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Comunicación
Briefing on the integrated control of *Aleurocanthus woglumi* Ashby (Hemiptera: Aleyrodidae) to Brazil

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Aleurocanthus woglumi Ashby (Hemiptera: Aleyrodidae) is a class A2 quarantine insect pest in Brazil. Its population is managed with biological control agents and monitoring is done in different countries. Such information is important for develop strategies to eradicate the insect in Brazil. The briefing to control black fly was discussed in this study for application in Brazil.

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Aleurocanthus woglumi Ashby (Hemiptera: Aleyrodidae) originated from Asia and can be found in Africa, America and Oceania (EPPO, 2008). This insect can use more than 300 plants species as hosts (Nguyen & Hamon 1993), including avocado, banana, coffee, ginger, grape, guava, litchi, mango, papaya, pear, rose and, most commonly, *Citrus* spp., from which the greatest damages are reported (EPPO, 2008).

Aleurocanthus woglumi adults are dark-gray with red stripes on their chest and abdomen, and measure approximately 0.99 to 1.24 mm in length (Nguyen & Hamon, 1993). *A. woglumi* females lay their eggs on the underside of leaves in clusters of 35 to 50 eggs which are easily recognized by their spiral shape (Nguyen & Hamon, 1993; Lemos *et al.*, 2006). The damage caused by black fly nymphs or adults is due to their sap sucking habits that may transmit serious viruses to the host plant and lead to the production of sooty molds that are dark symbiotic fungi (e.g. *Capnodium* sp.). These fungi generally grow on honeydew excreted by sucking insects, inhibiting photosynthesis of the host plant (Lotorto, 1978; Raga & Costa, 2008).

In Brazil, *A. woglumi* are found in the states of Pará (Oliveira *et al.*, 2001), Maranhão (Lemos *et al.*, 2006), Amazônia, Amapá, Tocantins (Pena & Silva, 2006/07), São Paulo (Raga & Costa, 2008) and Goiás (Sá *et al.*, 2008). Currently, this insect is

classified as a A2 quarantine pest under officer control to avoid spreading throughout the Brazilian territory (RAGA & COSTA, 2008; SÁ *et al.*, 2008). The black fly has great potential to become a severe pest in Brazil because few studies have been performed regarding this insect and the effectiveness of chemical and natural enemies for the insect on the various potential host plants (SÁ *et al.*, 2008).

Monitoring the black fly populations with geographical information systems and infrared images has demonstrated to be adequate for mapping and to observe outbreaks in citrus plants (FLETCHER *et al.*, 2004). The black flies could be detected by infrared, black and white, and near infrared images. Quantitative data can also be obtained from infrared images (EVERITT *et al.*, 1994), however, the operating costs of this technology may limit its use, especially in developing countries or areas where agribusiness is not very intensive. The greatest challenge of this technology is to detect the pest population below the level of economic loss.

The specificity of natural enemies for targeted pests is an important criterion for the selection and introduction of natural enemies in classical biological control programs. An organism in an ecosystem may lead to unpredictable results, and informed and rational evaluations supported by ecological data are necessary (WAAGE *et al.*, 2001). An apparent absence of negative effects of an exotic natural enemy is not sufficient for its introduction (HOELMER & KIRK, 2005). Scientific evidence of impacts on the targeted pests including the assessment of sources of mortality in all stages should be known before introducing exotic agents and then evaluated after their release (MICHAUD, 2002; EHLER, 2007).

Successful control of *A. woglumi* with natural enemies in Caribbean countries has shown that the introduction of these agents can be successful, but the exchange of information among research bureaus becomes central point to achieve this goal (BROWNING, 1992).

Amitus hesperidum Silvestri (Hymenoptera: Platygasteridae), introduced in citrus plantations of Trinidad and Tobago, was able to reduced more than 98% of black fly populations with parasitism rates of 60 to 90% within 4 to 13 months after release of the parasitoid (WHITE *et al.*, 2005). *A. hesperidum* and *Encarsia opulenta* (Silvestri) (Hymenoptera: Aphelinidae) were released to control black fly in citrus plantation of southern Texas (MEAGHER & FRENCH, 2004). Both parasitoids controlled the black fly populations. Parasitized nymphs of *A. woglumi* suggest that *E. opulenta* was more efficient than *A. hesperidum* (MEAGHER & FRENCH, 2004). *E. opulenta* was also able to rapidly decrease high densities of this pest (SUMMY & GILSTRAP, 1992). Taxonomic studies later indicated that the species of parasitoid released was *Encarsia perplexa* Huang & Polaskek (Hymenoptera: Aphelinidae) in Mexico and the U.S.A. (MYARTEVA & SALAS, 2005). Taxonomic evaluations also verified problems when material from Central America was released for black fly control in Hawaii (CULLINEY *et al.*, 2003). Therefore, critical studies of the ecosystem and the use of taxonomy are needed to minimize mistakes in any biological control project (ZUCCHI, 2002).

Cales noacki Howard and *Encarsia pergandiella* Howard (Hymenoptera: Aphelinidae) are found in Brazil (HOWARD, 1907) and are promising parasitoids of *A. woglumi* (RAGA & COSTA, 2008). *C. noacki* is an important agent for the biological control of *Aleurothrixus floccosus* (Maskell) (Hemiptera: Aleyrodidae) (ULUSOY *et al.*, 2003). This parasitoid showed parasitism rates higher than 92% in *Tetraleurodes perseae* Nakahara (Hemiptera: Aleyrodidae) in avocado (ROSE & WOOLEY, 1984). *E. pergandiella* parasitizes *Bemisia tabaci* (Gennadius) (GREENBERG *et al.*, 2008; HARDIN *et al.*, 2008) and *Bemisia argentifolii* Bellows & Perring (Hemiptera: Aleyrodidae) (GREENBERG *et al.*, 2001), which are insect pests in different crops in Brazil.

Encarsia pergandiella can be collected in Brazilian fields and may be cultivated in the

laboratory with the intent of improving its biological potential (DONNELL & HUNTER, 2002). The predator *Malla boninensis* (Okamoto) (Neuroptera: Chrysopidae) is reported as a natural enemy of *A. woglumi* (NEHARE *et al.*, 2004; BHAATI *et al.*, 2007; ZADE *et al.*, 2007). Furthermore, enzootic diseases of *Aschersonia* sp. in populations of *A. woglumi* can be a source of biological material for microbial control (PENA, 2007).

Synthetic insecticides can provide immediate control of insect pest populations, but some aspects, such as its selectivity to the biological control agents must be exhaustively studied before being used (BUENO *et al.*, 2008; GIOLO *et al.*, 2008; MOSCARDINI *et al.*, 2008).

The Brazilian Ministry of Agriculture, Livestock and Supply provides instructions for the transport of host plants from area where the black fly is found. Plants or plant material can be transport by Permission Transit Botanicals with the following additional statement: "There were no signs of *Aleurocanthus woglumi* in the place of production over the past six months and the departure was inspected and they are free of the pest" (MAPA, 2008).

Methods to control *A. woglumi* are important tools for the management of exotic pests. The polyphagous behavior and host availability require the use of different methods and knowledge of agroecosystem which becomes the first step to establish strategies for the control of black fly in Brazil as well as abroad.

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RESUMEN

SANTOS ANDRADE, G., P. LUIZ PASTORI, A. I. DE AZEVEDO PEREIRA, L. PIN DALVI, G. DIAS DE ALMEIDA, F. FAGUNDES PEREIRA. 2009. Nota sobre el control integrado de *Aleurocanthus woglumi* Ashby (Hemiptera: Aleyrodidae) en Brasil. *Bol. San. Veg. Plagas*, **35**: 259-263.

Aleurocanthus woglumi Ashby (Hemiptera: Aleyrodidae) está incluída en la lista A2 de plagas de cuarentena en Brasil. Su población es controlada con agentes biológicos y la vigilancia se realiza en diferentes países. Esta información es importante para desarrollar estrategias para erradicar el insecto en el Brasil. La reunión de información para el control de la mosca prieta de los cítricos se discutió en este estudio para su aplicación en Brasil.

Palabras clave: Mosca prieta de los cítricos, control biológico, plagas exóticas, Manejo Integrado de Plagas.

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