EFFECT OF TRANSPLANTING TIME ON INCIDENCE OF
ALTERNARIA LEAF BLIGHT IN SOLANUM KHASIANUM CLARK

RABIN K. SHARMA, PARAN BARUAH and ANIL C. GHOSH
Regional research laboratory, Jorhat – 785 006, Assam

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ABSTRACT: Solanum khasi Clark is a shrub which yields solasodine, a steroidal alkaloid. Transplanting of seedlings of S. khasianum during November was found to be favourable for development of Alternaria leaf blight followed by transplanting in December, January and February. This paper presents the findings of the investigation.

INTRODUCTION

Solanum Khasianum Clark is a weed growing abundantly on waste lands throughout the North Eastern Region of India up to an elevation of 1500mts. This weed has come into prominence recently as a source of raw material for synthesis of steroid drugs. The berries of this shrub yields 1.80 – 3.45% solasodine, a steroidal alkaloid which is used for preparation of oral contraceptives (Hazarika et al 1977; Bhuyan et al 1988). The agrotechnique for cultivation of this crop was developed at jorhat (Hazarika and Ganguly, 1977) and it is considered best to raise the plants at spacing of 90cm x 90cm (Hazarika and Bora 1976). In the course of its cultivation as a medicinal herb, diseases such as Fusarium wilt (Bordoloi et al 1971) have been reported to occur as limiting factors in India. Leaf blight of Solanum khasianum caused by Alternaria tenuissima (Kunze Ex. Pers) wilt disease was for the first time reported from India by Bhuyan et al (1988) occurring in the experimental plantation of regional research laboratory, Jorhat. The disease however was most severe during March-May 1985 and entire experimental crop including plantations in other areas of Jorhat locality was severely attacked. Bhuyan and co-workers described the symptomatology of the disease, morphology of the pathogen and its pathogenicity. This paper presents the experimental findings on the effect of transplanting time on incidence of the disease in the Boko area of lower Brahmaputra valley in Assam.

MATERIALS AND METHODS

The seeds of Solanum Khasianum (JRL-30) were originally taken form RRL Jorhat. They were grown under edaphic and agroclimatic conditions of Boko in Lower Brahmaputra Valley of Assam. Seeds were tried in different months by sowing fortnightly during 1991-92. It was found that seeds sown in October had better germination and it was transplanted to the field in the month of November. After preparation of land random soil samples were collected and pH, presence of Carbon, Nitrogen, K2O and P2O5 were estimated in the Laboratory which have been presented in Table1.

Seedlings were raised in open nursery bed by sowing seeds in October and transplanted in the middle of every month upto February in a statistically laid out randomized black Design with 4 treatments of replicated trials,
Each plot was 24.30 sq.m (5.4mx4.5m). Height of the seedlings were about 15 cms at the time of planting and planted at 90cmx90cm spacing accommodating 30 plants in each plot. No fertilizer was used, as the soil was virgin and possessed the necessary nutrients in sufficient amount. The area was already a wet land and annual rainfall was 240cm during the year. Irrigation was necessary once in a week during the drought period. Weeding was done as and when required.

Disease incidence was recorded on randomly selected plants under naturally infected conditions. There leaves from the top, the middle and lower post of each plant were graded according to a rating scale of 0-5, where 0=healthy, 1=upto 12.5%, 2=12.6 to 25%, 3=25.1 to 50%, 4=50.1 to 75% and 5=above 75.1% leaf area infection. Percent disease incidence (PDI) was worked out by the formula:

\[ \text{PDI} = \frac{\text{Sum of all rating} \times 100}{\text{No. of plants observed} \times \text{maximum disease grade}} \]

The plants started flowering from the last part of April, 1992. Berries were harvested from June to September, 1992. These berries were dried under sunshine. Analysis of soil samples are shown in Table-1.

**RESULTS AND DISCUSSION**

As the flowering and fruiting of *Solanum khasianum* are not synchronized so it was necessary to harvest twice from the same plants. Yield data of fresh berries were pooled together and statistically analysed (Table 2). It was seen that transplanting seedlings in January at Boko in Lower Brahmaputra valley yielded maximum berries. Transplanting of seedling during November was highly favourable for development of disease followed by transplanting in the month of December, January and February.

The disease was observed before flowering which adversely affected the growth and vigour, thereby leading to reduction in yield of berries. It was seen that disease incidence (PDI) was more in the case of planting done in the month of November & December and these plants started flowering by the middle of April and May and disease was observed just before flowering (Table-2). Bhuyan et al (1988) indicated that there was a relationship between meteorological parameters and disease incidence. Third week of April was highly favourable for the development of disease due to heavy showers (91-8mm) with 70% disease incidence to the maximum. The disease progressed with increase in amount of rainfall. Also the mean temperature and relative humidity from the second week of March to the third week of May were in almost similar range throughout the period. Hence, development of disease was aggravated by pre-monsoon rains rather than temperature and relative humidity. It seems that rainfall coupled with a temperature of 27-30°C and relative humidity of range on 63-89% respectively could play an important role in disease development. Pattern of disease development directly linked with rainfall and high disease intensity in the months of highest mean
daily rainfall has been observed in case leaf spot of piper betel (Maiti and Sen, 1982).

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Table 1.
Soil data from six different places

| Parameters               | Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 | Sample 6 |
|--------------------------|----------|----------|----------|----------|----------|----------|
| pH                       | 5.80     | 5.40     | 5.40     | 5.46     | 3.35     | 5.85     |
| Organic carbon           | 2.23%    | 1.71%    | 1.52%    | 1.97%    | 1.42%    | 2.21%    |
| Available Nitrogen       | 0.039%   | 0.030%   | 0.025%   | 0.036%   | 0.036%   | 0.037%   |
| Available Potash as K₂O | 0.0058%  | 0.003%   | 0.002%   | 0.004%   | 0.0013%  | 0.0048%  |
| Available phosphate as K₂O | 0.0037% | 0.0025%  | 0.0018%  | 0.0032%  | 0.001%   | 0.0035%  |

Table 2.
Effect of time of planting on disease incidence and yield of solanum khasianum berries

| Yield/PDI                   | Time of planting | November | December | January | February | SE±m | CD 0.05 |
|-----------------------------|------------------|----------|----------|---------|----------|------|---------|
| Mean yield of berries (kg) plot | November         | 21.56    | 21.03    | 28.12   | 25.17    | 0.584| 1.801   |
| *PDI                        |                  | 11.57    | 10.35    | 8.65    | 8.89     |      |         |

*PDI = Percent Disease Index.

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