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Is *Popillia clara* Arrow an occasional visitor of sugarcane crop island in a diverse habitat?

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Sugarcane crop system, like many other agro-ecosystems, serves as a habitat for an array of arthropod communities including herbivores and natural enemies (David *et al*., 1986). While a few of the diverse herbivore species complete their life cycle within the crop territory as major pests, considerable majority exhibits sporadic herbivory with minimal or no economic loss. Such major and minor pests represent different niche categories such as borers, root feeders and defoliators, and taxonomic groups (David and Nandagopal, 1986). Besides, sugarcane crop seems to harbour occasional innocuous guests from other host plants within unique habitats. In the present communication, we document a Scarabaeid visitor in sugarcane germplasm planted as a crop island surrounded by natural vegetation.

The world sugarcane germplasm collection being maintained at the Sugarcane Breeding Institute Research Centre (SBIRC), Kannur, Kerala (11° 52' N, 75° 25’ E), constitutes a crop island, since there is no large-scale cultivation of sugarcane in the neighbourhood. Although intended to ensure freedom from pest and disease attack, the uniqueness of the habitat has not prevented the germplasm to play host to the known yet infrequent pests (Mahesh et al., 2013a & b) and new minor associations (Mukunthan and Nirmala, 2002). Adults of the scarabaeid beetle *Popillia clara* Arrow (Coleoptera: Scarabaeidae) have been noticed on sugarcane inflorescence (Fig. 1), particularly of *Erianthus* spp., over the last four years (2010-2013). The beetle appeared in small congregations of up to 10 per arrow during June-December. Unlike adults of *Holotrichia serrata* F. (Coleoptera: Scarabaeidae) which congregate on neem foliage at dusk, *P. clara* adults were found on the arrows in the early hours of the day, apparently attracted by the glossy nature of the white silky callus hairs in the inflorescence of *Erianthus* species. Microscopic examination of arrows indicated no feeding or damage symptoms on the inflorescence. The congregations may possibly facilitate mating as in the

case of *H. serrata* on neem foliage, though the gender composition of the congregations was not examined.

Above-ground symptoms of damage such as foliage drying, generally caused by grubs of the more serious *H. serrata*, were not observed in *Erianthus* canes. Grubs of *P. clara* could be located in the root zone of sugarcane and grasses growing on the bunds but further observations of adult colonized on canes and randomly selected surrounding canes indicated that the grubs did not damage roots but survived feeding on soil organic matter. In laboratory studies of feeding behaviour of grubs and confirmation of identity of the beetle, grubs of *P. clara* collected from the sugarcane field (rich in organic matter with 4% carbon) and grassy bunds were reared in field collected soil, soil with roots and organic matter (FYM), and roots alone. Grubs developed in field collected soil, and soil with roots and organic matter but not in fresh roots alone which indicated that the grubs may feed on organic matter.

Further examination of the habitat indicated that the adult beetles fed on the foliage, flowers and fruits of roselle (*Hibiscus sabdariffa* L.) and wild mallow (*Hibiscus vitifolius* L.) (Family: Malvaceae) present around the sugarcane plantation (Fig. 2). The beetles gregariously fed on the upper side of leaves of these plants by chewing the soft tissue but leaving the veins unfed leading to their skeletonization. The beetle congregations also fed on the flower buds and petals; feeding on fruits led to their malformation.

In the description of *P. clara*, Arrow (1917) mentioned no host records but stated the places of collection as Nilgiri Hills and Pondicherry, which indicated that the beetle was widely distributed in the plains of east coast and hills of Nilgiris. Despite reports of several *Popillia* spp. occurring as pests of monocots and dicots in Indian literature (Nair, 1986), no records of occurrence of *P. clara* in India are available after Arrow (1917). The lack of such reports notwithstanding, it can be assumed that *P. clara* may have a far wider distribution in peninsular India in view of its present record in the biodiversity-rich west coast. The present observation of its occurrence can also be construed as the first record at Kannur, Kerala, as well as in sugarcane crop system where the grubs are apparently surviving on the rich organic matter content of the soil as indicated by the preliminary laboratory tests. The feeding damage by adults in Malvaceae members indicated that *P. clara* is utilizing these plants as

major adult hosts and visiting sugarcane after flowering. By virtue of its abundant canopy and year-round availability, sugarcane germplasm cultivated as a crop island in the present study site has served as an alternative host for several pests in the recent past (Mukunthan and Nirmala, 2002; Mahesh *et al*., 2013a & b), albeit for short periods with minimum or no loss to its own biomass. However, this appears to be the first instance of a herbivore not utilizing the vast biomass of sugarcane as a potential host. Although the scarabaeid does not seem to deserve any attention from control point of view as of now, the possibility of its stable association with economic impact on the sugarcane crop island would make an interesting study.

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Fig. 1. *Popillia clara* adult on sugarcane arrow

Fig. 2. *Popillia clara* adult feeding damage on leaf (left) and fruit (right) of *Hibiscus sabdariffa*