

## STRUCTURE AND DEVELOPMENT OF FLOWER GALLS IN *BYRSONIMA SERICEA* (MALPIGHIACEAE) AND THEIR EFFECTS ON THE HOST PLANT METABOLISM

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### Introduction

*Byrsonima sericea* DC (Malpighiaceae) is the most representative species of the genus *Byrsonima* in the “restinga” from Rio de Janeiro state<sup>1</sup>. This species exhibits galls, which are anomalies in the development of tissues and organs in response to an inducer. Five of these galls affect its reproductive organs<sup>2</sup>. Studies on galls in reproductive structures are rare, but this species represents a notable case of super-host of floral galls in restinga<sup>3</sup>. The action of gallers on plant tissues causes not only morphological alterations but also modifications in the synthesis of secondary metabolites<sup>3</sup>. This work presents morphological, anatomical, and histochemical studies of floral galls of cecidomyiidae (Diptera; new species, with a single annual generation) in *Byrsonima sericea* and their metabolic and morphological effects on reproductive organs.

### Material and Methods

Inflorescences of *B. sericea* containing galls at different stages of development were collected for laboratory analysis. The morphological, anatomical, and metabolic effects on the galled structures were assessed through observations under a stereoscopic microscope and an optical microscope with bright field and polarized light. For anatomy and histochemistry, fresh or fixed samples were processed according to usual methods of microtomy and staining. For histochemical tests, the materials were sectioned by hand and subjected to specific reagents for detection of starch (Iugol), phenolic compounds (10% ferric chloride), lipids (Sudan IV), tannins (3% copper acetate and 10% lead acetate), reducing sugars (Fehling and Benedict), and alkaloids (Draggendorf and Mayer)<sup>4</sup>.

### Results and Discussion

The galled flower buds do not reach anthesis and suffer abscission, falling to the ground, where the larvae complete their development until the next flowering season. Observations on the external morphology allowed the identification of differences between non-galled and galled buds, such as alteration of the general shape of the bud and atrophy of all floral parts and elaiophores at all stages of development. The gall developed in the pedicel, making it elongated and curvilinear, with a greenish coloration and a central larval chamber. In the most advanced stages of development, the pedicel becomes brown, with a rough surface and high density of trichomes in the apical portion of the gall, protecting the larvae and promoting the opening of the external floral parts of the affected buds. The main anatomical differences observed were atrophy of elaiophores and petals, hypertrophy of the basal region of the bud and pedicel, near the ovary region; absence or atrophy of the stamens; absence of anthers, pollen grains, and ovules. Histochemical tests indicated changes in the metabolites gradient along the gall structure: carbohydrates and lipids towards the larval chamber, while phenols towards external tissues of the gall. Lipids were also observed in the nutritive tissue in other galls, such as one induced by *Bruggmanniella byrsonimae*<sup>3</sup> in *B. sericea*, and another in *Lantana camara* galls<sup>6</sup>.

### Conclusion

Our insights revealed that galled flower buds undergo profound changes in their floral organogenesis processes and metabolite distribution, as well as parasitic castration. The continuity of the studies will allow us to understand the induction of floral galls, their development, and changes in essential oils (future stages). Integrated analyses of such processes will contribute to the study of galls in Malpighiaceae in “restinga” environments.

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