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## Bud Take Success of Different Almond Varieties on Peach Rootstock

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**Abstract:** The bud sprouting percentage was maximum in all almond varieties except Genco, which showed poor results. The bud survival percentage was high 85.11 and 79.68 % in Tuono and Ferrastar, respectively. All the varieties showed no significant differences in the Scion height and number of branches produced. It can be concluded that Ferrastar and Tuono can be successfully budded on local peach rootstock at Peshawar valley.

**Key words:** Almond, Bud take success, peach rootstock

### Introduction

Almond, *Prunus amygdalus* L. is important specie native to southwestern Asia. Numerous wild almond species are found in the mountainous desert regions extending from South Western Europe to Afghanistan, Turkistan and western china. The cultivated almond species apparently originated in central Asia (Iran) from hybridization among native species followed by local seedling selection by native peoples. Its cultivation spread along the shores of Mediterranean Sea into North Africa and to Italy, and Spain, southern France, Portugal. From their seeds it spread to other parts of the world, including the USA, Australia, South Africa and South America.

The leading exporting countries of almonds are USA and Spain followed by Italy, China and Iran. The USA and Spain produce more than 50% of the world production (Ahmad and Altaf, 1995). In Pakistan the total area under almond cultivation is 10.7 thousands ha and the production from it is 49.1 thousand tons. In NWFP total area under almond cultivation is 0.4 thousands ha and the production from it is 2.8 thousands tones (Anonymous, 1998a).

Almond is highly valuable dry fruit but systematic study is required to find the varieties for plains area. In this connection in past some varieties 1-e Non-pareil, Neplus Ultra, Mission, Vesta and Jardonala were imported from abroad (USA) and were evaluated at Agriculture Research Institute Tarnab Peshawar but non of these varieties performed better (Anonymous, 1998b).

Some new varieties, Fra Giulio Grande, Ferrastar, Ferragnose, Tuono and Genco of almond were imported from Italy and were cultivated during 1989. These varieties were budded on different exotic rootstocks, i-e GF 677, Franco, but these varieties produced low yield it may be due to the poor growth of tree. So this project was designed to study the response of these varieties to our local peach rootstock. Which is commercially used for almost all stone fruits at Peshawar.

In order to study budtake success, bud sprouting percentage, Scion height and plant survival percentage of almond. Five different varieties of almond Fra Giulio Grande, Ferrastar, Ferragnese, Tuono and Genco were budded on local peach rootstock with the following objectives.

To evaluate best compatible scion to local peach rootstock. To study growth performance of different almond varieties on local peach.

### Materials and Methods

To study the bud take success of different varieties of almond on peach rootstock a research work was conducted

at Agricultural Research Institute, Tarnab, Peshawar in the year 1999-2000. Five different variety of almond Fra Giulio Grande, Ferrastar, Ferragnese, Tuono and Genco were budded on Peach Peshawar local rootstock.

The experiment was laid out in Randomized Complete Block Design with five treatments (varieties) and three replications. After the analysis LSD test was applied to the means to check the significant difference. The row to row distance was 2.5 feet and the plant to plant distance was 3-4 inches. In each treatment the number of budded plants were 50. The total number of plants budded on the plant were 750 Nos. The seedlings were budded on 1st week of June.

Untying of buds and topping of the rootstock was done after two weeks of the budding. While bending of the stocks 6-8 cm above and apposite of the buds was done three weeks after budding. All the cultural practices like hoeing, weeding and irrigation were kept uniformly as usual during the research work. Data were recorded on the following growth parameters.

**Bud Sprouting percentage:** The sprouted buds in each treatment were counted after the completion of bud sprouting. Percentages of the buds were calculated as follows:

$$\text{Sprouting (\%)} = \frac{\text{Sprouted bud} \times 100}{\text{Total plant budded}}$$

**Bud survival percentage:** Plant survival was calculated by subtracting total number of bud sprouted from the plants remained alive and then percent plant survival was calculated as:

$$\text{Bud survival (\%)} = \frac{\text{Bud Survive} \times 100}{\text{Total plant budded}}$$

**Budling growth:** The budling growth was measured 150 days after budding in cm using measuring rod and average growth was calculated.

**Number of Branches:** Number of branches was counted on budling and average number of branches per plant was calculated.

### Results and Discussion

The result of the growth performance of different scion varieties of almond on peach rootstock is discussed as follow:

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Table 1: Bud sprouting percentage

Varieties	Average Sprouting %
Fra Giulio Grande	70.6
Ferrastar	68.6
Ferragnese	71.3
Tuono	60.6
Genco	30.6

Table 2: Analysis of variance for percent bud takes success of different almond varieties on peach rootstock

S. O. V	D.F	S.S	M.S	F.Value	Prob	Remarks
Hepircetton	2	3.600	1.800	0.1444		
Varieties	4	907.067	226.767	18.1898	0.0004	***
Error	8	99.733	12.467			
Total	14	1010.400				

\*\*\* = Highly significant at 0.050 level of significance

Table 3: Bud survival percentage

Treatments or varieties	Bud survival %
Fragiulio Grande	63.98
Ferrastar	79.686
Ferragnose	73.794
Tuono	85.114
Genco	42.734

Table 4: Analysis of variance for percent bud survival of different almond varieties on peach rootstock

S. O. V	D.F	S.S	M.S	F.Value	Prob	Remarks
Replication	2	6.990	3.495	0.4051		
Varieties	4	834.919	208.730	24.1918	0.0002	***
Error	8	69.025	8.628			
Total	14	910.934				

\*\*\* = Highly significant at 0.050 level of significance

Table 5: Analysis of variance for number of branches of different almond varieties on peach rootstock

S. O. V	D.F	S.S	M.S	F.Value	Prob	Remarks
Replication	2	4.133	2.067	0.4366		
Varieties	4	22.933	5.733	1.2113	0.3775	N.S
Error	8	37.867	4.733			
Total	14	64.933				

NS = Non significant at 0.050 level of significance

Table 6: Analysis of variance for Scion height and Growth of different almond varieties on peach rootstock

S. O. V	D.F	S.S	M.S	F.Value	Prob	Remarks
Replication	2	1765.158	882.579	2.0870		
Varieties	4	4529.023	1132.256	2.6773	0.1100	N.S
Error	8	3383.219	422.902			
Total	14	9677.400				

NS = Non significant at 0.050 level of significance

Table 7: Means data recorded for the Bud sprouting, Bud survival, Number of branches and Scion height

Varieties	Bud sprouting	Bud survival	Number of branches	Scion height
Fra-Giulio Grande	35.333A	31.990A	7	65.193
Ferrastar	34.333A	39.843AB	6.667	93.133
Ferragnese	35.667A	36.897BC	4	66.04
Tuono	33.333A	42.577C	7.333	103.293
Genco	15.3338	21.367D	5.333	104.14
Sivnificance	***	***	NS	NS

\*\*\* Denotes the results are high significant at 5% level of significance.

NS Denotes results are Non significant at 5% level of significance.

**Bud sprouting percentage:** The means for bud takes success is represented in Table 7. While the sprouting percentage and analysis of variance is given in Table 1 and 2 respectively. It is revealed from the ANOVA Table 1 that bud take success was significantly affected by different varieties the highest bud take success was observed in

Ferragnese (71.3 %) followed by Fra Giulio Grande (70.6%), Ferrastar, (68.6%), Tuono, (66.6%) and Genco (30.6%). Genco showed significantly poor bud take success (30.6%) as compared to the rest of varieties. This result shows that it might be the varietal character. Some varieties with in the same species behave differently in term of compatibility to rootstock. That's why the high bud take success shown by Ferragnese (71.334%) while other showed low as in case of Genco (30.66%). Similar results were also confirmed by Unal *et al.* (1995).

**Bud survival percentage:** The means for bud survival percentage is represented in Table 7. While data for bud survival ANOVA that Bud survival was significantly affected by different varieties at 0.050 level of significance (Table 3, 4) highest bud survival was found in Tuono, (85.154%), followed by Ferrastar (79.686 %), Ferragnose (73.794%), Fragiulio Grande (63.98 %) and Genco (42.734%) respectively. Similar results were also confirmed by Ninkovski (1986).

**No. of Branches:** The means for number of branches is represented in Table 7. The analysis of variance table for the number of branches is given in Table 5. As it is revealed from the analysis of variance table number of branches was not significantly effected by different varieties at 0.050 level of significance (Table 5). But highest number of branches was observed in Tuono (8), Followed by Fragiulio Grande (7), Ferrastar (7), Genco (5) and Ferragnose (4) respectively. Similar results were confirmed by Lonescue *et al.* (1986) and Sharma and Sharma (1986). Who stated highest rate of success of plum on wild peach.

**Scion height and Growth:** The means data recorded for the Scion height is represented in Table 7. The analysis of variance table for Scion height is given in Table 6. It is revealed from the analysis of variance table growth of scion was not significantly affected by different varieties at 0.050 level of significance (Table 6). However maximum growth was found in GENCO (104.140 cm), followed by Tuono 1108.293 cm), Ferrastar (93.133), Ferragnose (65.40 cm) and Fragiulio Grande (65.193 cm) respectively.

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