SELECTED ARTICLES.

EXPERIMENTAL TAPPING OF HEVEA BUDDINGS V.*

IN this communication are assembled the results of the continued tapping of the experiment recently reported and of new experimental tappings of the Hevea buddings. It contains the yield statistics of :—

A. The isolated seed gardens of
Clones 33, 36, 49, 50, 52, 80, 139, 142.

B. Experimental plantation of Tjinta Radja,
Clones 27, 28, 36, 35, 49, 139 and seedlings.

C. Experimental plantation of Boekit Maradja,
Clones 33, 49, 51, 53, 65, 71, 76, 80, 147, 65, 163, 152, 174, 182 and seedlings.

D. Tamiang Rubber Estates,
Clone 256.

E. Soengei Pantjoer,
Clones 26, 33, 36, 49, 138, 139, 140, 141, 142, 145, 151, 152, 157, 161, 164, 165, 166, 181, 182, 183, 184, 185, 186, 188, 190, 207, 208, 209, 212, 214, 222.

A. EXPERIMENTAL TAPPINGS IN THE ISOLATED SEED GARDENS.

In the attached tables† are shown the results of the continued experimental tappings of clones 33, 36, 49, 50, 52 and 80 over a period of 14 months. They are a continuation of our Communications Nos. 40, 44, 55, and 59.‡ The clones 139 and 142 have been newly incorporated in the above. The annual averages in these tables have no further connection with the previous tapping years April-February and May-March respectively, but are calculated over the calendar year. This change was made in the interests of greater uniformity in the tapping experiments. Seeing that on the East Coast planting of buddings is mostly carried out in October-December, the calendar years practically coincide with the years of age of the buddings.

Clones 33, 50, 52, 80, 139 and 142 were still tapped on the old panel, but a new panel was opened at a height of 1·20 metres on clones 49 and 36 in October, 1927. With the exception of the foregoing, the tapping system for all the clones remained the same, viz., a single left-hand cut at an angle of 30° over one-third of the circumference, alternate monthly tapping with a bark consumption of 45 mm per tapping month. To calculate the annual yields the average yield per tapping should be multiplied by 150 tapping days.

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* By Dr. C. Heusser in *Archief voor de Rubbercultuur*, 13e Jaargang No. 9, September, 1929.

† Tables not reproduced.

‡ *Archief voor de Rubbercultuur*; VIII No. 1 (1924), IX No. 8 (1925), XI No. 5 (1927) and XII No. 1 (1928).

Since tapping began on the one-third cut, clone 33 as well as all the other clones, has remained free from brown bast. In clone 36 the oldest buddings again gave no further trouble this year from wind damage. Bark renewal, with the exception of the rejected clone 52, was satisfactory, and was very good in the case of clones 50, 80 and 36. The growth of the buddings is very good with the exception of clone 33. The latter appeared backward in girth increase and leafed very quickly.

With regard to the yields, the following is to be observed :—

The falling-off of yield due to wintering was in general very great in 1928. As a result of this clone 33 only showed an increased yield of 2 g. In spite of the high tapping cut, clone 36 showed an increase of 8·2 g. in yield and is at present the best of the clones standing in the seed gardens. Budding No. 7 gave an average of 100·6 g. in October 1928, and on October 10th reached 147 g., being the highest day's production obtained. It is to be regretted that this clone in its early stages is so susceptible to wind damage. Clone 49 showed a decrease of 1·3 g. in 1928, compared with 1927. This is thought to be due to climatic factors. The increase in yield of clone 50 was only 1·6 g. It must be admitted that a bigger increase than this was expected, but it is believed that a bigger increase can be counted on next year. In July, clone 50 flowered and bore fruit for the second time, so that during the past year, 18,350 viable seeds were harvested from the 10 buddings. It is not beyond the realms of possibility that this had a detrimental effect on the production.

The yield of clone 52 increased considerably. Although the figures show that on primary bark reasonable yields may be obtained, the unsightly bark renewal makes that this clone will not be able to compete with better ones.

Clone 80 has made good progress, but owing to the loss of half of this seed garden in 1927 through a whirlwind, the reliability of the average is diminished.

The yields of clones 139 and 142 are not such that they can be put on a par with the A.V.R.O.S.-clones at present in use.

As however the tapping results of the seedlings of these two clones have been discussed in our Communication No. 70, it has been considered advisable to publish the yields of the buddings here.

B. EXPERIMENTAL TAPPINGS ON TJINTA RADJA III.

The experimental tappings of buddings and seedlings reported upon in our Rubber Series Communications 54 and 59,* were continued, thanks to the kind co-operation of the manager and staff of the estate.

The latex from the clones and the seedlings of selected trees was again weighed separately each day on the estate. On the 8th, 15th, 22nd and 30th of each tapping month measurements of the rubber content were taken and from these measurements the yields per tree per tapping were calculated. The seedlings from 36×35 and the illegitimate seedlings of 49 were again measured as before by the usual method, namely, coagulating in the cup, crepeing, drying and weighing the monthly yields.

Tapping was carried out alternate monthly, with a left-hand cut at an angle of 30°. In the case of the buddings a new panel was opened during the year at a height of 1·20 metres, and the length of the tapping cut was reduced from $\frac{1}{4}$ to $\frac{1}{3}$ of the circumference. This transition was not made simultaneously for all the trees, for the majority it was carried out during the second tapping period, and for the remainder during the 6th tapping period.

* *Archief voor de Rubbercultuur*, X No. 12 (1926) and XII No. 1 (1928).

The seedlings are still being tapped for the most part on the old panel over $\frac{1}{2}$ the circumference. The consumption of bark was normal ($1\frac{3}{4}$ = 45 mm).

Growing conditions have been considerably improved during the past year by digging drains. Bark renewal is good for all the clones, and the yields of buddings have very satisfactorily improved. Clone 49 still remains the best yielder, with a yield of 258% of that of the seedlings from selected seed. Cross 36 × 35 attained the highest yield per tree, being 4 times that of the seedlings from selected seed. As however the number of seedlings trees is small and the experimental tappings with the same crosses on Soengei Pantjoer show less favourable results, the above must be accepted with a certain reserve. This however does not detract from the fact that amongst the trees of this cross (36 × 35) there are valuable new clones for isolation. The three-year's old buddings of the very promising numbers will prove this after a few years. Tree No. 25 of 36 × 35 gave a yield of 13·7 kg. in 1928, and tree No. 18, 12·92 kg. The illegitimate seedlings of 49 have jumped up 15·2 g. These seedlings were all tapped on the foot of the tree.

C. EXPERIMENTAL TAPPINGS ON BOEKET MARADJA.

We are indebted to Mr. H. J. V. S. Holder, Manager of Boekit Maradja Estate, for the extensive yields measurements, from which the average tapping results have been calculated and compiled in the accompanying table.* In conjunction with his Staff he has continued admirably the experimental tapping described in detail in our Communication No. 58.†

The continuation of the experiment covers a period of $1\frac{1}{2}$ years (July 1927-December 1928). To the clones tapped from the commencement, viz., Nos. 51, 65, 71, 76, 80, 152 and 163, and the control seedlings, five new clones of the same age were added in November 1927, January 1928 and March 1928, namely No. 33, 49, 53, 147 and 182. The former clones were continued for half a year on the same panel (on half the circumference) and thereafter on a new panel over one-third of the circumference and 80 cm. above the junction. For the control seedlings the new tapping panel was also set out over one-third of the circumference, but the change was made one tapping period later and the height tapping was only $62\frac{1}{2}$ cm. The new buddings added to the experiment were tapped over half the circumference at a height of 50 cm.

With regard to the number of trees of each group that were tapped, the following is to be noted: The experiment was commenced with 200 trees which were tapped alternate months in two series of 100 trees, series A being tapped in the odd months, and Series B in the even months, When it appeared after tapping for $1\frac{1}{2}$ years that the yields from both series were practically the same, the experiment was continued from the beginning of 1928 with Series A only, the trees from Series B being reserved for other experiments. The group of control seedlings was however increased from 100 to 200 trees. As the result of wind damage the number of trees of clones 163 and 80 was reduced from 100 to 50. With the newly-added clones, the numbers of buddings had to be limited as follows: Clone 174 20, Clones 33 and 49 25, Clone 182 50.

The first three columns of the table show the annual averages per tree per tapping for 1926, 1927 and 1928 (*i.e.*, the 4th, 5th and 6th years of age.) In the last column the annual yield per tree in kilograms dry rubber for 1928 is given. The table also shows the monthly averages obtained during the 9 tapping periods of the continued experimental tapping.

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* Table not reproduced.

† *Archief voor de Rubbercultuur*, XII No. 1 (1928).

The new yield statistics of Boekit Maradja give rise to the following provisional remarks: Amongst the clones already tapped Nos. 152, 71 and 163 appear again to be the most striking. The yield per 200 trees (*i.e.*, per hectare) in the 6th year of age would be 750 kg. for 152, 694 kg. for 71 and 662 kg. for 163. Clones 51 and 76 remain less valuable. Clone 80 has not fulfilled expectations and although its production is 1 2/3rds that of the seedlings, upon the introduction of new clones, this clone has to be put in one of the last places in the list of the usual A.V.R.O.S.-clones. Amongst the new clones tapped, 49 stands out. With this clone it is very noticeable how these trees which were first tapped at the age of five years, commence with a high production, and have hardly reacted to the rather heavy wintering of 1928. With clones 49 a yield of 792 kg. per 200 trees can be reckoned. The yields of 53, 147, 182 and 33 are also considerable. Clone 53 is one of the clones previously misjudged owing to the first yield measurements, of which the yield, now that we have other more promising clones, does not in the first place draw attention. Clone 33 possesses without doubt high-yielding capacities, but even on the good soils of Boekit Maradja still remains a sparsely growing tree.

With all these clones bark renewal was satisfactory. Statistics concerning bark renewal, latex concentration, etc. Will be published in the next Communication on these experimental tappings, in comparison with the control seedlings. The oldest renewed bark will be then 3½ years old.

D. EXPERIMENTAL TAPPINGS WITH CLONE 256 ON TAMIANG RUBBER ESTATES.

Clone 256 was discovered during an examination of a budded plantation on Tanah Terbang. In the report on this examination* this clone appeared as No. IV, resp. T.T.I. To prevent any confusion it was mutually agreed later to give this clone the number A.V.R.O.S. 256.

The buddings were planted out in October 1920, and originated from a mother-tree on Tanah Terbang which up to the present has not been traced. The first production measurements were taken in 1925 and 1926. In 1927 these measurements could not be continued owing to certain circumstances. For the purpose of selective thinning, however, the usual latex measurements were carried out this year. The buddings belong to the class producing over 100 cm.

We are in possession of complete lists of the yields in dry rubber since January, 1928, for which we are indebted to the painstaking co-operation of Mr. Rusterholz, Manager of Tamiang Rubber Estates. The trees were tapped alternate months with a left-hand cut over half the circumference. The average height of the tapping cut in 1928 was 60 cm. above the union.

The measurements were first of all made for 8 buddings. By means of the seeds a further 12 buddings in October 1928 were identified as belonging to 256 and included in the experiment. The yields were determined for each individual tree by daily coagulation in the cups, individual collection and hanging up of the coagula on separate wires for each tree. At the end of a tapping period, the monthly yields were hung for 14 days in the smokehouse and when completely dry were weighed at the experimental station and the daily averages calculated. The average daily yields over 1928 (the 8th year of age of the buddings) are assembled in the accompanying table.† The number of tapping days was 161, and the average annual yield per tree works out at 6·71 kg.

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* *Archief voor de Rubbercultuur* 1926, p. 199.

† Tables not reproduced.

The buddings of 256 are almost ideal trees as far as their outward appearance is concerned. They are good growing trees with a straight trunk and smooth thick bark, and show excellent bark renewal; branching is rather regular and strong, and the crown is not too broad.

E. EXPERIMENTAL TAPPINGS ON NEW CLONES IN THE EXPERIMENTAL GARDEN OF SOENGEI PANTJOER.

The buddings of the clones mentioned below were planted out in 1922 and 1923, partly in rows simultaneously (Nos. 214, 212, 209, 208, 207, 188, 222, 2nd series) and partly at different times as supplies between the seedlings planted in 1921 (1st series). The development of the buddings of the latter series was therefore irregular. In order to obtain yield statistics which can be compared with each other to a certain extent, the buddings of this last series were taken into tappings when they had a girth of 40 cm. at a height of 1 metre, and for calculating the annual averages, the 6 first tapping periods have been taken as the first tapping year, and the 7th to 12th periods as the 2nd tapping year.

In the first experimental series a number of partly known clones which really were not intended for clone section, were included in addition to the new clones (181, 182, 183, 184, 185, 186, 187, 188, and 189). These buddings, sometimes represented by only a few specimens, are authentic buddings of the mother-trees, which in 1920 were mostly used for crossing. After hesitation, these clones (Nos. 26, 33, 36, 49, 138, 139, 140, 141, 142, 145, 151, 152, 157, 161, 164, 165, 166) were added here as it was felt that approximate figures are better than none at all.

The clones planted out in rows all at the same time were brought into tapping simultaneously (December 1927). The yields of 10 trees from each clone were measured together. Only 2 buddings of clone 222 were present.

All buddings were tapped on the first panel at a height of 50 cm. above the union, with a left-hand cut over half the circumference. The second panel was set out over one-third, and at a height of 1 metre. The bark consumption was limited to 45 mm. per tapping month as usual, and tapping was carried out alternate monthly.

From the resultant yields, the following observations can be made :—

1. Clones 185, 183, 214, 209, 222, 186 gave a higher production than the old clones at present in use. Further yield figures will have to be awaited before a definite valuation of these clones will be possible.

Clone 185 stands out particularly by its high production, as a yield of 34 g. during the second year of tapping has never before been reached by any A.V.R.O.S. clone. The pity is that this clone forms crooked stems with continuous grooves.

2. Clones 188, 166, 207, 208 belong to the very promising numbers.

3. The remaining clones experimentally tapped have in our opinion little chance of giving better yields than those at present in use.

FINAL REMARKS.

1. Clone 49, 50, 71, 152, 163 and 256 are, as regards yield and period over which observations were made, foremost in the list of A.V.R.O.S.-clones.

2. The great sensibility of clone 36 for wind damage forms a serious drawback.

3. The yield figures of clones 183, 185, 186, 209 and 214 justify full interest and accurate further observations.

4. The yields of clones 27, 35 and 53 show that they differ only little in order of yield from the clones mentioned sub 1.

5. Clones 80 and 33 have not fulfilled expectations.