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INSECT PESTS AND THEIR NATURAL ENEMIES IN THE CIRCARS

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In Nature, some of the vegetable-feeding species of insects have such enormous powers of multiplication, that, had it not been for the existence of certain natural checks—biological or climatic—no vegetation whatever will be left on the face of the earth. In the keen struggle for existence, certain insects that live at the expense of others usually exploit the presence of the vegetable feeders in such large numbers and are able to bring about a diminution in their numbers automatically. An attempt is made in this article to give an account of the natural enemies of some of the chief crop pests of the Northern Circars so as to show how they bring about their control.

2. It is a known fact that the *Sarava* (or the first) crop of paddy suffers a good deal from borer, whereas the *Dalava* (the second or Summer crop) suffers very little though it starts with a greater number of moths at the outset. This appears to be partly due to the activity of egg parasites, which make their appearance at the time of harvest of *Sarava* crop and gradually assert themselves on the approach of summer. The chief egg parasite is *Tetrastichus sp.*, which confines itself to egg masses of *Schoenobius*. During some years its parasitisation is remarkable being capable of destroying as many as 80 per cent of eggs. It is, however, found only in small numbers in the main or *Sarava* season, but develops in astonishing numbers in borer eggs from February onwards. No other host excepting *Schoenobius* has yet been noted. The eggs of the parasites are laid inside the eggs of paddy borer, and the tiny grub that emerges from the egg in a day or two empties the egg contents and begins to attack other eggs. During its course of life it destroys from 2 to 3 eggs, and after a larval existence of about 7 to 8 days it pupates inside. The pupal period is about a week. The adult wasp is capable of laying eggs anywhere in the egg cluster and consequently if a sufficient number of eggs is laid in an egg-cluster it is completely emptied. An individual wasp is capable of laying as many as 35 eggs, and lives as an adult for about 10 days. In the case of the other two egg parasites, *Phanurus* and *Trichogramma*, their activities are

limited as they are capable of parasitising only the surface layer of eggs of a *Schoenobius* egg-cluster. *Phanurus* generally parasitises up to 50 per cent of eggs ; whereas the degree of parasitisation by *Trichogramma* does not exceed 10 per cent. *Phanurus* completes its life-cycle in about 15 days, whereas *Trichogramma* takes about 9 to 12 days. Both are the common egg parasites of many other Pyralid borers. In the case of *Phanurus* only one grub is noted in each egg, but in the case of *Trichogramma* the number may vary from 1 to 3. The larval parasites of paddy borer (*Topobracon* and *Microbracon*) are not, however, of much economic importance as they are not capable of destroying more than 5 per cent of borer caterpillars.

3. The cane borer (*Argyria sticticraspis*) has the common Pyralid egg parasites controlling its abnormal increase, *Phanurus* and *Trichogramma*, which are of little efficacy in the case of *Schoenobius*, the power of parasitisation being confined to the surface layer of eggs, but are of special importance, in the case of cane borer, the eggs being laid in a thin layer, overlapping one another like the tiles on a roof. The parasites in spite of their limited capabilities can reach any egg. *Phanurus* predominates during summer, but the degree of parasitisation is as low as 12 per cent. *Trichogramma*, however, asserts itself after the break of South-west monsoon and the degree of parasitisation rises as high as 80 per cent. The larval parasite, *Stenobracon*, is not of much use as it is not capable of destroying more than 10 per cent of the borers.

4. In the case of *Sesamia inferens*, the chief borer of *Pyru* Ragi, the controlling factors are the two Braconid larval parasites. The ragi borer which flourishes best in the cold weather, begins to appear in *Pyru* Ragi towards the end of January a fortnight after planting and assumes a serious form with the approach of February. The degree of parasitisation of *Sesamia* caterpillars is as low as 5 per cent in January, but gradually increases during February, reaching a maximum of 80 per cent in March. So there is no wonder if we fail to see any white ears in some of the fields, in spite of a large number of deadhearts in the young crop.

It is the common belief among cultivators, that continuous heavy rains prove detrimental to *Hieroglyphus banian*, the paddy grasshopper and that its depredations are heavier when bright weather prevails. After some heavy showers, the writer noted large number of dead grasshoppers attached to grasses on bunds, which on examination by the Government Mycologist at Coimbatore

was found to be due to an Entomophagous fungus (*Empusa grylli.*) Probably the pest is checked to a certain extent by this fungus during humid weather. *Natada nararia*, the leaf eating nettle grub on coconut of the Godavari Central delta assumes a serious form during dry weather. Its presence is not felt much during the rainy season, and hence during the years when the monsoons fail it increases in enormous numbers and badly defoliates coconut gardens. A similar phenomenon has also been recorded in Ceylon where a bacterial disease is reported to affect the caterpillar during rainy weather, the rains greatly assisting the spread of the epidemic.

5. 'Kodu'—the Silver Shoot in paddy—caused by the Paddy gallfly is greatly influenced by its parasites chiefly, *Platygaster oryzae*. It is only when this parasite is affected by adverse climatic conditions, such as, an early break of the monsoon followed by a sudden and prolonged break, that the insect assumes a pest condition.

6. No detailed account of the parasites of *Nephantis*, the black headed caterpillar of coconut, need be given here as a great deal of information is already on record. All along the East Coast, the pest assumes a serious form now and then, the parasites being adversely affected in some way or other. But when later on rains are received and favourable conditions prevail, the pest is naturally controlled by the combined team work of different parasites. A few years back, some of the coconut trees round about Ellore, Samalkot, Anakapalle, Vizianagram and Chicacole Road were so bad that they presented a very pitiable sight indeed. On examination no larval parasites could be noted among the caterpillars. But subsequently, however, the parasites began to appear and assert themselves with the result that the pest was absolutely controlled without any effort on the part of the Agricultural Department, and the trees in these places now present a pleasing appearance. It may also be mentioned in this connection that in the case of certain caterpillars found on paddy, such as, *Psalis* and *Parnara* the parasites are so constantly found that it is generally difficult to rear them into moths and that is why they are never noted in a pest condition.

7. In this connection, it may be stated, that a youug coconut garden near Theenarla in Vizagapatam District noted to be badly affected by scales *(Aspidiotus destructor)* was sprayed with a contact poison, though it could not be supposed that all the stages of scales would be affected. The effect, however, was that

the ranks of the pest were greatly thinned, and the field for predatory Lady birds, and Syrphids being thereby limited, the latter could concentrate on the scales left to greater purpose and check the pest to a considerable extent. The result was that the young garden improved wonderfully and created a good impression on the landlord.

8. The biological study of insect life has greatly widened the sphere of activity of the Entomologist, who has not only to study the insect in detail, but also all forms of life connected with it. The importance of such study has no doubt been realised even by the lay public since the popular demand is for a control of pests by their natural enemies as opposed to artificial methods. Such study is, however, no mean a task, as it requires great patience and keen observation, but it may be confidently stated that it will have its own reward.