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## Oviposition of *Quesada gigas* in weed no hostess: implication in pest management

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**ABSTRACT:** This study recorded the choice of dry plant of *Conyza* spp as oviposition site by cicada *Quesada gigas* (Olivier, 1790). We presented issues of natural history of the cicadas that indicate the inability of immatures to complete life cycle in this species of plant. Some implications on cultures where *Q. gigas* has economic importance are also discussed.

**Key words:** *paricá*, *coffee*, *buva*, *bioecology*, *control*.

## Oviposição de *Quesada gigas* em planta daninha não hospedeira: implicação no manejo de pragas

**RESUMO:** Registra-se a escolha de plantas secas de *Conyza* spp como local de oviposição pela cigarra *Quesada gigas* (Olivier, 1790). São apresentadas questões da história natural das cigarras que indicam a impossibilidade dos imaturos completarem seu ciclo de vida nessa espécie vegetal. São discutidas algumas implicações no manejo de culturas onde *Q. gigas* possui importância econômica.

**Palavras-chave:** *paricá*, *café*, *buva*, *bioecologia*, *controle*.

In agricultural pest management, the environmental handling is one of the main ways to avoid or reduce the attack of insects. For this to be effective, it is necessary to know biological, ecological and behavioral aspects of pest species in question, as well as understand the environmental factors that favor its development (ALTIERI et al., 2003).

Cicadas are hemimetabolous insects in which female lays eggs on aerial part of plants. When eggs hatch, nymphs fall to the ground where initiate the construction of a single underground gallery. Inside this gallery, the nymph will remain until the moment they come to surface where the emergence of adult occur. Newly hatched nymphs measure a few millimeters (MACCAGNAN & MARTINELLI, 2004) and soon after hatching are subject to die by drying or predation (MORIYAMA & NUMATA, 2006). To be protected, they tend to penetrate into the soil as soon as possible and, therefore, are not able in dispersing. Thus, the choice where the females

lay their eggs is crucial to the success of nymphs development (YANG, 2006). In general, the nymphal period of development is semivoltine (LOGAN, 2006) occurring to the extreme to last seventeen years on *Magicicada* species (KARBAN, 1997). The only source of food during the nymphal period comes from the roots of the host that is available inside the gallery (WHITE & STREHL, 1978).

In Brazil, the cicada *Quesada gigas* (Olivier 1790) (Hemiptera: Cicadidae) is considered pest in the coffee culture in regions of the state of Minas Gerais and São Paulo for almost half a century (MARTINELLI, 2004). A little over a decade this species became serious problem in the parica plantations (*Schizolobium parahyba* var. *amazonicum* (Huber ex Ducke) Barneby, Fabaceae) in the states of Pará, Maranhão and Mato Grosso (ZANUNCIO et al., 2004; MACCAGNAN et al., 2014). Traditionally, the control of *Q. gigas* in coffee is made with the use of insecticides applied in the ground, primarily systemic neonicotinoids (SOUZA

et al., 2007) and just recently with the use of sound trap designed specifically for this species (MACCAGNAN & MARTINELLI, 2009). In parica plantations, chemical method is still in the experimental stage (LUNZ et al., 2010, MONTEIRO et al., 2014).

Parica is a pioneer tree native from the Amazon region. Due the rapid growth and textural and physical properties, that provides high-quality lamination and plywood, this species has been cultivated in extensive areas in the North region of Brazil (GALEÃO et al., 2005). A limiting factor to this cultivation has been the infestation by *Q. gigas*. Damage is caused due continuous sucking of sap on roots by the nymph, causing losses estimated at 20% of production or even premature death of the trees in the most severe infestations (LUNZ et al., 2010). Lack of information regarding the bioecology of this specie has hampered the development of alternative methods of management. Being so, the present research aims to report the selection of no host plants as oviposition site by *Q. gigas* and to show its consequence on pest management.

During a visit in parica plantations in November 2007, in the municipality of Dom Eliseu, State of Pará, Brazil, we observed the presence of *Q. gigas* depositing eggs in dry twigs of weed *Conyza* spp (Asteraceae). To confirm the use of *Conyza* as oviposition site, an area of about half hectare was inspected being randomly collected ten of these plants that were completely dry. This collect took place in plot with parica plants with approximately one year old. In lab the stems and branches were open lengthwise using a cutter. Number of egg nests and number of eggs per nests were counted.

At all, 22 stems and 65 side branches were analyzed. Into the stems was reported only one egg nest containing 25 eggs and were found egg nests in eight of the branches, being the average 3.5 (min. 1- max. 10) egg nests per branch. Egg nests contained on average 26.5 (16-43) eggs. The eggs had milky white coloration, were distribute in double row and inclined earlier in relation the branch axis (Figure 1). This features match with the pattern presented to *Q. gigas* associated in coffee plants (DECARO JR et al., 2012). Egg nests average per branch founded was similar to the presented by DECARO JR et al. (2012) (2.2 egg nests per branch), but the number of eggs per nest in *Conyza* spp was twice higher than in coffee (13.2 per egg nest).

The genus *Conyza* has extensive worldwide distribution, being *C. canadensis* and *C. bonariensis* that cause higher damage to agriculture (LAZAROTO et al., 2008). According to these authors, *C. bonariensis* is native and widely distributed in South America.

Both species are annual cycle, so they are unlikely to host immature of cicadas that in general needs more than one year to complete its development.

Due the parica plantation where the cicadas were observe laying eggs had about one year old is an indication that the adults of *Q. gigas* came from surrounding areas, because plants of with this age cannot support the complete nymphal development, as explained above. In addition, *Q. gigas* lays eggs in dry branches (DECARO JR et al., 2012) and is unexpected that parica plants at this age have it. Thus, the presence of dry branches of other plant species in areas with recent parica plantations or even coffee can provide an early *Q. gigas* infestation.

An important factor in pest management is to understand how the species are distribute spatially in area and factors that determine this pattern. In Brazil, studies have been conducted to assessment the distribution pattern shown by cicadas nymphs in parica plantations and coffee (RIBEIRO et al., 2006; MONTEIRO et al., 2013). Sampling to evaluate the level of control of cicadas in coffee is also done counting nymphs in the soil (SOUZA et al., 2007). To this is required dig the soil and expose the roots, being a costly process and may affect the plant when not well done. Since the newly hatched nymphs have limited dispersal ability, the spatial pattern of nymphs in the soil may be reflection of the spatial distribution of eggs nests. Studies on the sampling of infestations of cicada through eggs nests would make possible to evaluate in advance the level of infestation, thus enabling the determination of best strategies of control. These studies should be take into consideration not only the host plant, but also others that occur in the area and provide dry branches.

The cleaning and removal of dry branches in a period that precedes the reproduction of cicadas could avoid oviposition sites and be a strategy for management of cicadas. Similar strategy was cited by FONSECA & AUTUORI (1932) to reduce the infestation of the cicada *Fidicina mannifera* (Fabricius, 1803) in coffee plantations. Other possibility is keep dry branches only in specific points within or next the area of planting and these branches could serve for the concentration of the postures in these locations, facilitating subsequent management.

Results reported here indicates that *Q. gigas* is little selective in choosing the place where lays eggs. Development of methods of control of *Q. gigas* beyond the chemical might serve as a way of reducing costs and with less impact. However, lack basic studies for implementation of the management of *Q. gigas* as, for example, information about the factors that determine

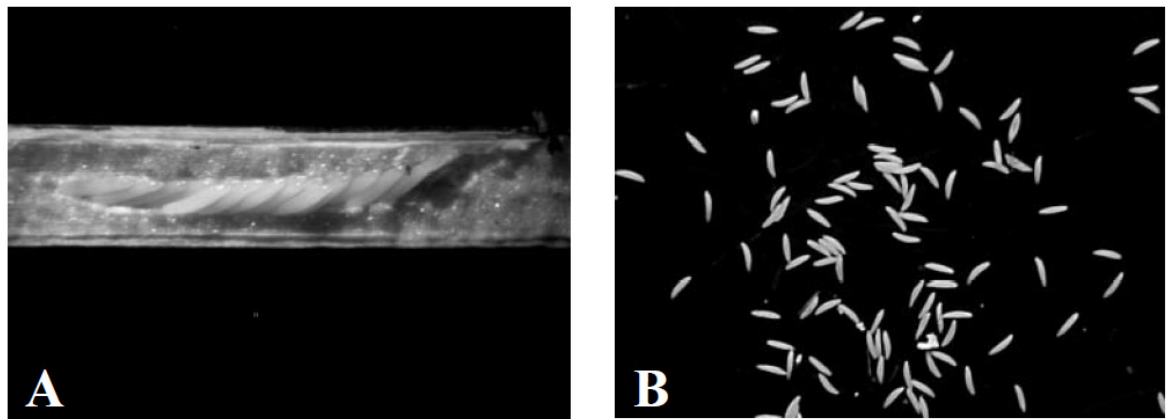


Figure 1 - Oviposition of *Quesada gigas* in weed *Conyza* spp. A. Eggs nests into side branch B. Eggs with fusiform format and white milky color.

the choice of the place of oviposition by females, studies on embryonic development and hatching, and studies on the survival rate of nymphs.

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