

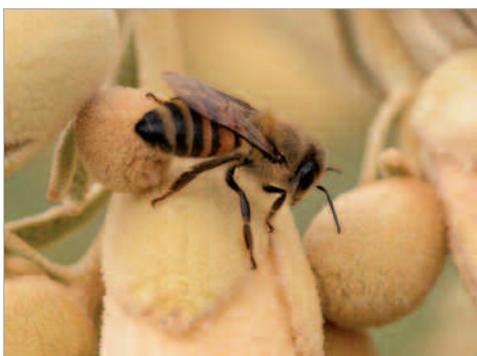
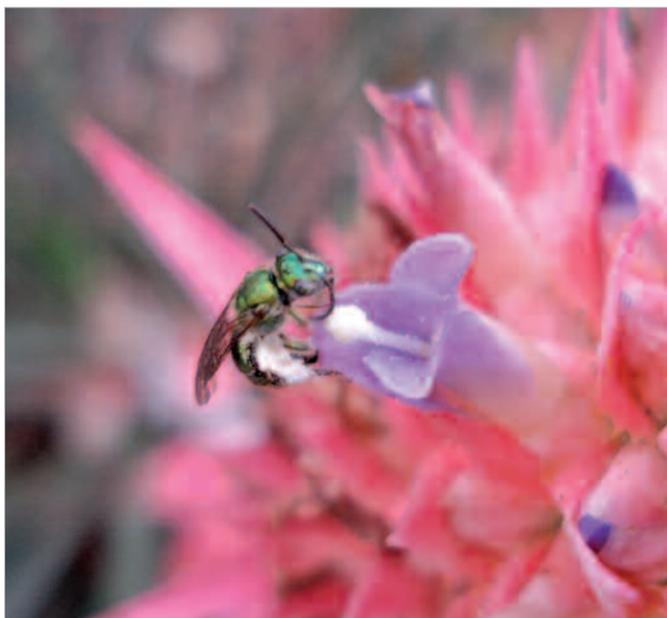
THE STUDY OF SECRETORY STRUCTURES IN PLANT SPECIES FROM BRAZILIAN CERRADO THROUGH STRUCTURAL, CHEMICAL AND ECOLOGICAL APPROACHES

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Above, *Ananas Ananassoides*, and below, *Zeyheria montana*

The plant secretory structures play essential role in the production of secondary metabolites with several functions on biological interactions. Its study might give help in the analyses of plant communities' structure, providing information on defense and attraction mechanisms on plant-animal interactions.

The current project objectives to study the different aspects of the secretion system in the cerrado native plant species belonging to Apocynaceae, Bignoniaceae, Bromeliaceae, Fabaceae, Malpighiaceae and Rubiaceae families.

The analyses of plant secretory structures are being performed by light and electron microscope. *In situ* detection of main substance categories, present in

the secretory tissues and cells, as well as histochemical, citochemical and imuno-histochemical tests, ultra structural citochemistry and biochemical analyses have been employed. The chemical profile of the secretion will be analyzed using thin-layer chromatography and gas chromatography-mass spectrometry (GC/MS). The function of the substances produced by external secretory glands, on plant-animal interactions, has been evaluated through field observations and experiments. We also look forward to contribute with important information on the economical potential of bioactive products and its sustainable utilization. In addition, our results can help to the strategies definition of conservation and management of biological diversity in the Cerrado at the Sao Paulo State, a fragmented landscape.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

The major advances obtained with the development of the project, to date, are as follows:

- i) *Tabernaemontana catharinensis* has been used as a model for ontogenesis, development, anatomy and ultra structure studies, from embryo to adult plants, with and without experimental damages;
- ii) Mellithophilous and ornithophilous species were chosen to compare the distribution, morphology, ultra structure and histochemistry of floral glands and their chemical secretion profile. Analysis of microorganisms associated to floral nectar has been performed;
- iii) Floral biology, flower morphology, nectar structure and secretion of *Ananas ananassoides* were evaluated. Nectar dynamics experiments were performed to verify the pattern of secretion during the whole anthesis;
- iv) Osmophores and floral anatomy of nocturnal pollinated legume species, canals and cavities of oil, oil-resin of *Copaifera spp.* and tannin producer structures in *Dimorphandra mollis* and *Stryphnodendron adstringens* have been studied;
- v) Floral biology, phenology and flower morphology have been evaluated. Anatomy and sub cellular structure of extra floral nectaries and sepal, petal and connective glands have been analyzed;
- vi) Populations of 21 species of Rubiaceae were identified in cerrado and semi deciduous forest for phenology and periodicity to collect material for secretion studies. Herbivory, bacteria nodules, anatomy and ultra structure have been evaluated in vegetative apex and leaves of all species;
- vii) Experimental analyses have been performed in order to verify the influence of temperature and light conditions on the development of secretory system of *Copaifera langsdorffii* (Leguminosae).
- viii) Considering that several and specific messages send by plant VOCs could be modulated by the selection through mutualisms, as well as antagonists, this sub-project aims to evaluate the VOCs composition in relation to florivores and pollinators richness and behavior. Chemical analysis of *Bauhinia rufa* VOCs will be performed by Gas Chromatography/Mass spectrometer (GC/MS);
- ix) Experiments have been designed aiming to evaluate the influence of biotic and abiotic changes, on the functioning of floral glands and consequently on the interaction with pollinators and reproductive success of cerrado species;
- x) Floral nectar secretion and nectary structure are going to be evaluated in two genera of Asteraceae, one basal and the other derived, both very common in disturbed areas of cerrado. Anatomy and ultra structure of nectary, besides field experiments on nectar secretion, and records on floral visitors, have been performed.

MAIN PUBLICATIONS

Possobom CCF, Guimarães E, Machado SR. 2010. Leaf glands act as nectaries in *Diplopterys pubipetala* (Malpighiaceae). *Plant Biology*. **12(6)**: 863-870.

Rodrigues TM, Santos DC, Machado SR. 2011. The role of the parenchyma sheath and PCD during the development of oil cavities in *Pterodon pubescens* (Leguminosae-Papilionoideae). *Comptes Rendus Biologies* (in press).

Rodrigues TM, Teixeira SP, Machado SR. 2011. The oleoresin secretory system in seedlings and adult plants of copaíba (*Copaifera langsdorffii* Desf., Leguminosae-Caesalpinioideae). *Flora* (in press).

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