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Effect of irrigation, pruning severity & nitrogen fertilization on fruit quality of plum cv. Santa Rosa

Ashima Suklabaidya and Kuldeep Mehta

Abstract
An experiment was conducted to standardize the renewal pruning intensities under different irrigation & nitrogen levels for getting better yield & quality fruits in *Santa Rosa* plum. There were three irrigation levels, four pruning severities and two nitrogen levels. Pruning was done in the month of January every year. Pruning treatments exhibited a significant effect on fruit quality during both the years of study. Irrigation at 20 per cent soil moisture depletion of field capacity resulted in higher tree growth, fruit size and quality fruits. Fruit weight, volume, size, fruit firmness (75 % of HB) pruned trees whereas fruit yield was higher in lightly (25 % of HB) and normal pruned trees. Maximum reducing sugars, total sugars and non-reducing sugars were observed in I_3 and minimum in I_1 treatment. Reducing sugars, total sugars and non-reducing sugars in fruits tended to increase significantly with the increasing pruning severity. Among the nitrogen fertilization treatments, maximum was recorded at N_1as compared to N_2.

Keywords: Plum trees, *Prunus salicina*, pruning, nitrogen fertilization, irrigation, fruit quality

1. Introduction
Among the stone fruits, '*Santa Rosa*' plum (*Prunus. salicina*) is one of the important fruit crop of the temperate regions. Efficient orchard management practices have a key role in enhancing the productivity of plums. Pruning, nitrogen fertilization, and irrigation are important cultural practices which affect yield and quality in plums.
Work on the standardization of plum and fertilizer requirement of plum have been conducted separately by several workers under different set of agro-climatic conditions, but virtually no work has been carried out to standardize the optimum levels of pruning, irrigation & N-fertilization for regular and quality production of *Santa Rosa* plum. Keeping these facts in view, the present studies were undertaken.

2. Materials and Methods
The present studies were undertaken in the experimental orchard of Department of pomology, Dr. Y. S. Parmar University of Horticulture and Forestry, Solan (H.P) during 2010-2012. Seventy two trees of *Santa Rosa* plum with equal age and vigour, spaced at 6 m x 6 m were selected for trial purpose. The experiments was laid out in split-split plot design with, irrigation levels as the main plot, pruning levels as the Sub-plots and nitrogen levels as the Sub-Sub-plot treatment. The experimental unit consisted of a single tree. There were three irrigation levels, four pruning severities and two nitrogen levels with three replications.

Three irrigation levels are –
I_1 – Irrigation at 20 per cent soil moisture depletion of field capacity
I_2 – Irrigation at 40 per cent soil moisture depletion of field capacity
I_3 – Irrigation at 60 per cent soil moisture depletion of field capacity

There were four pruning severities –
T_1 – Heading back of scaffolds (75 percent)
T_2 – Heading back of scaffolds (50 percent)
T_3 – Heading back of scaffolds (25 percent)
T_4 – Normal pruning

i) Heading back of scaffolds 75%:- Shortening of scaffolds branches was done by $3/4^{th}$ & consisted of 45 to 50 percent thinning out.
ii) Heading back of scaffolds 50%:- In this treatment the shortening of scaffolds branches was done by 1/2 and 45 to 50 percent thinning out.

iii) Heading back of scaffolds 25%:- It consists of shortening of shoots by $1/3^{rd}$ and 45 to 50 percent thinning out.
iv) Normal pruning:- In this system recommended practice of pruning is followed. Pruning was done in January every year.

Two nitrogen levels - N1, & N_2
N_1 – 75 percent additional nitrogen of recommended dose as CAN
N_2 – 50 percent additional nitrogen of recommended dose as CAN.
The size of the fruit was measured in terms of length and diameter. The length & diameter was measured with digital vernier calliper and expressed in milimeter (mm).Fruit weight was taken by weighing ten randomly selected fruits on electric top pan balance. The readings so obtained were average & expressed in g/fruit. The fruit volume was obtained by water displacement method in a graduated cylinder and was expressed in cubic centimeter (CC). For Stone weight a unit sample of fruits were weighed, the stones removed from the fruits, were washed under the tap water, dried between two sheets of filter papers and weighed. The results were expressed in grams as weight per stone. Pulp stone ratio was obtained by subtracting the average weight of seed from the average weight of fruit and expressed in percentage. Fruit Firmnes was determined with the help of penetrometer and the average pressure was expressed in kg cm^{-2}. Yield was recorded as the total fruit weight harvested from the tree in each year and expressed as kg/tree. The pooled analysis (over years) was done and the observation was recorded for the following parameters. T.S.S, Titratable acidity, Total sugars, Reducing sugar, Non-reducing sugars were estimated by the method described by A.O.A.C (1980) [1].

3. Results and Discussion

Fruit size, weight and volume were significantly affected by different levels of irrigation during both the years of study. Maximum fruit size, weight and volume was recorded at 20 per cent soil moisture depletion of field capacity & minimum at 60 percent. Greater fruit size, weight, and volume at 20 per cent SMD of field capacity may be attributed to better availability of water & nutrients for growth & development of fruits. There findings are in comformity with Tagi (1984) [16], Sharma and Chandel (2005) [14]. Rana *et al*. (2000) [11] also recorded highest fruit size, weight & volume of Kiwi fruit when vines are irrigated at 20 per cent SMD of field capacity & lowest in unirrigated vines. Pruning had a marked influence on average fruit size, weight and volume. In 2010-2011 there was no fruit due to heavy pruning whereas in the next year highest fruit length, diameter, weight and volume was recorded in T_1 treatment (75 % HB of scaffolds).

Table 1a: Effect of different levels of irrigation, pruning and nitrogen on fruit length (mm) and fruit diameter (mm)

Treatments	Fruit length (mm)			Fruit diameter (mm)		
	2010-2011	2011-2012	Pooled	2010-2011	2011-2012	Pooled
Irrigation levels (Main Plot Treatment)						
I_1 (20% SMD of field capacity)	29.45 (5.00)	44.19 (6.64)	36.82 (6.03)	29.63 (5.02)	41.74 (6.45)	35.68 (5.92)
I_2 (40% SMD of field capacity)	27.76 (4.87)	41.20 (6.41)	34.48 (5.83)	26.96 (4.80)	38.78 (6.22)	32.87 (5.69)
I_3 (60% SMD of field capacity)	25.84 (4.71)	37.40 (6.10)	31.57 (5.58)	25.36 (4.67)	35.43 (5.95)	30.39 (5.46)
$CD_{0.05}$	0.05	0.07	0.05	0.02	0.03	0.02
Pruning (Sub plot treatment)						
T_1 (Heading back of scaffolds 75%)	0.00 (1.00)	44.50 (6.66)	22.25 (4.71)	0.00 (1.00)	40.55 (6.36)	20.27 (4.49)
T_2 (Heading back of scaffolds 50%)	39.23 (6.34)	41.96 (6.47)	40.60 (6.36)	38.52 (6.28)	39.33 (6.26)	38.92 (6.23)
T_3 (Heading back of scaffolds 25%)	36.79 (6.14)	39.80 (6.30)	38.29 (6.18)	36.09 (6.08)	37.99 (6.15)	37.04 (6.08)
T_4 (Normal Pruning)	34.73 (5.97)	37.32 (6.10)	36.02 (5.99)	34.65 (5.96)	36.74 (6.05)	35.69 (5.97)
$CD_{0.05}$	0.05	0.06	0.04	0.02	0.02	0.01
Nitrogen (Sub-sub plot treatment)						
N_1 (75% additional N as CAN)	28.19 (4.90)	41.73 (6.45)	34.96 (5.87)	27.85 (4.87)	39.75 (6.30)	33.80 (5.76)
N_2 (50% additional N as CAN)	27.18 (4.82)	40.06 (6.32)	33.62 (5.75)	26.78 (4.79)	37.55 (6.12)	32.17 (5.62)
$CD_{0.05}$	0.01	0.03	0.02	0.02	0.02	0.02

Since pruning decreases the number of flower buds and consequently the number of fruits, i.e., reduction in the crop load could be the probable reason for increased fruit size due to pruning. Another possible explanation for the increased fruit size with increasing pruning may be the increased uptake of nutrients especially N and K by plum trees (Sharma, 1995) [12]. Kanwar (1978) and Singh (1992) [15] also reported bigger fruits due to heavy pruning.
Fruit size, weight and volume increased significantly with the N application. Sharma and Awasthi (1985), Arora *et al*. (1999) [2] and Badyal (1980) [4] also observed higher fruit weight with N application in Santa Rosa plum and peaches. This is because of the fact that N is extremelly mobile and developing fruits act as a metabolic sink for the nutrient elements. The increase in fruit size, weight and volume could be attributed to its central role in various metabolic processes in the plant.
I x T and I x N interaction was found to be significant for both the years of study for fruit diameter & T x N had non-significant effect.

Table 1b: Effect of different interaction I x T, I x N and T x N on fruit length (mm) and fruit diameter (mm) in plum

Interactions	Fruit length (mm)			Fruit diameter (mm)		
	2010-2011	2011-2012	Pooled	2010-2011	2011-2012	Pooled
I_1T_1	0.00 (1.00)	48.54 (6.96)	24.27 (4.92)	0.00 (1.00)	43.93 (6.62)	21.97 (4.68)
I_1T_2	41.88 (6.54)	44.63 (6.68)	43.26 (6.57)	42.01 (6.55)	42.70 (6.53)	42.36 (6.50)
I_1T_3	38.82 (6.31)	42.81 (6.54)	40.81 (6.38)	38.91 (6.31)	41.02 (6.40)	39.97 (6.32)
I_1T_4	37.11 (6.17)	40.76 (6.38)	38.94 (6.24)	37.60 (6.21)	39.29 (6.26)	38.44 (6.19)
I_2T_1	0.00 (1.00)	44.82 (6.69)	22.41 (4.73)	0.00 (1.00)	40.97 (6.40)	20.48 (4.52)
I_2T_2	38.97 (6.32)	42.56 (6.52)	40.77 (6.38)	37.83 (6.23)	39.52 (6.27)	38.58 (6.21)

I_2T_3	36.80 (6.14)	40.13 (6.33)	38.46 (6.20)	35.64 (6.05)	38.02 (6.16)	36.83 (6.06)
I_2T_4	35.28 (6.02)	37.29 (6.10)	36.28 (6.02)	34.37 (5.94)	36.82 (6.06)	35.60 (5.96)
I_3T_1	0.00 (1.00)	40.13 (6.33)	20.06 (4.47)	0.00 (1.00)	36.74 (6.06)	18.37 (4.28)
I_3T_2	36.85 (6.15)	38.68 (6.21)	37.77 (6.14)	35.72 (6.05)	35.96 (5.99)	35.84 (5.98)
I_3T_3	34.74 (5.97)	36.47 (6.03)	35.61 (5.96)	33.73 (5.89)	34.93 (5.90)	34.33 (5.85)
I_3T_4	31.78 (5.72)	33.92 (5.82)	32.85 (5.73)	31.97 (5.74)	34.10 (5.83)	33.04 (5.74)
$CD_{0.05}$	0.11	NS	NS	0.03	0.03	0.03
I_1N_1	29.77 (5.03)	44.81 (6.69)	37.29 (6.07)	30.17 (5.06)	42.95 (6.55)	36.56 (6.00)
I_1N_2	29.14 (4.98)	43.56 (6.59)	36.35 (5.99)	29.09 (4.98)	40.52 (6.36)	34.80 (5.85)
I_2N_1	28.43 (4.92)	41.91 (6.47)	35.17 (5.89)	27.40 (4.84)	39.44 (6.27)	33.42 (5.74)
I_2N_2	27.09 (4.81)	40.49 (6.35)	33.79 (5.77)	26.52 (4.77)	38.12 (6.17)	33.32 (5.64)
I_3N_1	26.36 (4.75)	38.46 (6.19)	32.41 (5.65)	25.98 (4.72)	36.84 (6.06)	31.41 (5.56)
I_3N_2	25.32 (4.67)	36.14 (6.00)	30.73 (5.50)	24.73 (4.62)	34.02 (5.83)	29.38 (5.37)
$CD_{0.05}$	0.02	NS	0.02	NS	0.04	0.02
T_1N_1	0.00 (1.00)	45.45 (6.73)	22.73 (4.76)	0.00 (1.00)	41.62 (6.44)	20.81 (4.55)
T_1N_2	0.00 (1.00)	42.79 (6.59)	21.77 (6.24)	0.00 (1.00)	40.25 (6.34)	20.12 (4.43)
T_2N_1	37.54 (6.20)	43.54 (6.36)	41.32 (4.66)	39.29 (6.43)	39.47 (6.27)	39.38 (6.23)
T_2N_2	36.03 (6.08)	41.12 (6.24)	39.88 (6.12)	38.46 (6.07)	38.40 (6.06)	38.43 (6.16)
T_3N_1	39.84 (6.38)	40.55 (6.53)	39.05 (6.42)	36.68 (6.24)	39.17 (6.25)	37.92 (6.07)
T_3N_2	35.37 (6.02)	39.06 (6.17)	37.54 (6.05)	35.43 (6.03)	37.94 (6.19)	36.69 (6.05)
T_4N_1	38.63 (6.40)	38.11 (6.40)	36.74 (6.31)	35.51 (6.05)	36.81 (6.15)	36.16 (6.01)
T_4N_2	34.08 (5.91)	36.53 (6.03)	35.31 (5.93)	33.86 (5.90)	35.53 (5.95)	34.70 (5.88)
$CD_{0.05}$	0.02	NS	NS	0.02	NS	NS

Table 1c: Effect of irrigation, pruning and nitrogen fertilization (I x T x N) interaction on fruit length (mm) and fruit diameter (mm)

Interactions	Fruit length (mm)			Fruit diameter (mm)		
	2010-2011	2011-2012	Pooled	2010-2011	2011-2012	Pooled
$T_1N_1I_1$	0.00 (1.00)	49.10 (7.00)	24.55 (4.95)	0.00 (1.00)	44.90 (6.70)	22.45 (4.73)
$T_2N_1I_1$	42.48 (6.59)	45.15 (6.71)	43.81 (6.61)	42.93 (6.62)	43.64 (6.60)	43.29 (6.57)
$T_3N_1I_1$	38.58 (6.37)	43.57 (6.60)	41.57 (6.44)	39.55 (6.36)	42.60 (6.52)	41.07 (6.40)
$T_4N_1I_1$	37.03 (6.16)	41.44 (6.43)	39.23 (6.26)	38.18 (6.26)	40.68 (6.37)	39.43 (6.27)
$T_1N_2I_1$	0.00 (1.00)	47.99 (6.92)	23.99 (4.89)	0.00 (1.00)	42.96 (6.55)	21.48 (4.63)
$T_2N_2I_1$	41.29 (6.50)	44.11 (6.64)	42.70 (6.53)	41.08 (6.48)	41.77 (6.46)	41.42 (6.43)
$T_3N_2I_1$	38.06 (6.24)	42.05 (6.48)	40.05 (6.32)	38.28 (6.26)	39.45 (6.28)	38.86 (6.23)
$T_4N_2I_1$	37.20 (6.18)	40.07 (6.33)	38.65 (6.21)	37.01 (6.16)	37.90 (6.15)	37.45 (6.12)
$T_1N_1I_2$	0.00 (1.00)	48.78 (6.76)	22.89 (4.78)	0.00 (1.00)	41.79 (6.46)	20.89 (4.57)
$T_2N_1I_2$	39.89 (6.39)	43.38 (6.58)	41.63 (6.45)	38.29 (6.26)	40.05 (6.32)	39.17 (6.25)
$T_3N_1I_2$	37.41 (6.19)	40.73 (6.38)	39.07 (6.25)	36.11 (6.09)	38.65 (6.21)	37.38 (6.11)
$T_4N_1I_2$	36.44 (6.11)	37.76 (6.14)	37.10 (6.09)	35.20 (6.01)	37.29 (6.10)	36.24 (6.02)
$T_1N_2I_2$	0.00 (1.00)	43.86 (6.62)	21.93 (4.68)	0.00 (1.00)	40.15 (6.33)	20.07 (4.48)
$T_2N_2I_2$	38.05 (6.24)	41.75 (6.46)	39.90 (6.31)	37.38 (6.19)	38.59 (6.21)	37.09 (6.16)
$T_3N_2I_2$	36.19 (6.09)	39.53 (6.28)	37.86 (6.15)	35.17 (6.01)	37.39 (6.11)	36.28 (6.02)
$T_4N_2I_2$	34.12 (5.92)	36.82 (6.06)	35.47 (5.95)	33.54 (5.87)	36.36 (6.02)	34.95 (5.91)
$T_1N_1I_3$	0.00 (1.00)	41.48 (6.44)	20.74 (4.55)	0.00 (1.00)	38.17 (6.17)	19.08 (4.36)
$T_2N_1I_3$	37.15 (6.17)	39.86 (6.31)	38.50 (6.20)	36.64 (6.13)	37.06 (6.08)	36.85 (6.07)
$T_3N_1I_3$	35.65 (6.05)	37.35 (6.11)	36.50 (6.04)	34.38 (5.94)	36.27 (6.02)	35.32 (5.94)
$T_4N_1I_3$	32.65 (5.80)	35.14 (5.92)	33.90 (5.82)	32.91 (5.82)	35.86 (5.98)	34.38 (5.86)
$T_1N_2I_3$	0.00 (1.00)	38.78 (6.22)	19.39 (4.40)	0.00 (1.00)	35.31 (5.94)	17.65 (4.20)
$T_2N_2I_3$	36.55 (6.12)	37.51 (6.12)	37.03 (6.08)	34.81 (5.98)	34.85 (5.90)	34.83 (5.90)
$T_3N_2I_3$	33.84 (5.90)	35.59 (5.96)	34.71 (5.89)	33.08 (5.83)	33.59 (5.79)	33.33 (5.77)
$T_4N_2I_3$	30.91 (5.64)	32.69 (5.71)	31.80 (5.63)	31.04 (5.66	32.33 (5.68)	31.69 (5.62)
$CD_{0.05}$	0.05	NS	NS	NS	NS	NS

Figures in parentheses are square root transformed values

Table 2a: Effect of different levels of irrigation, pruning and nitrogen on fruit weight (g) and fruit volume (cc).

Treatments	Fruit weight (g)			Fruit volume (cc)		
	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
Irrigation levels (Main Plot Treatment)						
I_1 (20% SMD of field capacity)	29.67 (5.02)	47.33 (6.87)	38.50 (6.16)	30.00 (5.05)	46.65 (6.82)	38.32 (6.15)
I_2 (40% SMD of field capacity)	28.36 (4.92)	44.37 (6.65)	36.36 (5.99)	28.76 (4.95)	44.20 (6.64)	36.48 (6.00)
I_3 (60% SMD of field capacity)	26.70 (4.78)	40.79 (6.38)	33.75 (5.77)	27.03 (4.81)	39.59 (6.28)	33.31 (5.73)
$CD_{0.05}$	0.03	0.05	0.04	0.04	0.04	0.03
Pruning (Sub plot treatment)						
T_1 (Heading back of scaffolds 75%)	0.00 (1.00)	47.20 (6.86)	23.60 (4.85)	0.00 (1.00)	46.28 (6.79)	23.14 (4.80)
T_2 (Heading back of scaffolds 50%)	39.54 (6.36)	45.16 (6.71)	42.35 (6.50)	40.00 (6.40)	44.27 (6.64)	42.13 (6.48)
T_3 (Heading back of scaffolds 25%)	37.38 (6.19)	43.16 (6.56)	40.27 (6.34)	37.88 (6.23)	42.49 (6.51)	40.19 (6.33)
T_4 (Normal Pruning)	36.04 (6.08)	41.13 (6.41)	38.59 (6.20)	36.50 (6.12)	40.89 (6.38)	38.70 (6.21)
$CD_{0.05}$	0.04	0.05	0.03	0.04	0.04	0.03
Nitrogen (Sub-sub plot treatment)						
N_1 (75% additional N as CAN)	28.70 (4.94)	44.81 (6.68)	36.75 (6.02)	29.06 (4.97)	44.49 (6.66)	36.77 (6.02)
N_2 (50% additional N as CAN)	27.79 (4.87)	43.52 (6.59)	35.65 (5.93)	28.13 (4.90)	42.47 (6.51)	35.30 (5.90)
$CD_{0.05}$	0.02	0.03	0.02	0.02	0.02	0.02

Table 2b: Effect of different interaction I x T, I x N and T x N on fruit weight (g) and fruit volume (cc)

Interactions	Fruit weight (g)			Fruit volume (cc)		
	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
I_1T_1	0.00 (1.00)	50.60 (7.11)	25.30 (5.02)	0.00 (1.00)	49.89 (7.06)	24.94 (4.99)
I_1T_2	41.95 (6.55)	48.21 (6.94)	45.08 (6.71)	42.55 (6.59)	46.95 (6.85)	44.75 (6.68)
I_1T_3	38.87 (6.31)	46.09 (6.78)	42.48 (6.51)	39.29 (6.34)	45.33 (6.73)	42.31 (6.50)
I_1T_4	37.85 (6.23)	44.41 (6.66)	41.13 (6.41)	38.16 (6.25)	44.41 (6.66)	41.28 (6.42)
I_2T_1	0.00 (1.00)	47.42 (6.88)	23.71 (4.86)	0.00 (1.00)	46.66 (6.83)	23.33 (4.83)
I_2T_2	39.52 (6.36)	45.42 (6.73)	42.47 (6.51)	39.92 (6.39)	45.19 (6.72)	42.55 (6.52)
I_2T_3	37.72 (6.22)	43.42 (6.58)	40.57 (6.37)	38.52 (6.28)	43.27 (6.57)	40.90 (6.39)
I_2T_4	36.19 (6.09)	41.21 (6.41)	38.70 (6.22)	36.59 (6.13)	41.69 (6.45)	39.14 (6.25)
I_3T_1	0.00 (1.00)	43.57 (6.60)	21.79 (4.66)	0.00 (1.00)	42.28 (6.50)	21.14 (4.59)
I_3T_2	37.16 (6.17)	41.85 (6.46)	39.51 (6.28)	37.53 (6.20)	40.65 (6.37)	39.09 (6.25)
I_3T_3	35.56 (6.04)	39.96 (6.32)	37.76 (6.14)	35.83 (6.06)	38.87 (6.23)	37.35 (6.11)
I_3T_4	34.09 (5.92)	37.76 (6.14)	35.93 (5.99)	34.76 (5.97)	36.57 (6.04)	35.66 (5.97)
$CD_{0.05}$	0.77	NS	NS	0.07	NS	NS
I_1N_1	30.13 (5.06)	47.95 (6.92)	39.04 (6.21)	30.64 (5.10)	47.26 (6.87)	38.95 (6.20)
I_1N_2	29.20 (4.98)	46.70 (6.83)	37.95 (6.12)	29.35 (5.00)	46.03 (6.78)	37.69 (6.10)
I_2N_1	28.89 (4.96)	44.78 (6.68)	36.83 (6.03)	29.07 (4.97)	44.90 (6.69)	36.98 (6.04)
I_2N_2	27.83 (4.87)	43.96 (6.62)	35.90 (5.95)	28.45 (4.92)	43.51 (6.59)	35.98 (5.96)
I_3N_1	27.07 (4.81)	41.69 (6.45)	34.38 (5.82)	27.47 (4.84)	41.30 (6.42)	34.38 (5.82)
I_3N_2	26.34 (4.75)	39.89 (6.31)	33.11 (5.71)	26.59 (4.77)	37.88 (6.15)	32.24 (5.63)
$CD_{0.05}$	NS	NS	NS	NS	0.02	0.02
T_1N_1	0.00 (1.00)	47.88 (6.91)	23.94 (4.89)	0.00 (1.00)	47.34 (6.87)	23.67 (4.86)
T_1N_2	0.00 (1.00)	45.76 (6.81)	23.26 (4.82)	0.00 (1.00)	45.22 (6.71)	22.61 (4.75)
T_2N_1	37.95 (6.24)	46.52 (6.76)	42.19 (6.44)	40.79 (6.46)	45.27 (6.72)	43.03 (6.55)
T_2N_2	40.42 (6.43)	43.97 (6.62)	41.61 (6.39)	39.21 (6.33)	43.26 (6.57)	41.23 (6.41)
T_3N_1	36.82 (6.14)	44.56 (6.50)	39.58 (6.28)	38.55 (6.28)	43.55 (6.59)	41.05 (6.40)
T_3N_2	36.42 (6.11)	42.34 (6.44)	39.01 (6.24)	37.21 (6.18)	41.44 (6.43)	39.32 (6.26)
T_4N_1	38.66 (6.29)	41.61 (6.67)	40.13 (6.29)	36.90 (6.15)	41.80 (6.46)	39.35 (6.27)
T_4N_2	38.66 (6.29)	40.65 (6.37)	38.16 (6.17)	36.11 (6.09)	39.98 (6.31)	38.04 (6.16)
$CD_{0.05}$	0.02	NS	NS	0.02	NS	NS

Figures in parentheses are square root transformed values.

Table 2c: Effect of irrigation, pruning and nitrogen fertilization (I x T x N) interaction on fruit weight (g) and fruit volume (cc)

Interaction	Fruit weight (g)			Fruit volume (cc)		
	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
$T_1N_1I_1$	0.00 (1.00)	51.47 (7.17)	25.73 (5.07)	0.00 (1.00)	50.14 (7.08)	25.07 (5.00)
$T_2N_1I_1$	42.70 (6.61)	48.51 (6.96)	45.61 (6.75)	43.53 (6.67)	47.46 (6.88)	45.50 (6.74)
$T_3N_1I_1$	39.56 (6.36)	46.93 (6.85)	43.25 (6.57)	40.47 (6.44)	46.02 (6.78)	43.25 (6.57)
$T_4N_1I_1$	38.27 (6.26)	44.89 (6.69)	41.58 (6.44)	38.56 (6.29)	45.43 (6.74)	42.00 (6.48)
$T_1N_2I_1$	0.00 (1.00)	49.74 (7.05)	24.87 (4.98)	0.00 (1.00)	49.64 (7.04)	24.82 (4.98)
$T_2N_2I_1$	41.20 (6.49)	47.90 (6.92)	44.55 (6.67)	41.57 (6.52)	46.45 (6.81)	44.01 (6.63)
$T_3N_2I_1$	38.17 (6.25)	45.24 (6.72)	41.70 (6.45)	38.10 (6.25)	44.65 (6.68)	41.37 (6.43)
$T_4N_2I_1$	37.43 (6.19)	43.93 (6.62)	40.68 (6.37)	37.75 (6.22)	43.39 (6.58)	40.57 (6.36)
$T_1N_1I_2$	0.00 (1.00)	47.99 (6.92)	24.00 (4.89)	0.00 (1.00)	47.44 (6.88)	23.72 (4.87)
$T_2N_1I_2$	40.98 (6.47)	45.88 (6.77)	43.43 (6.59)	40.74 (6.46)	45.87 (6.77)	43.30 (6.58)
$T_3N_1I_2$	38.10 (6.25)	43.72 (6.61)	40.91 (6.39)	38.67 (6.29)	43.96 (6.63)	41.31 (6.42)
$T_4N_1I_2$	36.47 (6.12)	41.51 (6.44)	38.91 (6.24)	36.86 (6.15)	42.32 (6.50)	39.59 (6.29)
$T_1N_2I_2$	0.00 (1.00)	46.85 (6.84)	23.43 (4.64)	0.00 (1.00)	45.89 (6.77)	22.95 (4.79)
$T_2N_2I_2$	38.05 (6.24)	44.96 (6.70)	41.50 (6.44)	39.09 (6.33)	44.51 (6.67)	41.80 (6.46)
$T_3N_2I_2$	37.35 (6.19)	43.13 (6.56)	40.24 (6.34)	38.38 (6.27)	42.58 (6.52)	40.48 (6.36)
$T_4N_2I_2$	35.91 (6.07)	40.91 (6.39)	38.41 (6.19)	36.33 (6.11)	41.06 (6.40)	38.69 (6.22)
$T_1N_1I_3$	0.00 (1.00)	44.18 (6.64)	22.09 (4.70)	0.00 (1.00)	44.43 (6.66)	22.22 (4.71)
$T_2N_1I_3$	37.58 (6.21)	42.88 (6.54)	40.23 (6.34)	38.09 (6.25)	42.48 (6.51)	40.28 (6.34)
$T_3N_1I_3$	36.18 (6.09)	41.26 (6.42)	38.72 (6.22)	36.51 (6.12)	40.66 (6.37)	38.58 (6.21)
$T_4N_1I_3$	34.51 (5.95)	38.43 (6.19)	36.47 (6.03)	35.27 (6.02)	37.64 (6.13)	36.45 (6.03)
$T_1N_2I_3$	0.00 (1.00)	42.96 (6.55)	21.48 (4.63)	0.00 (1.00)	40.13 (6.33)	20.06 (4.47)
$T_2N_2I_3$	36.74 (6.14)	40.83 (6.39)	38.78 (6.22)	36.97 (6.16)	38.82 (6.23)	37.90 (6.15)
$T_3N_2I_3$	34.95 (5.99)	38.66 (6.21)	36.80 (6.06)	35.15 (6.01)	37.09 (6.09)	36.12 (6.00)
$T_4N_2I_3$	33.67 (5.88)	37.10 (6.09)	35.39 (5.94)	34.24 (5.93)	35.49 (5.95)	34.87 (5.90)
$CD_{0.05}$	NS	NS	NS	NS	NS	NS

Figures in parentheses are square root transformed values.

Pulp to stone ratio – The pooled data indicates that highest pulp to stone ratio (30.40 %) was recorded in trees irrigated at 60 per cent & lowest value (26.36 %) was observed in trees irrigated at 20 per cent soil moisture depletion of field capacity. Pruning treatment also had significant effect on pulp stone ratio maximum pulp to stone ratio (33.50 %) was noticed under T_4 treatment & the minimum was obtained with T_1 treatment (14.77 %).

Table 3a: Effect of different levels of irrigation, pruning and nitrogen on fruit firmness (kg cm^{-2} and pulp-stone ratio (%)

Treatments	Fruit firmness (Kg cm^{-2})			Pulp-stone ratio (%)		
	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
Irrigation levels (Main Plot Treatment)						
I_1 (20% SMD of field capacity)	9.37 (3.00)	12.45 (3.52)	10.91 (3.26)	22.77 (4.44)	29.96 (5.47)	26.36 (5.07)
I_2 (40% SMD of field capacity)	10.29 (3.12)	13.70 (3.70)	12.00 (3.42)	24.15 (4.57)	31.90 (5.64)	28.02 (5.23)
I_3 (60% SMD of field capacity)	10.83 (3.19)	14.35 (3.78)	12.59 (3.50)	26.62 (4.78)	34.18 (5.84)	30.40 (5.44)
$CD_{0.05}$	0.06	0.02	0.05	0.14	0.10	0.09
Pruning (Sub plot treatment)						
T_1 (Heading back of scaffolds 75%)	0.0 (1.00)	12.75 (3.56)	6.37 (2.52)	0.00 (1.00)	29.53 (5.43)	14.77 (3.84)
T_2 (Heading back of scaffolds 50%)	13.13 (3.75)	13.15 (3.62)	13.14 (3.62)	31.88 (5.72)	31.94 (5.64)	31.91 (5.64)
T_3 (Heading back of scaffolds 25%)	13.56 (3.81)	13.87 (3.72)	13.72 (3.70)	32.65 (5.79)	33.10 (5.75)	32.88 (5.73)
T_4 (Normal Pruning)	13.97 (3.86)	14.23 (3.77)	14.10 (3.75)	33.51 (5.87)	33.48 (5.78)	33.50 (5.78)
$CD_{0.05}$	0.05	0.03	0.03	0.07	0.09	0.07
Nitrogen (Sub-sub plot treatment)						
N_1 (75% additional N as CAN)	9.86 (3.06)	13.19 (3.62)	11.53 (3.35)	24.02 (4.64)	32.46 (5.69)	28.73 (5.29)
N_2 (50% additional N as CAN)	10.47 (3.14)	13.81 (3.71)	12.14 (3.44)	25.00 (4.55)	31.57 (5.61)	28.28 (5.20)
$CD_{0.05}$	0.04	0.02	0.03	0.05	0.04	0.04

Table 3b: Effect of different interaction I x T, I x N and T x N on fruit firmness (Kg cm^{-2}) and pulp-stone ratio (%)

Interactions	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
I_1T_1	0.00 (1.00)	11.65 (3.41)	5.82 (2.41)	0.00 (1.00)	27.19 (5.21)	13.59 (3.68)
I_1T_2	11.80 (3.57)	12.05 (3.46)	11.93 (3.45)	29.55 (5.52)	30.07 (5.48)	29.81 (5.45)
I_1T_3	12.55 (3.68)	12.82 (3.57)	12.68 (3.56)	30.56 (5.61)	30.98 (5.56)	30.77 (5.54)
I_1T_4	13.17 (3.76)	13.28 (3.64)	13.22 (3.63)	30.97 (5.65)	31.61 (5.62)	31.29 (5.59)
I_2T_1	0.00(1.00)	13.10 (3.61)	6.55 (2.55)	0.00 (1.00)	29.81 (5.46)	14.90 (3.86)
I_2T_2	13.77 (3.83)	13.40 (3.66)	13.58 (3.68)	31.22 (5.67)	31.45 (5.60)	31.34 (5.59)
I_2T_3	13.57 (3.81)	14.03 (3.74)	13.80 (3.71)	32.27 (5.76)	32.96 (5.74)	32.61 (5.71)
I_2T_4	13.82 (3.84)	14.28 (3.77)	14.05 (3.74)	33.08 (5.83)	33.38 (5.77)	33.23 (5.76)
I_3T_1	0.00(1.00)	13.50 (3.67)	6.75 (2.59)	0.00 (1.00)	31.60 (5.62)	15.80 (3.97)
I_3T_2	13.82 (3.84)	14.00 (3.74)	13.91 (3.72)	34.87 (5.98)	34.31 (5.85)	34.59 (5.88)
I_3T_3	14.57(3.94)	14.77 (3.84)	14.67 (3.83)	35.13 (6.00)	35.36 (5.94)	35.25 (5.93)
I_3T_4	14.93(3.99)	15.13 (3.89)	15.03 (3.87)	36.49 (6.12)	35.45 (5.95)	35.97 (5.99)
$CD_{0.05}$	0.11	NS	NS	0.15	NS	NS
I_1N_1	9.07 (2.96)	11.83 (3.43)	10.45 (3.19)	22.53 (4.42)	29.42 (5.42)	25.97 (5.02)
I_1N_2	9.68 (3.04)	13.07 (3.61)	11.38 (3.33)	23.01 (4.47)	30.50 (5.52)	26.75 (5.11)
I_2N_1	9.81 (3.06)	13.53 (3.67)	11.67 (3.38)	23.66 (4.52)	31.50 (5.60)	27.58 (5.19)
I_2N_2	10.76 (3.18)	13.87 (3.72)	12.32 (3.47)	24.63 (4.61)	32.30 (5.68)	28.47 (5.27)
I_3N_1	10.70 (3.18)	14.21 (3.76)	12.45 (3.49)	25.89 (4.71)	33.78 (5.81)	29.83 (5.39)
I_3N_2	10.96 (3.21)	14.49 (3.80)	12.72 (3.52)	27.36 (4.84)	34.59 (5.87)	30.97 (5.49)
$CD_{0.05}$	NS	0.02	0.05	NS	NS	NS
T_1N_1	0.00 (1.00)	12.37(3.51)	6.18 (2.48)	0.00 (1.00)	28.86 (5.36)	14.43 (3.79)
T_1N_2	0.00 (1.00)	13.13 (3.62)	6.56 (2.56)	0.00 (1.00)	30.20 (5.49)	15.10 (3.88)
T_2N_1	12.53(3.67)	12.81(3.57)	12.67 (3.55)	31.20 (5.66)	31.61 (5.61)	31.40 (5.59)
T_2N_2	13.72 (3.83)	13.49 (3.67)	13.61 (3.68)	32.57 (5.78)	32.27 (5.67)	32.42 (5.69)
T_3N_1	13.30 (3.78)	13.57 (3.68)	13.43 (3.66)	32.06 (5.74)	32.78 (5.72)	32.42 (5.69)
T_3N_2	13.82 (3.84)	14.18 (3.76)	14.00 (3.74)	33.25 (5.84)	33.42 (5.77)	33.33 (5.77)
T_4N_1	13.62 (3.82)	14.01(3.74)	13.82 (3.71)	32.84 (5.81)	33.01 (5.74)	32.92 (5.73)
T_4N_2	14.32 (3.91)	14.46 (3.80)	14.39 (3.79)	34.19 (5.92)	33.96 (5.82)	34.07 (5.83)
$CD_{0.05}$	NS	NS	NS	NS	NS	NS

Figures in parentheses are square root transformed values

Among the nitrogen fertilization, pooled analysis of the data reveals that max pulp to stone (28.73 %) was found with treatment N_1 as compared to N_2 (28.28 %). From the perusal of data in Tables – 3b it is evident that interactions I x T, I x N and T x N were found to be non-significant during both the years of study.

T.S.S:- T.S.S & sugar content were significantly influenced by different levels of irrigation. Trees subjected to 60 per cent soil moisture levels resulted in highest T.S.S and sugar while lowest was recorded in 20 % SMD of field capacity. The possible explanation of higher total soluble solids content in the fruits harvested from trees receiving 60 per cent soil moisture level may be smaller size of fruits in which dilution of sugars are less as compared to bigger sized fruits obtained in trees irrigated at 20 per cent depletion of soil moisture level.

Table 3c: Effect of irrigation, pruning and nitrogen fertilization (I x T x N) interaction on fruit firmness (kg cm^{-2}) and pulp-stone ratio (%)

Interactions	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
$T_1N_1I_1$	0.00 (1.00)	10.73 (3.27)	5.36 (2.31)	0.00 (1.00)	26.00 (5.09)	13.00 (3.60)
$T_2N_1I_1$	11.13(3.48)	11.21(3.34)	11.17(3.34)	29.45 (5.51)	29.87 (5.46)	29.66 (5.44)
$T_3N_1I_1$	12.33(3.65)	12.37(3.51)	12.35(3.51)	30.17 (5.58)	30.68 (5.53)	30.42 (5.51)
$T_4N_1I_1$	12.83(3.71)	13.00(3.60)	12.92(3.59)	30.50 (5.61)	31.12 (5.57)	30.81 (5.55)

$T_1N_2I_1$	0.00(1.00)	12.57(3.54)	6.28(2.50)	0.00 (1.00)	28.37 (5.32)	14.18 (3.76)
$T_2N_2I_1$	12.47 (3.66)	12.90 (3.59)	12.68 (3.56)	29.65 (5.53)	30.27 (5.50)	29.96 (5.47)
$T_3N_2I_1$	12.77 (3.71)	13.27 (3.64)	13.02 (3.60)	30.95 (5.65)	31.27 (5.59)	31.11 (5.57)
$T_4N_2I_1$	13.50 (3.80)	13.57 (3.68)	13.53 (3.67)	31.43 (5.69)	32.09 (5.66)	31.76 (5.63)
$T_1N_1I_2$	0.00 (1.00)	12.97 (3.60)	6.48 (2.54)	0.00 (1.00)	29.29 (5.41)	14.64 (3.82)
$T_2N_1I_2$	12.80 (3.71)	13.33 (3.65)	13.07 (3.61)	30.24 (5.58)	30.72 (5.53)	30.48 (5.51)
$T_3N_1I_2$	13.13 (3.75)	13.77 (3.71)	13.45 (3.66)	31.84 (5.73)	32.92 (5.73)	32.38 (5.69)
$T_4N_1I_2$	13.33 (3.78)	14.07 (3.75)	13.70 (3.70)	32.55 (5.79)	33.08 (5.75)	32.81 (5.72)
$T_1N_2I_2$	0.00 (1.00)	13.23 (3.63)	6.61 (2.57)	0.00 (1.00)	30.33 (5.50)	15.17 (3.89)
$T_2N_2I_2$	14.73 (3.95)	13.47 (3.67)	14.10 (3.75)	32.21 (5.76)	32.18 (5.67)	32.20 (5.67)
$T_3N_2I_2$	14.00 (3.87)	14.30 (3.78)	14.15 (3.76)	32.71 (5.80)	32.99 (5.74)	32.85 (5.73)
T_4N_2I2	14.30 (3.91)	14.50 (3.80)	14.40 (3.79)	33.62 (5.88)	33.69 (5.80)	33.65 (5.80)
$T_1N_1I_3$	0.00 (1.00)	13.40 (3.66)	6.70 (2.58)	0.00 (1.00)	31.30 (5.59)	18.65 (3.95)
$T_2N_1I_3$	13.67 (3.82)	13.90 (3.72)	13.78 (3.71)	33.90 (5.90)	34.25 (5.85)	34.07 (5.83)
$T_3N_1I_3$	14.43 (3.92)	14.57 (3.81)	14.50 (3.80)	34.18 (5.92)	34.74 (5.89)	34.46 (5.86)
$T_4N_1I_3$	14.70 (3.96)	14.97 (3.86)	14.83 (3.85)	35.47 (6.03)	34.82 (5.90)	35.14 (5.92)
$T_1N_2I_3$	0.00 (1.00)	13.60 (3.68)	6.80 (2.60)	0.00 (1.00)	31.91 (5.64)	15.95 (3.99)
$T_2N_2I_3$	13.97 (3.86)	14.10 (3.75)	14.03 (3.74)	35.84 (6.07)	34.36 (5.86)	35.10 (5.92)
$T_3N_2I_3$	14.70 (3.96)	14.97 (3.86)	14.83 (3.85)	36.09 (6.08)	35.99 (5.99)	36.04 (6.00)
$T_4N_2I_3$	15.17 (4.02)	15.30 (3.91)	15.23 (3.90)	37.51 (6.20)	36.09 (6.00)	36.80 (6.06)
$CD_{0.05}$	NS	NS	NS	NS	NS	NS

Figures in parentheses are square root transformed values

Table 4a: Effect of different levels of irrigation, pruning and nitrogen on TSS (%) and titratable acidity (%)

Treatments	TSS (%)			Titratable acidity (%)		
	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
Irrigation levels (Main Plot Treatment)						
I_1 (20% SMD of field capacity)	15.15 (3.60)	16.74 (4.09)	15.94 (3.99)	0.42 (1.18)	0.63 (0.79)	0.53 (0.79)
I_2 (40% SMD of field capacity)	15.26 (3.88)	17.21 (4.14)	16.23 (4.03)	0.37 (1.16)	0.54 (0.73)	0.45 (0.73)
I_3 (60% SMD of field capacity)	15.40 (4.03)	17.31 (4.16)	16.35 (4.12)	0.32 (1.14)	0.46 (0.67)	0.39 (0.67)
$CD_{0.05}$	0.01	0.01	0.01	0.05	0.03	0.01
Pruning (Sub plot treatment)						
T_1 (Heading back of scaffolds 75%)	0.00 (1.00)	17.19 (4.14)	8.59 (2.93)	0.00 (1.00)	0.62 (0.78)	0.31 (0.78)
T_2 (Heading back of scaffolds 50%)	16.46 (4.17)	17.11 (4.13)	16.78 (4.09)	0.54 (1.24)	0.57 (0.75)	0.55 (0.75)
T_3 (Heading back of scaffolds 25%)	16.41 (4.17)	17.05 (4.12)	16.73 (4.09)	0.48 (1.22)	0.52 (0.72)	0.50 (0.72)
T_4 (Normal Pruning)	16.20 (4.14)	16.99 (4.12)	16.60 (4.07)	0.46 (1.21)	0.47 (0.68)	0.46 (0.68)
$CD_{0.05}$	0.008	0.007	0.006	0.07	0.03	0.03
Nitrogen (Sub-sub plot treatment)						
N_1 (75% additional N as CAN)	14.30 (3.37)	17.12 (4.13)	15.71 (3.80)	0.38 (1.17)	0.56 (0.75)	0.47 (0.75)
N_2 (50% additional N as CAN)	14.24 (3.37)	17.05 (4.12)	15.64 (3.79)	0.36 (1.16)	0.52 (0.72)	0.44 (0.72)
$CD_{0.05}$	NS	0.003	0.004	0.05	0.05	0.05

Table 4b: Effect of different interaction I x T, I x N and T x N on TSS (%) and titratable acidity (%)

Interactions	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
I_1T_1	0.00 (1.00)	16.85 (4.10)	8.42 (2.90)	0.00 (1.00)	0.73 (0.85)	0.36 (0.85)
I_1T_2	16.36 (4.16)	16.76 (4.09)	16.56 (4.06)	0.62 (1.27)	0.67 (0.82)	0.65 (0.82)
I_1T_3	16.32 (4.16)	16.68 (4.08)	16.50 (4.06)	0.55 (1.24)	0.59 (0.77)	0.57 (0.70)
I_1T_4	15.92 (4.11)	16.65 (4.08)	16.29 (4.03)	0.52 (1.23)	0.54 (0.74)	0.53 (0.74)
I_2T_1	0.00 (1.00)	17.27 (4.15)	8.63 (2.93)	0.00 (1.00)	0.60 (0.77)	0.30 (0.77)
I_2T_2	16.46 (4.17)	17.22 (4.15)	16.84 (4.10)	0.53 (1.23)	0.56 (0.75)	0.55 (0.75)
I_2T_3	16.37 (4.16)	17.18 (4.14)	16.78 (4.09)	0.48 (1.21)	0.52 (0.72)	0.50 (0.72)
I_2T_4	16.19 (4.14)	17.15 (4.14)	16.67 (4.08)	0.47 (1.21)	0.49 (0.70)	0.48 (0.70)
I_3T_1	0.00 (1.00)	17.45 (4.17)	8.72 (2.95)	0.00 (1.00)	0.52 (0.72)	0.26 (0.72)
I_3T_2	16.57 (4.19)	17.33 (4.16)	16.95 (4.11)	0.46 (1.21)	0.48 (0.69)	0.47 (0.69)
I_3T_3	16.53 (4.18)	17.29 (4.15)	16.91 (4.11)	0.42 (1.19)	0.44 (0.66)	0.43 (0.66)
I_3T_4	16.49 (4.18)	17.17 (4.14)	16.83 (4.10)	0.39 (1.17)	0.38 (0.61)	0.38 (0.61)
$CD_{0.05}$	0.01	NS	NS	0.01	NS	0.02
I_1N_1	12.12 (3.35)	16.72 (4.08)	14.42 (3.76)	0.43 (1.19)	0.66 (0.81)	0.54 (0.81)
I_1N_2	12.18 (3.36)	16.75 (4.09)	14.47 (3.77)	0.42 (1.18)	0.61 (0.78)	0.51 (0.78)
I_2N_1	12.22 (3.36)	17.13 (4.13)	14.68 (3.79)	0.38 (1.17)	0.56 (0.74)	0.47 (0.74)
I_2N_2	12.29 (3.37)	17.28 (4.15)	14.78 (3.81)	0.36 (1.16)	0.52 (0.72)	0.44 (0.72)
I_3N_1	12.38 (3.38)	17.28 (4.15)	14.83 (3.81)	0.33 (1.15)	0.47 (0.69)	0.40 (0.69)
I_3N_2	12.42 (3.39)	17.34 (4.16)	14.88 (3.82)	0.30 (1.13)	0.44 (0.66)	0.37 (0.66)
$CD_{0.05}$	NS	0.005	NS	NS	NS	NS
T_1N_1	0.00 (1.00)	17.15 (4.14)	8.57 (2.92)	0.00 (1.00)	0.64 (0.79)	0.32 (0.79)
T_1N_2	0.00 (1.00)	17.23 (4.15)	8.61 (2.93)	0.00 (1.00)	0.59 (0.76)	0.29 (0.76)
T_2N_1	16.44 (4.17)	17.07 (4.13)	16.76 (4.09)	0.55 (1.24)	0.59 (0.70)	0.57 (0.77)
T_2N_2	16.49 (4.18)	17.14 (4.14)	16.81 (4.10)	0.52 (1.23)	0.55 (0.74)	0.53 (0.74)

T_3N_1	16.38 (4.16)	17.01 (4.12)	16.70 (4.08)	0.50 (1.22)	0.53 (0.73)	0.51 (0.73)
T_3N_2	16.43 (4.17)	17.09 (4.13)	16.76 (4.09)	0.47 (1.21)	0.50 (0.71)	0.49 (0.71)
T_4N_1	16.13 (4.13)	16.95 (4.11)	16.54 (4.06)	0.48 (1.21)	0.49 (0.69)	0.48 (0.69)
T_4N_2	16.27 (4.15)	17.03 (4.12)	16.65 (4.08)	0.44 (1.20)	0.45 (0.69)	0.45 (0.67)
$CD_{0.05}$	NS	0.005	NS	NS	NS	NS

Figures in parentheses are square root transformed values

Table 4c: Effect of irrigation, pruning and nitrogen fertilization (I x T x N) interactions on TSS (%) and titratable acidity (%)

Interactions	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
$T_1N_1I_1$	0.00 (1.00)	16.82 (4.10)	8.41 (2.90)	0.00 (1.00)	0.76 (0.87)	0.38 (0.61)
$T_2N_1I_1$	16.33 (4.16)	16.76 (4.09)	16.55 (4.06)	0.63 (1.27)	0.71 (0.84)	0.67 (0.81)
$T_3N_1I_1$	16.29 (4.15)	16.66 (4.08)	16.48 (4.05)	0.56 (1.25)	0.61 (0.78)	0.58 (0.76)
$T_4N_1I_1$	15.85 (4.10)	16.63 (4.07)	16.24 (4.03)	0.53 (1.24)	0.56 (0.74)	0.54 (0.74)
$T_1N_2I_1$	0.00 (1.00)	16.88 (4.10)	8.43 (2.90)	0.00 (1.00)	0.70 (0.83)	0.35 (0.59)
$T_2N_2I_1$	16.38 (4.16)	16.77 (4.09)	16.57 (4.07)	0.61 (1.27)	0.64 (0.80)	0.62 (0.79)
$T_3N_2I_1$	16.36 (4.16)	16.69 (4.08)	16.52 (4.06)	0.55 (1.24)	0.58 (0.76)	0.56 (0.75)
$T_4N_2I_1$	15.99 (4.12)	16.67 (4.08)	16.33 (4.04)	0.51 (0.23)	0.53 (0.73)	0.52 (0.71)
$T_1N_1I_2$	0.00 (1.00)	17.20 (4.14)	8.60 (2.93)	0.00 (1.00)	0.62 (0.78)	0.31 (0.55)
$T_2N_1I_2$	16.44 (4.17)	17.15 (4.14)	16.80 (4.09)	0.55 (1.24)	0.57 (0.75)	0.56 (0.75)
$T_3N_1I_2$	16.36 (4.16)	17.11 (4.13)	16.73 (4.09)	0.49 (1.22)	0.53 (0.73)	0.51 (0.71)
$T_4N_1I_2$	16.09 (4.13)	17.07 (4.13)	16.58 (4.07)	0.49 (1.22)	0.51 (0.71)	0.50 (0.70)
$T_1N_2I_2$	0.00 (1.00)	17.34 (4.16)	8.67 (2.94)	0.00 (1.00)	0.58 (0.76)	0.29 (0.53)
$T_2N_2I_2$	16.48 (4.18)	17.30 (4.15)	16.89 (4.11)	0.51 (1.23)	0.55 (0.74)	0.53 (0.73)
$T_3N_2I_2$	16.38 (4.16)	17.25(4.15)	16.82 (4.10)	0.47 (1.21)	0.50 (0.71)	0.47 (0.69)
T_4N_2I2	16.30 (4.15)	17.22 (4.15)	16.76 (4.09)	0.46 (1.20)	0.47 (0.68)	0.46 (0.68)
$T_1N_1I_3$	0.00 (1.00)	17.42 (4.17)	8.70 (2.95)	0.00 (1.00)	0.54 (0.73)	0.27 (0.52)
$T_2N_1I_3$	16.55 (4.18)	17.31 (4.16)	16.93 (2.17)	0.48 (1.21)	0.50 (0.70)	0.49 (0.70)
$T_3N_1I_3$	16.50 (4.18)	17.26 (4.15)	16.88 (4.10)	0.44 (1.20)	0.46 (0.67)	0.45 (0.67)
$T_4N_1I_3$	16.46 (4.17)	17.15 (4.14)	16.80 (4.09)	0.42 (1.94)	0.40 (0.63)	0.41 (0.64)
$T_1N_2I_3$	0.00 (1.00)	17.48 (4.18)	8.74(2.95s)	0.00 (1.00)	0.50 (0.71)	0.25 (0.50)
$T_2N_2I_3$	16.59 (4.19)	17.35 (4.16)	16.97 (4.12)	0.45 (1.20)	0.46 (0.68)	0.45 (0.67)
$T_3N_2I_3$	16.56 (4.19)	17.31 (4.16)	16.93 (4.11)	0.41 (1.18)	0.43 (0.65)	0.21 (0.64)
$T_4N_2I_3$	16.52 (4.18)	17.20 (4.14)	16.86 (4.10)	0.35 (1.16)	0.36 (0.60)	0.35 (0.59)
$CD_{0.05}$	NS	NS	NS	0.01	0.02	0.02

Figures in parentheses are square root transformed values

Higher Sugar & T.S.S of the fruits were significantly higher in case of heavily pruned trees arnd higher N application, while minimum in fruits from lightly pruned trees. Higher T.S.S and sugars as a result of increasing pruning severity can be explained on the basis of increased leaf to fruit ration (Sharma, 1995) [13] and consequently more synthesis of carbohydrates and other metabolites and their translocation to the fruit tissues. There findings are in agreement with Awasthi and Singh (1990) [30] and Thakur (1993) [18].

Titratable acidity –

Highest acidity was recorded in the fruits produced by the trees irrigated at 20 % SMD of FC. Higher soil moisture level helps in increase the rate of metabolic synthesis, enhances the degradation of carbohydrate and encouraging the formation of organic acid. The decrease in carbohydrate with simultaneous increase in organic acids under high soil moisture might have contributed for higher acidity in the fruits. There findings are also in agreement with Tagi (1984) [16] Sharma and Chandel, 2005 [14].

Table 5a: Effect of different levels of irrigation, pruning intensities and nitrogen fertilization on reducing sugar (%) and non-reducing sugar (%)

Treatments	Reducing sugar (%)			Non-reducing sugar (%)		
	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
Irrigation levels (Main Plot Treatment)						
I_1 (20% SMD of field capacity)	3.60 (2.05)	5.16 (2.27)	4.38 (2.07)	2.48 (1.80)	4.34 (2.08)	3.41 (1.83)
I_2 (40 % SMD of field capacity)	4.42 (2.22)	5.89 (2.42)	5.16 (2.25)	2.82 (1.88)	4.64 (2.15)	3.73 (1.91)
I_3 (60% SMD of field capacity)	4.48 (2.23)	6.09 (2.46)	5.28 (2.28)	3.40 (2.01)	4.78 (2.18)	4.09 (2.00)
$CD_{0.05}$	0.02	0.05	0.03	0.05	0.05	0.06
Pruning (Sub plot treatment)						
T_1 (Heading back of scaffolds 75%)	0.00 (1.00)	6.02 (2.45)	3.01 (1.73)	0.00 (1.00)	4.75 (2.17)	2.37 (1.54)
T_2 (Heading back of scaffolds 50%)	5.78 (2.60)	5.85 (2.41)	5.82 (2.41)	4.05 (2.24)	4.60 (2.14)	4.33 (2.07)
T_3 (Heading back of scaffolds 25%)	5.57 (2.56)	5.63 (2.37)	5.60 (2.36)	3.88 (2.20)	4.54 (2.13)	4.21 (2.05)
T_4 (Normal Pruning)	5.31 (2.51)	5.36 (2.31)	5.33 (2.30)	3.67 (2.15)	4.45 (2.10)	4.06 (2.01)
$CD_{0.05}$	0.02	0.03	0.02	0.04	0.04	0.03
Nitrogen (Sub-sub plot treatment)						
N_1 (75% additional N as CAN)	4.29 (2.19)	5.87 (2.42)	5.08 (2.23)	3.03 (1.93)	4.68 (2.16)	3.85 (1.95)
N_2 (50% additional N as CAN)	4.04 (2.14)	5.56 (2.35)	4.80 (2.17)	2.77 (1.87)	4.49 (2.11)	3.63 (1.89)
$CD_{0.05}$	0.01	0.01	0.01	0.01	0.02	0.01

Table 5b: Effect of different interactions I x T, I x N and T x N on reducing sugar (%) and non-reducing sugar (%)

Interactions	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
I_1T_1	0.00 (1.00)	5.58 (2.36)	2.79 (1.67)	0.00 (1.00)	4.56 (2.13)	2.28 (1.51)
I_1T_2	5.14 (2.47)	5.43 (2.33)	5.29 (2.29)	3.50 (2.12)	4.37 (2.09)	3.94 (1.98)
I_1T_3	4.79 (2.40)	5.00 (2.23)	4.90 (2.21)	3.33 (2.08)	4.28 (2.07)	3.81 (1.95)
I_1T_4	4.47 (2.34)	4.62 (2.14)	4.54 (2.13)	3.08 (2.01)	4.13 (2.03)	3.60 (1.89)
I_2T_1	0.00 (1.00)	6.10 (2.47)	3.05 (1.74)	0.00 (1.00)	4.71 (2.17)	2.35 (1.53)
I_2T_2	6.08 (2.66)	5.97 (2.44)	6.03 (2.45)	3.99 (2.33)	4.65 (2.15)	4.32 (2.08)
I_2T_3	5.92 (2.63)	5.91 (2.43)	5.92 (2.43)	3.76 (2.18)	4.61 (2.14)	4.19 (2.04)
I_2T_4	5.69 (2.58)	5.59 (2.36)	5.64 (2.37)	3.52 (2.12)	4.58 (2.14)	4.05 (2.01)
I_3T_1	0.00 (1.00)	6.38 (2.52)	3.19 (1.78)	0.00 (1.00)	4.98 (2.23)	2.49 (1.57)
I_3T_2	6.13 (2.66)	6.15 (2.47)	6.14 (2.47)	4.66 (2.38)	4.77 (2.18)	4.72 (2.17)
I_3T_3	6.00 (2.64)	5.98 (2.44)	5.99 (2.44)	4.53 (2.35)	4.73 (2.17)	4.63 (2.15)
I_3T_4	5.78 (2.60)	5.86 (2.42)	5.82 (2.41)	4.42 (2.32)	4.64 (2.15)	4.53 (2.12)
$CD_{0.05}$	0.03	0.03	0.03	0.07	NS	0.07
I_1N_1	3.71 (2.08)	5.30 (2.30)	4.51 (2.10)	2.74 (1.86)	4.42 (2.10)	3.58 (1.88)
I_1N_2	3.49 (2.03)	5.02 (2.23)	4.25 (2.05)	2.22 (1.74)	4.25 (2.06)	3.23 (1.79)
I_2N_1	4.49 (2.23)	5.88 (2.42)	5.18 (2.25)	2.92 (1.91)	4.79 (2.18)	3.86 (1.95)
I_2N_2	4.35 (2.20)	5.91 (2.43)	5.13 (2.24)	2.71 (1.86)	4.49 (2.11)	3.60 (1.88)
I_3N_1	4.67 (2.26)	6.43 (2.53)	5.55 (2.34)	3.43 (2.02)	4.82 (2.19)	4.12 (2.01)
I_3N_2	4.28 (2.19)	5.75 (2.39)	5.02 (2.21)	3.38 (2.01)	4.74 (2.17)	4.06 (2.00)
$CD_{0.05}$	NS	0.02	0.02	0.02	NS	0.02
T_1N_1	0.00 (1.00)	6.22 (2.42)	3.11 (1.76)	0.00 (1.00)	4.87 (2.20)	2.43 (1.56)
T_1N_2	0.00 (2.64)	5.82 (2.35)	2.91 (1.70)	0.00 (1.00)	4.63 (2.15)	2.31 (1.52)
T_2N_1	5.99 (2.56)	6.00 (2.41)	5.99 (2.44)	4.18 (2.27)	4.69 (2.16)	4.43 (2.10)
T_2N_2	5.57 (2.59)	5.70 (2.36)	5.64 (2.37)	3.93 (2.21)	4.51 (2.12)	4.22 (2.05)
T_3N_1	5.75 (1.00)	5.73 (2.42)	5.74 (2.39)	4.00 (2.23)	4.63 (2.15)	4.31 (2.07)
T_3N_2	5.40 (2.56)	5.53 (2.35)	5.46 (2.33)	3.75 (2.17)	4.46 (2.11)	4.10 (2.02)
T_4N_1	5.43 (2.53)	5.53 (2.25)	5.48 (2.33)	3.94 (2.22)	4.53 (2.12)	4.24 (2.05)
T_4N_2	5.20 (2.48)	5.18 (2.28)	5.19 (2.27)	3.40 (2.09)	4.36 (2.08)	3.88 (1.96)
$CD_{0.05}$	0.17	NS	NS	0.02	NS	0.03

Figures in parentheses are square root transformed values

Table 5c: Effect of irrigation, pruning and nitrogen fertilization (I x T x N) interactions on reducing sugar (%) and non-reducing sugar (%)

Interactions	2010-11	2011-12	Pooled	2010-11	2011-12	Pooled
$T_1N_1I_1$	0.00 (1.00)	5.66 (2.37)	2.83 (1.68)	0.00 (1.00)	4.74 (2.17)	2.37 (1.53)
$T_2N_1I_1$	5.31 (2.51)	5.55 (2.35)	5.43 (2.33)	3.82 (2.19)	4.45 (2.10)	4.13 (2.03)
$T_3N_1I_1$	4.93 (2.43)	5.15 (2.26)	5.04 (2.24)	3.59 (2.14)	4.36 (2.08)	3.98 (1.99)
$T_4N_1I_1$	4.62 (2.37)	4.84 (2.20)	4.73 (2.17)	3.55 (2.13)	4.14 (2.03)	3.84 (1.96)
$T_1N_2I_1$	0.00 (1.00)	5.51 (2.34)	2.75 (1.66)	0.00 (1.00)	4.39 (2.09)	2.19 (1.48)
$T_2N_2I_1$	4.97 (2.44)	5.31 (2.30)	5.14 (2.26)	3.19 (2.04)	4.29 (2.07)	3.74 (1.93)
$T_3N_2I_1$	4.66 (2.38)	4.85 (2.20)	4.36 (2.18)	3.07 (2.01)	4.20 (2.05)	3.64 (1.90)
$T_4N_2I_1$	4.32 (2.30)	4.40 (2.09)	4.36 (2.08)	2.61 (1.89)	4.12 (2.03)	3.36 (1.83)
$T_1N_1I_2$	0.00 (1.00)	6.06 (2.46)	3.03 (1.74)	0.00 (1.00)	4.86 (2.20)	2.43 (1.56)
$T_2N_1I_2$	6.17 (2.67)	5.90 (2.42)	6.03 (2.45)	4.04 (2.24)	4.80 (2.19)	4.42 (2.10)
$T_3N_1I_2$	6.03 (2.65)	5.81 (2.41)	5.92 (2.43)	3.88 (2.20)	4.77 (2.18)	4.32 (2.08)
$T_4N_1I_2$	5.77 (2.60)	5.75 (2.39)	5.76 (2.40)	3.79 (2.18)	4.73 (2.17)	4.26 (2.06)
$T_1N_2I_2$	0.00 (1.00)	6.14 (2.47)	3.07 (1.75)	0.00 (1.00)	4.55 (2.13)	2.27 (1.50)
$T_2N_2I_2$	5.99 (2.64)	6.05 (2.46)	6.02 (2.45)	3.95 (2.24)	4.51 (2.12)	4.23 (2.05)
$T_3N_2I_2$	5.82 (2.61)	6.01 (2.45)	5.92 (2.43)	3.65 (2.15)	4.46 (2.11)	4.05 (2.01)
T_4N_2I2	5.61 (2.57)	5.43 (2.33)	5.52 (2.35)	3.25 (2.06)	4.43 (2.10)	3.84 (1.96)
$T_1N_1I_3$	0.00 (1.00)	6.94 (2.63)	3.47 (1.86)	0.00 (1.00)	5.00 (2.23)	2.50 (1.58)
$T_2N_1I_3$	6.50 (2.73)	6.55 (2.55)	6.52 (2.55)	4.67 (2.38)	4.80 (2.18)	4.74 (2.17)
$T_3N_1I_3$	6.29 (2.70)	6.24 (2.49)	6.27 (2.50)	4.54 (2.35)	4.75 (2.18)	4.64 (2.15)
$T_4N_1I_3$	5.91 (2.62)	6.01 (2.45)	5.96 (2.44)	4.50 (2.34)	4.74 (2.17)	4.62 (2.15)
$T_1N_2I_3$	0.00 (1.00)	5.81 (2.41)	2.90 (1.70)	0.00 (1.00)	4.96 (2.22)	2.48 (1.57)
$T_2N_2I_3$	5.75 (2.59)	5.75 (2.39)	5.75 (2.39)	4.65 (2.37)	4.75 (2.17)	4.70 (2.16)
$T_3N_2I_3$	5.72 (2.59)	5.73 (2.39)	5.72 (2.39)	4.53 (2.35)	4.72 (2.17)	4.62 (2.15)
$T_4N_2I_3$	5.66 (2.58)	5.71 (2.39)	5.69 (2.38)	4.34 (2.31)	4.54 (2.13)	4.44 (2.10)
$CD_{0.05}$	0.03	0.05	0.03	NS	NS	NS

Figures in parentheses are square root transformed values

Pruning treatment recorded the max acidity & minimum in light pruning (T_4) treatment. A marked increase in acidity with N application was recorded in (Table - 4a). Similar results have been reported by Bhutani *et al*. (1983) [5] in plum. There results are in conformity with those of Chadha and Bajwa (1966) [7], Chandel (1985) [8]. The increase in acidity with N application might be due to increased synthesis of amino acids, proteins & other metabolites and their consequent translocation to the fruits. The interaction I x T was found significant in the year 2010-11, whereas all other interaction were found to be non-significant.

Table 6a: Effect of different levels of irrigation, pruning intensities and nitrogen fertilization on total sugar (%)

Treatments	Total sugar (%)		
	2010-11	2011-12	Pooled
Irrigation levels (Main Plot Treatment)			
I_1 (20% SMD of field capacity)	6.21 (2.53)	9.73 (3.11)	7.97 (2.80)
I_2 (40% SMD of field capacity)	7.40 (2.72)	10.76 (3.28)	9.08 (2.99)
I_3 (60% SMD of field capacity)	8.07 (2.82)	11.16 (3.34)	9.61 (3.07)
$CD_{0.05}$	0.03	0.06	0.02
Pruning (Sub plot treatment)			
T_1 (Heading back of scaffolds 75%)	0.00 (1.00)	11.03 (3.30)	5.51 (2.34)
T_2 (Heading back of scaffolds 50%)	10.06 (3.32)	10.68 (3.26)	10.37 (3.21)
T_3 (Heading back of scaffolds 25%)	9.66 (3.26)	10.45 (3.23)	10.06 (3.16)
T_4 (Normal Pruning)	9.12 (3.18)	10.05 (3.16)	9.61 (3.09)
$CD_{0.05}$	0.02	0.01	0.01
Nitrogen (Sub-sub plot treatment)			
N_1 (75% additional N)	7.49 (2.73)	10.79 (3.28)	9.14 (3.00)
N_2 (50% additional N)	6.96 (2.65)	10.31 (3.20)	8.63 (2.91)
$CD_{0.05}$	0.01	0.01	0.01

Table 6b: Effect of different interactions I x T, I x N and T x N on total sugar (%)

Interaction	2010-11	2011-12	Pooled
I_1T_1	0.00 (1.00)	10.40 (3.22)	5.20 (2.28)
I_1T_2	8.82 (3.13)	10.04 (3.16)	9.43 (3.07)
I_1T_3	8.31 (3.05)	9.51 (3.08)	8.91 (2.98)
I_1T_4	7.72 (2.95)	8.98 (2.99)	8.35 (2.88)
I_2T_1	0.00 (1.00)	11.07 (3.32)	5.53 (2.35)
I_2T_2	10.29 (3.36)	10.88 (3.29)	10.59 (3.25)
I_2T_3	9.00 (3.30)	10.70 (3.27)	10.30 (3.20)
I_2T_4	9.40 (3.32)	10.40 (3.22)	9.90 (3.14)
I_3T_1	0.00 (1.00)	11.62 (3.40)	5.81 (2.41)
I_3T_2	11.05 (3.47)	11.11 (3.33)	11.08 (3.32)
I_3T_3	10.79 (3.43)	11.15 (3.33)	10.97 (3.31)
I_3T_4	10.45 (3.38)	10.76 (3.28)	10.60 (3.25)
$CD_{0.05}$	0.03	0.03	0.03
I_1N_1	6.60 (2.59)	9.96 (3.15)	8.28 (2.86)
I_1N_2	5.82 (2.46)	9.50 (3.08)	7.66 (2.75)
I_2N_1	7.57 (2.74)	10.92 (3.30)	9.25 (3.01)
I_2N_2	7.22 (2.69)	10.60 (3.25)	8.91 (2.96)
I_3N_1	8.29 (2.85)	11.49 (3.38)	9.88 (3.12)
I_3N_2	7.85 (2.79)	10.83 (3.29)	9.34 (3.03)
$CD_{0.05}$	0.02	0.02	0.01
T_1N_1	0.00 (1.00)	11.35 (3.36)	5.67 (2.38)
T_1N_2	0.00 (1.00)	10.71 (3.27)	5.35 (2.31)
T_2N_1	10.40 (3.37)	10.89 (3.29)	10.65 (3.26)
T_2N_2	9.71(3.26)	10.46 (3.23)	10.09(3.17)
T_3N_1	9.97 (3.30)	10.61 (3.25)	10.29(3.20)
T_3N_2	9.36 (3.21)	10.30 (3.20)	9.82(3.13)
T_4N_1	9.59 (3.25)	10.31 (3.20)	9.95(3.15)
T_4N_2	8.78 (3.12)	9.78 (3.12)	9.28 (3.04)
$CD_{0.05}$	0.02	NS	NS

Figures in parentheses are square root transformed values

Table 6c: Effect of irrigation, pruning and nitrogen fertilization (I x T x N) interactions on total sugar (%)

Interaction	2010-11	2011-12	Pooled
$T_1N_1I_1$	0.00 (1.00)	10.66 (3.26)	5.33 (2.30)
$T_2N_1I_1$	9.34 (3.21)	10.25 (3.20)	9.79 (3.13)
$T_3N_1I_1$	8.72 (3.11)	9.74 (3.12)	9.23 (3.03)
$sT_4N_1I_1$	8.37 (3.06)	9.20 (3.03)	8.78 (2.96)
$T_1N_2I_1$	0.00 (1.00)	10.14 (3.18)	5.07 (2.25)
$T_2N_2I_1$	8.31 (3.05)	9.84 (3.13)	9.07 (3.01)
$T_3N_2I_1$	7.91 (2.98)	9.28 (3.04)	8.59 (2.93)
$T_4N_2I_1$	7.07 (2.84)	8.75 (2.95)	7.91 (2.81)
$T_1N_1I_2$	0.00 (1.00)	11.19 (3.34)	5.59 (2.36)
$T_2N_1I_2$	10.43 (3.38)	10.96 (3.31)	10.69 (3.27)
$T_3N_1I_2$	10.12 (3.33)	10.84 (3.29)	10.48 (3.23)
$T_4N_1I_2$	9.76 (3.28)	10.71 (3.27)	10.24 (3.19)
$T_1N_2I_2$	0.00 (1.00)	10.94 (3.30)	5.47 (2.33)

$T_2N_2I_2$	10.16 (3.34)	10.80 (3.28)	10.48 (3.23)
$T_3N_2I_2$	9.68 (3.26)	10.56 (3.24)	10.12 (3.18)
T_4N_2I2	9.04 (3.16)	10.10 (3.17)	9.57 (3.09)
$T_1N_1I_3$	0.00 (1.00)	12.12 (3.49)	6.10 (2.47)
$T_2N_1I_3$	11.44 (2.52)	11.47 (3.88)	11.45 (3.38)
$T_3N_1I_3$	11.08 (3.47)	11.25 (3.35)	11.16 (3.34)
$T_4N_1I_3$	10.65 (3.41)	11.01 (3.31)	10.83 (3.29)
$T_1N_2I_3$	0.00 (1.00)	11.04 (3.32)	5.52 (2.34)
$T_2N_2I_3$	10.67 (3.41)	10.75 (3.27)	10.71 (3.27)
$T_3N_2I_3$	10.50 (3.39)	11.04 (3.32)	10.77 (3.28)
$T_4N_2I_3$	10.24 (3.35)	10.50 (3.24)	10.37 (3.22)
$CD_{0.05}$	0.02	0.02	0.02

Figures in parentheses are square root transformed values

Sugar Content

These results are in line with those of Mills *et al*. (1996) [10], who reported an increase in sorbitol & total sugars cone in apple under drought conditon. Dochev *et al*. (1976) [9] also noted a significant increase in sugar content under water deficit conditions.

The total sugars & reducing sugar decreased with the increasing level of N (Table …) in both the years. Bhutani *et al*. (1983) [6] also recorded reduction in total sugar and reducing sugar with the rising N level. This reduction might have been due to the utilization of more sugars for the production of organic acids, protein amides & amino acids.

The interaction of different levels of irrigation & pruning (I x T), irrigation & Nitrogen (I x N) had significant effect for reducing sugars, while T x N had non-significant effect for the pooled data whereas, Non-reducing sugars had significant effect. There could be expected because of cu mulative effect of irrigation & nitrogen fertilization.

4. Summary and Conclusion

Fruit size in terms of length, breadth, weight and volume were maximum in trees subjected to I_1 treatments The pruning treatments indicates that maximum fruit length, breadth, weight and volume was recorded at T_2 treatments and minimum was observed in T_1 treatments. The highest fruit length, breadth, weight and volume were observed in N_1 treatment as compared to N_2.

Fruit firmness was influenced significantly by different levels of irrigation, pruning and nitrogen fertilization treatmens. Maximum fruit firmness was recorded in I_3, T_4 and N_2 treatment and the minimum fruit firmness was recorded in I_1, T_1 and N_1 treatment.

Maximum pulp to stone ratio was recorded in I_3, T_4 and N_1 treatments and the minimum pulp to stone ratio was observed in I_1, T_1 and N_1 treatment.

TSS content of plum was markedly influenced by irrigation, pruning and fertilizers. Highest TSS was registered in I_3 T_2 and N_1 the minimum in I_1, T_1 and N_2 treatment. All the first order interactions I x T, I x N and T x N was found to be non-significant during both the years.

Fruits of trees irrigated at 20 per cent soil moisture depletion of field capacity had the highest acidity and the lowest acid content was recorded in 60 per cent. Pruning intensities had no consistent effect on acidity during both the years. T_2 treatment had significantly maximum acidity and minimum was observed in T_1 treatment. In nitrogen fertilization treatments titratable acidity was higher in N_1 treatment as compared to N_2. The interaction between different levels of irrigation and pruning had significant effect on titratable acidity in the first year, whereas it was found to be non-significant in the subsequent year.

Maximum reducing sugars, total sugars and non-reducing sugars were observed in I_3 and minimum in I_1 treatment. Total, reducing and non-reducing sugars in fruits tended to increase significantly with the increasing pruning severity. Among the nitrogen fertilization treatments, maximum was recorded at N_1 as compared to N_2.

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