

## Ragi Blast and its Control\*

by

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**Synopsis:** Blast is a serious disease affecting ragi (*Eleusine coracana* Gaertn.) in Madras State. Among the fifteen fungicides tested seven fungicides viz., ceresan lime mixture dust, Dithane Z-78, Flit 406, Bordeaux mixture, 1% wettable sulphur, Forbam and Ziram were found to reduce the incidence of the disease and also increase the grain yield to a significant extent.

**Introduction:** Ragi (*Eleusine coracana* Gaertn.) is one of the important millets grown in this State. It occupies more than nine lakhs of acres and forms one of the staple items of food for the rural population and plays an important role in rural economy. This crop is subject to the ravages of a serious fungus disease, viz. blast, caused by the fungus *Piricularia* sp. which takes a heavy toll every year. The annual loss in yield is roughly estimated at more than 10% of the total crop. When the disease appears in an epidemic form, the loss of grain may range up to 50% depending upon the weather conditions (Mc Rae 1922).

The disease was first recorded in this State in 1919 and since then it has been found to occur almost every year, and it has also been reported in other states like Mysore (Venkatarayan 1946). Blast infection occurs in all stages of the ragi crop both in the nursery and in the transplanted crop. In the nursery, spindle-shaped leaf-spots are formed and in severe outbreaks the leaves dry up. In the transplanted crop the infection is found as leaf spots as well as blackening of the nodes, neck and fingers. The affected earhead dries up and becomes chaffy resulting in heavy loss in yield ranging up to 50%. Attempts to produce blast resistant varieties of ragi have not proved successful so far as all available varieties have been found to be susceptible to the disease. Hence the only alternative method of controlling the disease is by the chemical method, i. e., by application of fungicides.

**Materials and Methods:** The short duration popular ragi variety Co. 7 was planted for the experiment in field No. 75 on the Central Farm, Agricultural College and Research Institute, Coimbatore under gardenland conditions. The fungicides tested and the plan and lay out particulars are furnished below:

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|---|--|
| 1. Zinc Ethylene bis dithiocarbamate<br>(Dithane Z-78) 0.15 | 3. Bordeaux mixture $\frac{1}{2}$ %              |
| 2. Bordeaux mixture 1%                                      | 4. Zinc dimethyl dithiocarbamate (Ziram)<br>0.2% |

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| 5. Sulphur (Wettable sulphur) 0.83%   | 11. Methoxyl ethyl mercuric chloride + slaked lime (Ceresan lime mixture (1:8) dust) 20 lbs. per acre. |
| 6. Cuprous oxide (Fungimar) 0.25%   | 12. Phenyl Mercury Acetate + Ethyl Mercury chloride (Agrosan dust 20 lbs. per acre)                    |
| 7. 20% Copper (Colloidal Copper) 0.25%  | 13. Copper oxychloride (Microcop) 0.31%  |
| 8. Ferric dimethyl dithiocarbamate (Ferbam) 0.5%                                  | 14. Copper oxychloride (Parrycop) 0.25%  |
| 9. N. trichloro methyl mercapto-4 Cyclohexene-1, 2, dicarboximide (Flit 406) 0.3% | 15. Copper oxychloride (Fytolan) 0.25%   |
| 10. Sulphur dust 20 lbs. per acre.  | 16. Control (No treatment)   |

Size of Plot 88' x 24'.

Randomised and replicated four times.

Date of transplanting 28—3—1961.

The fungicides were applied twice on the crop four weeks and six weeks after transplanting. The fungicides were sprayed with the hand operated rocker type sprayers at 100 gallons per acre taking care to avoid drift to other plots. The dust formulations were applied by means of muslin cloth bags during the early morning hours at the rate of 20 lbs. per acre. During the second round of treatment the crop was in ears just commencing to flower. While harvesting, an area of about quarter cent i. e., 12' x 9' was marked out in the centre of the plot, for purposes of recording neck infection and grain yield. The crop received the normal manurial and cultural treatments. The incidence of blast was recorded immediately before the application of the fungicides as well as before harvest.

**Experimental Results:** *Effect of fungicides on disease incidence and grain yield:* The data relating to the grain yield and mean percentage of neck infection were collected at the time of harvest and the same were statistically analysed and the results are furnished in table below. Incidentally observations on leaf infection were also made but the leaf infection was found to be very light.

*Table showing the effect of the different treatments on the incidence of the neck infection and grain yield.*

S. No.	Treatments	Mean percentage of neck infection	Mean yield per plot of 12' x 9' in ozs.	Acre yield in lb.	Percentage of increase yield over control
1	2	3	4	5	6
1.	Dithane Z. 78	20	114.25	2884	146.47
2.	Bordeaux mixture 1%	16	103.75	2619	133.01
3.	Bordeaux mixture ½%	17	81.00	2044	103.80
4.	Ziram	22	94.50	2385	121.12
5.	Wettable sulphur	19	101.50	2562	130.11
6.	Fungimar	27	84.50	2133	108.32
7.	Colloidal copper	20	85.20	2158	109.59
8.	Ferbam	24	99.25	2505	127.22

1	2	3	4	5	6
9. Flit 406		26	104.75	2644	134.28
10. Sulphur		22	79.75	2012	102.18
11. Ceresan lime mixture dust		25	115.50	2915	148.04
12. Agrosan dust		28	88.25	2227	113.10
13. Microcop		17	89.25	2252	114.37
14. Parrycop		22	83.25	2098	106.56
15. Fytolan		23	84.75	2136	108.48
16. Control (No treatment)		34	78.00	1969	100.00

Whether significant: Yes (at  $p = 0.05$ )

	Infection	Yield
S. E.	4.2	6.95
C. D.	6.132	13.99

#### Conclusions :

Neck infection :

2, 3, 13, 5, 1, 7, 4, 10, 14, 15, 8, 11, 9, 6, 12, 16.

Grain Yield :

11, 1, 9, 2, 5, 8, 4, 13, 12, 7, 15, 6, 14, 3, 10, 16.

It is seen from the above table that in respect of incidence of neck infection all the treated series except Agrosan dust have recorded significantly less incidence than control. Agrosan dust was also found to cause slight scorching of the foliage and it was some time before the plants could recover.

As regards yield, it is found that all the treated series have recorded increased yield over control. However only the following treatments viz. Ceresan lime mixture dust, Dithane Z. 78, Flit 406, Bordeaux mixture 1%, Wettable sulphur, Ferbam and Ziram were significantly superior to control in respect of grain yield. Among the above seven treatments Ceresan lime dust treatment has recorded the highest yield and is significantly superior to all other treatments except Dithane Z. 78, Bordeaux mixture 1% and Flit 406 which are on a par. Dithane Z. 78 is the second best among the treatments.

Discussions: The results of the present studies indicate that application of the following fungicides viz. Ceresan lime mixture dust, Dithane Z. 78, Flit 406, Bordeaux mixture 1%, Wettable sulphur, Ferbam and Ziram not only reduces the incidence of neck infection but also increases grain yield of ragi to a significant extent. It will also be seen that Ceresan lime mixture dust and Dithane Z. 78 have recorded 48.04% and 46.47% increase in yield valued roughly Rs. 150/- and Rs. 135/- respectively in terms of money over control. Flit 406, Bordeaux mixture 1% and wetttable sulphur have recorded

more than 30% increase in yield over the control. The interesting feature in this experiment is that a dust formulation viz. Ceresan lime mixture dust has given the highest yield. However this dust cannot be recommended straightaway till grains are tested for residual effect. It is suggested that this fungicide can be used till the heading stage. For large scale field use the cost of application of dust will work out considerably less than that for spraying. Although Ceresan lime mixture dust was found to scorch paddy plants in another experiment (Anon. 1961) conducted in this section it did not produce any deleterious effect on the ragi plant. On the other hand Agrosan dust was found to cause slight scorching of ragi plants in the above experiment although it was not found to do so in the case of paddy plants. Sulphur dusting was found to give very marked increase in yield in the case of paddy in another experiment conducted in this section but its effect is not so marked in the case of ragi crop. These observations indicate that the action and the efficacy of certain fungicides differ from crop to crop. From the results it will be seen that the increased yield is partly due to the control of the disease and partly due to the stimulatory effect of the fungicides. These studies have brought out the relative efficacy of various fungicides in the control of ragi blast. Among the fungicides tested Ceresan lime mixture dust, Dithane Z. 78, Flit 406, Bordeaux mixture 1%, Wettable sulphur, Ferbam and Ziram have given significantly better results in controlling ragi blast as well as increasing grain yield.

**Summary:** Blast is a serious disease affecting ragi (*Eleusine coracana* Gaertn.) in Madras State. A number of fungicides were tested for their efficacy in the control of the disease. The following seven fungicides viz. Ceresan lime mixture dust, Dithane Z. 78, Flit 406, Bordeaux mixture 1%, Wettable sulphur, Ferbam and Ziram were found to reduce the incidence of the disease and also increase the grain yield to a significant extent. Although Ceresan lime mixture was found to cause slight scorching of paddy plants it had no such effect on ragi and on the other hand, it has recorded the highest grain yield in ragi and this can be used till the heading stage as the toxicity of this fungicide has not been tested in this investigation. Agrosan dust was found to have slight scorching effect on ragi plants.

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