

## EFFICACY OF ESSENTIAL OILS OF SOME MEDICINAL PLANTS AGAINST DIAMOND BACK MOTH (*PLUTELLA XYLOSTELLA* L.) ON CABBAGE

Rashmirekha Singh\*, N. N. Singh, V. K. Mishra and Priyanka

Department of Entomology & Agricultural Zoology, Institute of Agricultural Sciences, B. H. U., Varanasi - 221 005, India.

\*e-mail : rashmirekha.singh27@gmail.com

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**ABSTRACT :** An experiment was carried out under field conditions at the Vegetable Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi during *rabi* seasons of 2016-17, to evaluate the bio-efficacy of eight essential oils along with one insecticide against Diamond back moth (DBM), *Plutella xylostella* (L.) and their impact on cabbage yield. Among the different treatments *Pogostemon cablin* oil was most effective against Diamond back moth which was followed by *Curcuma longa* oil, *Ocimum basilicum* var. surabhi oil, *Cymbopogon citrates* oil, *O. basilicum* × *O. tenuiflorum* oil, *Cymbopogon martini* oil, *Ocimum basilicum* var. Saumya, Acephate 75 SP and *Mentha* sp. oil, respectively. The difference in their effectiveness was statistically significant. Whereas, *Mentha* sp. oil recorded the lowest efficacy compared with rest of treatments it was also significantly superior over control. The effect of *Cymbopogon citrates* i.e. Citronella oil on cabbage yield was found superior over rest of the treatments. This may be due to effectiveness of *C. citrates* against other important insect pests of cabbage, whereas the performances of *C. martinii* oil, *P. cablin* oil and *O. basilicum* var. saumya oil were also very good like the performance of *C. citrates* oil. The economics (B:C ratio) of various treatments applied for management of DBM were also calculated in which maximum B : C ratio was found with *C. martinii* oil(31.27:1) followed by *C. citrates* oil (28.86:1) and *P. cablin* oil (27.69:1) and the least B:C ratio was found in *Mentha* sp. oil (17.70:1).

**Key words :** Cabbage crop, diamond back moth, essential oils, efficacy, yield.

### INTRODUCTION

Cabbage is one of the most popular winter vegetables in terms of nutritional and economic significance. Among all the cruciferous crops, cabbage ranks first in production in the world as well as India. China is the largest producer of cabbage followed by India. It is one of the most popular winter vegetables. It is also an economically important cruciferous vegetable and grown for its edible enlarged terminal buds, which is a rich source of Calcium, Potassium, Sodium, Sulphur, Phosphorus, Vitamin A, B<sub>1</sub>, B<sub>2</sub> and C, carbohydrates and dietary fiber. It helps cure arthritis, diabetes as well and it can be eaten raw as a salad or can be boiled, steamed and cooked as curry. It has occupied 3.72 lakh hectares and produced 85.34 lakh tonnes with an average productivity of 22.9 MT/ha in India during 2012-13 (NHB, 2013). The productivity of cabbage hampers due to various causes and among them heavy attack of insect-pests is the major constraint. Although the crop has a heavy demand, the Diamond back moth (DBM), *Plutella xylostella* L. (Lepidoptera : Plutellidae) is one of the major problems in its profitable cultivation. The pest occurs in endemic form on early and late sown cabbage. The damage is caused by the larvae of DBM from seedling stage till harvesting stage of the cole crops. As a result of continuous feeding by

the larvae by mining and scrapping of the under surface of leaf tissues, leads to the under size curd formation and sometimes even head formation does not take place. It was estimated that at least 17-99% loss in marketable yield is due to DBM attack alone (Anonymous, 2015). DBM is known to cause yield loss from 31 per cent (Abraham and Padmanabhan, 1968) to 100 percent (Cardleron and Hare, 1986). Continuous use of chemicals leads to several ill effects *i.e.* toxic residual hazard, development of pesticide resistance in the target pests, pest resurgence and emergence of secondary pests. Thus it is necessary to search some new highly selective and easily biodegradable "Green pesticides" like essential oils, botanicals to solve this problem. The aim of the present study is to determine the efficacy of some plant derived essential oils against the pest as well as the yield of cabbage.

### MATERIALS AND METHODS

The present investigations were carried out under field conditions at the Vegetable Research Farm of Institute of Agricultural Sciences, Banaras Hindu University, Varanasi during *rabi* season of 2016-2017. The field experiment was laid out in simple randomized block design (RBD) with ten treatments, which includes