

A NOTE ON THE VARIABILITY OF TEA SEEDLINGS.

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A careful comparison of a series of tea seedlings will show that considerable variation between plant and plant is observable in such characters as height, leaf number, leaf shape, and amount of branching. These differences are most obvious among seedlings from unselected seed-bearers, but even where the seed-bearers have been carefully selected for uniformity, it is still observable in less degree. It may be thought that the differences in the latter case are due to differences in the seed-bearers that have escaped the eye of the selector, but complete uniformity will not be found even among the progeny of a single seed-bearer. The causes of variation fall into two categories, firstly, differences in the local environmental of individual seedlings and, secondly, differences in their inherited constitution.

The form of a seedling is influenced by its environment, the fertility of the soil and the amount of light, for example, having considerable influence. The amount of water and of light available to a seedling varies considerably from place to place in a seed-bed, and in consequence variations in the form of the seedlings result. The inherited constitution is also by no means the same in each seedling, and therefore, just as children of the same parents often differ considerably in form, large variations occur among them.

It would be possible to reduce the differences in inherited constitution considerably by always self-fertilizing the flowers of a number of generations of seed-bearers. But the work would have to be continued for many decades before the plants would be uniform.

It is possible, however, to compare the relative importance of environmental differences and of inherited differences as causes of variability. In a previous note on the vegetative propagation of tea ⁽¹⁾, it has been pointed out that two plants can be obtained from one seed by allowing it to germinate, and splitting it down the axis of stem and root in such a way that each half bears one seed leaf. The latter contains sufficient reserves to enable the halves to heal their wounds and to grow into normal plants. It is possible to sub-divide further and experiments are in progress to determine the feasibility of obtaining four plants from one seed. To date, considerable success has attended the production of identical twins.

The differences between the twins will be due to variations in the local environment of the plant, since they have the same inherited constitution. The differences between pairs of twins will be due both to differences in environment and to differences in constitution, since they are produced from different seeds. The difference between the variation within pairs and the variation between pairs will indicate the importance of the differences in inherited constitution, since if the latter are unimportant the variation will be the same. If they are important, the variation between pairs will be larger than that within pairs.

Seed was obtained from good jât bearers known to be relatively even in type. From these seeds a large number of pairs of twins were obtained, which, after growth in washed sand, were transferred to baskets. Six months after the "twinning" operation the height and number of leaves were measured on one hundred and eighty-seven pairs. The height was taken from the junction of the base of the seed leaf with the stem to the base of the apical bud, plants from which the cotyledon had already dropped being omitted. In counting the leaves, fish leaves were not included.

The following figures are an index of the variability between and within pairs:—

	<u>Height.</u>	<u>Leaf Number.</u>
Between pairs	1·918	4·687
Within pairs	0·743	2·251

Statistical test shows that these differences are real, and are not due to chance. Thus the variation between pairs is larger than that within pairs. It may therefore be concluded that differences in inherited constitution do play an important part in producing variations in tea seedlings.

It is a long-established custom to remove for planting purposes only the strongest plants from tea seed beds. The weaker plants that remain are either pulled up, or else allowed to grow until they attain a suitable size for planting. The foregoing data show that a large proportion of the small plants will have failed to attain a useful size owing to an inherited tendency to grow weakly. The fact that the removal of competition from the more vigorous plants around them enables them to attain a useful size does not remove this fundamental objection to their use. It is therefore better to discard all the weaker plants entirely.

The facts described above also indicate a possible method of improvement in the technique of tea experimentation. The first requisite for accurate experimental work is uniformity of the tea bushes. The data show that additional uniformity may be obtained by the use of vegetatively propagated material, and the use of twin plants is therefore being adopted in small scale experiments involving the comparison of two treatments.

REFERENCE.

- (1) Tubbs, F. R.—A note on the vegetative propagation of tea.—*Tea Quarterly*, 1932, 5, 154-156.