



Development and characterization of microsatellite molecular markers for the investigation of polydomy in a Cerrado savanna ant, *Camponotus leydigi* (Formicidae: Formicinae)

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Abstract

Polydomy occurs when an ant colony occupies at least two spatially separated but socially connected nests. The identification of polydomy in ant colonies is important to understand ant life history, evolutionary success, and biotic and abiotic impacts on the environment. Several methodologies are used for the correct delimitation of the borders of the colonies and, therefore, in the identification of colonies with polydomous structure, these limits can be determined according to behavioral, spatial and genetic approaches. In the present study we develop and characterize microsatellite markers in order to complement ecological results that suggest the existence of polydomy in the cerrado ant species, *Camponotus leydigi*.

Key words:

Ants, behavior, microsatellite.

Introduction.

Camponotus leydigi (Forel) is a widely distributed ant species in the Neotropics and is frequently found in the Brazilian Cerrado savanna interacting with plants and other insects. Recent behavioral and spatial data supported the existence of polydomy in *C. leydigi* colonies in the cerrado reserve at Itirapina-SP (southeast Brazil)¹. Polydomous ants (i.e. physically separated but socially connected nests) are ecologically successful due to diet diversification and increased rate of resource exploitation (through area expansion and/or increased foraging efficiency). Delimitation of polydomous colonies requires the use of several methods, including behavioral, spatial, and genetic approaches². In the present study we develop and characterize microsatellite markers in order to, through molecular data, complement ecological results that suggest the existence of polydomy in *Camponotus leydigi*.

Results and Discussion

Six *C. leydigi* workers from the same colony were used to obtain a microsatellite-enriched library. According to this method, repetitive sequences were captured with (CT)₈ and (GT)₈ biotin-linked probes, with subsequent recovery by streptavidin magnetic-coated beads³. Polymorphic microsatellite markers are being selected to analyze the relatedness among workers from ten nests belonging to a single *C. leydigi* polydomous colony from the cerrado reserve at Itirapina-SP (southeast Brazil). Thirteen microsatellite loci were obtained (Chart 1) from each ten successfully amplified after polymerase chain reactions (PCR). Thirty different *C. leydigi* genotypes were used for loci characterization, such as their polymorphism content.

Chart 1. Microsatellite loci developed for *C. leydigi* with respective motifs and expected sizes.

Locus	Motif	Expected Size
C11	(ag) ⁴ ...(tg) ⁴² ...(ga) ⁶	241
C12	(ta) ⁴ ...(ta) ⁴ ...(at) ³ ...(tg) ³⁰ ...(at) ³	270
C14	(ta) ⁸ ...(tg) ¹⁴ ...(gt) ³ ...(gt) ¹⁰	225
C15	(gt) ²⁵	154
C110	(ac) ⁷ ...(ca) ²² ...(at) ³	270
C117	(at) ³ ...(ag) ³ ...(at) ³ ...(ta) ³ ...(tg) ¹⁶ ...(tgta) ³	270
C120	(ac) ⁹ ...(ta) ³ ...(ta) ³	304
C122	(gt) ⁷ ...(tg) ⁷	274
C126	(taa) ³	104
C136	(tc) ⁵ ...(cg) ³ ...(ct) ²⁵	361
C139	(tta) ³	136
C142	(tc) ⁴	146
C149	(ca) ⁴ ...(ac) ⁴ ...(ca) ³ ...(ca) ³ ...(cg) ³	217

Conclusions

We successfully developed microsatellite markers for *C. leydigi*, which will allow future studies on population genetics and ecology of *Camponotus* ants in Cerrado, including behavioral, dispersal and conservation investigations.

Acknowledgement



¹ Soares, H. Jr. História natural, comportamento e ecologia de *Camponotus leydigi* forel, 1886 (Hymenoptera: Formicidae) em vegetação de cerrado. 2018. Dissertação (Mestrado em Biologia Animal) - Instituto de Biologia, Universidade Estadual de Campinas, Campinas.

² Ellis, S.; Procter, D. S.; Buckham-Bonnet, P. e Robinson, E. J. H. *Insectes Soc.* **2017**, 64, 9.

³ Billotte, N.; Lagoda, P. J. L.; Risterucci, A. M. e Baurens, F. C. *Fruits*. **1999**, 54, 277.