International Journal of Novel Trends and Innovation
IJNTI.ORG | ISSN : 2984-908X
An International Open Access, Peer-reviewed, Refereed Journal

STUDIES ON BIO-CONTROL OF LEAF SPOT (CERCOSPORA MORICOLA COOKE) IN MULBERRY (MORUS SPP)

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Abstract:
Cercospora moricola cooke one of the fungal pathogen caused by leaf spot diseases in mulberry plants .the incitant of leaf spot is one among causing damage to the leaf and also affect the silk worm health infected leaves are of poor quality and unsuitable for feeding of the silkworms and also chemical products of pesticides caused by environ mental pollution, so my concept ecofriendly bio control plant extracts higly resitences of diseases of Cercospora diseases Trichoderma Harziuanum tolerant to chemical fungicides has been reported for the integrated fungicides for their bio – efficacy against different fungal bio-agent for tolerance level and the friendly fungistatic behavior. Eucalyptus globules plant extract highly in habitation conidial germination allium sativum L second highly in habitation conidial germination. Some more plant extracrts highly inhibition cercospora moricola spores, so my concept above mentioned plant extracts (eco) control leaf spot diseses of cercospora.

Keywords: Mulberry, disease, Cercospora moricola, Plant oils, Pesticides

I. Introduction

Sericulture is an Agri-based enterprise covered by two activities i.e., Mulberry cultivation and silkworm rearing. Mulberry is a drought tolerant plant raised under both irrigated and rainfed conditions for the production of quality leaf, the sole food of the silkworms. Apart from having ideal rearing conditions, congenial climate and disease-free silkworm seed, quality mulberry leaf is most essential for rearing of the silkworms with disease tolerance for harvesting of cocoons with qualitative and quantitative nature.

Sericulture is predominantly practiced by small and marginal farmers in the states of Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal, Jammu and Kashmir and other states. The income per acre per annum is comparatively very high when compared to other crops. It has got a very good potential with regard to employment generation, as the industry is involved with Mulberry cultivation, Silkworm rearing, Silk Reeling, Silk Twisting, Silk Dyeing, Silk Weaving, Block printing, Silk garments manufacturing and allied activities like Bamboo tray making, Bamboo Chandrike making and Sericulture carpentry. One-acre Mulberry plantation provides employment to 9 -11 persons with directly and indirectly related activities of the sericulture/silk industry. Silk is having its own importance for having so much of export potential (Raja gopal Reddy *et al*, 1999). Sericulture in India is as old as the ancient Indian culture. In India, Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal and Jammu & Kashmir are the major sericulture practicing states. Recently, it has been noticed that many states of India have taken this enterprise at larger scale. In the Global Silk scenario, India has emerged as one of the important sericulture practicing countries in the Tropics and ranks second. In India the major Silk producing states are Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu and Jammu & Kashmir.

Status of Global Sericulture:

China and India are the major producers of silk among the silk producing countries of the world. China produces nearly 71% of the total raw silk production in the world, followed by India (17%). Other countries like Japan, Brazil, Korea Republic,

Uzbekistan, Thailand and Vietnam are also practicing sericulture. The demand for silk is also increasing all over the world and it is only China and India which are meeting the demand of world raw silk.

Diseases are the major limiting factor in Mulberry cultivation for production of quantitative and qualitative leaf production. Good number of fungal pathogens cause variety of diseases to Mulberry foliage, roots or stem right from its plantation to throughout its life period. Out of them, foliar pathogens are of major significance, because of their direct accessibility to Mulberry leaves as they are air-borne in nature. They cause 15-20% loss in leaf production, besides severe destruction of leaf lamina to about 20-25% which leads to leaf loss both by quantity and quality. Feeding of the Silkworms with the diseased leaves leads to poor larval growth and are prone to different Bacterial, Viral and Fungal diseases. This situation ultimately leads to crop failures or reduction in crop yield with poor quality cocoons. So, there is every necessity in raising healthy mulberry plantation for production of quality leaf, duly following package of practices and protocols of pest management.

II.RELATED WORK

Cercospora moricola Cooke, the incitant of leaf spot is one among them causing damage to the leaf and also affects the silkworm's health (Fig.1.3). The infected leaves are of poor quality and unsuitable for the feeding of the silkworms. It is common leaf spot disease on different agriculture crops and some other weeds growing besides mulberry gardens. Since, mulberry is exclusively grown for feeding the silkworms for a period of 25-28 days. It was observed that the *Cercospora moricola* Cooke population gets rebuilt within four weeks from the date of spray or three weeks from reaching the safe period, further work is essential on this line preferably in using mechanical or biological methods.

Cercospora infected mulberry leaves

Mulberry is under cultivation in Rayalaseema region of Andhra Pradesh. With the prevalence of adverse environmental conditions in Anantapur district, many insects and disease pests especially foliar fungal pathogens surviving on some other crops are moving on to the new palatable host like mulberry for their survival. In spite of having so many risks, the farmers are practicing Sericulture for its having attractive employment and income generating nature (Raja gopal Reddy *et al*, 1999).

Some new infestations with different pests are observed on mulberry during rainy and winter season, which are affecting, not only to the quality but also quantity of mulberry leaf. *Cercospora* leaf spot disease over mulberry is one among them causing threat to the industry in recent years by way of damaging the qualitative and quantitative nature of the mulberry leaf. The indiscriminate using of systemic chemicals to combat the pests and diseases has resulted in severe ecological, health hazards. So, natural products offer a safe and alternative to such chemical pesticides. In the present study, some locally available plant products were tested for their antifungal activity.

III.METHODOLOGY

Even though many fungi are reported causing leaf spot, *Cercospora moricola* Cooke is widely occurring and causes serious damage to mulberry leaf yield and quality. It was first recorded on mulberry from Allahabad, Uttar Pradesh (Mitter and Tandon, 1937). Since then it has been reported from many other parts of the country. It causes a direct leaf yield loss of about 5 per cent due to defoliation, which may, however, reach up to 35 per cent in most severe conditions. In addition, it also causes 20-25 destruction of leaf lamina (Sikdar and Krishnaswamy, 1980; Sukumar and Ramalingam, 1989). The disease badly affects the nutritional value of leaves by reducing moisture, proteins, sugars and chlorophyll contents, and thus makes the leaves unsuitable for silkworm feeding (Sikdar *et al*, 1979; Siddaramaiah and Hedge, 1990; Srikantaswamy *et al*, 1996).

Crcospora moricola produces minute circular brownish spots on the leaves, which gradually increase in size, and turn dark brown surrounded by chlorotic holes. On severity, the spots coalesce resulting in larger spots, yellowing and defoliation probably because of the production of some toxins by the invading pathogen (Siddaramaiah *et al*, 1980). Dead affected leaf tissues become brittle and drop-off, resulting in the formation of characteristic shot holes (Sukumar and Ramalingam, 1986). Besides Cercospora spot, many other types of spots with varying colours, shapes and sizes are also observed in mulberry which are caused by several other fungi (Bilgrami *et al*, 1979).

Causal Organism and Disease cycle:

Cercospora moricola Cooke belongs to the class Fungi Imperfecti. The dispersal of fungal spores takes place mainly through rain splash (Sukumar and Ramalingam, 1981). Rainfall also favours disease development (Siddramaiah *et al*,1978a; Sukumar and Ramalingam,1989). Ultra-structural studies reveal the ball-and-socket type attachment of conidia and conidiophores. Upon germination, the conidial germ tubes show strong tropic response to stomata and penetrate through open stomata without forming any specialized penetration structures. No direct penetration through cuticle and epidermal layer is observed in *Cercospora moricola* (Sukumar and Ramalingam, 1990; Gupta et al, 1995). On the development of infection spot, the conidial production reaches its maximum on the 5th day of symptom appearance. The young leaves are more susceptible to infection than older ones (Sukumar and Ramalingam, 1987).

Higher disease incidence is observed in closer plant spacing than in wider. Thus, wider spacing between plants is suggested to avoid the disease incidence (Sharma *et al*, 1996a). Removal of infected leaves before sporulation is also suggested as physical control of disease (Sukumar and Ramalingam, 1989). Among various fungicides tested, spraying of 0.2 pe cent solution of Carbendazim 50%WP twice at an interval of 15 days after disease appearance is found most effective and easiest method of control (Siddramaiah *et al*,1978c).Use of biodegradable materials like fresh plant extracts has been taken up on top priority during the last three decades for plant disease control in view of the high cost of chemical pesticides and their hazardous nature (Fawcett and Spencer, 1970; Grainage and Ahmed, 1988; Jespers and ward, 1993; Mitra *et al*, 1984). Chemical control of mulberry disease is involved with so much of risk for having the residual toxicity to silkworm, when the chemical sprayed leaves are fed to them. So, there is a need to find out some biodegradable natural products of non-toxic nature.

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Discussion

The indiscriminate use of synthetic pesticides for controlling insect, pests and diseases in sericulture may offer a potential hazard to farmers, silkworms, wild life, and the environment. New technologies have been developed to control insect and disease pests in mulberry without affecting the ecosystem. In this line, integrated pest management (IPM) technique, one of the new approaches where adaptation of different suitable measures in an integrated manner can manage the pest population at a safe level without causing economical injury is adopted widely in sericulture too. molecules will be suitable in controlling pest population without affecting agro-ecosystem holds good in sericulture too.

Pesticides have played a vital role for the control of major pests and diseases with a commensurate increase in production. Although chemicals are effective in controlling pests and diseases, the indiscriminate use of pesticides resulted in development of resistance to pesticides, resurgence of target pests, secondary pest outbreaks, killing of non-target

organisms, residual toxicity and environmental pollution (Sharma *et al*, 1998; Urech *et al*, 2000).

Plant protection measures gained so much momentum since the period of green revolution. The constant use of plant protection chemicals resulted in increased production of different crops. But at the same time it has added to the environmental pollution, health hazards and death of beneficial organisms. Since then efforts were made to find out alternatives to chemical fungicides. Some studies were conducted on the use of plant extracts, to develop another line of research in the line of controlling the plant diseases. Besides being safe and non - phytotoxic, the plant extracts are known to be effective against various plant pathogens.

IV. CONCLUSIONS

Foliar diseases create serious problems in qualitative and quantitative leaf production especially during rainy and winter seasons. Leaf spot disease caused by *Cercospora moricola* Cooke is one of the most serious infestations, causing quantitative and qualitative leaf loss.

Occurrence of different fungi on leaf surface of mulberry was totally depending on the Biotic and Abiotic factors. In the integrated management of the *Cercospora* leaf spot fungus, growth and development of the pathogenic fungus is to be checked with the recommended plant products, plant oils and antagonistic fungi. Then only it will be possible to control leaf spot disease by way of developing certain effective protocols with the integration of the recommended plant products, oils and bio control agents under integrated pest management for the effective control of the leaf spot disease of Mulberry. Basing on the experimental results, it is to infer that some of the tested plant products (6), plant oils (3) and antagonistic fungi (2) were found to be so effective in controlling the leaf spot disease caused by Cercospora moricola Cooke to the level of certain percentage (%).

V. ACKNOWLEDGEMENT

The authors are thankful to Guide, Dr. C. Raja gopal Reddy, Sericulture Officer, Division of Bio-organics, Andhra Pradesh State Sericulture Research and Development Institute, Kirikera, Hindupur, Andhra Pradesh for bringing me to the line of Research and his counseling and guidance in fixation of this applied research topic, planning of work, experimentation and preparation of dissertation.

Authors also thankful to Dr. Sunil Misra, Scientist, Biology Division, Indian Institute of Chemical Technology (IICT), Hyderabad, A.P and Prof. R. Ramanjaneyulu, Department of Microbiology, Sri Krishna Devaraya University, Anantapur, A.P, for their suggestions and critical review of the experimental work. I am also thankful to Mr. S.V. Seshagiri, Research Assistant, Silkworm Breeding Division, Andhra Pradesh State Sericulture Research and Development Institute (APSSRDI), for his expert photography and formatting of the data.

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