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Aspects of the color evolution after the imaginal molt of *Pachycoris torridus* (Scopoli, 1772) (Hemiptera: Scutelleridae)

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Scientific Note

The species *Pachycoris torridus* (Scopoli, 1772) is popularly known as "stink bug of physic nut", due to their attacks to culture of physic nut (*Jatropha curcas* Linnaeus) (Silva et al., 1968). However, this is not the only plant where these stink bug were found, for be polyphagous and consequently pest of various agricultural crops, like rice, orange, cassava, mango, among others (Silva et al., 1968). In Brazil, this species has been reported in 15 different states (Souza-Firmino et al., 2015). For presenting variations in patterns of colors and stains from their body, has already been described eight times as new species (Lima, 1940). The correct specific identification is essential for success in programs of biological control and therefore the knowledge of intraspecific variation is fundamental in this identification (Morales and Freitas, 2010). In this context, this work was conducted with the objective to contribute with details on the evolution of coloration of *P. torridus* after the imaginal molt and avoid that new taxonomic errors occur.

Adults, nymphs and eggs of *P. torridus* was colected in physic nut in the city of São José do Rio Preto-SP (20°46'48.2"S, 49° 21'18.3"W) in the period June to November 2014. With a total of 200 insects analyzed. The nymphs were separated from adults in glass box (35×25×25 cm), containing leaves and fruits of physic nut and acerola, which were covered with fabric screen to avoid insects output (Figure 1a).

The insects were analyzed daily. The changes of instars were detected to be noted the exuviae, and by himself growth of nymphs. For the analysis of the evolution of the coloring of *P. torridus* after the imaginal molt (after the 5th instar) the specimens were individualized in plastic pots of 80 ml, containing leaves and fruits of pysic nut and acerola (Figure 1b). Colour evolution was monitored and registered after the imaginal molt, which can be observed in Figure 2.

As described by Gabriel and Franco (2012), our analysis confirmed that all adults, after the last ecdysis, present the yellow color to the emerge, but we verified, for the first time, that this color is transitory and the color evolution is gradual. When emerge as adult, *P. torridus* presents the yellow color (head, chest, abdomen and legs) (Figure 2a). First develops the pattern of spots, in a gradual onset, of the pronotum to the scutellum (Figure 2c). After 12 hours begins to evolution of the permanent coloration, both of the spots as the carapace, also in a gradual manner, of the pronotum to the scutellum (Figure 2g). After 24 hours of the last ecdysis, the bug already presents its permanent adult form (Figure 2h).

In 2012, Gabriel and Franco in a study about the morphological aspects of *P. torridus* observed that the color of the spots of the descendants may differ or not of the color of the female that they were born, and in the same oviposition can be born descendants of different colors. Furthermore, the authors describe that all adults, to emerge, showed yellow color and, in the course of time, have become orange, red or remained with the origin color.

The chromatic variations can interfere in evolutionary ecology of these different phenotypes, and may intervene in their fitness. Moreover, the polymorphism may influence the communication between the sexes and, therefore, on the probability of mating within different phenotypes (Joron et al., 1999). However, some insects are unpalatable to predators and often use warning colors like orange, red and yellow to advertise them (Ruxton et al., 2004). Many predators know to associate the presence of chemical defense with visual signals, and polymorphism may perform this role to avoid predators (Joron et al., 1999). The presence of chemical defenses in *P. torridus* has not been studied but it is possible that it get toxic compounds during feeding in pysic nut, thus as occurs with other species of the same genus (Williams et al., 2001).

Therefore, we recorded that the color evolution in the species *P. torridus* is gradual and we suggest that possibly the mechanism responsible for high polymorphism in the species may be a aposematic behavior. But we highlight, that further analysis should be conducted to test the

Figure 1. (a) Glass box for accommodation of insects; (b) Plastic pot for monitoring the color evolution after the imago molt.

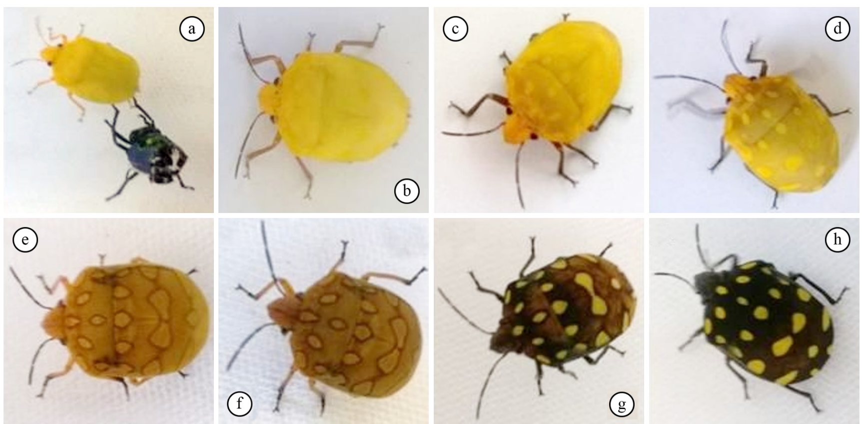

Figure 2. Colour evolution in *P. torridus*: hours after the last ecdysis. (a) newly emerged imago; (b) one; (c) three; (d) five; (e) seven; (f) nine; (g) twelve; (h) twenty-four.

hypothesis. In addition, we draw attention to the need for multidisciplinary studies to the description of new species with intraspecific chromatic variation to prevent new taxonomic error.

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