Uttar Pradesh J. Zool. 12 (2) : 107-110, 1992 ISSN 0256-971X

TROPILAELAPS CLAREAE DELFINADO AND BAKER (ACARI : LAELAPIDAE) INFESTING ADULTS OF *APIS MELLIFERA* LINN.

S. SRIVASTAVA, ARUN KUMAR, O.P. SHARMA AND DESH RAJ
HIMACHAL PRADESH KRISHI VISHVAVIDYALAYA, BEE RESEARCH STATION, NAGROTA-BAGWAN - 176047, INDIA.

All the three castes of *A. mellifera* were found harbouring the adult females of *T. clareae* on their bodies. The mites were found attached to the narrow posterior mesothoracic plate, second abdominal tergite and propodeum of bees. The incoming foragers and drones harboured lesser number of mites than the outgoing ones.

INTRODUCTION

Delfinado & Baker first described *T. clareae*, a mite in 1961, collecting the individuals from dead samples of *Apis cerana*. Later Delfinado-Baker & Aggarwal (1987) described *T. clareae* leading both an oligophagus and polyphogus life infesting the five species of *Apis i.e. A. mellifera, A. cerana, A. dorsata, A. laboriosa and A. florea*. In case of *A. mellifera*, this mite was observed moving fast on combs, infesting and damaging mainly the brood (Atwal, 1969; Atwal & Goyal, 1971; Wang *et al.*, 1986). Chahal *et al.* (1986) and Naim & Bist (1987) described the occurrence of this mite only on adult honeybees but they failed to specify the harbouring caste. Recently Woyke (1984 & 1987) and Wang *et al.* (1986) have categorically reported the occurrence of *T. clareae* on adult workers of *A. mellifera*. In view of scanty information on host-pest interaction, further studies with regard to the association of the mites and adults of three castes of *A. mellifera* honeybees *viz.* workers, drones and queens have been made.

MATERIAL AND METHODS

Twenty adult worker and 20 adult drone bees each from five infested and untreated *A. mellifera* colonies were randomly caught from the combs with the help of a forceeps. Similar number of outgoing and incoming foragers and the drones were also caught at the entrance of the infested colonies. Each of such bees was examined on the spot under a hand lense (10 x) for the presence and place of attachment of the mite. Then each bee was rinsed and washed in petrol (Koeniger *et al.*, 1983) to dislodge and count the attached mites. Similarly laying queens of 10 infested colonies were examined only under a hand lense (10x). The observations were taken five times on alternate days. Homology of honeybee's body parts, suggested by Snodgrass (1975), is used to describe the place of attachment of mite on the adults of *A. mellifera*. The above studies were conducted during the months of August-September, 1991 at Nagrota Bagwan (906m asl, 32° 1′ N Latitude, 76° 19′E Longitude).

RESULTS AND DISCUSSION

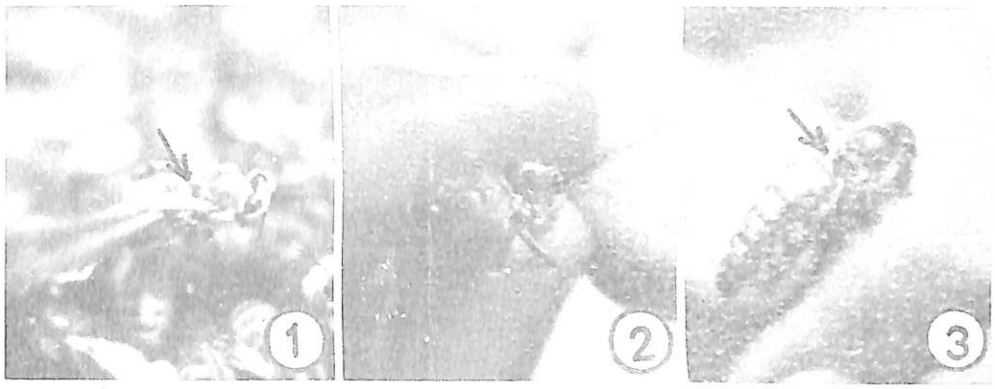
The adult workers as well as as the drones and the queens of *A. mellifera* were found harbouring the adult females of *Tropilaelaps clareae* (Figs. 1-3). The mite population recorded on three castes are presented in Table I. A total of 4.09% of the adult workers inside the hive, 2.72% of outgoing but a negligible population (0.68%) of incoming foragers were

Table. I. The population of *Tropilaelaps clareae* on adult worker, drone and queen bees of *A. mellifera* at Nagrota–Bagwan.

Colonies Sr. Number	5		8		15		44		63		Total		
Caste of bee examined	Bees examined	Bees infested	Bees examined	Bees infested	Bees examined	Bees infested	Bees examined	Bees infested	Bees examined	Bees infested	Bees examined	Bees infested	% infestation
WORKERS													
Inside the hive	100	6 (1 – 2)	60	2 (1)	100	3 (1)	100	5 (1)	80	2 (1 – 2)	440	18 (1 – 2)	4.09
Outgoing foragers	100	2 (1)	60	2 (1)	100	2 (1)	100	2 (1)	80	3 (1 – 2)	440	12 (1 – 2)	2.72
Incoming foragers	100	1 (1)	60	0	100	0	100	1 (1)	80	1 (1)	440	3 (1)	0.68
DRONES													
Inside the hive	80	5 (1 – 3)	40	4 (1 – 2)	100	7 (1 – 5)	60	5 (1 – 5)	40	2 (1 – 2)	320	23 (1 – 5)	7.18
Outgoing	80	3 (1 – 2)	40	2 (1 – 4)	100	5 (1 – 2)	60	3 (1 – 2)	40	2 (1 – 2)	320	14 (1 – 4)	4.68
Incoming	80	1 (1)	40	0	100	1 (1)	60	2 (1)	40	1 (1)	320	5 (1)	1.56
QUEENS											10	6 (2 – 5)	60.00

Figures in parentheses indicate the number of mite-per infested bee.

observed parasitized by mite. The mites on the adult workers were found attached either on the posterior narrow plate of mesonotum or on the II abdominal tergite (Fig.1). A total of 7.18% of *A. mellifera* drones inside the hive were found with mites on their bodies, whereas a total of 4.68% (3.75 to 5% per colony) and 1.56% (0 to 3.33% per colony) populations of the outgoing and incoming drones, respectively, in different colonies were also observed carrying mites on their bodies. The infested drones resting inside the hive or going out were found harbouring 1-5 mites per drone (Table I). The mites remained attached to posterior narrow plate of mesonotum and on the II abdominal tergite (Fig. 2) and also to the sternal areas of meso-and metathorax as well. Sixty percent queens of the infested colonies were harbouring the adult females of *T. clareae*. The number of mites per infested queen varied between 2 to 5 (Table I). The place of attachment on their bodies were identical as in the case of worker bees and also on the propodeum (Fig. 3).



Figs. 1-3. 1. One female mite, *T. clareae* attached on posterior mesothoracic plate of *A. mellifera* worker; 2. Two female mites attached on the tergum of second abdominal segment of *A. mellifera* drone; 3. Three female mites attached on the propodeum of *A. mellifera* queen.

The occurrence of *T. clareae* on the adult workers of *A. mellifera* is in conformity with the observations made by Morse & Laigo (1969), De Jong *et al.* (1986), Burgett *et al.* (1983), and Chahal *et al.* (1986). Woyke (1984) and Koeniger and Muzaffar (1988) reported that the mite can survive on adult workers for about 2 days and 24 hrs under caged conditions. The presence of *T. clareae* on the outgoing and the incoming foragers, drones as well as on the queens of *A. mellifera* is being reported for the first time. Further, since the drones have free entry to different colonies, the occurrence of mite in considerable numbers on the drones inside the hive and outgoing ones (1-5 mites/drone) is quite interesting. The mite *T. clareae* must be using the drones chiefly as a means of the dispersal in the apiaries. The attachment of the mites in lesser number on the workers (1-2 mites/worker) than on the drones (1-5 mites/drone) is assigned due to extensive and frequent grooming behaviour of the workers. The lesser number of mites recorded on the incoming foragers than that of the out going ones indicated that some of the mites get dislodged either on flowers or in the field during the flight. If the mites get dislodged on the flowers, its interaction with other foragers of the same or different *Apis* species visiting the flowers may help the mite to get entry into other colonies. However, this needs further investigation.

The mite *T. clareae* holds a variation from *Varroa jacobsoni* Oudemans as regards to its place of attachment on the adult *A. mellifera*. *V. jacobsoni* has been reported though attached to the thoracic tergite (large anterior plate of the mesonotum, Akrantankul, 1987; Kumar *et al., 1988), yet the majority were found under the abdominal sternites (Karaus et al.*, 1986). *T. clareae* was found attached on the narrow posterior plate of mesonotum and

in the majority on the II abdominal tergite and on the propodium of the bees in the present observations.

ACKNOWLEDGEMENTS

The authors are grateful to Prof. Dr. N.P. Kashyap, Head, Department of Entomology, HPKV, Palampur for providing facilities during the course of studies.

REFERENCES

AKRATANAKUL, P. 1987. *Honeybee diseases and enemies in Asia : a practical guide*. FAO, Rome. p 51.

ATWAL, A.S. 1969. Serious infestation of *Apis mellifera* L. bees by the ectoparasitic mite *T. clareae*. *XXII Int. Beekeep. Congr. Summ.* **22** : 108.

ATWAL, A.S. & GOYAL, N.P. 1971. Infestation of honeybee colonies with *Tropilaelaps* and its control. *J. apic. Res.* **10** (3) : 137-142.

BURGETT, M., AKRATANAKUL, P. & MORSE, R.A. 1983. *Tropilaelaps clareae* a parasite of honeybees in South east Asia. *Bee Wld.* **64** : 25-28.

CHAHAL, B.S., BRAR, H.S., JHAJJ, H.S. & GATORIA, G.S. 1986. Status of bee diseases and ectoparasitic mites in *Apis mellifera* L. in Punjab, *India. Indian J. Ecol.* **13** (1) : 46-51.

DE JONG, D., MORSE, R.A. & EICKWORT, G.C. 1982. Mite pests of honeybees. *Ann. Rev. Entomol.* **27** : 229-252.

DELFINADO, M.D. & BAKER, F.W. 1961. *Tropilaelaps*, a new genus of mite from the Philippines (Laelapidae (S. Lat.) Acarina). *Fieldiana Zool.* **44** (7) : 53-56.

DELFINADO-BAKER & AGGARWAL, K. 1987. Infestation of *Tropilaelaps clareae and Varroa jocobsoni* in *Apis mellifera liguistica* colonies in Papua New Guinea. *Amer. Bee Jour.* **127** (6) : 443.

KARAUS, B., KOENIGER, N. & FUCHS, S. 1986. Unterscheidung zwischen Bienen veischiedenen Alters durch *Varroa jocobsoni* Oud. und Bevorzugung von Ammenbienen in Sommerbienenvolk. *Apidologie.* **17** (3) : 257-266.

KOENIGER, N. & MUZAFFAR, N. 1988. Life span of the parasitic honeybee mite *T. clareae* on *Apis cerana, Apis dorsata* and *Apis mellifera. J. apic Res.* **4** : 207-212.

KOENIGER, N., KOENIGER, G. & DELFINADO-BAKER, M. 1983. Observations on mites of the Asian honeybee species (*Apis cerana, Apis dorsata, Apis florea*). *Apidologie.* **14** (3) : 197-204.

KUMAR, J., GUPTA, J.K. & DOGRA, G.S. 1988. Discovery of the ectoparasitic mites *Varroa jacobsoni* on *Apis mellifera* L. in Himachal Pradesh, India. *Amer. Bee Jour.* **128 :** 124.

MORSE, R.A. & LAIGO, F.M. 1969. The potential and problems of beekeeping in the Philippines. *Bee Wld.* **50** : 9-14.

NAIM, M. & BIST, B.S. 1987. A review on mites as pests of honeybee. *Indian Bee J.* **49** : 54-57.

SNODGRASS, R.E. 1975. The anatomy of honey bee. In : *The hive and the honey Bee.* Dadant and Sons, Hamilton, Illinois. pp. 75-124.

WANG, J., WEI-HAU ZHANG, MIN HONG, SHAO-TING YANG & ZHE-HONG WU 1986. A preliminary investigation on the owerwintering of small mites (*T. clareae*) (in chinese). *J. Fujian. Agri. Coll.*13(4) : 299-303.

WOYKE, J. 1984. Survival and prophylactic control of *Tropilaelaps clareae* infesting *Apis mellifera* colonies in Afganistan. *Apidologie.* **15** : 421-434.

1987. Length of stay of the parasitic mite *Tropilaelaps clareae* outside sealed honeybee brood cells on a basis for its effective control. *J. apic Res.* **26** (2) : 104-109.