



NESTING BEHAVIOUR OF THREE SPECIES OF *CERATINA* POLLINATING CASHEW

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ABSTRACT

Cashew is a cross-pollinated crop requiring insects primarily bees for successful pollination. Honey bees and several native bees are important pollinators of cashew. Among the native bees, *Braunsapis* spp. and *Ceratina* spp. are commonly present in the study region. Under *Ceratina*, three species namely, *C. hieroglyphica*, *C. bingami* and *Ceratina* sp. 1 have been recorded on cashew and their nesting behaviours have been documented under the present investigation. The nests of these three bee species have been found in dried twigs/ sticks of cashew trees. Nests of all three species had smooth circular entrances, but the diameter of the entrance hole varied with species. It was just 1.0-1.5 mm for *Ceratina* sp. 1, 2.5-4.0 mm for *C. hieroglyphica*, 3.5-4.0 mm for *C. bingami*. The nest, as well as cell dimensions, varied with species. In all three species, older cells were at the bottom of nests, while young ones were towards the entrance. Each egg was laid on the pollen provided in an individual cell and sealed with powdered wood particles. Guarding at nest entrance by adult female blocking with its abdomen was commonly noticed in the nests. The number of individuals in a single nest varied between 1-14, 1-7 and 1-19 for *C. hieroglyphica*, *C. bingami* and *Ceratina* sp. 1, respectively. The trees with the pruned cut ends had more number of bee nests compared to unpruned ones. The study suggests that increasing smooth cut ends in the sticks by pruning and leaving the dried sticks in the cashew plants wherever possible can facilitate the native bees to make nests in them thereby they can be conserved.

Key words: Cashew, pollinator, nest, *Ceratina*, *Braunsapis*, pollen, bees, cross-pollination, behaviour, foraging

Cashew, *Anacardium occidentale* L. is a cross-pollinated commercial tree nut crop having sticky pollen and requires insects for pollination. Though multiple insect species visit cashew flowers, bees are important for pollination (Sundararaju, 2000). Recent surveys in cashew plantations showed that along with honey bees, several wild bees, including genera *Braunsapis*, *Ceratina*, *Pseudapis*, *Lasioglossum* etc. *Ceratina* spp. (Apidae: Hymenoptera) are common pollinators of cashew in the Puttur region of Karnataka, India (Vanitha and Raviprasad, 2016). Foraging activity of common bees on cashew flowers was documented and the peak foraging activity was noticed between 11.00 and 13.00 hrs (Vanitha and Raviprasad, 2018). Observations at cashew plantations led to the location of bee nests in the thin dried stem portions or cut ends of cashew sticks. *Braunsapis* spp. were the dominant ones among the stem nesting bees, followed by *Ceratina hieroglyphica* Smith, *Ceratina* sp. 1. and *C. binghami* Cockerell. The bees under genus *Ceratina* Latreille (Apidae: Ceratinini) are commonly known as small carpenter bees, and they can be easily separated from Halictids by its long glossa and tiny jugal lobe in the hindwings (Grissell, 2017). Although the genus *Ceratina* is taxonomically diverse in the tropics, many aspects of Neotropical species

are still poorly known (Gonzalez et al., 2004). Thus, the study aimed to document the nesting behaviour of three *Ceratina* bee species pollinating cashew flowers.

MATERIALS AND METHODS

Observations for the presence of bee nests in dried twigs or stems were undertaken in the cashew plantations of ICAR- Directorate of Cashew Research, Puttur, Karnataka. The region is a hilly track between the West Coast and the Western Ghats of India, located at 12.77 °N and 75.22 °E at an average elevation of 87 metres. The vegetation cover of the study site was dominated by cashew which was grown as a monocrop, while, weed flora including *Leucas aspera*, *Mimosa* spp., *Ceasalpinia* sp., *Spermacoce* sp., *Tridax procumbens*, *Wedalia trilobata* etc and perennial trees like areca nut (*Areca catechu*), rubber (*Hevea brasiliensis*) and other forest cover surrounds the study site. The soil type is lateritic. The temperature in the area varies from 16.0 to 39.0 °C and relative humidity varied from 43 to 98%, with mean annual rainfall of 3970 mm.

Observations revealed that the presence of neat circular holes at the tips of dried cashew sticks or pruned cut ends indicates occupation by nests. Such