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Research note

First record of arthropods associated with *Greigia juareziana* (Bromeliaceae)

Primer registro de artrópodos asociados a *Greigia juareziana* (Bromeliaceae)

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Abstract. Here we present the first known records for Mexico and the Neotropics of arthropods associated with the terrestrial bromeliad *Greigia juareziana*. The site locality for the collection of the host species is the southeast portion of the San Martín Tuxtla volcano in the state of Veracruz, Mexico. Four species of arthropods were detected within the leaf axils and inflorescences of the bromeliad, 3 of which were insects *Anasa bellator*, *Proxis punctulatus* and *Apion* sp. belonging to the Orders of Hemiptera and Coleoptera. The remaining species was identified only to family (Myriapoda: Chilopoda: Lithobidae).

Key words: terrestrial bromeliad, coexisting arthropod fauna, Curculionidae, Hemiptera, Miriapoda, Los Tuxtlas, Veracruz.

Resumen. Presentamos los primeros registros conocidos para México y los neotrópicos de los artrópodos asociados con la bromelia terrestre *Greigia juareziana*. La localidad para la recolección de esta especie es la parte sureste del volcán San Martín Tuxtla, en el estado de Veracruz, México. Se detectaron 4 especies de artrópodos dentro de las axilas de las hojas e inflorescencias de la bromelia, 3 de los cuales fueron insectos *Anasa bellator*, *Proxies punctulatus* y *Apion* sp., pertenecientes a los órdenes Hemiptera y Coleoptera. La especie restante fue identificada sólo hasta familia (Myriapoda: Chilopoda: Lithobidae).

Palabras clave: bromelia terrestre, fauna de artrópodos coexistente, Curculionidae, Hemiptera, Miriapoda, Los Tuxtlas, Veracruz.

The family Bromeliaceae comprises over 3 000 species in 56 genera (Luther, 2006), and has undergone one of the most remarkable adaptive radiations in the plant world (Benzing, 2000). Bromeliads are well known for their morphological and ecological plasticity by having a large variety of life-forms (epiphytes, terrestrials, saxicoles), ecophysiological adaptations (C_3, CAM, tank bromeliads, atmospheric bromeliads, etc.), pollination and dispersal modes (birds, bats, insects, wind), which makes them an important component of tropical ecosystems. They are essential for the survival of many animal species, providing shelter, water, nutrients and resting or aggregation sites useful for mating (Benzing, 1990, 2000). Especially epiphytic tank bromeliads, including rosetted, overlapping wide leaves that allow water and debris accumulation, have been well documented as important for the establishment and the maintenance of high arthropod diversity in tropical forest canopies, because they contribute to the structural complexity of tree crowns, and thus potentially expand the variety of microhabitats (Stork, 1987a,b; Nadkarni and Matelson, 1989; Benzing, 1990; Nadkarni, 1994; Dejean and Olmsted, 1997; Stuntz et al., 2002).

The inventory of arthropods associated with the plant family Bromeliaceae in Mexico has been very limited. Nevertheless, a few species of bromeliads have been studied in detail and several new species of Opiliones, Hymenoptera, Coleoptera, Lepidoptera, Diptera, Odonata, Isopthera, and Hemiptera have been described, as well as some ecological aspects (Beutelspacher, 1969, 1999; Zaragoza, 1974; Brailovsky,1985; Brailovsky et al.,

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1992). For example in the state of Veracruz, Beutelspacher (1999) recognized 47 insect families belonging to 14 orders in just 1 epiphytic species, *Aechmea bracteata* (Swartz), in Los Tuxtlas, whereas Montes de Oca et al. (2007) captured 153 individuals belonging to 37 carabid beetle species in several epiphytic species on the Cofre de Perote mountain in Veracruz. However, much less is known about the role of terrestrial bromeliads serving as habitat for arthropod species in tropical forests.

The bromeliad genus *Greigia* Regel includes 36 species of large, terrestrial or saxicolous bromeliads occurring in disturbed vegetation along roadsides and trails in the understory of upper montane forests from Mexico to the tropical Andes, as well as in temperate rain forests of central and southern Chile (Luther, 2006; Will et al., 2009). Their short, globose, axillary inflorescences obscured by dense foliage mark *Greigia* species as candidates for some of the unusual pollination and seed dispersal syndromes among Bromeliaceae. Flowers range from drab, and are obscured by subtending, foliaceous bracts and adjacent foliage, to quite colourful red to pink corollas and bracts, however, to date no pollination records are available in the literature. The brownish, globose fruits are probably harvested by small, non volant mammals (Benzing, 2000). Mexico has 2 endemic taxa, *Greigia juareziana* L. B. Sm. and *G. vanhyningii* L. B. Sm., both native to Chiapas, Oaxaca and Veracruz State (Espejo-Serna et al., 2004). The former species just recently was discovered on the San Martín Tuxtla volcano as first record for Veracruz (Krömer and Acebey, 2007). Up to the present, there are no species of arthropods reported in the literature to be associated with *Greigia* and much less known are the species that may act as pollinators. For this reason, we emphasize the need to inventory the entire arthropod fauna associated with the genus *Greigia,* as well as other terrestrial bromeliads.

Greigia juareziana is a terrestrial species of limited abundance and is usually associated with heavy leaf litter on the forest floor. A group of 8 individuals were located in the southeastern portion of the slope of the volcano San Martín Tuxtla, Veracruz, Mexico (N 18° 33´27´´ - W 95° 11´25´´) at an altitude of 1 490 m in the cloud forest. This small population was found in the dense understory along with fern and palm species (Fig. 1A). On February 8, 2010, a complete specimen (± 0.80 cm in height) was collected and placed in the interior of a black

Figure 1. A. *Greigia juareziana* in natural habitat on San Martín Tuxtla volcano, Veracruz, Mexico. B. Axillary inflorescence of *Greigia juareziana.* C. *Anasa bellator* (Fabricius). D. *Proxys punctulatus* (Polisot de Beauvois). E. *Apion* sp. F. Lithobidae sp. Photographs by T. Krömer (A, B) and E. Solis-Pérez (C, F).

plastic bag and transported to the laboratory taking into account the criteria of Richardson (1999) and Stuntz et al. (2002). The specimen had several dry inflorescences located on the axillary area of the leaves (Fig. 1B), which were covered with leaf litter and other organic matter. Arthropod specimens were collected after a careful review of the plant and preserved in 70% alcohol. Four species of arthropoda were detected in the leaf axils and inflorescences of *G. juareziana*, 3 of which were insects *Anasa bellator* (Fabricius, 1787), Coreidae, *Proxis punctulatus* (Polisot de Beauvois, 1818), Pentatomidae, and *Apion* sp., Curculionidae belonging to the Orders of Hemiptera and Coleoptera, respectively. The remaining species was identified only to family (Myriapoda: Chilopoda: Lithobiomorpha: Lithobidae) (Figs. 1C-F).

The Hemiptera material was identified by using the identification keys by Brailovsky (1985) and Brailosvky et al. (1992) and in the case of the Coleoptera and Myriopoda specialists of each group were contacted. All the arthropod material collected is deposited in the invertebrate collection of the Los Tuxtlas Field Station of Tropical Biology of the Institute of Biology of the National Autonomous University of Mexico (EBTLT-IBUNAM).

Although, it is not clear at this moment if the arthropods found in the leaf axils and inflorescences of *G. juareziana* may play a role as pollinators for this plant species or whether the bromeliad is used as a refuge or as a reproductive microsite. We believe that further examination of more individuals of *G. juareziana,* as well as other species will determine important ecological aspects for terrestrial bromeliads.

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