INTRODUCTION

Since ages there has been a great demand for more production of food to feed the enormously increasing population of both man and animal. This major responsibility lies on the shoulder of the farming community i.e. the farmers. Farmers toil day and night to fulfil the increasing demands for food and fibre but unfortunately their economic efforts are constantly harmed by pests. Anything, which is harmful to man and man’s economic efforts are called Pests. In general Pests include various insects, diseases, weeds, rodents, reptiles, birds, animals etc.

*Spilarctia obliqua* Walker commonly known as Bihar hairy caterpillar belongs to the order Lepidoptera, family Arctiidae, the damaging stage of this pest is the larvae which is covered by a tuft of hairs all over the body and occurs sporadically, feeding the green leaves and soft shoots voraciously. It is a polyphagus pest and if immediate pest control measures are not taken then it may result in complete defoliation thereby, reducing the yield in quantity and quality to a considerable extent. It attacks all crops/vegetable at any stage of growth, which may even cause the destruction of the total crop. Earlier this pest was confined to soybean crop but now it has become a serious pest and a great concern to the rural and urban communities.

Recently pests immunity to pesticides, disease causing pathogens, immunity to fungicides and weeds immunity to weedicides has become a serious concern and top priority for researchers, scientists all over the world to formulate better agrochemical and bio-pesticides to combat the pests.

Heavy losses due to the above factors created an alarming situation for the nation and thus importance of plant protection in agriculture become the dire need to safeguard survival. Keeping in view of these constant setbacks, *The Directorate of*
Plant Protection, Quarantine and Storage, N.H. – IV, at Faridabad (Haryana) was set up by the Govt. of India, Ministry of Agriculture. Insecticides Act, 1958 came into force and the Central Insecticides Board comprising of experts became the supreme recommending authority for agrochemical/bio-pesticides.

Scientists/Researchers keep constant vigil on the agrochemical, bio-pesticides being recommended by them. The agrochemical formulators are registered with the above Directorate, which grants license for their various formulations only after they test their efficacy, residual effect etc. Various agriculture Universities, Scientists, Researcher lay trials of the agrochemical and then all the data are processed, paying way for the final nod by the C.I.B to the formulators. Formulators are expected to provide literatures, posters, banners in several languages to facilitate easy information to farmers in their respective territories concerning the agrochemicals they are using. Literature means the complete minute details about the product along with the antidotes in case of poisoning while handling the agrochemical.

In Uttar Pradesh about Rs. 60 Crores worth agrochemicals is purchased yearly for farmers on which sometimes 50 per cent subsidy is granted by the Govt. of India, Ministry of Agriculture. Besides this about, Rs. 25 Crores worth spraying equipments is also purchased for the farmers. This huge bulk of agrochemicals and spraying equipments reach the farmers via the set channels.

Today the Government of India has many established Research Stations, long term projects of I.C.A.R, Directorate of Extension, Directorate of Plant Protection, Agricultural Universities, Research and Development based Agrochemical Multinationals, wherein huge sum of money is being spent to combat the various pests in agriculture using IPM technique ensuring the use of bio pesticide and reducing the frequency of agrochemical sprays. More emphasis is now stressed upon the use of
bio-agents which provides a conducive environment for the growth and multiplication of eco-friendly predators, parasites, entomophagus fungus, wilt/rot suppressing fungus etc. to increase their population, thus paving way for the natural control of pest and achieving produce which is free of pesticide residues.

Indiscriminate use of agrochemicals killed the ecofriendly predators and parasites and eventually the pest developed immunity to certain harsh agrochemicals being used frequently under heavy dosages. Human/animal health hazards due to pollution of environment, soil, water and ecological imbalance of ecofriendly predators, parasites, entomophagus fungus and wilt/rot suppressing fungus etc. paved way for the adoption of Integrated Pest Management programme wherein damaging larval stage of the pest is taken into consideration. These bio-agents either repel or gradually kill the pest in their larval stage they also hamper the life cycle of the pest considerably.

Since Spilarctia obliqua (Walker) is a pest of great concern, a research topic entitled, “Comparative efficacy of Neem products and Beauveria bassiana in the management of Bihar hairy caterpillar [Spilarctia obliqua (Walker)]” was conceived for a solution to control the damage caused by this sporadic, voracious and polyphagus pest.

Neem (Azadirachta indica A. juss) is a member of the mahogany family Meliaceae. Neem products are used as repellent, antifeedant, oviposition deterrent, growth regulator or sterilant. Neem leaves and seed kernels have antiviral, bactericidal and nematicidal properties. The utility of crushed kernels as adjuvants to nitrogenous fertilizers for their slow release has been well experimented. When used as amendment to soil it improves the temperature, pH, O₂ level, nutrient status of soil structure and therefore plant growth becomes faster.
Extract from its extremely bitter seeds and leaves may be the ideal insecticide. They attack many pestiferous species, they seem to leave people, animal and beneficial insects unharmed. They are biodegradable. Neem is a non-toxic and long-lived than the synthetic insecticides.

For centuries the neem tree has been held in high esteem by Indian folks for its medicinal and insect controlling values. The bodies of insects absorb the neem compounds as if they were the real hormones, but this only blocks their endocrine systems. The resulting deep-seated behavioural and physiological aberrations leave the insects so confused in brain and body that they cannot reproduce and their populations plummet.

*Beauveria bassiana* is an entomophagus fungi belonging to the class Deuteromycetes which controls effectively the lepidopterous, homopterous, orthopterous and coleoterous pest population. A suspension of fungal spores in water is sprayed over the crop. The larvae of the pest during feeding the leaves comes in contact with the fungal spores which germinate producing mycelium and hyphae penetrating into the larvae causing diseases and malfunctioning of the internal body system, thus killing it within 4-5 days. Keeping all these facts in mind the present experiment was carried out with following specific objectives:

1. To evaluate the feeding and contact action of Neem products and *Beauveria bassiana* on 1st, 3rd and 5th instar larvae of *Spilarctia obliqua* (Walker).

2. To asses the residual action of *Beauveria bassiana* and Neem products on 1st, 3rd and 5th instar larvae of *Spilarctia obliqua* (Walker).

3. To observe the mortality effect of Neem products and *Beauveria bassiana* in pupal dipping of 1st, 3rd and 5th days old pupae of *Spilarctia obliqua* (Walker).
4. To identify the suitable treatment combinations and mode of action (through feeding, contact, residual and pupal dipping) of the Botanical Insecticides and *Beauveria bassiana* on the mortality rate of *Spilarctia obliqua* (Walker).