

Two Major Insect Pests of the Deccan

By T. V. RAMAKRISHNA AYYAR, B.A., Ph. D.

and

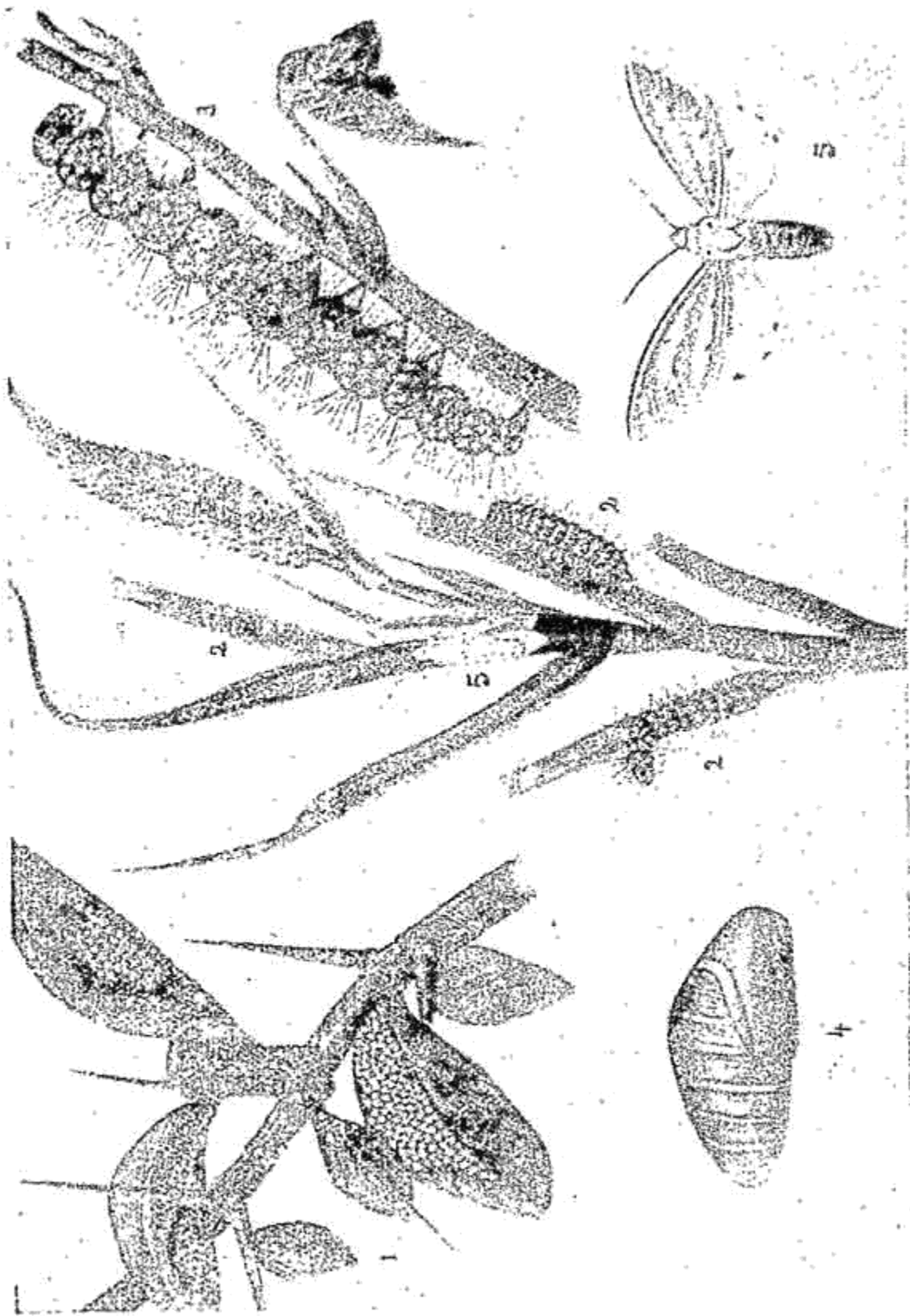
T. V. VENKAT KRISHNAN, L. Ag.

Agricultural Department (Hyderabad-Deccan).

Among the different zoo-geographical regions into which India is generally divided the Deccan plateau, lying between the Eastern and Western Ghats, forms a very distinct and important region; and the greater part of this extensive tableland is included in the Indian State of Hyderabad. Though the flora and fauna of this region are in some respects similar to those of the adjacent coastal plains or the Indo-Gangetic alluvial areas, the peculiarities in the physical features and climate of this tract are found to exercise a considerable amount of influence on the plants and animals inhabiting this tract. In view of the fact that we have hardly any connected records of the insect fauna of this region, a preliminary attempt is made in this paper to present a brief summary of the general features and life habits of two insects which appear to rank as the most important forms which are of great economic importance in the area and which seriously affect the prosperity of the Deccanese farmer.

It may be noted that in the extensive upland areas of this plateau the majority of the cultivated plants are dry crops, and among these the millets (especially *Jowar*--*Sorghum* species) castor, and cotton appear to be very important; and of these *jowar* and castor occupy pre-eminent positions practically constituting the most important food and money crops of the Deccanese farmer. It may not perhaps be well known to many of us that the acreage under *jowar* in the Hyderabad State, which reaches upto nine million acres, is much more than that of any other single Province or State in India and that the acreage under castor in the Hyderabad State represents more than fifty per cent. of the total area under this crop in the whole of India. Though there are other crops grown in this tract like rice, cotton, fruit trees etc., with their respective insect enemies, the annual toll levied by noxious insects on these two crops—*jowar* and castor—is found to be very substantial; and during years similar to the last (1941) when vagaries of the weather were very conspicuous and the agricultural and local conditions became very abnormal, the loss caused by insects becomes appreciable and often a panic is created.

The Pests. Among the insects associated with *jowar* and castor there are two which are not only of outstanding importance in relation to these two crops but also rank as the two major pests (insect K. Ds.) of cultivated crops in the Deccan. These are, the one known as the Red-Hairy Caterpillar (*Amsacta albistriga*, M.) which feeds practically on all dry crops, and the second the castor semi-looper Caterpillar (*Achoea janata*, L.) a creature which has a special partiality to the castor oil plant and is commonly found.



The Red Hairy Caterpillar (*Amsacta albistriga* M.)

- 1. Egg masses on wild plant.
- 2, 3. Caterpillar young and full grown.
- 4. Pupa removed from soil.
- 5. Moth with closed and open wings.

feeding on the foliage of this plant. Though both the insects enjoy a wide distribution all over the greater part of India and, the castor semi-loopers a still wider distribution,—having been recorded from almost all parts of the Indo-Ceylonese region,—these two insects are found specially conspicuous in the dry areas of Peninsular India.

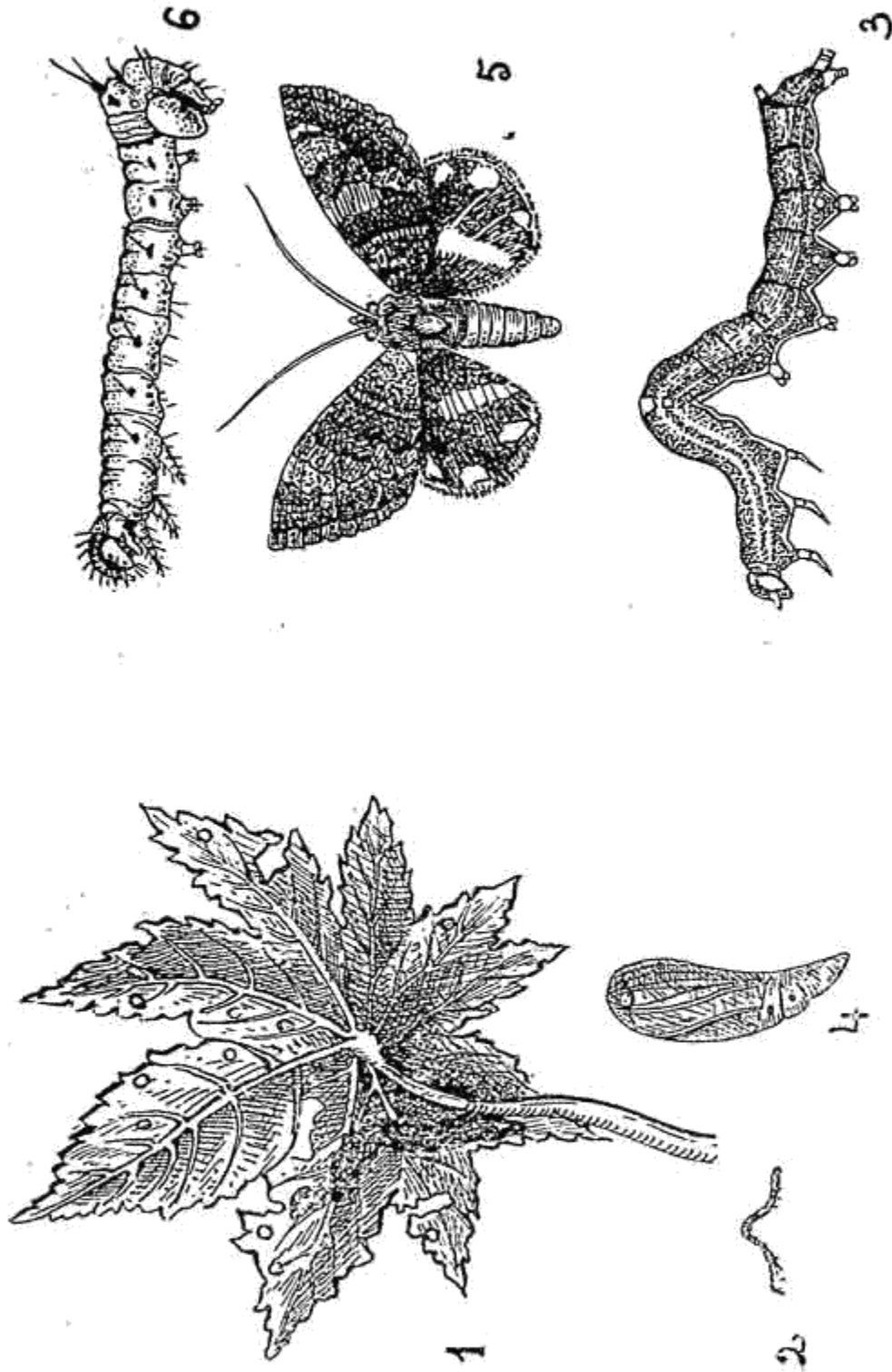
1. **The Red Hairy Caterpillar** (*Amsacta albistriga*, M.). Several species of hairy caterpillars are found all over India but it is found that the more important ones among the economic forms are found to have some localised distribution. The Red Hairy Caterpillar is found all over the Deccanese and Mysore tablelands, and in some dry areas of South India also especially the Coromandel districts, but is not common in Northern India. In the United Provinces, Bengal and Bihar the hairy caterpillar chiefly noted is a different one known as the Bihar hairy caterpillar (*Diacrisia obliqua*, W.); another one which holds its sway over North Bombay, Gujerat and North Indian areas is the one known as *katra* (*Amsacta moorei*, B). Each of these is a very important and serious crop pest in its respective area and causes appreciable damage to different kinds of cultivated crops.

The creature which the Deccanese farmer has to contend against viz., the Red hairy caterpillar, generally makes its appearance almost every year a few days after the first monsoon rains of May—June, and is commonly found on the fields for the next two months. It is found feeding on almost all dry crops and sometimes even on wild plants, if the former are not available in the vicinity. Among crops attacked, it is commonly noted on all kinds of millets, groundnut, gingelly, castor, cotton, red gram and other pulses;—it is practically a polyphagous creature, very few green plants being found escaping its attention. During certain years favourable to the creature, the caterpillar appears in great swarms as a regular plague, and apart from causing a considerable amount of damage to growing crops, it often becomes a regular nuisance in other ways; in rural areas numbers of these creatures in their eager search for food and pupating spots, infest huts and cottages adjacent to fields and come into contact with the bodies of inmates causing severe irritation and itching as a domestic pest; on one occasion a few years ago in South India the insect was found crossing a rail road in such enormous numbers as to stop a moving railway train abruptly. It was found impossible to run the train over the caterpillar-infested rails which became completely covered with the greasy crushed bodies of millions of the creature and the engine wheels could not move properly until after the rails were properly cleaned and made fit for the wheels.

Though to the layman farmer the insect appears all on a sudden as a plague of hairy caterpillars soon after the first monsoon showers, it has its own life history behind it, with the greater part of which most of our farmers are unfortunately unaware. The life cycle of the creature starts from eggs laid in groups on different young plants by the flying parent insect (the female moth) within a week or two after the early monsoon rains and each group contains 200 or more eggs; a single mother moth in captivity has

been found capable of laying as many as 800 to 1,000 eggs. From each of these eggs a small slender hairy worm-like creature hatches out within 4 to 6 days; the young hairy caterpillar which is dark in color feeds on grasses and the foliage of young plants of different kinds, grows in size and gradually gets a reddish brown color. In about a couple of weeks thousands of these caterpillars are found in the crop areas and it is only then that the cultivator first comes to realise the presence of the pest. At this stage the caterpillar is very active, extremely voracious, and in a month's time when it reaches its full growth it measures $1\frac{1}{4}$ " in length. The head is red and the body has a reddish or yellowish brown color with the surface covered with tufts of dark hair. Generally the body has dark bands towards each end of the body but there are variations noted in this coloration. The under surface, the six true legs and the ten false legs are dark in color. At this stage it stops feeding and seeks a favourable spot in the field especially along the sides of field bunds, and there enters the soil three or four inches underground. Under the soil, the caterpillar constructs an earthen cell around itself and enclosing itself by means of a crude cocoon of silk and hair it undergoes a sudden change in shape and enters on the resting or 'samadhi' stage. The changed form of the insect and its general shape and appearance and color resemble date seed. The remaining portion of the insect's life history is a closed book to the ordinary cultivator who naturally thinks that with the disappearance of the caterpillars from the field the pest has become destroyed. In this underground *samadhi* stage which is generally assumed by about August—September the creature remains without food or locomotion throughout the succeeding autumn and winter months—upto the month of May of the following year—8 to 9 months!!—a phenomenon which even some of our educated men often refuse to believe until after actual demonstration. With the first monsoon rains of the following year, from each underground pupa, a flying dark and red spotted active whitish moth (adult insect) emerges out of the soil and this is the adult winged moth we started the story with. There are both males and females among them; the latter, after connection with its partner, starts laying its eggs on the growing crops as stated at the beginning and a fresh cycle of the insect starts. In this way year after year, fresh generations of the hairy caterpillar appear and during years favourable to the pest it is noted in unusually large number causing a good deal of trouble to the cultivators.

The Castor Semi-looper (*Achoea Janata* L) — This creature is also a caterpillar, but belongs to a family different from that of the red hairy caterpillar; in general appearance and life habits also it exhibits some marked differences. It is an elongated dark greyish brown, smooth worm-like creature unlike the medium sized cylindrical, hairy caterpillar. In locomotion also there is marked difference between the two;—while the hairy caterpillar is an actively moving form the castor insect moves slowly like a lame creature. As regards the fundamental features in development both



The Castor semi-looper (*Achoea janata* L.)

1. Castor leaf with eggs and caterpillar.
2. Young semi-looper.
3. Full grown Semi-looper.
4. Pupa.
5. Moth.
- 6 Parasitised semi-looper.

are similar passing through the four stages in their life history—the egg—caterpillar—pupa and the adult moth stage.

The life story of this castor insect begins as a minute spherical beautifully sculptured bluish green egg laid by the mother moth on the tender parts of the castor plant generally on the under surface of small tender leaves. The moth does not lay the eggs in batches like *Amsacta*: each egg is deposited separately in convenient spots, and in this way one moth has been noted to lay from thirty to hundred eggs. After an incubation period of nearly a week, from each egg a small very slender dark brown caterpillar emerges. Like the hairy caterpillar this creature also gradually grows in size, by feeding on the foliage of the castor plant, and when about to enter the pupa stage it measures about 2 to 2½ inches in length. It is elongate, with the body surface smooth and having an ashy grey brown color with faint lateral stripes in some cases. On the upper surface of the tail end there are two small tubercular projections also. The body has a central dorsal hump, showing two pairs of pale tubercles. During locomotion as stated above the insect makes a half loop of the body as it moves, showing the central hump like a hunch back! This characteristic method of locomotion has earned for the creature the name 'semilooper'; we find other caterpillars also of this kind on different plants and even those which make full loops of their body during locomotion and which are popularly known as 'loopers' or measuring worms. This peculiar bending posture during locomotion with the curious whitish spots on its head, recalling the caste marks of orthodox Hindus has gained for the insect the rather appropriate name of *Dasari purugu* (a devotee worm) from the castor cultivators of the Deccan. After reaching this full-fed condition in about two weeks the caterpillar either goes down into the soil near about the food plant or encloses itself in the fold of a leaf and changes into the pupa stage covered over by a flimsy silken cocoon. The fairly stout pupa has a greyish brown color and is about ¾" to 1" long. Unlike that of the hairy caterpillar (*Amsacta*) the pupa (*the samadhi*) stage in this case does not last for a period more than 10—15 days; at the end of this period, from each cocoon a stout dark greyish flying moth emerges and a fresh generation of the insect starts within a week's time. Since the pupal period in this case is very short the insect is able to pass through four generations during each castor season, from July—August to February—March. From these facts we can easily get some idea as to how, under favourable conditions and with such powers of rapid multiplication the insect could appear in its thousands, cause severe damage to the crop and bring about very substantial loss to the cultivators.

Remedial measures. The extraordinary numerical strength of their progeny and their remarkable powers of rapid multiplication under favourable conditions and especially the fact that these two pests appear at a time when the crops are all in their young and tender stages and liable to suffer serious damage, go to make these two insects extremely serious pests.

To control these two pests a knowledge on the part of the cultivators of the fundamental points in their life histories will be of the greatest help in taking proper measures to nip the pests in the bud. The most important points to note are the time of the year when these appear as pests and a familiarity with their different stages—especially in the case of the hairy caterpillar. With this knowledge preventive measures can be adopted at the proper time and a good deal of trouble and money saved.

In the case of the hairy caterpillar some of the features in its life habits offer facilities for dealing with it successfully in different ways. Though it is in the caterpillar stage that the insect actually causes damage to the crops, tackling the pest when it has already appeared on the crop on a large scale will be found rather a very difficult task. On the other hand the collection of the adult moths soon after their emergence from the soil after the first rains of May—June will be found very practicable and extremely economic. The black and red spotted whitish moths which are the adults of the caterpillar and which generally emerge in the evenings after the first monsoon rains are very conspicuous, harmless and very slow moving creatures; as such boys and girls could easily pick and destroy hundreds of them. When it is realised that one single moth can lay from six to eight hundred eggs, and the collection and destruction of a hundred female moths would be equal to the destruction of nearly a lakh of caterpillars, the value of this method can easily be appreciated. The intelligent cultivators of a tract who realise this, can employ even for small presents or cash little boys and girls to do this work and save the crops from a future outbreak of hairy caterpillars in their area. In the same way cultivators familiar with the pupal stage of this insect and the usual places in the fields where they are generally found underground, can also dig out from the soil hundreds of these reddish brown date-seed like pupae early in summer before the moths emerge out of them after the rains in May—June, thus preventing the emergence of moths. These two methods are the most practicable and extremely cheap ones. In addition to the collection of moths and the pupae, the former can also be attracted to light traps, because most of the hairy caterpillar moths show a tendency to come to lights in numbers after dusk. These traps should be set up sufficiently early to trap moths before they lay their eggs. Insecticidal methods against the hairy caterpillar have not been found successful nor are they practicable under our Indian conditions. If these preventive measures are missed at the proper time the cultivator can also attempt collecting and destroying the egg-masses but this may not give sufficiently successful results since the moths lay eggs in all kinds of plants and often even on inanimate objects. But when once the eggs have hatched and the caterpillars have started moving about in their hundreds, control measures become very difficult and do not prove very successful though mechanical methods of beating the creatures to death or making trenches to prevent the progress of the swarms may help a little.

In the case of the castor semi-looper, however, the feasible methods of control are rather different in view of the somewhat different habits of that creature. The adult moths with their protective dark brown color are very difficult to be observed in the fields and are not slow moving or have the habit of emerging at dusk in numbers like the hairy caterpillar moth. The only feasible method which can be adopted in the case of this insect with some good effect is the tackling of the caterpillar stage alone, especially during the younger stage and early in the season before the insect passes through its first generation and multiplies in numbers. Two methods can be adopted in this direction. The most effective and practically inexpensive one is that of hand-picking the caterpillars from the young castor plants and destroying them by dropping them into kerosenated water. Little boys and girls of the villages can be easily taught how to do this and in the long run the castor cultivator's own family folk can resort to this method and easily check the pest practically without any cost. The semi-looper, unlike the hairy caterpillar, is slow moving, quite smooth to the touch and absolutely harmless, and can therefore be safely collected with the hand by little children. The alternate method is to kill the caterpillars by the application of an insecticide, the usual stuff used against leaf-eating forms being an arsenic compound—generally lead arsenate. This stuff is mixed with water and the solution sprayed on the infested plants. The insecticide can also be applied in the form of a dust over the plants by means of dusters or rough hand bags. It might, however, be added that the application of an insecticide, while certainly effective under normal conditions, has unfortunately some defects which go against its recommendation in all cases—especially to our poor and illiterate cultivators. These are (1) the cost of insecticide application comes to about Rs. 2 or 3 per acre varying with the cost of the stuff, transport charges and the upkeep of spraying machines without adding the cost or hire for the latter. (2) A shower of rain soon after the application of the insecticide completely washes away the poison from the plants and makes the application wholly ineffective. (3) The insecticide usually used is a deadly poison to both human beings and domestic animals and has, therefore, to be handled with very great care to avoid risks of poisoning especially among illiterate farmers. It is very unsafe in the hands of our *ryots* at least for some decades to come. Nor is it now-a-days possible to easily get the necessary insecticides and spraying machines, especially the latter which are not easily available in India. Comparing these two methods of control any one can easily be convinced how practicable, cheap and effective the simple mechanical method of hand-picking is compared to the costly, tedious and often risky method of using an insecticide. Unfortunately, our cultivators are carried away more by external shows and applications of drugs than by simple and cheap methods, which are, however, not showy.

In this connection it may be interesting to note that the Agricultural Department of H. E. H. the Nizam's Government has been paying some special attention to these two pests for some years in the past in the way of

propaganda, demonstration and substantial help to cultivators by making cultivators of the pest infested areas fairly familiar with these two pests, and also the methods, but unfortunately, as is the case everywhere in India, the average farmer is indifferent to these advices and suggestions, and makes a hue and cry when the pests appear in serious proportions and when it becomes too late to carry out any cheap and effective control measures. This last season (1941) the Government arranged to give special help to the castor farmers to control the semi-looper which had appeared as a serious pest due to abnormal climatic conditions in the important castor areas of the Dominions. The measures suggested were chiefly hand-picking of the worms by village children for small rewards and spraying wherever it was found necessary and feasible under the supervision of trained hands.

It may be added that, in course of time, as further intensive studies which are intended to be carried on in connection with these two important pests progress, other methods of tackling the pests more successfully may be evolved—especially methods of biological control which are now-a-days being tried in various parts of the world against different crop pests which defy the ordinary methods usually adopted.

In conclusion, it may be remarked with some strong emphasis that in the case of both these pests, however, the control measures suggested will prove extremely effective, and quite satisfactory only when there is sufficient co-operation between all the adjacent farmers of any infested area, and the work is carried on at the proper time by all the cultivators in harmony. Meantime, of course, it is the duty of the entomologist and the agricultural propagandist to properly educate his clientele and bring home to them both by preaching and demonstration the salient facts in the life stages of these creatures and the proper time and methods to control them effectively and economically. In course of time, if they succeed in these attempts and the cultivator realises and enjoys the results of these methods, apart from the gratitude they earn from him, they have the satisfaction that they have done their duty and added their quota to diminish the miseries of the poor Indian farmer.

SELECTED ARTICLES

Rural Reconstruction in Madras.

The pivot of rural reconstruction work in this Province is the Collector. Collectors of districts convene periodical conferences of district officers and members of the legislature resident in the district once a quarter to consider proposals for the utilization of the Government of India grant and to discuss matters pertaining to the administration of the district. The planning of rural improvements best suited to the needs of the district is the duty of the conference. The agencies to carry out the improvements are the Revenue, Irrigation, Co-operative, Forest, Agricultural and Veterinary Departments, whose activities are controlled and co-ordinated by the Collector.

The Government of India grant is utilized on the following objects:

- (1) Improvement of rural water supply including bore-wells