Xylosandrus compactus (Coleoptera: Curculionidae: Scolytinae), a new pest of *Swietenia macrophylla* in the Peruvian Amazonia

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Abstract: *Swietenia macrophylla* King (Meliaceae) is a tree with high commercial value. Its cultivation is being promoted in the Peruvian Amazon region as part of government and private reforestation programs. In nurseries, seedlings are attacked by the scolytine *Xylosandrus compactus* (Coleoptera, Curculionidae). Damage caused by the Insect is described and a seedling mortality rate of 38.41% is reported.
Key words: Coleoptera, Curculionidae, Scolytinae, *Xylosandrus compactus*, pest, mahogany, seedlings, Amazonia, Peru.

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Resumen: *Swietenia macrophylla* King (Meliaceae) es un árbol de alto valor comercial. Su cultivo se está promocionando en la Amazonia peruana como parte de programas de reforestación gubernamentales y privados. Enlos viveros, los plantones son atacados por un el escolitino *Xylosandrus compactus* (Coleoptera, Curculionidae). Se describe el daño causado por el insecto y se Insect damages are described and seedlings mortality rate of 38,41% is reported.
Palabras clave: Coleoptera, Curculionidae, Scolytinae, *Xylosandrus compactus*, plaga, caoba, plantones, Amazonia, Perú.

Introduction

Swietenia macrophylla King (Meliaceae) known in Peru as mahogany or caoba is a forest species measuring between 40 and 48m height and from 0.40 to 1.80m in diameter, 1.50m from the ground. It is found in the humid tropical forest from the Yucatán peninsula in Mexico to the Amazon region (Lamb, 1966). The main use of the mahogany is luxury cabinetmaking, interior decoration, musical instruments and sculpture. Wood has high durability, can be easily saw up, has good performance at artificial drying programs and at several turning, drilling and molding operations (Carrión & Solano, 2002); its finish results in a smooth, brilliant and resistant surface which turns it into one of the most valuable types of wood in the Amazon region (Ribeiro *et al.*, 1999). Due to its high value in the national and international market, this species has been severely extracted, which has led to be included in the CITES Appendix II to avoid commercial extinction (CITES, 2002).

For several years, Peruvian government, NGOs and private enterprise have promoted reforestation programs with this species. In Peru, as in any country where plantations have been an attempt, one of the elements that limited their development was *Hypsiphylla grandella* pest (Wightman *et al.*, 2005) which may infest between 71% to 100% of the plants in the plots of land set up (Neto *et al*., 2004; Barros & Brandi, 1975; Delgado & Couturier, 2006).

In 2007, in the Peruvian Amazon region, a small dark brown beetle that drills stems and produces mahogany saplings mortality in nursery at the "Jenaro Herrera" Forest Research Center –CIJH was observed.

Material and method

The work was carried out from November 2007 to December 2008 at the "Jenaro Herrera" Forest Research Center-Peruvian Amazon Research Institute (IIAP), located at 4°55'S and 73°44'W at 125 masl, in the district of Jenaro Herrera, province of Requena, Department of Loreto. Average temperature fluctuates from 21.1° the lowest to 32.6°C the maximum, annual rainfall is 2 730mm. The area is located on onshore earth surface, and is of loamy sand, argillaceous to sandy-argillaceous kind with an acid pH from 3.9 to 4.6 (Claussi *et al*., 1992). The experiment was carried out in bulk production nurseries to be distributed to indigenous and rural communities. Five patches measuring 10m long x 1m wide each were selected. These were planted with 1 800 mahogany seedlings each, at a 10cm x 10cm distance one from the other. Each patch was protected with a roof of 1m height and covered with *Phytelephas macrocarpa* palm tree leaves. Damages assessment was undertaken at the time of delivering the plants, when these were one year three months old. One part of the plants infested were transported to the laboratory in order to determine the average diameter and location of the infestation (root, basal medium and apical areas of the stem), the number of insects and galleries by plant. The work is complemented by bioecological comments made in the nursery and in the field.

Results and discussion

Xylosandrus compactus (Eichhoff) (Coleoptera: Curculionidae: Scolytinae: Xyleborini) is a new pest for mahogany and

the common name proposed is mahogany sapling borer. The adult has a light brown to black color, female measures between 1.5 to 1.8mm and male is smaller, between 0.75 and 1.25mm. The body is covered with a thick hairiness. The milky white larva has a brown head. Female gets to the mahogany seedling and builds a chamber for oviposition and larva development (Fig 1). In a chamber, up to seven larvae and four adults have been found at the same time. This does not mean that the larvae belong to the same cohort or that are descendants of the adults located in the chamber. As in other plant species, when entering the chamber, the female introduces and grow an *Ambrosia* fungus that serves as food for larva (Brader, 1964; Couturier & Tanchiva, 1991; Hara & Beardsley, 1979; Lindaren, 1990; Ngoan *et al*., 1976). The chamber built prevents the movement of plant fluids and its surrounding tissues necrotize. When there is severe damage, seedlings die and when damage is slight in the degenerated area, seedlings break with wind or a small mechanic action, producing new sprouts damaging in turn, the wood of the future adult tree (Fig 2).

During the experiment, 8107 mahogany seedlings have been assessed, from which 38.41% of the plants were dead or severely damaged; and 23% had broken stems. When talking about infestation, these data can be underestimated since when delivering seedlings, only those with severe and slight damages were considered unsuitable; skewing those in the initial stage of infestation where the insect begins to develop. Average diameter of infestation was 4.43mm; sd=0.91 and was 3.1mm minimum, average height was 56.82cm; sd=15 (n=500). The highest rate of infestations was found in the basal part of the plant with 71.3%, followed by the medium part with 18.7 and 9% in the apical part.

It has been observed that as the seedling were delivered, the number of insects decreased and some of them disappeared. This probably due to a decrease of nursery humidity, produced by the decrease of plant density, greater light and air circulation in nurseries (Fig 3), important factors in the establishment and development of the pest as shown in *Myrciaria dubia* (Delgado & Couturier, 2004).

Xylosandrus compactus is originating from Asia and it is now well established in the tropical areas of Africa (Commonwealth Institute of Entomology 1968, 982; CABI/EPPO, 1997). In South America, it was probably introduced in Peru in the 80s, through Brazil (Wood, 1982). It was found in Ecuador (Oriente, Napo) in coffee branches in 1985 (Couturier, unpublished). This insect represents an important plague attacking several trees and bushes such as "Coffee" *Coffea Arabica L* (Brader, 1964), "Avocado" *Persea Americana* Will (Wolfenbarger, 1973), "Cacao" *Theobroma cacao* L. (Hara & Beardsley, 1979) "Annatto" *Bixa orellana* L. (Silva *et al*., 1994). It was first reported in the Peruvian Amazon region as "camu camu" plague of *Myrciaria dubia* (Couturier & Tanchiva, 1991).

Conclusion

Xylosandrus compactus was first reported as a new mahogany pest. The impact of the insect in nurseries needs greater attention for forestry development in the Amazon region. The pest control shall begin with the management of all elements oriented to reduce nursery's humidity and to help a good sun exposure when plants reach diameters equal to or greater than 3.1mm.

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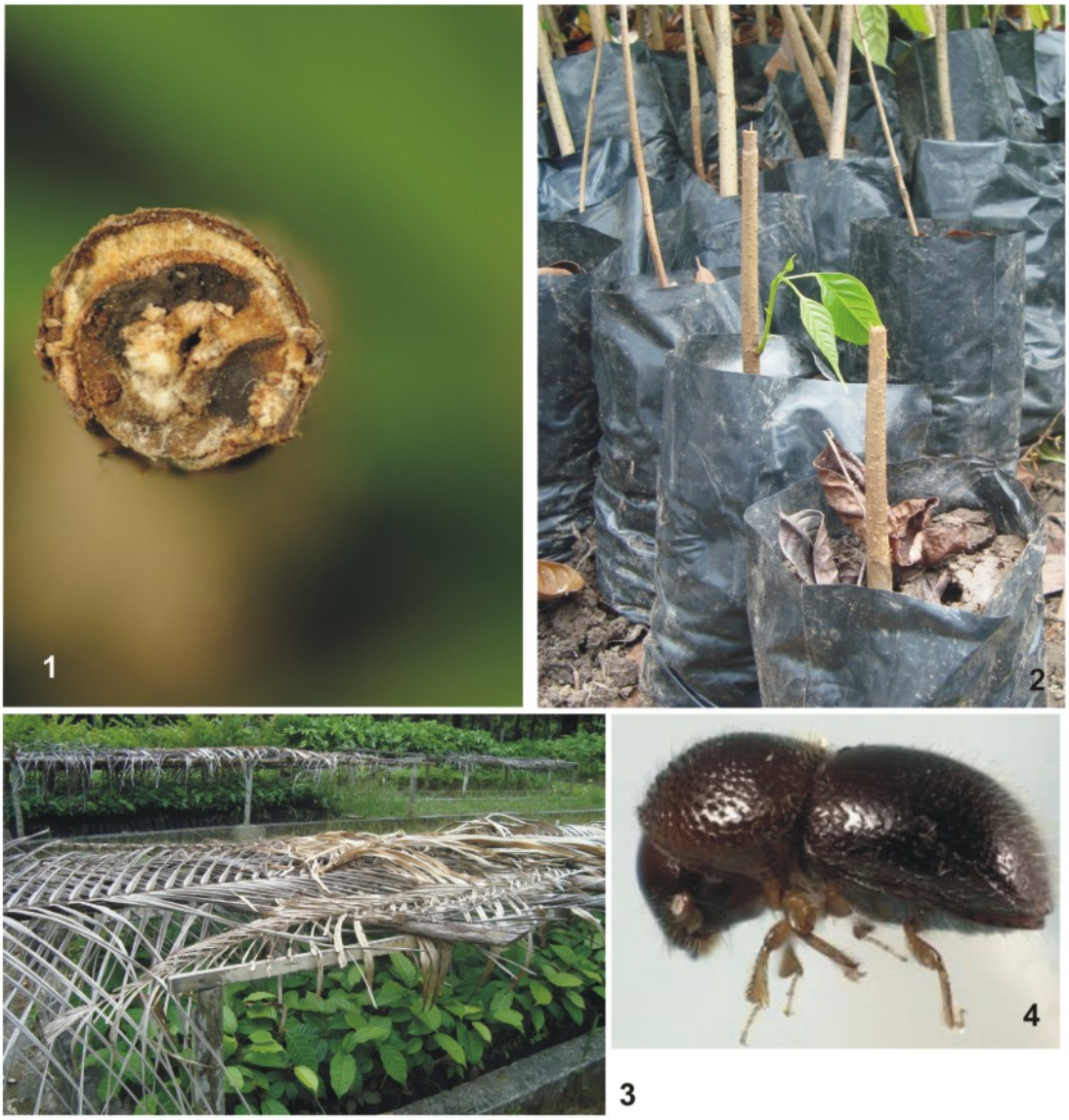

Fig. 1. Transversal view of a chamber produced by *X. compactus.* **Fig. 2.** Damages in eight-month old *Swietenia macrophylla* saplings at the "Jenaro Herrera" Forest research Center. **Fig. 3.** Four month old *Swietenia macrophylla* nursery at the "Jenaro Herrera" Forest Research Center. **Fig. 4.** Adult female of *Xylosandrus compactus* (photo Kristina Simms).

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