Life table and demographic parameters of mustard aphid, *Lipaphis erysimi* (Kaltenbach) (Hemiptera: Aphididae) on five brassicaceous host crops

Keerthi Manikyanahalli Chandrashekara[1,2], Sachin Suresh Suroshe[1,*], Praveen Kumar Singh[3], Subhash Chander[4] and Padala Vinod Kumar[1]

[1]Division of Entomology, ICAR-Indian Agricultural Research Institute, Pusa, New Delhi 110 012, India
[2]Division of Crop Protection, ICAR-Indian Institute of Horticultural Research, Bengaluru 560 089, India
[3]Centre for Protected Cultivation Technology, ICAR-Indian Agricultural Research Institute, Pusa, New Delhi 110 012, India
[4]ICAR-National Research Centre for Integrated Pest Management, New Delhi 110 012, India

Brassica **plants play a significant economic role as they are cultivated as vegetables, oilseed sources, condiments and forages. Emerging insect pest outbreaks threaten the production of cole crops. The mustard aphid, *Lipaphis erysimi* (Hemiptera: Aphididae) is a perpetual annual threat to the cultivation of cole crops in India. The life table is a fundamental requisite for formulating pest management strategies. Hence, the life table of *L. erysimi* was studied on five brassicaceous host plants. The results showed that the total nymphal duration was shortest on mustard (5.82 ± 1.10 days), whereas it took 8.80 ± 0.89 days on broccoli. Similarly, the most prolonged and shortest oviposition period was recorded on mustard (6.81 ± 0.44 days) and broccoli (4.25 ± 2.59 days) respectively. The GGE biplot analysis showed that cabbage was the most preferred host, whereas broccoli was the least preferred by *L. erysimi*. The intrinsic rate of increase of *L. erysimi* was lowest on broccoli (0.21) and highest on mustard (0.35). Similarly, the net reproductive rate was highest on mustard (28.52 ± 0.37) and lowest on broccoli (12.52 ± 0.21). The age-stage-specific survival rate of an adult was maximum on cauliflower (0.84), and the highest age-stage life expectancy of *L. erysimi* at age zero was 12.84 days on cauliflower. The age-stage reproductive value at age zero was 1.42 on mustard. The population had doubled every 1.98 ± 0.008 days on mustard compared to 3.30 ± 0.025 days on broccoli. The data showed that mustard was the most preferred host for *L. erysimi*, and broccoli the least preferred or comparatively resistant.**

Keywords: Brassicaceous host crops, demographic parameters, *Lipaphis erysimi*, life table, pest management.

COLE crops are one of the most abundantly consumed vegetables worldwide. They belong to the genus *Brassica*, family Brassicaceae. The *Brassica* vegetables, viz. broccoli, Brussels sprouts, cabbage, cauliflower, collard greens, kale and turnip are economically significant as they provide nutrition and health-promoting substances to humans. In India, cole crops are mainly grown during winter, and the country ranks second in producing cauliflower and cabbage[1,2]. The production of cole crops is constantly threatened by emerging insect pests and diseases, whose incidence has increased in recent years. About 50 insects are known to cause significant economic damage to *Brassica* hosts. Among these, aphids, members of the order Hemiptera, are one of the world's most notorious pests of *Brassica* crops, primarily visible at the flowering stage and severely affecting crop yield yearly (65–96%)[3,4]. The mustard aphid, *Lipaphis erysimi* (Hemiptera: Aphididae), is a specialist aphid species on *Brassica* hosts, which poses a serious threat to their cultivation, including cabbage, cauliflower and rapeseed-mustard in India[5,6]. *L. erysimi* causes direct plant damage by sucking phloem sap and indirect damage by releasing honeydew, which later serves as a medium for fungal growth, restricting photosynthetic activity and respiration in plants[7–9].

In India, *L. erysimi* typically infests crops between December and March. The *Brassica* coenospecies lack genetic resistance to aphids or are restricted to a few wild accessions[10]. This compels growers to protect yield losses from insect pests by applying synthetic insecticides. In addition to easy availability and application, and immediate knockdown effect on insects, farmers typically prefer chemical insecticides to control pests in less developed and developing nations[11]. The application of insecticides is associated with various problems like resistance, resurgence and residues to the ecosystem and humans. There is an urgent need for alternative management techniques. Knowledge of any insect pest's biological, reproductive and population parameters is crucial for formulating effective and sustainable pest management strategies[12].

The development and stability of insects are significantly influenced by the species and quality of host plants, and the variety of host plants can also affect the population

*For correspondence. (e-mail: sachinsuroshe@gmail.com)