

Performance of Some Walnut Cultivars under Climatic Conditions of Murree Hills

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Abstract: The present studies were carried out on four walnut cultivars viz Hartley, Payne, Sorrento and Odom at the Hill Fruit Research Sub-Station, Lower Topa, Murree during 1999-2000. Vigorous plants were noted of Odom cultivar. Similarly Odom nuts were significantly larger in size having 36.70 mm length and 35.65 mm diameter as compared to the minimum size (29.50 mm length x 27.54 mm diameter) in cv. Sorrento. Weight of the fruit kernel and kernel percentage was maximum in Odom and minimum in Payne. Nuts of Odom cv. Mature in the first week of October while all other cultivars in second week of October. Significantly highest number of fruits/tree (205) and weight (2.07 Kg) was attained in Odom and least in other cultivars. Conclusively Odom cultivar of walnut is recommended for early maturity, large and heavy fruit and the maximum yield.

Key Words: Performance, walnut cultivars, climatic conditions, plant height, spread, blooming, maturity, nut size, nut weight and kernel percentage

Introduction

The origin of the word 'Walnut' has traced to 'Gaul nut': In the past, France was known as 'Gaul nut' which later on got converted into 'Walnut' in English. Another view is that the name walnut has been derived from 'Walnut' an old English word for 'Welsh-nut' (Beede, 1985). In literature it is usually called 'Persian walnut' wrongly termed as English Walnut and sometime called Carpathian Walnut'. Carpathian walnut is proved cold hardy race of *Juglans regia*, which survive and produce good crop even when temperature falls to -35 °C (Mitra *et al.*, 1991). Botanically walnut belongs to the family Juglandaceae and genus *Juglans*. This genus includes 21 species among which *regia* is the most important commercially cultivated in many countries. The other species are grown locally for timber and nuts. Ramos *et al.*, (1985) reported that the walnut can tolerate as low as -11 °C during deep dormancy but as soon as the growth commences after dormancy, the temperature 2 or 3 degrees below freezing point (0°C) kills leaves, shoots and flowers and thus resulting into crop failure. Regarding rainfall and site, Mitra *et al.*, (1991) pointed out that 80 cm rainfall is considered significant for the cultivation of walnuts. In severe drought conditions, the plant may make fair growth but nuts do not fill well. Similarly, in the Kashmir Valley, the flat and is used for rice cultivation, around the edges of hilly slopes are apple orchards while higher up the slopes at an altitude of about 2000 m or more are walnut plantation. Hartley and Payne are commercial cultivars of California (Brooks and Olmo, 1972). The shell of Hartley is light-coloured, thin and seal well.

Materials and Methods

The present studies were carried out at the Hill Fruit Research Sub-Station, Lower Topa, Murree during the years 1999-2000. Four walnut cultivars viz. Hartley, Payne, Sorrento and Odom of ten years age were selected. The first three varieties were brought from Italy through an Italian project and the last variety was brought from Oregon State University, U. S. A. and planted during spring, 1988. The experiment was laid out in Randomized Complete Block Design (RCBD) with four treatments and five trees per replication. Analysis of variance techniques were adopted at five percent level of probability for data processing (Steel and Torrie, 1990). Height and spread of the plants were taken in meters with the help of measuring rod while stem girth in cms with the help of measuring tape. Walnuts were harvested when the hulls on the nuts became loose and started bursting. Whole walnut crop was hand picked, hulls were removed from the nuts. These walnuts were sun dried for seven days. Twelve fruits from the dried heap were picked up randomly. Size (length and diameter) of fruit was measured in mm with the help of Digital Vernier

Callipers. Yield was determined both in number and total weight per tree. Individual fruit weight and kernel weight was also calculated in grams. Kernel percentage was calculated on the basis of whole weight and kernel weight.

Results and Discussion

The plant vigour in terms of stem girth and spread measured in meters was found significant (Table 1). Maximum plant spread was in Odom followed by Hartley and minimum plant spread was noted in Sorrento. Though the plant height was non significant yet maximum plant height was attained by Odom cultivar of walnut followed by Hartley and minimum in Payne.

Maximum stem girth was noted in Odom followed by Hartley and minimum stem girth was in Payne with mean of 10.70 cms/tree. Almost similar results were noted during second year pertaining to plant height, spread and stem girths parameters in various cultivars of walnut. These findings are partly supported by Brooks and Olmo, 1972 that Hartley and Payne are commercial cultivars of California.

The cultivar Odom gave early bloom and all other cultivars late. The early bloom in Odom may be due to low chilling requirement as compared to all other cultivars. Like blooming, Odom cultivar also matures one week earlier than all other cultivars. Whereas all the four cultivars of walnut under trial viz. Hartley, Payne, Sorrento and Odom are thin-shell cultivars (Table 2).

The fruit size both in length and diameter measured in millimeters was found significant during 1999 and 2000 (Table 3). Maximum fruit length was attained by Odom followed by Hartley and minimum length was recorded in Sorrento. Fruit size in diameter was also maximum in Odom followed by all other cultivars. Almost similar trend was noted during second year. It is evident from the data presented in Table 4 that individual fruit weight has been found significantly different from each other in various cultivars of walnut during both years of studies. Maximum weight of fruit was in Odom followed by Sorrento during first year. Almost similar results were found during second year. The present findings are fully corroborate with the findings of Brooks and Olmo 1972 that shell of Hartley is light coloured thin and seal well. Walnut kernel weight calculated in grams in various tested cultivars during 1999 and 2000 were found significant. Maximum kernel weight was found in Odom cultivar followed by Sorrento while minimum kernel weight was calculated in Hartley. Almost similar results were noted during 2000. It was noted from the experimental data (Table 4) that during first year, maximum kernel percentage was noted in Odom against all other tested cultivars ranging from 33.39 to 43.01. Almost similar results were found during the second

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Table 1: Plant Vigour of Four Walnut Cultivars

Cultivars	Plant Height (m)		Plant Spread(m)		Stem Girth (cm)	
	1999	2000	1999	2000	1999	2000
Hartley	2.85	3.10	2.38 ab	2.44 b	18.20ab	26.25ab
Payne	2.46	2.82	1.72 c	1.94 c	10.70 c	18.50 c
Sorrento	2.70	2.99	2.16 bc	2.39 c	13.07 bc	20.25bc
Odom	3.10	3.50	2.86 a	2.99 a	20.11 a	27.20 a
LSD @ 5%	-	-	0.48	0.43	6.64	6.22

Means followed by different letters significantly different at 5 % probability level

Table 2: Blooming Period, Maturity and Shell Thickness In Walnut Cultivars

Cultivars	Blooming Period		Maturity		Shell Thickness	
	1999	2000	1999	2000	1999	2000
Hartley	April, 3rd week	April, 3rd week	October, 2nd week	October, 2nd week	Thin	Thin
Payne	April, 3rd week	April, 3rd week	October, 2nd week	October, 2nd week	Thin	Thin
Sorrento	April, 3rd week	April, 3rd week	October, 2nd week	October, 2nd week	Thin	Thin
Odom	April, 2nd week	April, 2nd week	October, 1st week	October, 1st week	Thin	Thin

Table 3: Nut Length and Nut Diameter of four Walnut Cultivars

Cultivars	Nut Length (mm)		Nut Diameter (mm)\	
	1999	2000	1999	2000
Hartley	30.72 b	29.67 b	25.60 b	24.70b
Payne	30.00 b	28.89 bc	25.58b	24.18 b
Sorrento	29.50 b	27.54 c	25.70 b	24.80 b
Odom	36.70 a	35.65 a	36.40 a	35.50 a
LSD @ 5%	2.09	1.50	1.84	1.14

Means followed by different letters significantly different at 5 % probability level

Table 4: Nut With, kernal Weight Kernal Percentage, Number of Fruits/Tree and Nut Weight/Tree in Four Walnut Cultivars

Characters	Years	Cultivars				LSD value @ 5 %
		Hartley	Payne	Sorrento	Odom	
Nut Weight (g)	1999	5.95 b	5.84 b	6.44 b	10.12 a	1.54
	2000	5.49 b	5.33 b	6.30 b	9.95 a	1.30
Kernal Weight (g)	1999	2.31 c	1.95 d	2.77 b	6.57 a	0.21
	2000	1.94 bc	1.74 b	2.58 b	6.60 a	2.17
Kernel Percentage	1999	38.82 b	33.39 c	43.01 b	64.92 a	4.49
	2000	35.43 b	32.70 b	41.40 b	67.05 a	2.17
Number of Nuts/tree	1999	120.00 c	95.00 d	145.00 b	205.00 a	16.00
	2000	137.00 c	112.00 d	168.00 b	211.00 a	6.80
Nut Weight (Kg/tree)	1999	0.71	0.55	0.93	2.07	-
	2000	0.75 c	0.59 c	1.06 b	2.09 a	0.21

Means followed by different letters significantly different at 5 % probability level

year. The highest kernel percentage was in Odom which is due to thin shell and full development of kernel.

Yield: Significant differences were found for yield both in number of walnuts per tree and nut weight per tree except the nut weight per tree during 1999, Table 4. During first year, maximum number of walnuts per tree were obtained in Odom followed by Sorrento and Hartley. Minimum number of nuts per tree were in Payne. Similarly maximum nut weight per tree was noted in Odom and minimum in Payne. Sorrento and Hartley cultivars of walnut were found intermediocre in nut weight per tree with means of 0.93 Kg and 0.71 Kg/tree, respectively.

Almost similar trend was noted during second year pertaining to yield in umber of nuts/tree. But during 1999, the nut weight per tree did not respond at all. The literature on the various aspects of walnut cultivar is laching.

References

- Beede, R. H., 1985. Walnut Orchard Management. Div. Agric. Nat. Res., Univ. Cali., pp: 2-8.
- Brooks, R. M. and H. P. Olmo, 1972. Register of New Fruit and Nut varieties. Univ. Of Calif. Press. Barkley and Los Angeles. U.S.A. pp: 613-639.
- Mitra, S. K., Rathore, D. S. and T. K. Bose, 1991. Walnut., Temperate Fruits. Published by Horticulture and Allied Publishers 27/3, Chakraberia Lane, Calcutta, India. Pp: 377-414.
- Ramos, D. E., McGranahau, G. and L. Hendricks, 1985. Walnut Orchard Management. Div. Agric. Nat. Res., Univ., Calif. pp: 96-102.
- Steel, R. G. G. and J. H. Torrie, 1990. Principles and Procedures of Statistics, McGraw Hill Book C., New York, U. S. A.