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Survey for the natural occurrence of white rust disease of rapeseed-mustard in agro-climatic zone-I of Bihar

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Abstract
A roving survey was conducted during *Rabi* 2020-21 and *Rabi* 2021-22 seasons to observe natural occurrence of white rust disease of rapeseed-mustard caused by *Albugo candida* Kuntze prevailing in Agro- Climatic Zone-I of Bihar *viz.* Muzaffarpur, Samastipur, Darbhanga and Vaishali district. The presence of incidence of the disease in all the places were observed during survey and differed across the surveyed areas because of the prevailing congenial environmental conditions and pathogen factors. The white rust incidence were varied between 15.5 to 20.3%. It was found that the mean per cent disease incidence was maximum in the district of Muzaffarpur (20.3%) and minimum in the district of Vaishali (15.5%). From survey report, it had been concluded that in previous years white rust disease was considered as minor disease but due to changing climate it was prevailing in all the areas in Agro-climatic Zone- I conditions and the incidence of the disease was increasing with time in Bihar.

Keywords: White rust, *Albugo candida*, rapeseed-mustard, survey

Introduction
The most significant oilseed crop in India are Rapeseed-mustard. Rapeseed-Mustard are globally known as "Oilseed brassica", which holds the status of the third most important oilseed crop after soyabean and palm. Total area, production and yield of rapeseed-mustard in world during 2019-20 was 35.95 million hectares (mha), 71.49 million tonnes (mt) and 1990 kg/ha, respectively. Globally, India continues to be rank 2nd after Canada in acreage (19.81%) and rank 4th after Canada, European Union and China in production (10.37%) (Anonymous, 2021).

It is grown all over India in both tropical and subtropical regions covering 6.86 m ha of area producing 9.12 mt with 1331 kg/ha average productivity. Rapeseed and mustard are known by several names throughout India, including sarson, rai or raya, toria or lahi. Sarson and Toria are typically thought of as rape seeds, whereas Rai, Raya, or Laha is thought of as mustard. The Indian mustard *Brassica juncea*is a plant that is grown in India and other countries primarily with the aim ofproducing edible oil. It is also used as a fodder crop for cattle and as a condiment and spice for enhancing food flavour. The oil is primarily consumed by people directly. Due to the ongoing rise in demand of the edible oils and their products, the global production of rapeseed mustard has been rising rapidly in a number of nations (Chahan and Kumar 2005) [3]. Rapeseed mustard crops are primarily planted in India during the *Rabi*season from September to November and are harvested from February to March. A reasonable temperature of 21 to 25^{0}C is necessary for crop (Ahlawat, 2010) [2]. It is particularly suited to rainfed agricultural systems because of its low water requirement i.e. 240–400 mm (nearly 70% area). It is one of the extremely important *Rabi* oilseed crops in India, second only to groundnuts in terms of output and area, and it provides fats to the majority of the population living in the states of Uttar Pradesh, Punjab, Rajasthan, Madhya Pradesh, Bihar, Orissa, West Bengal, and Assam. Major mustard growing states of the country are Rajasthan (46.06%), Haryana (12.60%), Madhya Pradesh (11.38%), Uttar Pradesh (10.49%), West Bengal (7.81%), Gujarat (3.66%), Jharkhand (2.54%), Assam (1.94%), Bihar (0.98%) and Punjab (0.50%) (Anonymous, 2019-2020).

White rust (*Albugo candida* Kuntze), Alternaria blight (*Alternaria brassicae* (Berk.) Sacc.), Sclerotinia stem rot (*Sclerotinia sclerotiorum* (Lib.) de Bary), Downy mildew (*Pernospora*

parasitica (Pers.) de Bary) and Powdery mildew (*Erysiphe cruciferarum* Opiz) are important diseases which have a negative impact on crop productivity in the area. White rust pathogen is one of the damaging fungi, and it severely hinders the production of oilseed brassicas. The fungus not only lowers production by causing foliar damage of crop, but it also drastically reduces both seed (siliqua) as well as oil yield by harming siliqua during the pod-formation stage. Hence, a roving survey was conducted during *Rabi* 2020-21 and *Rabi* 2021-22 seasons to observe natural occurrence of white rust disease prevailing in Agro- Climatic Zone-I of Bihar *viz.* Muzaffarpur, Samastipur, Darbhanga and Vaishali district of Bihar to observed the prevalence of the incidence of disease across the surveyed areas in changing climatic conditions.

Materials and Methods

Field survey of rapeseed-mustard growing areas of Zone- I districts of Bihar *viz*., Samastipur, Muzaffarpur, Vaishali, and Darbhanga was conducted during *Rabi* 2020-21 and *Rabi* 2021-22 to ascertain the status of white rust disease in mustard. The disease incidence were recorded from the appearance of disease symptoms. White rust symptoms were checked on randomly chosen infected plants from each field by using quadrant rule ($5m^2$ quadrant, five plots were selected). The number of normal and diseased plants exhibiting the recognizable symptoms was counted. Using the formula provided by Chester (1950) [8], the per cent disease incidence was calculated, as shown below.

$$\text{Disease incidence} = \frac{\text{Total number of diseased plants}}{\text{Total number of plants counted}} \times 100$$

Results and Discussion

A roving survey was conducted in *Rabi* 2020-21 and *Rabi* 2021-22 in adjacent districts of RPCAU *viz.* Samastipur, Muzaffarpur, Vaishali and Darbhanga where oilseed brassicas are grown on large scale.

Table 1: Survey for natural occurrence of White Rust Disease of Rapeseed-Mustard in *Rabi* 2020-21 and *Rabi* 2021-22 in Different Districts of Agro- Climatic Zone-I of Bihar

Sl. No	Districts	Villages of Agro- Climatic Zone-I	Disease incidence (%)			
			Rabi 2020-21	Mean	*Rabi* 2021-22	Mean
1	Samastipur	Pusa Farm	11.1	9.62	22.2	18.50
		Birauli	8.8		17.5	
		Morsand	8.5		15.8	
		Manjhaul	10.0		18.0	
		Hasanpur	9.7		19.0	
2	Muzaffarpur	Dholi	16.6	11.02	24.0	20.34
		Dubaha	9.8		16.0	
		Bahadur	8.7		21.6	
		Dhobauli Sube	7.5		19.0	
		Rohua	12.5		21.0	
3	Vaishali	Hariharpur	4.8	6.40	11.1	15.50
		Patepur	5.5		16.0	
		Bahuara	9.2		17.1	
		Mahua	6.4		18.4	
		Malpur	6.1		15.0	
4	Darbhanga	Jale	10.1	7.54	17.5	16.34
		Madhopatti	8.5		16.5	
		Bahadurpur	6.4		12.2	
		Mohammadpur	5.5		12.1	
		Hayaghat	7.2		14.6	

During field survey, disease incidence was recorded and it was observed that the disease incidence differed across all of the surveyed areas because of the prevailing congenial environmental conditions and aggressive pathogen factors. The data on disease incidence of white rust disease caused by *Albugo candida* from various regions are presented in the table 1. From the data it is clear that the disease incidence varied between 6.40 -11.02 per cent during *Rabi* 2020-21 and 15.50 – 20.34% during *Rabi* 2021-22. It was found that the mean per cent disease incidence was maximum in the district of Muzaffarpur (11.02 and 20.34%) and minimum in the district of Vaishali (6.40 and 15.50%) respectively during both the seasons. Highest incidence of 16.6 and 24.0% respectively was recorded from the Dholi region of Muzaffarpur district followed by Pusa Farm of Samastipur district where it was 11.1 and 22.2% respectively during *Rabi* 2020-21 and *Rabi* 2021-22 cropping season. The lowest incidence (4.80 and 11.1%) was recorded from the Hariharpur of Vaishali district followed by 5.5 and 12.1% in Mohammadpur of Darbhanga during the study year respectively. Similar results with the present investigations had been described by other researchers also, (Kolte and Tewari, 1980; Kolte, 1982) [4, 5] who found the disease showing up on rapeseed and mustard crops in India in varied amounts. Ghasolia *et al.* (2004) [4] reported the similar outcomes that the white rust disease incidence vary from place to place and time to time in different areas of Rajasthan and found diseaseincidence between 40-60% in some districts, 20-39% in other districts and less than 20% in other districts. Yadav *et al.* (2018) [7] also found the similar results in survey that the disease intensity vary among all the surveyed areas and found in range of 19.76-32.79% in different areas of Madhya Pradesh.

Conclusion

During roving survey conducted in *Rabi* 2020-21 and *Rabi* 2021-22 in adjacent districts of RPCAU *viz.* Muzaffarpur, Samastipur, Darbhanga and Vaishali where oilseed brassicas

were grown, disease incidence was recorded and it was observed that the incidence of the diseasediffered across all of the surveyed areas because of the prevailing congenial environmental conditions and aggressive pathogen factors. The disease incidence varied between 6.40-11.02 during *Rabi* 2020-21 and 15.50 - 20.34% during *Rabi* 2021-22. The mean per cent disease incidence was maximum in the district Muzaffarpur (11.02 and 20.34%) and minimum in the district of Vaishali (6.40 and 15.50%) during both the seasons.

References

1. Anonymous. Project Coordinator's Report (2020-21) presented in 28th Annual AIRCP (R&M) Group Meeting Through Video-Conference at ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur, Rajasthan (August 06-07, 2021); c2021.
2. Ahlawat IPS. Rapeseed and Mustard. A Report. In: Agronomy- Rabi crops. Division of Agronomy. IARI. New Delhi; c2010. p. 1-26.
3. Chahan JS, Kumar A. Status and future thrust area of rapeseed-mustard research in India. Indian J Agric Sci. 2005;75:102-103.
4. Ghasolia RP, Shivpuri A, Bhargava AK. Sclerotinia rot of Indian mustard in Rajasthan. Indian Phytopathol. 2004;57(1):76-79.
5. Kolte SJ. Diseases of rai and toria. Indian Farming. 1982;32:91-93.
6. Kolte SJ, Tewari AN. Note on the susceptibility of certain oleiferous Brassicae to downy mildew and white blister diseases. Indian J Mycol Plant Pathol. 1980;10(2):191-192.
7. Yadav R, Singh P, Sandhu PS, Pant U, Avtar R, Radhamani J, et al. Identification and evaluation of Indian mustard genotypes for white rust resistance and agronomic performance. Indian J Genet Plant Breed. 2018;78(1):81-89.
8. Chester W. II. The propagation of sound waves in an open-ended channel. The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science. 1950 Jan 1;41(312):11-33.