6. **Summary**: In an experiment conducted to find out the economic spacing for bunch groundnut grown under irrigation, it was found that the spacing 9" x 6" gave higher returns than other spacings tried. A seed rate of 90 lbs. of picked kernels will have to be used for this spacing.

7. **Acknowledgements**: Our thanks are due to Sri P. Krishna swamy, B. SC. (AG.), Superintendent, Agricultural Research Station, Tindivanam for help in preparing this article.

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The Control of the Rice Mealy Bug — Ripersia Oryzae Gr — in the Tanjore Delta of the Madras State

by

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Introduction: Mealy bugs and scales are serious pets on cultivated crops — The mealy bug — *Ripersia Oryzae Gr* — is responsible for the malady popularly known as "soorai" on paddy in the Madras State. It is widely distributed in the Madras State and has been noted in Tanjore, South Arcot, Tiruchirappalli, Coimbatore, and Malabar districts. It occurs in a fairly severe form more often in the Tanjore delta than in other tracts.

The presence of the pest in the field is easily noticed by the characteristic round or oval sunken patches in the midst of a normal crop, The plants in the affected patches die in course of time and those that survive, seldom put forth normal earheads. The few earheads that may emerge are distorted and chaffy.

The control of the pest has been a difficult problem due to the concealed existence of the bugs inside the leaf sheaths. The results of recent investigations conducted for three seasons at the Agricultural Research Station, Aduthurai on the control of this pest are furnished in this paper.

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Review of previous work: Newstead (1917) makes mention of pest as having been noted in South India. Green (1931) gives the correct identity of the pest. Ramakrishna Ayyar, the eminent South Indian Entomologist, has made mention of the pest in a number of his publications from 1917 to 1933. The same author gives a detailed account of the pest and its occurrence in South India in his publications in 1938. It was first noted in Coimbatore district in 1907 and collected from Tanjore in 1940. A good deal of information on the life history and habits, nature of damage, etc. is available. The bug breeds on a variety of grasses. Destruction of all grasses in which the insect breeds, elimination of infested seedlings before transplanting and helping vigorous growth by proper manuring have been recommended for its control (Ramakrishna Ayyar — loc. cit.). Intensive investigations on the control of the pests were in progress from 1950 onwards Santhanaraman (1952) explored the possibilities of controlling the pest by mechanical and insecticidal methods. The mechanical method adopted was to burn the grasses on field bunds before the sowing of paddy with a view to exterminate the mealy bugs living on them. The method however did not give encouraging results. Preliminary insecticidal trials indicated encouraging results with high concentrations of Parathion, Schradan and BHC when applied to infested patches at the early stage of appearance of the pest.

Materials and Methods: Investigations were pursued for three seasons, viz, 1953—54, '54—55 and '55—'56 with a view to evolve the most effective and economic method of control of the pest. Two separate methods of trials with insecticides were explored. A number of insecticides like BHC, Endrin, Folidol (Parathion) BF. P. O. and Systox were tried.

In one set, the seedlings were treated about a week prior to transplanting in order to eliminate the pest at the early stage and the effect of treatment in reducing the incidence of the pest on the transplanted crop was studied.

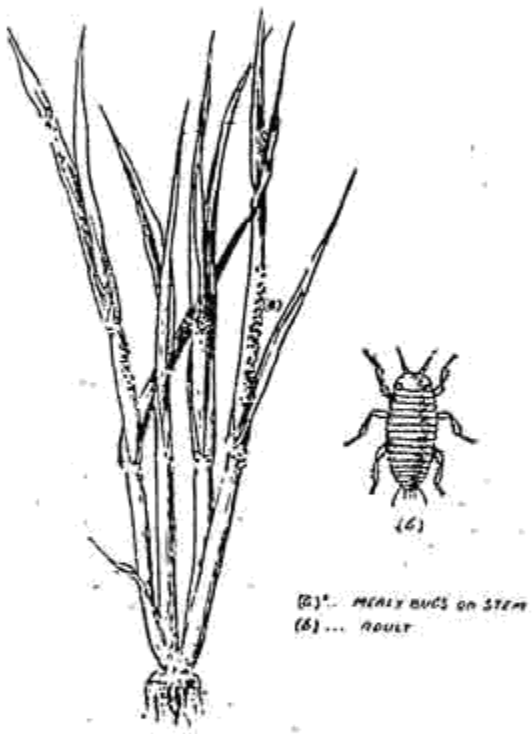
The other method was to treat the 'soorai' patches at the initial stage of appearance in the planted fields and watch for further expansion in size.

The variety of paddy chosen for the nursery trial was Co. 25 for all the three seasons while the treatment of patches was tried on other varieties also, as opportunities arose. The nursery trials were confined to the Thaladi crop while treatment of patches was tried on Samba also.

Assessment of Results: The effect of the nursery treatment was gauged by measuring the acre of 'soorai' patches formed in the different plots at the time of harvest. The yield under the different treatments was also recorded.

With regards to the treatment of 'soorai' patches, the results were assessed by noting the relative expansion in size of the patches after treatment as compared to the area affected at the time of treatment.

Results: *Nursery Trial: 1953 — '54.* BHC 0·1% spray, BHC 10% dust and Folidol 0·025% spray were applied in the nursery. 10 cent plots under each treatment was planted with the crop. The data gathered are furnished in Statement I. 'Soorai' incidence was least under Folidol. The yield was also high in the plot treated with this chemical. The treatment however did not eliminate the pest.



THE RICE MEALY BUG
CONTROL : FOLIDOL 0·05 % OR
SYSTOX 0·15 %

1954 — '55. Folidol 0·025%, Endrin 0·04% and Systox 0·15% sprays were tried. BHC was eliminated as results in the previous season were not encouraging with reference to this chemical. The treated seedlings were planted in larger plots of 20 cents under each treatment. The data gathered are furnished in Statement II. The incidence of the pest was too low during the season to arrive at any conclusion.

1955 — 56. Folidol 0·05% and 0·025%, Endrin 0·04% and Systox 0·15% were tried as in previous seasons. The treated seedlings were planted in large fields of 45 cents for each treatment. The results showed the least incidence of the pest and a maximum yield in the plot treated with Folidol 0·05% (Vide statement III) — The observations confirmed the first year's findings.

Treatment of infested patches to prevent further spread: 1953 — '54. BHC 0·2% spray, Hexidole 950 RR (BHC with special

Effect of treatment of 'soorai' patches - Percentage of expansion in size to the original

1953 — '54	1954 — '55	1954 — '55	1955 — '56	1955 — '56	1955 — '56	1955 — '56	1955 — '56
Statement IV	*Statement V*	*Statement VI*	*Statement VII*	*Statement VIII*	*Statement IX*	*Statement X*	*Statement XI* *
riety Co. 25 Thaladi) atments: 6; o. of patches eated with ch chemical: 4; Treated on 28-1-'54	Variety Co. 25 (Thaladi) Treatments: 6; No. of patches per treatment: 4; Treated on 30-12-54	Variety ADT 25 (Thaladi) Treatments: 6; No. of patches per treatment: 4; Treated on 22-12-'54	Variety Co. 25 (Samba) Treatments: 5; No. of patchos per treatment: 5; Treated on 23-10-'55	Variety Co. 25 (Thaladi) Treatments: 5; No. of patches per treatment: 5; Treated on 29-11-55	Thovai Samba (Thaladi) Treatments: 4; No. of patches per treatment: 5; Treated on 14-12-55	Nellore Samba (ADT. 11 Thaladi) Treatments: 5; No. of patches per treatment: 4; Treated on 21-12-'55	ADT. 25 (Thaladi) Treatments: 5; No. of 'soorai' patches per treatment 10; Treated on 29-12-'55 and 11- 1.'56
Treatments / percentage of expansion at harvest	Treatments / percentage of expansion	percentage of expansion	Treatments / percentage of expansion	percentage of expansion	Some plant srevived in these treatments / percentage of expansion	percentage of expansion	percentage of expansion
Foli-dol 0·025 % / 9·0	Folidol 0·025% / 8·6	Nil	Folidol 0·05% / 1·4	Nil		Nil	15·0	Nil
BF. PO 0·5% / 9·3	Endrin 0·04% / 7·0	3·1	Folidol 0 025% / 12·0	Nil		Nil	not included	5·6
BHC 0·2% / 18·4	Isodrin 0·05% / 55·9	12·8	Systox 0·15% / Nil	Nil		Nil	8·0	Nil: some plants revived
Hexidol RR 950 BHC with special adhesive) 0·1% / 25·0	Hexidol 950 RR; 0·2% / 27·9	23·1	Endrin 0·94% / 16·1	3·8		13·5	26·2	14·5
Systox 0·5% / 7·2	Systox 0·15% / Nil	2·1	Control / 76·5	40·8		83·8	55·5	82·2
Control / 40·0	Control / 75·1	37·8						

Folidol 0·05% (oz. in 6½ gallons of water) and Systox 0·15% (1 oz. in 4 gallons) gave consistently encouraging results

Two rounds of treatments at a fortnight's interval as the incidence was of a severe nature.

adhesive) 0·1%, BFPO 0·5% and Systox 0·5% were tried. The expansion in size was least under Folixol and Systox — Vide Statement IV.

1954 — '55. Hexidol 950 RR 0·2%, Isodrin 0·1% and Endrin 0·04% were tried in addition to Folidol and Systox during the season. Folidol and Systox confirmed their superior efficiency in arresting the spread of the pest. Endrin also gave some promising indications. Trials were conducted on varieties Co. 25 and ADT. 25. The data gathered are tabulated in Statements V and VI.

1955 — '56. Five sets of trials under Samba and Thaladi under different varieties in the farm and ryots' field were conducted, the variants consisting of Folidol, Systox and Endrin. Folidol and Systox gave the best results in controlling the spread of the pest. Some of the plants revived in the patches treated with these chemicals. Endrin did not yield consistently good results. (Vide Statement VII to XI.)

In one trial (Statement XI), two rounds of treatment at a fortnight's interval were required as the incidence of the pest was heavy.

In all these trials, the insecticidal application was given 5 to 6 weeks after planting when the initial infestation could be detected.

Mortality Observations : The mortality of the insects caused by Folidol, Systox and Endrin was observed one week after treatment was provided for examining the mortality of the bugs with a view to allow the full play of the systemic properties of Systox and Folidol on the insect. Dead and living bugs on 5 infested tillers in each treatment were counted. The data are furnished in Statement XII. Systox 0·15% and Folidol 0·05% caused the highest mortality of bugs.

Summary and Conclusions : A number of synthetic chemicals was tried against the rice mealy bug for three reasons. Folidol 0·05% and Systox 0·15% and Systox 0·15% proved to be the most effective treatments both in minimising the damage and increasing the yield.

The treatment of the crop at the nursery stage will Folidol 0·05% or Systox 0·15% gives much relief with reference to the incidence of the pest on the transplanted crop. The insect may appear to some extent in the transplanted fields even after nursery treatment. The initial appearance of 'soorai' patches in the planted fields can be detected in about 5 to 6 weeks after planting...est under application of Folidol or Systox will arrest the further s·

pest. In cases of serious infestation, two rounds of treatments will be required for controlling the pest in the affected patches.

Mortality observations showed that Folidol and Systox were the most effective of the different insecticides tried.

The cost of the chemical for treating the nursery required for planting one acre works out approximately to Rs. 2—8—0 in the case of Folidol 0·05% (1 oz. in 6¼ gall) and Rs. 8—0—0 in the case of Systox 0·15% (1 oz. in 4 gallons of water). For treatment of patches, the cost varies with the size of each patch and severity of occurrence of the pest.

For all practical purposes, a careful watch over the planted crop at critical periods to detect the first signs of infestation and prompt application of one of the above pesticides will quite suffice to minimise or eliminate loss arising from this pest. Folidol is a known remedy to control a number of other pests also occurring on paddy and at the same time cheaper than Systox.

As these chemicals are highly poisonous and easily get absorbed into the body tissues, they should be used with care and under expert guidance.

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APPENDIX

Nursery Treatment Trial

Statement I :

1953–'54 Variety Co. 25. Treatments : 4
Area planted under each treatment : 10 cents; Treated on 5–10–1953 ;
Extent of 'soorai' damage and acre yield

Treatment	Area of affected patches	Yield per acre in lb.
1. Folidol 0·05% Spray	48 sq. ft	3,643
2. BHC 10% dust	114 ,,	3,457
3. BHC 0·1% spray	180 ,,	3,374
4. Control	83 ,,	3,312

Statement II :

1954–'55 Variety Co. 25. Treatments : 4
Area planted under each treatment : 20 cents; Treated on 28–9–1954;
Extent of damage and yield

Treatment	Area of affected patches	Yield per acre in lb.
1. Endrin 0·04% spray	39·3 sq. ft.	3,411
2. Folidol 0·025%	38·1 ,,	3,528
3. Systox 0·15%	27·3 ,,	3,033
4. Control	48·0 ,,	3,294

The incidence was too low to arrive at any conclusion.

Statement III :

1955–'56 Variety Co. 25. Treatments : 5
Area of transplanted crop under each treatment 45 cents;
Treated on 7–10–1955

Treatment	Area of affected patches	Acre yield in lb.
1. Folidol 0·05% spray	95·75 sq. ft.	4,216
2. Folidol 0·025% spray	151·5 ,,	3,931
3. Systox 0·15% ,,	113·0 ,,	3,707
4. Endrin 0·04% ,,	200·5 ,,	3,528
5. Control	243·0 ,,	3,049

The incidence of the insect is least and yields highest under Folidol and Systox.

Statement XII :

Mortality Studies 1955 – '56.

Treated on 29–12–1956. Mortality after one week of treatment i. e., on 5–1–1956.

	Treatment	No. of dead mealy bugs.	Number alive	Total	Percentage of mortality
1.	Folidol 0·05%	104	41	145	71·7
2.	Folidol 0·025%	76	49	125	60·8
3.	Systox 0·15%	109	28	137	79·6
4.	Endrin 0·04%	55	135	190	29·0
5.	Control	6	162	168	3·6

Mortality was highest under Systox 0·15% (1 oz. in 4 galls) and Folidol 0·05% (1 oz. in $6\frac{1}{4}$ galls).

Note on the Liberation of Hydrogen Sulphide in Submerged Paddy Soils

by

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Introduction : Hydrogen sulphide is toxic to plants even in small puantities. It causes injury to the root cells and inhibits respiration. The toxicity is a function of the concentration and time of contact of H_2S with the plant. The injury increases with time of exposure of the plant to the gas even in minute quantities (1. 2). The uptake of nutrients is vitally affected and Baba *et al*, (3) from their studies on the nutrition of rice showed that the absorption of some nutrients particularly potassium and silica and of water was decreased by the addition of H_2S. As a result of similar studies, Mitsui *et al*, (4, 5) showed that passing H_2S through the culture solution at the rate of two bubbles a second for 30 minutes caused a market reduction in ion accumulation, water absorption and protein synthesis during the subsequent 23 hours. Ion uptake was reduced in the following order :— $P_2O_5 > K_2O > Sio_2 > NH_4 > MnO > H_2O >$ Mgo > CaO. They concluded that the severe Helminthsporium root rot noticed in certain soils was a result of H_2S injury. The toxicity