

Effect of Colchicine on Fruit set and Pulp/Seed Ratio of Loquat (*Eriobotrya japonica* Lindl.)*

by

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Synopsis: Observations made on the effect colchicine on fruit set and pulp/seed ratio of loquat are reported in this paper.

Introduction: There are three main problems in the fruit crop of loquat (*Eriobotrya japonica* Lindl, $2n=34$) which limits the commercial cultivation of this fruit in Uttar Pradesh. They are self incompatibility (Bajpai 1950, 1952), non-setting of fruits in flowers of the months of August and September (Hayes 1945, Bajpai 1949), and the relatively many seeded nature of fruits which narrows the pulp/seed ratio of the fruits. Singh *et al* (1961) have pointed out the fact that induced polyploidy can be of some definite aid in solving some of the problems of loquat fruit production. The present work relates to the effect of colchicine on growing shoots of loquat in increasing fruit set carried out during 1961-62 at the Botanical Gardens, Government Agricultural College, Kanpur.

Materials and Methods: Four trees of loquat (variety pale yellow) apparently of same vigour and age were selected for the study. The concentrations of colchicine used were 0.125%, 0.25%, 0.5% and 1.0% with a control. The duration for each treatment was 6 hours, 12 hours and 24 hours. Thus seventy-five well growing branches were selected. Aqueous solutions of desired concentrations of colchicine were prepared in distilled water. Few upper leaves from the branches were removed in order to facilitate the treatment. The colchicine solutions were applied over cotton wads wrapped around the growing tips of the shoots prepared for the treatment. The treated branches were covered by alkathene sheets (5" x 5") in order to check the evaporation of the solution. After treatment the shoots were washed with water. The inflorescences developing from treated branches were bagged before opening of flowers to study the fruit setting.

Observations: The data recorded on the performance of treated shoots and control are presented in table.

It may be seen from the table that the fruit setting has increased in almost all the treated branches. Only one of the branches of 0.5% colchicine treatment for 24 hours duration did not form any fruit.

The fruits which developed from colchicine treated branches were distinctly heavier than the control (Plate A). The ratio between pulp and seed also increased in these cases. The seeds were shrivelled in most of the cases (Plate B).

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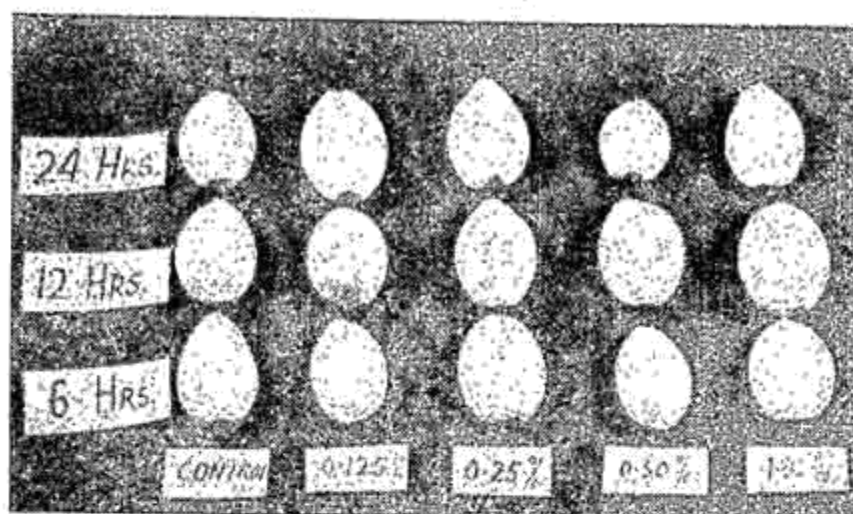


PLATE A.

Showing fruits of different concentration of colchicine treated branches.

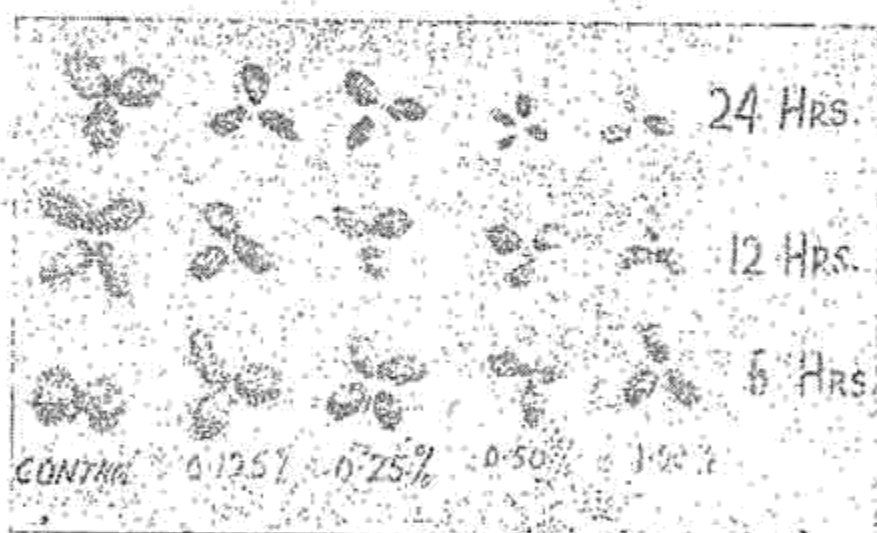


PLATE B.

Showing the seeds of fruits of different concentrations of colchicine treated branches.

Discussion and Conclusion: The fruit setting on selfing was increased in colchicine treated shoots. The fruit setting in control was on an average 1.58% whereas in the treated shoots it ranged from 0% to 7.93%. The failure to set fruit in the shoots treated with 0.5% colchicine for 24 hours duration may be due to the adverse effects of the chemical.

Bajpai (1950) and Singh *et al* (1961) reported self compatibility in loquat at the diploid levels to the extent of 1.4% to 1.54% and in the present investigation also a similar level has been observed. Singh *et al* (1961) reported self compatibility at polyploid level to the extent of 5.55%. The work

TABLE
Percentage increase in self compatibility and pulp/seed ratio.

Col. %	No. of shoots flowered	Length of inflorescence in cms.	No. of flowers	No. of fruit matured	Self compatibility in %	Wt. of fruits in gms.	No. of seeds	Wt. of seeds in gms.	Wt. of pulp in gms.	Pulp/seed ratio
6 hours duration:										
Control	3	11.0	135	3	2.22	30.50	10	4.50	26.00	5.80:1
		9.0	110	1	0.90	11.00	3	1.00	9.00	9.00:1
		12.0	116	2	1.72	20.25	6	3.00	17.25	5.75:1
0.125	3	10.0	120	1	0.83	9.50	3	1.20	8.30	6.91:1
		9.5	96	1	1.06	10.00	2	1.30	8.70	6.69:1
		11.0	120	3	2.50	31.00	10	4.40	26.60	6.04:1
0.250	1	8.0	80	2	2.50	24.00	7	3.00	21.00	7.00:1
		7.6	1	1.31	11.50	3	1.40	1.10	10.10	15.00:1
0.500	6.0	11.2	2	1.78	28.00	5	2.30	2.30	25.70	11.16:1
		7.5	65	3	4.61	51.25	10	4.10	37.15	9.06:1
1.000	2	6.0	80	2	2.50	26.50	6	3.00	23.50	7.66:1
12 hours duration:										
Control	2	9.5	98	1	1.02	10.00	3	1.25	8.75	7.00:1
		10.5	115	2	1.73	18.75	4	3.00	15.75	5.25:1
0.125	1	9.5	80	3	3.73	36.25	7	4.60	31.65	6.08:1
		7.0	58	2	3.44	27.50	6	2.30	25.20	10.95:1
0.250	2	9.0	90	3	3.33	39.00	7	3.75	35.25	9.04:1
		6.0	105	4	3.80	55.00	12	5.00	50.00	10.00:1
1.000	1	8.0	95	3	3.16	43.25	9	4.10	39.15	9.54:1
24 hours duration:										
Control	2	11.0	122	3	2.45	30.10	9	4.00	26.10	6.52:1
		10.5	101	1	0.99	9.50	2	1.40	8.11	5.71:1
0.125	2	7.5	105	3	2.87	34.00	8	3.10	30.90	9.96:1
		6.0	102	4	3.92	47.50	13	5.00	42.50	8.56:1
0.250	2	6.5	81	3	3.70	39.10	9	3.25	35.85	11.08:1
		7.0	108	7	6.54	83.20	19	7.80	75.40	9.66:1
0.500	2	5.5	47	Nil	—	—	—	—	—	—
		7.0	72	1	1.34	5.80	4	0.60	5.20	8.66:1
1.000	1	8.0	63	5	7.93	67.80	14	6.00	61.80	19.03:1

of Stout and Chandler (1941) in *Petunia*, and Crane and Lewis (1942) in *Pyrus* spp. also show, that if some compatibility is present at the diploid level, this may be increased appreciably in the polyploids.

The fruits borne on colchicine treated shoots were heavier than the control. The pulp to seed ratio in the treated fruits ranged from 6:1 to 19:1 whereas in control it ranged from 5.2:1 to 9:1. The greater pulp to seed ratio seems to be due to the increased amount of pulp and decreased weight of seeds, which were shrivelled in most of the cases. Similar results had been obtained by Singh *et al* (1961) on loquat by colchicine treatment.

Loquat is a highly self incompatible fruit tree and if self compatibility is increased, it is likely to improve its yield considerably. The present investigations point to the possibility of increased fruit set in loquat by the application of colchicine. Further investigations are to be taken up to determine whether the effects noticed are due to the induction of poly ploidy or those resulting from physiological changes.

Summary: Observations on the effect of colchicine on fruit set and pulp to seed ratio of loquat are reported. Growing shoots of loquat were treated with aqueous solution of colchicine of concentrations 0.125%, 0.25%, 0.50% and 1.0% for 6, 12, and 24 hours durations, and compared with a control. Fruit set in the colchicine treated shoots was found to be higher than in the control. The pulp to seed ratio was also observed to be greater in fruits of colchicine treated shoots over their controls.

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