

Progress of Plant Protection in Madras State

by

K. R. NAGARAJAN, B. Sc., (Ag.),
Crop & Plant Protection Officer (Entomology)
Coimbatore.

Introduction : The heavy toll levied by insect pests on cultivated crops has been an annual feature, ever since man took to Agriculture. The situation, of late has taken a turn for the worse due to the changing conditions. The drive to increase agricultural production and the ready response of the cultivators have lead to some unforeseen repurcussions by way of creating new problems in insect control. The intensive cultivation coupled with the rapid expansion of the area under the plough has resulted in the various crops being grown throughout the year and this has provided a favourable atmosphere for the breeding and perpetuation of the numerous insect hordes. As a result, pests which were already reckoned as serious have increased in their virulance while some species which were considered only of minor importance, have now, assumed quite serious proportions - viz. the rice jassid (*Nephotettix bipunctatus*) flared up into prominence by 1948 and has now come to stay as a very serious pest of paddy. Added to this the white jassid (*Tettigoniella spectra*), the fulgorid (*Nysia atravenosa* and *Nilaparvata lugens*) along with the black Pentatomid (*Scotinophora lurida*) etc., claim very serious attention in certain localities. The steady and alarming increase in the depredations by the field rat (*Bandicota bengalensis*) would only render the picture more lurid.

Another instance would be that of the insect enemies of the long staple variety of cotton. The damage by the green jassid (*Empoasca devastans*), the aphid (*Aphis gossypii*) and the spotted bollworm (*Earias sp*) has reached such terrific levels that insecticidal treatments have practically fitted themselves into the regular agricultural practices of certain tracts. In the case of sugarcane, it is subject to a very serious pest - the early shoot borer (*Chilo traea infuscatella*). Similar examples can be quoted in large numbers. In short, the situation is getting more and more critical and any definite measure envisaging the reduction of the loss would go a long way to render the country self supporting, not only in its food requirements but also in the supply of raw materials which are so vital to feed the numerous industrial enterprises.

The Madras Agricultural Department has, from its very inception, been endeavouring to afford the necessary degree of relief to the ryots and the following is a resume of its activities and the results obtained thereof

Previous work: The entomology section was first organised at Coimbatore during 1912 for investigating the insect problems of the Madras State and evolving suitable measures of control. Attention had, necessarily, to be concentrated in the earlier days towards the study of the fundamental aspects, like the life history and habits, nature and extent of damage, distribution, host plants etc. The subject itself being still in its infancy and the efficacy of the then available insecticides limited, the control measures suggested had to be more of a mechanical or cultural nature based on the habits of the insect, with an occasional use of the chemicals then in vogue. These were at best more palliative inciting little or no enthusiasm from the ryot. A fund of information has, however, accumulated as a result of the pioneer work which has served as a strong foundation for further work on the economic side.

Present work in Plant Protection: One of the outstanding discoveries of the second world war period was about the potentialities of the chlorinated hydrocarbons, DDT and BHC, as effective killers of disease carriers like mosquitoes, flies, lice etc. The findings were first kept as top secrets and used to protect the fighting forces. With the termination of the war, attempts were made to adapt these chemicals for the control of crop-pests as well. With the rapid inflow of further experience and knowledge, safer formulations were evolved and some of them were found to confer a remarkable degree of relief. The advent of these wonder chemicals happily synchronised with the formation of a separate Plant Protection Section by 1949. Two Officers, one for the control of insect pests and the other for fungus diseases were appointed - one set for the Andhra and the other for the residuary State. They were provided with a compliment of two assistants (one for Entomology and one for Mycology) for each district to popularise the approved remedial measures. The field being practically virgin, astounding developments were possible within a very short time. The old methods were summarily discarded and the entire aspect of Plant Protection was revolutionised, by switching on to the newer synthetic insecticides. The response of the cultivators has been something magnificent, as evidenced by the enormous quantities of chemicals purchased and consumed by them.

The first field scale use of these chemicals, taken up by the Government Entomologist Coimbatore, was that of BHC 5% against the rice grasshopper (*Hieroglyphus banian*) in the Andhra during September 1948 and that of DDT 5% and 50% WP against the rice jassid (*Nephotettix bipunctatus*) extensively in the Tamil districts by November of the same year. Encouraged by the convincing results obtained against these two major pests, the chemicals were rapidly tested against numerous other insect pests as and when opportunities occurred. The results being uniformly successful, the subsequent popularity of the insecticides was only a matter of course. Statement I furnishes the data regarding the draw of the chemicals with the progressive increase from year to year.

With the extensive use of the chemicals and passing off of the first wave of enthusiasm, some of the serious draw-backs like phytotoxicity, absorption and retention, tainting, selective action, secondary infestation by other pests etc., which are inherent with most of the chlorinated hydrocarbons, came to light as a result of the experiments conducted by the Government Entomologist, Coimbatore, and by others elsewhere. Greater care had, therefore, to be exercised in advocating a judicious application of the formulations.

The next advancement in the synthesis of these modern insecticides was the production of organo-phosphorous compounds like, HETP, TEPP, Parathion, Malathion, Diazinon etc. These chemicals are strong poisons and are therefore more potent - the special features being that their application is not fraught with the adverse effects as are common with some of the hydrocarbons. The results of the trials carried out by the Government Entomologist, Coimbatore, were transmitted to the public with no loss of time.

A more recent development is the synthesis of the systemic insecticides. When sprayed on the plants or applied to the soil, they are absorbed and retained by the plant, rendering themselves proof against infestation by mites, aphids, coccids etc. Though their range of action is, at present, limited to a few categories of pests, the discovery has served as an incentive for further research and the results, if successful, would take us much nearer the solution of certain pest problems which have so far baffled human ingenuity. All the products that are now being freely used in the treatment of extensive areas of food, vegetable, fruit and commercial crops have been detailed in Statement I. The area of the crops treated with the above chemicals is given in Statement II.

Statement III furnishes the particulars of the acreage protected against serious pests of rice like the stem borer, jassids and rats and the quantity of food grains saved. Statement IV shows the areas under important commercial crops as well as the number of fruit and coconut trees effectively treated.

A perusal of the data furnished in these statements would clearly indicate the progress and appreciable increase in the areas tackled and the quantities of the insecticides consumed, the sum total of which would naturally go to improve the country's resources and enrich the cultivator.

Conclusion : Insect pests of cultivated crops have come to stay and the havoc caused by them is increasing to almost ruinous levels year by year. Unless requisite protective measures are taken, Agriculture, which constitutes the very back-bone of the country would ere long cease to be a profitable proposition. The Plant Protection Organisation of the Madras Agricultural Department has clearly indicated the possibilities of harnessing the latest discoveries in science to the benefit of the cultivator and, considering the larger interests of the country's welfare, the results amply show that steps taken towards the expansion of this organisation would be well worth the trouble and expense.

STATEMENT I.

*Quantities of Insecticides purchased and distributed by the Department
(in Tons)*

	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58
BHC 5%	107½	31½	15½	30	7½	..	..
BHC 10%	130	310	768	583	900	718	752
BHC 50% (WP)	46½	42½	71	96½	89½	115½	106
DDT 5%	49½	20	95	47½	70	91	105½
DDT 10%	110	..	1	..	1	½	..
DDT 50% (WP)	90	7	13	11	9	7	45½
Toxaphene 10%	4	16	22	..	5	..	..
Cotton dust	51	..	..	..	..	..	..
Calcium arsenate	3½	1/3	3	3	7	3	5
Zinc phosphide	2	3-1/3	2	12½	..	2½	2
H. E. T. P.	½	2/3	1/3	1½	1	1/3	1½
Parathion (Folidol tubes of 100 cc.)	..	..	..	1759	17,418	43,490	39,975
Endrin (Gallons)	..	..	..	..	202	..	590

STATEMENT II.

Area of crops treated by the Plant Protection Organisation.

Year	Food crops in acres	Vegetables in acres	Other crops in acres	Total in acres	Total No. of fruit trees & other trees
1949-50	12,110	2,562	2,980	17,658	25,160
1950-51	37,288	5,209	15,033	58,130	43,650
1951-52	1,05,352	6,491	22,604	1,34,447	23,815
1952-53	1,83,135	9,280	34,000	2,26,415	38,024
1953-54	1,68,300	9,730	27,300	2,05,330	37,200
1954-55	1,38,820	6,270	32,090	1,77,780	83,440
1955-56	1,88,680	9,040	50,130	2,47,850	1,30,470
1956-57	1,72,660	11,250	75,225	2,59,135	1,16,160
1957-58	2,22,530	18,720	1,06,860	3,48,110	1,12,900

STATEMENT III.

Area under paddy affected by the Stem borer, Jassids, Rats and other pests (in Acres)

Year	Stem borer		Jassid		Rats		Other pests		Total area (Cols 2+4+6+8)	Appraised Quantity of food grains saved in tons
	Area treated	As % to the total area treated	Area treated	As % to the total area treated	Area treated	As % to the total area treated	Area treated	As % to the total area treated		
1	2	3	4	5	6	7	8	9	10	11
1949-50	522	4.70	1,768	15.80	3,372	30.20	5,506	49.30	11,168	1,042
1950-51	1,165	3.82	5,371	17.71	10,693	35.26	13,111	43.23	30,340	2,758
1951-52	2,845	2.84	10,396	10.40	89,443	69.13	17,338	17.33	1,00,022	0,093
1952-53	7,987	4.91	13,039	8.06	1,18,892	73.10	21,689	13.43	1,61,607	14,700
1953-54	18,832	12.10	60,237	38.90	33,750	21.80	42,201	27.20	1,55,020	14,092
1954-55	20,678	16.70	17,138	13.90	62,983	51.20	22,468	18.20	1,23,272	11,206
1955-56	29,090	16.22	28,405	15.85	96,845	53.91	25,141	14.02	1,79,481	16,316
1956-57	47,030	29.70	35,031	22.10	40,307	25.45	36,012	22.75	1,58,380	14,400
1957-58	55,300	27.70	48,650	24.32	50,660	25.33	45,290	22.65	1,99,900	18,100

STATEMENT IV.

Area under Commercial crops and the number of fruit trees and other trees treated.

Year	Commercial Crops				Total	Fruit Trees & other Trees (in No.)				Total
	Chilli	Cotton	Ground nut	Other crops		Coco-nut	Man-goes	Citrus	Other fruit trees	
1	2	3	4	5	6	7	8	9	10	11
1949-50	2,126	182	200	478	2,986	9,830	7,835	6,767	728	25,160
1950-51	12,220	601	1,228	1,584	15,633	17,001	11,932	9,727	4,990	43,650
1951-52	18,403	2,350	1,181	670	22,604	2,002	9,504	12,309	..	23,815
1952-53	23,236	2,036	1,037	7,641	34,000	9,480	16,278	11,834	432	38,024
1953-54	17,509	1,651	1,419	6,721	27,300	12,460	8,884	15,000	856	37,200
1954-55	18,215	3,548	1,614	9,313	32,690	58,636	5,974	6,787	12,043	83,440
1955-56	20,091	13,121	1,803	9,115	50,130	8,914	26,348	12,759	10,449	1,30,470
1956-57	30,956	13,176	11,424	10,660	75,225	65,334	24,497	19,314	7,015	1,16,160
1957-58	48,050	24,830	18,400	15,680	1,06,860	33,290	54,690	14,940	9,980	1,12,900