SCIENTIFIC NOTE

Unusual Oviposition Behavior by a Seed Feeding Bug (Heteroptera: Rhopalidae)

ANTÔNIO R. PANIZZI[1], EDSON HIROSE[2] AND VIVIANE R. CHOCOROSQUI[2]

[1]*Embrapa, Centro Nacional de Pesquisa de Soja, C. postal 231, 86001-970, Londrina, PR*
[2] *Depto. Zoologia, Universidade Federal do Paraná, C. postal 19020, 81531-990, Curitiba, PR*

Comportamento de Oviposição Incomum por um Percevejo Sugador de Sementes (Heteroptera: Rhopalidae)

RESUMO - O percevejo *Jadera choprai* Göllner-Scheiding (Heteroptera: Rhopalidae) alimenta-se de sementes maduras de *Cardiospermum halicacabum* (L.) (Sapindaceae) caídas no solo. Observações em laboratório indicaram que a fêmea cava com as pernas dianteiras um buraco no solo solto com cerca de 0,5 cm de profundidade, oviposita e depois cobre os ovos com as partículas do solo. Em condições artificiais, as fêmeas enterraram os ovos em mais de 60% das oviposições e as ninfas foram capazes de eclodir e chegar até a superfície a partir de profundidades de até 4 cm. Esse comportamento de oviposição é considerado raro entre os percevejos sugadores de sementes que, em geral, ovipositam sobre as plantas hospedeiras.

PALAVRAS-CHAVE: Insecta, *Jadera choprai*, ovo.

ABSTRACT - *Jadera choprai* Göllner-Scheiding (Heteroptera: Rhopalidae) feeds on the ground on mature seeds of *Cardiospermum halicacabum* (L.) (Sapindaceae). Laboratory observations indicated that females dug a hole of ca. 0.5 cm in the the soil with the forelegs, laid eggs, and covered them with lose soil. In artificial conditions, females buried the eggs in over 60 % of the ovipositions, and nymphs were able to reach the soil surface from eggs buried 4 cm. This oviposition behavior is rare among seed suckers heteropterans, that usually oviposit on host plants.

KEY WORDS: Insecta, *Jadera choprai*, egg.

There are several patterns of oviposition behavior among the seed-sucking heteropterans. For those species that lay eggs in masses, as in pentatomids, eggs are laid in a variable (two to eight) number of rows per mass (Javahery 1994). Other species, such as lygaeids, may lay eggs in batches or singly in crevices in the soil, or along leaf veins (Sweet 2000).

Species of heteropterans that feed on mature seeds include the scentless plant bugs (Rhopalidae), a group of bugs considered of minor economic importance (Schaefer & Kotulski 2000).

In Brazil, there are at least two species of rhopalids within the genus *Jadera* (Silva *et al*. 1968) and their biology are practically unknown. In general, they are associated with plants of the family Sapindaceae (order Sapindales) (Carroll & Loye 1987), which include trees and vines, some of them important weeds in row crops (Kremer & Spencer 1989, Lorenzi 2000).

Among the sapindaceous weeds, the balloon vine *Cardiospermum halicacabum* (L.) is commonly found in soybean [*Glycine max* (L.) Merrill] fields in southern Brazil (A. Brighenti, pers. comm.). During February-March 2001, nymphs and adults of *Jadera choprai* Göllner-Scheiding were observed at the Embrapa (Empresa Brasileira de Pesquisa Agropecuária) Farm in Londrina Co., northern Paraná State of Brazil, associated with the balloon vine. In general, bugs were found on the soil, in copula. Because they were observed to oviposite on the ground, pairs were taken to the laboratory, and their oviposition behavior observed. Since females will bury the eggs, the ability of nymphs to emerge and reach the soil surface from eggs located in different depths, was also observed.

In the first study, the preferred site for egg deposition by females in the laboratory was tested. For each treatment, three pairs of *J. choprai* were used and each set placed in a plastic box (12 x 12 x 3.8 cm) containing a plastic lid with dry sand, a lid with mature seeds of balloon vine, and a lid with wet cotton. From February 6 to 27, 2001, daily observations were made, and the number of eggs laid in one of the four sites were recorded: eggs buried in the sand; eggs laid on the sand; eggs laid in between mature seeds; and eggs laid on the filter paper. The boxes were placed at random in an environmental chamber maintained at 25 ± 1°C and 65 ± 5% RH with a photoperiod of 14:10 (L:D). Each treatment was replicated four times. The mean number of eggs and the mean percentage of eggs laid in each site was calculated, and the means compared using the Tukey test ($P<0.05$).

In a second study, the ability of nymphs to emerge and reach the soil surface from eggs placed in different soil depths was determined. Each group of 10 eggs were selected and put in petri dishes (9 x 1.5 cm) lined with filter paper and containing a plastic lid with dry sand. The following treatments (four replications) were set as: eggs buried at 0.5 cm; eggs buried at 1 cm; eggs put on the sand; and eggs placed on the filter paper. The dishes were placed in the environmental chamber and the number of hatched nymphs recorded. The mean number of nymphs and the mean percentage of nymphs hatched were calculated, and compared using the Tukey test ($P<0.05$).

Females *J. choprai* preferably buried the eggs, with over 60% of the eggs being laid in the sand. Less than 20% of the eggs were laid on the sand, on the filter paper or in between the balloon vine seeds (Fig. 1). The ovipositon behavior consisted of females digging a small hole (ca. 0.5 cm deep) using the forelegs in fast longitudinal movements. With the body bending in an angle of ca. 30° in relation to the soil surface, each egg was dropped in intervals of ca. 2 min. The number of eggs laid in each occasion varied from 1 to 31, with a mean of 12 eggs/hole. After oviposition was completed, females covered the eggs with movements of fore and median legs. In several occasions, mate guardian behavior was observed with males turning to copulate with the females as oviposition was completed. Similar behavior was formerly described for another species of rhopalid, *J. haematoloma* Herrich-Schaeffer by Carroll (1988) in the United States.

Emergence of nymphs, from eggs buried in the sand (0.5 to 1.0 cm), or laid on the sand or on the filter paper, occurred in ca. 90% of the cases (Fig. 2). Therefore, at least in the laboratory, exposed eggs were not dehydrated, which may happen in natural conditions. Also, hiding the eggs in the soil may increase their survivorship by avoiding the attack of natural enemies.

Additional laboratory observations carried with eggs placed in glass tubes (10 cm length x 1.5 cm diameter), and buried 4 cm, indicated that nymphs were able to emerge and reach the soil surface. This suggests that in nature, nymphs may survive even when extra soil is dumped over the eggs, as it may happen with soil carried by rain water or wind.

In conclusion, *J. choprai* shows an unusual oviposition behavior by burying the eggs, and nymphs are able to emerge from the soil, even when extra soil is deposited over the eggs.

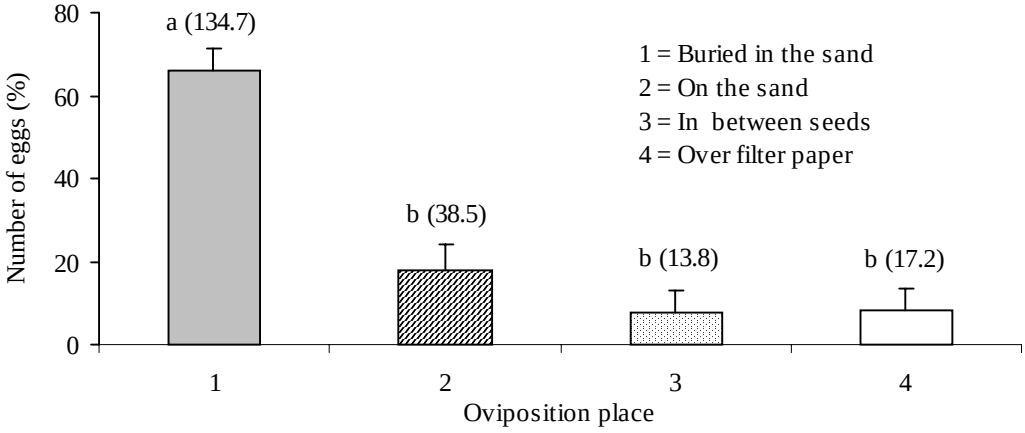

Figure. 1. Place of egg deposition by female *J. choprai* in the laboratory. Temperature 25 ± 1°C, RH 65 ± 5% RH, photoperiod 14hL. Mean percentages followed by the same letter do not differ significantly using Tukey test ($P<0.05$). Mean number of eggs in parentheses.

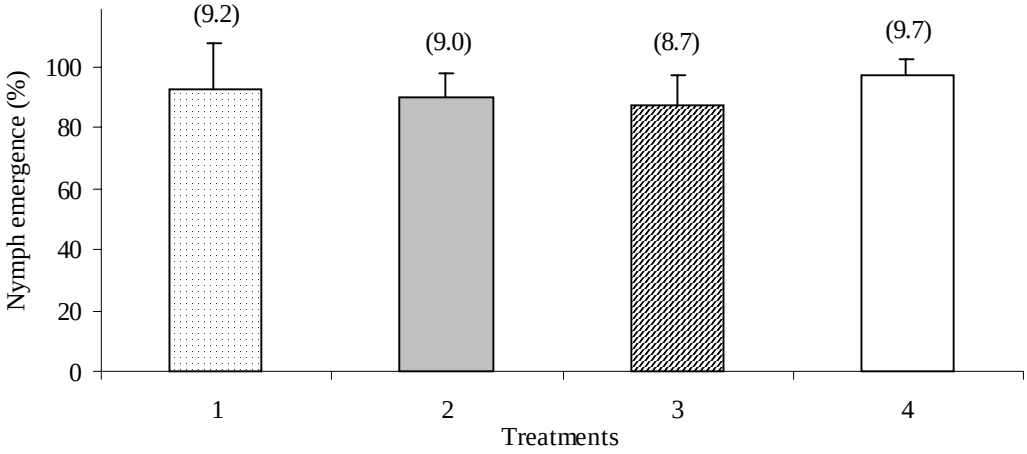

Figure. 2. Mean percentages of the number of nymphs of *J. choprai* emerged from eggs laid in or on the sand or on the filter paper in the laboratory. Temperature 25 ± 1°C, RH 65 ± 5% RH, photoperiod 14hL. Treatments: 1 = eggs buried at 0.5 cm; 2 = eggs buried at 1.0 cm; 3 = eggs placed on the sand; and 4 = eggs placed on the filter paper. Mean number of nymphs in parentheses.

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