Growth of Camedor Palm *Chamaedorea Hooperiana* (Hodel) in Primary and Secondary Rain Forest and their Effect on Soil Biodiversity of The Los Tuxtlas. Veracruz, México

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Introduction

In the Veracruz State, there are 11, 000 hectares aproximately which are dedicated to extraction of camedor palm from the primary rain forest and only 1,000 hectares are destinated for cultivation (Vela e Ixtla 2005). The exportation of palm, *Chamaedorea hooperiana*, from the Los Tuxtlas to United States is highly viable (Eccardi, et. al., 2001), although their production could be unsustainable (Oyama, 1992). The palm extractions have reduced the populations of *Chamaedorea hooperiana* palm until 70% and only a few fragments with palm in natural stage are remaining in Los Tuxtlas.

The Workshop

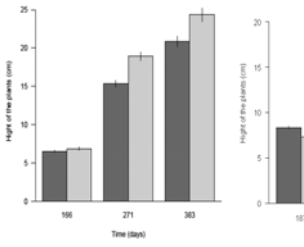
At December 2006 a workshop was realized in López Mateos with farmers and researchers in order to identify some agricultural or agroforestal system for demosnstrative plots. Participants determined that agroforestry system which include camedor palm *Chamaedorea hooperiana* whithin primary or secondary rain forest was the best system to work demonstrative plots

Strategy

We used the woodlot approximation (Nyadzi, et. al. 2003), in order to develop a technology for grow palm and soil diversity conservation. The intervention was split in two phases:
1) Back yard nursery.- In order to optimize the palm production, we introduce three new components to current management practices: 1) exposition of seedbeds soil to sun in order to soil sterilization; 2) a vermicompost unit to supply of organic substrate for seedbeds and to prevent farmers extract soil from the rainforest; and 3) micorrizic inoculation for improve the seedling growth and to demonstrate micorrizas management. The growth of the palm in relation a these factors was evaluated and their effect on soil macrofauna diversity
2) Palm growing in forest.- We were going to evaluate the palm growth in two systems: 1) Primary rain forest and 2) Fallow system. It is supposed that primary rain forest is the best system to palm cultivation due to original physicochemical conditions. If it can be proved that palm cultivation in fallow system is similar or best that palm cultivation in primary rain forest, then, regeneration of secondary rain forest can be stimulated in order to palm cultivation in such systems. Soil macrofauna diversity also was evaluated.

Set Up the Back yard nursery

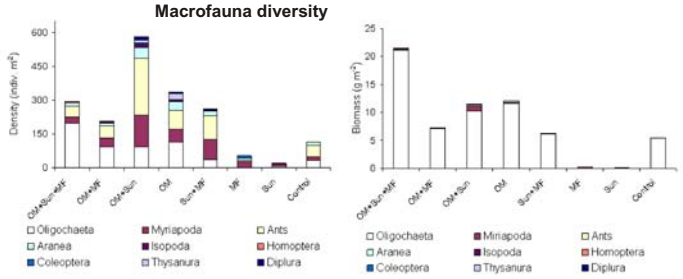
The plants were measured three times along the backyard phase. Palms germinated after 3 months and the first measurement was done after five months



RESULTS: Growth of

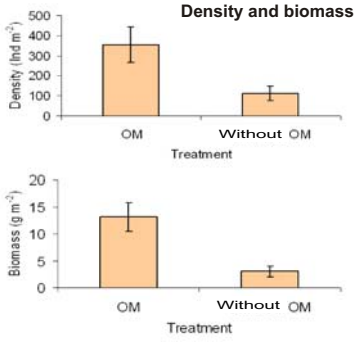
In the backyard phase only the effect of the organic matter was statistically significant on the palm growth. In López Mateos a positive effect was evident (a) whereas in San Fernando the effect was negative. In San Fernando, Farmers added 1kg of ashes to all treatments. It was supposed that ashes were adsorved in treatments with vermicomposting in comparison with treatments whithout organic matter resulting in a better growth in last ones.

Macrofauna diversity



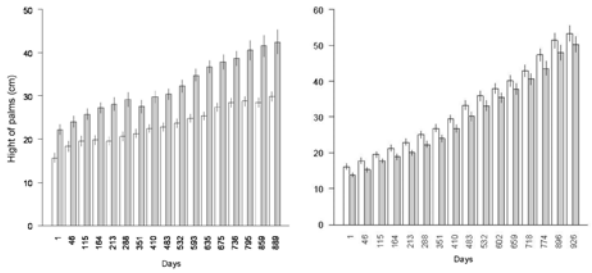
9 groups of Macrofaune in backyards plots were determined. Trends in treatments indicated that treatments with organic matter had greater diversity, density (a) and biomass (b) than the other treatments. Ants, eartworms and miriapodes were the most abundant whereas the earthworms were the organisms more important in biomass.

Density and biomass of Macrofauna



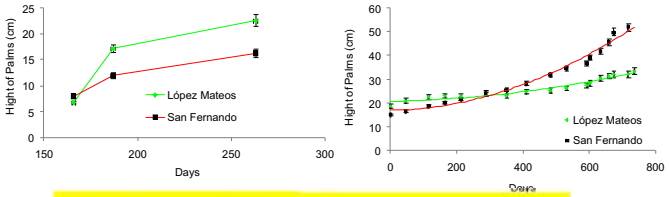
Similar to the palm growth, only the effect of the organic matter treatments was significant on both, total density and biomass of macrofauna. The figure on the left show clearly the difference between treatments with and without organic matter.

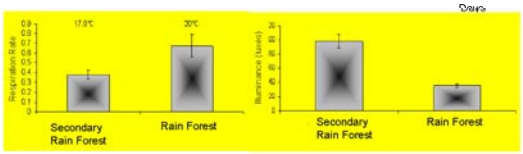
Growth of palm *Chamaedorea* in Rain Forest (a) and Secondary Forest (b)



Growth of palm *Chamaedorea* in both, rain forest and secondary forest indicated that the positive and significant effect of organic matter treatments in the backyard, was maintained when the palms were transplanted to rain forest in López Mateos (a) whereas that in San Fernando, secondary forest (b), the negative and significant effect of the organic matter on growth of the palms was not maintained and treatments with and without organic matter become to be similar in hight.

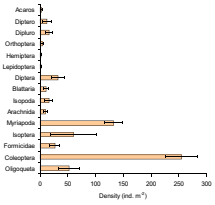
Comparative growth of *Chamaedorea* palm in primary and secondary forest



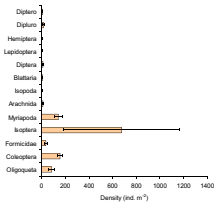


Comparative growth of palms indicated that, in the backyard phase (a), *Chamaedorea* palms grew better in López Mateos (green line) than in San Fernando (red line). In both plots mesh for shadow was used in order to allow 70% of light but in San Fernando, the backyard plots were flooded due to the days were very rainy. By contrast, when the *Chamaedorea* palms were transplanted, they grew better in the secondary forest (b) (red line) compared with the palms growing in primary forest (green line). The explanation is that in spite of that temperature and respiration rate of soil in primary forest was greater than in the secondary forest (see figure a with bars), the illuminance was greater in the last one. *Chamaedorea hooperiana* require more than 50% of light in order to a better growth.

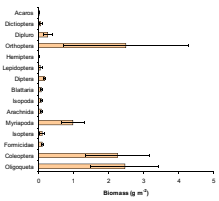
Richness and density of Macrofauna in primary forest and secondary forest



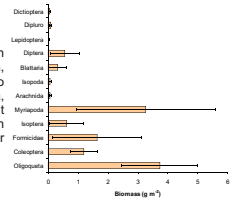
15 groups of macrofauna were founded in primary forest whereas 13 groups were founded in secondary forest. Most abundant groups in both systems were coleoptera, myriapoda, isoptera and oligochaeta. The remaining groups were more abundan in primary forest than the secondary one. Richness was similar in both system indicating that secondary system with palm can to maintain a richness of macrofauna, similar to those of the primary forest.



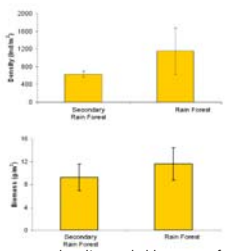
Biomass for group



For the biomass, groups more important in primary forest were earthworms, coleoptera, myriapoda and orthoptera, whereas to secondary forest earthworms, myriapoda, ants and coleoptera were the most important. Scale biomass was similar in both systems, whereas scale density was higher for the secondary forest.

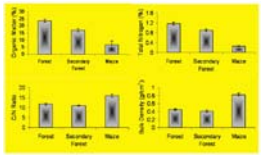


Average density and biomass of all macrofauna



Average density and biomass of all macrofauna (on the left) indicate que both system, i.e. primary forest and secondary forest, had similar values although primary forest tends to has higher values.

Potential of recuperation of soil fertility from a maize system



In the above figure it can be seen that starting with low fertility conditions in a maize system, levels of organic matter, total nitrogen, C/N ratio and bulk density, similar to primary forest, can be recuperated if we are capable to stimulate the traditional fallow system combined with palm *Chamaedorea*. Secondary forest in the figure was a maize system in 1998 and at 2000, trees were left to grow during 6 years resulting in a secondary forest. At 2006 *Chamaedorea* palm was transplanted to the secondary forest within the BGBD project activities. It can be concluded that levels of macrofauna diversity and chemical and physical fertility can be recuperated and maintained in woodlot systems growing both, threes of the secondary forest and *Chamaedora hooperiana*.

Ackowledgements

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