



Research Article

REPORT ON EARLY OCCURRENCE OF CHRYSANTHEMUM WHITE RUST (*Puccinia horiana* henn.)

THAKUR NEELAM^{*1}, SRIRAM S.², NAIR SUJATHA A.³, KUMAR RAJIV⁴ AND SANGMA DONALD⁵

¹Division of Floriculture and Medicinal Crops, ICAR-Indian Institute of Horticultural Research, Bengaluru, 560089, India

²Division of Plant Pathology, ICAR-Indian Institute of Horticultural Research, Bengaluru, 560089, India.

^{3,4}Division of Floriculture and Medicinal Crops, ICAR-Indian Institute of Horticultural Research, Bengaluru, 560089, India

⁵Division of Fruit Crops, ICAR-Indian Institute of Horticultural Research, Bengaluru, 560089, India

*Corresponding Author: Email-neelamthakur71@gmail.com

Received: December 14, 2016; Revised: January 09, 2017; Accepted: January 10, 2017; Published: January 18, 2017

Abstract- In Indian scenario, chrysanthemum white rust is an emerging disease which is reported during 2014-15 in Bengaluru, India. The occurrence of this disease coincides with post-monsoon season followed by winter spell. In this paper, we are reporting occurrence of this disease during monsoon season which indicates white rust pathogen is becoming adaptable to wider range of weather conditions. This occurrence is correlated with the prevailing weather conditions during same period. We found that due to intermittent rains in monsoon, the temperature falls down and become favorable for white rust initiation. Popular variety of chrysanthemum among farmer of called 'Marigold' was found severely infected with white rust.

Keywords- Chrysanthemum, White Rust, Survey, Monsoon

Citation: Thakur Neelam, et al., (2017) Report on Early Occurrence of Chrysanthemum White Rust (*Puccinia horiana* Henn.). International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 9, Issue 3, pp.-3686-3687.

Copyright: Copyright©2017 Thakur Neelam, et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Academic Editor / Reviewer: Shaili Kumari

Introduction

A number of diseases and pests are constraints in the quality production of chrysanthemum and they severely damage the plants at various stages of growth. Chrysanthemum white rust, caused by *Puccinia horiana* Hennings is one of the most destructive fungal diseases of chrysanthemum.

In India, chrysanthemum white rust is an emerging disease. Occurrence of this rust disease has been recently documented [1]. This rust disease was noticed in and around Bengaluru, Karnataka and in Udagamandalam, Tamil Nadu since 2012, with a renewed occurrence in 2014. Severe incidence of this disease coincides with the post-monsoon season followed by the winter spell (October to December). In this study, we have reported early occurrence of white rust in and around Bengaluru (Bidadi, Ivarkandapura and Shivkote) in July end and first week of August, 2016. The total rainfall during last week of July, 2016 (26-31 July) was 140.4mm and the mean minimum and maximum temperatures recorded during last week of July and first week of August were 19.86°C and 29.14°C (ranged 18°C to 24°C) and 21.29°C to 27.86°C (ranged 19°C to 23°C) respectively. Farmer's fields were severely infested with chrysanthemum white rust, caused by *Puccinia horiana*. The probable reasons for occurrence of this disease are weather conditions prevailed during that period which are conducive for growth and sporulation of the pathogen and, to some extent, plant material used for propagation purposes originating from infected areas like Tamil Nadu. The infected material may carry *P. horiana* as teliospores in pustules or as mycelium.

This survey was carried out in farmer's fields during last week of July, 2016 with popular chrysanthemum variety 'Marigold'. Plants in farmer's field were examined for symptoms and 0 to 3 disease rating scale [2] was used to record the severity of the chrysanthemum white rust where 0=no infection, 1=fewer than five pustules per plants, 2=five to 100 pustules per plant, 3=more than 100 pustules per plants and two or more leaves with coalesced over at least 75% of the leaf area. Majority of plant population were categorized in disease rating scale 3 where more than 100 pustules per plants and two or more leaves with coalesced over at least 75%

of the leaf area were reported.

The first symptoms of white rust were yellow spots on upper leaf surfaces, with 4 mm diameter. Subsequently, developments of prominent pustules on the lower surface of leaves were recorded. Pustules were pinkish or buff coloured at first, and turned to waxy white when matured. Later they became sunken and necrotic lesions. Severely infected leaves dry up and hang along the stem.



Fig-1 Chrysanthemum rooted cuttings infected with *P. horiana*



Fig-2 Chrysanthemum field infested with *P. horiana*.

New infections were initiated by basidiospores released from pustules during periods of high relative humidity (96-100%) when temperature was between 4°C and 23°C (optimum 17°C). The spores landed on plant surface can germinate and penetrate within two hours at optimum temperatures (15°C to 20°C). A thin film of free water is required for infection. For 5 to 14 days post infection, the fungus grows within the plant as a latent infection, after which chlorotic spots, and ultimately pustules appear. Teliospores produced in pustules remain attached to leaves, germinating in place to produce the next generation of basidiospores when conditions of temperature and humidity are favorable [3].

Conclusion

The chrysanthemum white rust is an emerging and destructive disease in India. The occurrence and severity of the disease can be minimized by using disease free planting material, resistant varieties, following proper cultural practices and plant protection through chemical methods. The early incidence of white rust during monsoon season indicates the adaptability of this fungus to wider range of weather conditions. White rust occurrence was noticed only during cold spell preceded by monsoon and its occurrence during the period of intermittent rains coupled with few days having low night temperature implies that the pathogen is capable of surviving in field and its ability to build up the population quickly in the presence of suitable host. This will lead to substantial loss in crop yield. Therefore, there is a need to identify tolerant high yielding varieties so those growers get better economic return.

Acknowledgement

The authors acknowledge the facilities provided by the Director, ICAR-Indian Institute of Horticultural Research, Bengaluru for conducting this study.

Author contributions

1. Neelam Thakur: Survey of farmers field, disease scoring, reference collection and paper writing
2. S. Sriram: Guidance on pathological aspects and editing of manuscript
3. Sujatha A. Nair: Guidance on horticultural aspects of the crop and editing of manuscript
4. Rajiv Kumar: Guidance on horticultural aspects of the crop and editing of manuscript
5. Donald Sangma: Assistance in survey of farmers field and documentation

Abbreviations

mm= millimeter

°C=degree centigrade

%=percentage

EFSA=European Food Safety Authority

Ethical approval: We assured that this article does not contain any studies with human participants or animals performed by any of the authors.

Conflict of Interest: None declared

References

- [1] Sriram S., Chandran N.K., Kumar R., Krishnareddy M. (2015) *New Disease Reports*, 32, 8.
- [2] Bonde M.R., Peterson G.L., Rizvi S.A., Smilanick J.L. (1995) *Plant Diseases*, 79, 500-505.
- [3] EFSA Panel on Plant Health (PLH). (2013) *EFSA Journal*, 11(1), 3069.