

Egg parasitoids of *Podisus sculptus* distant (Heteroptera: Pentatomidae) in an *Eucalyptus* plantation in the Brazilian Amazonian Region

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Resumen: Huevos de *Podisus sculptus* Distant (Heteroptera: Pentatomidae) fueron recolectados en una alta población de larvas desfoliadoras de eucalipto, en Almerin, Estado de Pará, Brasil. Se obtuvieron seis especies de parasitoides de esos huevos: *Ooencyrtus submetallicus* Howard, *Ooencyrtus* sp.1 y sp.2 (Hymenoptera: Encyrtidae), *Telenomus persimilis* Ashmead, *Telenomus cristatus* Johnson y *Trissolcus pustulans* Johnson (Hymenoptera: Scelionidae). *T. persimilis* presentaron una mayor tasa de parasitismo en huevos de *P. sculptus*. Además, esta especie y *O. submetallicus* presentaron la mayor tasa de parasitismo de huevos de hospedero alternativo *Podisus nigrispinus* (Dallas) (Heteroptera: Pentatomidae) en laboratorio.

Key words: predator, parasitoids, biological control.

Pentatomidae predators, particularly of the genus *Podisus*, have been reported as natural enemies of many insect pests in North America (McPherson 1980). In Brazil, they have been registered in plantations of *Eucalyptus* (Zanuncio *et al.* 1994b), *Pinus* (Teixeira and Villa 1987), soybean and cotton (Grazia and Hildebrand 1987), coffee (Gravena and Lara 1982), cashew (Silva 1965), passion fruit (Costa Lima 1940), avocado (Fischer and Patel 1989) and beans (Jacomino *et al.* 1989). For this reason, species of this group are important as biological control agents of many species of defoliator caterpillars and other insects, both in natural occurrence and in programmed releases (Zanuncio *et al.* 1994a).

Species of predatory bugs of the genus *Podisus* present wide distribution and can be found in most Brazilian States such as Goiás (Zanuncio *et al.* 1991), Ceará (Silva 1965),

Mato Grosso do Sul (Jacomino *et al.* 1989), Pará (Zanuncio *et al.* 1993), Rio Grande do Sul (Gastal 1981), São Paulo (Teixeira and Villa 1987), Espírito Santo (Moraes *et al.* 1983), Rio de Janeiro (Guajará *et al.* 1993) and Minas Gerais (Zanuncio *et al.* 1994a). Grazia and Hildebrand (1987) consider that *Podisus nigrispinus* Dallas, *Podisus cloelia* Stal, *Podisus sagitta* Fab. (= *P. nigrispinus*), *Podisus thetis* Stal and *Podisus volxemi* are the most common species of this group in Brazil. Although *P. nigrispinus* and *Brontocoris tabidus* Signoret are the best known Pentatomidae predators in Brazil (Zanuncio *et al.* 1992), other species of this genus, *Podisus sculptus* Distant is found in the State of Pará, Brazil and in Costa Rica, Panama, Peru and Bolivia (Thomas 1992).

Few species of Pentatomidae predatory species have been used in biological control

programs in Brazil, mainly due to the limited knowledge of their predatory habits and biology as well as techniques of mass rearing, liberation, evaluation and management after release (Torres *et al.* 1996). Populations of these predators in the agroecosystems can be affected by factors such as prey availability (O'Neil and Stimac 1988), prey defense (Tostowaryk 1972), parasitoids and predators (Torres *et al.* 1997). Knowledge of these factors is important to estimate population tendencies and potential of these controllers (Luck *et al.* 1988).

Egg parasitoids of Pentatomidae of the Scelionidae, Encyrtidae, Trichogrammatidae and those of 13 other families (Lassale and Gauld 1993) are important agents of biological control due to their great diversity and high mortality caused to their hosts (Orr *et al.* 1986). Species of Scelionidae can affect biological control programs because they can parasitize eggs of native and introduced Pentatomidae predators and phytophagous species of this family (Orr 1988).

Johnson (1984, 1985) reported that *Trissolcus basalis* Wollaston, *Trissolcus solocis*, *Trissolcus cristatus* Johnson and *Telenomus hullei* parasitized *Podisus maculiventris* Say. Orr *et al.* (1986) mention that *T. basalis*, *Trissolcus euchisti* Asmead, *Trissolcus edessae*, *Telenomus cristatus* Johnson and *Telenomus podisi* Ashmead parasitized eggs of *P. maculiventris* in soybean fields in the United States. Torres *et al.* (1996) indicated the occurrence of *T. podisi*, *Trissolcus brochymenae* Ashmead, *Ooencyrtus* sp., *Anastatus* spp. and *Trissolcus scuticarinatus* in eggs of *P. nigrispinus* collected in plantations of *Eucalyptus cloeziana* in the State of Minas Gerais, Brazil and Barcelos *et al.* (1994) found eggs of *B. tabidus* parasitized by *T. cristatus* and *T. brochymenae*.

Considering that egg parasitoids can have a great impact on populations of Pentatomidae predators the objective of this research was to identify egg parasitoids of *P. sculptus* collected in the County of Almerim, State of Pará, Brazil in an outbreak of the *Eucalyptus* defoliator species *Thyrintina arnobia* Stoll (Lepidoptera: Geometridae), *Sarsina violascens* Herrich-

Schaeffer (Lepidoptera: Lymantridae) and *Nystalea nyseus* Cramer (Lepidoptera: Notodontidae).

Egg masses of *P. sculptus* were collected in plants of *Eucalyptus urophylla* and transported to the Laboratory of Entomology, of the "Universidade Federal de Viçosa (UFV)", in Viçosa, State of Minas Gerais, Brazil. These egg masses were individualized in Petri dishes (9.0 cm diameter and 1.5 cm height) at a temperature of 25.0 ± 1.0 °C, relative humidity of $60.0 \pm 10.0\%$ and a photoperiod of 12 hours where they were observed twice a day to check for nymph hatching and emergence of egg parasitoids. All nymphs of *P. sculptus* were removed and the remaining predator eggs were placed in glass tubes with honey and capped with cotton, to evaluate the rate of parasitism.

Six parasitoid species were obtained from egg masses of *P. sculptus*: *Ooencyrtus submetallicus* Howard, *Ooencyrtus* sp.1 and *Ooencyrtus* sp.2 (Hymenoptera: Encyrtidae), and *T. cristatus*, *Trissolcus pustulans* (Johnson) and *Telenomus persimilis* Ashmead (Hymenoptera: Scelionidae). The last species presented the highest parasitism rate in eggs of *P. sculptus* and has also been reported as *T. podisi* (Johnson 1984).

T. persimilis and another species, *O. submetallicus*, showed higher parasitism rate of eggs of the alternative host *P. nigrispinus*, in laboratory, while the other species did not present good development in this host. This suggests that *T. persimilis* and *O. submetallicus* can have a larger impact on populations of Pentatomidae predatory species, because they are not specific. This could allow them to maintain their populations in *Eucalyptus* plantations when the host *P. sculptus* is at low population numbers.

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