Data from: Nematode communities indicate diverse soil functioning across a fog gradient in the Namib Desert gravel plains

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Abstract:

1. Soil nematodes are fundamentally aquatic animals, requiring water to move, feed, and reproduce. Nonetheless, they are ubiquitous in desert soils because they can enter an anhydrobiotic state that allows them to persist when water is biologically unavailable.
2. In the hyper-arid Namib Desert of Namibia, rain is rare, but fog routinely moves inland from the coast and supports plant and animal life. Very little is understood about how this fog may affect soil organisms. We investigated the role of fog moisture in the ecology of free-living, soil nematodes across an 87-km fog gradient in the gravel plains of the Namib Desert.
3. We found thatnematodes emerged from anhydrobiosis and became active during a fog event, suggesting that they can utilize fog moisture to survive.
4. There was no difference in soil nematode abundance across the fog gradient. Nematode abundance was similar under shrubs and in interplant spaces. Interplant soils harbor biological soil crusts that may sustain nematode communities.
5. As fog declined along the gradient, nematode diversity increased in interplant soils. In areas where fog is rare, sporadic rainfall events can stimulate the germination and growth of desert ephemerals that may have a lasting effect on nematode diversity.
6. In a 30-day incubation experiment, nematodes increased in abundance when soils were amended with water and organic matter. However, these responses were not evident in field samples, which show no correlations among nematode abundance, location in the fog gradient, and soil organic matter content.
7. Soil nematodes are found throughout the Namib Desert gravel plains under a variety of conditions. Although shown to be moisture- and organic matter-limited and able to use moisture from fog for activity, variation in fog frequency and soil organic matter across this unique ecosystem may be biologically irrelevant to soil nematodes *in situ*.

Keywords: Anhydrobiosis, desert soil, fog, nematode diversity, soil biodiversity, biological soil crusts.

Date of data collection: March -November 2020

Geographic Location of data collection: Namibia

Language: English

Methods: See citation for detailed methods

Missing data: Not every variable in the spreadsheet was measured for every sample taken. “nd” or “9999” indicates not determined throughout the dataset.

Variables in Dataset:

Sample ID: Name of soil sample

Experiment: Which experiment it was collected for (all are described in the citation article)

Date collected: Date upon which field samples were collect ed

Attributes: Simple description of sample

GPS\_coordinate\_Latitude

GPS\_coordinate\_Longitude

Elevation(masl): Elevation of sampling site in meters above sea level

Soil moisture (g/100g): The gravimetric water content of the sample

Organic matter (%LOI): The organic matter content as determined by loss on ignition

pH: pH of soil slurry

EC (us/cm): electrical conductivity of soil slurry in microsiemens/cm

Nematodes/kg: Density of nematodes in soil sample on a per kg basis

Taxonomic richness: The number of different genera of nematodes represented in the sample

Panagrolaimus: Number of nematodes identified as belonging to this genus in sample.

Panagrobelus: Number of nematodes identified as belonging to this genus in sample.

Chiloplacus: Number of nematodes identified as belonging to this genus in sample.

Acrobeles: Number of nematodes identified as belonging to this genus in sample.

Nothacrobeles: Number of nematodes identified as belonging to this genus in sample.

Mesorhabditis: Number of nematodes identified as belonging to this genus in sample.

Zeldia: Number of nematodes identified as belonging to this genus in sample.

Elaphonema: Number of nematodes identified as belonging to this genus in sample.

Paracrobeles: Number of nematodes identified as belonging to this genus in sample.

Drilocephalobus: Number of nematodes identified as belonging to this genus in sample.

Nothotylenchus: Number of nematodes identified as belonging to this genus in sample.

Aphelenchoides: Number of nematodes identified as belonging to this genus in sample.

Aphelenchus: Number of nematodes identified as belonging to this genus in sample.

Hexatylus: Number of nematodes identified as belonging to this genus in sample.

Proportion uncoiled (non-anhydrobiotic): The proportion of nematodes with uncoiled morphology after a special extraction using sucrose solutions. Uncoiled morphology indicates nematode was active or dead at time of collection (coiled nematodes are anhydrobiotic).