# Predation of Eggs of Lincus lobuliger Breddin (Hemiptera: Pentatomidae) on Coconut Trees by Hololepta (Leionota) Quadridentada (Olivier) (Coleoptera: Histeridae)

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# Predation of eggs of *Lincus lobuliger* Breddin (Hemiptera: Pentatomidae) on coconut trees by *Hololepta* (*Leionota*) *quadridentada* (Olivier) (Coleoptera: Histeridae)

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In Brazil, hartrot of coconut was first described in the state of Bahia in 1982 (Bezerra & Figueiredo 1982). In 1987, yield losses from 26.5 to 34% caused by this disease were recorded in coconut plantations in the state of Pernambuco (Mariano et al. 1990). Outbreaks of hartrot also have been reported in the states of Alagoas, Sergipe, Paraíba and Mato Grosso (Souza 2005). The disease usually attacks productive coconut trees, and depending on the vector population, dissemination is rapid, resulting in an almost complete elimination of the plantation. The pathogenic microorganism *Phytomonas staheli* McGhee & McGhee (Protozoa: Trypanosomatidae) is associated with hartrot of coconut (Parthasarathy et al. 1976).

*Lincus lobuliger* Breddin (Hemiptera: Pentatomidae: Discocephalinae), which occurs only in northeastern Brazil, is one of the most threatening pests of palm trees because it is capable of transmitting trypanosomatids of the genus *Phytomonas* (Fig. 1) (Rolston 1983; Resende et al. 1986; Panizzi et al. 2000; Sgrillo et al. 2005; Campos & Grazia 2006). The stink bug *L. lobuliger*, one of 35 members of the genus, is a black pentatomid approximately 9.4 to 12.0 mm in length. The adults dwell in the petiole axils of coconut leaves, where they feed on the sap (Moura & Rezende 1995; Panizzi et al. 2000).

Overall, species of *Lincus* are photophobic, and hide in well-sheltered areas at the base of the leaf rachis. Their dispersal probably occurs by nocturnal flights and by walking and climbing along the trunk (Couturier & Kahn 1989; Llosa et al. 1990; Dollet 2016). In a coconut plantation, a visual inspection of the fronds or stems is not adequate to locate *Lincus* spp. It is only by gently pulling down the rachis of a lower frond that these insects are found hiding in a very humid environment with large amounts of plant debris, notably the remnants of male flower bracts (Dollet 2016).

Thus, in an attempt to rear *L. lobuliger* in the laboratory for biological and control studies, insects were collected from cv 'Green Dwarf' of Jiqui coconut trees, in a rural area of Valença (13.2850°S, 39.2550°W to 13.2950°S, 39.2650°W) in southern Bahia. In short, coconut trees showing hartrot symptoms were identified and cut at the stem base. Thereafter, the leaves were removed and the axils and organic matter contained in the leaf sheaths were examined for insects.

During a first visit to collect *Lincus* spp. in Nov 2015, several specimens were found. In contrast, in a subsequent visit in Jul 2016, fewer stink bugs were found. It is noteworthy that during later sampling there was the frequent presence of adults of a clown beetle, which were collected and identified as the predator *Hololepta* (*Leionata*) *quadridentada* (Olivier) (Coleoptera: Histeridae). The collected beetles were

**Fig. 1.** Adult of *Lincus lobuliger* (Breddin, 1908) (Hemiptera: Pentatomidae: Discocephalinae) found in Valença, southern Bahia State, Brazil. Photo by Henri Pierre Aberlenc.

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placed in the same container as the eggs, nymphs, and adults of the stink bug. At the end of the day, *Lincus* eggs were observed on the mouthparts of the histerid beetles.

To confirm the observed predation behavior in the laboratory, the 4 beetles were placed in a Petri dish (60 × 15 mm) with 2 stink bug egg clusters (with 8 and 10 eggs each), and *H. quadridentada* feeding on *L. lobuliger* eggs was recorded. A further visit was conducted in Nov 2016, and a very small number of *L. lobuliger* was observed, but the presence of *H. quadridentada* on almost all of the 11 felled coconut trees was noted.

*Hololepta quadridentada* has been reported on avian farms as a natural enemy of arthropods that develop on poultry litter (Gianizella & Prado 1998; Lopes et al. 2006). In agricultural settings, this beetle has been reported as a natural predator of *Cosmopolites sordidus* (Germar) (Coleoptera: Curculionidae) and *Scyphophorus acupunctatus* Gyllenhal (Coleoptera: Curculionidae), which are pests of banana and agave cactus, respectively (Mesquita 2003; Velázquez et al. 2006).

In spite of the broad geographic distribution of the species (South and Central America) (Mazur 2011), and having been reported as economically relevant, the recognition of the taxon is currently difficult. *Hololepta quadridentada* can be distinguished from other Neotropical species of the genus by a more convex-shaped body, without frontal striae; the pronotum is regularly curved on the sides, without coarse punctures, and with lateral striae along all lateral edges; the elytra with the first dorsal stria abbreviated and the second dorsal stria complete; the inferior carina of the medium and posterior tibiae possess teeth; the pygidium possesses deep and dense punctuation. Also, males have a deep hole on the anterior angles of the pronotum (Fig. 2).

Due to the transmission of hartrot, the damage inflicted by *L. lobuliger* on coconut palms in northeastern Brazil is severe. Regarding the biological control of *L. lobuliger*, little is known about its natural enemies. An egg parasitoid complex was mentioned by Moura & Resende (1995), but no data are available on its impact on *L. lobuliger* populations. The presence of a protozoan morphologically similar to *P. staheli* in the digestive tract of *Arilus* sp. (Heteroptera: Reduviidae) captured in the field was observed by Meneguetti & Trevisan (2010), who suggested that it might be possible to control *Lincus* sp. biologically by the introduction of these reduviid predators.

Here, we report for the first time *H. quadridentada* preying on eggs of *L. lobuliger*, suggesting that this histerid contributes to the natural biological control of this vector. In addition, our results may contribute to the development of biologically sound control strategies against *L. lobuliger* or other *Lincus* species. Further research should focus on the efficiency of *H. quadridentada* as predator of *Lincus* spp. eggs, as well as on the natural enemy complex associated with this pest.

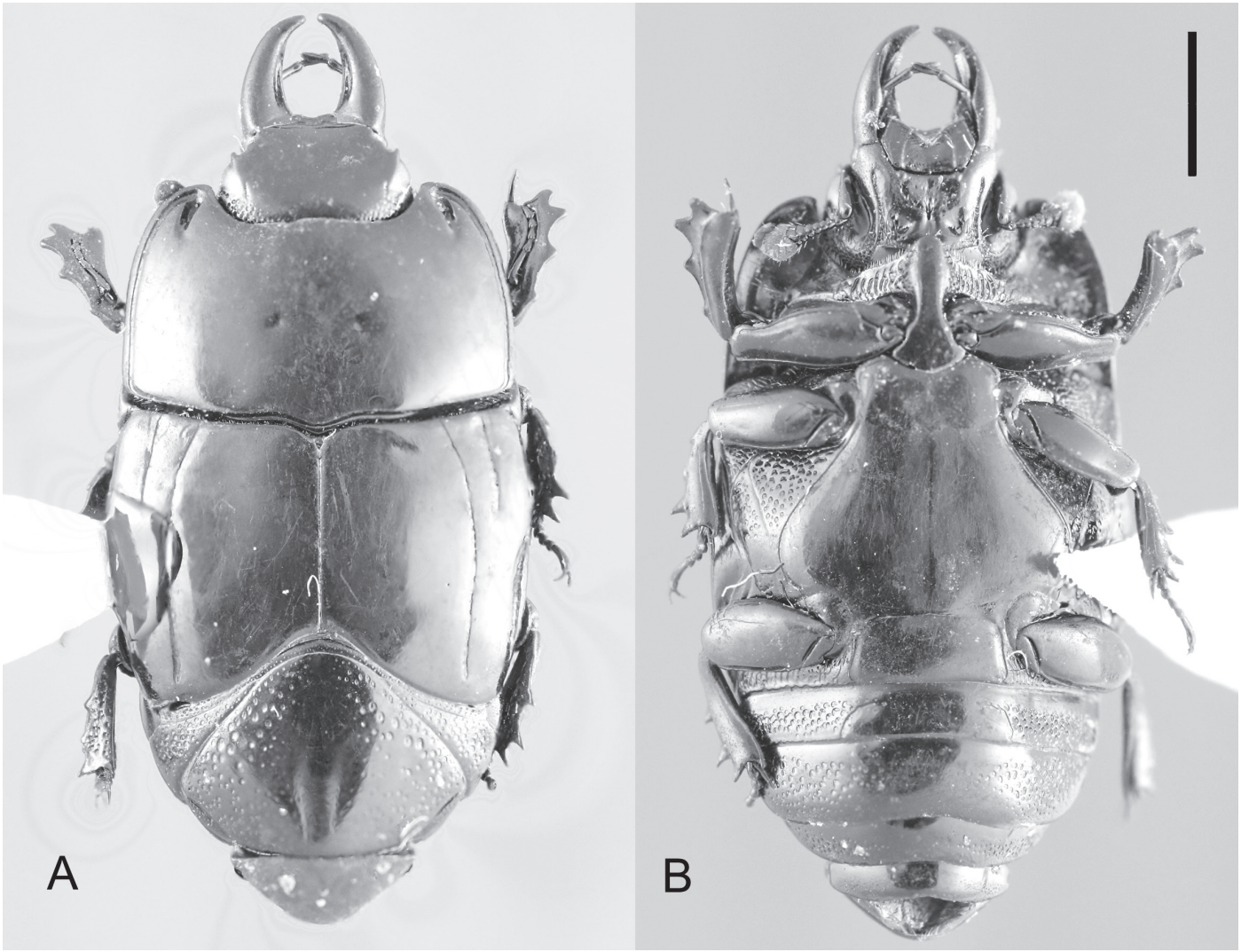


**Fig. 2.** Male of *Hololepta* (*Leionata*) *quadridentada* (Olivier, 1789): (A) dorsal view; (B) ventral view. Scale: 2 mm. Photo by Fernando Willyan Trevisan Leivas.

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## Summary

Coconut trees of the cv. Green Dwarf of Jiqui in Bahia, northeastern Brazil, that displayed hartrot symptoms were cut and inspected for the presence of insect vectors in the leaf axils. Eggs, nymphs and adults of *Lincus lobuliger* Breddin (Hemiptera: Pentatomidae), vector of the protozoan causing hartrot, were collected together with an abundance of adults of the predatory beetle *Hololepta* (*Leionata*) *quadridentada* (Olivier) (Coleoptera: Histeridae). In the field, both were placed in a plastic container for transport, and the predation of *L. lobuliger* eggs by the histerid was observed. The predation was subsequently confirmed under controlled laboratory conditions. Here, we report for the first time *H. quadridentada* preying on *L. lobuliger* eggs, suggesting that the histerid contributes to the natural biological control of this vector. Moreover, our results could contribute to the development of biologically sound control strategies against *L. lobuliger* or other *Lincus* species.

Key Words: *Cocos nucifera*; phytomonas; hartrot, insect vector; predator

## Sumario

Plántulas de cocotero de la variedad enano verde de Jequi ubicados en el estado de Bahía, Nordeste de Brasil, que presentaban síntomas del hartrot, fueron cortados y inspeccionados en cuanto a la presencia de insectos en las axilas de las hojas. Huevos, ninfas y adultos de *Lincus lobuliger* Breddin, 1908 (Hemiptera: Pentatomidae), vector del protozoario del hartrot, fueron colectados en asociación con una grande abundancia de adultos de lo escarabajo depredador *Hololepta* (*Leionata*) *quadridentada* (Olivier, 1789) (Coleoptera: Histeridae). En campo, estos fueron acomodados en un recipiente plástico para transporte, siendo observada la predación de huevos de *L. lobuliger* por el histerídeo. Posteriormente, la predación fue confirmada en condiciones controladas de laboratorio. Este es el primer relato de *H. quadridentada* depredando huevos de *L. lobuliger*, sugiriendo que el histerídeo contribuye para el control biológico natural de este vector. Además, este conocimiento podría contribuir al desarrollo de estrategias ecológicas de control de *L. lobuliger* y otras especies de *Lincus*.

Palabras Clave: *Cocos nucifera*, fitomonas, hartrot, insecto vector, predador

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