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**Diversity Restated: >99.9% of Global Species in Soil
Biota**

 **Robert Blakemore**

Diversity Restated: >99.9% of Global Species in Soil Biota

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Recent dawning and the uptake expansion of rapid genomic sequencing has radically transformed our understanding of the biosphere, especially casting a new light in relation to soils. Williamson et al. (2017) concluded: “Soils represent the greatest reservoir of biodiversity on the planet; prokaryotic diversity in soils is estimated to be three orders of magnitude greater than in all other ecosystems combined.” In other words, soils may contain >99.9% of species, mainly microbes. Supporting this were, for example, Bickel & Or (2020) and Zhao et al (2022) who found: “soil is the most microbiologically abundant (10^{29}) and diverse (10^{11}) environment on the Earth” and, in their figure 3A, these latter authors showed soil taxa at >10× that of the ocean, i.e., >90% diversity in Soil vs Ocean. Independently, Blakemore (2022) estimated the Soil Realm is home to $\sim 2.1 \times 10^{24}$ taxa supporting >99.9% of global species biodiversity, mostly Bacteria, Archaea or other microbes, based upon topographic extrapolation of field data.

Nevertheless, a fallacy persists that soil supports a fraction of its true diversity, e.g., Bardgett’s (2024) obituary for Dr Diana Wall misleadingly claims: “The soil is home to more than half of all species...” Presumably referring to Anthony et al. (2023) who tallied 10^{10} taxa as 59%, “approximately two times greater soil biodiversity than previous estimates”, despite being considerably less than either Zhao et al. (2022) of 10^{11} taxa or $\sim 2.1 \times 10^{24}$ by Blakemore (2022).

Further progress detail, as summarized in Fig. 1, is presented in Blakemore (2023: tab. 2; 2024).

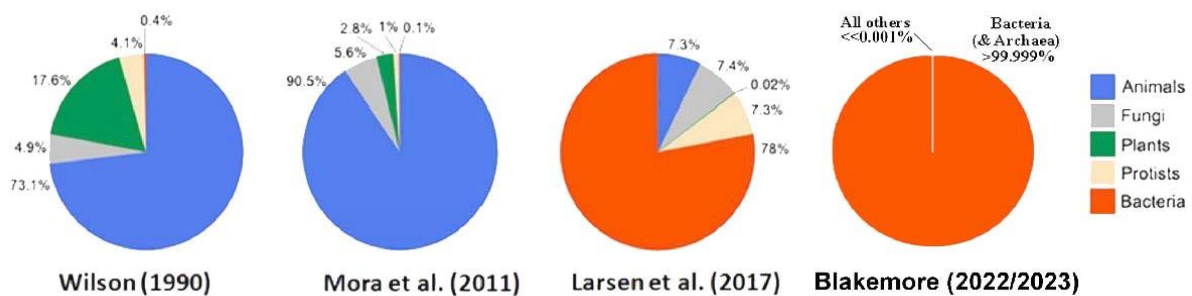


Figure 1. Relational global species, now mainly soil Bacteria (from Blakemore2022/2023).

That soil hosts >99.9% of global diversity requires a sea-change in attitudes – and funding – to recognize its true scope. This should spur formation for at least one dedicated Soil Ecology Institute (for both natural and managed lands) tasked to research and help reverse current mass degradation of our planet’s most crucial, yet most neglected ecosystem – that of the Soil Realm.

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