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Studies leading to bio-ecology of cabbage aphid, *Brevicoryne brassicae* (L.) were investigated giving special emphasis on various aspects of population trends, biology, morphology and associated natural enemies in Manipur. Efficacy of some important insecticides and plant-based compounds were also studied. Results were analysed with suitable statistical methods and presented in different chapters.

Regular surveys showed that this species enjoys a serious infestation on all the cruciferous crops in different parts of Manipur. Among the hosts, cabbage, *Brassica oleracea* (local variety) was the main host plant infesting a total period of about seven to nine months. The data on the incidence of this pest at altitudinally different agroclimatic zones revealed that the incidence pattern was in descending order as the altitude decreased. Appreciable density of the pest was also recorded at Mao (high altitude) during the period of peak abundance (1,257.67 aphids/sample) which is followed by Kangpokpi and Imphal respectively. Similarly, the peak period was also found varying between the three study sites.

Of the three different forms of aphid, maximum was represented by the nymphs followed by apterous and alate adults.
The alate and apterous population varied from 0.45-7.69% and 2.08-27.50% in all the sites. But the nymphs represented considerable proportion of 72.50-94.60%.

The correlation between aphid populations with biotic and abiotic factors showed that the abiotic factors, such as, temperature, relative humidity and rainfall were found to be negatively correlated with the aphid population except in some respects. The biotic factors like Coccinellid and Syrphid predators exhibited positive correlation during both the cropping seasons at all the three study sites. It may be mentioned here that average temperature and rainfall were important among the abiotic factors and among the natural enemies Syrphids were important in regulation of the aphid population under field condition.

The variation or trend in growth rate and the reproductive potential were almost similar to that of the field abundance of the pest in all the study sites indicating that growth rate and reproductive potential could also be used as an indicator to know the seasonal variations of the population of a given species.

Field assessment indicated the regular presence of three Coccinellids, such as, Coccinella septempunctata, C. transversalis and Menochilus sexmaculatus and three Syrphids, viz.,
Metasyrphus (M.) confтратer, Ischiodon scutellaris and Episyrophus balleatus as predators in the aphid colony, in addition to an aphid parasitoid, Diaeretiella rapae. The predators were very much seasonal and followed similar trend of fluctuation with that of the aphids. The Syrphids were dominant over the Coccinellids at study site I and III whereas Coccinellids outnumbered the Syrphids at study site II. However, out of the total predators, Syrphids constituted 43.24-65.75% and the rest being Coccinellids (34.25-41.93%) at the three study sites.

The data indicated that both the factors (biotic and abiotic) were seemed to be responsible for the maintenance of the population of B. brassicae under field conditions. But considering the above two factors, abiotic factors like temperature and rainfall showed profound influence on the population of aphid.

The incidence of alate aphids trapped was found to be coincided with its infestation level on its plant host. Peak alate population was observed in the last week of January. Alate population trapped showed a highly significant (P < 0.05) negative correlation with minimum temperature and rainfall.

Present study revealed that B. brassicae is an oligophagous species as its host plants belonged to the family cruciferae. Biology of this aphid was studied on cabbage (local variety)
in 3 seasons, viz., Autumn, Winter and Spring. The total nympha
development took 7.91, 9.74, 13.52 days during Autumn, Spring
and Winter seasons respectively. The reproductive period was
longer in Winter (22.83 days) followed by Autumn and Spring.
Adult longevity was also more in Winter (29.56 days) followed
by Autumn and Spring respectively. Fecundity was significantly
higher in Winter (64.5) and minimum in Spring (24.16). Total
life cycle varied from 29.34, 33.84 and 43.08 days in Spring,
Autumn and Winter respectively.

Comparative biology of B. brassicae was studied on six
cruciferous host plants, viz., Cabbage I (improved variety),
Cabbage II (local variety), Cauliflower, Knol khol, Mustard,
Radish. It revealed that the total nymphaal development ranged
from 12.91-15.15 days in average. Fecundity was significantly
higher on knol khol and cabbage II (30.4, 28.6 nymphs/female).
Similarly, adult lived for longer period on knol khol and cabbage
II showing the preferred hosts of this pest.

The biology of this pest was also conducted by exposing
in three different photoschedules, i.e., LD 8:16, LD 12:12 and
LD 16:8 in the laboratory. Under LD 8:16 treatment, the pest
could complete the nymphaal development quickly and the fecundity
as well as longevity were also significantly higher than the
other LD treatments. It revealed that the cabbage aphid, *B. brassicae* responded as short-day species.

The morphometric data of different developmental stages of the aphid revealed the morphological changes in different seasons which would enable in understanding the difference between the stages. Nymphal key characters have been provided for separating the different instars which could be properly utilised for identification of the stages collected from the field. During the comparative biology of the aphid in the laboratory, four apterous oviparous females were also recorded from the three host plants. A brief description of the sexual female is also appended.

The natural enemy complex of *B. brassicae* comprised of three species of Coccinellids and six species of Syrphids among the predators and one species of Aphidiid among the parasitoids. The parasitoid was observed sporadically. Seasonal abundance of the predators closely synchronised with the population trend of the host aphid. Prey–predator relationship with reference to seasonal abundance, developmental biology, morphology and feeding efficiency including behavioural aspects of common predators of the aphid have been studied. In general, Syrphids were dominant over the Coccinellids. Among the predatory insects, *Metasyrphus (M.) confrater* was the most abundant speices among
the syrphids and among the coccinellids, *C. septempunctata* was the most abundant.

Comparative biological study of these predators revealed that *M. (M.) confretar* appeared to be an efficient predator in terms of consumption (260.28 aphids/larva). The consumption of *E. balteatus* was found to be the least (184.83 aphids/larva).

Efficacy of the insecticides and plant products revealed that insecticides were significantly more effective than the plant products. Among the insecticides, *Monocrotophos* (0.05%), *Quinamphos* (0.05%) and *Malathion* (0.05%) registered higher percent mortality during the initial period of treatment and reached cent percent after 72 hr of treatment. However, the neem product, *Nimbecicidina* (0.03%) showed less percent mortality initially (21%) but reached 67.33% mortality after 72 hr of treatment showing a promising result.