

An uncommon feeding habit: mutillid wasps (Hymenoptera, Mutillidae) visiting extrafloral nectaries in Malpighiaceae

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(With 1 figure)

The family Mutillidae comprises a diverse group of solitary wasps, with over 4000 described species (Lelej, 2005). They are characterized by strong sexual dimorphism: all females are wingless, while males almost always are fully winged and capable of flight. Adult females are generally parasitoids of immature stages of other aculeate Hymenoptera. When inside a host nest they are known to drink hemolymph from the host larvae or prepupae. Adult males, on the other hand, generally feed on nectar. Additionally, both females and males can also collect honeydew from Hemiptera or sweet exudates from extrafloral nectaries as the main article in their diets (Brothers, 1989).

Extrafloral nectaries (EFNs) are nectar-producing plant structures that are usually not directly involved in pollination (Elias, 1983). Such structures are extremely variable anatomically and morphologically, and can be found on various above-ground plant parts, especially the leaf, petiole, pedicel and stem (Weber and Keeler, 2013). These EFNs are particularly attractive to ants (e.g. Almeida and Figueiredo, 2003), which play an important role in plant's indirect defense against herbivores (Koptur, 1992). They can also attract a variety of other nectar-foraging insects, like hymenopteran parasitoids that may attack herbivorous insects (Jervis et al., 1993).

According to Weber and Keeler (2013) EFNs are present in 3941 species of vascular plants, representing 745 genera in 108 families; yet as reported by the authors, only 1.0-1.8% of flowering plant species have EFNs. Here we present the first record of Mutillidae feeding on extrafloral nectaries in Malpighiaceae, a family of herbs, shrubs, vines and trees that comprises about 1300 species worldwide (Davis and Anderson, 2010).

In December 2013, during a field trip to the Serra da Canastra National Park, in Minas Gerais State, Brazil, we noticed the presence of a large number of hymenopterans flying near to/or feeding on EFNs of two different shrub species of Malpighiaceae, including winged males and wingless females of Mutillidae. The plants were identified as *Banisteriopsis campestris* (A.Juss.) Little, which bear a pair of EFNs at the base of the leaves (Figure 1B), and *B. vernoniifolia* (A.Juss.) B. Gates (Figure 1A), with the EFNs located at the leaf blades (Figure 1D). The observations

were conducted on plants growing on red latosol soils in a grassland area near the “Carral de Pedras” (20.224° S 46.486° W; 1400 m.a.s.l.).

Thirteen mutillid wasp specimens (ten males and three females) were collected feeding on EFNs of *Banisteriopsis*. Following their collection, these specimens were identified as four different species, comprising subfamilies Mutillinae and Sphaerophthalminae. Females were identified as *Darditilla vianai* Casal, 1968 (Figure 1E) and *Pseudomethoca* cfr. *cerasina* (Gerstaecker, 1874) (Sphaerophthalminae), and *Timulla scoparia* (Gerstaecker, 1874) (Mutillinae). Males were identified as *Traumatomutilla floccosa* (Gerstaecker, 1874) (five specimens), *Pseudomethoca* sp. (three specimens, probably the male of *P.* cfr. *cerasina*) (Sphaerophthalminae), and *T. scoparia* (two specimens) (Mutillinae) (Figure 1C). Eleven additional Hymenoptera families were collected feeding on EFNs of *Banisteriopsis*: Apidae, Bethyloidea, Braconidae, Crabronidae, Eucharitidae, Eurytomidae, Evaniidae, Ichneumonidae, Pompilidae, Pteromalidae and Torymidae. The plants were also regularly visited by workers of two species of the ant genus *Camponotus*, *C. novogranadensis* Mayr, 1870 and *Camponotus* sp.

Information on the feeding habits of adult mutillid wasps seems to be scarce in the literature. To date there are only a few records of Mutillidae visiting EFNs: in Carlinville, IL, USA, Robertson (1929) reported the presence of males of *Timulla vagans* (Fabricius, 1798) and *Sphaerophthalma* sp. in EFNs of *Chamaecrista fasciculata* (Michx.) Greene (Fabaceae), and males of *Ephuta scrupea* (Say, 1836) and *Sphaerophthalma* sp. in EFNs of *Strophostyles helvula* (L.) Elliott (Fabaceae). In Brazil, Lenko (1970) recorded females of *Traumatomutilla latevittata* (Cresson, 1902) feeding on EFNs of a *Mimosa* sp. tree (Fabaceae), in Três Lagoas, Mato Grosso do Sul State. In the Pacific coast of Central America, Quintero and Cambra (2001) observed males of *Dasymutilla araneoides* (Smith, 1862) feeding on EFNs of *Ipomoea pes-caprae* (L.) R.Br. (Convolvulaceae) and *Euphorbia hirta* L. (Euphorbiaceae).

New records of feeding habits, like those presented here, are valuable because fewer than 4% of mutillid species have any biological traits studied (Brothers, 1989).

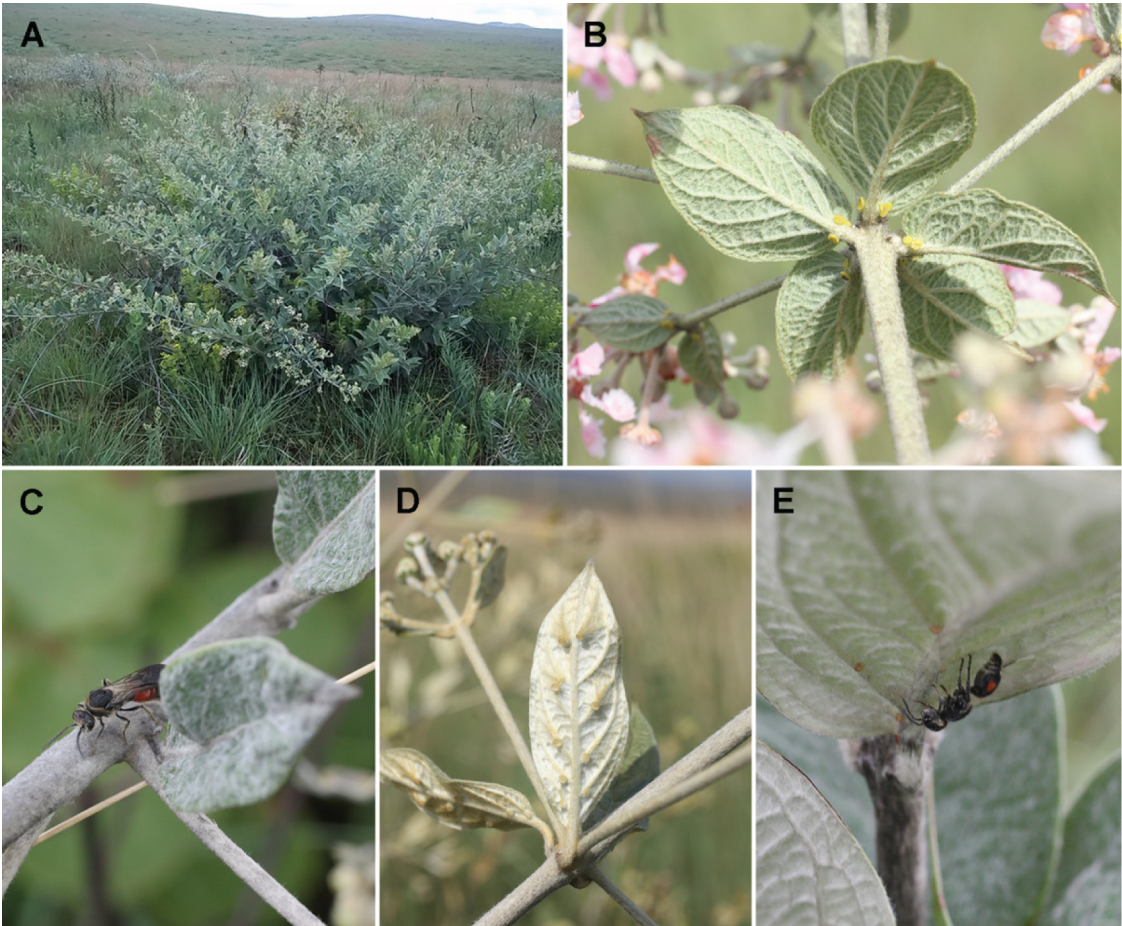


Figure 1. (A) An overview of the shrub *Banisteriopsis veroniifolia* (A.Juss.) B. Gates; (B) EFNs of *Banisteriopsis campestris* (A.Juss.) Little, located at the base of the leaves; (C) Male of *Timulla scoparia* (Gerstaecker, 1874) visiting *B. veroniifolia*; (D) EFNs located at the leaf blades of *B. veroniifolia*; (E) Female of *Darditilla vianai* Casal, 1968 visiting *B. veroniifolia*.

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