Sesame (til) is a major oilseed crop and its yield in Madhya Pradesh in comparison to some other states of the country. One of the major constraints in sesame production is the colossal damage caused by insect pests. *Antigastra catalaunalis* Duponchel is the key pest of this crop. It is commonly called leaf roller or capsule borer. The major and minor pests are jassid, *Orosius albicinctus* Distant and bud fly, *Dasineura sesami* Grover and Prasad & whitefly, *Bemisia tabaci* Genedius respectively. Til hawk moth, *Acherontia styx* Westwood (sporadic pest) and mirid bug, *Nesidiocoris tenuis* Rent are occasional pests in addition to many others.

The present work was undertaken to study incidence of the above named pests in the Bundelkhand region of Madhya Pradesh and to figure out some integrated measurers of control for them. For this, bionomics of *Antigastra catalaunalis*, *Dasineura sesami* & *Acherontia styx* and management of all the six pests was studied. The widely accepted, highly effective, non toxic and environmentally safe plant product neem was used as extracts of leaves and seeds in addition to its commercially available formulation Neem oil. In addition, some other natural products such as Garlic buds + Red pepper extracts and some indigenous natural products used by tribals and farmers such as Cow butter milk & Cow urine were also used. Efforts were made to examine effects of the bio-agent *Bacillus thuringiensis* on pest infestation on sesame. A known insecticide Endosulfan was used as a standard to compare the results. Sprays of different extracts of the above compounds and *Bacillus thuringiensis* were given to plots sown with sesame individually, alternately and intermittently. Control of pests by intercropping method has also been worked out. The results were statistically analysed.
The objective of the work planned has been successfully achieved after more than three years of work and the results can be concluded as follows:

1. *Antigastra catalaunalis* completes its life span in 28 days. It passes through a nascent and five larval stages. The larvae are voracious feeders of leaves, flowers and capsules and even one to three larvae are enough to denude a fully-grown plant within 24 to 28 hrs.

2. *Dasineura sesami* has been found to have a life span of 18-33 days. A nascent and four larval stages are found in this insect. The larvae damage the plants within one to four days.

3. *Acherontia styx* completes its life span in 39 days, passes through a nascent and five larval stage. Almost an entire sesame plant is denuded by one larva within 24 hrs.

4. Larval population of *Antigastra* & *Dasineura* and also nymph & adult population of jassid, mirid bug and whitefly were significantly controlled by two individual sprays of natural (Neem oil, Neem seed kernel extract, Neem leaf extract and Garlic bud & Red pepper) and indigenous (Cow urine and Cow butter milk) products as well as the chemical pesticide Endosulfan. Per cent damage to leaves, flowers and capsules was studied in case of the major pest *Antigastra* and minor pest *Dasineura* only. There was significant control as mentioned above and this led to increased yield attributes. The effectiveness of all the compounds have been found to be in the order: Endosulfan > Neem seed kernel extract (in cow urine) > Neem oil > Neem leaf extract (in cow urine) > Garlic buds + Red pepper extract @ 10 ml/l > Cow urine > Garlic buds + Red pepper extract @ 5 ml/l > Cow butter milk.
5. Larval population of *Antigastra & Dasineura*, nymph and adult population of jassid, mirid bug and whitefly and also per cent damage of leaves, flowers and capsules caused by *Antigastra & Dasineura* larvae were significantly reduced by alternate/intermittent sprays of Neem seed kernel extract (NSKE), *Bacillus thuringiensis* Dipel (Bt-Dipel), Cow butter milk (CBM) and Endosulfan along with positive growths of plant heights in centimetre, number of branches and capsules i.e. yield attributes. The order of effectiveness of the compounds has been usually found to be, Endosulfan (four intermittent sprays) followed by NSKE (in water) (four intermittent sprays), NSKE/Bt-Dipel/NSKE/Endosulfan (alternate sprays), NSKE/Endosulfan/NSKE/Endosulfan (alternate sprays), Bt-Dipel/NSKE/Endosulfan/NSKE (alternate sprays) and Cow butter milk (four intermittent sprays).

6. Intercropping of sesame with other crops like Black and Green gram, Cluster bean and Pearl millet has shown that the larval population of *Antigastra & Dasineura*, per cent damage of leaves, flowers and capsules are significantly reduced. Significant change has also been found in yield attributes, which increase by intercropping. The order of efficacy derived from the present results shows best results by intercropping with Green gram followed by that with Black gram, Cluster bean, Sorghum and Pearl millet. Thus, intercropping is a good component of insect pest management in sesame.

7. The grain yield, net profit and incremental cost benefit ratio (ICBR) significantly increased by two individual sprays of the five natural products, two indigenous products and the chemical insecticide Endosulfan in all plots. The effectiveness
of these compounds has been found to be in the order: Endosulfan > Neem seed kernel extract (in cow urine) > Neem oil > Neem leaf extract (in cow urine) > Garlic buds + Red pepper extract @ 10 ml/l > Cow urine > Garlic buds + Red pepper extract @ 5 ml/l > Cow butter milk in grain yield and net profit but ICBR were always the highest in Neem seed kernel extract treated plots followed by Neem leaf extract, Cow urine and Endosulfan.

8. Grain yield was maximum in purely Endosulfan (four intermittent sprays) treated plots followed by purely NSKE (in water) (four intermittent sprays) treated, NSKE/Bt-Dipel/NSKE/Endosulfan (alternate sprays)>NSKE/Endosulfan/NSKE/Endosulfan (alternate sprays)>Bt-Dipel/NSKE/Endosulfan/NSKE (alternate sprays) > Cow butter milk (four intermittent sprays) treated plots. However, net profit and ICBR was the

Thus, NSKE was the best option for insect pest management as an alternative to the chemical insecticide Endosulfan, as derived from the present work.

9. The base crop and seed equivalent grain yield (kg/ha) were maximum when sesame was intercropped with Green gram followed by Black gram. However, intercropped grain yield was maximum when sesame was intercropped with Sorghum, Pearl millet and Green gram.

Thus, the larval population of Antigastra & Dasineura, nymph & adult population of jassid, mirid bug and whitefly, per cent damage of leaves/flowers/capsules, yield attributes and grain yield/economics have led to the conclusion that although Endosulfan is most effective, it is invariably followed by NSKE for the various
parameters tested as above. In some case it is equally good as the insecticide in controlling the pests and ultimately resulting in better yields. Hence, it is suggested that the chemical insecticide Endosulfan can be replaced successfully by the natural product such as Neem seed kernel extract, which is ecologically safe as well as economical. Neem oil and Neem leaf extract are also good agents for management of insect pests. As the pests mentioned above are also successfully controlled by intercropping system, the farmers can also be suggested to use Green gram and Black gram crops for intercropping with sesame to manage most of its insect pests.

The crop protection market is still dominated by conventional chemical control methods. However, new agrochemicals of natural origin, with active compounds, are continuously being looked for and are needed either to be used alone or along with classical chemical and other approaches for integrated crop management. The present work has been an attempt well fulfilled in this direction.

**Future Plan for Integrated Pest Management in Sesame**

While carrying out the experiments for control of pests of sesame some adult predators were found such as Agathis species, Chrysoperla carnea (Stephens) and Carabid grub. These were found praying upon the larvae, pupae and adults of different pests at different periods of development. It is proposed to carry on this work further considering the aspect of predation as a control measure for pests of sesame for Insect Pest Management (IPM).