

Effect of different soil types on the incidence of pea wilt (Pot culture)

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SUMMARY

An experiment has been conducted during *Rabi* season, 2009, to evaluate the effect of different soil types *viz.*, black, red, sandy, sandy loam, and clay soil on incidence of pea wilt incited by *Fusarium oxysporum* f.sp. *pisi*. Results revealed that the disease was significantly highest in black soil (96.40%) followed by clay soil (58.00%). While, least wilt incidence was noticed on red soil (29.20%). It was recorded that the disease incidence varied from locality depending upon cropping pattern, environmental condition and inoculum buildup.

Key Words : Pea, Wilt, *Fusarium oxysporum* f.sp. *pisi*, Soil types

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Pea (*Pisum sativum* L.) belonging to the family Leguminosae, is highly nutritive and contains a high percentage of protein, carbohydrates and vitamins and high proportion of mineral matter. The peas are cool season crop and as such it should be grown in the plains only in winter season. Peas are cultivated for the fresh green seeds, tender green pods, dried seeds and foliage and cooked as a vegetable, marketed fresh, canned and frozen. Dry peas are used as whole, split as dhal, roasted, parched, boiled and made into flour.

Pea is affected by several plant pathogens including fungi, bacteria and viruses that causes serious diseases. Among the fungal diseases, wilt incited by *Fusarium oxysporum* considered as one of the most devastating diseases of the pea, which results in heavy yield losses. In *Fusarium* wilt disease of pea, first symptom appears as slight vein clearing on the outer portion of the younger leaves, followed by

epinasty (down ward drooping) of the older leaves. At the seedling stage, plant infected by *F. oxysporum* may wilt and die soon after symptoms appear. In older plants, vein clearing and leaf epinasty are often followed by stunting, yellowing of the lower leaves, formation of adventitious roots, wilting of leaves and young stems, defoliation, marginal necrosis of remaining leaves and finally death of the entire plant (Agrios, 1988) browning of the vascular tissue is strong evidence of *Fusarium* wilt. Further, on older plants symptoms generally become more apparent during the period between blossoming and fruit maturation (Jones *et al.*, 1982; Smith *et al.*, 1988).

Pea cultivation throughout the country in general and in the region of Marathwada and Western Maharashtra particularly has been facing the serious menaces of wilt incidence. Most of the pea cultivars under cultivation are highly susceptible to the wilt. Hence, it was necessary to find out the suitable chemical control measures and exploit disease resistant/tolerant sources and manipulate cultural practices by adjusting sowing dates for successful management of the disease.

Keeping in view, the economic importance of the crop and yield losses caused by *Fusarium* wilt in pea, present studies were undertaken.

Various types of soils existing in Latur district were collected for testing their effect on wilt development. The

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inoculum of test pathogen *F. oxysporum* f. sp. *pisi* was mass cultured on sand maize medium (1:1) and added to various types of soils in pots @ 100 g/kg of soil.

Five types of soil viz., black, red, sandy, sandy loam and clay soil were used and Arkel pea variety was raised in the pots containing 1.5 kg of sick soil. Ten plants per pot were maintained and all the treatments were replicated four times.

Observations on number of plants wilted per treatment and replication were recorded at 30, 45, 60, 75 and 90 days after sowing. The per cent wilt disease incidence was calculated on the basis of initial plant count and total number of wilted plants.

Five types of soil viz., black, red, sandy, sandy loam and clay soil were used to study the effect of soil types on incidence of pea wilt. The Results are presented in Table 1 and depicted in Plate 1 and Fig. 1.

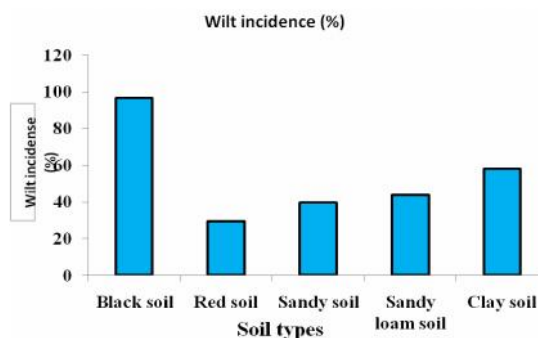


Fig. 1: *In vivo* (Pot culture) effect of soil types on wilt incidence in pea cv. ARKEL



Plate 1: Effect of different soil types on wilt incidence in pea cv. Arkel

Results (Table 1) revealed that the disease was significantly highest in black soil (96.40%) followed by clay soil (58.00). Comparatively minimum wilt incidence was observed in sandy loam (43.50%), and sandy (39.70%) and red (29.20%) soils.

Sr. No.	Soil types	Per cent wilting*
1.	Black soil	96.40 (76.31)
2.	Red soil	29.20 (32.70)
3.	Sandy soil	39.70 (39.05)
4.	Sandy loam	43.50 (43.50)
5.	Clay	58.00 (49.60)
S.E. \pm		0.18
C.D. (P=0.05)		0.54

These results of the present studies to some extent are contradictory with the earlier results of Sagar and Sugha (1998) who reported highest pea wilt incidence in silty loam soil (85.70 %), sandy loam soil (84.70 %) and comparatively minimum wilt incidence in clay soil (78.50 %). Chandrasekaran and Shanmugam (1984) studied the effect of soil type on wilt incidence on chickpea root rot (*Fusarium solani*) and reported highest disease incidence in sandy loam soil (96.30 %), followed by black soil (53.80 %) and red soil (35.00 %). While studying the effect of soil types on the incidence of pea wilt diseases, it was noticed that black soil showed highest wilt disease incidence than the other soil types.

REFERENCES

- Agrios, G.N. (1988). *Plant pathology*, 803, 3rd. Ed. Academic Press, Inc. NEW YORK, U.S.A.
- Chandrasekaran, A. and Shanmugam, N. (1984). Effect of soil types on chickpea root rot caused by *Fusarium solani* (mart) Sacc. *Indian J. Mycol. & Pl. Pathol.*, **14** (1): 92-94.
- Jones, J.P., Jones, J.B. and Miller, W. (1982). *Fusarium* wilt on tomato. Fla. Dept. Agric. and Cosumer Serv., Div. of Plant Industry. Plant Pathology Circular No. 237.
- Sagar, V. and Sugha, S.K. (1998). Effect of soil types and available nutrients on *fusarial* population and severity of pea wilt. *J. Mycol. Pl. Pathol.*, **28**(3): 294-199.
- Smith, I.M., Dunez, J., Phillips, D.H., Lelliott, R.A. and Archer, S.A. eds. (1988). *European hand book of plant disease*. Blackwell Scientific Publications: Oxford.: 583pp.

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