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Comparative Foraging Efficiency of Insect Pollinators Visiting Coriander (*Coriandrum sativum* L.) Bloom

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ABSTRACT

Coriander is a glabrous, aromatic annual and erect plant which is cultivated for its leaves and seeds. It is attracted by diverse insect species which result in efficient pollination of the crop. An effort to find the foraging activity of main pollinators in coriander was done. The highest foraging speed (time spent on umbel) was recorded in *Xylocopa valga* and minimum in *Apis cerana*. The lowest foraging rate (umbels/minute), however, was observed in case of *X. valga* that visited less number of flowers per minute and minimum was in *A. cerana*. *A. cerana* started foraging early at 0730 ± 0014 hours however, late cessation was recorded in *Bombus trifasciatus* (1930 ± 0018 h). The highest foraging period (h) was observed in *B. trifasciatus* and shortest was in *A. mellifera*.

Key words: Coriander, Foraging activity, Pollinators, Foraging speed, Foraging rate.

Introduction

Coriander (*Coriandrum sativum* L.) is one of the important seed spices, (Meena *et al.*, 2015) and is grown in India, Morocco, Russia, East European countries, France, Central America, Mexico and USA (Coskuner and Karababa, 2007). Being good source of aromatic compounds and essential oils, is cultivated for its leaves and seeds and such oils are biologically active possessing ingredients which have antibacterial, antifungal and antioxidant activities (Mandal and Mandal, 2015). It is one of the 20,000 species of plants which is used in food, cosmetics and other chemicals in the world (Hmamouchi, 1997). The seeds possess 5 per cent of ash and also malic acid, tannin and some fatty matter (Diederichsen, 1996). The crop attracts diverse pollinators as there is presence of exposed nectar, abundant pollen production, zygomorphic flowers

and compact umbels which attract the pollinators (Koul *et al.*, 1989; Diederichsen, 1996). Out of the array of floral visitors, *Apis mellifera*, *A. cerana*, *A. dorsata*, *A. florea* and *Trigona iridipennis* are the main bee pollinators of coriander that visit more for nectar and also obtain pollen (Anonymous, 2001).

Methodology

The experiment was carried out at Experimental Farm, of Division of Entomology, Faculty of Agriculture, SKUAST-K Wadura. Local variety of coriander was sown in a single plot (10x10 m²) with row to row and plant to plant distance as 30 and 8 cm, respectively. Foraging activity of main pollinators viz., *Apis* spp., *Xylocopa* sp. and *Bombus* sp. was determined on the basis of foraging speed, foraging rate and foraging period.

Table 2. Foraging period of different insect pollinators on coriander (*Coriandrum sativum* L.)

Insect Pollinators /Visitors	Foraging activity (time in hours)		
	Initiation	Cessation	Total activity period/day
<i>Apis cerana</i>	0730 ± 0014	1815 ± 0021	10.50 – 11.00
<i>Apis mellifera</i>	0850 ± 0017	1740 ± 0016	8.00 – 9.00
<i>Xylocopa valga</i>	0745 ± 0018	1705 ± 0022	9.00 – 9.50
<i>Bombus trifasciatus</i>	0800 ± 0013	1930 ± 0018	11.00 – 12.00

*Mean of seven observations

reported higher foraging duration (13.10 ± 0.75 h) in *A. cerana* as compared to *A. mellifera* ($12.40-0.01$) which supports the present findings. Gautam *et al.* (2018) recorded initiation and cessation time in *X. fenestrata* as 0542 and 0551 hours, respectively, with total foraging period of 11.00 hours on ridge gourd bloom. Nayak *et al.* (2019) observed *B. haemorrhoidalis* starting foraging activity on kiwifruit inside cage from early morning (0610 h) till late in the evening (1750 h) with long foraging hours (11.40 h).

Conclusion

Coriander attracts diverse insect pollinators for its pollination. *A. cerana* has highest foraging rate and less foraging speed on coriander which means it spends less time per visit on the umbel but visits more number of umbels per unit time making it an efficient pollinator on coriander among all other pollinators. *A. cerana* has highest contribution in the pollination of coriander than other pollinators.

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