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Short Note

Evaluation of different fungicides for the management of pea root rot

A.S. Kapoor, Amar Singh, D. Singh[1], S. Dhancholia and Pardeep Kumar[2]
Department of Plant Pathology
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176 062, India.
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Abstract

For the management of pea root rot , 7 fungicides viz., F100 (carbendazim 37.5% + mancozeb 37.5%), Carbendazim (benzimidazol) Vitavax (carboxin), Raxil (tebuconazole) , and Vitavax power (carboxin 37.5% + thiram 37.5%) , thiram (dimethyl dithiocarbamate), and Dithane M-45 (mancozeb) and a mixture of bioagents "Himbio-4" (*Trichoderma harzianum* - SMA-4 , *T. harzianum* -SMA-5, *T. koningii* -DMA-8 and *T. koningii* - JMA-11) were evaluated as seed treatment against pea root rot at 4 locations representing different agro climatic zones of Himachal Pradesh. At Haripurdhar, Vitavax and Vitavax power (@ 3g/kg seed) were found most effective in managing pea root rot (0.77 % & 0.71 %) followed by thiram and carbendazim whereas, at Janjehli, carbendazim (2.5g/kg seed) was most effective.

Key words: Pea root rot, fungicides, efficacy.

Pea (*Pisum sativum* L.) occupies a premier place both as a grain legume and vegetable in most countries in the world especially in temperate region. In India, pea is cultivated in an area of 200- 250 thousand ha (Masood & Kumar, 2008) and grown as winter vegetable in the plains of North India but in Himachal Pradesh, it is mainly grown as an off-season vegetable crop and occupies an area of 7956 ha with an annual production of 81011mt (Anonymous, 1998). Pea is attacked by a number of diseases caused by bacterial (2), fungal (22), nematode (3) and viral pathogens (7) (Hagedorn, 2000). Fungal diseases viz., root rot complex, wilt, Aschochyta blight, powdery mildew and white rot are economically most important diseases in Himachal Pradesh which affect pea yields. However, root rot caused by several fungi: *Fusarium solani* f.sp. *pisi*, *Pythium* species and *Rhizoctonia solani* has become a most serious disease and threaten its cultivation in some pockets of the state. High soil moisture and warm temperature favour root rot development of all of these fungi. *F. solani* f.sp. *pisi* infection can be distinguished from others by the reddish brown external colour of the roots.

For the management of pea root rot , 7 fungicides viz., F100 (carbendazim 37.5% + mancozeb 37.5%), Carbendazim (benzimidazol) Vitavax (carboxin), Raxil (tebuconazole) , and Vitavax power (carboxin 37.5% + thiram 37.5%) , thiram (dimethyl dithiocarbamate), and Dithane M-45 (mancozeb) and a mixture of bioagents "Himbio-4" (*Trichoderma harzianum* - SMA-4 , *T. harzianum* -SMA-5, *T. koningii* -DMA-8 and *T. koningii* -JMA-11) were evaluated as seed treatment against pea root rot at 4 locations representing different agro climatic zones of Himachal Pradesh (Table 1). Field trials were conducted at each location using susceptible variety Azad P-1 in a randomized block design with three replications. All the package and practices of pea crop was followed. Disease incidence was recorded twice in a season first after 1 month of sowing and 2nd one day before first picking by recoding total number of plants and number of infected plants per plot and percentage of incidence was calculated accordingly as average of the two recordings.

Maximum disease pressure was found at Kukumseri (78.1%) followed by Janjehli (37.7%) and Palampur (12.38%), whereas at Haripurdhar (6.01%) it was comparatively very low (Table 1). It was observed that at two locations; Palampur (Zone II) and Kukumseri (Zone IV) none of the treatments were effective in managing the disease. However, at Haripurdhar (Zone-II) and Janjehli (Zone III) locations significant differences were observed. At Haripurdhar, Vitavax and Vitavax power (@ 3g/kg seed) were found most effective in managing pea root rot (0.77 % & 0.71 %) followed by thiram and carbendazim whereas, at Janjehli carbendazim (2.5g/kg seed) was most effective (10.5%) followed by Raxil (13.40%), Vitavax power (13.50%) and Vitavax (14.90%)

1 HAREC Dhaualkuan; 2 KVK Kukumseri

(Table 1). Green pod yield at Kukumseri and Palampur was non-significant whereas at Haripurdhar pea yields increased significantly in treatments; Vitavax power and Vitavax (2900 kg/ha) followed by carbendazim (2466 kg/ha).Though Himbio-4 was least effective at all the locations as seed treatment but managed the pea root rot significantly in comparison to control. The fungicides; Benlate, Captan, and Dithane M-45 (Maheshwari *et al.*, 1981), benomyl (Jhooty and Behar, 1970), Benalate, Ridomil MZ and Captan (Khan *et al.*, 1998) were reported to be effective against pea root rot under field conditions. Kapoor (2004) reported that Indofil M-45 and Bavistin completely inhibited the mycelial growth of *F. oxysporum* f. sp. *pisi* at 0.1 per cent concentration under *in vitro* condition.

Table 1.Effect of fungicides as seed treatment on pea root rot

Treatment	Dose (g/kg seed)	Root rot incidence (%)					
		L_1	L_2	L_3	L_4	Green pea yield (kg/ha)	Increase in yield over control (%)
F100	3	7.96 (2.88)	78.31 (62.27)	1.97 (1.70)	15.30 (23.07)	2116	54.9
Carbendazim	2.5	6.04 (2.61)	74.76 (59.99)	1.40 (1.60)	10.9 (19.24)	2466	80.5
Raxil	2	7.84 (2.95)	73.41 (59.05)	4.57 (2.34)	13.40 (21.46)	1750	28.1
Vitavax	3	8.06 (2.99)	70.01 (57.16)	0.70 (1.28)	14.90 (22.69)	2900	112.3
Vitavax power	3	9.84 (3.29)	79.82 (63.82)	0.77 (1.31)	13.50 (21.54)	2900	112.3
Thiram	3	5.44 (2.54)	68.04 (55.90)	1.03 (1.38)	20.70 (27.02)	2430	77.9
Mancozeb	3	6.86 (2.79)	76.94 (61.29)	2.12 (1.76)	20.8 (27.07)	1566	14.6
Himbio 4	8	7.19 (2.83)	56.92 (49.07)	5.58 (2.53)	28.6 (32.07)	1583	15.9
Control	-	12.38 (3.46)	78.12 (62.50)	6.01 (2.62)	37.7 (37.88)	1366	------
CD (P=0.05)		NS	NS	(0.65)	(2.49)	570	-------

L_1= Palampur (Kangra); L_2= Kukumseri (Lahaul & Spiti); L_3 Haripurdhar (Sirmour) ; L_4 Janjehli (Mandi)
Figures in parentheses are square root (L_1 & L_3) and angular (L_2 & L_4) transformed values

References

Anonymous.1998. Area and production of vegetables in Himachal Pradesh. Directorate of Agriculture (H.P.), Shimla-5.

Hagedorn DJ 2000. Compendium of Pea Diseases (up dated by Kraft JM 12.18.00). The American Phytopathological Society, Minnesota, USA. http:ssca.usask.ca/2000 Proceedings/Turkington.htm. 1-10 pp.

Jhooty JS and Behar DS 1970. Evaluation of different benomyl treatments for the control of Rhizoctonia damping off of peas. Pl. Dis. Rep. 54: 1049-52.

Khan J, Khan M and Amin M 1998. Distribution and integrated management of root rot of pea in Malakava division. Pakistan J. Bio. Sci. 1: 267-70.

Kapoor AS 2004. Integrated Disease Management in Peas. Final Technical Report NATP Sub project (CGP-II). 23pp.

Maheshwari SK, Jhooty JS and Gupta JS 1981. Studies on the wilt and root rot of pea and efficiency of various chemicals in controlling the wilt and root rot complex of pea. Agric. Sci. Digest India. 1: 37-38.

Masood, A. and Kumar, S. 2008 . India and global food security. The Hindu Survey of Indian Agriculture, pp 43-46.