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Screening of Fenugreek Genotypes Against Wilt under Natural Field Condition and Artificially Inoculated Condition

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ABSTRACT

Fenugreek (Trigonella foenum graecum L.) is an important seed spice, originated in South-Eastern Europe belonging to the family Fabaceae. It is the third largest seed spice in India after coriander and cumin. Although many diseases are reported in fenugreek, wilt is becoming more severe in recent years. However no study has been conducted on this disease in Karnataka, So present study was under taken to identify the sources of resistance. Thirty six and thirty eight genotypes were screened against Fusarium wilt of fenugreek by naturally infected field condition and artificially in sick pot technique, respectively during rabi, 2014-15. The results revealed that twenty four genotypes were found moderately resistant under natural conditions viz., DFC-2, DFC-3, DFC-5, DFC-6, DFC-8, AJM-1, AJM-2, Lam-m-2, DFC-9, DFC-10, DFC-11, DFC-13, DFC-14, DFC-15, DFC-17, DFC-18, DFC-19, DFC-20, DFC-23, DFC-25, DFC-26, DFC-27, DFC-28 and DFC-29, however, in sick pot condition only four genotypes like, DFC-3, DFC-8, DFC-27 and DFC-29 were found moderately resistant. Eleven genotypes were found moderately susceptible, only one genotype showed susceptible reaction i.e., DFC-22 under field condition. However, in sick pot method twenty eight genotypes were found moderately susceptible and 3 genotypes namely DFC-16, DFC-24 and DFC-25 showed susceptible reaction. None of the genotypes were found highly susceptible under field condition but three genotypes viz., Pant Ragini, DFC-22 and DFC-26 were highly susceptible to the disease under sick pot conditions. None of the genotypes was found immune or resistant to the disease in both conditions. Moderately resistant genotypes can be used in breeding programes.

Key words: *Fenugreek, Fusarium, Screening, Sick pot, Resistant, Susceptible*

INTRODUCTION

Fenugreek (*Trigonella foenum graecum* L.) is an important seed spice, originated in South-Eastern Europe belonging to the family Fabaceae. It is native of India and leading fenugreek producing country in the world. It is the third largest seed spice in India after coriander and cumin. In India, it is grown in about 66,000 ha with an annual production of about 90,000 tonnes[1].

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Rajasthan is the fenugreek bowl of country, contributing 90 per cent to the country's production. It has some pharmacological properties such as antitumor, antiviral, antimicrobial, anti-inflammatory, hypotensive and antioxidant activity[2].

Fenugreek is mainly grown as leafy vegetable throughout Karnataka and there is ample scope for its cultivation as seed spice. But fenugreek suffers from many of fungal diseases *viz.,* Cercospora leaf spot caused by *Cercospora traversiana,* root rot (*Rhizoctonia solani),* leaf spot (*Ascochyta sp.),* powdery mildew (*Erysiphe polygoni),* downy mildew (*Peronospora trigonellae)* and Fusarium wilt (*Fusarium oxysporum*)[3]. Fenugreek wilt complex caused by the fungi like *Fusarium oxysporum, Rhizoctonia solani* and *Sclerotium rolfsii* for the first time in India, [4]reported the *Fusarium oxysporum* Schlecht as the causal agent of wilt of fenugreek from Jaipur district of Rajasthan. Although many diseases are reported in fenugreek, wilt is becoming more severe in recent years. However no study has been conducted on this disease in Karnataka, So present study was under taken to identify the sources of resistance by screening fenugreek genotypes against Fusarium wilt by naturally in infected field condition as well as in artificially in sick pot technique, respectively during *rabi*, 2014-15.

MATERIALS AND METHODS

Field condition

Genotypes were screened against Fusarium wilt of fenugreek under field condition during *rabi*, 2013-14. The experimental field was prepared into fine tilth by deep ploughing before seed sowing. Totally 36 genotypes were screened with plot size of 2m×1m. Sowing was done on 1st November, 2014 with 30×10 cm spacing. Three replications were maintained. All agronomic practices were followed as per package of practice. Observations were recorded for per cent wilt incidence.

Sick pot technique

Thirty eight fenugreek genotypes were screened against *Fusarium oxysporum* under glasshouse condition. Genotypes were collected from Department of Horticulture, University of Agricultural Sciences, Dharwad. Giant culture was added at 8 per cent to the soil in the pot. Ten seeds were sown in each pot on 20th February, 2015. Each treatment was replicated twice. Observations were recorded on per cent disease incidence and were classified as follows[5].

RESULTS AND DISCUSSION

To identify the sources of resistance 36 and 38 genotypes were screened against Fusarium wilt of fenugreek by naturally in infected field condition and artificially in sick pot technique, respectively during *rabi*, 2013-14 as explained in Material and Methods. The data on reaction of each variety was presented in Table 1.

Twenty four genotypes were found moderately resistant under natural conditions *viz.,* DFC-2, DFC-3, DFC-5, DFC-6, DFC-8, AJM-1, AJM-2, Lam-m-2, DFC-9, DFC-10, DFC-11, DFC-13, DFC-14, DFC-15, DFC-17, DFC-18, DFC-19, DFC-20, DFC-23, DFC-25, DFC-26, DFC-27, DFC-28 and DFC-29, however in sick pot condition only four genotypes like DFC-3, DFC-8, DFC-27 and DFC-29 were found moderately resistant. Eleven genotypes were found moderately susceptible, only one genotype showed susceptible reaction *i.e.,* DFC-22 under field condition. However, in sick pot method twenty eight genotypes were found moderately susceptible and 3 genotypes namely DFC-16, DFC-24 and DFC-25 showed susceptible reaction. None of the genotypes were found highly susceptible under field condition but three genotypes *viz.,* Pant Ragini, DFC-22 and DFC-26 were highly susceptible to the disease under sick pot conditions. None of the genotypes was found immune or resistant to the disease in both conditions. Similar results were reported[6].

Genotypes were grouped into four categories based on the disease reaction in sick pot condition as moderately resistant, moderately susceptible, susceptible and highly susceptible (Table 1a). None of the genotypes were found immune or resistant to the disease.

The genotypes like DFC-3, DFC-8, DFC-27 and DFC-29 were grouped as moderately resistant. Twenty eight genotypes were moderately susceptible (AJM-1, AJM-2, Co-2, DFC-1, DFC-2, DFC-4, DFC-5, DFC-6, DFC-7, DFC-9, DFC-10, DFC-11, DFC-12, DFC-13, DFC-14, DFC-15, DFC-17, DFC-18, DFC-19, DFC-20, DFC-21, DFC-23, DFC-28, GM-2, Lam-m-2, LS-1, Pusa early branching and Pusa kasuri). The varieties like DFC-16, DFC-24 and DFC-25 showed susceptible reaction whereas the remaining three genotypes *viz.*, DFC-22, DFC-26 and Pant Ragini were highly susceptible to the disease (Plate 1).

Table 1: Screening of fenugreek genotypes against wilt under artificially in sick pot condition and field condition

Genotype	Sick pot condition		Field condition	
	Per cent disease incidence	Reaction	Per cent disease incidence	Reaction
AJM-1	15	MS	6.42	MR
AJM-2	20	MS	9.28	MR
Co-2	15	MS	-	-
DFC-1	15	MS	12.67	MS
DFC-2	15	MS	6.46	MR
DFC-3	5	MR	4.05	MR
DFC-4	15	MS	14.64	MS
DFC-5	15	MS	6.13	MR
DFC-6	20	MS	4.40	MR
DFC-7	20	MS	14.85	MS
DFC-8	10	MR	1.49	MR
DFC-9	20	MS	10.35	MR
DFC-10	25	MS	10.89	MR
DFC-11	15	MS	9.18	MR
DFC-12	20	MS	12.57	MS
DFC-13	20	MS	7.35	MR
DFC-14	20	MS	6.60	MR
DFC-15	20	MS	8.13	MR
DFC-16	30	S	20.18	MS
DFC-17	15	MS	9.97	MR
DFC-18	20	MS	10.17	MR
DFC-19	20	MS	5.73	MR
DFC-20	20	MS	8.01	MR
DFC-21	15	MS	15.42	MS
DFC-22	100	HS	35.11	S
DFC-23	20	MS	9.75	MR
DFC-24	40	S	19.74	MS
DFC-25	35	S	10.70	MR
DFC-26	100	HS	10.86	MR
DFC-27	5	MR	2.70	MR
DFC-28	15	MS	5.54	MR
DFC-29	5	MR	3.57	MR
GM-2	20	MS	20.61	MS
Lam-m-2	25	MS	10.89	MR
LS-1	20	MS	-	-
Pant Ragini	100	HS	23.02	MS
Pusa early bunching	15	MS	19.25	MS
Pusa Kasuri	20	MS	15.34	MS

Table 1a: Grouping of genotypes against wilt disease of fenugreek based on disease incidence

Reaction	Name of promising genotypes
Immune	-
Resistant	-
Moderately resistant	DFC-3, DFC-8, DFC-27, DFC-29
Moderately susceptible	AJM-2, Co-2, DFC-1, DFC-2, DFC-4, DFC-5, DFC-6, DFC-7, DFC-9, DFC-10, DFC-11, DFC-12, DFC-13, DFC-14, DFC-15, DFC-17, DFC-18, DFC-19, DFC-20, DFC-21, DFC-23, DFC-28, GM-2, Lam-m-2, LS-1, Pusa early bunching, Pusa Kasuri
Susceptible	DFC-16, DFC-24, DFC-25
Highly susceptible	DFC-22, DFC-26, Pant Ragini

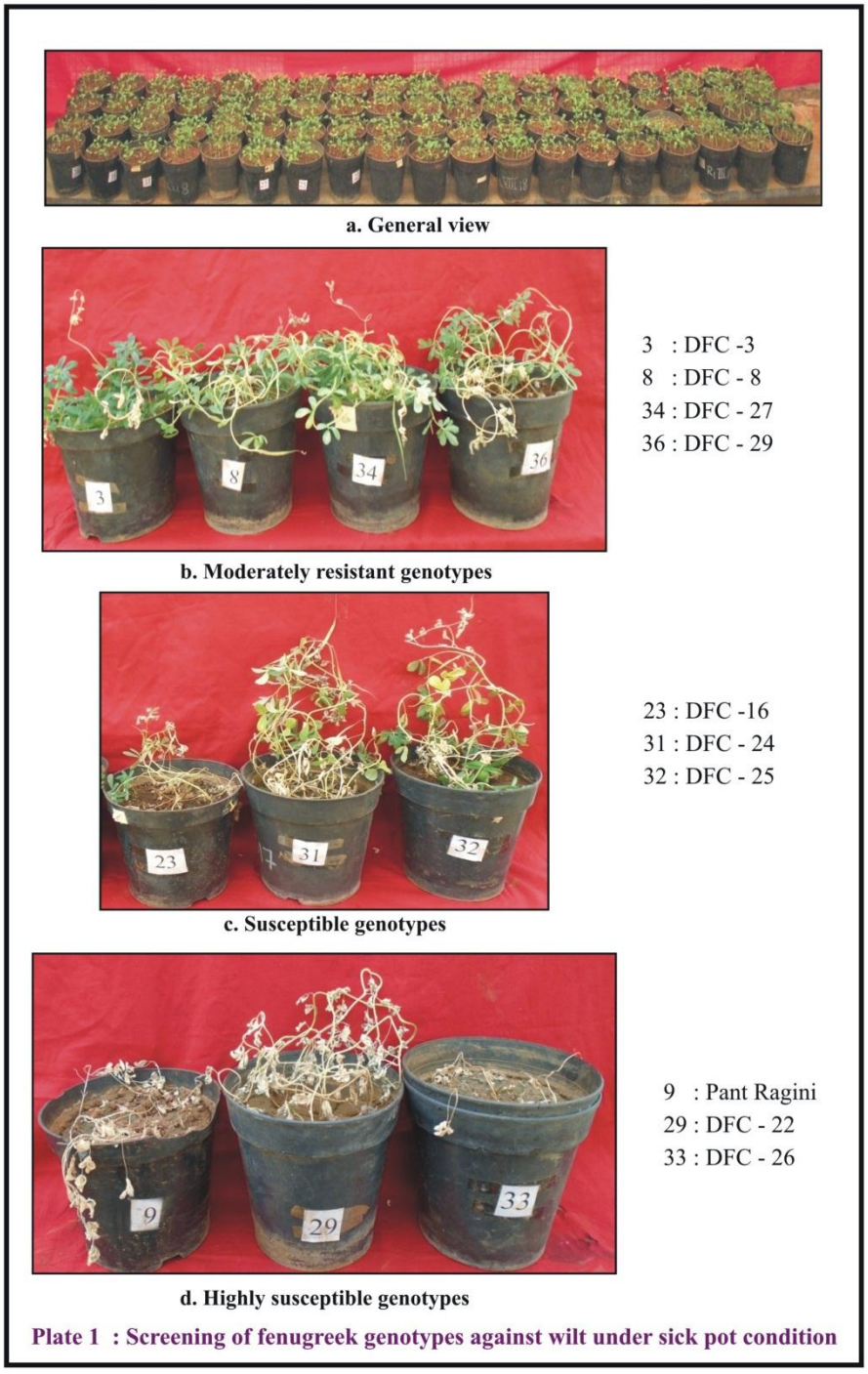

Plate 1 : Screening of fenugreek genotypes against wilt under sick pot condition

REFERENCES

1. Anonymous, 2014, http://www. indiastat.com/agriculture/2/spices/262/fenugreek/20663.
2. Kor, N.M. and Moradi, K., Physiological and pharmaceutical effects of fenugreek (*Trigonella foenum-graecum*) as a multipurpose and valuable medicinal plant. *Glob. J. Med. Pl. Res*., **1:** 199-206 (2013).
3. Prasad, R., Acharya, S., Erickson, S, and Thomas, J., Identification of cercospora leaf spot resistance among fenugreek accessions and characterization of the pathogen. *Australian J. Crop. Sci.*, **8(6):** 822-830 (2014).
4. Shivpuri, A. and Bansal, P. K., Fusarium wilt of *Trigonella foenum-graecum* L. *Indian J. Mycolo. Pl. Pathol.*, **26:** 749-751 (1987).
5. Mayee, C.D. and Datar, V.V., Phytopathometry, Tech. Bull.No.1, Uni. Agric. Sci., Marathawad, Parbhani (India), p. 146 (1986).
6. Chaudhary, S., Detection and management of wilt of fenugreek (*Trigonella foenum graecum*. L.) incited by *Fusarium oxysporum. M. Sc. Thesis,* Univ. Agric. Sci., Bikaner, Rajasthan, India, (2013).