J. Mycopathol. Res. **41(1)** : *105-106 (2003)*

Screening of mulberry germplasm for resistance to leaf spot caused by *Myrothecium roridum*

P. M. PRATHEESH KUMAR[1], S. C. PAL[2] AND S. M. H. QADRI[1]

[1] *Central Sericultural Research & Training Institute, Berhampore 742101, West Bengal and* [2]*Department of Botany, School of Life Sciences, Viswa Bharati, Santiniketan 731235, West Bengal*

In order to identify mulberry genotypes resistant against leaf spot caused by *Myrothecium roridum*, 160 exotic and indigenous mulberry genotypes were screened for three years. Genotypes Kajli, Jatinuni, *Morus cathayana*, Almora local, Bogura-1, Meergund-6, Fernodias, Punjab local, *M. tiliaefolia*, Sultanpur, Golaghat, Bush malda-A and Sujanpur were found highly resistant (PDI - 1-5). Rest 64 genotypes were resistant (PDI = 6-15), 73 were moderately resistant (PDI = 11-30) and 10 were susceptible. No variety was completely resistant or highly susceptible.

Key words : Mulberry, *Myrothecium* leaf spot, screening, resistance

INTRODUCTION

Mulberry (*Morus* spp). is an important foliage crop grown in varied agro climatic conditions in India. The plant is susceptible to various diseases (Rangaswami *et al.*, 1976). Leaf spot caused by *Myrothecium roridum* is one of the important diseases caused to mulberry during rainy seasons in plains of West Bengal. The disease reduces elemental composition and deteriorates nutritive value of mulberry leaves (Shree and Nataraja, 1993 ; Pratheesh Kumar *et al.* 2002). This results yield loss and ultimately economic loss to the sericulture farmers (Qadri *et al.*, 1999). Fungicides are reported (Govindaiah *et al.*, 1988) to control this disease. However, many fungicides cause residual effect to silkworms (Sikdar and Shenoi, 1980) and are not eco-friendly. Also extensive use of fungicides result development of resistance in pathogens against the chemicals. Therefore, use of host resistance could be most appropriate way to manage the disease. However, the resistance reaction of mulberry varieties against this disease is not known. Keeping this in view, a study was conducted to identify sources of resistance of mulberry germplasm against the disease.

MATERIALS AND METHODS

One hundred and sixty mulberry varieties including both exotic and indigenous were collected from various places and maintained at the experimental field of Central Sericultural Research & Training Institute, Berhampore, West Bengal, were used in this study. The genotypes were screened against the disease under natural epiphytotic condition for three consecutive years, 1996-1998. Since the disease is predominant during the rainy season, the screening was conducted during July-August and October-November every year. From each genotype, three plants were earmarked and the total number of healthy and infected leaves was recorded from five randomly selected branches. The disease severity was recorded in a 0–5 scale on the basis of per cent leaf area infected. The disease severity was expressed in Per cent Disease Index (PDI) which was calculated following standard formula (Govindaiah *et al.*, 1989) as follows :

$$PDI = \frac{\text{Sum of numerical values}}{\text{Total number of leaves observed} \times \text{maximum grading}} \times 100$$

The numerical values were obtained by multiplying number of infected leaves with their respective grading the genotypes were then categorised as immune or completely resistant (PDI = 0), highly resistant (PDI = 1-5), resistant (PDI = 6-10), moderately resistant (PDI = 10-20), susceptible (PDI = 20-50), and highly susceptible (PDI>50) as suggested by Philip *et al.* (1996).

RESULTS AND DISCUSSION

It is evident from the (Table 1), that out of 160 genotypes, none of the genotype was immune or completely resistant to the disease. However, varieties viz., Kajli, Jatinuni, *Morus cathayana,* Almora local, Bogura-1, Meergund-6, Fernodias, Punjab local, *M. tiliaefolia,* Sultanpur, Golaghat, Bush malda-A and Sujanpur were highly resistant (Table 1). Most of the varieties were resistant (63 nos.) or moderately resistant (73 nos.) However, genotypes viz, MR-1, Kanva-2, Obawase, *Morus multicaulis,* Tusimakow, KPG-3, Fukushimaoha, *Morus indica* HP, Senmasto and Akaji were susceptible and no variety was found to be highly susceptible.

Table 1 : Response of mulberry genotypes to *Myrothecium* leaf spot

Reaction of genotypes	Name of mulberry genotypes
Completely resistant (PDI = 0)	Nil
Highly resistant (PDI = 1-5)	Kajli, Jatinuni, *Morus cathayana,* Almora local, Bogura-1, Meergund-6, Fernodieas, Punjab local, *M. tiliaefolia,* Sultanpur, Golaghat, Bush malda-A, Sujanpur
Resistant (PDI = 6-10)	Wasemidori, Thailand (lobed), *M. alba* (ragoon), Kurseong, Tollyganj, Bogura-4, Bush malda-B, Atucanadia, *M. alba*, Madrid spain, Enshatakasuke, China black-B, Bishnupur-9, Takowase, Sterile, MS-6, Dudia white, Kokuso-13, Berhampore-6, Mysore local, *M. rotundiloba,* Goshoerami, Jodhpur, Meergund-2, Roznitul, Burma-8, MS-8, *M. rubra,* Berhampore-B, Assambola, Calabresa, OPH-3, *Morus indica* (black), Mizusowa, Serpentina, China black, Artificial, Cyprus, MS-5, Shrim-8, Roso, CSRS-II, Lisbon, Kairyoaki, FGDTR-9, Kolitha-3, KNG, Berhampore-A, KPG, Ankara, MS-7, Sujapur-5, Berhampore-4, Multicaulis. Mandalaya, Seijuro, Kokuso, Lloyos, Kaliakutai, ACC No. 11, ACC No. 165, Shrim-5, Nayedgami, Thailand (unlobed)
Moderately resistant (PDI=11-20)	Assamjati, Charitul, China white, Kolitha-7, Kokpilla, Canton china, Surat, MS-9, *M. australis,* Ranchi-1, Nannayapathi, Hungarian, Tomeioso, Sukakuchi, Philippines, Miuraso, Botatul, Matigara white, Italian mulberry, Monla-1, Rohachi, Laevigata, Bishnupur-4, Kosen, Kolitha-9, Takda, Black cherry, Molai, Shrim-2, Kanmasari, Monlai, Kabul, Tista valley, Moreti seringe, Ichihei, Dudhia red, *Morus nigra,* CSRS-1, Ichinose, Berhampore-20, Shidseguwa, Mirganj, English black, White badana, Rosodilombadium, Oshima, Kenmochi, *Morus indica, Morus ihouseringe,* RFS-175, Cattaneo, Kurimoto, Berhampore-39, OPH-1, Rosteli, Lemoncina, Egypt cairo, Rokokuyas, Kairoroso, Kolitha-8, MS-1, Sosuke, Australia, Matigara black, Moretiana, Aoroso, KPG-3, Shimanochi, China black, Nagaland local, Okinowa, Asiyoake, Creeping mulberry
Susceptible (PDI=21-50)	MR-1, Kanva-2, Obawase, *Morus multicaulis.* Tusimakow, KPG-3, Fukushimaoha, *Morus indica* HP, Senmasto, Akaji.
Highly Susceptible (PDI = >50)	Nil

This finding suggests that, genotype possessing good degree of resistance against the disease could be further exploited for breeding resistant plants to manage the disease.

REFERENCES

Govindaiah ; Gunasekhar, V., and Sharma, D. D. (1988). Control of *Myrothecium roridum* causing leaf spot of mulberry. *CSR & TI News Letter.* **3** : 5-6.

Govindaiah ; Sharma, D. D. ; Sengupta, K. ; Gunasekhar, V. ; Suryanarayana, N. and Madhavarao, Y. R. (1989). Screening of mulberry varieties against major fungal diseases. *Indian J. Seric.* **28** : 207-213.

Pratheesh Kumar, P. M. ; Pal, S. C., and Qadri, S. M. H., (2002). Relation between leaf spot (*Myrothecium roridum)* intensity and physio-biochemical changes in mulberry (*Morus* spp.). National Symposium on diversity of microbial resources and their potential application. STAC, Mallaguri, India. (*Abstr.)* SL-**8**, p21.

Qadri, S. M. H. ; Gangwar, S. K. ; Pratheesh Kumar, P. M. ; Elangovan, C. ; Das, N. K. ; Maji, M. D. and Saratchandra, B. (1999). Assessment of cocoon crop loss due to leaf spot disease of mulberry. *Indian J. Seric.* **38** : 35-39.

Rangaswamy, G. ; Narasimhanna, M. H. ; Kashiviswanathan, K. ; Sastry, C. R., and Jolly, M. (1976). Sericulture manual I. Mulberry cultivation. *FAO Agric. Bull.* Rome. pp 150.

Shree, M. P. and Nataraja (1993). Post infectional biochemical and physiological changes in mulberry. *Curr. Sci.* **65** (4) : 337-341.

Sikdar, A. K. and Shenoi, M. M. (1980). Control of leaf spot disease of mulberry by systemic fungicides. *Indian Phytopath.* **33** : 38-41.

(Accepted for publication January 14 2003)