Plight of insects dependent on the milkweed plant in Bangalore region

The usual complaint from senior citizens of Bangalore is that the city has lost its plants, animals and lakes because of exponential urbanization. Certainly, the city has lost the above in the course of time due to unprecedented developments. In this vast threatened list, the disappearance of a beautiful painted grasshopper, *Poecilocerus pictus* (F.) (Orthoptera: Pyrgomorphidae) (Figure 1) from the Bangalore region is apparent to zoologists because its principal host plant, milkweed (*Calotropis gigantea* L. and *C. procera* L.) is fast dwindling in and around the city.

P. pictus occurs in India, western Asia, North and East Africa[1]. The nymphs and adults of the hopper mainly feed on leaves of *Calotropis* spp. Although the grasshopper defoliates several species of plants[2–6], it has not been reported as a serious pest on any economically important crop. The gravid female grasshoppers lay eggs in the soil near milkweed plants and emergent nymphs and subsequent adults in large numbers feed on milkweed leaves. After the third instar, nymphs migrate to adjacent plants for feeding. Hence, a high density of milkweed plants occurring in one place is crucial for survival and development of *P. pictus*.

Calotropis spp. are common dry land plants[7] and were abundant in the environs of Bangalore some time ago. Because of this, a large population of *P. pictus* existed in the region on milkweed plants (pers. commun.). Nevertheless, today it is difficult to notice painted grasshoppers in and around Bangalore. In addition to the unavailability of large number of host (milkweed) plants that have been uprooted during urbanization in Bangalore, the other reasons for the absence of *P. pictus* in the city are the destruction of eggs in the soil, nymphs and adults on the milkweed plants while uprooting the plants, and unscrupulous collection of a large number of painted grasshoppers for preparation of meiotic chromosome stages in biology practical classes by graduate and postgraduate life sciences students in Karnataka. Both the male and female hopper nymphs and adults are indiscriminately collected from the field and then only adult males are dissected to remove the testes that are used for the preparation of meiotic stages. The field-collected nymphs of both sexes and adult females are discarded in places where they are unable to survive.

The large number of hoppers collected from the Bangalore area in earlier days was supplied not only to several colleges in the city, but also to those in different parts of Karnataka (pers. commun.). Certainly, meiotic chromosome preparations

Figure 1. Adults of *Poecilocerus pictus*: smaller male sitting on the female.

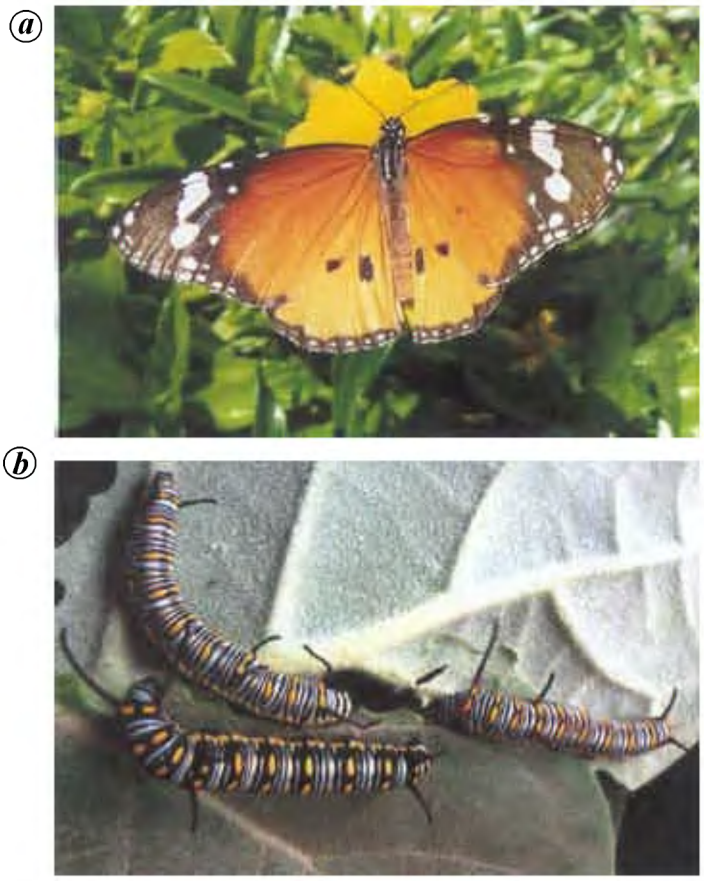

Figure 2. ***a***, *Danaus chrysippaus* butterfly. ***b***, Larvae of *D. chrysippus* feeding on milkweed leaves.

are basic tools in cytogenetics and our students cannot be denied the opportunity of studying meiosis. Large-sized adult hoppers, large lobes of testes in the adults, large chromosomes, abundant population and easy collection of adults in the field due to their docile nature made the painted grasshopper a favourite material for meiotic studies in practical classes. Of late, as the hoppers do not exist in and around Bangalore, they are collected from far away places and supplied to colleges (pers. commun.). Although defensive heart poisons present in painted grasshoppers by feeding on milkweed plant provided them protection against natural predators[8], their population in the vicinity of Bangalore is severely affected due to the unavailability of large number of milkweed plants, destruction of hopper stages and large-scale collection of hoppers. Consequently, our students may not have the luxury of using *P. pictus* testes for studying meiotic stages in near future. Even now, painted grasshoppers required for preparation of meiotic chromosome stages could be mass multiplied on milkweed plants in the greenhouse.

If the above is the status of painted grasshoppers in Bangalore, the position of the plain tiger butterfly, *Danaus chrysippus* (L.) (Lepidoptera: Nymphalidae), which feeds on *Calotropis* spp. is slightly different. *D. chrysippus*, the most widely distributed of all the Indian butterflies, also occurs in Ethiopia, Canary Islands, North Africa, Syria, Greece, Asia, China, Japan and over whole of the Indo-Australian region[9]. The sight of flying colourful plain tiger butterflies (Figure 2 *a*) is common even within Bangalore city area, thanks to some scattered vacant sites, of which a few possess milkweed plants. Although *D. chrysippus* larvae mainly feed on *Calotropis* spp. and *Asclepias curassavica* L.[9,10], the latter grows near water sources and is not as common as *Calotropis* spp. The butterfly lays eggs singly on succulent leaves of milkweed plant and the larvae (Figure 2 *b*) feed on milkweed leaves. Unlike *P. pictus*, a single milkweed plant can support several larvae of tiger butterflies. Similar to painted grasshoppers, plain tiger butterflies are also unpalatable to predators, as caterpillars of the butterfly feed on milkweed which contains poisonous glycosides[10]. The tiger butterfly is, however, likely to disappear from the Bangalore area as well, since milkweed plants on scarce vacant sites are likely to be uprooted for construction of buildings. As these two insect species mainly depend on *Calotropis* spp. for their development, their populations might be severely affected in the region where their principal host plant does not exist.

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