Effect of Various Sowing Dates on the Management of Wilt of Guar (*Cyamopsis tetragonaloba* L.)

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The 23rd International Grassland Congress (Sustainable use of Grassland Resources for Forage Production, Biodiversity and Environmental Protection) took place in New Delhi, India from November 20 through November 24, 2015.

Proceedings Editors: M. M. Roy, D. R. Malaviya, V. K. Yadav, Tejveer Singh, R. P. Sah, D. Vijay, and A. Radhakrishna

Published by Range Management Society of India

Paper ID: 1222
Theme: 2. Grassland production and utilization
Sub-theme: 2.2. Integration of plant protection to optimise production

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Keywords: *Fusarium solani* EGY 1, Guar, Management, Root rot, Sowing dates

Introduction

Cluster bean [*Cyamopsis tetragonoloba* (L.) Taub.], commonly known as guar, is a member of Leguminosae (Fabaceae) family. It is a short duration, drought resistant, low investment and high return cash crop. In Punjab, it is one of the important legume crop grown on about 9514 ha with production of 0.24 million ton (Anonymous, 2013). It can be grown in mixture with *bajra* and *jowar* but pure crop of guar supplies highest tonnage of palatable nutritious green fodder for longer duration without much deterioration in quality with the age of the crop. It is rich in nutrients with crude protein content and total digestible nutrients on dry matter basis of 18.1 and 60.0 per cent respectively. Besides fodder, it can also be grown for grain, green manure, cover crop and for vegetable purposes. Although, cluster bean being a hardy crop is very sensitive to the biotic and abiotic stresses. The crop has succumbed to number of diseases caused by fungi, bacteria and viruses. Of the all diseases, wilt of guar (*Fusarium caeruleum)* is a very serious disease. It causes heavy losses in summer sown crop and damage is visible on young plants. Attacks of the Fusarium wilt pathogen can destroy the crop completely. Modification of the soil environment by altering sowing dates and introduction of resistant genotypes can be effective control for *Fusarium solani* EGY 1causing wilt in guar.

Materials and Methods

The experiment was conducted at Forage Research Farm, PAU, Ludhiana during *Kharif* 2013 and 2014. The treatments comprised of four dates of sowing *viz.*, 1st week of June, mid June, 1st week of July and mid-July and each treatment was replicated thrice. Guar 80 varieties was sown in 2 x 2 m^2 plots with row to row spacing of 30 cm for raising fodder crop and 45 cm for grain crop. Recommended package of practices were followed for raising the crop (Anonymous, 2013). The plots were periodically observed for number of wilted plants and per cent incidence was calculated. The data on green fodder yield and grain yield qha^{-1} were also recorded.

Results and Discussion

Data presented in Table 1 showed that disease incidence varied from 9.41 to 74.55% for *Kharif* 2013 and from 11.09 to 74.84 for *Kharif* 2014. Maximum disease was observed during *Kharif* 2013 in the crop sown on 3rd June (1st week of June) with disease incidence of 74.55 per cent and disease appeared quite early after 23 days after sowing (DAS) and during *Kharif* 2014 disease appeared in crop sown on 1st June after 22 days with the incidence of 74.84 per cent. This was followed by crop sown on 17th June (mid June) and 1st July (1st week of July) during *Kharif* 2013 with per cent disease incidence of 65.72 (27 DAS) and 37.70 per cent (39 DAS) and in *Kharif* 2014 maximum incidence was followed by crop sown on 15th July and 1st July with disease incidence of 65.62 (25 DAS) and 36.36 (41 DAS) respectively. Minimum disease was recorded during *Kharif* 2013 and 2014 in crop sown on 15th July (mid July) with per cent disease incidence of 9.41 and 11.09 respectively, disease appeared late after 60 DAS during 2013 and 64 DAS during 2014. During both the seasons maximum grain and green fodder yield of 12.81 and 221.66 q ha^{-1} and 12.90 and 223.53 q ha^{-1} respectively was found in crop sown on 15th July (mid July) and least yield was recorded in crop sown on 3rd June (*Kharif* 2013) and on 1st June (*Kharif* 2014) with grain yield of 3.56 q ha^{-1} and 3.32 q ha^{-1} and green fodder yield of 80.33 q ha^{-1} and 78.90 q ha^{-1} respectively. This shows that wilt symptoms are more severe and appeared early during the hot weather affecting the yield due to injury to roots on account of less moisture in soil as compared to mid-July sown crop when moderate weather persists.

Table 1: Effect of different dates of sowings on development of *Fusarium solani* EGY 1

Sowing dates	Appearance of disease (DAS*)		Disease incidence (%)		Grain yield (q ha^{-1})		Fodder yield (q ha^{-1})	
	2013	2014	2013	2014	2013	2014	2013	2014
1st week of June	23	22	74.55	75.84	3.56	3.32	80.83	78.90

(3rd June)		(1st June)						
Mid-June (17th June)	27	25 (15th June)	65.72	65.62	4.78	4.87	116.66	117.93
1st week of July (1st July)	39	41	37.70	36.36	8.63	9.15	130.83	130.20
mid-July (15th July)	60	64	9.41	11.09	12.81	12.90	221.66	223.53
CD (p=0.05)			**5.09**	**4.97**	**0.81**	**1.13**	**10.22**	**3.77**

*DAS: Days after sowing

Vir and Grewal (1973) also observed that wilt of guar (*Fusarium careuleum*) was a serious problem and causes heavy losses to summer sown crop (April to June) under Delhi conditions. Navas-Cortes *et al*., (1998) reported that by advancing the sowing date from early spring to early winter can slow down the development of Fusarium wilt epidemics, delay the epidemic onset and minimize the final amount of disease in chickpea crop in Southern Spain. Similarly Chaudhary *et al*., (2001) revealed that early sown crop (1st July) exhibited higher *Fusarium udum* inoculum in wilt sick plot which gradually decreased in subsequent dates with least population in 16th September sown crop. Ahmed *et al*., (2002) found that November plantings reduced Fusarium wilt of lentil caused by *Fusarium oxysporum* f.sp. *lentis* and increased straw and seed yields for all the tested genotypes.

Conclusion

Minimum disease incidence was observed in late sown crop during the second fortnight of July and crop gave maximum grain and fodder yield during this period. Maximum disease incidence was observed in early sown crop in first week on June.

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