LAND USE EFFECTS ON LITTER DECOMPOSITION IN TROPICAL ECOSYSTEMS IN MEXICO

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Primary productivity and decomposition are the main processes in the ecosystem. Decomposition is a very important part of the nutrient cycling, give resources to plant nutrition, and there is an important pathway of energy flux. The analysis of this ecosystem process is necessary to identify the ecosystem services and to improve the ecosystem management programs.

Figure 1. Study windows in Los Tuxtlas Region (Modificado de García, 2005).

Mexico: Los Tuxtlas Biosphere Reserve

It is located in the state of Veracruz in the coastal plains of the Gulf of Mexico.
The region of Los Tuxtlas is a volcanic massif dating back to the Tertiary period, lava flows, volcanic ash, and other pyroclastics cover almost the entire area.
The altitudinal range is from sea level to 1,780 meters with the San Martin Tuxtla volcano as the highest elevation.
The climate of the region is hot and sub humid on the coastal plains, and temperate and humid in the highlands.
The Los Tuxtlas reserve is one of the most threatened protected areas in Mexico because the land use changes for crops and livestock farming.
This has led to continuous and rapid disappearance of habitat and natural vegetation.
Three sites (windows) were selected in the benchmark site in order to study soil organisms for their diversity and functional attributes, selected according to disturbance gradient, associated with three communities or "ejidos": Adolfo Lopez Mateos, Venustiano Carranza and San Fernando (Figure 1).

Objective and Methods

The aim of this study was to determine the litter decomposition differences in four land uses (Figure 2). López Mateos and Venustiano Carranza windows have the higher and lowest vegetation cover, respectively. Using the leaf litter, a six month experiment was carried out. Using the litter bag method, litter decomposition was estimated with the remaining weight proportion (RWP) in a monthly survey. Carbon, Nitrogen and the C:N ratio contents were quantified, at the beginning and the end of the experiment.

Litter of every type of land use

Labels of aluminum for every bag of mesh for his identification

Litter bags

Stock exchanges placed in the use of corn borders of

Figure 2. Land uses

Results

For San Fernando window (intermediate disturbance regime) and Venustiano Carranza, pasture had higher decomposition rates, and the dry weight loss was 59.63% and 68.74%, respectively. At López Mateos, higher decomposition rates (54.37%) were observed in the tropical rain forest.
C:N were significant different in most of the windows and land use (Table 1).

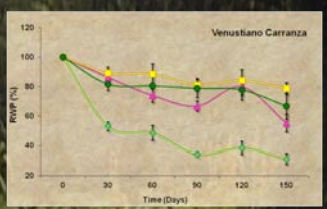

Table 1. Results of the laboratory analysis of nutriments

Community		Lopez Mateos		San Fernando		Venustiano Carranza	
Land use	Time	Initial	Final	Initial	Final	Initial	Final
Agroforestry	C	46.53	25.44*	46.29	46.85	48.73	45.48
	N	1.95	1.27*	1.72	2.18*	1.53	1.68
	C:N	23.87	19.97	26.83	21.52*	31.91	27.08
Maize crop	C	44.47	26.09*	44.81	29.49*	46.41	26.55*
	N	2.53	2.1	0.38	0.61*	1.87	1.28*
	C:N	17.58	12.42	118.86	48.23*	24.87	20.75
Pasture	C	42.6	18.54*	43.49	43.23	45.1	39.1*
	N	0.77	1.08	0.84	1.22*	0.8	1.22*
	C:N	55.44	17.11*	51.68	35.38*	56.7	32.03*
Forest	C	46.01	32.96*	46.25	43.9	46.15	45.28
	N	2.22	1.97	1.85	2.21*	1.29	1.65*
	C:N	20.75	16.72*	25.02	19.83*	35.79	27.48*

* Differences significant p<0.05

Conclusion

In general the slowest decomposition is given in the land use of maize and the most rapid in the pastures, while in the site with major coverage (Lopez Mateos) the slowest rate of decomposition was registered. Though it is true that the quality of the fraction to foliate turned out to be important, it is necessary to correlate these results with the information of microclimate and fauna of the soil for every window and use of soil. Land use and litter quality (C and N) determines differences in decomposition rates, but it is not clear that vegetation cover differences affect this ecosystem process.

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