

New host record of leaf cutting weevil (*Deporaus marginatus*: Attelabidae): An emerging pest of hog plum (*Spondias pinnata*: Anacardiaceae) from Kerala, India

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Abstract

The mango leaf-cutting weevil, *Deporaus marginatus* (Pascoe) (Coleoptera: Attelabidae), is a serious pest causing damage to young leaf flushes of mango. Currently, *D. marginatus* has been observed feeding on *Mangifera indica*, *M. foetida*, *M. sylvatica*, *Litchi chinensis* and *Anacardium occidentale*. Hog plum, *Spondias pinnata* (Anacardiaceae) is a glabrous indigenous plant having significant nutritive and medicinal value. *D. marginatus*, damaging Hog plum foliage, is hereby reported for the first time in Kerala, India. *D. marginatus* causes significant damage to the foliage of Hog plums. Adult males and females target fresh leaf flushes and feed by scraping the leaf tissues. Usual leaf-cutting damage is not observed; instead, feeding on the mesophyll tissues of the abaxial side is profound.

Keywords: *Spondias pinnata*, hog plum, weevil, *deporaus marginatus*, attelabidae

Introduction

Deporaus marginatus (Pascoe) (Coleoptera: Attelabidae) is an economically significant pest of mango *Mangifera indica* L. (Anacardiaceae) in India (Butani, 1979) [1], Bangladesh (Uddin *et al.*, 2003), Sri Lanka (Hutson and Alwis, 1934) [4] and Malasia (Tigvattnanont, 1988) [12]. The Attelabidae are triumphant family of weevils with over 2500 species in 150 genera and a global range (Oberprieler *et al.*, 2007) [8]. Young mango trees are more susceptible to leaf cutting weevil attack than mature trees (Wadhi and Batra, 1964) [15]. The seasonal population dynamics of the mango leaf cutting weevil was investigated (Mukherjee *et al.*, 2016) [7]. *D. marginatus* was seen in high numbers in June (Singh and Pandey, 1972) [10]. The heavy infestation of *D. marginatus* in Maharashtra is from July to October (Bhole *et al.*, 1987) [2]. *D. marginatus* is described as a specific mango pest (Srivastava, 1997) [11], and the sensitivity of several varieties of mango leaf cutting weevil and their control has been examined (Uddin *et al.*, 2003). The oviposition behaviour and development of the mango leaf cutting weevil at various phases of its life cycle have been documented (Uddin *et al.*, 2014) [13].

D. marginatus infestation has also been recorded in *Litchi chinensis* Sonn. in Uttar Pradesh (Gupta and Singh, 1986) [3]. *D. marginatus* has been identified as a minor cashew pest on nursery plants and delicate shoots (Vanitha, 2016) [14]. The biology of *D. marginatus* in cashew leaves was researched using the induced oviposition method and compared to that of normal mango leaves (Anoop and Ghosh, 2016). We report for the first time, the occurrence of *D. marginatus* in Hog plum from Panoor (11°45'59"N 75°34'42"E), in the northern region of Kerala, India. *Spondias pinnata*, often known as Indian Hog plum, is a glabrous, deciduous tree in the Anacardiaceae family. It is native to South Asia and can be found in India, Bangladesh, and other countries in the region. It contains a variety of phytochemicals such as tannins, alkaloids, terpenoids, phenolics, and saponins. It possesses antioxidant, antibacterial, antifungal, anti-cancer, hepatoprotector,

thrombolytic, ulcer-protecting, anti-diarrhoea, anti-hypertension, and antidiabetic effects (Mondal *et al.*, 2021) [6].

Materials and Methods

The feeding behaviour of the weevil is recorded and the adult weevils were collected from Hog plum using an insect net and transferred to clean bottles. They were then brought to the lab and stored at -20°C for DNA extraction and as a voucher specimen for future reference. The morphological characteristics of the collected specimens were studied using a Leica (M205 C) stereo zoom microscope. The identification of the specimens was carried out following Mukherjee *et al.*, (2016) [7]. The genomic DNA of *D. marginatus* was isolated and sequenced, to further confirm its identification.

Result and Discussion

D. marginatus normally causes damage to the host by cutting the leaves, and this symptom is crucial in determining the pest status and pest attack. This was not the case in the Hog plum, where *D. marginatus* fed on the abaxial side of the leaf and left a flap of tissue layer on top. This tissue layer eventually withers and creates a hole. This distinguishes *D. marginatus* attack on distinct hosts. This primarily affects young flushes of leaf, affecting plant growth and causing yield reduction in Hog plum. Male weevils are often smaller than females. Its body is dark brown with a reddish orange prothorax and femora. Male snouts are slender, shorter, and more curved than female snouts. A notable feature is the elongate antenna, which is located below the middle of the snout (Uddin *et al.*, 2014) [13]. *D. marginatus* eggs are tiny, creamy white, cylindrical, and smooth, turning yellow when they hatch. The only difference between the three larval instars is body size and head capsule. They are apodous, robust, flat, weakly curved, head exerted, mouth prognathous, and have fine body hair. The larva moves to loose soil and constructs a little earthen shell or cocoon for pupation. The pupa are creamy yellow and soft bodied after

3-4 days. The mature weevil emerges from the cocoon later. The overall lifecycle of *D. marginatus* from egg to egg is 55 – 56 days (Uddin *et al.*, 2014) [13]. Covering the leaves with polythene bags or mosquito net can be used to prevent the attack of *D. marginatus*. Using BHC and pyrethrin are one among the chemical control measures. Combination of cow dung and cow urine can also be used to reduce the infestation. While ant and spiders act as natural enemies (Kumar *et al.*, 2020) [5]. The host plants can influence the weevil's growth, development, fecundity rates, mortality and population dynamics (Rashid *et al.*, 2017) [9].

Conclusion

Being a newly reported host, understanding the life history characteristics of *D. marginatus* on Hog plum is therefore critical to successful integrated pest control management (IPM). The next step in this research will be to determine the biology and bionomics of *D. marginatus* on Hog plum. Because both the Hog plum and the Mango belong to the same family Anacardiaceae, the existence of several shared secondary compounds that attract the leaf cutting weevil by both host plants is obvious. As a result, identifying the common metabolite is crucial. Hence the future study reflects on this aspect as well.



A. Damage caused by *D. marginatus* on Hog plum leaf



B. Infested Hog plum leaf



C. *D. marginatus* on Hog plum leaf feeding on abaxial side



D. Adult *D. marginatus*

Plate 1: *Deporaus marginatus* on Hog plum

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