Biology and behaviour of *Ephestiasula pictipes* (Wood-Mason) (Hymenopodidae: Mantodea) under captive breeding

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**ABSTRACT**

The biology and behaviour of a common predator in cashew plantations, *Ephestiasula pictipes* (Wood-Mason), were studied under captivity for three seasons using greater wax moth larvae as prey. During Feb–May, incubation and nymphal developmental period were shorter when compared with Jun–Sep and Oct–Jan. The female mantids laid ootheca once in every 3–4 days, for a period of 70–77 days. Adult longevity and oviposition period were significantly higher during Feb–May, while no significant difference was observed in sex ratio, oviposition interval and pre oviposition period during different seasons. Sexual behaviour consisted of preliminary courtship and copulation, involving 14 activities in sequence. Duration of mounting, copulation and riding around on the female by the male widely varied from 2 min to 28 h; 5.15 to 6.10 h; and 2 to 74 h, respectively. High fertility, high fecundity, shorter life cycle, multinutrition and feasibility of laboratory rearing throughout the year are the advantageous features of *E. pictipes* that permits for its mass rearing and emergence as a viable biocontrol agent in future.

1. Introduction

The cashew (*Anacardium occidentale* L.) is an important commercial nut crop grown in the world. It is known to be damaged by more than 100 insect pests during different crop stages. Generally, pest incidence is more during flushing, flowering and fruiting period between Oct and Mar. Among the pests infesting cashew, tea mosquito bug and cashew stem and root borer are the two major pests, while leaf miners, shoot tip caterpillars, leaf edge and blossom webbers, apple and nut borers and thrips are other important pests and are of regional importance. Due to pest damage, yield reduction between 40% and 50% could occur during certain instances in a few cashew-growing regions of India (Sundararajan \& Sundarabahu 1999) as well as the world (Asogwa et al. 2008, Dwoomoh et al. 2012, Agbotten et al. 2014). At present, chemical control is widely used to manage pests of cashew. But in the current pest management scenario, there is an increasing demand for sustainable, environmental-friendly control methods, hence there is a necessity to explore the possibility of biological control. In past, natural enemies like spiders and reduviids have been reported as biocontrol agents of cashew pests (Bhat et al. 2013a; 2013b). Similarly, mantids also are common predators in cashew plantations. Mantodea is an insect suborder represented by 2452 species of praying mantids around the world, distributed in 446 genera and 14 families (Otte Spearman 2005). Mantids are diurnal insects that live mainly on tropical and sub-tropical regions (Ehrmann 2001). All mantids are predators feeding mainly on other insects and arthropods (Preston 1990; Ehrmann 1992; Khokhar \& Soomro 2009). Earlier, biological control attempts were made using mantids in British Columbia and the United States (Buckell 1941; Kevan 1979; Hurd 1985; Cannings 1987).

During the present investigation, purple boxer mantis, *Ephestiasula pictipes* (Wood-Mason) (Mantodea: Hymenopodidae), was observed as a predator of cashew pests. Presently, this mantid species is distributed in India and Nepal (Mukherjee et al. 2014). *E. pictipes* was one of the common mantids in cashew plantations of West coast region of Karnataka during Jul and Apr (Vanitha et al., Unpublished). This mantid species remain active during flushing and flowering period of cashew and found predating upon many cashew insect pests including tea mosquito bug, leaf weevils, ants, grasshoppers, leaf beetles, small caterpillars, hoppers, flies and cow bugs during Aug–Mar. Both the nymphs and adults of *E. pictipes* exhibit characteristic alternating stretching of their raptorial legs, which combined with the upturned femur gave it the name, "boxer mantis". As they walk, they have a quirk of stretching out their arms. The presence of nymphs and adults for a longer period of around nine to ten months in a year in the cashew plantations shows that this species could survive better and establish in...