

# Domestication of *Euterpe oleracea* (Arecaceae) to provide food from peatlands

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The 4<sup>th</sup> International Conference on Tropical Silviculture

Bogor, 24 August 2023

# Introduction



(Source: evergreen.tips)

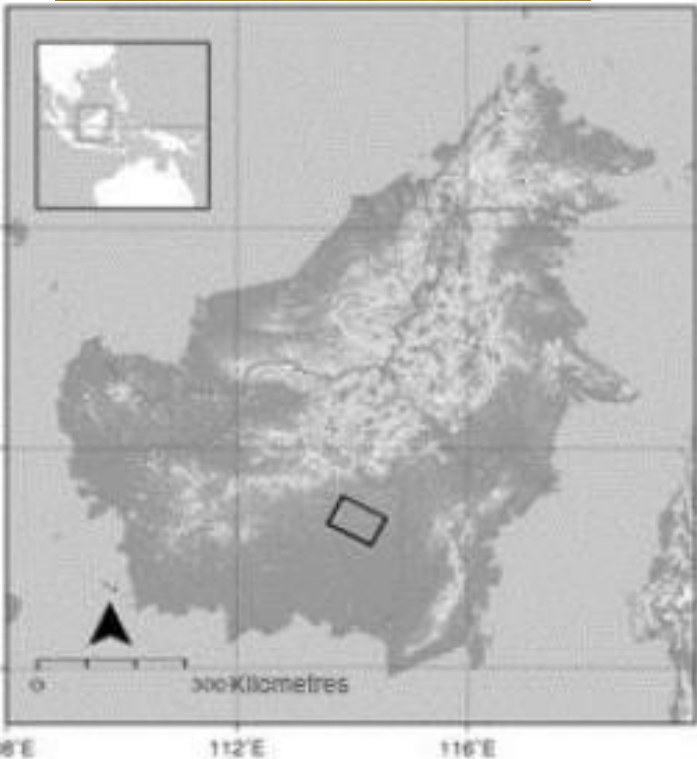


(Source: watson.com)

- Domestication of trees is referred to as a continuous process that includes product creation, management, adoption of preferred germplasm, and marketing.
- Tree domestication can be started from the introduction of new species from abroad, like numerous estate crops, such as coffee, rubber tree, and oil palm.
- *Euterpe oleracea* Mart. (Arecaceae) is a native tropical peat swamp forest of Central and South America; it distributes in the Amazonian, Peruvian, Venezuela and Suriname.
- It is known as acai (in Portuguese) or podonsiri (in Surinamese).
- All parts of the trees are beneficial.
- The objectives of the study were to describe the seed morphology, the germination rate, the early growth of açai in the nursery and after transplanted to the peatlands of Tumbang Nusa, Central Kalimantan.



# Methods



- The experiment in the nursery was conducted in two places, those are in the greenhouse of the Standardization Center for Sustainable Forest in Bogor, West Java Province, and The Forest Area with Specific Purposes, which is also known as *Kawasan Hutan dengan Tujuan Khusus* (KHDTK) of Tumbang Nusa, in Pulang Pisau district, Central Kalimantan province.
- The *E. oleracea* seeds originated from Suriname. They were bought from an acai processor in Meerzorg. The seeds were transported to Indonesia in January 2020, especially for this research.
- In Bogor, the seed scarification was done by removing the hair-like on the endocarp. The seeds were measured and weighed in the laboratory.
- The seeds were then sowed in the cocopeat media in February 2020, and they were observed until they germinated after 6 months.
- In Tumbang Nusa, some seeds have already germinated due to long transfer lag. The viable seeds were then sowed in the mixed soil+rice husk media without any treatment in March 2020.



# SEEDS AND SEEDLINGS



Photo by: HL. Tata)



- Variables observed:
- (1) Diameter and weight of seed
- (2) Germination rate
- (3) Relative growth rate of height (RGRH)
- (4) Relative growth rate of diameter (RGRD)
- (5) Number of leaves.

At the age of 12 months after planting (MAP) in the field and 28 MAP in the nursery.

Data Analysis:  
Independent sample  
*T*-test using SPSS.



Photo by: D. Rahmanadi)



Photo by: HL. Tata)



# RESULTS

**Table 1.** The measure and germination rate of *E. oleracea* seeds

Variables	Mean
Seed diameter (cm)	0.88 ± 0.01
Seed wet weigh (g)	1.19 ± 0.31
Germination soaked in warm water (%)	8.33
Time of germination	4-5 months
Germination soaked in cold water (%)	1.75
Time of germination	5 months
Germination without any treatment (%)	20.0
Time of germination	2 weeks



- The seeds soaked in warm water increased the germination rate.
  - Seeds without any treatment resulted in the highest germination rate.
- It is expected that the seeds have already been ripened physiologically.

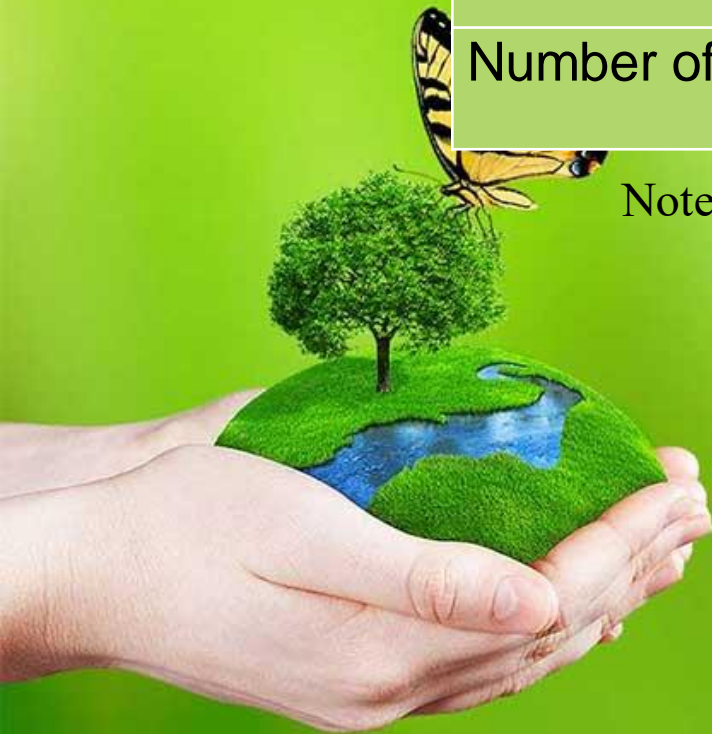
# RESULTS

**Table 2.** The relative growth rate of diameter (RGRD), the relative growth rate of height (RGRH), and number of leaves of *E. oleracea* in the field and in the nursery

Variables	Seedlings in the field	Seedlings in the nursery
RGRD (cm month <sup>-1</sup> )	0.08 ± 0.02 <sup>**</sup>	0.03 ± 0.006
RGRH (cm month <sup>-1</sup> )	4.21 ± 0.35 <sup>**</sup>	0.02 ± 0.002
Number of leaves	6.7 ± 1.2 <sup>*</sup>	5.4 ± 0.9

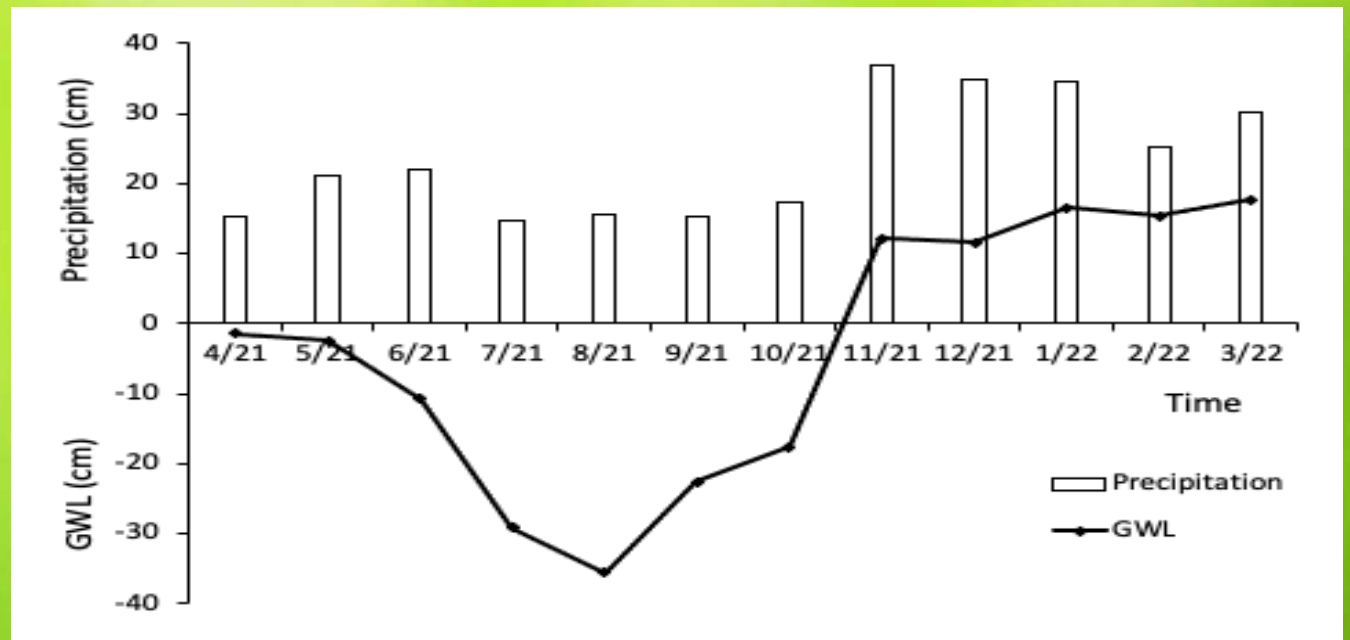
Note: asterisk denotes significant value in the field compare to the nursery; \* at p<0.05, \*\* at p<0.01

- In the natural habitat, the açai plant grows rapidly. The height may reach 2 m within a year (Cymerys et al. 2011).
- Açai seedlings in the field of KHD TK Tumbang Nusa at the age of 12 MAP have a height mean of  $92.4 \pm 30.5$  cm and diameter mean of  $2.5 \pm 0.5$  cm.



# RESULTS

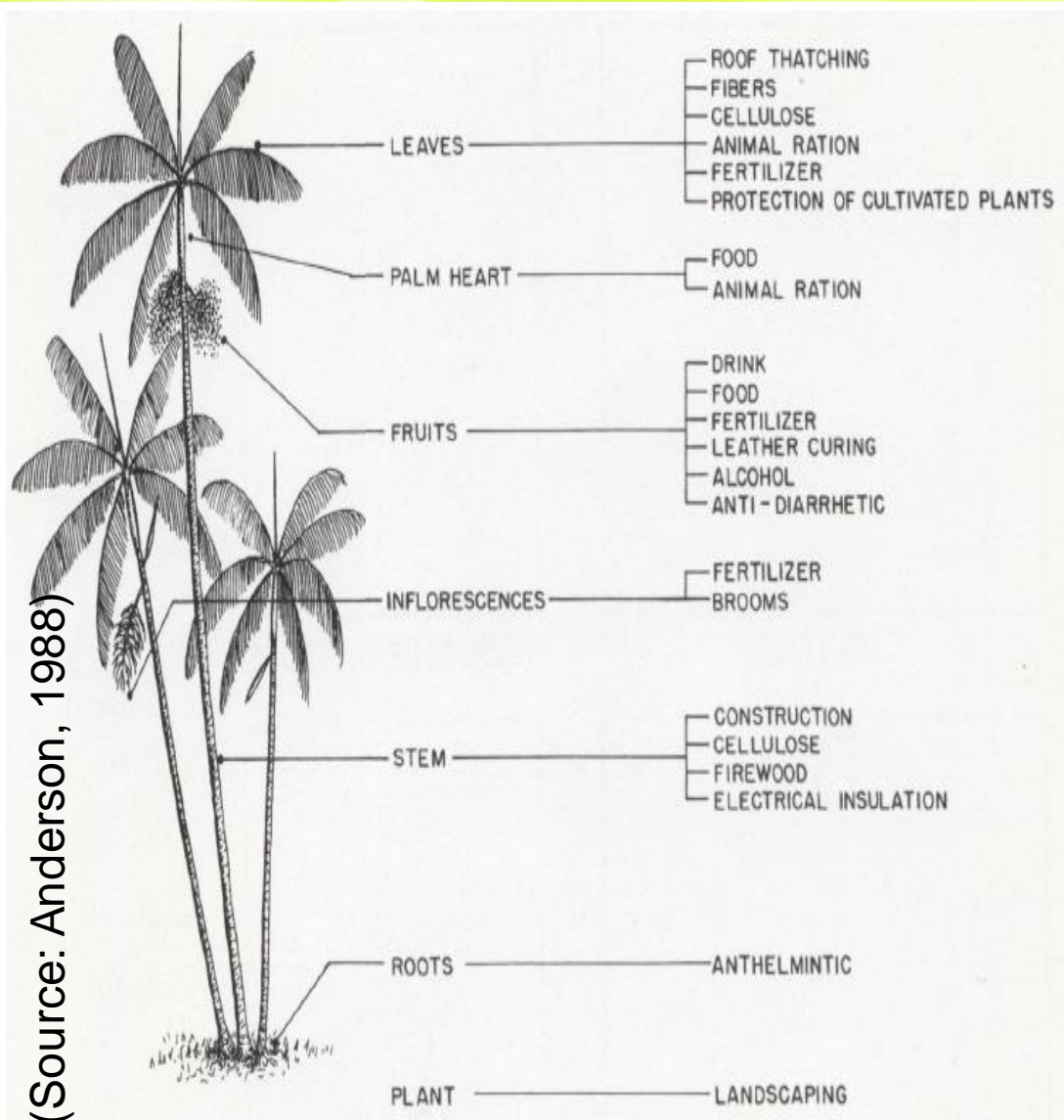
- The plot of açai in the KHDTK Tumbang Nusa was flooded from November 2021 to March 2022.
- The mean water level in November 2021 to March 2022 ranged from 11.6 to 17.7 cm.
- The açai seedlings survived, due to apical shoot of açai did not submerge under water.
- Naturally, açai grow on swamps and floodplains, in seasonally flooded and permanently flooded forests (Cymerys et al. 2011). It has pneumatophores.



**Figure 3.** Precipitation and groundwater level (GWL) in the KHDTK Tumbang Nusa, Central Kalimantan from April 2021 to March 2022



# PROSPECTS AND CHALLENGES

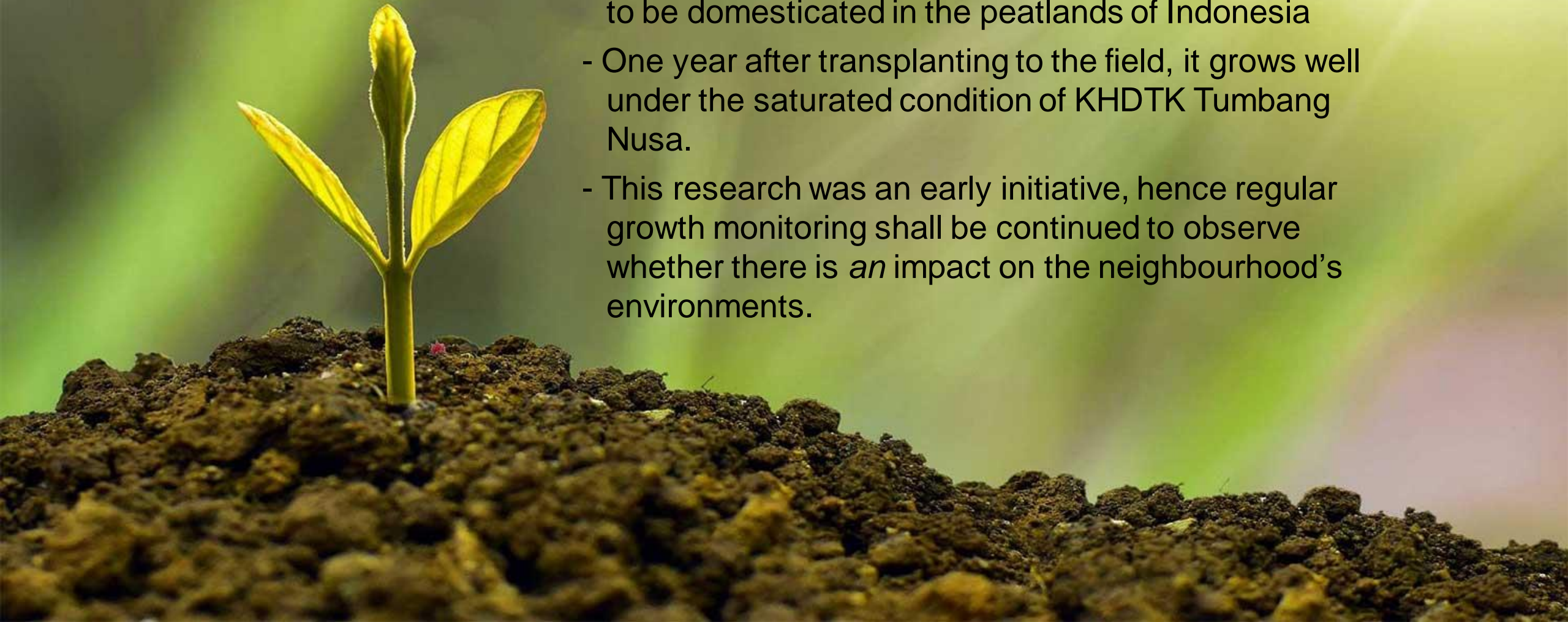


- Açaí is a promising species to be domesticated and planted as paludiculture species in a tropical peatlands.
- It is one species potential for the synergies between food security and climate change objectives in Indonesia.
- Exotic plants species may cause many impacts on the ecological patterns of the local community.
- When it has same genus (congeneric) with local species, the exotic plant species may encourage competition for pollinators or result in interspecific interference with pollen in native flowers (Tiberio et al. 2016)
- The introduction and domestication of an exotic species to Indonesia should follow the national regulation, which is P.3/2020 regarding the Implementation of Forest Plant Seeding.
- Aims to (i) ensure the preservation of plant genetic resources forest and its utilization; and (ii) ensure the availability of good quality of seeds and/or seedlings.
- There is still a long way to go for the implementation of açaí domestication in Indonesia.



# Conclusions

- As a paludiculture species, açai palm has a prospect to be domesticated in the peatlands of Indonesia
- One year after transplanting to the field, it grows well under the saturated condition of KHDTK Tumbang Nusa.
- This research was an early initiative, hence regular growth monitoring shall be continued to observe whether there is *an* impact on the neighbourhood's environments.





# THANK YOU

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