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Studies on DSI of leaf Blight disease in Safed Musli cultivation at Dahegaon

Dr. Sachin Tawade

Abstract

Chlorophytum borivilianum Santapau and Fernandes is one of the most important medicinal plants. It is commonly known as Safed musli viz. a traditional medicinal plant belongs to family Liliaceae. *Chlorophytum borivilianum* (Liliaceae) is listed as endangered species valued for its fasciculate storage roots. It was reported to have aphrodisiac properties and forms an important ingredient of herbal tonics viz. prescribed in the Ayurvedic systems of medicine. It is having curative property of diabetes, arthritis and to improve the immune system. Cultivation of it has severely affected by leaf blight disease. Tiny, pin-head, round, reddish-brown lesions first appeared on the leaves as longitudinal streaks along the midrib veins and at the margins of the diseased leaves. When leaves are infected, they dry out too soon and the plant is unable to produce healthy fingers, which is why they are used medicinally. Following the start of the rainy season, this disease manifests in August and September. Among the different diseases of *Chlorophytum borivilianum*, leaf blight caused by *Colletotrichum capsici* is very severe viz. responsible for 30 per cent yield losses. Keeping this in view, the present investigation was under taken to study the DSI at the field of Dahegaon Taluka Vaijapur Dist., Aurangabad.

Keywords: Safed musli, Leaf blight, *Colletotrichum capsici*, DSI, Dahegaon.

Introduction

Safed musli is known as "Divya Aushad" in Ayurvedic literature and is crucial to the creation of more than a hundred distinct medications. India has a huge market for Safed musli since it is the birthplace of Ayurveda. In Western India, particularly in Gujarat, it is customary for individuals to take a spun form of Safed musli twice daily with milk as part of their regular medical regimen. Additionally, there are examples of Safed musli being used in different ways across the nation, which suggests that there is a significant need for Safed musli in India (R. Haque *et al.*, 2011).

3500 ton is the annual demand of *Chlorophytum borivilianum* in India but its supply is only 500-600 ton (Kothari and Singh, 2003). The plant grows in the wild and on an account of its growing demand worldwide, it has been over exploited, pushing it to the category of a threatened species on the verge of extinction. The medicinal plant board of India has recognized *Chlorophytum borivilianum* as the sixth most important herb to be protected and promoted. The government of India is also extending subsidies to the farmers for the cultivation of this herb through National Horticultural Board (Murlidharan, 2004).

Origin and Distribution:

Chlorophytum borivilianum Santapau and Fernandes is one of the most important medicinal plants. It is commonly known as Safed musli viz. a traditional medicinal plant belongs to family Liliaceae. Eighty-five percent of the 300 species of musli are found in India. *Chlorophytum borivilianum* is mainly distributed in Southern Rajasthan, North Gujarat and Western Madhya Pradesh (Maiti and Geetha, 2005). There are thirteen *Chlorophytum* species known to exist in India. Native species are marketed as "Safed musli" in the Indian pharmaceutical industry, and all of these species have different looks. Among these, *Chlorophytum borivilianum* produces the highest yield and saponin content (Shariff and Chennaveeraiah, 1972). The native species *C. arundinaceum*, *C. tuberosum*, *C. laxum*, and *C. breviscapum* are also significant. (Trivedi and Tiwari, 2016).

Morphology:

When summer rains arrive, the little perennial herb *Chlorophytum borivilianum* emerges from the ground with a complete crown of radical leaves. Its fleshy, fasciculate root tubers come straight from the stem disc; that is, they don't have any fibrous structure. There are five to twenty cylindrical tubers. (Trivedi and Tiwari, 2016). The peeled tubers are white in color and cylindrical in the shape with slightly tapering towards lower side that resembles the shape of a pestle (Panda *et al.*, 2010).

It has 6 -13 radical leaves i.e. spirally imbricate at the base, sessile in nature, linear or ovate with acute apex and slightly narrowed at the base. The leaves spread horizontally, with smooth surfaces, wavy margins and parallel venation. Flowers are small, white, bracteate, pedicellate, zygomorphic, usually arranged in alternate clusters and each cluster comprising of 3 flowers (R. Haque *et al.*, 2011).

The bracts are linear, papery and purplish, 1.0 to 1.5 cm long; the pedicle looks whitish and 6 -10 mm in length. Perianth 6, linear, acute and 3-5 nerved. Stamens are 6, as long as perianth and its filaments are glabrous. The anthers yellow, linear and dehisces by longitudinal slits. Style is slightly longer than the stamens; ovary is 3 lobed, green, globose and sessile (Plate. I). It bears green to yellow colored fruit viz. almost equal in length and breadth. Seeds are endospermic, black colored and angular in shape (Singh *et. al.*, 2004).



Plate I: Morphology of *Chlorophytum borivillianum*.

Chlorophytum borivillianum (Liliaceae) is listed as endangered species (Nayar and Shastry, 1988) valued for its fasciculate storage roots. It was reported to have aphrodisiac properties and forms an important ingredient of herbal tonics viz. prescribed in the Ayurvedic systems of medicine (Kirtikar and Basu, 1975). It is having curative property of diabetes, arthritis and to improve the immune system. Because of these characteristics, roots from natural ecosystems are collected carelessly, which has led to a fall in natural populations.

Cultivation:

Realizing the therapeutic importance of Safed musli and its demand in national and international markets, domestication and cultivation experiments were initiated at some of the research centers in the country. The results of initial cultivation trials showed strong possibilities of Safed musli cultivation in Maharashtra with high economic returns (Singh *et. al.*, 2004), hence large number of farmers ventured into Safed musli cultivation in parts of the Marathwada and Vidarbha region of Maharashtra. Safed musli growers facing several problems like high cost of planting material, low seed germination and major impact of fungal infection mostly leaf blight caused by *Colletotrichum capsici*.

Leaf Blight:

The initial symptoms were the appearance of minute, pin-head, circular, reddish-brown, lesions on the leaves, viz. from longitudinal streaks along the midrib veins and at margins of the infected leaves. Infected leaves dry prematurely and plant fail to produce healthy fingers viz. used for medicinal purpose. This disease occurs in August and September after the onset of the rainy season. Among the different diseases of *Chlorophytum borivillianum*, leaf blight caused by *Colletotrichum capsici* is very severe viz. responsible for 30 per cent yield losses (Sattar *et. al.*, 2006).

Materials and Methods:

Survey of cultivation and incidence of Leaf blight of Safed musli:

The survey of cultivation of Safed musli in Marathwada region was carried out in June-July 2007 by visiting cultivated fields of Safed musli. In Aurangabad, Safed musli was cultivated at Dahegaon Taluka Vaijapur Dist., Aurangabad viz. located 45 Km away from Aurangabad on Shirdi highway, in the field of farmer Shri. Jagan Patil on 15 Acres of land.

Collection of Plant material:

Healthy and infected leaves of Safed musli were collected at random during the year 2007 to 2009 in the month of August and September. The leaves were collected in polythene bags from the field as per the method given by Mukadam and

Gangawane (1982). These leaves were brought to the laboratory and kept in plastic trays at room temperature for the further study.

Isolation and Purification of Pathogen:

Blight infected leaves were collected from different fields of Safed musli from Dahegaon Taluka Vaijapur Dist., Aurangabad, Maharashtra in the month of August 2007. Infected leaves were surface sterilized with 0.1 % sodium hypo chloride and cut into small pieces. These pieces were inoculated on Potato-Dextrose Agar (PDA) medium under sterilized conditions in Petri plates as per the method given by Verma and Sharma (2008). These plates were incubated for eight days at 27°C temperature for growth and development of fungal pathogen. After continuous transferring for three times on fresh PDA media, the isolates were purified as per the method used by Goh (1999) by single spore isolation method. The purified isolates were maintained on fresh Czapek-Dox Agar media and used for further study.

Identification of Pathogen:

The isolated fungal pathogen was identified on the basis of culture characters, morphological characters and fungal reproductive structures. The reproductive structures were observed under microscope and identified by using standard literature (Alexopolous, 1996; Barnett, 1970 and Mukadam, 1997).

Disease Severity Index (DSI):

The occurrence of leaf blight disease was examined in relation to temperature, rainfall, and relative humidity at the Safed musli field. For this aim, the meteorological data from 2007 to 2009 was acquired from the Water and Land Management Institute in Aurangabad. The incidence of disease was documented as a percentage by calculating the disease severity index (DSI) in connection to rainfall, temperature, and relative humidity throughout August and September from 2007 to 2009 at Safed musli field sites in Dahegaon (Tawade, 2021).

One hundred leaves, both healthy and infected, were randomly selected from the fields and closely examined. The leaves were divided into nine grades based on the percentage of infection in order to calculate the disease severity index (DSI) using Mayee's (1983) nine-point scale. The following formula was used to determine the disease severity index.

$$DSI = \frac{\sum \text{of all ratings}}{\text{No. of observations} \times \text{All rating} - 1} \times 100.$$

Result:

The Disease severity index at Dahegaon field, Dist., Aurangabad:

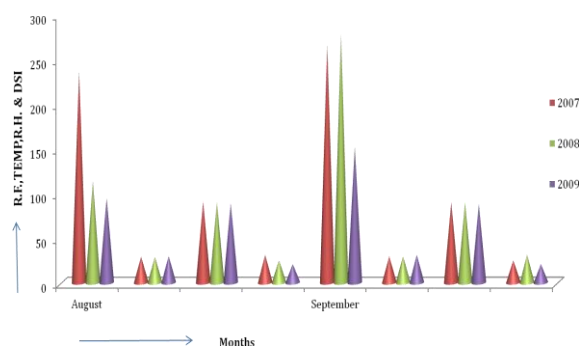
In 2007, during the months of August and September, when the temperature ranged from 29.0 to 29.5° C, the relative humidity ranged from 90.0 to 91.0 %, and the prevailing rainfall ranged from 236.5 to 266.0 mm, disease incidence was noted in the Safed musli field in Dahegaon, Taluka Vaijapur Dist., Aurangabad. The disease severity index fluctuated during this time, going from 25.0 to 31.2 percent. There was variance in the severity index of disease, which ranged from 25.0 to 31.2 percent, in 2008 throughout the months of August and September. The predominant rainfall ranged from 114.0 to 278.5 mm, the temperature ranged from 29.0 to 29.5 ° C, and the relative humidity was 90.0%. In 2009, the prevalent rainfall ranged from 95.0 to 152.0 mm, the temperature ranged from 29.8 to 31.3 ° C, and the relative humidity ranged from 88.0 to 89.0. There was no change in the severity index of disease, which is 20.8% as shown in table 1. and figure 1.

The data of three years indicates that, the average highest rainfall was 251.2 mm in 2007 and average lowest rainfall was 123.5 mm in 2009. The highest temperature 30.5 ° C was recorded in 2009 and lowest 29.2 ° C was in 2007 and 2008. The highest relative humidity was 90.5 % in 2007 and lowest 88.5 % were recorded in 2009. The average highest disease severity index was observed as 28.1 % in 2007 and 2008 and lowest disease severity index 20.8 % was observed in 2009 at the field of Dahegaon, Taluka Vaijapur Dist., Aurangabad.

Table 1: Shows the prevalence of Safed musli leaf blight at various temperatures, relative humidity levels, and rainfall levels in the Dahegaon field in the Taluka Vaijapur District of Aurangabad

Year	Disease Severity Index							
	August				September			
	R.F. (mm)	Temp. (° C)	R.H. (%)	Incidence (DSI)	R.F. (mm)	Temp. (° C)	R.H. (%)	Incidence (DSI)
2007	236.5	29.0	91.0	31.2	266.0	29.5	90.0	25.0
2008	114.0	29.0	90.0	25.0	278.5	29.5	90.0	31.2
2009	95.00	29.8	89.0	20.8	152.0	31.3	88.0	20.8
X	148.5	29.2	90.0	25.6	232.0	30.1	89.3	25.6
SD	62.70	0.38	1.00	4.27	56.91	0.69	0.94	4.27
SE ± 1	36.24	0.22	0.57	2.46	32.89	0.40	0.54	2.46
CD @ 5%	155.8	0.95	2.48	10.6	141.4	1.72	2.34	10.5

Fig. 1: Shows the prevalence of Safed musli leaf blight at various temperatures, relative humidity levels, and rainfall levels in the Dahegaon field in the Taluka Vijapur District of Aurangabad



Conclusion:

On the basis of results it is evident that as the rainfall and relative humidity increases at temperature 29.0 to 29.5 degree Celsius, disease severity found at increased level.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References:

1. R. Haque, S. Saha¹, T. Bera, ¹A Peer Reviewed of General Literature on Chlorophytum borivilianum Commercial Medicinal Plant, Int. J. Drug Dev. & Res., Jan-March 2011, 3(1): 165-177.
2. Kothari, S. K. and Singh, K. (2003). Production technique for the cultivation of safed musli (Chlorophytum borivilianum). *J. Horti. Sci. Biotech.* 78 (2) : 261-264.
3. Murlidharan (2004). Indian variant of Viagra. People's Democracy, Weekly organ of the Communist Party of India. 30 (34) : 1-2.
4. Mala Trivedi and Rajesh K. Tiwari (2016). Methods of enhancing seed germination in *Chlorophytum* sp. IRJET 3(5):21-25.
5. Maiti, S. and Geetha, K. A. (2005). Characterization, genetic diversity and cultivation of *Chlorophytum borivilianum* - an important medicinal plant of India. *Pl. Genetic Res. Charact. and Utiliz.* 3(2) : 264-272.
6. Shariff, A. and Chennaveeraiah, M. S. (1972). Karyo morphology of four diploid species of Chlorophytum. *Nucleus*. 15 : 39-45.
7. Panda, S. K., Das, D. and Tripathy, N. K. (2010). Pharmacological studies on root tubers of *Chlorophytum borivilianum* Santapau and Fernandes. *Int. J. Pharmac. and Phytochem. Res.* 2(4) : 13-17.
8. Singh, Aparbal., Singh, Saudan, Patra, D. D., Singh, Man., Arya, S. J. K. and Khanuja, S. P. S. (2004). Cultivation and processing technologies of Safed musli (*Chlorophytum borivilianum*). *J. Med. & Aro. Pl. Sci.* 26 : 70-76.
9. Nayar, M. P. and Shastry A. R. K. (1988). *Chlorophytum borivilianum*. In red data book of Indian Plants (Eds M. P. Nayar, A. R. K. Shastry) Botanical survey of India. 2 : 142.
10. Kirtikar, K. R. and Basu, B. D. (1975). Liliaceae: *Chlorophytum*. In Indian medicinal plants (Eds K R kirtikar, B D Basu and L.M.Basu) Allahabad. : 2508-2509.
11. Sattar, A., Alam, M., Khaliya, A., Shukla, R. S. and Khanuja, S. P. S. (2006). First report of leaf blight of *Chlorophytum borivilianum* caused by *Colletotrichum capsici*. *Pl. Path.* 55(2) : 301.
12. Mukadam, D. S. and Gangawane, L. V. (1982). Methods in experimental plant pathology. Marathwada University publication, Aurangabad.
13. Verma, Kalp and Sharma, Shyam, Sundar. (2008). Disease survey of Safed musli (*Chlorophytum borivilianum*) in zone IV and V of Rajasthan. *Ind. Phytopath.* 61(2) : 277-279.
14. Goh, T. K. (1999). Single spore isolation using a handmade glass needle. *Fungal diversity*. 2: 47-63.
15. Alexopolous, C. J. (1996). Introduction to Mycology, John Wiley and Sons, Inc. Publication, New York Winchester, Brisbane, Toronto and Singapur.
16. Barnett, H. L. (1970). Illustrated genera of fungi imperfecti. Buress Publication.
17. Mukadam, D. S. (1997). The illustrated kingdom of fungi, Aksharganga Prakashan, 24 Pannalal Nagar, Aurangabad.
18. Sachin V. Tawade (2021). Studies on severity of leaf blight disease in Safed musli cultivation. IJIRSET. 10(5): 5231-5234.
19. Mayee, C. D. (1983). Final report of project, "Epidemiology and forecasting of Groundnut rust in Marathwada region". Final report of research project.