2.49	101	68850	5.05	0.89
Tropical Coniferous Forests	4	400	28.28	11.38	22	2496	12.47	4.07
Tropical Dry Forests	91	370	58.04	4.31	5	997	10.20	3.33
Tropical Moist Forests	576	22313	47.68	2.68	255	175438	6.01	0.53
(B) Habitat								
Forest	606	22201	47.81	2.62	521	759082	3.41	0.43
Grassland	6	446	17.09	3.35	189	371078	3.41	0.54
Multiple habitats	7	2224	27.82	16.10	56	347665	3.69	1.23
No vegetation	-	-	-	-	9	2396	5.09	3.48
Plantation crop	2	90	30.50	9.64	66	94511	2.95	0.74
Plantation forest	122	1398	35.50	2.93	73	55516	2.59	0.50
Savanna	3	125	26.34	4.03	278	52177	11.53	0.87
Shrubland	38	282	11.43	3.59	265	196370	5.92	0.90
Urban greenspace	2	24	88.71	45.05	53	262768	1.78	0.46
Wetland	5	23	35.35	14.69	54	25515	8.90	6.22

Table S4. Published values of arboreal ant densities. We only considered studies that sampled ants by arboreal fogging, allowing for the standardization of values to sampling area. In several cases, the number of ants per m^2 was not reported in the study but could be calculated from the available data.

Location	**Region**	**Vegetation**	**Sample area (m^2)**	**Ants / m^2**	**References**
Brazil, Manaus	tropical	Lowland rainforest	36	34.25	(29)
Brazil, Manaus	tropical	Inundation rainforest	76.8	21.14	(30)
Brazil, Manaus	tropical	Lowland rainforest	38.4	85.9	(30)
Brazil, Pantanal	tropical	Inundation palm forest	99	25.19	(31)
Brazil, Pantanal	tropical	Inundation rainforest	120	24.7	(32)
Brazil, Pantanal	tropical	Inundation rainforest	86	81.4	(33)
Peru, Manu NP	tropical	Lowland rainforest	93.6	669.23	(34)
Colombia, Gorgona NP	tropical	Lowland rainforest	64	70.59	(35)
Malaysia, Sabah, Danum Valley	tropical	Lowland rainforest	6	805.55	(26)
Malaysia, Sabah, Danum Valley	tropical	Lowland rainforest	450	10.04	(36)
Malaysia, Sabah, Danum Valley	tropical	Lowland rainforest	200	106.98	(37)
Brunei (Borneo)	tropical	Inundation rainforest	200	22.15	(38)
Brunei (Borneo)	tropical	Lowland rainforest	30	7.64	(39)
Australia, Cape Tribulation	tropical	Lowland rainforest	66	17	(39)
Australia, Eungella NP	tropical	Upland rainforest	22.5	1.4	(39)
Australia, Atherton Tablelands	tropical	Seasonal vine forest	33	0.6	(39)
New Caledonia, Rivière Bleue	tropical	Evergreen forest	180	3.84	(40)
Indonesia, Seram	tropical	Lowland rainforest	10	580.9	(11)
Indonesia, Sumatra	tropical	Rain- & plantation forest	1536	49.9	(41)
India, Western Ghats	tropical	Lowland rainforest	50	16.86	(42)
Uganda, Bodongo Forest	tropical	Different forest types	976	37.98	(43)
Ghana	tropical	Lowland rainforest	144*	14.83	(44)
Ghana	tropical	Rainforest & cocoa plantation	95	220.07	(44)
Ghana, Kade	tropical	Cocoa plantation	375	120.84	(45)
Cameroon, Mbalmayo Forest	tropical	Plantation forest	650	135.6	(46)
Costa Rica, Central Valley	tropical	Coffee plantation	156	12.77	(47)
Australia, Kununurra	tropical	Mango plantation	250	68.58	(45)
Australia, Mt. Glorious	subtrop.	Mesophyll vine forest	100*	4	(45)
Australia, Brisbane	subtrop.	Rainforest	168	0.67	(48)
Australia, Lamington NP	subtrop.	Forest	61.5	8.6	(39)
Australia, Werrikimbe NP	subtrop.	*Nothofagus* forest	85	9.12	(39)
Australia, Styx River	subtrop.	*Nothofagus* forest	25	7.4	(39)
South Africa	subtrop.	Parkland	90	15.48	(49)
South Africa, Southern Cape	subtrop.	Forest	1136.4	1.03	(50)
weighted mean (trop. + subtrop.)				**54.9**	
weighted SEM (trop + subtrop.)				**14.9**	
Australia, Victoria	temp.	Rainforest	55	3.2	(39)
Australia, Dryandra & Karragullen	temp.	*Eucalyptus* woodland	275*	3.06	(45)
Great Britain	temp.	Parkland	90	0.64	(49)
weighted mean (temperate)				**2.56**	
weighted SEM (temperate)				**0.58**	

*) only lower canopy sampled

Table S5. Published estimates of the proportion of worker ants engaged in foraging, expressed as a percentage of the colony total; the methods used for estimation differ between studies. The study by Chew (1959) (51), which provides additional values for *Novomessor cockerelli*, *Myrmecocystus mimicus* and *Pogonomyrmex occidentalis*, was not included here as its estimates are considered unreliable (52).

Ant species	**Foragers (%)**	**References**
Camponotus pennsylvanicus	10	(53)
Camponotus herculeanus	20	(52)
Formica fusca	20	(52)
Formica exsectoides	20	(52)
Formica polyctena	43; 25	(54, 55)
Monomorium floricola	24	(56)
Monomorium pharaonis	40.5	(56)
Odontomachus brunneus	77	(57)
Pogonomyrmex badius	10; 20	(14, 58)
Pogonomyrmex salinus	7.7	(59)
Pogonomyrmex montanus	22.9	(60)
Pogonomyrmex subnitidus	19.4	(60)
Pogonomyrmex rugosus	18.4	(60)
Pogonomyrmex californicus	10	(61)
Pogonomyrmex occidentalis	10	(62)
Pogonomyrmex mendozanus	11.5	(63)
Pogonomyrmex inermis	15	(63)
Pogonomyrmex rastratus	8.5	(63)
Solenopsis invicta	50	(15)
Temnothorax rugatulus	9.8	(64)
mean	**22.2**	

SI References

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