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Evaluation of pigeonpea genotypes against *Fusarium udum* butler under artificial epiphytotic condition

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Abstract
Wilt of Pigeonpea is a very destructive disease caused by fungus *Fusarium udum* Butler. In India, Pigeonpea 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. Out of 130 genotypes screened, ten genotypes (ICP-8859, ICP8860, ICP8862, ICP8863, ICP89049 ICP12731, BWR254, BWR370, AWR74/15 and Banda Palera were found resistant, 22 moderately resistant, 26 tolerant, 30 moderately susceptible and 42 were highly susceptible to *Fusarium* wilt.

Keywords: Epiphytotic, *Fusarium*, genotypes, resistant

Introduction
Pigeonpea is one of the major grain legume crops grown in the tropics and subtropics and commonly known as Arhar, Tur, Redgram, Cangopea and Gandul, holds an important position in Indian subcontinent. It is a *kharif* season crop that has wide adaptability and low input requirements. The heavy shedding of leaves adds considerable organic matter in to the soil. Pigeonpea is the 4th ranked pulse crop in the world. In India, Pigeonpea is the 2nd most important pulse crop after chickpea. Besides India, it is also grown in South East Asia, Africa, and America. In India, production of Pigeonpea was 3.17mt, on area of 3.88 m ha with yield of 817 kg/ha (Anonymous, 2014) [1]. In India, the crop is mainly grown in Andhra Pradesh, Bihar, Uttar Pradesh, Karnataka, Gujarat, Madhya Pradesh, Maharashtra, Orissa and Tamilnadu. The poor yield of Pigeonpea is mainly due to biotic stress like diseases and insect pests. The maximum number of pathogen has been reported from India (Nene *et al.*, 1996) but only few of them like wilt is the most important, major and destructive ones.
The crop suffers heavily due to *Fusarium* wilt in the major growing areas resulting into huge production losses (Vishwa Dhar *et al.*, 2005). In India, it is the most serious problem all over the Pigeonpea growing states especially in U.P., M.P., Bihar and Maharashtra. In the epiphytotic conditions, disease incidence was recorded 15-25 per cent in general and up to 50 per cent (Butler, 1910). In Bihar and Uttar Pradesh, 5-10 per cent losses in standing crop are common feature every year (Singh, 2006). In discriminate use of chemicals for controlling the disease has led to development of fungicide resistance strain and more importantly, environmental pollution, posing a potential risk to animal and human health. Due to high cost and hazardous effect of used chemical pesticides from last thirty years are not valid today. Hence, for minimizing the losses caused by wilt need inexpensive and environmentally safe management practices.

Materials and Methods
Seeds of one hundred thirty genotypes of Pigeonpea 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) using the methods described by Nene *et al.*, (1982) [5]. The plots (sick soil) showed over 90 per cent wilt incidence in susceptible cultivars (Bahar) of Pigeonpea were used for screening the test varieties. After germination, observations were

recorded regularly up to 60 days for the appearance of wilt symptoms and severity. The disease was recorded using 1-9 scale for the wilt disease of Pigeonpea as described in Table 1

Table 1: Disease rating scale for *Fusarium* wilt (Nene *et al*., 1981) [6]

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

Results and Discussion

One hundred thirty genotypes of Pigeonpea were screened for their reaction to *Fusarium udum* by sick plot technique. It is evident from the result presented in table 2 that out of 130 genotypes, ten genotypes *viz.*; ICP8859, ICP8860, ICP8862, ICP8863, ICP89049, ICP12731, BWR254, BWR370, AWR74/15 and Banda Palera were found resistant, 22 moderately resistant, 26 tolerant, 30 moderately susceptible and 42 genotypes were highly susceptible to *Fusarium* wilt. The most susceptible variety Bahar showed 80 per cent wilting. Yadav *et al.,* (2003) [10] has been screened out the genotypes ICP 8859, ICP 8860, ICP 8863 AWR 74/15 and in Banda Palera were resistant to *Fusarium* wilt in sick plot and water culture techniques used for screening, respectively. These reports on resistant genotypes to *Fusarium* wilt are in conformity with the present findings. The similar results were also screened by Madhukeshwara *et al.,* (2004) [3] and Mahesh *et al.,* (2006) [4].

Table 2: Performance of Pigeonpea genotypes against *Fusarium udum* under artificial epiphytotic conditions.

S. No.	Reaction	Name of the genotypes
1.	Resistant	ICP8859, ICP8860, ICP8862, ICP8863, ICP12731, ICP89049, AWR74/5, BWR254, BWR370 and Banda Palera
2.	Moderately resistant	ICP2016.A, ICP1763.A, ICP8473, ICP29.7, ICP12610, ICP12651, ICP31076, ICP12633.B, ICPL84008, ICP14722, JBP282.A, JBP003, PGP36, PGP41, KPL1, KPL42, DAC10-111, NDS465, BWR369, BWR190, BWR153 and Sujata
3.	Tolerant	JBP049, JBP102.A, JBP138.B, JBP294, ICP12566.A, ICP3149, ICP3387, ICP163.B, ICP3236, ICP1763, ICP12662, ICP9120, ICPL8908, ICPL93004, PGP37, PGP42, PGP44, GP295, GP352, GPS52, MS3783.A, LGP542.B, VKS11/24, KPL33, PH1059 and HY3.C
4.	Moderately susceptible	ICP3993, ICP1231.A, ICP3236, ICP6727.A, ICP14.A, ICP9596, ICP12977, ICP7011, ICP2907, ICP479.B, ICP3038, ICP12412.B, JBP005, JBP046, JBP737.B, NDS338, MA10-14, MA10-13, MMP5305,VKG14/13, PGP40, PGP37, PGP43, DAC10-114, DAC10-93, DAC10-110, DAC10-106, DAC10-92, DWR97 and KPL33
5.	Highly susceptible	ICP2726, ICP7164, ICP452-13, ICP5370.A, ICP12422, ICP12372, ICP308, ICP289.A, ICP12250, ICP2545, ICP3397.A, ICP5774, ICP267.A, ICP8865, ICP11293, ICP8859, ICPL141, ICP11290, ICP7198, ICP4769, ICP10958, ICP88047, PGP45, PGP47, MA10-1, MA10-6, MA10-15, JPB278, JBP037, JBP008.C, JBP0014, JPB008.C1, JBP064.B, JBP.036.B, JBP275, KPL32, KPL33, DAC10-89, DWR97, DAC1091 and AKPNP8/71

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