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PJBS

ISSN 1028-8880

Pakistan Journal of Biological Sciences

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

The Response of Fazli Manani Plum (*Prunus domestica* L.) to Various Rootstocks

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Abstract: The vegetative and reproductive growth of Fazli Manani plum (scion variety) was studied on various locally available rootstocks viz; Peshawar local peach, Peshawar local plum, Hari apricot and Swat local peach at Agricultural Research Institute Tarnab, Peshawar, where the water table is 4-7 feet. The maximum mortality percentage (30%) was recorded in both peach rootstocks (Peshawar and Swat local peach). The Peshawar local plum and peach produced a vigorous tree through out the course of study, while the highest yield tree was obtained on scion variety budded on Peshawar local plum rootstock.

Key words: Rootstock, scion, shoot growth, girth and yield

Introduction

Fazli Manani Plum (*Prunus domestica* L.) has gained an importance as scion commercial variety on account of its better characteristics through out Pakistan but still this variety has the potential to produce best quality fruit by providing it a suitable rootstock. Most fruit species need a suitable rootstock because trees grown from seedlings are seldom as satisfactory as trees propagated on recognized rootstocks. It was reported that seedlings trees take longer to come into bearing and are usually prone to erratic cropping. He further added that a rootstock provides the rooting system on which the desired variety (called the scion) is budded or grafted. Correct choice of rootstock is important as the stock influences the behaviours of the tree throughout its life, especially its size, the age at which cropping begins, and the yield. The vegetative growth of the tree was reported vigorous on plum rootstock by Singh *et al.* (1990), Massai *et al.* (1993), Ystaas and Froyes (1993), Rozpara and Grzyb (1993) and Erdos and Suranyi (1994). But Pixy plum rootstock had dwarfing effect of the scion variety (Renaud and Canelas, 1994; Barroso and Renaud, 1993). Rootstock effect on yield was studied by many research scientists, most of them concluded that plum on plum rootstock produced the best results in terms of yield (Ystaas and Froyes, 1993; Ystaas *et al.*, 1994; Rozpara and Grzyb, 1993; Kosina, 1994). While in contrast Singh *et al.* (1990) reported no significant differences among plum rootstocks, they also observed that apricot rootstock for plum was incompatible and the plant did not survive. Childers (1973) reported that trees on peach rootstock do best when grown on well-drained sandy loam soils, but are not tolerant of wet soils.

Since rootstock has great influence on tree vigor, fruit yield and productive life of scion varieties, hence there was need to study the effects of commonly available rootstocks on Fazli Manani plum (Scion variety). So, this project was initiated to study various vegetative and productive growth parameters, which may be influenced by the rootstock.

Materials and Methods

The peach stone of Peshawar local, Swat local and apricot Hari were obtained from Peshawar, Swat and Haripur and were sown in well prepared plots in the month of November, 1993. The seedlings were budded with Fazli Manani plum as a scion variety. Next year uniform budded plants were selected from the nursery and were planted in regular field according to the Randomized Completely Block.

Each treatment was replicated five times, while each replication had 2 trees. The distance between plant to plant and row to row was kept 20 feet. Plant mortality percentage, Tree trunk Girth growth (Annual increment), Shoot growth and Fruit yield were recorded during the course of study.

Results and discussion

Plant Mortality: It was evident from Table 1 that maximum mortality (30 percent) was occurred in case of Peshawar local peach rootstock, where as it was minimum (10 percent) both in Apricot Hari and Plum Peshawar local rootstocks.

Shoot and girth growth: The shoot and girth growth was significantly ($p < 0.05$) maximum through out the period of five years. After one year of plantation, there were no significant differences in girth growth (Table 2) but shoot growth was poor in Hari apricot stock (Table 2). They showed significant differences in the girth increments during 2nd, 3rd and 4th years. Hari apricot stock gained poor growth among all rootstocks, while Peshawar local peach and plum were best. The trend of girth growth was similar and not significant during the 5th and 6th year, while shoot growth was significantly different among all stocks through out the course of study (Table 2). The trend of girth growth during the last two years (when the trees came into bearing) changed and was found not significant (Table 2). Hari apricot rootstock was poor before bearing but gained equal girth increments after bearing (Table 2) but poor shoot growth (Table 2), similarly concluded by Singh *et al.* (1990) and Black (1959). This trend shows that the degree of yield may affect the girth increment during bearing stage.

Table 1: Plant Mortality (%) as affected by different rootstocks

Rootstock	Mortality %
Peach Pesh. local	30 a
Peach Swat local	20 ab
Apricot Hari	10 b
Plum Pesh. Local	10 b

Means follow by the same letter are not significantly different ($p < 0.06$) Fisher LSD test

Yield: The mean yield was significantly ($p < 0.05$) varied among the plum Peshawar local and other rootstocks. During the first year of bearing there was no significant difference among peach Peshawar local, peach Swat local and Apricot Hari rootstocks, but yield was more in plum Peshawar local rootstock, While in the second year peach

Gul *et al.*: Evaluation of rootstock for Fazli Manani Plum

Table 2: The influence of various rootstocks on the growth of tree trunk girth and shoots (cm) during five (5) years

(A) Year-wise Increment In Tree Trunk Girth Growth (cm) tree ⁻¹						
Rootstock	1994	1995	1996	1997	1998	1999
Peach Peshawar local	8.20A	16.56A	23.83A	35.05A	45.04 A	52.07 A
Peach Swat local	8.70A	14.70AB	16.92AB	26.56A	32.97 AB	46.16 A
Apricot Hari	6.30A	11.3813	13.248	19.47A	25.088	37.86 A
Plum Peshawar Local	8.00A	15.42AB	21.49A	30.48A	39.83A	43.09 A
Significance	N.S	*	**	NS	*	NS
LSD at 5% level	-	2.42	3.86	-	7.87	-
(B) Year-wise Shoots Growth (cm) tree ⁻¹						
Rootstock	1994	1995	1996	1997	1998	1999
Peach Peshawar local	102.60A	126.90B	128.30A	135.40A	125.10A	117.40A
Peach Swat local	106.37A	139.74A	134.19BC	116.74BC	112.37B	94.448
Apricot Hari	84.90B	116.7813	131.66C	111.78C	106.2213	81.38C
Plum Peshawar Local	115.27A	121.49B	145.20A	126.89AB	117.33AB	101.498
Significance	**	**	**	**	**	**
LSD at 5% level	7.03	7.31	5.76	6.43	6.69	6.54

Means follow by the same letter are not significantly different ($p < 0.05$) Fisher LSD test. ($p < 0.01$) and ($p < 0.05$) denoted by N.S is not significant

Table 3: The effect of different rootstocks on the yield of Fazli Manani plum

Rootstock	Two years mean Yield (kg) tree ⁻¹	
	1998	1999
Peach Peshawar local	10.96AB	29.08B
Peach Swat local	9.34B	22.82B
Apricot Hari	7.08B	13.73C
Plum Peshawar Local	18.65A	39.31A
Significance	*	**
LSD at 5% level	4.99	4.84

Means follow by the same letter are not significantly different ($p < 0.05$) Fisher LSD test

($p < 0.01$) and ($p < 0.051$) denoted by ** and * respectively

Peshawar local and peach Swat local were better than Apricot Hari, but obtained lower yield as compared to plum Peshawar local also reported. Over all Fazli Manani plum as a scion variety produced highest yield on plum Peshawar local rootstock (Table 3) as also observed previously by Dulliurn and Dalbro (1955), Paulic (1983), Ystaas and Froynes (1993), Ystaas *et al.* (1994), Rozpara and Grzyb (1993) and Kosina (1994).

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