Journal of Plantation Crops 16 (Supplement): 277-279

CROWN BUDDING – A METHOD TO REDUCE COST OF PRODUCTION OF NATURAL RUBBER IN INDIA

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ABSTRACT

Since the abnormal leaf fall disease of rubber caused by *Phytophthora* spp. is very severe and debilitating, crown budding of high yielding susceptible clones, viz., GT 1, RRIM 600 and RRIM 628 with disease resistant/tolerant clones viz., F 4542, FX 516 and RRII 33 was tried to combat the disease.

Leaf retention against abnormal leaf fall disease of unsprayed crown budded plants was very good when compared to sprayed control plants. The yield of RRIM 600 and RRIM 628 crown budded plants was higher than control plants whereas yield of GT 1 crown budded plants was found to be lower in the cases of all three crown clones. Though, the crown budding appears to be a promising method in the control of abnormal leaf fall disease, further experimental data for all available high yielding clones are necessary for making general recommendation of this technique.

INTRODUCTION

Crown budding of high yielding susceptible panel clones with disease resistant clones was introduced in India in the rubber culture with a view to reducing the cost of production of natural rubber. Most of the high yielding clones and clonal seedling rubber cultivars used in India are susceptible to abnormal leaf fall disease caused by *Phytophthora* spp. In high yielding clones, annual loss due to this disease is estimated to be about 30 to 50 per cent (Ramakrishnan, 1960). Abnormal leaf fall disease recurring annually during south west monsoon period requires costly prophylactic spraying of copper fungicides (Radhakrishna Pillai, 1977) resulting in high cost of production of rubber. The control of abnormal leaf fall disease by fungicide application is also a short term remedy only. The clones found to be resistant/tolerant to this disease are low yielders. Hence, the crown budding on high yielding clones with resistant/tolerant clones was tried and such technique will be more economic and permanent solution for reducing the cost of production of natural rubber.

MATERIALS AND METHODS

Two-year-old high yielding clones viz., RRIM 600, RRIM 628 and GT 1 were crown budded (Yoon, 1957, 1971, 1972, 1973) at a height of 2.5 to 3 m from the primary bud union with F 4542, FX 516 and RRII 33 which were found to be resistant/tolerant to abnormal leaf fall disease and also to other diseases. The crown budded plants were left unsprayed from the very beginning and leaf retention assessment against abnormal leaf fall

Table I. *Leaf retention against abnormal leaf fall disease (in %)*

Clone	Location I (Panel clone GT 1)						Location II (Panel clone RRIM 628)						Location III (Panel clone RRIM 600)					
	1979	1980	1981	1982	1983	1984	1979	1980	1981	1982	1983	1984	1979	1980	1981	1982	1983	1984
F 4542	91	92	84	85	72	80	94	93	93	69	80	71	88	95	90	56	73	76
FX 516	93	91	89	90	64	80	91	93	92	72	82	79	92	96	92	57	78	80
RRII 33	88	87	88	84	73	80	90	94	94	70	90	84	87	97	91	84	81	82
Control	31	73	44	51	68	65	56	27	41	14	8	63	22	66	26	68	22	61

disease was carried out. Girth measurement was recorded at the height of 125 cm from the primry bud union during 5th, 9th and 13th year of crown budding. Yield of randomly selected plants was recorded by cup coagulation method from the second year of tapping.

RESULTS AND DISCUSSION

Leaf retention against abnormal leaf fall disease in crown budded areas was higher than that of copper fungicides sprayed areas (Table I). The powdery mildew disease incidence was very severe during 1984 and caused repeated leaf fall and die-back even in the three round sulphur-dusted areas due to unusual rains during the refoliating period, but crown budded plants escaped from this disease by their early wintering habit.

During the immaturity period, girth of control plants was more than that of crown-budded plants. Crown budded plants attained tappable girth by the seventh year while the control plants by the sixth year. But during the tapping period, girth of the RRIM 628 and RRIM 600 crown budded plants increased making them on par with control or in certain combinations even surpassing it. Whereas the girth of GT 1 crown budded plants was found to be less than that of the control plants (Table II).

The yield data indicate that yield of RRIM 600 and RRIM 628 crown budded plants was more than that of control plants. However, in the case of GT 1 the yield of crown-budded plants was found to be less than the control plants (Table III). Out of the three clones used RRIM 600 and RRIM 628 were most compatible to attain maximum girth and yield.

Table II. *Girth (in cm) at 125 cm height*

Clone	Location I (Panel clone GT 1)			Location II (Panel clone RRIM 628)			Location III (Panel clone RRIM 600)		
	5th year	9th year	13th year	5th year	9th year	13th year	5th year	9th year	13th year
F 4542	40	59	71	42	62	71	29	60	70
FX 516	40	68	81	35	66	69	34	57	72
RRII 33	36	61	75	35	59	74	31	58	75
Control	51	79	85	46	58	71	38	56	66

Table III. *Yield (dry rubber/tree/tap in g)*

Clone	Location I (Panel clone GT 1)						Location II (Panel clone RRIM 628)						Location III (Panel clone RRIM 600)					
	1979	1980	1981	1982	1983	1984	1979	1980	1981	1982	1983	1984	1979	1980	1981	1982	1983	1984
F 4542	20	26	30	32	40	42	41	74	62	67	61	62	38	40	41	50	42	48
FX 516	23	31	35	37	42	35	62	70	57	57	53	66	32	48	38	49	36	47
RRII 33	21	29	30	34	44	34	48	65	55	75	56	73	38	37	40	51	50	57
Control	36	47	47	49	62	46	33	41	41	46	50	52	36	36	35	30	31	41

By adopting crown budding it is observed that the immaturity period may be extended by about one year. This loss due to delay in attaining maturity will be more than compensated by the possible annual saving in spraying expenses and by increase in yield.

Though the crown budding appears to be a promising method in control of abnormal leaf fall disease, further experimental data for all available high yielding clones are necessary for making general recommendation of this technique.

ACKNOWLEDGEMENT

The authors are thankful to M/s. Cochin Malabar Estates & Industries Ltd., A.V. Thomas & Co. Ltd., and Harrisons Malayalam Ltd. for their co-operation in conducting this experiment.

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