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Preliminary evaluation of incidence and severity of powdery mildew and rust disease of garden pea (*Pisum sativum* L.) in Allahabad

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Abstract

Survey was conducted in different villages of Allahabad for powdery mildew and rust disease severity. During survey, maximum powdery mildew severity (32.77) was observed in Koraon, followed by Kaundhiyara (30.21), Karchhana (29.52), Manda (28.76), Meja (28.07), Chaka (26.12), Manda (28.76) and Shankargarh (24.16). Powdery mildew disease severity was found to be least in Jasra (23.31). Similarly, maximum rust severity was observed in Karchhana (45.31) followed by Kaundhiyara (43.98), Jasra (36.73), Chaka (35.13), Shankargarh (34.64), Manda (34.33), Meja (29.84) and Koraon (27.11). Rust disease index was found to be least in Urwan (25.79).

Key words: disease severity, pea, powdery mildew, rust.

Introduction

Pea is a valuable vegetable crop all over the world. Major green peas producing states in India are Karnataka, Madhya Pradesh, Rajasthan, West Bengal, Assam, Himachal Pradesh, Uttar Pradesh, Bihar, Haryana and Punjab. However, Uttar Pradesh accounts for 70 per cent of the total pea production in India (Indiastat, 2014) [3]. The area under pea in Uttar Pradesh during the year 2014-15, the area was 22.15 thousand hectares with production 228 thousand tonnes. Among the various diseases of pea, Powdery mildew caused by *Erysiphe pisi* and rust caused by *Uromyces fabae* are two major diseases causing severe loss with in short period of time. In years of epidemics, affected leaves dry up and fall off, and pods remain undeveloped, which consequently results in yield losses of higher than 30% (EPPO, 2012) [2]. When both diseases occur together, there is a severe damage to leaves and pods resulting in heavy loss of yield ranging from 50 to 100 % (Janila *et al.*, 2001) [4].

The survey carried out in the districts viz., Farrukhabad, Kanpur and Hamirpur of Uttar Pradesh indicated that mung bean and urd bean were found to be naturally infected by several leaf infecting fungi including *Erysiphe pisi* (Saxena and Gupta, 1981) [6]. Survey of different localities in Uttarakhand and Uttar Pradesh for prevalence of pea rust was done during 2013-2014 and 2014-2015. The data revealed that per cent disease severity was ranged from 37.50 to 90.00 and 1.28 to 7.37. Disease incidence was highest in Rampur district of Uttar Pradesh whereas maximum disease severity was observed in Udham Singh Nagar district of Uttarakhand (Upadhyay *et al.*, 2016) [7].

Roving surveys were conducted and the observation on diseases severity, stage of the crop and variety were recorded. Observations on powdery mildew disease were recorded on randomly selected plants from the bottom, middle and top leaves. Disease intensity was recorded on a 0-9 disease rating scale (Mayee and Datar, 1986) [5] and per cent disease incidence (PDI) was calculated as per Wheeler (1969) [9].

Maximum mean per cent disease incidence (PDI) for powdery mildew of pea was observed in Meja taluka (28.86) followed by Karchhana (28.61), whereas minimum per cent disease incidence was noticed in Bara (23.73).

In Meja taluka, maximum disease severity was observed in Manda village (42.25) followed by Allava village (41.58) of Koraon block, Gohani (36.54), Lakhanpur village (36.51) of Meja block, Hulka village (35.62) and Chakdiha village (33.65) of Manda block. Minimum severity was recorded in Bharari (15.96) of Manda block, followed by Unaur (17.18) of Urwa block and Bari village (17.81) of Meja block.

In Karchhana taluka, maximum disease severity was observed in Barsawal village (40.62) followed by Tikari village (38.58) of Kaundhiyara block, Arai village (32.86) of Karchhana

block, Lakhrawan village (30.56) of Karchhana block, Nayapura village (30.25), Akodha village (28.37) of Karchhana block and Kaitha village (26.42) of Kaundhiyara block. Minimum severity was recorded in Panwar village (15.25) of Kaundhiyara block, followed by Baswari (23.68) and Dadri (24.75) of Chaka block, Semra (25.80) of Chaka block and Lohari village (26.32) of Karchhana block.

In Bara taluka, maximum disease severity was recorded in Badhaiya (30.25) followed by Bajjala village (25.56) of Jasra block and Kapari village (25.26) of Shankargarh. Minimum severity was observed in Newariya village (20.50) followed by Amilia tahar village (20.65) of Shankargarh block and Antarsuiya village (20.87) of Jasra block.

Among all blocks, maximum powdery mildew severity was observed in Koraon (32.77), followed by Kaundhiyara (30.21), Karchhana (29.52), Manda (28.76), Meja (28.07) and Chaka (26.12). Powdery mildew disease incidence was found to be least in Jasra (23.31) followed by Shankargarh (24.16) and Manda (28.91).

The variation of disease severity in various localities is mainly attributed to the climatic factors like temperature, relative humidity and distribution of rain fall followed by cultural practices like sanitation and other suitable management practices. Maximum disease severity was recorded in pea crop of Manda village which was affected due to warm weather with higher relative humidity.

Maximum mean per cent disease incidence (PDI) for rust of pea was observed in Karchhana taluka (41.47) followed by Bara (35.68), whereas minimum per cent disease incidence was noticed in Meja (29.26).

In Karchhana taluka, maximum disease severity was observed in Panwar village (56.25) followed by Barsawal village (51.00) of Kaundhiyara block, Akodha (50.56), Arai village

(48.62) of Karchhana block, Lakhrawan village (46.92) and Kaitha village (43.68) of Kaundhiyara block. Minimum severity was recorded in Tikari (25.00) of Kaundhiyara block, followed by Dadri (26.23) of Chaka block and Baswari village (30.56) of Chaka block.

In Bara taluka, maximum disease severity was observed in Amilia tahar village (40.26) followed by Asarwai village (38.70) Jasra block, Newariya village (36.96) of Shankargarh block, Bajjala village (36.75) of Jasra block, Antersuiya (35.84) of Jasra block, Badhaiya village (35.76) and Basahara tahar village (35.65) of Jasra block. Minimum severity was recorded in Kapari village (25.60) of Shankargarh block.

In Meja taluka, maximum disease severity was recorded in Manda (46.53) followed by Rajapur village (39.85) of Manda block and Baghol village (36.47) of Koraon block, Khanpur village (36.32), Kangada village (36.23), Bashara village (32.85) and Lakhanpur village (30.49) of Meja block. Minimum severity was observed in Gohani village (15.60) followed by Unaur village (16.52) of Urwa block and Chakdiha village (22.59) of Manda block.

Among all blocks, maximum rust severity was observed in Karchhana (45.31), followed by Kaundhiyara (43.98), Jasra (36.73), Chaka (35.13), Shankargarh (34.64) and Manda (34.33). Rust disease incidence was found to be least in Urwa (25.79) followed by Koraon (27.11) and Meja (29.84).

The variation of disease severity in various localities is mainly attributed to the climatic factors like temperature, relative humidity and distribution of rain fall followed by cultural practices like sanitation and other suitable management practices. Maximum disease severity was recorded in pea crop of Barswal village which was affected due to warm weather with higher relative humidity (El-Kazzaz *et al.*, 1990 and Wani *et al.*, 2003) ^[1, 8].

Detailed survey for the powdery mildew and rust disease of Pea in Allahabad district of Uttar Pradesh.

District	Taluka	Block	Village	Variety	PDI for powdery mildew	PDI for rust		
Allahabad	Bara	Jasra	Antarsuiya	Arkel	20.87	35.84		
			Asarwai	Arkel	21.98	38.70		
			Bajjala	Anupama	25.56	36.75		
			Basahara tahar	-	24.86	35.65		
		23.31					36.73	
		Shankargarh	Amilia tarhar	Rachna	20.65	40.26		
			Kapari	Rachna	25.26	25.60		
			Newariya	-	20.50	36.96		
			Badhaiya		30.25	35.76		
			24.16					34.64
		Karchhana	Chaka	Nayapura	-	30.25	43.50	
				Semra	-	25.80	40.25	
				Dadri	Indra	24.75	26.23	
				Baswari	Arkel	23.68	30.56	
	26.12					35.13		
	Kaundhiyara		Tikari	Anupama	38.58	25.00		
			Barswal	B-22	40.62	51.00		
			Panwar	-	15.25	56.25		
			Kaitha	B-22	26.42	43.68		
			30.21					43.98
	Karchhana		Akodha	Indra	28.37	50.56		
			Arai	-	32.86	48.62		
			Lakhrawan	Anupma	30.56	46.92		
			Lohari	-	26.32	35.14		
			29.52					45.31
	Meja		Koraon	Allava	Anupama	41.58	23.52	
		Baghol		Anupama	29.74	36.47		
		bashara		-	23.25	32.85		
		Gohani		-	36.54	15.60		
		32.77					27.11	
Urwa		Kangada	Indra	25.98	36.23			

			Shukulpur	-	24.67	23.76
			Hulka	Indra	35.62	26.65
			Unaur	-	17.18	16.52
			25.86			25.79
		Manda	Bharari	-	15.96	28.35
			Manda	Malviya matar	42.25	46.53
			Rajapur	Malviya matar	23.19	39.85
			Chakdiha	-	33.65	22.59
		28.76			34.33	
		Meja	Khanpur	-	32.36	36.32
			Soraon	Anupama	25.63	26.96
			Lakhanpur	Indra	36.51	30.49
			Bari	-	17.81	25.62
		28.07			29.84	

PDI- Per cent Disease Incidence

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