



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; SP2: 955-956

Subhash Chandra
Department of Plant Pathology,
Narendra Deva University of
Agriculture and Technology
Kumarganj, Faizabad, Uttar
Pradesh, India

Neeraj Kumar Rajvanshi
Department of Plant Pathology,
Narendra Deva University of
Agriculture and Technology
Kumarganj, Faizabad, Uttar
Pradesh, India

Ajay Kumar
Department of Plant Pathology,
Narendra Deva University of
Agriculture and Technology
Kumarganj, Faizabad, Uttar
Pradesh, India

Evaluation of lentil genotypes against *Fusarium oxysporum* f. sp. *Lentis* under artificial epiphytotic condition

Subhash Chandra, Neeraj Kumar Rajvanshi and Ajay Kumar

Abstract

Wilt of lentil is a very destructive disease caused by fungus *Fusarium oxysporum* f. sp. *Lentis*. In India, lentil crop suffers a great loss due to this disease. The use of resistant variety is one of the best methods of disease management. Therefore, studies were planned to search out the genotypes against *Fusarium* wilt through sick plot technique. Keeping this point in view, one hundred fifty genotypes of lentil were tested for the resistance against *Fusarium oxysporum* f. sp. *lentis* in field condition. It is evident from the result presented in table 2 that out of 150 genotypes, 66 genotypes viz.: RLG-109, VL-138, IPL-316, LL-1136, K-75, RLG(105), PL-101, LL-1187, IPL-532, KLB-104, L-4704, IPL-529, LL-1135, KLS-107, IPL-531, DPL-62, IPL-318, SL-28, PLO-98, L-4702, IPL-219, RLG-112, L-4076, LH84-8, HPLC-649, L-1114, L1161, IPL-215, PLO-097, IPL-319, L-4076, DPL-15, IPL-526, IPL-220, VL-142, DL-11-5, IPL-531, KLS-113, VL-143, IPL-325, L-4588, LL-1231, L-4707, PL-129, IPL-325, IPL-324, PL-117, IPL-529, IPL-319, IPL-513, IPL-521, RLG-147, HUL-57, L-4688, L-4147, IPL-315, VL-134, NDL7-402, L-4076, VL-516, RLG-73, IPL-314, VL-133, VL-515, IPL-526, L-4589 and LH07-27 were found resistant, 37 genotypes were found moderately resistant, 34 genotypes were found moderately susceptible, 9 genotypes were found susceptible and 4 genotypes viz.: RVL-48, L-4590, HUL-57 and RLG-109 were found highly susceptible. None of the genotypes was found immune against the disease.

Keywords: Epiphytotic, *Fusarium*, genotypes, resistant.

Introduction

Legumes occupy unique crops in the world by virtue of their high protein content (15-35), carbohydrates, fiber, minerals and nutrients in seeds and it have capability to fix atmospheric nitrogen in symbiotic association with root nodule bacterium (Rhizobium). According to the Indian Council of Medical Research optimum requirement of the pulses for person to maintain his health is 10 µg/days. However not even half of this quantity is available to the people. In India most of the population is primarily vegetarian pulses has a special place in the daily diet about (7-15%) of food grain, of people due to its high protein contents and several uses. India is a major pulse growing country of the world. During 1996-97 pulses occupied 71.4 million hectares of the world with a total production of 57 million tones and average yield of 806 kg/ha. (FAO, 1997), while in India pulses were grown on 1.60 million hectare with the production of 0.94 million tones and average yield 591 kg/ha (Anonymous, 2012) ^[1, 2]. Lentil (*Lens culinaris*) also known as masoor, is one of the important pulse crop after chickpea and pea among Rabi pulses. In India, it is grown 15 lakh/hectare. With production 9.5 tones' and productivity 633.33 kg/ha and mainly grown in U.P., Bihar, M.P. and West Bengal.

In Uttar Pradesh it grown about 0.59 million/hectare with 0.41 million/tones production and productivity 695 kg/hectare (Source Department of Economics 2011-12). Lentil belongs to the order-Rosales, sub orders- Rosneae, family-Leguminaceae and sub family-papilionaceae. In India, it is grown in winter season. Mostly lentil is grown in India as a rain fed crop by marginal farmers in their marginal lands using their local seeds without any input like improved seeds, fertilizers, irrigation and pesticides and consequently economic return is poor. A number of factors are responsible for this low yield. Depredations by diseases are one of them.

The lentil crop is infected by a large number of pathogens such as fungi, bacteria, Virus & nematodes which significantly contribute to poor yields. Among the disease wilt, Anthracnose, Alternaria blight, Ascochyta blight, black root rot, gray mold, rust, powdery mildew and collar rot are important in different part of the country. In this region *Fusarium* wilt caused by *Fusarium oxysporum* f. sp. *lentis*, Rust caused by *Uromyces fabae*, Alternaria blight caused by *Alternaria alternate*, collar rot is caused by *Corticium rofsii* and powdery mildew is caused by *Erysiphe pisi* are widely distributed in Rabi season, The crop suffers heavily due to *Fusarium*

Correspondence

Subhash Chandra
Department of Plant Pathology,
Narendra Deva University of
Agriculture and Technology
Kumarganj, Faizabad, Uttar
Pradesh, India

wilt in the major growing areas resulting into huge production losses by Gorden (1965)^[5] and Grewal (1988)^[6].

Materials and Methods

Seeds of one hundred fifty genotypes of lentil were obtained from the Department of Genetics and Plant Breeding, N.D. University of Agriculture and Technology, Kumarganj, Faizabad (U.P.) and IIPR, Kanpur. The genotypes were screened under artificial epiphytotic conditions (Sick plot technique) and two test entries after one line of susceptible check (L 9-12) are sown. After germination, observation, were recorded regularly up to 24 days for the appearance of wilt symptoms and severity. The disease was recorded using 1-9 scale for the wilt disease of lentil as described in (Table-1).

Table 1: Disease rating scale for *Fusarium* wilt

S. No.	Scale	Description	Disease reaction
1.	1	No symptoms on any plant	Resistant
2.	3	10% or less mortality	Moderately
3.	5	11-20% mortality	Tolerant
4.	7	20-50% mortality	Moderately susceptible
5.	9	51% or more mortality	Susceptible

Results and Discussion

Use of resistant genotypes is the best method of avoiding the occurrence of the disease. Keeping this point in view, one hundred fifty genotypes of lentil were tested for the resistance against *Fusarium oxysporum* f. sp. *lentis* in field condition. It is evident from the result presented in table 2 that out of 150 genotypes, 66 genotypes viz.; RLG-109, VL-138, IPL-316, LL-1136, K-75, RLG(105), PL-101, LL-1187, IPL-532, KLB-104, L-4704, IPL-529, LL-1135, KLS-107, IPL-531, DPL-62, IPL-318, SL-28, PLO-98, L-4702, IPL-219, RLG-112, L-4076, LH84-8, HPLC-649, L-1114, L1161, IPL-215, PLO-097, IPL-319, L-4076, DPL-15, IPL-526, IPL-220, VL-142, DL-11-5, IPL-531, KLS-113, VL-143, IPL-325, L-4588, LL-1231, L-4707, PL-129, IPL-325, IPL-324, PL-117, IPL-529, IPL-319, IPL-513, IPL-521, RLG-147, HUL-57, L-4688, L-4147, IPL-315, VL-134, NDL7-402, L-4076, VL-516, RLG-73, IPL-314, VL-133, VL-515, IPL-526, L-4589 and LH07-27 were found resistant, 37 genotypes were found moderately resistant, 34 genotypes were found moderately susceptible, 9 genotypes were found susceptible and 4 genotypes viz.; RVL-48, L-4590, HUL-57 and RLG-109 were found highly susceptible. None of the genotypes was found immune against the disease. The similar results were also screened by Kaur and Sharma (1993)^[7]. The above findings are similar as described by Khare (1981)^[8], Bhat *et al.*, (2006)^[6] and Bayaa *et al.*, (1997)^[3].

Table 2: Performance of Lentil genotypes against *Fusarium oxysporum* f. sp. *lentis*, under artificial epiphytotic conditions.

Rating scale	Reaction	No. of genotype	Name of genotype
0	Free(Immune)	Nil	Nil
1-2	Resistant	66	RLG-109, VL-138, IPL-316, LL-1136, K-75, RLG(105), PL-101, LL-1187, IPL-532, KLB-104, L-4704, IPL-529, LL-1135, KLS-107, IPL-531, DPL-62, IPL-318, SL-28, PLO-98, L-4702, IPL-219, RLG-112, L-4076, LH84-8, HPLC-649, L-1114, L1161, IPL-215, PLO-097, IPL-319, L-4076, DPL-15, IPL-526, IPL-220, VL-142, DL-11-5, IPL-531, KLS-113, VL-143, IPL-325, L-4588, LL-1231, L-4707, PL-129, IPL-325, IPL-324, PL-117, IPL-529, IPL-319, IPL-513, IPL-521, RLG-147, HUL-57, L-4688, L-4147, IPL-315, VL-134, NDL7-402, L-4076, VL-516, RLG-73, IPL-314, VL-133, VL-515, IPL-526, L-4589, LH07-27.
3-4	Moderately Resistant	37	IPL-081, HUL-57, KLB-101, LH07-26, KLB-09-2, L-4146, KLS-218, DPL-15, PL-104, VL-141, IPL-406, KLB-345, IPL-533, NDL11-2, L4695, IPL-214, L-4691, LL-1031, PL-074, L4696, L-4692, L-4582, L-4689, HUL-57, NDL6-1-10, PL024, LL-1020, NDL7-302, PL-639, IPL-312, L-4583, LL-1036, PL-639, VL-514, NDL7-401, LL-1023, PL-406.
5-6	Moderately susceptible	34	KLB-317, RKL-1001, PL-100, L-4701, L-4705LL-1181, IPL-217, PLO-99, LH07-28, KLS-314, JL-3, L-4588, LL-1122, VL-520 VL-516, L4147, VL-140, HPLC-617, LH08-10, LL-1210, PL-104, IPL-219, PL-101, VL-521, LH-4848, IPL-406, NDL-11-1, L-4591, IPL-81, DPL-62, L-4583, L-4692, VL-514, RLG-75,
7-8	Susceptible	9	L-4706, PL-122, IPL-221, IPL-318, IPL-532, IPL-215, LL-1203, KLB-314, DL-11-4.
9	Highly Susceptible	4	RVL-48, L-4590, HUL-57, RLG-109

References

- Anonymous. Directorate of Economics and Statistics, Department of Agriculture and Cooperation. Area, Production and Yield of Lentil (Masur) during 2011-12 in major producing states, 2012.
- Anonymous. Project Coordinators Report. Annual group meet (*Khariif*) 16-18 May 2014. All India Coordinated Research Project on MullaRP. IIPR, Kanpur, 2012, 17.
- Bayaa B, Erskine W, Singh M. Screening of Lentil for resistance to *Fusarium* wilt. *Methodology and Source of Resistance*. *Euphytica*, 1997; 98(1-2):69-74.
- Bhat Nazir A, Beigh MA, Maheshwari SK, Masoodi SD. Screening and yield of Lentil (*Lens esculenta* Monech.) germplasm as influenced by *Fusarium* wilt. *Ann. Pl. and Prot. Sci.* 2006; 14(1):139-141.
- Gorden WL. Pathogenic strain *Fusarium oxysporum*. *Canadian Journal of Botany*. 1965; 45(12):1309-1318.
- Grewal JS. Disease of pulse crops-An overview. *Indian Phytopathology*. 1988; 45:1-14.
- Kaur A, Sharma LC. Screening of Lentil varieties against *Fusarium* wilt. *Indian J of Mycol. Pl. Pathol.* 1993; 23(2):172-173.
- Khare MN. Diseases of Lentil. In: *Lentils*, eds., Webb, C. and Hawtin, G. ICARDA/CAB, U.K., 1981, 163-172.