

Poster presentation

EXPLORATION OF NATURAL ENEMIES OF CALOTROPE IN ITS NATIVE RANGE: PREDISPERSAL SEED-PREDATION IN PAKISTAN

Asad Shabbir^{1,2*}, Shahid Ali², Kunjithapatham Dhileepan³

¹University of Sydney, School of Life and Environmental Sciences, Narrabri, Australia; asad.shabbir@sydney.edu.au

²University of the Punjab, Ecology and Evolution, Department of Botany, Lahore Pakistan

³Biosecurity Queensland, Department of Agriculture and Fisheries, Brisbane, Australia

Calotropis procera (Aiton) W.T. Aiton (Apocynaceae), commonly known as calotrope, Indian milkweed or Aak, is a spreading shrub or medium-sized tree native to South Asia, West Asia and North Africa. It is a serious weed of rangelands and is a target weed approved for biological control in Australia (Dhileepan, 2014). Surveys in its native range in Pakistan yielded several common herbivores (Table 1) (Ali and Shabbir, 2017). The pre-dispersal seed-feeding Aak fruit fly, *Dacus persicus* Hendel (Diptera: Tephritidae), and Aak weevil, *Paramecops farinosus* Schoenherr (Coleoptera: Curculionidae), have been identified as prospective biological control agents due to records of their restricted host range (Dhileepan, 2014) (Figure 1; Table 1).

Life history, seasonal dynamics and damage potential of both agents were studied under laboratory and field conditions in Lahore, Pakistan. Populations of *D. persicus* began to increase in summer (June) and peaked in August to September before starting to decline in autumn (November). The duration of the life cycle of *D. persicus* (egg to adult) was 42.2 ± 0.4 days (mean \pm SE) with a range of 38 to 50 days. The average life span of an adult fly was 16.4 ± 0.7 days. The Aak fruit fly larvae destroyed all immature seeds and internal tissue of infested pods of the host plant (Figure 1).

In contrast, Aak weevil populations built slowly during spring and early summer (March to May) and peaked in late summer (August). Like the Aak fruit fly, the larvae of the Aak weevil also destroyed all immature seeds of infested pods (Figure 1).

Table 1. Common herbivores associated with *Calotropis procera* in Pakistan.

SPECIES	ORDER	FAMILY	FEEDING HABIT	HOST RANGE ^a
<i>Platycorynus peregrines</i> (Herbst)	Coleoptera	Chrysomelidae	Leaf (adult); Root (larva)	Generalist
<i>Paramecops farinosus</i> Schoenherr	Coleoptera	Curculionidae	Leaf (adult); Fruit and seed (larva)	Specific to <i>Calotropis</i> spp.
<i>Niphona indica</i> Breuning	Coleoptera	Cerambycidae	Stem borer	Specialized
<i>Poekilocerus bufonius</i> (Klug)	Orthoptera	Pyrgomorphidae	Leaf	Generalist
<i>Poekilocerus pictus</i> Fab.	Orthoptera	Pyrgomorphidae	Leaf and fruit	Generalist
<i>Spilostethus hopes</i> (Fab.)	Hemiptera	Lygaeidae	Seed	Generalist
<i>Aphis nerii</i> Boyer de Fanscolombe	Hemiptera	Aphidae	Leaf and fruit	Generalist
<i>Dacus persicus</i> Hendel	Diptera	Tephritidae	Fruit and seed	Specific to <i>Calotropis</i> spp.

^a information taken from Ali and Shabbir (2017) and Dhileepan (2014)

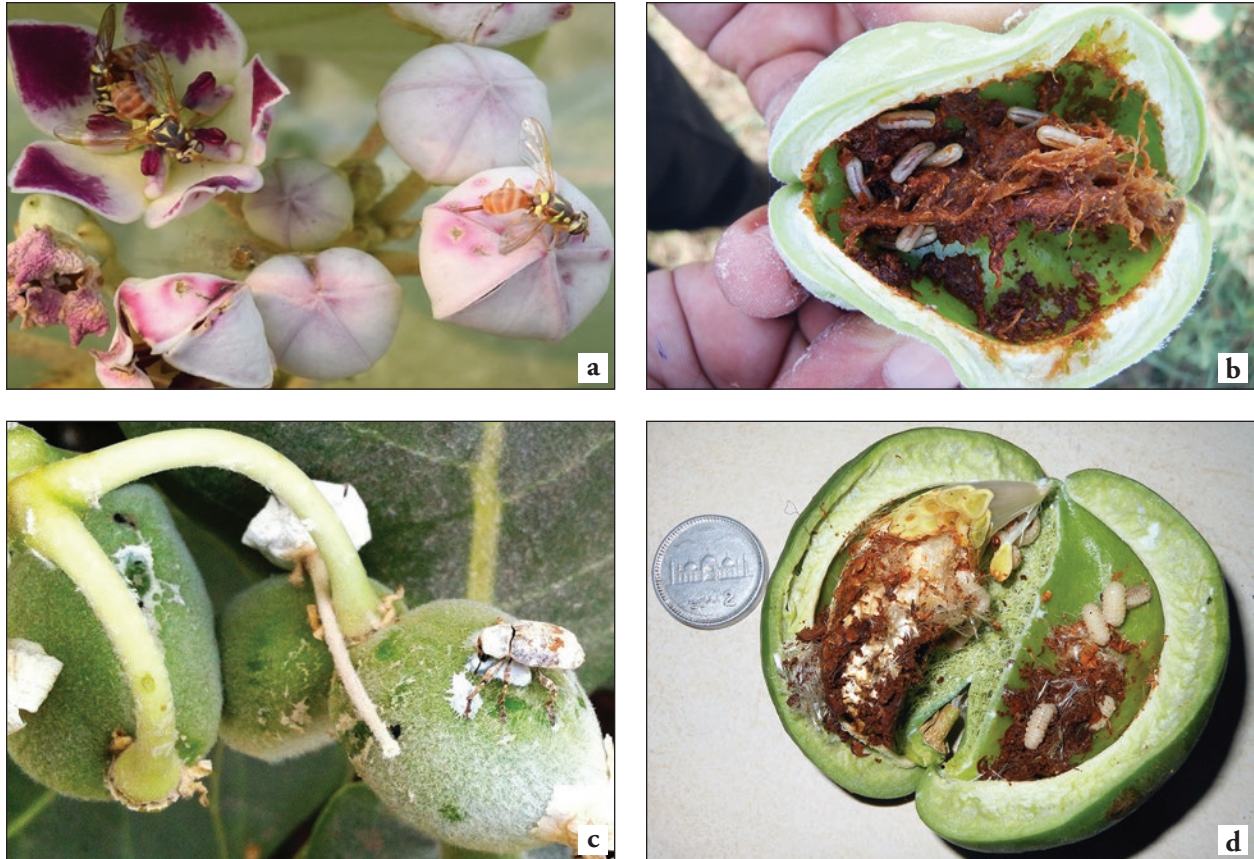


Figure 1. Prospective biocontrol agents of calotrope. (a) Adults of the fruit fly *Dacus persicus* sitting on flowers of *Calotropis procera*; (b) seed damage caused the larvae of *D. persicus*; (c) an adult weevil, *Paramecops farinosus*, on young fruit of *C. procera*; (d) seed damage caused the larvae of *P. farinosus*.

Field host specificity, fast development and damage potential of the fruit fly and weevil indicate that these agents hold promise to be considered as potential candidate agents for biological control of *C. procera* in Australia and other parts of the world where *C. procera* and the closely related *C. gigantea* (L.) Dryand. are problem weeds. Both agents are planned to be imported into quarantine for further testing in Australia.

Acknowledgments

The authors highly acknowledge the Queensland Department of Agriculture and Fisheries (QDAF) for providing partial funding for this research. The first author is grateful to CABI for providing travel support to attend the XV ISBCW conference in Engelberg, Switzerland.

References

- Ali, S., Shabbir, A., 2017. Insects Associated with Calotrope (*Calotropis procera* Aiton) in Northern Punjab, Pakistan. Punjab University Journal of Zoology 32, 91–99.
- Dhileepan, K., 2014. Prospects for the classical biological control of *Calotropis procera* (Apocynaceae) using coevolved insects. Biocontrol Science Technology 24, 977–998.