SHORT COMMUNICATION

FORAGING BEHAVIOUR OF STINGLESS BEE, *TETRAGONULA IRIDIPENNIS* (HYMENOPTERA –APIDAE) IN BROCCOLI FLOWERS IN AMBIKAPUR OF CHHATTISGARH

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Abstract: The observation was undertaken at Rajmohini Devi College of Agriculture and Research Station, Ambikapur of Indira Gandhi Krishi Vishavidyalaya Raipur (C.G.) during 2018-19 to study the foraging activity of stingless bee on broccoli flowers at five spots, five minutes per square meter at different hours of the day from 8AM to 5PM. The foraging activity was recorded highest in between 10-11AM (7.82 bee/5min/m^2/day) followed by in between 11-12 (4.91 bee/5min/m^2/day) noon and between 9-10 AM (4.00 bee/5min/m^2/day) and decreased in between 1-2PM (1.88 bee/5min/m^2/day), 2-3 PM (1.42 bee/5min/m^2/day) and increased between 3-4 PM(2.22 bee/5min/m^2/day). However, the lowest activity was recorded in between 4-5 PM (1.00 bee/5min/m^2/day).

Keywords: Broccoli flower, Foraging behavior, Stingless bee, *Tetragonula iridipennis*

INTRODUCTION

Broccoli is an important edible vegetable crop belongs to cabbage family (Brassica).Its green flowering heads, leaves and stalk are eaten as vegetable. It is grown in cool season required 20-25^{0}C and curd is formed in the December month when the curd is leaves for seed purpose it started flowering in March month in Surguja region. Its flowers are yellow which is rich in nectar and pollen due to which honey bees and other pollinators are attracted to visit the broccoli flowers. Stingless bee is important insect visitors visited the broccoli bloom during starting to end of the bloom.

MATERIALS AND METHODS

The observation was undertaken at RMD college of Agriculture and Research Station, Ambikapur (C.G.) during 2018-19 to study the foraging activity of small insect stingless bee on broccoli flower. The bee population was recorded randomly selected five spots, per square meter area during five minutes at five days intervals. The population of stingless bee was recorded from 8 AM to 5 PM per day during the initial of bloom to end of blooms.

(A) Broccoli flower

(B) Stingless bee foraging on flower

RESULTS AND DISCUSSION

The result depicted in table 1 that the stingless bee visited the broccoli flowers at the initial stage of the crop was observed from 8AM to 5PM.At the first week of observation the maximum visitation was recorded in between 10-11 AM (3.6 bee/5min/m^2/day) followed by at 11-12 noon (3.4 bee/5min/m^2/day) and at 8-9 AM (2.20 bee/5min/m^2/day) however, minimum population was recorded in between 4-5PM (0.6 bee/5min/m^2/day).

During the second week of observations the highest foraging activity was recorded in between (5.00 bee/5min/m^2/day) followed by 11-12 noon (4.20 bee/5min/m^2/day) 9-10 AM (3.60 bee/5min/m^2/day) and 8-9 AM (2.00 bee/5min/m^2/day) however the

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lowest population was observed in between 4-5PM (1.00 bee/5min/m^2/day).

During the third week, the highest population was recorded in between 10-11AM (7.8 bee/5min/ m^2/day) followed by in between 11-12 noon (5.00 bee/5min/m^2/day) and 9-10 AM (4.2 bee/5min/ m^2/day) and lowest was found during 4-5PM (0.400 bee/5min/m^2/day).

In the 4th week higher bee population was recorded in between 10-11AM (10.20 bee/5min/m^2/day) followed by in between 11-12 noon(6.20 bee/5min/ m^2/day) and at 1-2PM (3.8 bee/5min/ m^2/day) but the lowest bee visitation was recorded in 4-5 PM (1.20 bee/5min/m^2/day).

During 5th week similar population was recorded in between 10-11 AM (12.20 bee/5min/m^2/day) followed by in between (5.80 bee/5min/m^2/day) however the lowest population was noticed at 4-5PM (1.40 bee/5min/m^2/day).

In 6th week the higher visitation was recorded in between 10-11AM (11.00 bee/5min/m^2/day) followed by in between 11-12noon(6.20 bee/5min/ m^2/day) and 9-10 AM (5.00 bee/5min/ m^2/day) hoever the lower population was observed in between 2-3PM (1.20 bee/5min/m^2/day).

During the 7th week the bee visitation was found decreased due to less quantity of flowers. However, the higher visitation was recorded in between 10-11AM (5.00 bee/5min/m^2/day) followed by in between 11-12 noon(3.6 bee/5min/m^2/day) and at 9-10AM(3.5 bee/5min/m^2/day) however less visit was recorded at 4-5PM(0.60 bee/5min/m^2/day).

It is clearly depicted that overall the maximum foraging activity was observed in between 10-11AM (7.82 bee/5min/m^2/day) followed by in between (4.91 bee/5min/m^2/day), at 9-10AM(4.00 bee/5min/ m^2/day) at 3-4 PM(2.22 bee/5min/m^2/day), at 8-9AM(1.94 bee/5min/m^2/day), at 1-2 PM(1.88 bee/5min/m^2/day) and at 2-3 PM(1.42 bee/5min/ m^2/day).The minimum visit was recorded in between 4-5PM(1.00 bee/5min/m^2/day).

The line are more or less similar with the earlier workers Bruijn and Sommeeijer (1997) studied on individual nectar foraging of stingless bee,Nemato *et al* (2000) on stingless bee as crop pollinators a review, Saravanan *et al* (2004) worked on resin foraging, Saravanan (2007) for incoming stingless bee,Ghazi *et al* (2014) who reported on foraging activity of stingless bee and Vijyan *et al* (2018) recorded on season and timing of stingless bee.

Table 1. Population of stingless bee on broccoli flowers during 2018-19.

Date of observations	Population of bees/5min/m^2 (Different hours of the day)							
	8-9 AM	9-10Am	10-11Am	11-12Noon	1-2PM	2-3PM	3-4PM	4-5PM
28/02/19	2.2	3.0	3.6	3.4	1.6	1.0	1.8	0.6
06/03/19	2.0	3.6	5.0	4.2	1.4	1.2	1.6	1.0
11/03/19	1.8	4.2	7.8	5.0	1.2	1.4	2.2	0.4
16/03/19	1.4	3.2	10.2	6.2	3.8	2.6	3.6	1.2
21/03/19	2.6	5.4	12.2	5.8	2.2	1.8	2.4	1.4
26/03/19	2.4	5.0	11.0	6.2	1.8	1.2	2.6	1.8
31/03/19	1.2	3.5	5.0	3.6	1.2	0.8	1.4	0.6
Total	13.6	28	54.8	34.4	13.2	10	15.6	7.00
Mean	**1.94**	**4.00**	**7.82**	**4.91**	**1.88**	**1.42**	**2.22**	**1.00**

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REFERENCES

Amano, Kazuhire, Nemoto, T. and Heard, T.A. (2000). What are stingless bees, and why and how to use Them as crop pollinators? – A Review JARQ 34(3):183-190.

Bruijn, L.L.M.de and Sommeeijer, M.J. (1997). Colony foraging in different species of stingless bees (Apidae, Meliponinae) and the regulation of individual nectar foraging.Insects, Soc 35-47.

Ghazi, R., Azmi, W.A., Jaapar, M.F. and Hasaan, N.B. (2014). Foraging Activities of Stingless Bee (Hymenoptera: Apidae: Hetrotrigona itama) international symposium on insects, 1-3 December.pp 21-27.

Saravanan , P.A., Muthuraman, M. and Sriram, R. (2004). Some observations on certain behaviours of stingless bee *Trigona iridipennis* Smith. Proceedings of the 8th IBRA international Conference on Tropical Bees and VI Encontro sobre abelhas, Sep 4th to 10 2004.

S**aravanan, P.A. and Alagar, M.** (2007). Foraging activity of stingless bee, *Trigona iridipennis* Smith. Journal of Plant Prot. Environment 4(2):65-69.

Vijayan, M, Saravan, P.A. and Srinivasan, M.R. (2018). Effect of season and timings on the foraging activity of stingless bee *Tetragonula iridipennis* Smith (Hymenoptera- Apidae).Madras Agric. Journal, 105(7-9):286-290.