First report of *Gymnandrosoma aurantianum* (Lepidoptera: Tortricidae) in pecan in Brazil

*Dori Edson Nava¹, Vinícius Soares Sturza²*, and Carlos Roberto Martins¹

The cultivation of hardy pecan, *Carya illinoinensis* (Wangenh.) K. Koch (Juglandaceae), in Brazil started in the 1870s, but significant expansion occurred only during the 1960s and 1970s due to governmental stimuli aiming to bring in new investments for forestation (Backes & Irgang 2004; Ortiz & Camargo 2005). Economic exploration of pecan cultivation garnered attention in Brazil in the 21st century due to its high revenue, crop nutritional value, use of lands with irregular (sloping) surfaces, and the development of integrated systems with pastures for animal production, or the cultivation of pecan along with other crops (Fronza et al. 2013, 2018; Martins et al. 2017). In 2017, harvested areas were concentrated in the southeastern (21%) and southern (79%) regions of Brazil. The state of Rio Grande do Sul increased its production area to 86% between 2007 and 2017, and is currently the largest producing state, accounting for two-thirds of the total harvest area in Brazil (IBGE 2017). Simultaneously with the increase of pecan orchards in the country, pests seem to be damaging plants; however, information on this problem continues to be limited. This is the first report of the occurrence of *Gymnandrosoma aurantianum* (Lima) (Lepidoptera: Tortricidae) in pecan in Brazil.

Pecan samples were taken from 2 areas in May 2018: 1 in the municipality of Uraí in the state of Paraná (23.315200°S, 50.501339°W) from a pecan orchard of about 80 ha, which was planted in 1965. The second was taken in the municipality of Chapada in the state of Rio Grande do Sul (28.070686°S, 53.155628°W) from an orchard of about 5.2 ha, planted in 2009, which was attached to another area of about 27.6 ha of pecan trees planted between 2013 and 2014. In these 2 areas, plants were sampled randomly. Three nuts infested with lepidopteran caterpillars were found in Uraí and 5 were found in Chapada, respectively. Insects were fed in order to obtain adult moths (Fig. 1), which were identified according to Adamski & Brown (2001).

The damage on fruits occurred by excavation and perforation of the light green with darkish green outer pericarp layer (husk) that encloses the endocarp. The larval feeding resulted in deep galleries, even promoting some grooves in the outer pecan pericarp. Excrement (frass) of the larvae were found between the outer pericarp layer and the endocarp as shown in Fig. 2. On these infested pecans, the damage did not reach the endocarp, but galleries did compromise the pericarp, which might imply risk of contamination by microorganisms, and trouble for transportation and storage because of shorter shelf life.

Twenty phytophagous insects have been identified that feed on pecan plants, 3 of which are common in North America where this species is indigenous: *Phylloxera devastatrix* Pergande and *Phylloxera notabilis* Pergande (both Hemiptera: Phylloxeridae), and *Monellia caryella* (Fitch) (Hemiptera: Aphididae) (Paulsen et al. 2013; Boscardin & Costa 2018). No species recorded in Brazil belongs to the Tortricidae family, although 2 species have been found in pecan nuts and trees in North America: *Cydia caryana* (Fitch) and *Gretchenia bolliana* (Slingerland) (both Lepidoptera: Tortricidae) (Ree & Knutson 1997; Thompson & Conner 2012; Boscardin & Costa 2018).

---

¹Embrapa Clima Temperado, Pelotas, 96010-971, Brazil; E-mail: dori.edson-nava@embrapa.br (D. E. N.), carlos.r.martins@embrapa.br (C. R. M.)
²Universidade Federal de Pelotas, Programa de Pós-graduação em Fitossanidade, Capão do Leão, 96010-610, Brazil; E-mail: vsturza27@yahoo.com.br (V. S. S.)
*Corresponding author; E-mail: vsturza27@yahoo.com.br
**Summary**

The cultivation of hardy pecan, *Carya illinoinensis* (Wangenh.) K. Koch (Juglandaceae), has increased in Brazil in the current century; however, the knowledge about insect pests is limited. This report deals with the occurrence of *Gymnandrosoma aurantianum* (Lima) (Lepidoptera: Tortricidae) in pecan trees for the first time in Brazil, discussing symptoms and possible risks.

Key Words: *Carya illinoinensis*; Juglandaceae; Olethreutinae; Graphotilini; citrus fruit borer

---

**References Cited**

Adamski D, Brown JW. 2001. Systematic revision of the Ecdytolophia group of genera (Lepidoptera: Tortricidae: Graphotilini) in the New World. Entomologica Scandinavica Supplements 58.

Backes P, Irgan G. 2004. Árvores do Sul. Guia de identificação & interesse Ecológico. As principais espécies nativas Sul-Brasileiras. Instituto Souza Cruz, Santa Cruz do Sul, Brasil.

Bento JMS, Murata Y, Ono M, Parra JRP, Vilela EF. 2006. Identification, synthesis, and field evaluation of the sex pheromone from the citrus. Journal of Chemical Ecology 32: 155–168.

Boscardin J, Costa EC. 2018. A noqueira-pecã no Brasil: uma revisão entomológica. Ciência Florestal 28: 456–468.

Carvalho JHS, Barbosa JC, Yamamoto PT, Bicalho IB. 2015. Distribuição espacial do bicho-furão, *Gymnandrosoma aurantianum* (Lima, 1927) (Lepidoptera: Tortricidae), em citros utilizando geostatística. Revista Brasileira de Fruticultura 37: 600–609.

Fronza D, Poletto T, Hamann JJ. 2013. O cultivo de noqueira-pecã. Universidade Federal de Santa Maria, Santa Maria, Brazil.

Fronza D, Hamann JJ, Both V, Anese R O, Meyer EA. 2018. Pecan cultivation: general aspects. Ciência Rural 48: 1–9.

Garcia MS, Parra JRP. 1999. Comparação de dietas artificiais, com fontes protéicas variáveis, para criação de *Trichogramma platneri* (Hymenoptera: Trichogrammatidae) para o controle de *Gymnandrosoma aurantianum* (Lima) (Lepidoptera: Tortricidae). Anais da Sociedade Entomológica do Brasil 28: 219–232.

IBGE – Instituto Brasileiro de Geografia e Estatística. 2017. Produção Agrícola Municipal. https://sidra.ibge.gov.br/tables/1613#resultado (last accessed 10 Oct 2019).

Martins CR, Fronza D, Malgrain MB, Bilharva MG, De Marco R, Hamann JJ. 2017. Cultura da noz-pecã para a agricultura familiar, pp. 65–81. In Wolff LF, Medeiros CAB [eds.]. Alternativas para a diversificação da agricultura familiar de base ecológica. Embrapa Clima Temperado, Pelotas, Brazil.

Molina RMD, Parra JRP. 2006. Seleção de linhagens de *Trichogramma platneri* (Hymenoptera: Trichogrammatidae) for the biological control of *Acrobasis nux-vorella* (Lepidoptera: Pyralidae) and *Cydia carya* (Lepidoptera: Tortricidae). Southwestern Entomologist 38: 523–530.

Ortiz ERN, Camargo LEA. 2005. Doenças da nogueira pecan (*Carya illinoinensis*), pp. 501–506. In Kimathi H, Amorim L, Resende JAM, Bergamin Filho A, Camargo LEA [eds.], Manual de fitopatologia. Agronômica Ceres, São Paulo, Brazil.

Parra JRP, Bento JMS, Garcia MS, Yamamoto PT, Vilela EF, Leal WS. 2004. Development of a control alternative for the citrus fruit borer, *Eddytophala aurantiana* (Lepidoptera, Tortricidae): from basic research to the grower. Revista Brasileira de Entomologia 48: 561–567.

Paulsen CM, Cottrell TE, Ruberson JR. 2013. Distribution of the black pecan aphid, *Melanocallis carayaefoliae*, on the upper and lower surface of pecan foliage. Entomologia Experimentalis et Applicata 146: 252–260.

Prates HS. 1992. Resultados recentes do controle do bicho-furão - lagarta da mariposa dasaranjas - *Gymnandrosoma aurantianum* (Lima, 1927) em citros 1992. Informativo Coopercitrus 71: 20–21.

Ree B, Knutson A. 1997. Field guide to the insects and mites associated with pecan. Texas A&M University Libraries, College Station, Texas, USA. http://hdl.handle.net/1969.1/87786 (last accessed 10 Oct 2019).

Silva AGA, Gonçalves CR, Galvão DM, Gonçalves AJL, Gomes J, Silva MN, De Simoni L. 1968. Quarto catálogo dos insetos que vivem nas plantas do Brasil: seus parasitos e preadores: insetos do Brasil: hospedeiros e inimigos natívoros. Ministério da Agricultura, Rio de Janeiro, Brazil.

Thompson TE, Conner P. 2012. Pecan. pp. 771–801 in Badenes ML, Byrne DH [eds.], Handbook of Plant Breeding. Fruit Breeding, Part 4. Springer, New York, USA.

Vilela EF, Bento IS, Walder J, Leal WS. 2001. Sexual behavior and diel activity of citrus fruit borer. Journal of Chemical Ecology 27: 2053–2065.