



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2019; 8(6): 2275-2277  
Received: 01-09-2019  
Accepted: 05-10-2019

**Tushar Mishra**  
Department of Plant Pathology,  
IGKV, Raipur, Chhattisgarh,  
India

**SS Shirsole**  
Department of Plant Pathology,  
IGKV, Raipur, Chhattisgarh,  
India

**N Khare**  
Department of Plant Pathology,  
IGKV, Raipur, Chhattisgarh,  
India

**N Lakpale**  
Department of Plant Pathology,  
IGKV, Raipur, Chhattisgarh,  
India

**Corresponding Author:**  
**Tushar Mishra**  
Department of Plant Pathology,  
IGKV, Raipur, Chhattisgarh,  
India

## Evaluation of field pea varieties/entries against powdery mildew under field conditions

**Tushar Mishra, SS Shirsole, N Khare and N Lakpale**

### Abstract

The present study was carried out during *Rabi* 2009-2010 at the horticultural farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G) to evaluate nine treatments (Nine varieties/entries of Pea VP-215, PMR-53, VRPMR-11, ARKA-AZEET, IP-3, KS-210, KS-205, VP-434 and VP-433) of Pea for yield potential against Powdery mildew. The maximum powdery mildew severity was observed in pea variety KS-210 (78.75%) followed by KS-205 (77.50%), both of which were on par with each other. Minimum powdery mildew severity was observed in variety ARKA-AZEET (15.00) followed by VRPMR-11 (20.00%), PMR-53 (21.25%) and VP-215 (22.50%). Out of nine varieties/entries of Pea, three entries and one variety was found moderately resistant (MR), two entries were found moderately susceptible (MS), one entries was found susceptible (S), and two entries were found highly susceptible (HS).

**Keywords:** Powdery mildew severity, entries/varieties and screening

### Introduction

Pea (*Pisum sativum* L.) is an important pulse as well as vegetable crop (*Trebuchet et al.*, 1953) [6] having growing season of at least five months duration. Pea occupies a position of considerable importance because of its palatability in the form of vegetable curry along with other vegetables and also widely used as pulses in daily diet. It contains a high percent of digestible protein (7.2g/100g) of edible portion and good content of vitamins, like vitamins A (139 IU), vitamins B (0.25mg/100g) and vitamins C (9mg/100gm). It is also very rich in minerals like phosphorus (139mg/100g), magnesium (34mg/100gm) and Iron (1.5mg/100gm) (Choudhary 1967). It is an excellent food source used either as a vegetable or soup or canned, frozen or dehydrated and pea straw is a nutritious fodder (Aykroyd, 1963) [2]. The crop is vulnerable to a large number of diseases, such as powdery mildew (*Erysiphe pisi*), Ascochyta blight (*Ascochyta* spp.), bacterial blight (*Pseudomonas syringae* pv. *syringae*), white rot (*Sclerotinia sclerotiorum*) and pea rust (*Uromyces pisi*). Of these, Powdery mildew poses a continuous threat to its successful cultivation in crop growing areas of the Chhattisgarh state. Powdery mildew is a fast spreading disease of Pea. It causes significant losses in yield where ever the crop is grown under favorable environmental conditions. In a crop badly affected by powdery mildew, the reduction in number of pod plant<sup>-1</sup> is estimated to be 28.6% (Rathi and Tripathi, 1994) [5]. The disease also reduces quality of harvested green pea crops, adversely affecting tenderometer values, flavour and appearance of peas for canning or freezing (Gritton and Ebert, 1975) [4]. The disease has been reported to be managed by fungicide application (Bhardwaj and Sharma, 1984) [3] but the genetic resistance is regarded, the only practicable and cost-effective control for such a fast growing disease, Therefore, the present study was conducted to screen out Pea entries/varieties against *E. pisi*.

### Material and Methods

The field experiment was conducted during *Rabi* 2009-2010 at the horticultural farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G). A randomized block design consisting of nine treatments (nine varieties of Pea VP-215, PMR-53, VRPMR-11, ARKA-AZEET, IP-3, KS-210, KS-205, VP-434 and VP-433) replicated four times with a plot size of 5m X 1.50m was adopted. All nine varieties were sown on 5<sup>th</sup> November, 2009 with proper spacing. The rows were spaced at 30 cm and plants were spaced at 20cm a part. Standard agronomic practices were followed to raise the crop. The observations were recorded on eleven yield contributing characters namely, Plant Population, Plant Height, Number of Branches, Length of pods, Pods per plant, Grains per pods, Grains weight per plant, Test weight (100 seed weight) Days to first flowering and Days to 50% flowering.

The screening was undertaken to assess the reaction of field pea varieties/entries against *Erysiphe pisi* under field condition in order to locate the resistant varieties for crop improvement programme. Observations were taken at seven

days intervals with first incidence of powdery mildew. Zero to five scales was used for rating of powdery mildew (Anonymous, 1999) [1].

**Table 1:** Yield contributed characters of different varieties and powdery mildew reaction

Treatment	Plant population	Plant height (cm)	Branches plant <sup>-1</sup>	Length of pod (cm)	Pods Plant <sup>-1</sup>	Grains Pod <sup>-1</sup>	Grain wt Plant <sup>-1</sup> (gm)	100-seed weight (gm)	Days to first flowering	Days to 50% flowering	Powdery Mildew Severity %
VP-434	127.50	78.86	2.30	7.96	6.2	5.3	1.73	34.41	48.50	54.25	38.75 (38.49)
KS-205	110.75	76.13	2.10	8.06	6.0	6.2	2.08	33.44	46.25	51	77.50 (61.68)
KS-210	124.75	74.06	1.93	8.35	5.8	6.4	1.90	36.73	45.00	50.5	78.75 (62.54)
VP-433	131.25	78.45	2.20	7.90	5.9	5.3	1.75	32.86	48.25	61	35.00 (36.27)
IP-3	137.75	79.25	2.35	6.00	7.0	4.2	1.30	29.74	44.25	50	62.50 (52.23)
ARKA-AZEET	133.75	86.75	2.90	8.10	9.8	5.4	1.72	41.22	46.25	54.25	15.00 (22.78)
VRPMR-11	126.25	82.50	2.70	6.42	6.9	5.3	1.56	39.16	53.75	61	20.00 (26.56)
PMR-53	105.25	80.56	2.60	6.95	7.1	4.5	1.27	36.18	48.00	53.25	21.25 (27.45)
VP-215	119.00	79.75	2.40	6.39	7.5	4.4	1.24	34.09	46.25	54.25	22.50 (28.31)
S.Em±	10.12	2.05	0.16	0.25	0.16	0.15	0.059	1.03	1.27	1.35	1.24
CD at 5%	29.55	5.98	0.47	0.75	0.48	0.45	0.171	3.01	3.72	3.95	3.63

\* Average of three replication

\*\* Figure in the parentheses are transformed values

**Table 2:** 0-5 scale, of powdery mildew disease scoring

Score	Percent disease infection	Reaction
0	0	Highly resistant
1	1-10	Resistant
2	10.1 – 25	Moderately resistant
3	25.1- 50	Moderately susceptible
4	50.1-75	Susceptible
5	75.1- above	Highly susceptible

To find out the disease pressure in the experimental area, location severity index (LSI) was calculated by using the formula given below:

$$LSI = \frac{\sum X}{\text{Total number of entries (varieties)}}$$

Where,  $\sum X = \sum (\text{Score} \times \text{No. of varieties of each score})$

## Result and Discussion

### Assessment of yield contributing characters of different pea varieties and powdery mildew reaction

Comparative yield contributing characters study was conducted during *Rabi* 2009-10 considering 9 cultivars evaluated against powdery mildew of field pea as per the disease screening norms and the results obtained have been presented in table.

### Yield contributing characters

#### Plant population

The plant population of nine pea varieties is presented in Table 1. Maximum plant population was recorded in variety IP-3 (137.75) followed by ARKA AZEET (133.75), VP-433 (131.25), VP-434 (127.50), VRPMR-11 (126.25), KS-210 (124.75), VP-215 (119.00) and KS-205 (110.75). The lowest plant population was recorded in variety PMA-53 *i.e.* 105.25.

#### Plant height

The plant height was recorded for nine varieties which ranged from 74.06 cm. to 86.75 cm. The result revealed that the maximum plant height was recorded in variety ARKA-

AZEET (86.75 cm.) followed by VRPMR-11 (82.50 cm.), PMR-53 (80.56 cm.), VP-215 (79.75 cm.), IP-3 (79.25 cm.), VP-434 (78.86 cm.), VP-433 (78.45) and KS-205 (76.13). The lowest plant height (74.06 cm.) was noted in variety KS-210.

#### Number of branches per plant

The number of branches per plant recorded in different varieties is presented in Table1. The mean number of branches per plant ranged from 1.93 to 2.90. The maximum number of branches per plant (2.90) was found in variety ARKA-AZEET followed by VRPMR-11 (2.70), PMR-53 (2.60) and VP-215 (2.40). The minimum number of branches per plant (1.93) was counted in variety KS-210.

#### Length of pods

The length of pod varied from 6.00 to 8.10 cm. The maximum length of pods (8.10 cm.) was noted in variety ARKA-AZEET followed by KS-210 (8.35 cm), KS-205 (8.06 cm.), VP-434 (7.96 cm), and VP-433 (7.90 cm), where as the minimum length of pods (6.00 cm) was noted in variety IP-3.

#### Pods per plants

The mean number of pods per plant ranged from 5.8 to 9.8. The maximum number of pods per plant (9.8) was found in variety ARKA-AZEET followed by VP-215 (7.5), PMR-53 (7.1) and IP-3 (7.0). The minimum number of pods per plant (5.8) was counted in variety KS-210.

#### Grains per pod

The grains per pod varied from 4.2 to 6.4. The maximum grains per pods (6.4) was noted in variety KS-210 followed by KS-205 (6.2.), ARKA-AZEET (5.4), VRPMR-11 (5.3) and VP-434 (5.3.), where as the minimum grains per pods (4.2.) was noted in variety IP-3.

#### Grain weight per plant

The mean of grain weight per plant ranged from 1.24 to 2.08. The maximum grain yield per plant (2.08) was found in variety KS-205 followed by KS-210 (1.90), VP-433 (1.75) and VP-434 (1.73). The minimum grain yield per plant (1.24) was counted in variety VP-215.

**100 seed weight**

ARKA-AZEET has the highest 100 seed weight (41.22 g) followed by VRPMR-11 (39.16 g), KS-210 (36.73 g), PMR-53 (36.18 g) and VP-434 (34.41 g). The minimum 100 seed was weighted in variety IP-3 (29.74 g).

**Days to first flowering**

The minimum days to first flowering were recorded in variety IP-3 and 44.25 *i.e.* 50 days after sowing where as the maximum number of days to first flowering was recorded in variety VRPMR-11 *i.e.* 53.75 days after sowing.

**Days to 50% flowering**

The minimum days to 50% flowering were recorded in variety IP-3 and KS-210 *i.e.* 50 days after sowing where as the maximum number of days to 50% flowering was recorded in variety VRPMR-11 *i.e.* 61 days.

**Powdery mildew severity**

It is evident from the data presented in Table 1 that, the maximum powdery mildew severity was observed in pea variety KS-210 (78.75%) followed by KS-205 (77.50%), both of which were on par with each other. Minimum powdery mildew severity was observed in variety ARKA-AZEET (15.00) followed by VRPMR-11 (20.00%), PMR-53 (21.25%) and VP-215 (22.50%). Out of nine varieties/entries of Pea, three entries and one variety was found moderately resistant (MR), two entries were found moderately susceptible (MS), one entry was found susceptible (S), and two entries were found highly susceptible (HS). The location severity index (LSI) was 2.1 which proved that disease pressure was moderate. Resistance and susceptibility were readily distinguishable under the prevailing field conditions.

These results suggested that the screened entries/varieties against powdery mildew disease provide information on new resistance varieties as well as good source of resistance that could be further useful to breeders in order to develop improved variety with resistance against powdery mildew required for this region. However, there is need for further evaluation of more numbers of lines against powdery mildew to find more resistant materials for better yield.

**References**

1. Anonymous. Project Co-ordinates Report IIPR. Kanpur (UP), 1999.
2. Aykroyd WR. Indian Council of Medical Research, New Delhi, Special Rept, Ser, 1963, 42.
3. Bhardwaj SS, Sharma SL. Field evaluation of mildewcides against powdery mildew (*Erysiphe polygoni*) on pea (*Pisum sativum*) in Himachal Pradesh. Indian J Mycol. Pl. Path. 1984; 2:103-105.
4. Gritton ET, Ebert RD. Interaction of planting date and powdery mildew on pea plant performance. Journal of American Society of Horticultural Science. 1975; 100:137-142.
5. Rathi AS, Tripathi NN. Assessment of growth reduction and yield losses in pea (*Pisum sativum*) due to powdery mildew disease caused by *E. Polygoni* DC. *Crop Research* (Hissar). 1994; 8:371-376.
6. Trebuchet G, Chopinet R, Drowsy J. Contribution to the study of pea varieties grown in France. Ann Amel Plantes. 1953; 3:147-251.