



STUDY ON THE INCIDENCE OF POWDERY MILDEW DISEASE IN AGRO-CLIMATIC CONDITIONS OF LUCKNOW REGION OF UTTAR PRADESH

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ABSTRACT

Mulberry is the sole host plant of the silkworm *Bombyx mori* Linn which produces silk. The disease caused by fungus *Phyllactinia corylea* makes mulberry leaves unsuitable to feed the silkworm. The Disease severity is ranging from a few individual spots to numerous lesions nearly covering entire leaves as a result there decrease in the production of quality leaves by 50% which greatly effects silkworm rearing as well as sericulture industry. With a view of adopting control measures, the incidence of powdery mildew were studied for eight different mulberry varieties namely Tr-10, S-1, S-146, S-13, S-1635, AR-12, AR-14, Br-2 in autumn season. The results of the present study revealed that powdery mildew is significantly less prevalent in Br-2 variety ($F=21.84$; $p<0.01$) of mulberry during autumn season of Lucknow.

Keywords: *Phyllactinia corylea*, foliar disease, *Bombyx mori*, silkworm.

INTRODUCTION

Mulberry leaf, the only food for the silkworm (*Bombyx mori*) is deep rooted perennial plant widely distributed in Asia, Europe, Africa and Latin America grown under varied climatic conditions ranging from temperate to tropics. Mulberry leaf is a major economic component in sericulture since the quality and quantity of leaf produced per unit area has a direct bearing on cocoon harvest. Mulberry leaves are the sole sources of nutrients e.g., protein, carbohydrates, vitamins, minerals etc. for silkworm's growth (Tang *et al.*, 2003). The quantity and quality of mulberry foliage is often hampered by the infestation of pathogens, parasites and insect pests. Jeyarajan reported that these pathogens infect mulberry leaves and reduces not only yield but also nutritional values, thus making the leaves unsuitable for silkworm feeding (Bakshi *et al.*, 1972). Moisture, ash, lipid, crude fibre, carbohydrate, vitamins and minerals contents were decreased significantly after infection of mulberry leaves with fungus, *Phyllactinia corylea* (Tang *et al.*, 2006) It was known that various microorganisms seriously infected the mulberry leaves, of these microorganisms, fungus is most important because they cause many diseases; as a result the mulberry leaves are unsuitable to feed silkworm. The major foliar fungal diseases are leaf spot caused by *Cercospora moricola*, leaf rust caused by *Cerotilium fici* and powdery mildew caused by *Phyllactinia corylea*. The disease becomes apparent at conidial stage. The conidiophores were straight at early stages but at appeared spirally coiled when the conidia were matured (Babu *et al.*, 2002) Symptoms included white superficial mycelium with abundant sporulation on the lower surface of leaf. The annual leaf yield loss due to major foliar diseases was estimated to be 20-30 % in India (Phillip *et al.*, 1994). Besides this the diseases also reduced leaf quality drastically leading to poor silkworm rearing and crop loss

up to 55.59% at maximum disease severity of powdery mildew (Qadri *et al.*, 1998) The incidence and intensity of different mulberry diseases is influenced by the pathogens and different agro-climatic conditions. The disease is becoming important because severe foliar lesions render plants unacceptable for silkworm production (Kurt and Soyulu, 2001). As a result of outbreak of disease there is production of poor quality leaves which finally produces poor quality of cocoons thus causing a serious set back to sericulture industry. Keeping in view of above mentioned problem the present study was undertaken to find out the best mulberry variety among eight different varieties viz. TR-10, S-1, S-146, S-13, S-1635, AR-12, AR-14, BR-2 suitable for Lucknow agro-climatic conditions to minimize the crop loss due to the incidence of powdery mildew.

MATERIALS AND METHODS

The present study was carried out in autumn season of the year 2008 at mulberry germplasm centre of Babasaheb Bhimrao Ambedkar University, Lucknow. Eight plots with different mulberry varieties viz. TR-10, S-1, S-146, S-13, S-1635, AR-12, AR-14, and BR-2 were selected for the undertaken study. In each plot, 25 plants were taken into observation to study the incidence of powdery mildew in high and less extent in autumn season of Lucknow in different mulberry varieties.

The percentage of incidence of powdery mildew disease was calculated by following formula:

$$\text{Incidence of powdery mildew (in percentage)} = \frac{\text{No. of plants infected} \times 100}{\text{Total No. of plants}}$$

Analysis of variance (ONE WAY ANOVA) and Newman Keul's Multiple Range test were used. Significance was taken at $p<0.05$ level.



Table-1. Incidence of powdery mildew disease in different mulberry varieties in autumn season of Lucknow (U.P.).

S. No.	Name of the variety	No. of plants	Mean \pm SEM	CV (%)
1	TR-10	25	16.33 \pm 9.43	14.14
2	S-1	25	20.00 \pm 11.56	18.00
3	S-146	25	13.66 \pm 7.89	15.23
4	AR-12	25	15.00 \pm 8.67	17.66
5	BR-2	25	9.33 \pm 5.39	27.01
6	S-1635	25	19.33 \pm 10.98	13.94
7	S-13	25	15.66 \pm 9.05	9.71
8	AR-14	25	18.33 \pm 10.59	16.64

Significance level was taken at $p < 0.05$

RESULTS AND DISCUSSIONS

Powdery mildew disease caused by *Phyllactinia corylea* was recorded more or less throughout the year. The incidence and severity of disease depends on local agronomical conditions, mulberry variety, cultural practices and season. Results of the present study indicates the significant difference in the different varieties of mulberry varieties with respect to powdery mildew infection TR-10 ($F = 79.45$; $p < 0.001$), S-1 ($F = 48.86$; $p < 0.005$), S-146 ($F = 68.44$; $p < 0.005$), S-13 ($F = 21.82$; $p < 0.01$), AR-12 ($F = 15.05$; $p < 0.005$), AR-14 ($F = 57.19$; $p < 0.005$), S-1635 ($F = 25.44$; $p < 0.01$) and BR-2 ($F = 21.84$; $p < 0.01$). Significance level was taken at $p < 0.05$.

There is high extent of infection of *Phyllactinia corylia* in all varieties TR-10 (65.33%), S-1 (80%), S-146 (54.67%), S-13 (62.67%), AR-12 (60%), AR-14 (73.33%), S-1635 (76%) compared with BR-2 (37.33%) variety which is showing least percent of infection of powdery mildew in autumn season (Figure-1).

Dikshit *et al.*, (2006) observed high incidence of powdery mildew during August-December and lesser incidence of disease during March-June, because of prevalent dry weather conditions. Similarly, Chakravorty *et al.*, (2003) reported high incidence of disease from second week of August (1.32 PDI) which reached its peaks during the last week of September (14.62 PDI) and October.

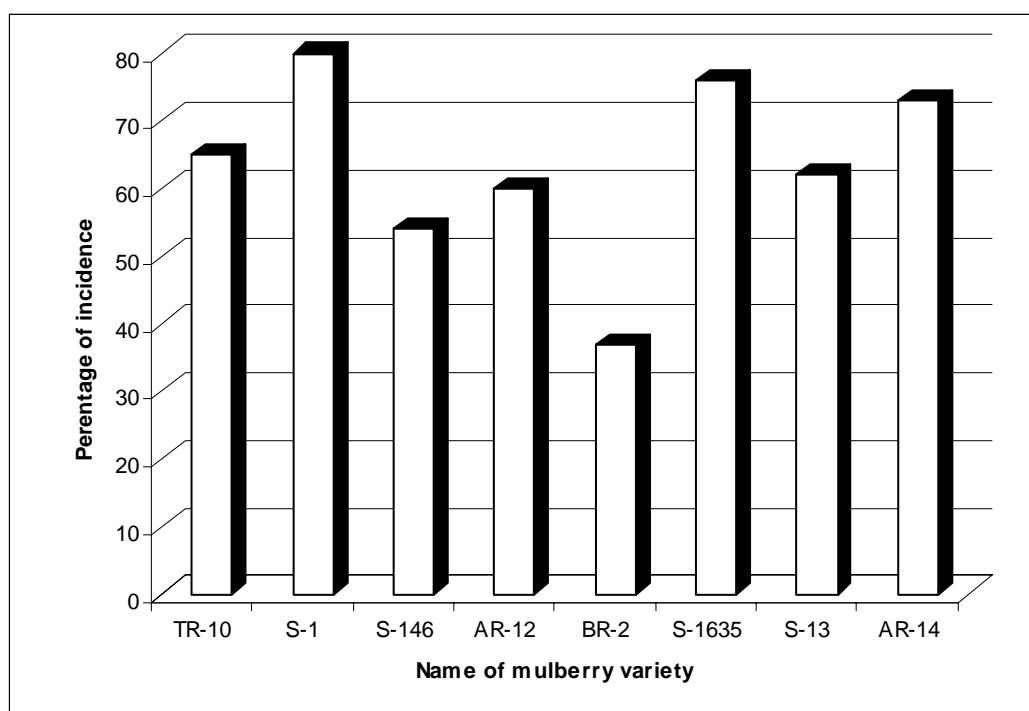


Figure-1. Incidence of powdery mildew in autumn season of Lucknow (2008).



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