



## Effect of pruning intensity and different levels of potassium chloride on vegetative growth and yield of phalsa fruits (*Grewia subinaequalis* D.C.)

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**Abstract:** The present investigation was carried out during the year 2014-15. The experiment was laid out in factorial randomized block design with nine treatments and replicated in three times, considering two plants as a unit. The treatments significantly increased the vegetative growth and yield of phalsa' the maximum vegetative growth attributes like as shoot length(203.00cm), number of shoots per plant(103.33), number of leaves per shoot(27.00), internodal length (6.66), yield attributes like number of fruits per node(14.33), number of fruiting node per shoot(16.00), fruit yield per plant(3.50 kg) and per hectare (58.30 q) were recorded with the spray of KCl @ 0.4 per cent with 50cm pruning intensity.

**Key Words:** Foliar application of nutrients, Vegetative growth, Yield attributes of phalsa

### Introduction

Phalsa (*Grewia subinaequalis* D.C.), a subtropical fruit, belongs to family Tiliaceae with chromosome no. (2n) = 36. Phalsa is native to India. Fruit is known as berry. It has 41 genera and 400 species, A wild species *Grewia elastica* grown on lower hills all over India. Phalsa, belongs a hardy plant, can withstand drought and can be grown under adverse climatic conditions. It requires distinct winter and summer for better yield and fruit quality. There is no improved variety of phalsa. Some local selections, Local and Sharbati are popular. Two distinct types tall and dwarf have been recognized. Dwarf type is commonly grown. It is quite productive (Singh, 2002). It is commercially grown in Uttar Pradesh, Punjab, Haryana, West Bengal, Gujarat, Maharashtra, Andhra Pradesh and Bihar. It has high nutritional and medicinal value containing iron, vitamin 'A', 'C' and phosphorous. It contains about 50-60% juice, 10-11% sugar, 2-2.5% acids, calories 329 per lb (724 per kg), moisture 81.13%, protein 1.58%, fat 1.82% and crude fiber 1.77%. Its medicinal qualities are known since Vedic times. It is mostly consumed as fresh fruit and has cooling effect on human system. The fruits are somewhat astringent. They help in cure inflammation, heart and blood disorders fever and constipation. The fruits are used for making excellent juice and squash. In addition to nutrient intensity and pruning has also been reported to manage plant canopy and enhance the flowering, fruiting, yield and quality of many fruit crops (Singh, 2008 and Ali *et al.*, 2001). It

bears small berry like fruits of deep reddish brown colour with sub acidic in taste. The main problem in phalsa cultivation is the uneven ripening and small fruit size which are to be picked individually. Considering the importance of phalsa there is greater need to initiate the nutrient management programme to increase fruit size and fruit yield. The present investigation was therefore, undertaken to evaluate the effect of foliar feeding of nutrients on vegetative growth and fruit yield.

The objectives of study to find out the effect of pruning intensity and different levels of Potassium chloride on vegetative growth and yield of phalsa fruits.

### Materials and Methods

The experiment was conducted at departmental, Main Experiment Station (Horticulture), Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad during 2014-15 growth season. Twenty five year old plants of phalsa having uniform vigour were selected for present investigations. The experiment was conducted in Factorial Randomized Block Design (R.B.D.) with nine treatments which were replicated three times, considering two plant unit. T<sub>1</sub>: 0 cm+ Water Spray, T<sub>2</sub>: 0 cm+ KCl 0.2%, T<sub>3</sub>: 0 cm+ KCl 0.4%, T<sub>4</sub>: 25 cm+ Water Spray, T<sub>5</sub>: 25 cm+ KCl 0.2%, T<sub>6</sub>: 25 cm+ KCl 0.4%, T<sub>7</sub>: 50 cm+ Water Spray, T<sub>8</sub>: 50 cm+ KCl 0.2%, T<sub>9</sub>: 50 cm+ KCl 0.4%.

Pruning was done in first week of February and first spray of nutrient in second fortnight of March (Pre blooming Stage) and

**Table -1** : Effect of pruning intensity and different levels of Potassium chloride on vegetative growth and yield of phalsa fruits

Pruning intensity	Shoot length(cm)	No. of shoots/plant	No. of leave s/ shoot	Internodal length (cm)	No. of fruits/Node	No. of fruiting node/shoot	Fruit yield / plant (kg)	Fruit yield/ha
P <sub>1</sub>	186.55	69.33	20.33	5.67	10.22	11.88	2.44	40.72
P <sub>2</sub>	188.66	74.55	23.00	5.87	11.00	12.77	2.60	43.31
P <sub>3</sub>	190.44	83.00	23.66	6.10	12.11	13.66	2.83	47.20
SEm	1.51	1.77	0.44	0.15	0.41	0.35	0.063	1.03
CD	4.55	5.31	1.32	0.46	1.23	1.07	0.18	3.11
<b>Nutrients</b>								
C <sub>0</sub>	184.33	60.22	19.66	5.51	9.11	10.88	2.32	38.68
C <sub>1</sub>	188.66	73.55	22.00	5.90	10.88	12.88	2.48	41.46
C <sub>2</sub>	98.88	93.11	25.33	6.24	13.33	14.55	3.06	51.08
SEm	1.51	1.77	0.44	0.15	0.41	0.35	0.063	1.03
CD	4.55	5.31	1.32	N.S.	1.23	1.07	0.18	3.11
<b>Interaction</b>								
P <sub>1</sub> C <sub>0</sub>	181.66	56.00	17.00	5.43	8.00	10.33	2.20	36.64
P <sub>1</sub> C <sub>1</sub>	182.33	59.33	20.66	5.46	8.66	11.00	2.36	39.42
P <sub>1</sub> C <sub>2</sub>	189.00	65.33	21.33	5.63	10.66	11.33	2.40	39.98
P <sub>2</sub> C <sub>0</sub>	182.33	68.33	21.00	55.73	10.33	12.00	2.36	39.42
P <sub>2</sub> C <sub>1</sub>	186.33	72.00	22.33	5.96	11.00	13.00	2.50	41.64
P <sub>2</sub> C <sub>2</sub>	197.00	80.33	22.66	6.00	11.33	13.66	2.60	43.31
P <sub>3</sub> C <sub>0</sub>	195.66	83.66	23.00	5.86	12.33	13.33	2.76	46.09
P <sub>3</sub> C <sub>1</sub>	198.00	92.33	26.00	6.20	13.33	14.33	2.93	48.86
P <sub>3</sub> C <sub>2</sub>	203.00	103.33	27.00	6.66	14.33	16.00	3.50	58.30
SEm	0.50	0.59	0.14	0.05	0.13	0.11	0.12	0.34
CD	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

P<sub>1</sub>: 0 cm pruning above ground level; P<sub>2</sub>: 25 cm pruning above ground level; P<sub>3</sub>: 50 cm pruning above ground level; C<sub>0</sub>: Water Spray; C<sub>1</sub>: KCl - 0.2 %; C<sub>2</sub>: KCl-0.4%

second spray just after fruit setting. The observations regarding shoot length(cm), number of shoots per plant, number of leaves per shoot, internodal length(cm) were recorded in last week of October at full growth stage and Yield attributes like number of fruits per node, number of fruiting node, fruit yield per plant (kg), fruit yield per hectare (q) were recorded at the time of fruit picking. The data were analysed statistically and results were evaluated at five per cent significance (Panse and Sukhatme, 1985).

### Results and Discussion

Data presented in table-1 reveal that most of treatments proved to improve the vegetative growth and yield of phalsa over control. The maximum shoot length (203.00), number of shoots per plant (103.33), number of leaves per shoot (27.00), internodal length (6.66), number of fruits per node (14.33), number of fruiting node per shoot (16.00), fruit yield per plant (3.50 kg) and per hectare (58.30 q) were recorded with the spray of KCl @ 0.4 per cent at 50 cm pruning intensity. The favorable effect of potassium in promoting number of leaves might be due to abundant supply of Potassium on plant growth moreover, the increase in vegetative growth may be attributed to an increase uptake of these elements which being a constituent of protein component of protoplasm. All these factors contributed to cell multiplication, which has resulted in to better photosynthetic activity and it's translocation to promote better vegetative growth. Thus maximum number of leaves per shoot (27.00) with the foliar application of KCl @ 0.4% per cent and pruning at 50 cm above ground level was obtained. The findings are in agreement with result of Kumar (2004) in litchi and Singh *et al* (2009) in phalsa.

Potassium is desired for the development of the fruiting nodes. It helps in the translocation of carbohydrates and other metabolites for better reproductive growth of plants. The results are in conformity with the finding of Singh *et al* (2001) in aonla and Kumar (2004) in litchi. The higher number of fruits per node might be due to fact that nitrogen is component of chlorophyll and potash help in chlorophyll formation that regulate the build up of proper C:N ratio, which controls the flowering and fruiting of plants. It is also assumed that potassium and chlorine play significant role in photosynthetic activity and better translocation of metabolites for developing fruitlets. These results are also confirmed with the earlier findings of Nath (1994) in pruning of old Assam lemon tree; Singh *et al* (2001) in aonla, Kumar (2004) in litchi.

It is well established fact that pruning is one of the important cultural operation in phalsa cultivation. Annual pruning is essential for securing high yield of better grade fruits. The increase in growth and yield attributes particularly number of shoots per plant, number of fruiting nodes per shoots, number of fruits per node and increased yield per plant which contributed towards such an increase in average yield per hectare. The present findings are confirmed with the results of Nath (1994) in pruning of old Assam lemon tree; Ali *et al* (1991) in guava; Singh *et al* (2001) in aonla; Kumar (2004) in litchi.

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