

REPRODUCTIVE BIOGEOGRAPHY OF *CURATELLA AMERICANA* IN BRAZIL

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Introduction

Plant mating systems have historically been discussed as species' properties and most comparisons have been done among species rather than among populations or individuals of a given species (Levin 2012). Taking into account that mating systems can vary according to local conditions can boost the understanding of the evolution of plant reproductive strategies (Dart et al., 2012). We have investigated the spatial structure of the pollination and mating system of *Curatella americana* in Brazil. Our hypothesis is that differences in pollination (frequency and diversity of pollinators) of *C. americana* will be associated to changes in its mating system.

Methods

We studied seven populations of *Curatella americana* distributed among three disjunct areas of savannah (Cerrado) and observed and quantified (i.e. frequency of interaction) the pollinators on at least five different individuals at each population. At the same populations we performed experiments on the reproductive system. The pollination tests were cross and self-pollination, natural pollination (exposed flowers) and autonomous self-pollination (bagged flowers). To test for differences in fruit set related to the mating system and the regions, we used a Generalised Linear Mixed Model assuming a binomial distribution. The fixed factors were region, the pollination treatment and the interaction between them. The random factors were the individuals nested within sites and these nested within regions. Our response variable was fruit number relative to the total number of flowers in each treatment and individual. We tested the models with all fixed factor combinations and only a fixed intercept, always keeping the random factor. In order to compare the generated models we used AIC (Akaike Information Criterion). Relationships between pollinator frequency and mating system were tested using the Pearson Correlation. All tests were performed using R software.

Results and Discussion

Richness and abundance of flower visitors were more similar in those sites sampled within the same region than across different regions. There was a general gradient of pollinator species richness and abundance decreasing from South to North, which was correlated with visitation rate in each population. Few individuals of pollinators (mainly bees) were recorded in *C. americana*'s populations in Roraima. No flower visitor was recorded in

the population of Amajari, even though it is a fairly well conserved area of Cerrado.

Regarding to the reproductive system, the full model (considering region, pollination treatments and the interaction between them) was the most likely to explain the variation in fruit set between populations. Taking out the interaction between region and reproductive system the model became as likely as only the reproductive system. The model considering only the regions was slightly less likely than the null model. Cross and self-pollination were negatively correlated ($r = -0.87$, $p = 0.009$). Populations in the South set more fruit with cross-pollination and were more restrictive in their self-pollination. Populations in the North were more similar regarding the results of cross and self-pollination. Natural pollination followed the pattern recorded for richness and abundance of pollinators, with fruit set decreasing towards North.

Conclusion

Pollination regimes of *Curatella americana* populations were different across regions, especially between South (Mato Grosso) and North (Roraima), with richness and abundance of flower visitors decreasing with latitude. The reduced fauna of pollinators in the North region has resulted in more self-compatibility and self-pollination in those populations. Reduced functional abundance of pollinators in the North may be caused by the past climate dynamics and this study is goin on at the moment.

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References

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