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Studies on Ecology, Biology and Relevance of *Leea guineensis* G. Don. (Leeaceae) in Landuse Systems on Leyte, Philippines.

Diplomarbeit

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6 Summary

The conducted study dealt with the morphological characters as well as habitat descriptions of *Leea guineensis*. Furthermore, it was analyzed which flower visitors are attracted to the inflorescenses and if the communities of flower visitors differ between areas with different anthropogenic influence. The results were surveyed for a possible application of *L. guineensis* in the "Rainforestation Farming". The study site was located upwards from Cienda village, Leyte (Philippines) on the footslopes of the Mt. Pangasugan along the Tubod River.

For a better specification of the firstly general classified habitat types, the "Crown Free Projection" was determined on selected study plants by using the "vertical tube method". Additionally light and humidity measurements were conducted exemplarily on a study plant to compare the results with the data of an unwooded area.

General morphological characters were noted on location, measurements were either taken directly on the plant or through samples at the Leyte State University.

At the University of Hohenheim germination tests with seeds of *L. guineensis* were accomplished. The seeds were portioned into growth chambers with 15°C, 27°C and 40°C. At every temperature half of the seeds were grown in light, the other half in darkness.

Flower visitors were counted in degraded land and secondary forest and divided into species. Unknown species were catched, conserved in alcohol and identified.

The results of the habitat analysis showed a prefernce for shady and moist areas, mostly close to the Tubod River. The "Crown Free Projection" showed an average of 5 %. The exemplary light measurement showed that the light intensity was in the mean 22 % lower than on the unwooded area, in exchange the humidity was in the mean 17 % higher.

The germination tests showed the best results at a temperature treatment with 27°C, whereas more seeds germinated in light than in darkness. At 40°C the number of germinated seeds showed no difference betweeen light and darkness, at 15°C none of the seeds germinated.

To satisfy these light requirements within the "Rainforestation Farming", *L. guineensis* should be grown in the first year, to accomplish that the seeds can brake their canopy-induced dormancy. The second year tree should be shade loving when young and grow tall when old.

The morphological analysis indicated differences to the previous descriptions of *L. guineensis*. A new character are the stilt roots, which are supposed to be an adaption to the fluctuating water level of the Tubod River. Furthermore, the berries showed a very dark purple to black coloration.

These 2 characters are common for *L. indica*, which however differs in other characters from the studied plants. The studied plants could be a subspecies of *L. guineensis* on Leyte or a hybrid of *L. guineensis* and *L. indica*.

In addition, new morphological characters could be assessed for a better taxonomical classification of the Leeaceae. These characters include the differences between terminal and secondary leaflets. These two types of leaflets differed on the researched plant for example highly signifcant through their length and length/width ratio. Furthermore, the distance ratios to where the petiole attaches to the rachis were measured. If one petiole is present, it attaches to 61.08 ± 3.54 % of the complete rachis length. If two petioles are present they attach to 38.76 ± 4.15 % and to 76.76 ± 4 .73 % of the total rachis length. If three petioles are present they attach to 33.85 ± 3.78 %, 64.63 ± 6.01 % and 88.62 ± 3.35 % of the total rachis length. Addtionally it could be demonstrated that the secondary leaflets differ significantly in length depending on their position on the leaf. The 1.1 is shorter than the 1.2 secondary leaflet but both are longer than the 2. secondary leaflet. Furthermore, the angles between the leaves showed a mean of about 135°, which means there are 3 clockwise rotations passing 8 leaves, or 5 rotations in the anti-clockwise direction until there is a leaf directly above the starting one.

The flower visitors were dominated by bees, whereas no significant differences between degraded land and secondary forest could be pointed out. The differences could have been reduced through the sampling which led only along the watercourse. On inflorescenses in degraded land the composition of flower visitors was dependant on the number of flowers. On inflorescenses with more than 50 flowers the social bees (*Apis cerana*) dominated as flower visitors, whereas solitary bees (*Austronomia* sp., *Lipotriches* sp., *Amegilla* sp., *Thyreus* sp.) dominated on flowers with less than 50 flowers. An explanation for this pattern could be the interspecific competition of social and solitary bees. Social bees are able to recruit nestmates, what gives them the ability to harvest food that would not be as readily available to an individual foraging alone.

It could be assessed that the inflorescenses of *L. guineensis* bears nutrition for miscellaneous flower visitors and thus helps to keep up the overall biodiversity. These mostly hemitrop and eutrop flower visitors could contribute to a higher yield of the "Rainforestation Farming" system through pollination of other agricultural plants and through attracted wasps (*Liris* sp., *Delta* sp.) which could help to keep pests under control.