

THE SEED TREATMENT OF GINGER

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SEED ginger, which was being stored at the Experiment Station, Peradeniya, early in 1934, was reported by the Manager to have become superficially infected by *Sclerotium rolfsii* Sacc. during damp weather. On examination it was seen that the infection was fairly extensive and the ginger was sorted. The apparently clean ginger obtained was reserved for agricultural experiments, the very severely affected ginger was discarded and the third lot, consisting of ginger which was superficially infected by *Sclerotium rolfsii* but otherwise apparently sound, was used in the experiment described below. The ginger was what is known locally as Nugegoda ginger, which is probably a degenerate strain of Cochin ginger.

The seed treatment of potatoes to control the disease caused by *Rhizoctonia solani* is practised in temperate countries and an experiment was designed to determine if seed treatment of ginger would, under Ceylon conditions, reduce the infection of the ginger by *Sclerotium rolfsii*.

METHODS

Just over 1 cwt. of seed ginger was available for experiment. This was divided into three lots. The first lot was treated soon after the ginger had been sorted on 31st January, 1934, the second lot was treated on 4th April, shortly before planting, and the third was left untreated as a control. Treatment consisted of soaking the seed ginger in a 1 : 1,200 solution of corrosive sublimate for 1½ hours, in the manner described by Mason (1928, p. 499). One and one-third ounces of corrosive sublimate were dissolved in 10 gallons water in a tar barrel; the inside of the barrel was coated with tar and so was not

affected by the solution. The ginger was immersed in this solution. At the end of 1½ hours it was removed and dried in the open. After drying, it was again bulked.

On 7th April the ginger was planted. The lay-out of the area was in the form of a double latin square of 3 × 6 plots. Each plot was 20 feet by 18 feet and the plots were separated by shallow drains 2 feet wide. The seed pieces used for planting were smaller than usual owing to the amount available and each piece was approximately 2 inches long. The weight of seed ginger used in each plot was 6¼ lb., about one-half the usual seed-rate. The ginger was planted at distances in and between the rows of 18 in., giving 13 rows of 12 plants in each plot. All plots were mulched with paddy straw.

Counts of the numbers of plants growing in the different plots were made on 10th July and 31st July. Details of these counts are recorded in table 1.

TABLE I
FIELD RECORDS

Treatment	Replication No.	No. of plants observed to be growing on	
		10.7.34	31.7.34
A (treated early)	1	79	111
	2	87	118
	3	68	118
	4	63	106
	5	53	112
	6	85	121
	Total	435	686
B (treated late)	1	105	126
	2	95	128
	3	67	109
	4	85	127
	5	71	111
	6	75	127
	Total	498	728
C (Control untreated)	1	34	60
	2	32	67
	3	60	89
	4	32	54
	5	47	90
	6	40	110
	Total	245	470

The growth of the ginger at and subsequent to this stage was affected considerably by the shortage of rain. Rainfall up to April 1934, was approximately normal but subsequently there was a marked shortage until October, 1934. In table 2 are given the monthly rainfall figures for the year 1934, together with the offsets from the averages for 12 years. These figures are taken from the official records (Jameson, 1935).

TABLE II

Month	Rainfall for 1934 Inches	Offset from average for 12 years Inches
April ..	7.72	.. +0.5
May ..	4.84	.. -1.7
June ..	8.05	.. -2.9
July ..	3.63	.. -5.2
August ..	1.80	.. -4.7
September ..	0.73	.. -6.8
October ..	12.19	.. -0.2
November ..	6.42	.. -5.7

The continued shortage of water resulted in the failure of the ginger crop not only in this experiment but also in manurial and spacing trials which were being conducted in the same area. The result was that the total crop of ginger harvested was considerably less than the amount sown and no attempt could therefore be made to compute the effect of treatment on yield in this experiment. The adverse weather conditions caused crop-failures throughout Ceylon which resulted in widespread distress.

DISCUSSION OF RESULTS

In spite of the absence of any data on the effect of the seed treatment on yield, it is felt that the figures obtained from the observation of the emergence of plants in the different plots are so striking as to merit publication. In tables 3 and 4, statistical analyses are given of the records of the numbers of plants observed on 10th and 31st July respectively.

TABLE III
ANALYSIS OF VARIANCE
OF RECORD OF PLANT NUMBERS MADE ON 10.7.34.

Due to	D.F.	Sum of squares	Variance	F	One per cent. point
Blocks	.. 1	320.88	320.88	—	—
Rows	.. 4	247.56	61.89	—	—
Columns	.. 4	984.89	237.22	—	—
Treatments	.. 2	5782.11	2891.06	15.96	10.92
Error	.. 6	1087.00	181.17	—	—
Total	.. 17	8386.44	—	—	—

Standard Deviation = 13.46
Coefficient of Variability = 20.58%

Mean numbers of plants per plot			S.E. of mean	Significant
A	B	C	General mean	Difference
72.5	83.0	40.8	65.4	17.33

TABLE IV
ANALYSIS OF VARIANCE
OF RECORD OF PLANT NUMBERS MADE ON 31.7.34.

Due to	D.F.	Sum of squares	Variance	F	One per cent. point
Blocks	.. 1	56.89	56.89	—	—
Rows	.. 4	929.78	232.44	—	—
Columns	.. 4	649.78	162.44	—	—
Treatments	.. 2	6388.00	3194.00	15.71	10.92
Error	.. 6	1219.55	203.26	—	—
Total	.. 17	9244.00	—	—	—

Standard Deviation = 14.26
Coefficient of Variability = 13.62%

Mean numbers of plants per plot			S.E. of mean	Significant
A	B	C	General mean	Difference
114.3	121.3	78.3	104.7	18.12

In each of these it will be seen that the value of F (Snedecor, 1934) greatly exceeds the one per cent. point, which indicates that the effect of treatment is highly significant. The differences between the mean numbers of plants recorded at each observation

indicate that the treatment of seed ginger with corrosive sublimate had a marked beneficial effect on the development of the young plants when compared with the untreated plants.

The differences between the emergence of plants grown from seed treated early and treated just before planting were slight and were not significant.

SUMMARY

Seed ginger which was superficially infected with *Sclerotium rolfsii* was divided into three lots. The first lot was treated by immersion in a 1 : 1,200 aqueous solution of corrosive sublimate for $1\frac{1}{2}$ hours two months before planting. The second lot was similarly treated three days before planting. The third lot was untreated and served as a control.

The ginger was planted in a double latin square of 3×6 plots. Judging by the number of plants which developed, the treatment with corrosive sublimate had a marked beneficial effect. There was no significant difference between the effects of early and late treatment.

Subsequent weather conditions resulted in a failure of this and all other crops grown in the vicinity so that it was not possible to determine the effect of treatment on yield.

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