

## THE SELECTION OF HIGH-YIELDING TEA BUSHES FOR VEGETATIVE PROPAGATION

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High-yielding capacity is only one of the desirable characteristics for which one looks in attempting to improve tea planting material, but it is naturally the first to receive attention. This is so for two reasons, firstly yields are known to vary considerably from bush to bush so that real improvement is obviously possible in that direction, and secondly, yield is the most easily and directly assessed characteristic with which one has to deal.

With a crop harvested so frequently as tea, the collection of yield data is tedious, and in an ordinary field experiment the refinements of method introduced to secure accuracy in the data are well worth while despite their laborious nature. But in the selection of mother bushes for vegetative propagation, exact yield figures are of less importance. If from a field one hundred of the best bushes are chosen by eye, all that is required is that the best two or three of these hundred shall be identified by whatever further method of selection is adopted. At this stage their actual yield is of no importance.

The yield of a bush is obviously bound up with the number of flush shoots it produces. The question of interest is whether the relationship between yield and flush number is close enough to make flush counts a reasonable basis for yield selection. If so, the laborious weighing and drying of flush recommended hitherto in the Preliminary Memorandum on Tea Selection and in this journal, 1939, Vol. 12, p. 48, can be discarded. This problem has been under investigation during the past year.

Two fields were chosen and the normal procedure of selecting bushes by eye was carried out. These bushes were plucked for 40 rounds, and contrary to the plan usually adopted no discards were made. The flush was counted at every plucking, and the leaf was collected, bagged, dried and weighed, as recommended in the

Memorandum, at the end of each group of eight pluckings. The flush counts were totalled for the same periods, thus giving, in all, five sets of figures for both yield and flush count. Both fields gave similar results, but the data from one only are given here in illustration of the investigation. The conclusions set forth are based on the actual yields for 40 pluckings which are taken as an exact measure of the yield capacity of the bush over an extended period.

Table I shows how the dry weight yields and flush counts of 171 bushes are distributed with regard to one another. It is noticeable that on the whole, low flush numbers correspond with low yields and high flush numbers with high yields. In each column the highest number is printed in italic type. The average value for the yield corresponding with that particular flush group will be somewhere near the yield category of that italic printed figure. For example, consider the column headed 1,501 to 2,000 flushes. Out of sixty-one bushes in that flush group just over half (31) are concentrated in one yield group and the rest fall away fairly evenly on either side. That figure thirty-one has a prepondering influence in determining the average yield of those sixty-one bushes.

TABLE I

Correlation between Total Dry Weight Yields and Corresponding Flush Counts of Individual Bushes (40 Pluckings).

Total Numbers of Bushes falling in each Category (171 total)

Dry Wt. Gm.	Numbers of Flush (grouped)							
	501 to 1,000	1,001 to 1,500	1,501 to 2,000	2,001 to 2,500	2,501 to 3,000	3,001 to 3,500	3,501 to 4,000	4,001 to 4,500
351-400							1	
301-350					1	2	1	1
251-300				9	10	2		
201-250			19	16	11	2		
151-200		11	31	15	3			
101-150	2	18	11	1				
51-100	1	3						

The numbers printed in italics fall roughly on a diagonal and this establishes the *general* relationship that flush count is proportional to yield. We are chiefly concerned with the top right hand corner of the table. There we find three bushes with counts above 3,500. They have yields above 300 gm., but there are also a further three bushes which fall into the same yield group. At any rate, if we had selected on flush count and had decided to choose three bushes (rather less than two per cent of the originals) we should have succeeded in choosing three out of the best six yielders. For so accurate a choice we should have had to make forty flush counts for each bush.

TABLE II

Correlation between Total Dry Weight Yields (40 pluckings) and the Corresponding Flush Counts of Individual Bushes for the first 8 Consecutive Pluckings only.

Numbers of Bushes falling into each Category (171 total)

Dry wt. Gm.	Numbers of Flush (grouped)										
	50 to 100	101 to 150	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 450	451 to 500	501 to 550	551 to 600
351-400											1
301-350								1	3		1
251-300					2	4	2	7	4	1	1
201-250			2	6	11	12	12	9	2		
151-200		3	7	14	17	9	7	3			
101-150	1	5	11	3	6		1				
51-100		1	2	1							

In Table II the same 171 bushes have been distributed according to the same total dry weight yields at the end of 40 pluckings, but the flush counts are those for the first eight pluckings only. The figures for the numbers of bushes in each category are rather more diffusely spread than in Table I, but the same general relationship

holds, and it is evident that the flush counts of the first eight pluckings give in general a very fair forecast of final yields after forty pluckings. If we pick out the best three flush counts here, we find that no fewer than 24 other bushes have yields above 250 gm. But the increments in the yield groups are rather coarse, and the position is actually better than it looks at first sight.

TABLE III

Rank of the ten best individual bushes in respect of flush count and total yield.

Dry wt. yield gm. 40 Pluckings	Rank According to Flush Count				
	At 8 Pluckings	At 16 Pluckings	At 24 Pluckings	At 32 Pluckings	At 40 Pluckings
396	1	3	3	3	3
342	2	1	1	1	1
319	5	2	2	2	2
312	11	10	5	6	9
310	9	6	6	8	8
306	25	16	12	11	13
291	83	49	31	17	34
290	78	68	78	61	64
288	4	4	8	10	15
288	23	25	26	21	19

Table III gives the ten best bushes in order to their dry weight yield at the end of 40 pluckings. The actual yields are shown in the extreme left hand column. The remaining columns give the rank of the bushes according to their flush counts at the end of 8, 16, etc., pluckings up to the final flush count at the fortieth harvest. At the eighth plucking the best 2 bushes are discernible from their flush counts and after 16 plucking rounds the best 3 are found; a further 24 pluckings do not alter the choice. The fact that corresponding to the yield order of 1, 2, 3 the flush count order is 3, 1, 2

is of no importance: the data are to enable selection to be made for further and more stringent tests on the progeny. It is also noticeable that the three bushes separated out as agreeing in status by both methods are the only bushes of real interest from the point of yield. The difference between a 396 gm. and a 342 gm. yield is sufficient to make the former bush outstanding, and the second difference between 342 gm. and 319 gm. is also enough to make the higher yielding bush worthy of further observation. But the remaining eight bushes are grouped relatively close together and their total yield difference is only about three-fifths of the amount that separates the two best bushes. On these grounds therefore it is evident that relatively few flush counts will readily separate out the two per cent outstanding bushes from the larger number selected by eye.

The following procedure is recommended.

Record the flush counts for each mother bush and total the counts at the end of the fourth and eighth pluckings. If the bushes comprising the best two per cent are made up of the same individuals on each of these occasions, then they may be chosen for propagation. If not, then the counting must be continued for another group of four pluckings or till stability is reached. It is immaterial whether the ranking within the top two per cent remains stable, so long as no gaps occur in the order of merit.

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