

## OUR PRESENT POSITION IN SOUTH INDIA WITH REGARD TO THE CONTROL OF PADDY PESTS.

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My predecessors in this short symposium have dealt with Paddy from the aspect of cultivation, breeding and nurture respectively. Paddy, as a living organism, is subject to the influences of its environment. Consequently it is liable to the attacks of herbivorous animals including insects and to infection by parasitic fungi. The losses sustained on the aggregate by the paddy crop, from insect pests and fungus diseases, are enormous and unless the crop can be protected from these injurious organisms, the work of improvement effected by the Breeder, the Agriculturist and the Chemist is liable to be greatly wasted or at least very much handicapped. It is the function of the Entomologist and the Mycologist to do what they can, to protect the crop from them and minimise the damage.

*The Insect pests of Paddy in South India:*—In the Madras Presidency more than 30 different species are known to attack paddy. Fortunately, however, more than half of them occur only occasionally or in such small numbers as to be of little more than academic interest. The really serious pests are not many, but when they do appear, they appear in such numbers that their attacks prove disastrous.

*How they affect the crop:*—Some of the pests attack the crop when young—especially when it is in the nursery stage. Of these the most important is the Army Worm of Paddy—*Spodoptera mauritia*. It appears all on a sudden in its thousands and sometimes in its tens or hundreds of thousands and wipes out whole areas. The other pests of nurseries are the Black spined beetle—*The Rice Hispa*—found throughout the Presidency and the blue-black beetle (*Leptispa*) peculiar to Malabar, both of which are capable of seriously damaging young paddy.

Then there are others which appear after the crop has been transplanted. The Silver shoot disease is an instance of this kind. Soon after transplanting, the affected seedling produces a long tubular out-growth, which is a gall caused by a fly maggot. In bad cases even the tillers may be similarly attacked. Another such insect is the Rice Mealy Bug, which hides in crowded masses under the shelter of the leaf sheaths, and sucks the sap of the stems, affected plants becoming stunted and discoloured.

There is a third class of pests which attacks the earheads. The stem borer (*Schoenobius incertellus*) is one of this type. The young caterpillar bores into the stalk of the young earhead, causing it to wither and dry up. The Paddy Grasshopper also causes similar damage by biting into the stalks of the earheads. Another serious pest which sucks the grains in the milky stage and converts them into chaff, is the Rice Bug (*Leptocorisa acuta*).

*The present stage of investigation:*—It is now nearly 25 years since the first beginnings of Entomological work were made in this Province and a great amount of work has been done. The pioneer work has all been completed. All the major pests of the Province have been noted, and observations made as to the part of the year they are likely to occur and the nature of the damage they cause. In the case of the more important of them, a detailed investigation of the life-history and habits has been completed and a general knowledge of the weak points of their life-cycle gained, with a view to devise suitable control measures. Much of this work, however, does not interest the ryot. All that he asks for, are effective, practicable control measures.

But effective, practicable measures are not so easy to devise, as one may suppose. Although a study of the life-history of the pest concerned may give an indication of the kind of measures that may be adopted, yet a successful application of the measures demands a very full knowledge of the conditions under which the pest occurs, so as to modify them, where necessary, to suit particular conditions and to ensure a thoroughness of treatment. Before making a general recommendation of remedies, the Department has to try these measures under its own supervision, find out the defects of the methods advocated and after a thorough trial make sure of the conditions that may make for efficiency of control. It is only thereafter that a demonstration of remedies could be undertaken.

There are, however, various difficulties that handicap the Entomologist in this work. (1) Firstly, the actual presence of the pest is a *sine qua non* for trying any experiments: and this is a factor, of which one cannot always be certain, since it may not make its appearance every year. (2) Secondly, Paddy is generally a crop grown on a very extensive scale, and in case any widespread attacks of pests are noticed, it would be a sheer impossibility to deliver a direct frontal attack, by spraying, dusting or hand-netting, by reason of the very magnitude of the task and also of the general low economic condition of the ryot. The only possible way would probably be to try and see if the pest could be checked by introducing a change in the local practices.

*The present position with regard to the control of some of the pests:*—The difficulties of the problem may probably be best illustrated by a reference to the present position of the Department in regard to some of the major pests of this province.

*The Army Worm of Paddy (Spodoptera mauritia)* may serve as an illustration to show the handicaps of the economic entomologist in regard to successful pest control. This is an insect, which appears all on a sudden in enormous numbers on nurseries or young broadcast paddy chiefly in Malabar. Usually the ryot notices its presence only when the crop has already been partly devastated and by the time he reports the matter to the village authorities and the news eventually trickles down to the Entomologist through the usual official channels, the pest is usually found to have done its havoc and disappeared.

Since, year after year, in spite of various efforts the Entomological Section found itself in a position of helplessness whether for making observations or for trying remedial measures, owing to such belated receipt of reports, it was decided to try a different plan of action. A campaign was instituted in the various taluks of Malabar under the joint efforts of the Deputy Director of Agriculture, Seventh Circle and the Entomologist and one officer from their staffs was posted for each taluk during the months of April-May when the pest was due to appear. These officers visited village after village, met the ryots, explained to them the life-history of the pest and the nature of the remedies to be adopted, and instructed them to post an addressed card the moment an attack was discovered. In this way during the last four years,

the greater part of the Malabar District has been covered. Some of the out-breaks were detected in time, and last year, especially, it was found possible to save the greater part of the affected area in Kottayam Taluk. Similar success has also attended the work in Ponnani this year.

Again, observations made regarding the area in the neighbourhood of Cannanore, where the largest number of outbreaks has been noted in the past, have shown that there is a close relationship between the outbreaks occurring on Paddy nurseries in the valleys in May and those noted in October–November on hill grasses on the laterite hills of this area. If the services of an experienced officer were available for keeping this area under observation throughout the year for one or two seasons, valuable information may be gathered not only as regards factors governing outbreaks of this pest, but also as to the possibility of prognosticating future attacks.

*The Paddy Stemborer* is another of the major pests of paddy. In ordinary years, it is hardly of consequence, as careful counts taken in fields attacked have shown that the damage is only about 1 to 3%, but in certain seasons, the infestation leaps up to 10 to 25% or more. Continued observation for a series of years has revealed the fact that the sudden jump in the damage is to be traced to abnormal rainfall received in the preceding hot season, which has kept the wild paddy or the aftermaths from harvested fields, green, and thus sheltered the borer larvae. Further it has been noted that in places where two crops are raised in rapid succession or where wild paddy is found in abundance the infestation, even in ordinary years, is definitely greater than in other places. It is hoped further investigations on these lines may give a clue to the control of this pest.

*The Paddy Grasshopper* is a big problem in some of the paddy areas. The eggs are laid in the bunds and remain there till the monsoon breaks, at which time the hoppers emerge from the soil and feed on the paddy blades. It is however when the ears are produced that the greatest harm is done. The winged grasshoppers fly from plant to plant, cut the base of earheads and cause a great amount of loss of crop. The pest can be checked by hand-netting the young ones as they emerge from the bunds and by scraping out the eggmasses in the bunds before the hot weather begins. These measures are still under investigation.

*The Silver Shoot* is a disease familiar to the ryot and considered by him to be caused by unseasonable rainfall. While usually it does not cause much damage, in certain years losses up to 75% have been recorded. Investigations have shown that generally the pest is effectively kept in check in nature by a small parasite (*Polygnotus* sp.) and that outbreaks are accompanied by the disappearance of this parasite. Further work may probably show that the pest could be checked by the introduction of colonies of this insect at the right time.

*Lines of future work* :— Experience of Pest Control work in the past has shown the great importance of a continuity of effort. What appears to be needed at present is an intensive study of the pest year after year, not only for taking note of the effect of the climatic and other conditions on the prevalence of the pest, but also for testing the control measures thoroughly till they can be confidently recommended to the ryots. In my opinion the best scheme would be to set apart one man for work on a particular major pest, such as the Army Worm, and make him responsible for results.

Secondly, the policy of concentrating all the staff on one pest at a time in order to obtain conclusive results quickly, does not lend itself to the nature of Entomological work, for in many cases one cannot be sure of the appearance of the particular pest on which work is desired to be done. On the other hand such a concentration may lead to the neglect of other important pests that may turn up unexpectedly. What is needed is a sufficiently large and fairly mobile staff that should be in readiness to tackle at a moment's notice any pests that may be reported and make use of such opportunities to advance our knowledge of control methods.

Thirdly, a study of local conditions of the utmost importance in devising satisfactory remedies for pests. A method that may prove successful for a pest under the conditions of a particular tract, may be utterly unsuitable for controlling the same insect in a different agricultural area of the same province. This points to the necessity of decentralising staff to a certain extent and opening substations in typical tracts for Entomological study.