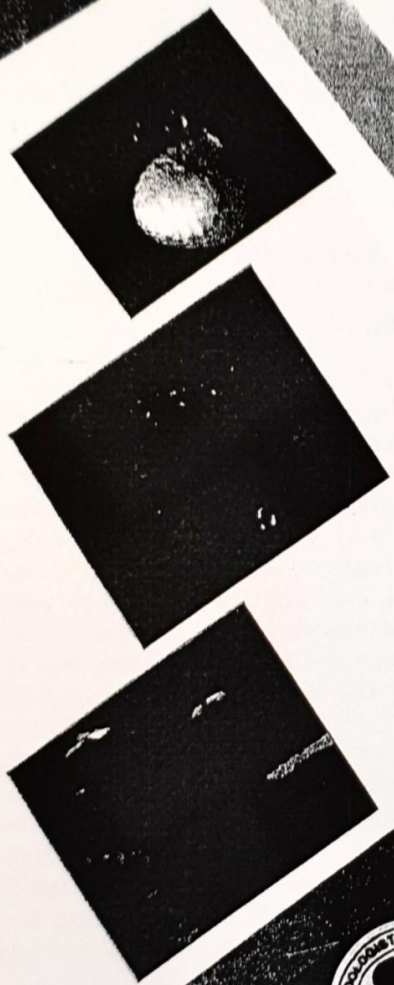
COMPENDIUM OF ABSTRACTS

XVII AZRA INTERNATIONAL CONFERENCE ON

FRONTIER RESEARCH IN APPLIED ZOOLOGY AND INSECT PEST MANAGEMENT STRATEGIES : A WAY FORWARD FOR FOOD AND NUTRITIONAL SECURITY



12-14 FEBRUARY, 2020

Venue :
University of Agricultu
Sciences, Raichur,
Karnataka

Jointly Organised by

AZRA UASR ESI

OP-7

Pollination efficiency of Non-Apis Bee pollinators in North Western Indian Himalayas

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Crop pollination by honey bees are well studied and documented, thus honey bees considered as the major pollinator of crops. A large number of non-Apis bees (bumble bee, digger bee, alkali bee, mason bee, small carpenter bee, leaf cutter bee, *etc.*) are also effective and specialized pollinators. There are about 24 species of non-Apis bees documented at Uttarakhand hills in different crop plants and ornamentals. Non-Apis bees are found to visit flowers of radish, cabbage, broccoli, summer squash, coriander, buckwheat, mustard etc in the region. Radish harbour relatively large number of non-Apis bees namely the sand bees, carpenter bees, leaf cutter bees, anthophorid bees and bumble bees. Digger bees were found in large numbers (0.12/ m^2/ min.) and they are found to have their nests nearby radish fields too. In toria/ mustard, non-Apis bees such as digger bees and sweat bees are seen in low populations with only 0.03 bees/ m^2/ min. and with a relative abundance of 2.05% of total pollinators/ flower visitors. Though non-Apis bees have a low share of 7.43% of total pollinators of cabbage, its availability is 0.15 bees/ m^2/ min. Ceratina bees are found visiting buckwheat and summer squash flowers. The pollination efficiency of Indian bee (*Apis cerana*), digger bee (*Andrena savigniyi*) and small carpenter bee (*Ceratina smaragdula*) was estimated to be 0.43, 0.39 and 0.16 in radish. The digger bees and carpenter bees caused an increase seed yield of 28.2% and 20.5% compared to control fields, thus the digger bees, *A. savigniyi* are good pollinators of radish. Bumble bee, *Bombus haemorrhoidalis* was found to be effective pollinator than small carpenter bees in summer squash. About 1.8 visits of bumble bee on a single female summer squash flower are required for optimum fruit formation and seed set however small carpenter bees has to visit 2.7 times. Small carpenter bees, *Ceratina* sp are good pollinators of buckwheat. Digger bees are found to have their nesting site in sandy patches near the flowering plants especially radish. Providing stick nest and pot nest for small carpenter bees and bumble bees, respectively attract and make them available in the crop fields and thus pave way for their conservation.

Keywords: Pollination, *Apis cerana*, Digger bees, Bumble bee.

OP-8

Foraging behavior of a wild bee species, *Pseudapis oxybeloides* Smith in Cashew

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Cashew (*Anacardium occidentale* L.) is an andromonaecious tree crop having stick pollen thus requires insects for pollination. In cashew plantations of Puttur, out of 40 flower visitors recorded on cashew, 64 % of the insect species belong to Apidae and Halictidae, while

the rest comprise of megachilids, scolids, bombylids, syrphids, sciarids, calliphorids and butterflies. Among the bee species visiting cashew flowers, a wild bee, *Pseudapis oxybeloides* Smith (Halictidae: Hymenoptera) was noticed as one of the common pollinators of cashew in Puttur region, located in South - West Karnataka. Other common species include *Braunsapis picitarsus* (Cameron), *Apis cerana indica* F. and *Ceratina hieroglyphica* Smith. This present investigation aimed to record the foraging behavior of *P. oxybeloides* on cashew flowers. The bees are stout, have large tegula and pale bands in abdomen, and are polylectic. It is a very good forager on cashew flowers collecting plenty of pollen grains. Foraging activity of *P. oxybeloides* started on cashew flowers between 9.00 and 10.00 am depending on the sunshine. Peak foraging activity was noticed between 10.30 am and 1.00 pm, while, the activity was almost absent during evening hours. Though, *P. oxybeloides* bees visited cashew flowers both for pollen and nectar, primary reward was pollen. The bees preferred freshly opened flowers, most commonly male flowers. Around 3-5 flowers were visited by a bee during a trip. Most of the times, the bees while on flight itself directly collected pollen grains from the anthers of long stamen of male flowers. Sometimes, bees collected nectar first and moved up to collect pollen. It was observed that bees touched the stigma of hermaphrodite flowers in flight during most of the times while moving among the flowers of inflorescence. Foraging speed varied between 1-4 seconds/ flower. Pollen load/ bee was recorded between 502 and 998. Interestingly, nesting sites of *P. oxybeloides* were located in the ground, sides of water passages in the cashew plantations and also in lateritic stone surface on ground without thick vegetation. Conservation of such nesting sites need to be taken care to protect this bee species.

Keywords: Wild bee species, *Pseudapis oxybeloides*, cashew