

UNUSUAL FEEDING HABITS IN FOUR IBERIAN HETEROPTERA (HEMIPTERA)

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Abstract: Several cases of unusual feeding habits in four species of Iberian Heteroptera are presented: phytophagy by *Rhynocoris erythropus* (Reduviidae), human biting by *Geocoris phaeopterus* (Geocoridae) and necrophagy by *Naucoris maculatus* (Naucoridae) and *Patapius spinosus* (Leptopodidae). The first data of necrophagy in the family Naucoridae and probably in Leptopodidae are presented.

Key words: Hemiptera, Heteroptera, Reduviidae, Geocoridae, Leptopodidae, Naucoridae, feeding habits, phytophagy, human biting, necrophagy, Iberian Peninsula.

Hábitos inusuales de alimentación de cuatro heterópteros ibéricos (Hemiptera)

Resumen: Se documentan varios casos de formas de alimentación poco usuales en cuatro especies de heterópteros ibéricos: herbivoría en *Rhynocoris erythropus* (Reduviidae), picadura a humanos en *Geocoris phaeopterus* (Geocoridae), y necrofagia en *Naucoris maculatus* (Naucoridae) y *Patapius spinosus* (Leptopodidae). Se presentan los primeros datos de necrofagia en la familia Naucoridae y probablemente en Leptopodidae.

Palabras clave: Hemiptera, Heteroptera, Reduviidae, Geocoridae, Leptopodidae, Naucoridae, hábitos alimentarios, fitofagia, picadura a humanos, necrofagia, Península Ibérica.

Introduction

The great majority of Heteroptera families are plant-feeders (Dolling 1991; Schuh & Slater 1995), but some of them, specially the aquatic and semiaquatic groups and some of the families of Cimicomorpha, are predators of diverse arthropods, small fish and tadpoles. The family Aradidae and the subfamily Cylapinae of Miridae has a mycophagous diet.

The hematophagy has appeared independently in different groups, tribe Cleradini of Rhyparochromidae, Cimicidae, subfamily Triatominae of Reduviidae and is an occasional way of obtaining food in several species of different groups (Schaefer, 2000). This way of feeding have reached the higher degree of evolution in the family Polytectidae, all of them permanent ectoparasites of bats.

Coprophagy and necrophagy are forms of food supply used occasionally by a small number of species (Adler & Wheeler, 1984; Constant, 2007).

The question of the original feedings habits of the Hemiptera remain still unsolved (Cobben, 1979; Sweet, 1979).

Inside of groups with a well defined way of feeding some species have evolved to exploit absolutely different food sources. In this work several cases of unusual feedings habits in four iberian Heteroptera are presented.

Phytophagy of *Rhynocoris erythropus* Linnaeus, 1767

Several families of predatory Heteroptera are well known as plant feeders (Naranjo & Gibson, 1996; Coll, 1998) but the phenomenon has been studied in detail only in species associated with crops. Coll (1998) revised several aspects concerning the relationship between the predatory Heteroptera and plants.

The Reduviidae are predominantly predators but some species have a phytophagous diet, (Stoner *et al.*, 1975; Bérenger & Pluot-Sigwalt, 1997). The relationships between the assassin bugs and plants may be facultative as a way to obtain moisture (Stoner *et al.*, 1975) or may show an obligate trophic association (Bérenger & Pluot-Sigwalt, 1997). We present the observation of the feeding on a plant by an european species, *Rhynocoris erythropus*, one of the most common assassin bugs of the Iberian fauna that can be found in herbaceous vegetation and shrubs hunting on several insects, flies, beetles, bees and other Hymenoptera, that visit flowers to feed on nectar and collect pollen and nectar. Also *R. erythropus* may be observed feeding on larvae and adults of several phytophagous insects. The species overwinters at nymphal stage and may be found under stones and leaf litter preying on the insect fauna of this habitat, such as Coleoptera, Dytiscidae, Hemiptera, Zygentoma and others groups.

The inflorescences of several plants like *Verbascum*, *Asphodelus*, *Dittrichia*, and others are used by *Rhynocoris erythropus* and *R. cuspidatus* as hunting grounds to prey on the insect visiting the flowers. My friend Alejandro Castro Tovar observed *R. erythropus* in July 2009 on the Sierra of Cazorla (Jaén) piercing the closed flowers of *Verbascum* sp. (Schrophulariaceae). We do not know if the search for nectar is a regular behavior in this species similarly like occur in other Harpactorinae genera, *Zelus*, *Repitpa*, *Ricolla*, in tropical countries (Haviland, 1931), or it is an occasional phenomenon. It might be only a way to get water in the hot and dry Spanish summer.

Human biting in *Geocoris* (*Geocoris*) *phaeopterus* (Germar, 1837)

Geocoridae is a small group of Heteroptera well known as predators of little insects. The genus *Geocoris* is known as accidental biter to man (Bergevin, 1923, 1924, 1926, Myers, 1929; Schaefer, 2000) in arid regions of North Africa. We present the first observations of this behavior in Spain. Three specimens were collected in Málaga, Playa de Sacaba, June 2009, by my friend Gloria Bastazo while they were biting in her legs.

Necrophagy in *Patapius spinosus* (Rossi, 1790)

Many aspects of the biology of Leptopodidae are unknown and his feedings habits and food sources are not clarified. One species of *Leptopus* (Péricart, 1990) has been observed in France eating on Psocoptera under laboratory conditions and there are not any other records of the feeding habits of the family in the literature.

In an extensive survey carried out in central Spain (Baz *et al.*, 2010) 46 species of Heteroptera were attracted to pitfall traps baited with squid. One misplaced sample contains two specimens of *Patapius spinosus* species not recorded in the study. This record may be the first data of necrophagy (see Constant, 2007) in one species of the family Leptopodidae, although perhaps the specimens of *Patapius* fell in the trap searching for a overwintering site in the stones surrounding the trap (see Baz *et al.*, 2007 for details of disposition of the trap in the field).

The observation was made at: Madrid, Villaviciosa de Odón, 1 male and 1 female, October, 2006, 30T 419855, 4473962, 540 m, Baz *et al.* leg., pitfall trap located in a mesomediterranean Oak forest on sandy soils.

Necrophagy in *Naucoris maculatus* Fabricius, 1798

The family Naucoridae is a group of aquatic bugs of mainly tropical distribution represented worldwide by more than 400 species (Sites, 2000). Many aspects of the biology of many genera and species of the family are unknown and there are few data about their feeding habits. Hungerford (1917) stated that the family feed mainly on insects and can consume snails. Poisson (1957) mentioned different insects larvae and aquatic snails, *Limnaea* sp., *Planorbis* sp., in aquarium conditions, as food sources of *Naucoris* (*Ilyocoris*) *cimicoides* (sic) (Linnaeus, 1758) and the possibility of occasional phytophagous diet in the species. Sites (2000) gathered the scarce data about the feeding of the few species of Naucoridae of known biology. These species, mainly with a Holarctic distribution prey on dipteran larvae and may be useful in the biological control of mosquito and other haematophagous Diptera. Wade *et al.* (2004) recorded insects larvae, small crustaceans, fish and snails as prey of the family in Australia.

My friend Luis Oscar Aguado observed in Río Negro del Puente, 800 m, 29TQG2954 (region of La Carballeda, close to Sanabria, Zamora), on July 2007, the body of a newt that was being devoured by two *Dytiscus* sp. and several *Hygrobia hermanni*. The dead newt were moving slowly with beetle bites and a specimen of *Naucoris maculatus* was taking hold the corpse with its forelegs and probably was sucking the body fluids of the remains. This document (Fig. 1) may be the

first example of necrophagy in the family Naucoridae (see Constant, 2007).

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Fig. 1. *Naucoris maculatus* feeding on the corpse of a newt (Photo by Oscar Aguado).

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