TAPROOTS AND LATERAL ROOTS

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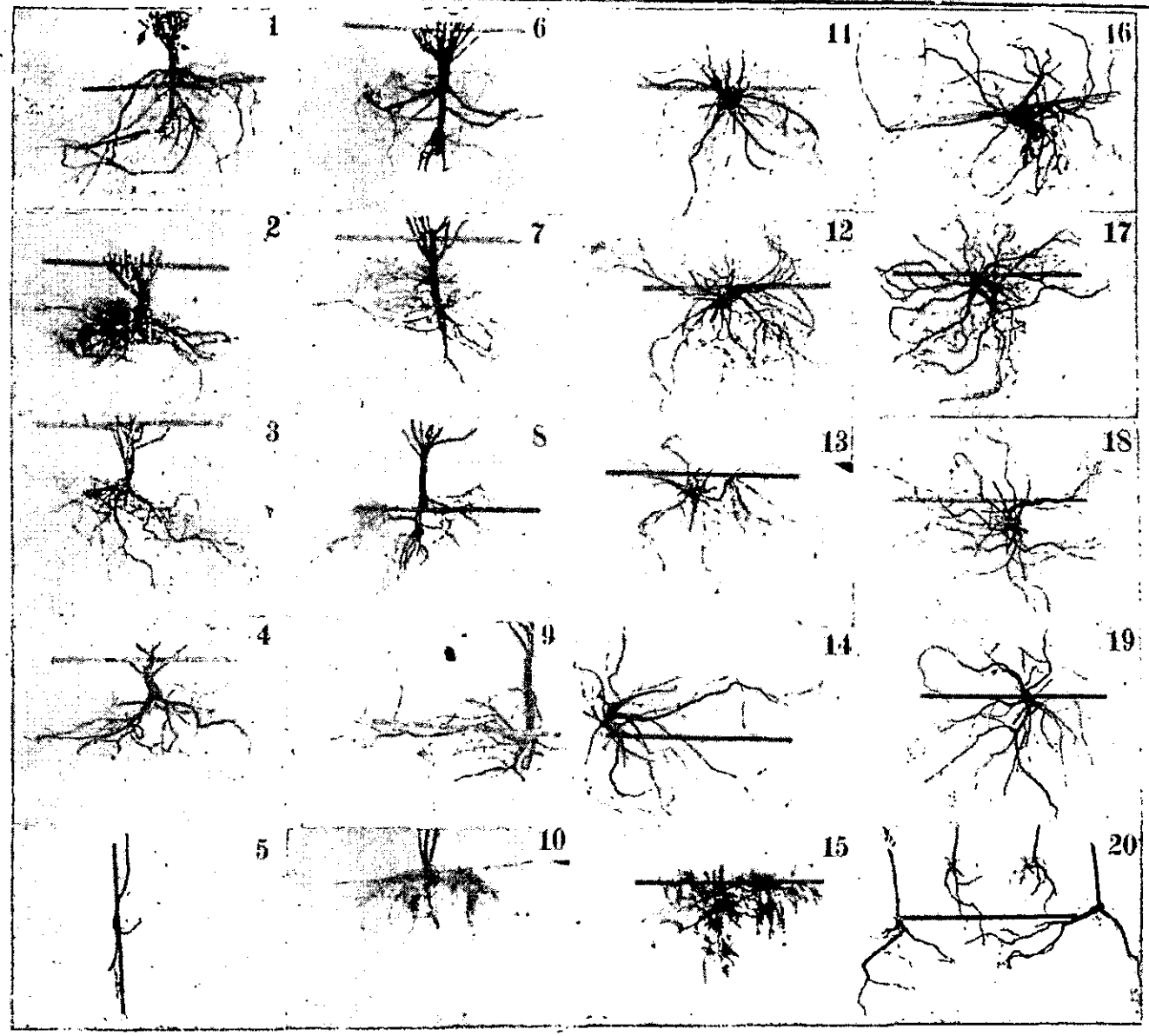
The conceptions of the taproot of the tea bush as an organ essential to the proper security of the bush within the soil, and as playing an important or essential part in the provision of water during periods of drought is still dying very hard in planting circles. While, no doubt, the taproot is of value to the plant if it exists, it is too often forgotten that by no means every bush has a taproot, and those that have none shew no visible difference from their neighbours. Take, for instance, a bush grown from a two-year-old stump as compared with a bush grown from seed-at-stake. In the latter case, if the attack of cutworm or white grub has not served it, a taproot may be present. In the former, no taproot, but only laterals grown from the seedling taproot are present. This, however, does not appear to be generally realised.

It is true that one or more of the laterals produced from the stump of the taproot of a two-year-old seedling may grow straight downwards and simulate a genuine taproot. But such is also true of lateral roots grown from any part of the root stock, and in considering drought resistance it is necessary to consider the depth to which any part of the root system reaches, rather than the



Figs. 1—15 & 16—20, Plants derived from Cuttings: Figs. 1 & 16, Clone 4 (6 years old); 2 & 17, Clone 26 (8 years old); 3 & 18 Clone 331 (5 years old); 4 & 19, Clone 510 (4 years old); 5) Clone 603 (4 years in nursery); 20. Clone 26 (4 years in nursery).

Figs. 6—15, Plants grown from two-year-old seedling stumps, after 8 years in the field. (Figs. 6 & 11, 7 & 12, etc. are of the same plants.)

presence, absence, or depth of the taproot as such.

It is well known that the finer rootlets of a tree may extend far beyond the permanent and thicker portions of the root, but any bulk of rootlets leads to the production of a relatively robust branch of the root system leading to them. It was therefore decided to uproot carefully a number of tea bushes grown from cuttings with a view to determining their general habit of rooting, in view of the fact that the common belief in the all-round efficacy of a taproot had led to fears that vegetatively propagated bushes would not stand up to field conditions as well as seedling plants.

Photographs were then taken of the root systems in two planes at right angles, showing distribution both in depth and in area (Figs. 1-20). The rod shown in each photograph is one metre (39 inches) long. The writer is much indebted to Mr. C. A. Loos, who carried out the whole of the photographic work involved.

Figures 1-4 are illustrative of the type of root system produced on bushes from single node cuttings. It will be observed that they all shew a tendency to develop a spreading root system within the fertile upper layer of soil, but that roots descend, although not vertically, as low as the vertical roots descending from the seedling root stocks shewn in the photographs numbered 6-10. This accounts for the fact that clones have stood up to drought conditions as well as ordinary tea, both in Uva and in Dimbula.

Further examination of the seedling root systems shewn in Figs. 6-10 indicates that although some of the lateral roots produced from the original two-year-old stump grow vertically downward, the bulk of the root system is concentrated in the upper layers of soil. Not only this, but certain of the lateral roots may, as in the clonal plants, descend as deeply as the taproot or its substitute. It is also interesting to observe that, while photographs 6 and 7 will doubtless delight the heart of the confirmed taproot enthusiast, they cannot by any means be called typical — a fact that has been confirmed over many years of examination of mature root systems from many parts of the Island.

Figures 6-10 exhibit a complete range of form from the type with a central root stock and thickened laterals to forms such as those shewn in Figures 9 and 10, which might well be thought indistinguishable from the clonal series 1-4. To complete the picture, reference may be made to Figures 5 and 20 which illustrate the roots of plants grown from cuttings and left four years in the nursery. Fig. 5 is admittedly exceptional, the common types being shewn in Fig. 20. Figs. 11-15 show the same root systems as Figs. 6-10, photographed to show their spread, for comparison with the similar clonal root systems shewn in photographs 16-19. It is noteworthy that in all cases except one the specimens grown from cuttings are several years younger than the seedling roots, all of which had been grown on in the field for 8 years, after being grown for two years in the nursery as stumps.

It is not likely that the taproot is a useless organ — in times of drought it may be of value — but the point which should not be missed is that it is not essential, and its function can be, and often is, taken over by lateral roots with no loss of efficiency.

One may, perhaps, conclude with the observation that provided the selection and testing of clones is carried out under the local conditions of an estate, a discussion about root systems is besides the point. If a clone is found to yield a larger quantity of better tea than the average bush on the estate, *under local conditions of drought, etc.*, from a commercial point of view it would appear to be an idle curiosity that demands to know whether the bush has a taproot or, indeed, any roots at all.