



## **Popular Article**

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### **Integrated Management of Ambrosia beetle in Arecanut**

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Arecanut (*Areca catechu* L.) is commonly known as betel nut palm and is an important commercial crop in most South Asian countries having economic, religious and medicinal importance. The yield potential of arecanut is greatly influenced by both biotic and abiotic factors such as cultural operations, nutrients, pest and diseases, soil type and weather parameters. Among them, the incidence of pest and diseases pose a serious threat and are major limiting factors on arecanut production. The important insect pests include white grub, inflorescence caterpillar, pentatomid, mites and spindle bug. However, occurrence of new insect pests in the plantation based ecosystem often correlated with climate change. Recently, a new beetle pest, commonly known as 'Ambrosia beetle' is becoming a serious threat on areca palms and is causing significant damage under favourable conditions.

Two species of ambrosia beetle, viz., *Xylosandrus crassiusculus* (Motschulsky, 1866) and *Euplatypus parallelus* (Fabricius) (Coleoptera: Curculionidae: Platypodinae) are infesting areca palms and the incidence is more prevalent in poorly managed orchards. Apart from arecanut they also infest on forest trees, fruit orchards and other perennial crops. In India, it is called as pin hole borer and first reported in Kerala and Karnataka on arecanut palms during 2018. These beetles makes small galleries and inoculate it with a mutualistic fungi (*Ambosiella xylebori* and *A. roeperi*), which serve as a food source for the developing broods. They maintain a close association with specific fungi group known as Ambrosia, which resides in a specialized pocket of a glandular tissue called 'Mycangia'; hence, these borers are referred as Ambrosia beetle.

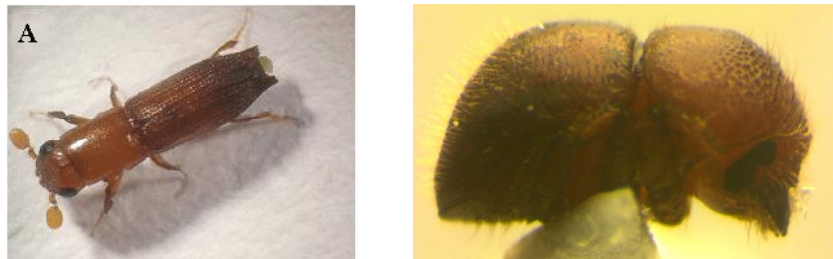


Fig. 1. Ambrosia beetle, *Euplatypus parallelus* (A) and *Xylosandrus crassiusculus* (B).

### **Association with fungi**

These beetles are fungivorous and live mutualistically with species-specific fungi. After finding a suitable tree, adult beetles excavates a tunnel and inoculates the spore of the fungal symbiont. Further, continuous burrowing of the beetle by chewing internal tissue allows rapid multiplication of fungus. The fungi is benefited from the nitrogenous waste of the insect as a source of nutrition and the larvae of beetle are exclusively mycetophagous. In addition, it also provides nourishment for adult beetles (Harrington, 2005). Further, the fungus may weaken the plant tissue for several days and thus facilitates further excavation of tunnel by the larvae. However, subsequent succession of other non-specific fungi may hasten the decaying of palms. With this mutualistic relationship, these beetles expand their host range under changing climatic conditions.

### **Nature of symptoms and damage on arecanut**

Generally, these beetles attack stressed woody host plants and are found more frequently on thin-barked surfaces. However, in recent times, this pest has been found infesting healthy palms, which includes stem and nuts. Upon infestation on younger palms, oozing of a yellowish brown resinous exudation from infested stems can be noticed. In addition, small or pinhead size holes can be seen after removal of the resinous exudation and the severely infested nuts may fall prematurely. Whereas, in older/stressed/diseased palms, a typical extrusion of fine wood powder outside can be seen at the entrance (Fig 2). Sometimes, foliage wilting, canopy dieback, branch and trunk necrosis can also be seen after penetration of beetle towards plant tissues and settlement of symbiotic fungus. They are most active from March to April; however, activity can be seen throughout the year at a lower level. Furthermore, the polyphagous nature and dispersal capabilities of these tiny species, combined with their great efficiency in locating and colonizing stressed plants make it difficult to control *X. crassiusculus* and *E. parallelus* under its invaded range (Gugliuzzo *et al.*, 2021).

## Management

It is practically difficult to control this pest using chemical measures once they enter into the tunnel. Therefore, the timing of preventive insecticide application is crucial to protect palms from damage by this pest.

1. Monitoring the activity of ambrosia beetle is essential.
2. Avoid establishing a new arecanut orchard in the vicinity of forest trees.
3. Severely infested trees should be removed from the orchard prevent subsequent succession on healthy palms before applying chemical measures.
4. If infested, remove the resinous exudation/sawdust frass with a knife and swabbing the infested stem with Chlorpyrifos 20EC @ 5ml/litre and Mancozeb 75WP @ 2 gm/litre as an *ad hoc* measures. Further, apply wet soil over the swabbed stem to improve treatment efficiency.



Fig. 2. Symptoms of Ambrosia beetle on nuts and stem. Presence of typical frass noodle on infested nuts (A & B). Multiple entrance holes and dark staining of exocarp (C). Bored holes on kernel (D). Extrusion of fine wood powder outside the entrance on stem.