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Studies on different disease incidences of S-1 and S-1635 Mulberry varieties during February and May crop

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Abstract

Silkworm (*Bombyx mori* L), is a monophagous insect. It has a great economic importance for its golden natural fibre. Murshidabad is the second largest traditional silk producing centre in West Bengal. These are few mulberry verities viz S-1,S-1635, C-2038, C-1730, TR-10, V-1, S-13, S-34 etc which is practiced in India. S-1 and S-1635 these two mulberry varieties are mainly practiced in Murshidabad throughout the year. Bacterial, Fungal, Viral diseases are common in mulberry but in West Bengal there are only 5-6 types of diseases are common in mulberry and can crossed threshold level. In this paper we point out a survey of damages of S-1 and S-1635 by 5-6 common diseases in February and May in 2018.

Keywords: S1, S1635, PDI,

Introduction

Mulberry is perennial, deciduous, deep rooted fast growing and high biomass producing plant. Mulberry silk is known to be the most luxurious, elegant, tender, and soft yarn in nature. The quality of mulberry leaves is influenced by several factors such as variety, agronomic practices, biotic and abiotic components thereby, positively affecting the overall cocoon production. From the beginning, of Murshidabad district was noted for sericulture which is clear to us from the Arthasashtra of Kautiliya. This industry got its peak performance here due to the hard labour and courage of Mughal emperors or kings. Some places of Murshidabad district had got an excellent position in sericulture and a number of foreigners had come to Murshidabad especially in Cossimbazar, Saidabad, and Jangipur (History of sericulture in Murshidabad). The growth and development of silkworm larvae and economic characters of cocoons are influenced largely by the nutritional quality of mulberry leaves fed. Matsumara *et al*. (1958) reported that out of the various characters responsible for success of cocoon crop mulberry leaf stood first (38.2%) followed by climate (37%), rearing techniques (9.30%), silkworm race (4.02%), Silkworm eggs (3.10%) and other factors (9.60%) etc. Nearly 70% of the silk protein produced by the silkworm is directly derived from

the protein of the mulberry leaves (Fukuda *et al*., 1959). So it has a huge economic importance. All commercial varieties are fast growing and produce nutrient rich leaves; hence attracted many more pathogens and pests. Excessive use of fertilizer, cultural malpractices and perennial nature of its own also make it a good harbour of many diseases (Dandin *et al*, 2003).

Fungal, viral, bacterial, nematode, mycoplasmal (Yellow dwarf disease in China, Japan, Korea and other countries reported by Kawai, 1939, Zedginidze, 1975, Xia, 1993), viroid (Hunchbacked disease in China & Japan reported by Xia, 1993) diseases are common in mulberry. But in West Bengal condition, only 5-6 diseases are more common and can cross economic threshold level. In Murshidabad favorable season is February, April, November and unfavorable season is June-July and September. Most of the farmers are cultivating S1 & S1635 verities. S1 popularly called 'Mandalaya' is a selection from OPH seedlings of unknown mother from the place Madalay (Burma). It is commonly cultivated in the plains of west Bengal (Gangetic alluvial plain). Leaf yield per year / ha is 27 mt. S1635 is a triploid variety with high leaf yielding ability (35 MT/ha/yr.) has been evolved by the Institute. The variety has been considered as National check. It is becoming popular under assured irrigation among the sericulture farmers in Malda, Murshidabad and Birbhum districts of West Bengal. The variety has also shown its superiority in some pockets of South India also.(Mulberry breeding and Genetics, Dr. Debashish Chakravarty, Scientist-D, Dr. Suresh, K., Scientist-B).

The present piece of work has been assigned to me to study the different disease incidence in two major mulberry varieties of West Bengal S-1 and S-1635 mulberry varieties during February and May Crop.

Materials and Methods

The present investigation was carried out in 2018 during February and May Crop at the Dept. of Sericulture, Krishnath College, Berhampore (latitude 24°50′N and longitude 88°13′E), Murshidabad, West Bengal, India with the aim to study the different disease incidence in two major mulberry varieties of West Bengal S-1 and S-1635 mulberry varieties during February and May Crop.

Diseases like bacterial wilt, sclerotium wilt and root knot affect/kill the plant, percent of disease plant /organs calculate for such disease by following formula

Disease incidence (%) = Number of infested Plant ×100/ Total number of plant studied

Foliar diseases like powdery mildew, leaf spot and leaf rust vary in intensity from plant to plant and from leaf to leaf on some plant. To obtain overall figure of disease intensity percentage of infected leaves and the percentage of leaf area are recorded. As measurement of the actual area of infection in large number of leaf samples is not possible, it has been agreed upon to use a visual scale for scoring the individual leaves of a sample and then calculate the infection percentage of percent incidence (P.I.) and percent disease index (PDI) by the following formula (McKinney,1923)

P.D.I=Sum of the Numeric Rating×100/Total number of leaves observed× Maximum grade (i.e., 5)

Disease should be scored from 5 plants, 4 in four corners (except boarder row) and 1 at the centre from the each plot. The disease incidence should be observed before leaf harvesting. At least 5 branches of each plant should be taken into consideration in which all the leaves should be counted and each leaf should be visually examined for scoring and recording of disease grade 5 scale as per AICEM guidelines given below.

Disease assessment key

Leaf spot Disease

Avg. No. of spot/leaf	Grade	Intensity
<4	1	Resistant
5-9	2	Moderately Resistant
14-19	3	Less Resistant
20-26	4	Susceptible
>27	5	Highly susceptible

Leaf rust Disease

Avg. No. of spot/leaf	Grade	Intensity
<10	1	Resistant
11-20	2	Moderately Resistant
21-30	3	Less Resistant
31-40	4	Susceptible
>41	5	Highly susceptible

Powdery mildew Disease

Percentage of leaf area are affected	Grade	Intensity
<10	1	Resistant
11-20	2	Moderately Resistant
21-30	3	Less Resistant
31-40	4	Susceptible
>41	5	Highly susceptible

Results and Discussion

The requirement of nutritionally rich and high yield of mulberry leaves has always been threatened by disease, pest and natural calamities. In the present work only disease incidence has been studied for 2 crop season, viz. February and May, 2018.

During February crop, 2018 Myrothecium Leaf spot, Pseudocercospora Leaf spot and Powdery Mildew were observed in both the mulberry varieties i.e. S1 and S-1635. In case of Myrothecium Leaf Spot average PDI was observed 3.86 and 1.56 respectively in S-1635 and S-1 mulberry varieties. In case of Pseudocercospora Leaf Spot average PDI was observed 3.63 and 2.84 respectively in S-1635 and S-1 mulberry varieties. Average PDI was observed in case of powdery mildew disease of mulberry was 3.67 in S-1635 mulberry variety and 3.36 in case of S-1 mulberry variety.

During May crop season, 2018 Myrothecium Leaf spot and Bacterial Leaf spot were observed in both the mulberry varieties i.e. S1 and S-1635. In case of Myrothecium Leaf Spot average PDI was observed 2.68 and 1.35 respectively in S-1635 and S-1 mulberry varieties. In case of Bacterial Leaf Spot average PDI was observed 3.48 and 2.26 respectively in S-1635 and S-1 mulberry varieties. Incidence of Powdery mildew was not recorded in this crop.

Studies of disease incidence during February crop

Table-1: Myrothecium Leaf spot (PDI)

Var	REP-1	REP-II	REP-III	MEAN
S-1635	3.81	4.12	3.65	3.86
S-1	1.25	1.58	1.86	1.56

Table-2: Pseudocercospora Leaf spot (PDI)

Var	REP-1	REP-II	REP-III	MEAN
S-1635	3.86	3.67	3.35	3.63
S-1	2.90	2.78	2.83	2.84

Table-3: Powdery Mildew (PDI)

Var	REP-1	REP-II	REP-III	MEAN
S-1635	3.21	4.12	3.68	3.67
S-1	2.35	3.93	3.81	3.36

Table-4: Myrothecium Leaf spot (PDI)

Var	REP-1	REP-II	REP-III	MEAN
S-1635	2.64	2.65	2.74	2.68
S-1	1.34	1.67	1.03	1.35

Table-5: Bacterial Leaf spot (PDI)

Var	REP-1	REP-II	REP-III	MEAN
S-1635	3.61	3.63	3.19	3.48
S-1	2.13	2.66	2.00	2.26

The present investigation indicates that occurrences of *Myrothecium roridum* (brown leaf spot), *Pseudocercospora* leaf spot and powdery mildew have been recorded highest in S-1635 mulberry varieties as compared to S-1 mulberry varieties. This may be due to higher nutritive value in triploid genotypes compared to diploid varieties as nutritive leaves are mostly preferred by any organism.

Summary and Conclusions

The present investigation was carried out in 2018 during February and May Crop at the Dept. of Sericulture, Krishnath College, Berhampore (latitude 24°50′N and longitude 88°13′E), Murshidabad, West Bengal, India with the aim to study the different disease incidence in two major mulberry varieties of West Bengal S-1 and S-1635 mulberry varieties during February and May Crop. Major findings are given below.

- During February crop, 2018 Myrothecium Leaf spot, Pseudocercospora Leaf spot and Powdery Mildew were observed in both the mulberry varieties i.e. S1 and S-1635.
- During May crop season, 2018 Myrothecium Leaf spot and Bacterial Leaf spot were observed in both the mulberry varieties i.e. S1 and S-1635. Incidence of Powdery mildew was not recorded in this crop.
- The present investigation indicates that occurrences of *Myrothecium roridum* (brown leaf spot), *Pseudocercospora* leaf spot and powdery mildew have been recorded highest in S-1635 mulberry varieties as compared to S-1 mulberry varieties.
- This may be due to higher nutritive value in triploid genotypes compared to diploid varieties as nutritive leaves are mostly preferred by any organism.

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