

The Food Crisis and its Solution.

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Insect pests of cereals, pulses, fruits and vegetables often levy a heavy toll on our food production. The ravages of insects do not stop with their destruction in the field. The stored produce, be it pulse or grain, is equally subject to the damage and a perpetual war has, therefore to be waged against insect enemies.

The contribution of the Entomology section towards the protection of the crop in the field as well as the proper conservation of the produce in the godown consists of research and the application of the methods devised in the field.

Research: The activities under this aspect mainly have been: (1) the trial of various insecticides and chemicals against insects and (2) exploitation of the indigenous vegetable poisons for their toxic properties. In the course of investigations on the latter aspect, the remarkable insecticidal properties of the common drug — VASAMBU — *Acorus Calamus*, PONNARALI — *Thevetia nerifolia* and wild tobacco — *Lobelia excelsa* were brought to light. Supplies from foreign sources, of insecticides of vegetable origin like Pyrethrum and Derris which are highly lethal to insects, but are harmless to man and other animals, were cut off owing to the war. These were made good by the establishment of large scale plantations of these plants in India. In the meanwhile, a few chemicals like D. D. T. and Gammexane were perfected as insecticides during the war and they are now available for common use. The utility, dosage and economics of these chemicals are being tested under South Indian conditions. The possibilities of other methods including mechanical, cultural and biological are also investigated.

Plant Protection: The results of research achieved in the Entomological Section are transmitted to the ryot with the help of the limited Plant Protection Staff and the Agricultural Demonstrators and a short resume of the work carried on in this line may not be out of place here. Taking the food crops, paddy ranks first in importance. This crop often suffers from a number of enemies from its seedling to the harvest stage. The more important of them are, the paddy thrips, the swarming caterpillar, the paddy grass-hopper, the rice bug and lastly rats. Cheap and practicable remedial measures, like application of insecticides, fumigants and in some cases mechanical methods like flooding, trenching are advocated and practised with success. Cholan, the next important food crop, is occasionally subject to deprecations of the cholam earhead bug. D. D. T. and Gammexane dusted even in a weak concentration of 2% have given considerable relief. Fruit crops as well as vegetables

have, among other enemies, a few species of plant lice and leaf-eating caterpillars and grubs, and these are easily controlled by timely sprayings or dustings. A more illuminating example of crop protection is by means of other parasitic insects. To mention a few, the control of the notorious, fluted scale by its predator beetle on the Nilgiris, that of the coconut caterpillar by its hymenopterous parasites in the West Coast and other Districts and of the sugarcane borer by its egg-parasite are some of the outstanding cases of success. It will be but redundant to mention here about the extermination of the obnoxious prickly pear by the cochineal insect. All these items are in progress in the districts. It is difficult to assess the results of the work in terms of money but periodical reports of the Plant Protection Staff show that millions of rupees worth of crops and produce are being saved from the depredation of insects by timely advice and help. The squad of the limited staff are always available to the ryot for advice and help regarding the control of any insect pest.

Storage of Grains: The benefits accrued by the methods mentioned in the previous paragraph may perhaps pale into insignificance, when compared with the spectacular results obtained in the storage and proper conservation of food grains.

The policy of the Central and Provincial Governments has, of late, been either to import or procure and stock enormous quantities of food-grains in spacious godowns at convenient centres. These godowns, in course of time, become the hot-beds for the prolific breeding and multiplication of the myriads of insects, which infest the grains. This contingency was not perhaps, sufficiently anticipated in its full magnitude in the earlier stages with the result that lakhs of rupees worth of food-grains were reported to have been rendered unfit for human consumption in Bengal and the entire lot had to be condemned.

As a result of this bitter experience, the Madras Government have taken the situation seriously on hand. A special Entomological staff, consisting of four Gazetted Officers with the requisite subordinate establishment, was created and attached to the Board of Revenue with the specific purpose of safe-guarding the grains from deterioration during storage. The four Assistant Entomologists are stationed at Coimbatore, Madras, Vijayawada and Tiruchirapalli and their duties may be briefly summed up as follows:— Consignments of food-stuffs, when imported from abroad, are examined at the port of entry and necessary advice given regarding their condition and disposal. As a general policy, the godowns are first disinfested with Gammexane D-034 as a prophylactic measure. Stocks, either imported or procured locally, are stored in these godowns and if necessary the gunny-bags are given a protective layer of the above chemical to prevent any outside infestation. The stocks are kept under a careful periodical scrutiny and cases likely to get infested or having a mild infestation are recommended for either immediate release or for

disposal after reconditioning, depending upon the circumstances. On the other hand, seriously infested materials are fumigated with Calcium cyanide, which is a special technique by itself. The chemical being a deadly poison, due care is taken to see that the treated grains are free from even a trace of the Hydrocyanic acid before release. A short account of the genesis of the large-scale fumigation and conservation of food-grains may be of some interest here. By about 1943, when the food crisis was just looming large, quite an alarming report about a heavy consignment of 6,000 tons of wheat having been imported from Australia in an infested condition, was received. Prompt measures were taken to investigate the complaint and fumigation with Calcium cyanide was decided upon as the only course left open. Suitable accommodation as well as machinery for applying the fumigant were improvised with the least possible delay and it is no small achievement for the Department to have fumigated the entire stock successfully and prevented the subsequent deterioration on a scale attempted nowhere else in India till now. The Entomological staff attached to the Board of Revenue, have now taken up the inspection, disposal and treatment of the stocks as a routine measure and the Government may now well feel confident that the proper conservation of the food stocks is sufficiently assured. The following figures may give a rough picture of the enormity of the work done by this branch of food protection service from the year 1945 upto the present year :

Place	Recom- mended for property.	Recom- mended for recondi- tioning.	Fumigated with Calcium cyanide.	Treated with Gammexane.	Treated with Gammexane and priorities of release suggested.
	Tons.	Tons.	Tons.	Tons.	Tons.
Madras	46,000	909	12,649	8,936	65,105
Coimbatore	19,271	5,452	4,596	12,962	Nil.
Tiruchirapalli	16,502	9,492	335	17,016	Nil.
Vijayawada	19,528	5,920	2,697	1,996	Nil.
Total	1,01,301	21,773	20,277	40,910	65,105

The above figures do not include the quantities that were regularly examined in the godowns every fortnight and also those that were examined at the ports of entry.

Conclusion: 1. The importance of an efficient and well-equipped plant protection service need hardly be emphasized here. 2. The Government have realised the necessity for such an organization and given effect to the proposal to depute one upper subordinate from each district for intensive training in Entomology and Mycology. Provision has also been made for equipping each District with the required amount of insecticides, fungicides and the appliances. 3. The storage section attached to the Board of Revenue has more than justified its existence and it is strongly recommended that the staff may be continued at least till the present crisis is over and the days of abundance are in sight.