J. Farm Sci., 29(4): (521-523) 2016

Prevalence of *Fusarium* wilt of pigeon pea caused by *Fusarium udum* Butler. in Karnataka

The food requirement of increasing population is a constant pressure for developing countries to full fill the requirement. The pulses are prime sources of protein requirements and pigeon pea is one of the most important grain legume crops of developing countries for sustainable development.

Pigeon pea wilt caused by *Fusarium udum* is a serious threat in the production which may cause considerable yield losses under congenial conditions. Saxena *et al.* (2010) reported that *Fusarium* wilt disease in pigeon pea is so devastating that it can cause production loss up to 97000 tonnes per year in India alone. Several investigators have reported that, *Fusarium udum* as a sole factor for the loss in the crop. In view of these, the present investigations were carried out to find out the prevalence of the disease across pigeon pea growing districts of Karnataka.

Random roving method of survey was carried out to record the severity of *Fusarium* wilt in pigeon pea. The survey was conducted during *rabi* 2014 - 15 in different districts of Karnataka *viz.,* Vijayapur, Yadagiri, Gulbarga, Belagavi, Chitradurga, Davangere, Dharwad, Tumkur and observations on disease incidence, severity as well as age of crop was noted down and notations were given for the respective isolates (Table 1). Disease incidence was assessed by counting the number of plants showing symptoms in three representative 75-100 plants randomly chosen in each field as mentioned by Smitha *et al.* (2015).

$$\text{Percent Disease Incidence (PDI)} = \frac{\text{Number of plants showing wilting symptoms}}{\text{Total No. of plants}} \times 100$$

During survey, characteristic symptoms of diseases were recorded and also samples were collected for isolation of pathogens

Among the districts covered under survey, maximum disease incidence was recorded in Vijayapura district (36.15%) followed by Yadagiri district (35.02%) whereas, disease incidence was minimum in Belagavi district (13.76) (Table 2).

In Vijayapura district, the disease incidence ranged from 10.11 per cent (Yakkundi) to 65.7 per cent (Aheri) (Table 2). The mean disease incidence was 36.15 per cent (Table 2). In Belagavi district, the disease incidence ranged from 12.45 per cent (Ugar) to 15.07 per cent (Ainapur) (Table 2) and the mean incidence of the disease was 13.76 per cent (Table 3). In Chitradurga district the disease incidence ranged 17.4 per cent (Rampur) to 28.9 per cent (Hosapete) with a mean disease incidence of 23.15 per cent. In Dharwad the mean disease incidence was 16.34 per cent. In Davanagere the disease incidence was ranged from 30.4 per cent (Anogodu) to 42.3

Table 1. Designation of the isolates of *Fusarium udum*, the causal agent of wilt in pigeon pea from different districts of Karnataka

District	Location	Isolates identified	Isolates
Vijayapur	Aheri	*Fusarium udum*	FuBa
Belagavi	Athani	*Fusarium udum*	FuBl
Chitradurga	Rampur	*Fusarium udum*	FuCd
Dharwad	Ethinagudda	*Fusarium udum*	FuDh
Davangere	Anogodu	*Fusarium udum*	FuDv
Gulbarga	Jevargi	*Fusarium udum*	FuGj
Tumkur	Shira	*Fusarium udum*	FuTm
Yadagiri-1	Hebbal	*Fusarium udum*	$FuYd_1$
Yadagiri-1	Hattigudoor	*Fusarium udum*	FuYd

Table 2. *Fusarium* wilt incidence in major pigeon pea growing districts of Karnataka.

District	Taluk	Village name	Stage of the crop	Crop grown condition	PDI
Vijayapur	Vijayapur	Rampur	Flowering	Rainfed	20.47
		Yakkundi	Podding	Rainfed	10.11
	Sindagi	Chikkarugi	Pre podding	Rainfed	35.20
		Aheri	Pre podding	Rainfed	65.70
	Basavana Bagevadi	Basavana Bagevadi	Pre podding	Rainfed	50.13
	Indi	Atharga	Pre podding	Rainfed	28.73
Belagavi	Athani	Ainapur	Flowering	Rainfed	15.07
		Ugar	Flowering	Rainfed	12.45
Chitradurga	Chitradurga	Hosapete	Podding	Rainfed	28.90
		Rampur	Podding	Rainfed	17.40
Dharwad	Dharwad	Yettinagudda	Podding	Irrigated	16.34
Davanagere	Davanagere	Lokikere	Podding	Irrigated	42.30
		Anogodu	Podding	Irrigated	30.40
Gulbarga	Jewargi	Jewargi	Podding	Irrigated	35.04
	Gulbarga	Kotnur	Podding	Irrigated	27.29
Tumkur	Sira	Sira	Post podding	Rainfed	14.15
		Agarahara	Post podding	Rainfed	21.60
Yadagir	Shorapur	Hebbal	Podding	Irrigated	43.60
	Shahapur	Hattigudur	Podding	Irrigated	40.17
		Bheemarayanagudi	Podding	Irrigated	12.68

Table 3. Mean per cent disease incidence of pigeon pea wilt in different districts and talukas

District	Taluka	Rainfed	Irrigated	Taluka	District
Vijayapur	Vijayapur	15.29	-	15.29	36.15
	Sindagi	50.45	-	50.45	
	Basavana Bagevadi	50.13	-	50.13	
	Indi	28.73	-	28.73	
Belagavi	Athani	13.76	-	13.76	13.76
Chitradurga	Chitradurga	23.15	-	23.15	23.15
Dharwad	Dharwad	-	16.34	16.34	16.34
Davanagere	Davanagere	-	36.35	36.35	36.35
Gulbarga	Jewargi	-	35.04	35.04	31.17
	Gulbarga	-	27.29	27.29	
Tumkur	Sira	17.86	-	17.86	17.86
Yadagiri	Shorapur	-	43.60	43.60	35.02
	Shahapur	-	26.43	26.43	
Mean disease incidence (%)		28.48	30.84	26.22	

per cent (Lokikere) with a mean disease incidence of 36.35 per cent. In Gulbarga the disease incidence was ranged from 27.29 per cent (Kotnur) to 35.04 per cent (Jewargi) with a mean disease incidence of 31.17 per cent. In Tumkur the disease incidence was ranged from 14.15 per cent (Sira) to 21.6 per cent (Agrahara) with a mean disease incidence of 17.86 per cent. In Yadagiri the disease incidence was ranged from 12.68 per cent (Bheemarayanagudi) to 43.6 per cent (Hebbal) with a mean disease incidence of 35.06 per cent.

The mean disease incidence of irrigated and rainfed areas at taluka level is depicted in Table 3. Under irrigated condition the least disease incidence was in Dharwad taluk (16.34 per cent) of Dharwad district and highest disease incidence was in Davangere Taluk of Davangere district. In case of rainfed condition highest wilt incidence was in Sindagi Taluk of Vijayapura district (50.45 per cent) and lowest wilt incidence was seen in Athani taluk of Belagavi district (13.76 per cent).

In rainfed condition the average disease incidence was 28.48 per cent and in irrigated condition it was 30.84 per cent. The disease incidence was severe in the later stages of the crop and the wilt incidence varied from13.76 per cent to 36.35 per cent.

Thus, as a whole, the data regarding wilt incidence in different locations depicts that the disease incidence varied from locality to locality with respect to its geographical condition, agro-climatic condition, cropping pattern, stage of the crop etc.

Earlier workers *viz.,* Butler (1910), Gade (2002), Pawar *et al.* (2012) and Smitha *et al.* (2015) also made the survey work for knowing the severity of the disease across different locations. The reason for the difference in losses observed could also be attributed to existence of distinct races of the pathogen in nature which varies in their biochemical nature (Kumar *et al.,* 2007) which was also studied by Chhetry and Devi (2014) who observed the large variation in wilt incidence in different locations and in different crop growth stages.

Continuous cultivation of the same crop year after year, could be the reason for high incidence of this disease as *Fusarium* is soil borne and also seed borne pathogen and is highly specific to pigeon pea crop. Further due to the formation of resting structure chlamydospore in the unfavourable condition it can overcome adverse climatic condition and retain in soil for more than six years even in the absence of host plant and also several findings state that there is existence of variability in the isolates of *Fusarium udum* from same site or distinct sites indicating the existence of distinct races of pathogen in nature. Due to this reason,x use of resistance breeding strategy for the management of the wilt disease has become an uphill struggle because a cultivar showing resistance at one agro climatic zone will show susceptibility in another agro climatic zone indicating the presence of distinct races of a pathogen.

From the present study of disease incidence in the different districts it was found that the disease progress is slow during early phases of growth but accelerates during the flowering and podding stage as the nutrients drain to the reproductive part of the plant and due to imbalance supply of nutrients in the stem and root region. This was in agreement with the study of Pawar *et al.* (2012) Chhetry and Ranjana Devi (2014), Smitha *et al.* (2015), who observed that the incidence of the disease is reported more from 30 - 60 per cent at flowering and crop maturity stages.

Department of Plant Pathology
College of Agriculture, Vijayapur - 586101
University of Agricultural Sciences
Dharwad - 580005, Karnataka, India
E-mail: rashmiuluvaru@gmail.com

U. S. RASHMI
S. N. CHATTANNAVAR

(Received: July, 2016 ; Accepted:December, 2016)

References

Butler, E. J., 1910, The wilt disease of pigeonpea and parasitism of *Neocosmospora vasinfectum. Dept. Agric. Bulletin,* India, 2:1.

Chhetry, G. K. N. and Ranjana Devi, T., 2014, Wilt epidemiology of pigeonpea (*Cajanus cajan* (L.) Millsp.) in organic farming system. *J. Agric. Vet. Sci.,* 7(1): 1-6.

Gade, R. M., 2002, Integrated disease management of pigeonpea wilt. *Ph.D. Thesis,* Marathwada Agric. Univ. Parbhani, M.S. (India).

Kumar, V. B., Chauhan and Srivastava, J. P., 2007, Pathogenic and biochemical variability in *Fusarium udum* causing Pigeonpea wilt. *Indian Phytopathol.,* 60(3): 281-288.

Pawar, S. V., Deshpande, G. D. and Utpal, Dey, 2012, Survey and survillance of pigeonpea wilt in Marathwada region. *Int. J. Plant Protect.,* 5 (2): 394-396.

Saxena, R. K., Saxena, K. B., Kumar, R. V., Hoisington, D. A. and Varshney, R. K., 2010, Simple sequence repeat-based diversity in elite pigeonpea genotypes for developing mapping populations to map resistance to *Fusarium* wilt and sterility mosaic disease. *J. Pl. Breed.,* 129: 135-141.

Smitha, K. P., Rajeswari, E., Alice, D. and Raguchander, T., 2015, Assessment of vascular wilt and dry root rot of pigeonpea in Tamil Nadu. *Int. J. Trop. Agril.,* 33(3): 2145-2151.