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OVIPOSITIONAL PREFERENCE OF *RHYNCHOPHORUS FERRUGINEUS* (OLIVIER) IN PALM SPECIES IN GOA

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ABSTRACT

Red palm weevil (RPW) *Rhynchophorus ferrugineus* (Olivier) (Coleoptera: Curculionidae) is devastating pest in commercial and ornamental palms. The study was conducted to find out ovipositional preference of *R. ferrugineus* in seven palm species. Result revealed that the fish tail palm (*Caryota cumingii* Lodd.) is highly preferred host for oviposition by *R. ferrugineus* followed by coconut (*Cocos nucifera* L.). Toddy palm (*Borassus flabellifer* L.) was found to be least preferred by *R. ferrugineus* for oviposition. The ornamental palm, cane palm *Dypsis lutescens* (H. Wendl.) Beentje and J. Dransf is found as new preferred host for oviposition in free choice test.

Key words: *Borassus flabellifer*, *Caryota cumingii*, *Cocos nucifera*, *Dypsis lutescens*, host plants, red palm weeevil, oviposition, ornamental palms, volatiles

The red palm weevil (RPW) *Rhynchophorus ferrugineus* (Olivier) (Coleoptera: curculionidae) is devastating pest of palms (Faleiro, 2006). It is mainly palm borer native to South Asia, spread mainly due to the movement of cryptically infested planting material to the Middle East, Africa and the Mediterranean during the last two decades. Globally, the pest has a wide geographical distribution in diverse agroclimatic conditions and an extensive host range in Oceania, Asia, Africa and Europe (Giblin-Davis et al., 2013). It's host range expanded from just four palm species (*Cocos nucifera* L.*, Phoenix dactylifera* L.*, Metroxylon sagu* rottb. *and Corypha umberaculifera* L.) in 1950s (Nirula, 1956) to 40 palm species worldwide http://www.savealgarvepalms.com/en/weevil-facts/host-palm-trees. *R. ferrugineus* is the lethal pest of major commercial palm crops in India viz., coconut, oil palm, date palm, and arecanut palm (Chandrika Mohan, 2020). *R. ferrugineus* is currently managed by employing a pheromone trap based Integrated Pest management (IPM) strategy, where the host plant resistance is not exploited (Lizanne et al., 2016). Smith (2005) reported that plant resistance to arthropods is characterized by three components viz., tolerance, antibiosis and antixenosis. A plant may exhibit two or more modes of resistance and in some cases, it may be difficult to differentiate between antixenosis and antibiosis as they may both affect arthropod populations (Smith, 2005). Tolerance is a plant's ability to withstand or recover from arthropod damage. Antibiosis adversely affects arthropod development, reproduction, or survival, and antixenosis (non-preference) prevents arthropod colonization of a host plant (Faleiro et al., 2014); *R. ferrugineus* gains entry into a palm when female weevils are attracted to palm tissue volatiles to lay eggs. Later grubs damage the palm tissues. Fresh wounds on frond bases (petioles) attract *R. ferrugineus* females for oviposition, which results in infestation (Abraham et al. 1998; Faleiro 2006). This study assessed the ovipositional preference to *R. ferrugineus* in seven palm species i.e., coconut (*Cocos nucifera* L.), arecanut (*Areca catechu* L.), oil palm (*Elaeis guineensis* Jacq.), cane palm (*Dypsis lutescens* (H. Wendl.) Beentje and J. Dransf), fish tail (*Caryota cumingii* Lodd. ex), royal palm (*Roystonea regia* O. F. Cook) and toddy palm (*Borassus flabellifer* L.) which are commonly grown in Goa, India as a plantation or ornamental crop.

MATERIALS AND METHODS

The experiment was conducted in the Department of Agricultural Entomology, Goa College of Agriculture, Ela Farm, Old Goa (15°49'17''N/73°74'58''E) during July, 2023. The extent of egg laying on seven palm species viz., *C. nucifera*, *A. catechu*, *E. guineensis*, *D. lutescens*, *C. cumingii*, *R. regia* and *B. flabellifer* was studied. These palm species were collected from campus and nearby hilly area. Adult weevils in this oviposition trials were collected from coconut field using insecticide free food baited - pheromone (Ferrolure™) based bucket traps and reconditioned in the laboratory for two weeks by allowing the adults to feed on sugarcane in plastic

cages (28± 1 °C, 76± 3% RH) (Faleiro et al., 2014). The petiole fibers from green fronds of each palm species were used to prepare a firm cylinder of 5 cm long x 2 cm diameter and offered to five fertile and gravid adult *R. ferrugineus* females. These were caged together with two active adult male weevils in humid plastic boxes (60 x 40 x 35 cm) for three days in free choice test trials to assess the extent of eggs laid in seven palm species tissue. The number of eggs laid (oviposition) in each palm species tissue were recorded by carefully extracting the eggs from the tissue using a fine camel hair brush. All the 3 oviposition trials were replicated five times in completely randomized block design. The data on oviposition was analyzed using the online Web Agri Stat Package (WASP 1), available at https://ccari.res.in/wasp/index.php

RESULTS AND DISCUSSION

The trial 1 showed that the highest number of eggs were laid by *R. ferrugineus* on *C. cumingii* (14.4) followed by *R. regia*, *C. nucifera*, *E. guineensis* and *A. catechu* with mean egg laid of 6.8, 4.6, 2.8 and 1.4 respectively. The *D. lutescens* and *B. flabellifer* were least preferred by *R. ferrugineus* for oviposition with mean eggs of 0.8 and 0.2 (Fig. 1). The result from trial 2 revealed that the oviposition of *R. ferrugineus* was highest in *C. cumingii* (8.4) followed by *C. nucifera*, *R. regia*, *A. catechu* and *D. lutescens* with 3.4, 2.8, 2.6 and 2.6 eggs respectively. The *E. guineensis* and *B. flabellifer* were least preferred by *R. ferrugineus* for oviposition with mean eggs of 0.8 and 0.0, respectively. The trial 3 results showed that the *C. cumingii* was found to be significantly superior for oviposition with mean 17.2 eggs followed by *C. nucifera*, *R. regia*, *D. lutescens*, *A. catechu* with 11, 7.6, 7 and 4.8 eggs, respectively. The *E. guineensis* and *B. flabellifer* were found to be least preferred for oviposition with mean eggs of 3.2 and 0.2 respectively. The data of all the three trials indicates that ovipositional preference of *R. ferrugineus* to *C. cumingii* is significantly superior

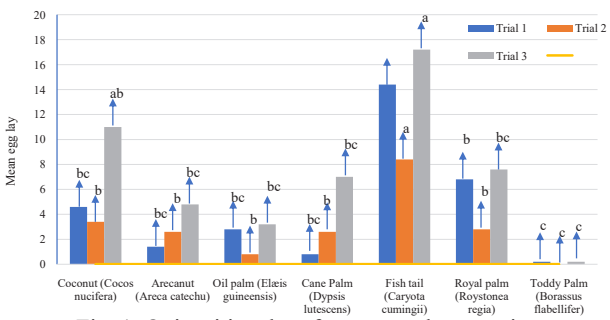

Fig. 1. Ovipositional preference to plam species by *R. ferrugineus*

(13.333). This was followed by *C. nucifera*, *R. regia*, *D. lutescens*, *A. catechu* and *E. guineensis* 6.333, 5.733, 3.467, 2.933, 2.267 eggs, respectively. *B. flabellifer* was found to be least preferred by *R. ferrugineus* for oviposition with average mean egg laid of 0.133. The high preference of *C. cumingii* as a host for oviposition by *R. ferrugineus* followed by *C. nucifera* may be for the presence of volatiles in the tissues. Among seven host species six have been reported as strong hosts for *R. ferrugineus* whereas *D. lutescens* is not reported as the host (Anonymous, 2013); *R. regia* and *D. lutescens* are widely used in gardening and landscapes, which can serve as an easy alternative for potential breeding habitat for *R. ferrugineus*. This warrants continuous monitoring of ornamental palms for integrated management to avoid breeding of *R. ferrugineus* in these palms.

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AUTHOR CONTRIBUTION STATEMENT

RS and SN conducted the experiment, analyzed the data and prepared the manuscript.

CONFLICT OF INTEREST

No conflict of interest.

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