

Rhizome Rot and Wilt of Ginger and their Control

by

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Ginger is cultivated on a large scale in Malabar and Godavari districts, the area under this crop being over 12,250 acres. In recent years the price of ginger has risen to such a degree that this crop has assumed great importance. Several diseases affect this crop but the most serious one is the wilt and the rhizome rot caused by more than one species of *Pythium* and *Sclerotium rolfsii* Sacc. The disease affects the harvested rhizomes stored for seed purposes as well as plants in the field. A storage rot occurs in the former and the wilting of the shoots followed by rotting of connected rhizomes is prevalent under field conditions. This disease has been under study by various investigators in many countries (Parham 1935, McRae 1911, Sen 1930, Uppal 1940). Four species of *Pythium* viz. *P. aphanidermatum*, *P. myriotylum*, *P. vexans* and *P. graminicolum* have been found to be capable of causing infection.

Pretreatment of rhizomes with chemicals in order to control the disease was first recommended by Park (1934, 1935, 1937_a, 1937_b) in Ceylon. He found that immersion of seed ginger in 0.1% mercuric chloride solution for two hours either just after harvesting or just before sowing yielded many more plants than untreated seed. Since then these have been tried in other States also. Elaborate experiments were laid out in Malabar during 1938 and succeeding years to find out the effect of various treatments on the incidence and control of storage rot and wilt.

Treatment of rhizomes with Ceresan, Agrosan GN. or mercuric chloride was found effective in preventing storage rot. Treatment of the rhizomes before storage was more useful than treatment at planting time. In some experiments mercuric chloride exerted a depressing effect on the yield of rhizomes, especially when the treatment was carried out twice, once before storage and again before planting. Application of Bordeaux mixture to the soil did not control the disease or affect the yield to any extent (Thomas, 1938, 39, 40, 41, 42, 43, 44).

In 1950 a scheme for the improvement of ginger was sanctioned by the Indian Council of Agricultural Research and was initiated at the Agricultural Research Station, Pattambi. Some of the

experiments included in the programme related to the study of the diseases. The results of the investigation carried out in 1950-'51 on the yield of ginger are recorded in this paper.

Materials and Methods: Seed rhizomes were purchased from ryots for use in these experiments. Many of them were badly affected by *Sclerotium rolfsii*. Apparently healthy rhizomes were selected from among these for the various treatments. In one experiment the soil was treated before planting by pouring a quarter pint of 1% Bordeaux mixture, 0.25% Perenox solution, Cheshunt compound, Colloidal copper or 0.05% of Mercuric chloride solution per planting pit. The treatments were carried out in replicated randomised plots. Storage trials were also conducted to test the effect of immersing the rhizomes in different strengths of Ceresan (wetttable) and mercuric chloride solutions for varying periods. Two brands of mercuric chloride were used viz., tablets prepared by May & Baker for agricultural use and the chemical purchased from chemists. The rhizomes were selected, immersed in solutions and dried under shade before pitting.

Results: *Effect of soil treatment:* The experimental plots were periodically examined to find out the germination percentage and the incidence of diseased shoots. It was found that the highest germination was in the plots treated with colloidal copper and Cheshunt compound. Bordeaux mixture and mercuric chloride application to the soil inhibited germination. The disease was prevalent in all the plots but the highest incidence was in the control where 16% of the shoots were found wilting. The weights of the rhizomes from each treatment were recorded at the time of harvest. The following table gives the results.

TABLE I

Treatments	Germination percentage	Average No. of tillers	% of diseased shoots in the field	Total yield of rhizomes from 5 beds
1% Bordeaux mixture	22.6	9.55	6.6	7.25 lb.
0.25% Perenox	66.0	8.05	11.9	26.50
Colloidal copper	76.6	8.61	10.9	35.25
Cheshunt compound	74.6	8.78	10.5	34.50
0.05% Mercuric chloride	44.0	8.07	5.7	20.76
Control (no treatment)	61.3	8.49	16.0	29.25

The highest yield was recorded from the plots treated with Cheshunt compound and colloidal copper and the lowest from the plots treated with Bordeaux mixture. There was not much difference

between the treatments in the production of tillers per plant. There is an indication in these experiments that drenching the soil with Cheshunt compound or colloidal copper will be useful in increasing the yield. Bordeaux mixture or mercuric chloride solutions cannot be recommended for soil treatment.

Storage experiments: Equal quantities of selected, apparently healthy, rhizomes were treated with different strengths of mercuric chloride (powder and May & Baker tablets) and wettable Ceresan before storage. The rhizomes were immersed in the solutions for varying periods and were stored only after drying in the shade. A long pit 3 feet deep wide at the bottom and 1 foot wide at the top was prepared and divided into 36 compartments for holding rhizomes which were given different treatments.

A plank was kept over the rhizomes which occupied about half the depth of the pit and covered over with earth, making arrangements for ventilation. The pits were filled in December 1950 and the rhizomes taken out and examined in May 1951. The relative quantities of the healthy and the diseased rhizomes are given in the following table.

TABLE II

Treatments	Time of immersion	Quantity stored in pounds	Healthy rhizomes in pounds	Diseased rhizomes in pounds	% of healthy rhizomes
0.1% mercuric chloride (powder)	1½ hrs.	80	60	20	75
0.2% "	45 min.	"	57	23	71
0.4% "	20 min.	"	59	21	74
0.05% Mercuric chloride (M & B) tablets	1½ hrs.	"	60	20	75
0.1% "	45 min.	"	63	17	79
0.2% "	20 min.	"	54	27	68
0.25% Ceresan (wetable)	30 min.	"	65	15	81
0.5% "	15 min.	"	59	21	74
Control (no treatment)	..	"	44	39	55

It is seen from the above table that the treatments have been helpful in reducing the incidence of disease during storage. There was a higher proportion of healthy rhizomes in the treated lots than in the control. This confirms the previous finding that seed treatment with mercuric chloride or Ceresan is useful for preventing storage rot. There was no difference between the May & Baker tablets and ordinary mercuric chloride, but the former is easier to handle.

It must however be stated that the above results represent the first year's observations only. The results during the subsequent years were also in conformity with the first year results.

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- (1935) *Ibid.* 1934, pp. D. 124-D. 131.
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Errata

(M. A. J. NOVEMBER 1955)

	For	Read
Page 501. Para 5:	and Rs. 3-8-0 for dressed grades	and Rs. 8-3-0 for dressed grades
Page 504. Tabular Statement. Headings second column:	Indian True Hemp	Italian True Hemp

Addenda et Corrizenda

In the article entitled "The intake of silica by the rice plant, with reference to Blast Disease" by Sri S. Venkatachalam, published in the Madras Agricultural Journal of September 1954, the following acknowledgment is added:

"The author is grateful to the Madras University for awarding a studentship in 1945-'45 for pursuing this investigation."

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The article entitled "The Soils of the Lower Bhavani Project area and means of improving their fertility" published in the Madras Agricultural Journal of November 1955, was contributed by the following:

Sri T. Rajagopala Ayyangar, Sri P. Kunhi Raman Menon and Sri M. P. Sankaranarayanan.
