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## Relationship of Disease Severity and Yield due to Leaf Blight of Mustard and Spray Schedule of Mancozeb for Higher Benefit

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A. K. CHATTOPADHYAY AND B. N. BAGCHI

Pulses and Oilseeds Research Station,  
Berhampore 742 101, West Bengal

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Severity of leaf blight of mustard was negatively correlated to seed yield. Minimum disease severity as well as highest yield was obtained by four foliar sprays of Mancozeb (Dithane M-45 @ 0.2%), starting from 30 days after sowing and at intervals of 15 days. Maximum benefit (3.9 and 3.88) was obtained from three sprays at 45, 60 and 75 days after sowing.

**Key words :** Mustard, *Alternaria brassicae*, Leaf blight, Correlation and Regression, Cost benefit ratio

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### INTRODUCTION

Leaf blight caused by *Alternaria brassicae* (Berk.) Sacc. is a major disease of rapeseed-mustard resulting heavy loss in yield. At present all the cultivated varieties show some degrees of susceptibility to this disease and often foliar spray is essential to minimize the crop loss. Mancozeb (Dithane M-45) had been identified by many workers as one of the effective chemicals to control leaf blight of mustard (Singh and Bhowmik, 1985; Kaushik *et al.*, 1983; Shivpuri *et al.*, 1988). All the aerial parts of the plant are attacked due to the disease and the damage is maximum when the siliquae are affected. The present study was undertaken to correlate the disease severity with yield as well as the spray schedule of Mancozeb to control effectively the disease for higher monetary return.



## MATERIALS AND METHODS

Experiments were conducted in randomized block design with four replications during *Rabi* seasons of 1984-85 and 1985-86. Varuna, a susceptible cultivar to leaf blight, was grown in the first week of November under prevailing epiphytotic condition for the disease during both the years. Foliar spray of Dithane M-45 @ 0.2% was started when the crop became 30 days old and continued upto 75 days at intervals of 15 days with different spray schedule. Observations were recorded by rating (0-5 scale), 50 siliquae were randomly selected from each replication to find out the severity of disease using the following formulae

$$PDI = \frac{\text{Sum of all numerical ratings} \times 100}{\text{No. of siliquae examined} \times \text{Maximum infection score}}$$

Seed yield of each plot was recorded. Linear regression analysis were made using the equation

$$y = a + bx$$

y = is the average yield and x is the disease severity.

Cost of spraying including labour charges, price of Mancozeb (Dithane M-45), charges for hiring spray machine and selling rate of mustard was calculated as per marketing schedule of 1986.

## RESULTS AND DISCUSSIONS

The data for both the years was pooled and relationship of leaf blight severity to seed yield was plotted in Fig. 1. The equation which fit the analysis was

$$\hat{y} = 21.40 + (-0.41) x$$

The data showed that the disease severity was negatively correlated with yield of plot. Every increase in disease severity resulted decrease in yield. Similar results were recorded in many plant disease (Kapoor and Singh, 1983; Nigam *et al.*, 1989; Saikia and Baruah, 1990; Sharma and Mishra, 1983).

The severity of the disease was minimum with four foliar sprays at intervals of 15 days when the highest yield was obtained. But monetary return was achieved by three sprays with the same intervals starting from 45 days after sowing in both the year (Table 1). A single spray of Mancozeb (Dithane M-45) significantly reduced the disease severity which in turn was maximum effective at 45 D.A.S. (Table 1). Disease symptom was first noticed between 35 to 40 D.A.S. on leaves and the initial spreading of the fungus might be drastically checked by application of fungicide at 45 D.A.S. In the present investigation siliquae were considered for the measurement of disease severity because the



**Table 1.** Effect of different spray schedule of Mancozeb (Dithané M-45 @ 0.2%) on the leaf blight disease severity of mustard (cv. Varuna) and its benefit ratio

| Treatments                              | Mean Disease severity (Per cent) |                 | Benefit ratio* |         |
|-----------------------------------------|----------------------------------|-----------------|----------------|---------|
|                                         | 1984-85                          | 1985-86         | 1984-85        | 1985-86 |
| Four sprays at 30, 45, 60 and 75 D.A.S. | 25.5<br>(30.27)                  | 13.2<br>(21.34) | 3.27           | 3.49    |
| Three sprays at 45, 60 and 75 D.A.S.    | 30.9<br>(33.65)                  | 14.9<br>(22.69) | 3.90           | 3.88    |
| Two sprays at 60 and 75 D.A.S.          | 32.7<br>(34.79)                  | 18.0<br>(25.11) | 2.85           | 3.01    |
| One spray at 30 D.A.S.                  | 38.8<br>(38.52)                  | 26.5<br>(30.99) | 1.01           | 1.36    |
| One spray at 45 D.A.S.                  | 35.2<br>(36.28)                  | 23.7<br>(29.14) | 1.72           | 2.13    |
| One spray at 60 D.A.S.                  | 37.7<br>(37.87)                  | 25.8<br>(30.55) | 1.11           | 1.55    |
| One spray at 75 D.A.S.                  | 41.0<br>(39.83)                  | 28.1<br>(32.02) | —              | —       |
| Control                                 | 48.6<br>(44.2)                   | 35.7<br>(36.7)  |                |         |
| C. D. at 5%                             | 3.45                             | 0.88            |                |         |

\*Benefit ratio was estimated when the cost of treatment was considered as 1.

leaves with the age of the plants decreased its resistance to disease and at mature stage most of the leaves were destroyed and siliquae were affected. A linear regression was obtained by James and Shih (1973) between disease severity

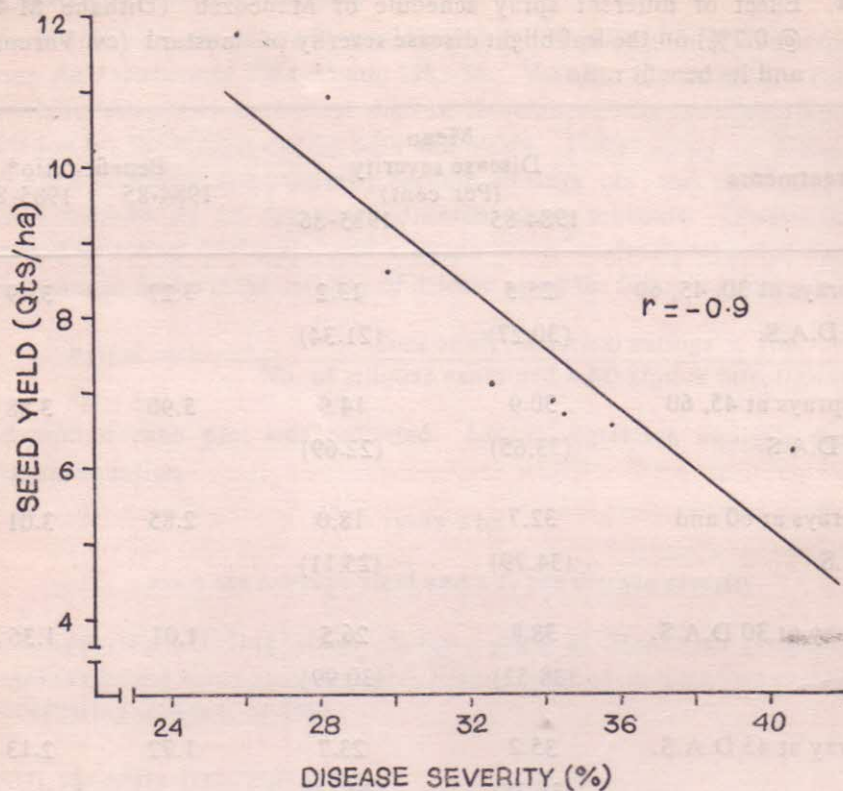


Fig. 1. Regression line showing seed yield at different level of leaf blight disease severity of mustard.

(percentage of leaf area affected) and incidence (percentage of leaves infected) in rust and mildew of winter wheat when the disease incidence value was below 65 per cent only. In this investigation incidence value was not considered as it was more or less cent percent in all the treatments and the net plot was considered for seed yield.

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#### REFERENCES

- James, W. C. and Shih, C. S. (1973). Relationship between incidence and severity of powdery mildew and rust on winter wheat. *Phytopathology* 63 : 183-187.
- Kapoor, A. S. and Singh, B. M. (1983). Estimation of yield loss in rice cultivar Norin-18 due to neck blast. *Indian Phytopath.* 36 : 136-137.



- Kaushik, C. D., Kaushik, J. C. and Saharan, G. S. (1983). Field evaluation of fungicides for the control of *Alternaria* leaf blight of *Brassica juncea*. *Indian J. Mycol, Plant Pathol.* **13** (3) : 262-264.
- Nigam, N., Rai, B and Mukherjee, K. G. (1989). Yield loss assessment caused by *Perenospora arborescens* in opium poppy. *Indian Phytopath.* **42** : 110-115.
- Saikia, L. and Baruah, B. P. (1990). Linear model for predicting yield loss in rice (*Oryza sativa*) due to sheath blight (*Rhizoctonia solani*) incidence. *Indian J. agric Sci.* **60** : 360-361.
- Sharma, J. P. and Mishra, A. P. (1983). Relationship between turcicum and maydis leaf blights in respect of grain yield in maize. *Indian Phytopath.* **36** : 255-256.
- Shivpuri, A., Siradhana, B. S. and Bansal, R. K. (1988). Management of *Alternaria* blight of mustard with fungicides. *Indian Phytopath.* **41** : 644-646.
- Singh, A. and Bhowmik, T. P. (1985). Persistence and efficacy of some common fungicide against *Alternaria brassicae*, the causal agent of leaf blight of rapeseed and mustard. *Indian Phytopath.* **38** : 35-38.

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