



# INTERFERENCE OF AN EXOTIC PALM OVER A NATIVE ONE AT THE FIRST DEMOGRAPHIC STAGES

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## INTRODUÇÃO

Biological invasions usually bring negative impacts to native biota, being considered one of the major causes of biodiversity loss. The Australian palm tree *Archontophoenix cunninghamiana* H. Wendl. & Drude was brought to São Paulo, Brazil, for ornamental purposes but became invasive in remnant patches of the Atlantic rainforest. In some urban patches in São Paulo city it is the dominant arboreal species (Dislich *et al.*, ., 2002). On the contrary, the native palm *Euterpe edulis* Martius, endemic of the Atlantic rainforest, is locally extinct in many regions, especially in small patches. Both species would occupy parts of the same functional niche at these forest remnants, and therefore, the reintroduction of *E. edulis* in substitution to the invasive palm is recommended. It is vital to know if the invasive species interferes in the early demographic stages and on the establishment of *E. edulis* before efforts and money for its reintroduction are spent. To achieve a well-succeeded reintroduction, the native species must be able to recruit new individuals and to obtain some competitive advantage over the reproductive individuals of the exotic species. However, our hypothesis is that the invasive species has high germination and viability rates and allelopathic properties that can influence the recruitment of the native palm.

## OBJETIVOS

The aim of this study is to subsidize the management of the exotic invasive palm in natural impacted areas, in order to evaluate the viability of using a native palm,

*Euterpe edulis*, to replace *A. cunninghamiana*, as both species provide plentiful fruits to frugivorous fauna in the forest patches. We compared the initial demographic stages of these two palms. To infer about germination efficiency we tested the direct interference of the exotic palm over the native one, using combined germination experiments, and indirect interference by testing for allelopathic effects.

## MATERIAL E MÉTODOS

We used kernels from depulped fruits (seeds) collected in December/2009 at the Universidade de São Paulo (*A. cunninghamiana*, 23°33'57"S and 46°43'43"W) and the Neblinas Park (*E. edulis*, 23°44'07"S and 46°11'05"W), both sites in São Paulo State, Brazil. We tested seed viability using the Tetrazolium salt solution (2,3,5 triphenyl tetrazolium chloride). To check for a possible interference of the exotic palm species over the seeds of the native one, we conducted experiments to evaluate interaction between species, both direct (germination of both species together, using fruits and seeds), and indirect (allelopathy, using lixiviate solutions of fruits and leaves of *A. cunninghamiana* in different concentrations). We performed nine replications with 12 seeds (or fruits) per treatment, and germination was carried out at in a greenhouse (25°C ± 2°C, air humidity around 80%) for 20 weeks. The parameters measured were: 1) germination percentages; 2) germination velocity index (GVI, number of days to start germination); 3) length of seedlings in each treatment.

## RESULTADOS

The lixiviate solutions did not cause inhibition on germination, nor any affect in the length of the seedlings of *E. edulis*. Even so, the native palm revealed a low performance, maintaining an average of 40.74% germination rate, when initial seed viability was 73.10%. As for the combined germination tests, the exotic palm did not show any interference on *E. edulis* for the parameters measured. But contrarily to expected, in the treatment where the fruits of *A. cunninghamiana* (pulp present) were used together with the seeds of *E. edulis*, only the exotic palm was significantly affected, showing a reduction in the germination rate and velocity, as well as a decrease in seedling length. However, in the treatment where only seeds from both species were used, *A. cunninghamiana* kept its high germination rates, on an average 88.43%, when 84.80% of the seeds were initially viable. The reduction in germination rates and germination velocity when the fruits were used is probably because the pulp creates a barrier that hinders the seed to absorb water, and may not be related to the applied treatment. This reduction in species germination when using whole fruits indicates that their consumption by frugivores facilitates germination and, on the other hand, if fruits are not depulped by frugivores, seeds will not be able to germinate at the same rate, therefore, the establishment success will decrease. In general, *E. edulis* showed high seed mortality (comparing the percentages of viability and germination), reflecting higher vulnerability than the exotic species in the initial demographic stages. Comparing the species performance at these initial phases, *E. edulis* germination rates were less than half the value of those of *A. cunninghamiana*, and the germination was significantly slower. The fact that the individuals of *A. cunninghamiana* spread quickly and effectively throughout forests may be related to its high germination rates and thus, a higher chance of successful establishment. Reis *et al.*, (2000) discussed the pyramid shaped demography of *E. edulis* in natural habitats, with a massive production of seeds and progressively smaller proportions of viable seeds, seedlings, juveniles and adults, respectively. This structure narrows the species bottleneck at the first demographic stages. So, to give native spe-

cies better competitive chances in the early stages, one option is to cut the bunches of the exotic, leaving the fruits on the soil, in order to decrease its consumption by arboreal fauna (especially birds), leading to lower chances of seedling establishment. This could in turn decrease the impact in forested areas and favor the native palm establishment.

## CONCLUSÃO

The use of exotic species for ornamental purposes can initiate or aggravate bioinvasion processes in natural areas nearby. Comparing the performance of the native *E. edulis* and of the exotic *A. cunninghamiana* palm species at the first demographic stages we verified that the exotic species is potentially more successful in the establishment phase. Looking at a reintroduction program we affirm that the re-establishment of *E. edulis* in the community would be difficult if it depended only from the recruitment by seeds, and this impediment cannot be attributed to any effect of the invasive species over the native, but to the natural bottleneck that *E. edulis* shows at this early demographic stages. The cutting of *A. cunninghamiana* bunches, leaving them on the soil, could also diminish the consumption by frugivorous birds.

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