

***Gonodonta* SPECIES (Lepidoptera: Erebidae) DEFOLIATING SUGAR APPLE AND ATEMOYA FRUITS IN THE SEMIARID REGION OF MINAS GERAIS**

JOSEILTON FARIA SILVA², CLARICE DINIZ ALVARENGA³,
TERESINHA AUGUSTA GIUSTOLIN⁴, LAÍS PACHECO SÁ⁵

ABSTRACT- This paper aimed to evaluate the occurrence of *Gonodonta* larvae defoliating sugar apple (*Annona squamosa*) and atemoia fruits (*Annona squamosa* x *Annona cherimolia* L. Mill.) in northern state of Minas Gerais. Larvae were collected between December 2007 and January 2008 in Annonaceae plantation in the rural area of the municipality of Janaúba, MG. Adults obtained have been sent for identification. The species identified were *Gonodonta bidens* Geyer, *G. nutrix* Stoll and *G. pyrigo* Cramer. The infestation level observed in the orchard was 85% of plants with the presence of *Gonodonta* larvae and the average defoliation percentage was 30%. These are the first records of *Gonodonta* species defoliating sugar apple and atemoia in Brazil.

Index terms: Fruit piercing moths, Annonaceae, *Annona squamosa*, *A. cherimolia* x *A. squamosa*.

ESPÉCIES DE *Gonodonta* (LEPIDOPTERA: EREBIDAE) DESFOLHANDO PINHA E ATEMOIA NO SEMIÁRIDO MINEIRO

RESUMO Esta comunicação tem como objetivo registrar a ocorrência de lagartas de *Gonodonta* desfolhando pinha (*Annona squamosa* L.) e atemoia (*Annona squamosa* L. x *Annona cherimolia* Mill.), no norte de Minas Gerais. As lagartas foram coletadas entre dezembro/2007 e janeiro/2008, em área de plantio de pinheira e atemoieira, na área rural do município de Janaúba-MG. Os adultos obtidos foram enviados para a identificação. As espécies identificadas foram *Gonodonta bidens* Geyer, *Gonodonta nutrix* (Stoll) e *Gonodonta pyrigo* (Cramer). O índice de infestação observado no pomar foi de 85% das plantas com presença de lagartas de *Gonodonta*, e a porcentagem média de desfolha foi de 30%. Estes são os primeiros registros de espécies de *Gonodonta* desfolhando pinheira e atemoieira no Brasil.

Termos para indexação: Mariposas furadoras de frutos, Annonaceae, *Annona squamosa*, *A. cherimolia* x *A. squamosa*.

Among anonaceae species that produce edible fruits, the most widely known and economically important are graviola, *Annona muricata* L., sugar apple, custard apple, *Annona squamosa* L., cherimoya, *Annona cherimolia* Mill. and atemoia, *A. cherimolia* x *A. squamosa* hybrid (MOSCA et al., 2006). In Brazil, the production of anonaceous plants is mainly focused on sugar apple and graviola. The northeastern region of Brazil accounts for about 95% of national sugar apple production (LEMOS, 2014). Atemoia is still unknown to most of the population, but is expanding in some regions of the

country, such as São Paulo, where 44% of Brazilian production is concentrated. In recent years, there has been an increase in the production of these fruits in northern Minas Gerais, being mainly concentrated in the micro-region of Janaúba (IBGE, 2009; LEMOS, 2014).

The production of anonaceae has some associated pests, especially borers of fruits *Cerconota anonella* (Sepp.) (Lepidoptera: Elachistidae) and seeds, *Bephratelloides pomorum* (Fabricius) (Hymenoptera: Eurytomidae) and defoliating larvae, *Cocytius antaeus* (Drury) (Lepidoptera: Sphingidae)

¹Paper (109-15). Received April 16, 2015. Accepted November 09, 2015.

²MSc in Plant Production in the Semiarid. State University of Montes Claros, Rua Reinaldo Viana, 2630 - Janaúba, MG, 39440-000. E-mail: joseiltonfs@yahoo.com.br

⁴Post-Doctorate in Entomology.State University of Montes Claros, Rua Reinaldo Viana, 2630 - Janaúba, MG, 39440-000. E-mail: clarice.corsato@unimontes.br

⁵Post-Doctorate in Entomology.State University of Montes Claros, Rua Reinaldo Viana, 2630 - Janaúba, MG, 39440-000. E-mail: teresinha.giustolin@unimontes.br

⁶MSc in Plant Production in the Semiarid.State University of Montes Claros, Rua Reinaldo Viana, 2630 - Janaúba, MG, 39440-000. E-mail: lpachecosa@gmail.com

(HAMADA et al., 1998; BRAGA SOBRINHO et al., 2012). Larvae of the genus *Gonodonta* Hubner (Lepidoptera: Erebidae) have also been reported in anonaceae (TODD, 1959). In Brazil, *Gonodonta* species have been reported as defoliating anonaceae, such as *Gonodonta* sp. in sugar apple (BRAGA SOBRINHO et al., 2012) and *Gonodonta fulvangula* (Geyer) em graviola (HAMADA et al., 1998), but without damage records. *Gonodonta* moths, although reported as attacking leaves, are also known to pierce the cuticle of anonaceae fruits and several other plant species with their proboscis to feed themselves (BIJZINGER et al., 2001; ZENKER et al., 2010).

Information on the occurrence and host plants of *Gonodonta* larvae is very old. *Gonodonta* larvae feed on plant leaves, mainly Annonaceae and Piperaceae, and adults on citrus fruits such as tangerine, grapefruit and mainly orange, as well as on tropical species such as sugar apple (TODD, 1959). However, there are few reports that relate damage caused by these insects to fruits (moths) or leaves (larvae).

Considering the lack of information on the occurrence of *Gonodonta* in cultivated plants and its possible relevance for anonaceae in Brazil, the aim of this study was to record the occurrence of *Gonodonta* larvae defoliating sugar apple and atemoya in northern state of Minas Gerais.

Larvae of different sizes were collected in an area of Annonaceae cultivation (sugar apple and atemoya), with 9 ha, located in the municipality of Janaúba, MG, between December 2007 and January 2008. A total of 100 plants were evaluated, recording presence or absence of larvae and the defoliation percentage in each plant. The defoliation percentage was evaluated by observing the entire plant to quantify leaf reduction, based on the score scale of Mesquita et al. (2002) (0 = no attack, 1 = 1% to 20% of defoliated area, 2 = 21 to 40% of defoliated area, 3 = 41 to 60% of defoliated area, 4 = 61% to 80% of 5 = 81% to 100% of defoliated area). The infestation index was determined by the following formula: $I = (\text{number of plants with presence of larvae or defoliation} / \text{number of plants evaluated}) \times 100$.

Larvae were taken to the Laboratory of Entomology of the State University of Montes Claros (UNIMONTES), Campus Janaúba, being stored in plastic containers and fed with sugar apple leaves (*A. squamosa*). Larvae were maintained under these conditions until pupation. Pupae obtained were transferred to new plastic containers aimed at the emergence of adults. Adults were killed, mounted on entomological pin and sent for specific identification by a specialist.

The species identified were *Gonodonta bidens* Geyer, *Gonodonta nutrix* (Stoll) and *Gonodonta pyrgo* (Cramer). The infestation index observed in the orchard was 85% of plants with presence of *Gonodonta* larvae and the mean defoliation percentage was 30%. In Brazil, little is known about the hosts of the larval phase of these species, as this is the first record of damage caused by larvae of these species in cultivated plants. This record is the result of the finding of intense attacks with high infestations rates of these insects in sugar apple and atemoya orchards in the northern region of Minas Gerais, causing high levels of defoliation, which evidences the need for further studies.

Gonodonta bidens presents as synonyms *Gonodonta miranda* Raymundo, *Gonodonta meridionalis* Todd and *Gonodonta tenebrosa* Todd. The hosts of *G. bidens* and *G. pyrgo* larvae are unknown and adults have been cited as *Citrus* pests (TODD, 1959).

Gonodonta nutrix presents as synonym *Gonodonta acmeptera* (Sepp) and its occurrence has been reported in annonaceous plants *Annona glabra* L., *A. squamosa* and *Annona diversifolia* Saff., in manacá, *Brunfelsia undulata* Sw. (Solanaceae) and tomato *Solanum lycopersicum* (Solanaceae) (TODD, 1959). Adults have been reported as citrus pests in Florida, attacking fruits and causing significant losses (KING and THOMPSON, 1958). Larvae have already been observed attacking sugar apple and atemoya leaves in Florida, but without causing significant damage, since they are very parasitized by braconids (PEÑA and CRANE, 2006).

In Brazil, *Gonodonta* species have already been captured by means of a light trap installed in a fragment of the Deciduous Seasonal Forest in the municipality of Itaáara, RS (VIANA and COSTA, 2001). In areas of grape cultivation in the Serra Gaúcha region, Zenker et al. (2010) collected by means of McPhail trap three *Gonodonta biarmata* Guenée adults. Similarly, Specht and Corseuil (2002) collected three *Gonodonta sicheas* adults (Cramer) by means of a light trap in Salvador do Sul, RS. In Piauí, Castelo Branco (2008), also by means of light trap, observed the occurrence of *G. bidens* and *G. pyrgo* adults in collections performed in sugarcane crops. However, these authors did not relate these lepidoptera to leaf or fruit damage.

Possibly, there are other fruit species that may be being attacked by *Gonodonta* larvae and / or adults/ however, information about the occurrence of these insects and their hosts is scarce, especially in Brazil. This work reports for the first time the occurrence of larvae of three *Gonodonta* species, *G. bidens*, *G. nutrix* and *G. pyrgo* attacking sugar apple and atemoya leaves in Brazil.

ACKNOWLEDGMENTS

To the National Council of Scientific and Technological Development (CNPq) for granting scholarship to the second author. To the Foundation for Research Support of the State of Minas Gerais (FAPEMIG), for granting a Research Incentive and Technological Development grant to the third author. To Capes for granting a Master's degree scholarship to the fourth author. To Professor Sivalva Neto (ESALQ / USP) for the identification of species.

REFERS

BÄNZIGER, H. Fruit-piercing moths (Lep., Noctuidae) in Thailand: A general survey and some new perspectives. **Bulletin de la Société Entomologique Suisse**, Lausanne, v.55, p. 213-240, 1982.

BRAGA SOBRINHO, R.; MESQUITA, A.L.M.; HAWERROTH, F.J. **Manejo integrado de pragas na cultura da ata**. Fortaleza: Embrapa Agroindústria Tropical, 2012. 27p. (Documentos, 153).

CASTELO BRANCO, R.T.P. **Entomofauna associada à cultura da cana-de-açúcar, no Município de União, PI- Brasil**. 2008. 92f. Dissertação (Mestrado em Agronomia) - Universidade Federal do Piauí, Teresina, 2008.

HAJI, F.N.P.; MOREIRA, A.N.; ALENCAR, J.A. DE; BARBOSA, F.R. **Monitoramento de pragas na cultura da videira**. Petrolina: Embrapa Semi-Árido, 2001. 29p. (Documentos, 162).

HAMADA, N.; GOMES, A.L.S.; COUTURIER, G.; RONCHI-TELES, B. Insetos associados à gravioleira (*Annona muricata* L., ANNONACEAE) na região de Manaus, Amazonas, Brasil. **Acta Amazônica**, Manaus, v.4, p.425-431, 1998.

IBGE - Instituto Brasileiro de Geografia e Estatística. **Censo Agropecuário**. Rio de Janeiro, 2009. 777p.

KING, J.R.; THOMPSON, W.L. Fruit Piercing Moth, *Gonodonta nutrix* (Cramer), attacks oranges in Florida. **The Florida Entomologist**, Gainesville, v.41, p.61-65, 1958.

LEMOS, E.E.P. A produção de anonáceas no Brasil. **Revista Brasileira de Fruticultura**, Jaboticabal, v.36, n.3, p.77-85, 2014. Número Especial.

MESQUITA, A.L.M.; BRAGA SOBRINHO, R.; OLIVEIRA, V.H. **Monitoramento de pragas na cultura do cajueiro**. Fortaleza: Embrapa Agroindústria Tropical, 2002. 36p. (Documentos, 48).

MOSCA, J.L.; CAVALCANTE, C.E.B.; DANTAS, T.M. **Características botânicas das principais anonáceas e aspectos fisiológicos de maturação**. Fortaleza: Embrapa Agroindústria Tropical, 2006. 28p. (Documentos, 106).

PEÑA, J.E.; CRANE, J.H. **Insect/mite management in *Annona* spp.** Gainesville: Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. 2006. Disponível em: <<http://edis.ifas.ufl.edu/pdf/files/IG/IG16600.pdf>>. Acesso em: 26 jan. 2015.

SPECHT, A.; CORSEUIL, E. Diversidade de noctuídeos (Lepidoptera, Noctuidae) em Salvador do Sul, Rio Grande do Sul, Brasil. **Revista Brasileira de Zoologia**, Curitiba, v.19, p.281-298. 2002.

TODD, E.L. **The fruit-piercing moth of the genus *Gonodonta* Hübner (Lepidoptera: Noctuidae)**. Washington: United States Department of Agriculture, Government Printing Office, 1959. 52p. (Technical Bulletin, 1201)

VIANA, T.M.B.; COSTA, E.C. Lepidópteros associados a duas comunidades florestais em Itaara, RS. **Ciência Florestal**, Santa Maria, v.11, p.67-80, 2001.

ZENKER, M.M.; BOTTON, M.; TESTON, J.A.; SPECHT, A. Noctuidae moths occurring in grape orchards in Serra Gaúcha, Brazil and their relation to fruit-piercing. **Revista Brasileira de Entomologia**, Curitiba, v.54, p.288-297, 2010.