

CONTROL OF UDBATTA DISEASE OF RICE

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Field trials were conducted during 1969–70 and 1970–71 at the Rice Research Station, Jeypore, for the control of udbatta disease of rice caused by *Ephelis oryzae*. Seventeen treatments in 1969–70 and 24 treatments in 1970–71, comprising of hot water, solar heat, a number of chemicals and their combinations, were tried. Over both the years hot-water treatment of 54°C for 10 min solar treatment, Granosan MDB + Vitavax, and Granosan MDB + Plantvax (1.140 g/6 ml of water) applied as slurry to $\frac{1}{2}$ kg of seed, were found to be excellent in controlling the disease. Tecto-60 and Granosan L tested during one year only were also effective.

INTRODUCTION

Udbatta disease of rice caused by *Ephelis oryzae* Sydow (= *Balansia oryzae* Narasimhan and Thirumalachar) has been reported to occur in several parts of India such as Mysore, Telungupalyam of Madras, Araku valley of Andhra Pradesh, North Kanara district of Bombay, Madhya Pradesh, Chota Nagpur division of Bihar and Orissa. In Orissa it is mostly confined to hilly tracts of the elevations of 1,500 to 3,500 feet, a.s.l., of Koraput, Kalahandi, Boudh-Phulbani and Ganjam districts. In Koraput district, the disease occurs in severe form in certain improved varieties such as J₁, J₃, J₅, PTB.10, CH 55, CH.62, EF.86, T.90 and CR.907, etc., and in certain local varieties viz., 'Hati panjar', 'Assamchuri', 'Matimami' and 'Deulabhog', etc., usually 2–3 per cent earhead infection is observed in normal years, but in years of epiphytotics, earhead infection up to the extent of 10–11 per cent occurs in susceptible varieties grown in damp location.

Infected plants cannot be recognized until they come to the boot leaf stage. The growth of the plant and its general appearance is not affected in any way by the disease. Heading in the diseased plants is reached at almost the same time, or often slightly earlier than in the normal plants. With the appearance of earheads, it is found that in place of a normal earhead, an erect, greyish white, cylindrical axis much like 'Agarbatti' (incense rod) emerges from the boot leaf sheath. In the infected panicles, the florets get glued together to the main rachis by the viscid spore mass which hardens into a crust and no grain is formed resulting in a loss of 100 per cent in infected earheads. The infected panicle and the flag leaf are reduced in size. In some cases the leaf blade of the flag leaf at junctura is crumpled and the infected earhead comes out with much difficulty. The flag leaf, second and third leaves and their corresponding leaf sheaths show lustrous greyish white appearance. The disease is usually noticed after emergence of earhead, but in some cases it can be recognized at boot leaf stage from such symptoms as crumpling of flag leaf at junctura and lustrous greyish white appearance of the leaf blades and corresponding leaf sheaths of the three leaves from the apex.

Although the disease is causing an appreciable loss in yield in certain susceptible varieties, much attention has not been given on control of the disease. The author (1964), however, made certain studies on the nature of the disease and control measures. He found that the disease could be controlled by treating the seeds with hot water at 54°C for 10 min or by solar heat. The conventional method of seed treatment with fungicides, such as Agrosan G.N. or Geresan was found to be ineffective in control of the disease. But since hot water treatment is a difficult process to be adopted by ordinary cultivators in the present investigation, attempts were made to find out the efficacy of certain chemicals, including systemic fungicides such as D 735-75 W (Vitavax), F 461-75 W (Plantvax) and Tecto 60 (Thiabendazole 60 per cent W.P.), which were found to be effective in the control of smuts and several plant diseases (Hardison 1966; Edgington and Reinberg 1966; Edgington and Kelly 1966; Edgington and Busch 1967; Chatrath *et al.* 1969; Weinke *et al.* 1969).

MATERIALS AND METHODS

Naturally infected seeds of CR.907 and PTB.10 were used in field trials of 1969-70 and 1970-71, respectively. The seeds were collected from badly infected fields and stored at the Rice Research Station, Jeypore (2,200 feet above sea level) for one year, before the trials were conducted. Seeds were sown after the different treatments in separate nursery beds at Rice Research Station, Jeypore, and were transplanted after about a month. All the treatments were replicated four times in a randomized block. Each plot consisted of 21 rows having 40 plants in each during 1969-70, and 10 rows having 63 plants in each during 1970-71. The incidence of the disease was recorded by counting the total number each of the normal and infected earheads in each plot and calculating the average percentage of infection.

The details of seed treatments are given in Table I.

RESULTS

It may be seen from the data (Table II) that the hot-water treatment, solar treatment, Granosan MDB + Vitavax, Vitavax + Plantvax, Pan 15 + Plantvax, and Granosan MDB + Plantvax were found to be significantly superior to control during 1969-70. However, all other fungicides except Captan were also effective in controlling the disease.

During 1970-71, hot-water treatment was also found to be the best in controlling the disease, followed by Granosan MDB + Vitavax, Tecto 60; Pan. 15 + Vitavax; Granosan L; Granosan L + Vitavax, which were at par. Amongst other seed treatments, all the treatments were significantly superior to control, except Mist-o-matic, Mist-o-matic + Vitavax, Vitavax + Plantvax, Plantvax and Granosan MDB.

Thus, it would be observed from the data that the hot water treatment at 54 °C for 10 min and fungicide such as, Granosan MDB + Vitavax were found to be significantly superior to other chemicals in controlling the disease in both the years of trials.

TABLE I
Seed treatments, chemicals used, etc.

Sl. No.	Treatment	Form	Chemical name	Dose/ $\frac{1}{2}$ kg of seed	Source	Method of treatment
1.	Agrosan G.N.	Powder	Mixture of phenyl mercury acetate and ethyl mercury chloride	1.250 g	ICI (Pvt.) Ltd., India	Applied to the seed as dry seed dressing
2.	Captan	"	N-(Trichloromethyl thio-4-cyclohexene-1,2-dicarboximide)	1.250 g	Ortho Chemicals, U.S.A.	"
3.	Vitavax (DCMO)	"	75 per cent 2,3-Dihydro-5-carbox-anilido-6-methyl 1,4-oxathin	1.140 g in 6 ml of water	Uniroyal Inc., U.S.A.	The wettable powder was applied to the seed as slurry
4.	Plantvax (DCMOD)	"	75 per cent 2,3-Dihydro-5-carbox-anilido-6-methyl 1,4-oxathin-4,4-dioxide	1.140 g in 6 ml of water	..	"
5.	Panogen 15	Liquid	2.2 per cent methyl-mercury dicyanodiamide	0.42 ml dissolved in 6 ml of water	Morton Chemical Co., U.S.A.	The liquid was applied to the seed as slurry
6.	Granosan MDB	Powder	1.93 per cent N-(Ethylmercuri)-p-toluenesulfonamide	1.140 g dissolved in 6 ml of water	E.I. duPont de Nemours & Co., U.S.A.	The wettable powder was applied to the seed as slurry
7.	Mist-o-matic (PMAA)	Liquid	7 per cent phenyl-mercuric ammonium acetate	0.3 ml dissolved in 6 ml of water	Gustafson Mfg. Co., U.S.A.	Applied to the seed as slurry

TABLE I (contd.)

Sl. No.	Treatment	Form	Chemical name	Dose/½ kg of seed	Source	Method of treatment
8.	Granosan L	Liquid	2.89 per cent methyl-mercury-2,3-dihydroxypropyl-mercaptide and 0.62 per cent Methylmercuric acetate	0.25 ml dissolved in 6 ml of water	E.I. duPont Nemours & Co., U.S.A.	The liquid was applied to the seed as slurry
9.	Granosan M	Powder	7.7 per cent N-(Ethylmercuri)-p-toluenesulfonamide	0.250 g dissolved in 6 ml of water	E.I. duPont Nemours & Co., U.S.A.	W. P. was applied to the seed as slurry
10.	Vitavax + Plantvax			Vitavax 0.570 g + Plantvax 0.570 g in 12 ml of water		"
11.	Vitavax + Pan. 15			Vitavax 1.140 g + Pan.15 0.42 ml in 12 ml of water		"
12.	Vitavax + Granosan MDB			Vitavax 1.140 g + Granosan MDB 1.140 g in 12 ml of water		"
13.	Vitavax + Mist-o-matic			Vitavax 1.140 g + Mist-o-matic 0.3 ml in 12 ml of water		"
14.	Plantvax + Pan. 15			Plantvax 1.140 g + Pan.15 0.42 ml in 12 ml of water		"
15.	Plantvax + Granosan MDB			Plantvax 1.140 g + Granosan MDB 1.140 g in 12 ml of water		"
16.	Plantvax + Mist-o-matic			Plantvax 1.140 g + Mist-o-matic 0.3 ml in 12 ml of water		"

TABLE I (contd.)

Sl. No.	Treatment	Form	Chemical name	Dose/ $\frac{1}{2}$ kg. of seed	Source	Method of treatment
17.	Granosan L + Plantvax	+		0.25 g of Granosan L + 1.140 g of Plantvax in 12 ml of water		W.P. was applied to the seed as slurry
18.	Granosan L + Vitavax	+		0.25 g of Granosan L + 1.140 g of Vitavax in 12 ml of water		Applied to the seed as slurry
19.	Granosan M + Plantvax	+		0.250 g of Granosan M + 1.140 g of Plantvax in 12 ml of water		"
20.	Granosan M + Vitavax	+		0.250 g of Granosan M + 1.140 g of Vitavax in 12 ml of water		"
21.	Ruberon	Tablet	3.45 per cent of ethyl mercuric phosphate (EMP) $\frac{1}{4}$ tablet dissolved in 500 ml of water		Hakko Chemical Industry Co. Ltd, Japan	"
22.	Tecto-60 (Thiaben- dazole 60 per cent W.P.)	Powder	2-(4-thiazolyl) ben- zimidazole	2.250 g	Merck & Co., Inc., U.S.A.	Applied to the seed as dry seed dressing
23.	Aureofungin + Teepol + CuSO ₄	Powder, liquid, crystals		111 mg of aureo- fungin was dissolved in 1.1 ml of Teep.1 and added to 5 lit of water to which 370 mg of CuSO ₄ was added	Hindustan Anti- biotics, Poona	Seeds were soaked in ordinary water over- night and there- after dipped in solu- tion for one hour and dried under shade

TABLE I (contd.)

Sl. No.	Treatment	Form	Chemical name	Dose/ $\frac{1}{2}$ kg. of seed	Source	Method treatment
24.	Hot water treatment at 54°C			$\frac{1}{2}$ kg of seed was immersed in 3.5 lit of water		Seeds were soaked in ordinary water (33-34°C) for 6 hr and then treated in hot water at 54°C for 10 min.
25.	Solar treatment			"		Seeds were soaked in ordinary water (33-34°C) for 6 hrs and then exposed to solar heat in a thin layer on a cement floor from 11.30 AM to 3.30 PM on 28.5.69 during 1969-70, the temperature ranged from 44 to 51°C and on the same date during 1970-71 the temperature ranged from 45 to 53°C.
26.	Seeds soaked in ordinary water			"		Seeds were soaked in ordinary water (33-34°C) overnight and then dried in a thin layer under shade at room temperature of 34°C.
27.	Control					

TABLE II
Effect of seed treatment on the incidence of *udbatta* disease of rice in 1969-70 and 1970-71

Sl. No.	Treatment	1969-70			1970-71		
		Avg. number of ear heads	Number of infected earheads	Avg. percentage of incidence in angle	Avg. number of ear heads	Avg. number of infected earheads	Avg. percentage of incidence in angle
1.	Agrosan G.N.	—	—	—	4504	46	5.65
2.	Captan	6237	18	2.98	—	—	—
3.	Vitavax	6615	4	1.17	4756	27	3.87
4.	Plantvax	6153	6	1.37	4520	56	6.19
5.	Pan. 15	6678	5	1.34	4473	22	3.91
6.	Granosan MDB	6669	3	1.12	4189	47	6.02
7.	Mist-o-matic	6258	4	1.12	4662	88	7.71
8.	Granosan L	—	—	—	4394	16	3.20
9.	Granosan M	—	—	—	4520	33	4.69
10.	Vitavax + Plantvax	6539	2	0.75	4331	51	6.27
11.	Vitavax + Pan. 15	6342	5	1.31	4237	12	3.12
12.	Vitavax + Granosan MDB	6510	2	0.73	4242	13	2.46
13.	Vitavax + Mist-o-matic	5901	6	1.28	4741	76	7.07
14.	Plantvax + Pan. 15	6678	2	0.78	4835	49	5.59
15.	Plantvax + Granosan MDB	6027	2	0.80	4441	19	3.65
16.	Plantvax + Mist-o-matic	6550	3	0.87	4802	44	5.35
17.	Granosan L + Plantvax	—	—	—	4868	33	3.88
18.	Granosan L + Vitavax	—	—	—	4110	16	3.49
19.	Granosan M + Plantvax	—	—	—	4048	28	4.40
20.	Granosan M + Vitavax	—	—	—	4882	21	3.78
21.	Ruberon	—	—	—	4567	50	5.87
22.	Tecto 60	—	—	—	5323	15	2.95
23.	Aureofungin + Teepol + CuSO ₄	6867	3	1.04	—	—	—
24.	Hot water treatment	6027	0.00	0.00	4898	4	1.55
25.	Solar treatment	6825	2	0.64	4705	27	4.63
26.	Seeds soaked in ordinary water	6342	7	1.62	4214	52	5.90
27.	Control	6798	15	2.85	4945	97	8.07
	SEM (Tr)			0.49			0.74
	C.D. 5 per cent			1.00			2.10
	C.D. 1 per cent			Nos.			2.69

NS=Not significant

REFERENCES

- Chatrath, M. S., Renfro, B. L., Nene, Y. L., Grover, R. K., Roy, M. K., Singh, D. V., and Gandhi, S. M. (1969). Control of loose smut of wheat with systemic fungicides. *Indian Phytopath.*, **22**, 184-187.
- Edgington, L. V., and Busch, L. V. (1967). Control of *Rhizoctonia* stem canker in potato. *Pl. Dis. Surv.*, **47**, 28-29.
- Edgington, L. V., and Kelly, C. B. (1966). Chemotherapy of onion smut with oxathin systemic fungicide. *Phytopathology*, **56**, 876.
- Edgington, L. V., and Reinberg, E. (1966). Control of loose smut in barley with systemic fungicide. *Can. J. Pl. Sci.*, **46**, 336.
- Hardison, Hohn (1966). Systemic activity of two derivatives of 1,4 oxathiin against smut and rust diseases of grasses. *Pl. Dis. Repr.*, **50**, 624.
- Mohanty, N. N. (1964). Studies on udbatta disease of rice. *Indian Phytopath.*, **12**, 308-316.
- Weinke, K. E., Lanber, J. J., Greenwald, B. W., and Preiser, F. A. (1969). Thiabendazole, a new systemic fungicide. *Proc. 5th Br. Insectic. Fungic. Conf.*, 340-346.