EXPERIMENTS ON THE POLLINATION OF HEVEA BRASILIENSIS. 2.

By

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Following on the previous paper (2) describing the pollinations carried out in May and June 1928 it is now possible to give the results of further experiments made in August and September on the young budded trees on Pilmoor Estate, Selangor, which were planted out as stumps at the end of 1924.

The results are shown in full in the Table, from which it will be seen that seven clones were crossed in nineteen combinations. From 1248 cross pollinations 91 fruits were obtained, that is 7.3 per cent were successful. The success varied greatly with the different crosses: four combinations were unsuccessful while others, for example A44 × B16 and A44 × D61, gave 20 per cent success and over. (In some crosses, owing to the scarcity of flowers on the young trees, very few flowers were used, and the percentage success might have been different with larger numbers.) These differences resemble those that have been described already by Heusser (1) for his work in Sumatra in 1920.

It is to be noted further that the success of crossing two trees (or clones) may depend largely on which is used as the mother. For example, although the cross pollinations between A44 and D61 were nearly equally successful in both directions, yet with A44 and B16 20 per cent of success was obtained with the first as mother while the reciprocal cross gave only 4 per cent. Again when A8 and B58 were crossed 3 per cent of the pollinations succeeded in the one direction and 13 per cent in the other. Similar results have been found in the Dutch East Indies: H. Rr. (3) in his review of the previous paper (2) states that his best cross in 1928 at Buitenzorg gave 52.9 per cent of success and yet in the reverse direction the success was merely 5 per cent.

The number of fruit obtained however does not represent the real success, as this depends also on the number of seeds that germinate.

The eleven fruits picked from clone A8 all looked normal, but the seeds in seven of them though full sized were light in weight, and contained merely the remains of the nucellus with no embryo or with both embryo and endosperm in various stages of arrested development. This behaviour was not confined to the fruit from artificial pollinations, for ordinary fruit picked from the same trees

at the same time also contained about 27 per cent of light seeds. In the preceding season as well a number of light seeds had been noticed.

From each of the crosses B58 x A44, B58 x D61, D61 x A44, and D61 x B16, (the mother clone is always mentioned first) two fruits of normal appearance enclosed light weight seeds. In addition one fruit from the cross D61 x B16 and two from D61 x A44 were imperfectly developed and small, although they remained on the trees for the usual time and their outer coats (exocarp) had started splitting when they were picked.

It may be interesting to compare the results of May and June with those of August and September. In the first season 134 flowers of A44 crossed with B58 gave 2 fruits, that is 0.8 per cent of success, and 6 seedlings, and in the second 43 flowers gave 3 fruits, that is 7 per cent, and 6 seedlings. The reciprocal cross B58 × A44 from 257 flowers gave 1 fruit, or 0.4 per cent of success, and 2 seedlings from the earlier pollinations, and 2 fruits from 42 flowers, i.e. 5 per cent, but no viable seeds from the later ones. (The numbers previously quoted (2) for the first season are incorrect owing to the subsequent discovery that one tree labelled A44 was a rogue and really A8.)

All the self-pollinations failed. Of 138 flowers of B58 pollinated with B58 pollen in September and of 255 in May and June not one set fruit.

The complete results for 1928 can be summarised thus:—2290 flowers of 8 clones were pollinated. 1685 crosses gave 94 fruits, i.e. 5.5 per cent of success, and 213 seeds germinated. 605 self-pollinations all failed.

The seedlings obtained have been planted out in the Rubber Research Institute Experiment Station at Sungei Buloh together with ordinary seed from the same clones and commercial "selected" seed as a basis of comparison

As indicated before, evidence was collected as to the conditions affecting the success of pollination and rather striking results were obtained. It is considered desirable however to gain additional information from this year's work before giving the results in detail. Briefly success was found to increase from morning to afternoon, while the age of the flower and rain also appeared to have a considerable influence.

This has a definite bearing on the methods used for pollination and justifies the continuance of bagging (which was used all last year) for afternoon work especially, whereas the quicker plugging method of Heusser is practically restricted to the morning, as it depends on pollination before the opening of the flower. Each method has points in its favour, and during this year the two are being used together.

CROSS POLLINATIONS OF HEVEA IN AUGUST AND SEPTEMBER 1928.

Parent Clones		Number of Female Flowers.	Number of Inflores-cences.	Number of Fruit Obtained.	Per cent of Success.	Number of Seeds Picked.	Number of Seeds Germinated
Female.	Male.						
A8	A44	261	37	9	3,4	27	10
	B58	59	7	2	3,4	6	2
A44	A8	39	9	0	..	..	..
	B58	43	7	3	7,0	9	6
	B84	12	2	0		..	..
	D61	57	10	12	21,0	36	34
	B16	50	11	10	20,0	30	27
	B95	22	8	0		..	..
B58	A8	54	6	7	12,9	21	19
	A44	42	8	2	4,7	6	0
	D61	71	7	5	7,0	15	10
	B16	115	12	4	3,5	12	11
	B95	61	7	0	..	..	..
B84	A44	10	3	3	30,0	10	10
D61	A44	104	14	19	18,3	57	47
	B16	29	4	7	24,1	21	10
B16	A44	100	13	4	4,0	12	8
	B58	53	10	1	1,9	3	2
B95	A44	66	11	3	4,5	9	9
		1248	186	91	7,3	274	205

SELF POLLINATIONS.

A8		31	3	0			
A44		20	4	0			
B58		138	20	0			
D61		6	1	0			
		195	28	0			

REFERENCES.

(1) HEUSSER, C. (1921). Kunstmatige bestuivingen bij *Hevea brasiliensis* in 1920. Archief voor de Rubbercultuur, **5,** 11.

(2) MORRIS, L. E. (1929). Field Observations & Experiments on the Pollination of *Hevea brasiliensis*. R. R. I. of Malaya Quarterly Journal, 1 & 2, 41—9.

(3) RR, H. (1929). Resultaten van kunstmatige bestuivingen in Malaya. (Review of 2). De Bergcultures, **3,** 1068.