



# Asian Journal of Plant Sciences

ISSN 1682-3974

**science**  
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## Yearly Incidence and Effect of Fungicides in Controlling Leaf Spot of Sapota

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**Abstract:** The study was laid out to find out the peak disease incidence period of leaf spot of Sapota (*Achras sapota*) and to evaluate the effect of six fungicides in controlling the disease. A total of five sprays were applied at 15 days intervals during dry season (November-January). It has been observed that the peak incidence period of leaf spot disease was higher in November to January. All fungicides were found effective significantly in controlling leaf spot disease over control. Among the fungicides, Bavistin (0.1%) and Dithane M-45 (0.2%) were found better in controlling the disease.

**Key words:** Leaf spot, control bavistin, Dithane M-45, leaf spot incidence period, Sapota

### Introduction

Sapota (*Achras sapota* L) is a delicious fruit that contain 12-14% sugar. It is also known as sapodilla or chiku in India. It is mainly cultivated as fruit crops in Bangladesh, while in South-East, Guatemala, British Honduras and over countries besides fruit, chickle is commercially produced from the same. The unripe fruits and bark yield milky white latex which solidifies on exposure to air form the base of making chickle. Immature fruits are astringent, while ripe fruits are sweet smelling and delicious. The mature fruits are also used for making mixed jams and they provide valuable sources of raw material for the manufacture of industrial glucose, pectin and natural fruit jellies. They are also canned as slices. In the Duch East Indies, the young leafy shoots are frequently eaten raw or mixed with other vegetables like lab-lab consumed as vegetable after steaming.

Sapota is affected by many diseases. Among of them, leaf spot is the most common and serious disease causing considerable yield loss in every year. It is caused by *Pestalotia* species have been reported by Rajendran (1971). Sharma *et al.* (1987) and Patel and Patel (1981) reported that leaf disease of Chicku (*Achras sapota*) is caused by *Pestalotia Sapotae* L. The disease first appears as numerous small, reddish-brown specks on the leaf lamina. These gradually enlarge to form more or less circular spots measuring 1-3 mm in diameter. Fully developed spots have greyish centre lesions. Maximum incidence of the disease is observed during October-December (Pathak, 1980). In Bangladesh, no work has been done to record the peak disease incidence period and control measures of the leaf spot disease of Sapota. The present piece of work was undertaken to see the

yearly incidence and the effect of some fungicides in controlling leaf spot of Sapota.

### Materials and Methods

The experiments were undertaken in the work to see (1) the yearly incidence and (2) the effect of some fungicides in controlling leaf spot of Sapota were conducted at the Sapota fruit garden of Regional Agricultural Research Station (RARS), Bangladesh during 1997-1998 and 1998-1999, respectively. The test variety was BARI Sapota 1. The experiments were laid out in Randomized Complete Block Design (RCBD) following three following three replications. Close monthly monitoring on disease incidence was done for one year starting from July, 1997 to June, 1998.

Seven treatments viz., Tilt 250 EC (Propiconazole), Dithane M-45 (Mancozeb), Cupravit 50 WP (Copper oxychloride), Macuprax (Cufraneb), Bavistin (Carbendazim) and Topsin M 70 WP (Thiophanate-methyle) including control treatment were applied for disease control at the rate of 0.05, 0.2, 0.2, 0.2, 0.1 and 0.2%, respectively. In control treatment, no fungicides were used. A total of five sprays were applied at 15 days intervals during the dry season (November-January). Irrigation and other cultural operations were done as and when needed. The weather data were collected from RARS, BARI, Hathazari, Chittagong. Data on the percent of spotted leaves and the percent of spotted leaves and the percent of leaf area diseased (LAD) were recorded by counting spotted leaves and visual estimation, respectively. The data were statistically analyzed and comparisons among the individual treatments were tested by Duncan's new multiple range test (DMRT) according to Gomez and Gomez (1984).

Table 1: Yearly leaf spot incidence of Sapota and Weather report during July 1997-June, 1998

| Month         | Leaf spot intensity |          | Weather report, 1997-98  |       |                      |
|---------------|---------------------|----------|--------------------------|-------|----------------------|
|               | % of spotted leaves | % of LAD | Temperature °C (Average) |       | Total rain fall (mm) |
|               |                     |          | Max.                     | Min   |                      |
| July, 97      | 40.39e              | 10.94h   | 29.25                    | 25.40 | 1218.50              |
| August, 97    | 44.67de             | 14.29gh  | 31.35                    | 26.00 | 1202.50              |
| September, 97 | 50.77c              | 24.80de  | 31.00                    | 26.30 | 280.50               |
| October, 97   | 58.19b              | 29.53bcd | 32.30                    | 26.06 | 138.00               |
| November, 97  | 66.54a              | 33.79ab  | 30.40                    | 19.60 | 76.00                |
| December, 97  | 68.85a              | 36.19a   | 27.07                    | 14.50 | 0.00                 |
| January, 98   | 65.17a              | 32.24abc | 27.21                    | 12.16 | 0.00                 |
| February, 98  | 58.52b              | 27.57cd  | 29.50                    | 14.50 | 0.00                 |
| March, 98     | 52.18c              | 21.39ef  | 32.06                    | 19.20 | 11.00                |
| April, 98     | 48.23cd             | 18.64fg  | 32.40                    | 24.70 | 110.00               |
| May, 98       | 45.34de             | 15.19gh  | 26.20                    | 23.80 | 507.00               |
| June, 98      | 43.92de             | 13.39h   | 28.60                    | 23.40 | 1106.50              |

In a column, means followed by a common letter(s) are not significantly different at the 5% level by DMRT LAD: Leaf area diseased

## Results and Discussion

### Experiment 1:

**Yearly incidence of leaf spot of Sapota:** Result pertaining to yearly leaf spot disease intensity during July 1997-June 1998 are presented in Table 1. The highest spotted leaves were observed in December (68.85%) which was closely followed by November (66.54%) and January (65.17%). The lowest spotted leaves were found in July (40.39%) which was followed by June (43.92%), August (44.67%) and May (45.34%). In case of LAD, the highest LAD was shown in the month of December (36.019%) which was closely followed by November (33.79%) and January (32.24%). The lowest LAD was observed in July (10.94%) which was followed by June (13.39%), August (14.29%) and May (15.19%).

It has been observed that spotted leaves (%) and LAD were higher in November to January. This result indicated that low temperature, low rainfall and dry weather (Table 1) increased leaf spot disease intensity during these months. Similar results were observed by Pathak (1980) in Sapota and Surianchandraselvan *et al.* (1991) in Coconut leaf spot disease caused by *Pestalotia Palmarum* L. They reported that the disease intensity was maximum in December (40.50%) and minimum in June (23.90%). They also reported highly significant negative correlation between disease intensity and temperature.

### Experiment 2:

**Effect of fungicides in controlling leaf spot of Sapota:** Results pertaining to different treatments of fungicides in controlling leaf spot disease of Sapota are presented in Table 2. It has been observed that fungicides showed profound and significant effect in controlling leaf spot of Sapota. Bavistin sprayed trees showed 36.24% spotted leaves which was significantly lower than all other treatments except Dithane M-45 (41.28%), whereas control treatment resulted highest spotted leaves (64.18%). In case of LAD, Bavistin sprayed trees gave the least LAD

Table 2: Performance of fungicides in reduction of level spot of Sapota during 1998-99

| Fungicides          | Dose(%) | % of spotted leaves | % of LAD |
|---------------------|---------|---------------------|----------|
| Tilt 250 EC         | 0.05    | 46.78bc             | 14.07bc  |
| Dithane M-45        | 0.2     | 41.28ab             | 12.10ab  |
| Cupravit 50 WP      | 0.2     | 48.81c              | 16.14cd  |
| Macuprax            | 0.2     | 55.20d              | 20.13e   |
| Bavistin            | 0.1     | 36.24a              | 9.91a    |
| Topsin M 70 WP      | 0.2     | 52.77d              | 18.42de  |
| Control (Untreated) | 0.0     | 64.18e              | 25.94f   |

Table 3: Performance of fungicides in reduction of level spot of Sapota over untreated control during 1998-99

| Fungicides     | Doses (%) | Disease reduction (%) of spotted leaves over untreated control | Disease reduction (%) of LAD over untreated control |
|----------------|-----------|--|---|
| Tilt 250 EC    | 0.05      | 27.11b   | 45.80cd   |
| Dithane M-45   | 0.2       | 35.68a   | 53.31de   |
| Cupravit 50 WP | 0.2       | 23.96bc  | 37.86bc   |
| Macuprax       | 0.2       | 13.97d   | 22.39a  |
| Bavistin       | 0.1       | 43.53a   | 61.78e  |
| Topsin M 70 WP | 0.2       | 17.78cd  | 28.86ab   |

In a column, means followed by a common letter(s) are not significantly different at 5% level by DMRT  
LDS: leaf area diseased

(9.91%) which was followed by Dithane M-45 with 12.10%. The unsprayed control treatment showed the highest LAD (25.94%).

The comparative effect of fungicides over control (untreated) showed that the fungicidal sprays resulted in 13.97-43.53% reduction of spotted leaves over untreated control (Table 3). The lowest and the highest reduction in spotted leaves were recorded under Macuprax (0.2%) and Bavistin (0.1%) spray, respectively. On the other hand, the reduction of LAD due to different fungicides ranged from 22.39 to 61.78% over control. The lowest and highest reduction in LAD was observed under Macuprax (0.2%) and Bavistin (0.1%) spray, respectively.

From earlier experiment it was observed that leaf spot disease of Sapota was severe during November to January, because during that period the disease was found predominant and severe due to dry weather and

relatively low temperature, hence, fungicidal sprays were given to the trees during those months. This has clearly been supported by Pathak (1980) in Sapota and Surianchandraselvan *et al.* (1991) in Coconut. From the above results it is clear that all the test fungicides have shown excellent effect in controlling leaf spot of Sapota. Out of the test fungicides, Bavistin (0.1%) was found to be best. These results are in accordance with the findings of Das and Mahanta (1985). They reported that Bavistin completely inhibited *Pestalotia Palmarum* Cke. *in vitro*. Further, the present study showed that next to Bavistin, Dithane M-45 (0.2%) was found to be better in controlling leaf spot of Sapota. This finding is supported by Ramaswamy *et al.* (1988). They evaluated fungicides against *Pestalotia psidii* and found that Dithane M-45 showed good result. Nair and Wilson (1978) reported that good inhibition of germination of *Pestalotia versicolor* L spores on glass slides of Sapota leaves was obtained for up to 15 days after application of Dithane M-45 (Mancozeb). Joshi and Raut (1992) observed that the severe disease of young clove trees caused by *Pestalotia versicolor* was best controlled by 0.1% Carbendazim (Bavistin) sprays applied 3 times at 15 days interval. Karthikeyan and Bhaskaran (1998) evaluated fungicides for controlling the leaf blight of coconut caused by *Pestalotia Palmarum* and found that Carbendazim (Bavistin) and Mancozeb (Dithane M-45) completely inhibited the mycelial growth of the pathogen. Khalequzzaman *et al.* (1998) sprayed five fungicides against grey leaf spot of coconut caused by *P. Palmarum* and observed that Bavistin (0.1%) and Dithane M-45 (0.2%) showed better performance to control the disease. The present study showed that the peak incidence period of leaf spot disease of Sapota occurring during November-January. Among the six test fungicides, Bavistin (0.1%) and Dithane M-45 (0.2%) gave better control against the disease. So, Bavistin (0.1%) or Dithane M-45 (0.2%) may be sprayed at November-January for controlling the disease.

## References

Das, C.M. and I.C. Mahanta, 1985. Evaluation of some fungicides against *Pestalotia Palmarum* Cke, incitant of grey blight of coconut. *Pesticides*, 19: 37-39.

- Gomez, K.A. and A.A. Gomez, 1984. *Statistical Production for Agricultural Research*. Intl. Rice Res. Inst., John Willy and Sons, New York, Chichester, Brisbane, Toronto, Singapore, pp: 643.
- Joshi, M.S. and S.P. Raut, 1992. Grey leaf blight disease of Clove in Konkan region of Maharashtra. *Indian Cocoa, Arecanut and Spices J.*, 15: 73-74.
- Karthikeyan, A. and R. Bhaskaran, 1998. Evaluation of fungicides in control of leaf blight disease of coconut caused by *Pestalotia Palmarum* (Cooke) Stey. *Indian Coconut J. (Cochin)*, 28: 6-8.
- Khalequzzaman, K.M., I. Hossain and M.M. Hossain, 1998. Effect of fungicides and potash in controlling grey leaf spot of coconut. *Bangladesh J. Train. and Dev.*, 11: 151-156.
- Nair, P.V. and K.I. Wilson, 1978. Residual toxicity of fungicides against *Pestalotia versicolor*. *Indian Phytopath.*, 31: 544-545.
- Patel, J.G. and A.G. Patel, 1981. A new leaf blight of chiku (*Achras sapota*) incited by *Pestalotia sapotae* in Gujrat. *Gujrat Agril. Univ. Res. J.*, 7: 41-42.
- Pathak, V.N., 1980. *Diseases of Fruit Crops*. Oxford and IBH publishing Co. New Dhlhi, Bombay and Calcutta, India, pp: 257.
- Rajendran, V., 1971. Leaf spot of sapota. *Lal Baugh*, 16: 21-22.
- Ramaswamy, G.R., H.S. Sohi and H.C. Govindu, 1988. Studies on the host range of *Pestalotia psidii*, the causal agent of grava canker and evaluation of fungicides against the pathogen. *Indian J. Micol, Plant Path.*, 18: 180-181.
- Sharma, B.M., S.C. Kaushal and S.K. Sugha, 1987. Growth requirements of *Pestalotia sapotae* causing grey blight of *Achras sapota*. *Research Bulletin of the Punjab University, Science*, 38: 55-58.
- Surianchandraselvan, M., R. Bhaskaran and M. Ramadoss, 1991. Epidemiology of grey leaf spot disease on coconut caused by *Pestalotiopsis Palmarum* (Cooke). *Indian Coconut J. (Cochin)*, 21: 19-20.