Improvement And Monitoring Of The Mangrove Reforestation System In The South-West Region Of Madagascar (Case Study Of The Ambondrolava Mangrove)

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Background
In the context of the vulnerability of mangrove ecosystems to climate change as well as its important role, which is increasingly recognized internationally in the context of reducing global greenhouse gas emissions. A study on the improvement and monitoring of the mangrove reforestation system was conducted. Our research took place in the southwestern part of Madagascar, from January 2021 to January 2022. It is located in, about 12 km from the city of Toliara, in the mangrove of Ambondrolava. Our objective is to assess and analyze the factors influencing the success of mangrove plantation according to local ecological conditions and also to determine the growth of mangrove species in order to prepare for sustainable management of mangrove forests.

Method
Four species: Avicennia marina, Rhizophora mucronata, Bruguiera gymnorhiza and Ceriops tagal were used to carry out this mangrove reforestation study. The process consists of planting seeds in nurseries and then replanting the plants in the natural environment in Six 06 plots of 100 m2 in 4 different sites. The plantation was carried out during the low tide spring tide where the plants are separated 1.5 m from each other. After reforestation, physical, chemical and biological parameters were taken during the live and dead waters. Reforestation monitoring consisted of measuring the heights of each plant, and counting the dead ones. The cause of the eventual mortality rate is determined within each plots.

Results
Nurseries show a success rate of more than 97%. In the natural environment, soil salinity varies on average from 17.87%o ; 17.51%o ; 22.2%o and 22.65%o respectively for the Antsahamaty; Bejihy; Andalatsarety and Ambotsibotsiky sites. Soil PH varies on average from 5.31 (Antsahamaty), 5.63 (Ambotsibotsiky), 5.35 (Andalatsarety) and 5.68 (Bejihy). Soil temperature varied from 26.51°C (Ambotsibotsiky), 28.28°C (Andalatsarety), 28.39°C (Bejihy) and 28.6°C (Antsahamaty). The type of substrate at each site is different. Ambotsibotsiky site has a muddy substrate type. While the other three sites have a sandy-muddy substrate type.
The evaluation of the success of plantations indicated a survival rate of 60%. The survival rate varies on average from 72.6% (Ambotsibotsiky), 66.66% (Andalatsarety), 52.08% (Bejihy) and 38.88%, (Antsahamaty). The mortality rate caused by crabs eating young mangroves represents 58% of the dead individuals in all sites. The survival rate of species within all sites varies from 39.23% (Avicennia

marina), 42.7% (Ceriops tagal), 71.87% (Bruguiera gymnorhiza) and 76.38% (Rhizophora mucronata). The increase in height of individuals varies on average by 0.38 cm/month (Ceriops tagal); 3.2 cm/month (Rhizophora mucronata); 3.46 cm/month (Avicennia marina) and 3.87 cm/month (Bruguiera gymnorhiza). Results also showed that different parameters, such as the types of substrates and the crabs consuming young mangroves, significantly influence the success of reforestation.

Conclusion

This study made it possible to observe the variations in physico-chemical and biological parameters of reforestation sites influencing the growth, survival of plants. Their growth and survival varies according to species and site.