

SOIL DISTURBANCE IN THE MEXICAN TROPIC AND ITS EFFECT ON SOIL

NEMATODES COMMUNITY: CASE STUDY IN "LOS TUXTLAS", VERACRUZ, MEXICO

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ABSTRACT

In the context of the Multinational Project "Conservation and Sustainable Management of the Below-Ground Biodiversity" (CSM/BGDD), a study at the Biosphere Reserve "Los Tuxtlas", Mexico, to determine the effect of different land use intensities on the soil nematodes was conducted. Three localities into the Reserve were chosen as replications and from each of them, different fields belonging to four land use intensities (Natural forest, Secondary forest, Pasture fields and Maize fields) were selected. Ecological measures of the structure of soil nematodes fauna, diversity, and maturity indices were assessed and compared among land uses. Fifty three families and one hundred twenty four genera were identified. The highest nematode abundance, richness of genera and diversity corresponded to Natural forest, closely followed by Secondary forest. Intensive agricultural systems like Maize fields and Pasture fields presented low richness of genera and significant lower diversity than non-disturbed systems. In general, plant-parasitic nematodes and bacterial feeders were the most dominant and abundant in the study area, followed by fungal feeders, omnivores and finally predators. The higher number of bacterial feeders was collected in Pasture fields and Maize fields; fungal feeders were more abundant in Maize fields, omnivores and predators in Natural forest and Secondary forest, and plant-parasitic in Secondary forest. Some disturbance indices (Maturity Index, Plant parasite Index, modified Maturity Index, and plant parasite Index/maturity Index ratio) showed differences among land uses, corresponding most of the highest values to non-disturbed systems (Natural and Secondary forest). In general, the conditions of the food chain in the study area correspond to a low to moderate disturbance, non-enriched, with canal of decomposition balanced by fungi and bacteria, low C/N ratio and food chain in maturation. Most of the ecological indices were useful to establish significant effects of different land uses on soil nematodes fauna in the study area.

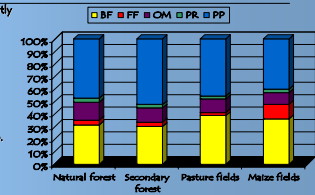
RESULTS II

Soil disturbance indices based on soil nematodes fauna from sites with four land use intensities in the Biosphere Reserve "Los Tuxtlas", Veracruz, Mexico.

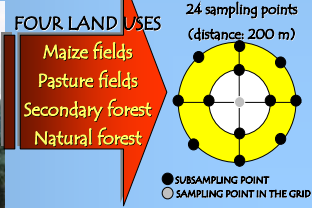
| Index | Natural forest | Secondary forest | Pasture fields | Maize fields |
|--------|----------------|------------------|----------------|--------------|
| T | 2.57 ns | 2.31 ns | 2.11 ns | 2.56 ns |
| FF/BF | 0.16 b | 0.18 b | 0.11 b | 0.45 a |
| WI | 0.97 b | 0.95 b | 1.80 a | 3.49 a |
| MI | 2.65 a | 2.60 a | 2.47 ab | 2.57 b |
| PPI | 2.91 a | 2.85 a | 2.68 b | 2.68 b |
| mMI | 3.21 a | 3.15 a | 2.93 a | 2.87 b |
| PPI/MI | 1.15 ns | 1.13 ns | 1.18 ns | 1.18 ns |

Means followed by different letters are significantly different. ns= not significant.

T= Trophic diversity Index
 FF/BF= fungal feeders/bacterial feeders ratio
 WI= ratio of microbial feeder nematodes
 MI= maturity index
 PPI= plant parasite index
 mMI= modified maturity index
 PPI/MI= plant parasite index/maturity index ratio.



SAMPLING



EXTRACTION, COUNTING, PROCESSING & MOUNTING

EXTRACTION: Sieving-Sugar flotation method (300 g per sample)

COUNTING:
 Three countings (1 ml)
 TOTAL: Average of 3 countings X 10.

PERMANENT MOUNTINGS

Nematodes killed by heat at 60°C for 1 min, and then fixed with cold formalin 4%

MASS DEHYDRATION

AND THE NEMATODES?

BACTERIAL FEEDERS

- Acrobelus*
- Aphanolaimus*
- Plectus*
- Desmocolex*
- Prismatolaimus*
- Rhabditis*
- Diploscapter*

PREDATORS

- Mononchus*
- Miconchus*
- Prionchulus*
- Mylonchulus*
- Trypila*
- Iotonchus*

OMNIVORES

- Mesodorylaimus*
- Oriverutus*
- Belondira*
- Labronema*
- Aporcelaimium*

PLANT-PARASITES

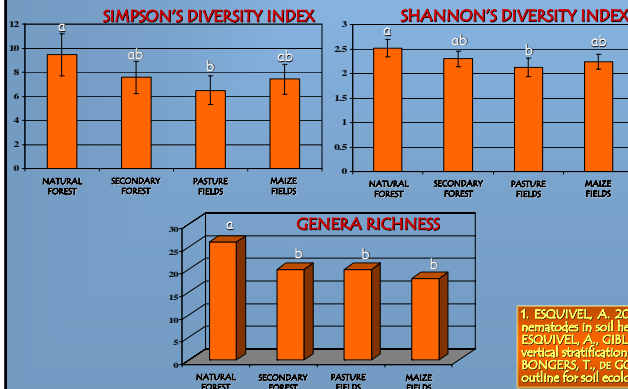
- Helicotylenchus*
- Criconema*
- Ogma*
- Discoicriconemella*
- Trophorus*
- Hemicyclaphora*
- Xiphinema*
- Pratylenchus*
- Meloidogyne*
- Trichoadorus*

FUNGAL FEEDERS

- Aphelenchus*

RESULTS I

53 Families & 124 Genera



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