

# Past and present genetic structure of the tropical rainforest palm *Astrocaryum mexicanum*: effects of anthropogenic fragmentation

## INTRODUCTION

Habitat fragmentation is omnipresent in most ecosystems on Earth, affecting not only species diversity but the elemental level of biodiversity: genetic variation.

We assessed the effects of fragmentation of the moist tropical rain forest of Lost Tuxtlas region, southern Mexico, on the genetic structure and diversity of one iconic species: the understory palm tree *Astrocaryum mexicanum*. This dominant species exert a tremendous influence in the community structure and diversity. Yet, it can only survive in primaeval forests.



## METHODS

Based on palm height it is possible to approximate the age of palms. Thus we compared the genetic structure of adult trees (older than 80 years) and young palms (younger than 3 years) within preserved and fragmented forests. (Figure 2)

Using MSVAR software, through MCMC methods, we were able to estimate ancestral population sizes with the microsatellite data and mutation rates.

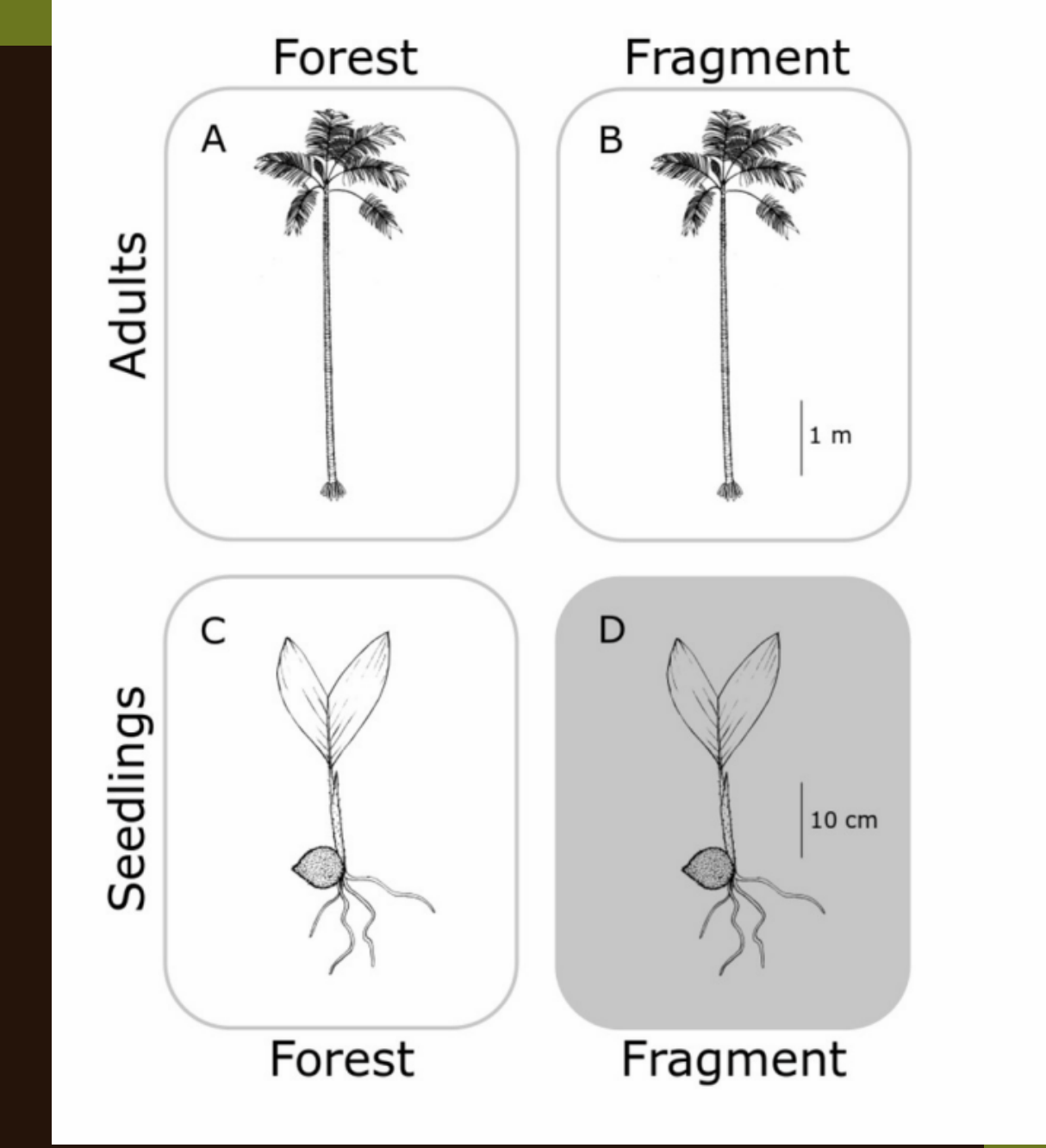
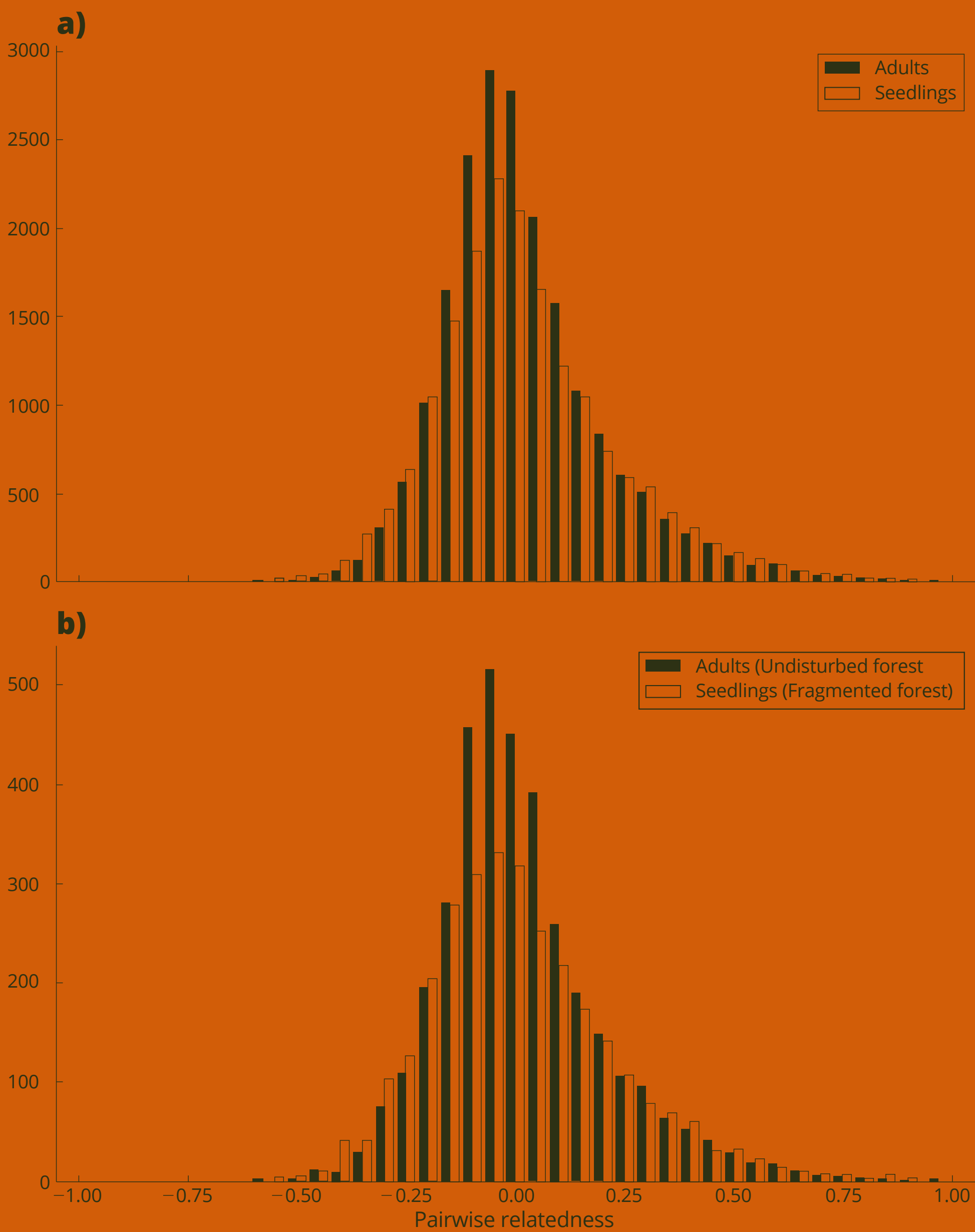


Figure 2. No genetic differentiation is expected between adult palm trees from continuous (A) and fragmented (B) forests because both predate fragmentation. Seedlings from continuous forests (C) will be similar to adults since they have not been subject to fragmentation effects. Only seedlings in fragments (D) would bear the effects of reduction of population size and isolation, displaying genetic differentiation with respect to the other three groups. Original drawing by L.J. Giraldo Kalil.

## RESULTS

Using Bottleneck software to simulate genetic diversity decay of fragmented populations in the future, we showed that even though fragmentation as a relatively recent event does not seem to have reduced genetic variation presently, it has the potential for reducing it greatly in the next few centuries.

Figure 4. Individual's pairwise relatedness. Frequency of pairwise relatedness between combinations of all individuals (adults and seedlings), for all loci (A). Pairwise relatedness between all adult individuals in continuous forests and seedlings of fragmented forests (B). The latter comparison is expected to detect differences due to fragmentation.



## CONCLUSION

We concluded that effective population size decreased greatly after the Last Glacial Maximum event, approximately 26,000 years ago, showcasing the effect of this ancient climatic change on a population's size and genetic structure.

