

# BIRD POLLINATION IN *CALOTROPIS PROCERA* (APOCYNACEAE: ASCLEPIADOIDEAE)?

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A snapshot (Fig. 1) taken of a sunbird visiting a flower of *Calotropis procera* (Aiton) W. T. Aiton (Apocynaceae subfamily Asclepiadoideae) initiated a discussion on the possibility of bird pollination in this genus. The picture shows a male purple sunbird (*Nectarinia asiatica*, Passeriformes, Nectariniidae) sitting on a branch of *Calotropis procera*, its beak reaching into the flower. *Calotropis procera* is a very common evergreen shrub or small tree of dry subtropical zones such as the Thar Desert in India where it is particularly abundant in ruderal vegetation (Bhandari 1990). It prefers open habitat with little competition. The flowers are nearly campanulate, their

colour is white with purple dots and edging to the tips of the petals.

Nearly all documented cases of pollination in the subfamily Asclepiadoideae are by insects, mostly belonging to the orders Hymenoptera, Lepidoptera and Diptera (Ollerton & Liede 1997). The major pollinators of *Calotropis* spp. are carpenter bees (*Xylocopa* spp., Hymenoptera) as shown by Ali & Ali (1989), Eisikowitch (1986) and Willmer (1988) (see also the ASCLEPOL database - Ollerton & Liede 1997).

There are only a few documented records of birds visiting asclepiad flowers, e.g. in *Leptadenia hastata* and



FIGURE 1. A male purple sunbird (*Nectarinia asiatica*) visiting a flower of *Calotropis procera* (picture by Manuel Pramsohler). The picture was taken in February 2005 in the Sam Dunes near the city of Jaisalmer (Rajasthan, India). These are sand dunes in a semi-desert, dominated by small shrubs such as *Calotropis procera* (Apocynaceae), *Aerva pseudotomentosa* (Amaranthaceae) and *Crotalaria burhia* (Fabaceae).

*Hoya macgillivrayi* (see the ASCLEPOL database and Ollerton & Liede 1997), in *Pleurostelma cernuum* (Woodell 1979) and in *Asclepias syriaca* (Southwick 1983). It was assumed that birds rob only nectar without pollinating the asclepiad flower and so the role of birds as potential pollinators remained doubtful (Ollerton & Liede 1997). However, Pauw (1998) demonstrated bird pollination in *Microloma sagittatum* via pollen transport on the bird's tongue. Typical characteristics of classically bird-pollinated flowers are an orange or red colour, the secretion of a large amount of dilute nectar, lack of an odor and they often have long floral tubes (Cronk & Ojeda 2008). So just for its flower characteristics *Calotropis procera* does not fit with a typical bird pollinated flower. But likewise *Microloma sagittatum* just for its flower morphology was not predicted to be bird pollinated (Ollerton 1998) and the pollination syndrome concept may only apply to a minority of flowering plants. It is possible that *Calotropis procera* fits to the concept of a functionally generalist flower (Ollerton et al. 2007) using different types of animals to get pollinated. However it is also possible that the sunbird was only acting as a nectar robber rather than a pollinator.

The purple sunbird feeds mostly on flower nectar, and to a lesser extent also on insects and spiders (Ali 2002). From January to March the area where the photograph was taken has very few plants in flower, thus it is likely that in this period of time purple sunbirds frequently visit *Calotropis procera* as an important nectar source. However this still needs to be quantified. Additionally, the abundance of Hymenoptera in the area was not high, so the plant may depend partly on purple sunbirds for getting pollinated. In order to ultimately prove bird pollination is taking place, the bird and in particular its tongue would need to be examined for its capacity to carry pollinaria. Furthermore, flowers would need to be isolated and to be exposed to purple sunbirds as potential pollinators only (Pauw 1998).

In the particular picture shown here (Fig. 1) it is unlikely that the bird is about to pick up pollinaria due to the relative position of the bird's tongue and that of the pollinaria (Ollerton, J., pers. comm.). The bird is probably only robbing nectar without pollinating the flower. Thus, although from this picture bird pollination of *Calotropis*

*procera* cannot be proven, this alternative way of pollination should not be excluded and further research is required.

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