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Primer Note

Microsatellite loci for *Orthophytum ophiuroides* (Bromelioideae, Bromeliaceae) species adapted to neotropical rock outcrops[1]

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- *Premise of the study:* Microsatellite primers were developed for *Orthophytum ophiuroides*, a rupicolous bromeliad species endemic to neotropical rocky fields. These microsatellite loci will be used to investigate population differentiation and species cohesion in such fragmented environments. The loci were tested for cross-amplification in related bromeliad species.
- *Methods and Results:* Eleven polymorphic microsatellite markers were isolated and characterized from an enriched library of *O. ophiuroides*. The loci were tested on 42 individuals from two populations of this species. The number of alleles per locus ranged from three to nine and the expected and observed heterozygosities ranged from 0.167 to 0.870 and from 0.369 to 0.958, respectively. Seven loci successfully amplified in other related bromeliad species.
- *Conclusions:* Our results suggest that the microsatellite loci developed here will be useful to assess genetic diversity and gene flow in *O. ophiuroides* for the investigation of population differentiation and species cohesion in neotropical mountainous habitats.

Key words: Bromeliaceae; cross-amplification; gene flow; genetic diversity; *Orthophytum ophiuroides*; population genetics.

The Bromeliaceae are exclusive to the tropical and subtropical areas of the Americas (except for one African species) and show extreme adaptive radiation. Species of this typical neotropical family have evolved to fill a variety of niches in a highly heterogeneous habitat, with an amazing diversity of adaptations (Benzing, 2000). Such rapid processes of adaptation and speciation can be used as models to study and understand larger issues regarding the evolution of neotropical plants. Studies on bromeliad species adapted to neotropical rock outcrops have improved our understanding of the processes of speciation and species cohesion in naturally isolated environments (i.e., Barbará et al., 2009; Palma-Silva et al., 2011).

Orthophytum Beer species are rupicolous herbs exclusive to the northeastern and southeastern regions of Brazil (Louzada and Wanderley, 2010). Although $2n = 50$ chromosomes are common within the Bromeliaceae, many *Orthophytum* species are polyploids ($2n = 100$ and 150) (Cotias-de-Oliveira et al., 2000; Louzada et al., 2010). Species of this genus generally inhabit granitic-gneiss inselbergs and quartzitic-sandstone outcrops in the Brazilian campos rupestres ("rocky fields") along the Espinhaço Range (Louzada and Wanderley, 2008). Such environments are spatially and ecologically isolated, providing a barrier against dispersal and migration, and they possess elevated species diversity and high levels of endemism (Echternacht et al., 2011). In fact, most *Orthophytum* species are restricted to small geographic ranges and some of them are narrow endemics (Louzada and Wanderley, 2010). This genus offers an interesting model system for examining speciation processes and endemism in neotropical mountainous habitats.

Here, we report microsatellite loci isolation, characterization, and cross-amplification for *O. ophiuroides* Louzada & Wand., a species endemic to the Chapada Diamantina section of the Espinhaço Range in the state of Bahia, Brazil (Louzada and Wanderley, 2008). The microsatellite loci reported here will be used to access levels of gene flow to resolve forces operating during species radiations on naturally isolated habitats. The knowledge of patterns of diversity and gene flow will also be important for management of conservation strategies and for understanding the genetic consequences of variation in mating systems or pollination syndromes.

METHODS AND RESULTS

To characterize microsatellite loci, 42 individuals of *O. ophiuroides* located in two populations from Lençóis in the Brazilian Federal State of Bahia were

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