SCIENTIFIC NOTE

Possible Egg Positioning and Gluing Behavior by Ovipositing Southern Green Stink Bug, *Nezara viridula* (L.) (Heteroptera: Pentatomidae)

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Possível Comportamento de Posicionamento e Aglutinação dos Ovos pelo Percevejo Verde, *Nezara viridula* (L.) (Heteroptera: Pentatomidae)

RESUMO - De março de 2002 a janeiro de 2004 foi mantida uma colônia do percevejo verde, *Nezara viridula* (L.), em laboratório. Durante esse período observou-se o comportamento de oviposição. Após o ovo ser expelido, a fêmea encosta a massa de ovos com a face dorsal do último tarsômero. Esse movimento feito com uma das pernas do último par foi observado uma única vez, logo após a deposição do ovo. Trata-se de um detalhe do comportamento no processo de oviposição pouco conhecido dessa espécie de pentatomídeo ainda não totalmente elucidado; especula-se que auxilie no posicionamento e aglutinação dos ovos uns aos outros.

PALAVRAS-CHAVE: Insecta, comportamento de oviposição, massa de ovos, tarsômero

ABSTRACT – From March 2002 to January 2004, a colony of southern green stink bug, *Nezara viridula* (L.), was kept in the laboratory, and its oviposition behavior was observed. During oviposition, soon after the egg is expelled, the female touches the egg mass with the dorsal surface of the last tarsomere; this movement of one leg of the hind pair occurred once. This small component of the oviposition behavior of this pentatomid is little known and not yet fully understood; it may help to position and glue the newly deposited egg to the others.

KEY WORDS: Insecta, oviposition behavior, egg mass, tarsomere

Southern green stink bug, *Nezara viridula* (L.), lays eggs in hexagonal-shaped masses, as do most stink bugs (Kiritani & Hokyo 1965, Javahery 1994). The number of eggs is variable (usually about 80 eggs/mass), and eggs are laid mostly on the lower surface of leaves of their host plants (Rizzo 1976). Bugs also oviposit on artificial substrates, such as plastic structures which mimic soybean leaflets, exactly in the same way as they do on natural leaflets, by laying eggs on the lower (abaxial) surface (Panizzi *et al.* 2000).

Several aspects related to oviposition of *N. viridula* have been investigated. For example, Kiritani (1963) reported on egg mass size variation and intervals between successive ovipositions. Lockwood & Story (1986) studied embryo orientation and its relationship with the glue that holds the egg mass together. Moreira & Becker (1986) proposed a method to determine the number of eggs/mass and the position of each egg in the mass. McLain & Mallard (1991) studied egg size variation and its consequence for the insect's life history, and noted that females use their hind tarsi and abdomen to feel the location of other eggs before continuing deposition. This detail in the oviposition process of *N. viridula* was further studied and is described and illustrated here.

From March 2002 to January 2004, a colony of *N. viridula* was kept in the laboratory at the National Center for Agricultural Utilization Research (USDA/ARS) in Peoria, Illinois. During this period several tests were conducted to verify the effect of soybean [*Glycine* max (L.) Merrill] plant extracts on the oviposition behavior of the bug on artificial substrate (cheese cloth stretched tightly over embroidery wooden rings) (Panizzi *et al.* 2004). During the performance of these bioassays, the egg laying behavior of *N. viridula* females on the artificial substrate was observed.

During oviposition, soon after the egg is expelled, the female touches the egg mass with the last tarsomere. As she moves the leg, the tarsomere folds and the dorsal surface that will touch the egg is exposed. This movement occurs once, using one leg, each time an egg is deposited (Fig. 1). For the next egg, the female slightly moves the tip of the abdomen to the side, and the process starts again, with the inflation of the genital plaques (gonocoxites and

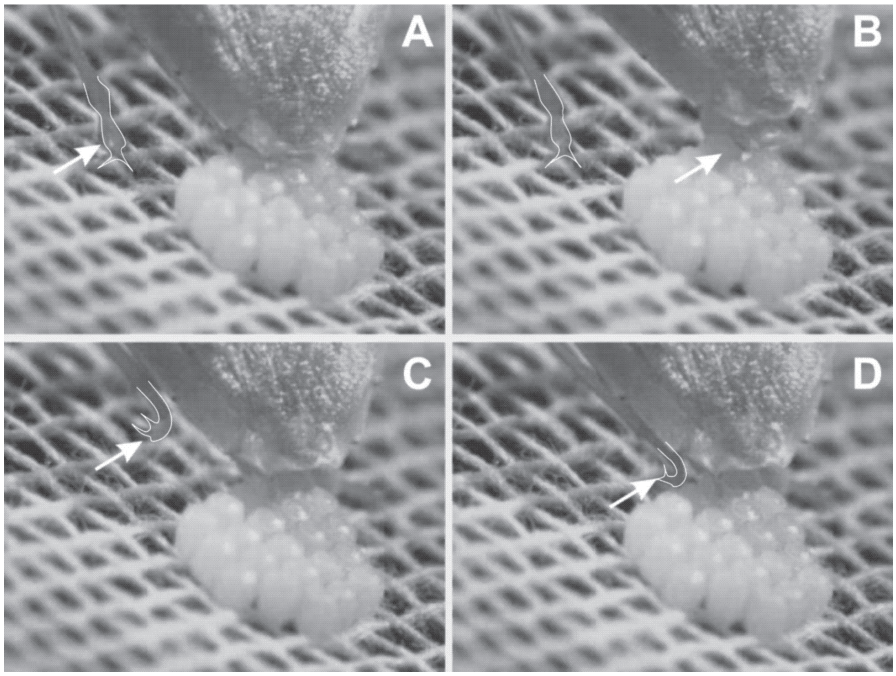

Figure 1. Female *N. viridula* ovipositing on an artificial substrate (cheese cloth). A = female preparing to oviposit – arrow indicates the position of the tarsi of the hind leg; B = female moves the tip of the abdomen to the correct position and egg is expelled and allocated to the right place, next to the previous egg – arrow indicates the expelled egg; C = female moves the hind leg, and prepares the tarsi to touch the egg mass – arrow indicates the last tarsomere plus claws folded at a right angle to the rest of the leg; and D = female touches the egg mass with the dorsal surface of the last tarsomere. White lines were used to highlight the tarsi/claws.

gonapophyses 8), followed by expulsion of the egg and movement of one leg of the last pair, which touches the egg mass as described above. This event was observed for five ovipositing females.

Additional observations on egg deposition were conducted, this time of females laying eggs on soybean leaflets, at the rearing facility of the Centro Nacional de Pesquisa de Soja of Embrapa, in Londrina, Paraná State, in November 2004. Again, females oviposited on soybean leaflets in the same way they had on the cheesecloth (three different females observed depositing one egg mass each). This oviposition behavior of *N. viridula* is speculated to help to position and glue the eggs one to the other and to the substrate, soon after they are expelled.

A final study was conducted to check the function of egg touching with the tarsomeres by females. Left and/or right legs of the last pair of females were removed and their oviposition behavior observed. The disposition of the eggs in the egg mass was, in general, not affected, although in some cases the eggs were found not in the normal (vertical) position in packed masses, but scattered; females whose legs had been removed moved less and laid fewer egg masses than did control (untouched) females. Clearly, additional studies are needed to clarify this behavior fully.

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