

## GRAFTING FOR DROUGHT RESISTANCE IN CLONAL TEA

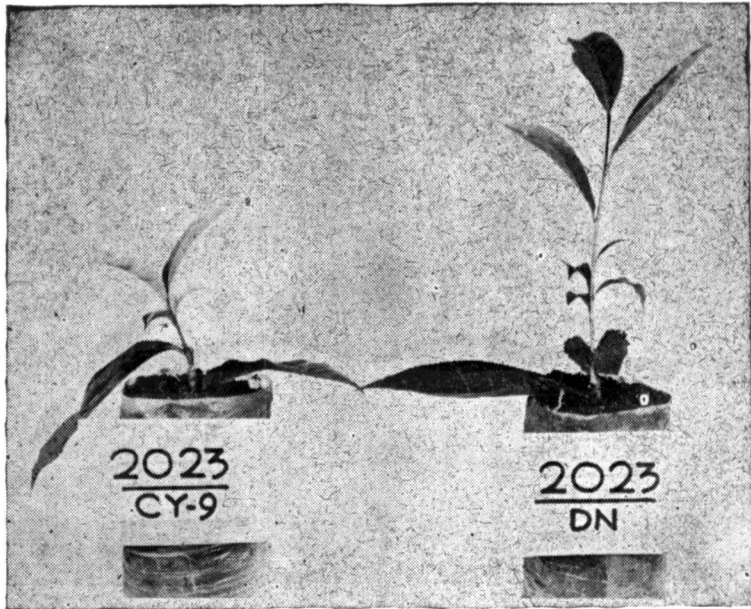
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The possibility of improving the drought tolerance of high-yielding but drought-susceptible clones by using known drought-resistant clones, as stocks in grafts of these, is examined in this preliminary study.

It is well known that in drought prone areas that high yielding clones such as 2023 and 2026 are generally less drought resistant than low yielding clones such as DN 2025, and CY 9. A recent study has revealed that an important factor responsible for clonal variation in drought resistance is differences in rooting depth (Nagarajah and Ratnasuriya, 1981). Table 1 shows the maximum rooting depth of 20-year-old clonal plants grown at St Coombs. It is evident from Table 1 that the less drought resistant clones 2023 and 2026 had a more shallow root system than the more drought resistant clones DN, 2025 and CY 9. These observations on clonal differences in yield, rooting depth and drought resistance has opened the possibility of obtaining plants which are high yielding and drought resistant by grafting scions from high yielding clones to stocks which have a deep root system. The preliminary results of a study on grafting are presented in this short communication.

The cleft grafting technique was used in this study. The method consisted of collecting single node cuttings from clones to be used as stock scion and making a cleft and a wedge in the stems of the stock and scion respectively and the union tied firmly with a strip of polythene. The composite cutting was next planted in well watered soil contained in polythene bags, and covered with a sheet of transparent polythene, to ensure that adequate moisture was maintained around the cuttings during the initial stages of growth. In addition the polythene cover would prevent excessive wetting and consequent wood rot of the grafts due to rain water. In case a large sheet of polythene is not available to cover the cuttings then the individual cuttings could be covered with polythene bags. The polythene cover was removed only after the axillary buds of the stock and scion had sprouted. The axillary bud of the scion was allowed to grow and the axillary bud of the stock was nipped. After the scion commenced growth the standard nursery practice was followed in watering and manuring the grafted plants.



*Fig. 1.* — Nine - month - old grafted plants 2023/DN and 2023/CY-9



Fig. 2. — Two - year - old grafted plants 2023/DN and 2023/CY-9. Note that both at 9 months and two years plants 2023/DN had a better shoot growth than plants 2023/CY-9.

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TABLE 1 — *The maximum rooting depth of 20 - year - old clonal plants. Commencing from clone NL 4/2 the clones are arranged in order of increasing degree of drought resistance. Mean of ten plants.*

<i>Clone</i>	<i>Rooting depth (cm)</i>
NL 4/2	56
2026	81
2023	90
2024	110
2027	135
2025	135
CY 9	140
DN	117
LSD (P=0.05)	15

TABLE 2 — *Shoot growth of the scion nine months after grafting. Mean of ten plants*

<i>Grafts</i>	<i>Shoot dry weight (g)</i>
2023/DN	0.57
2023/CY-9	0.28
2023/2025	0.57
LSD (P=0.05)	0.21

TABLE 3 — *Root growth of the stock nine months after grafting. Mean of ten plants.*

<i>Grafts</i>	<i>Root dry weight (g)</i>
2023/CY-9	2.20
2026/CY-9	1.84
LSD (P=0.05)	NS

The effect of scion-stock interaction on growth was ascertained by assessing the shoot and root growth of the plants nine months after planting and this data is presented in Tables 2 and 3. It is evident from Table 2 that the shoot growth in plants 2023/CY 9 was lower than plants 2023/DN or 2023/2025. Figs. 1 and 2 show that the reduced growth of plants 2023/CY99 relative to plants 2023/DN observed at nine months was also observed when the plants were two years old. This shows that in some clonal combinations stock-scion interaction can reduce shoot growth. This reduction in shoot growth was probably caused by growth inhibitors originating from the stock. On the other hand root growth data presented in Table 3 indicates that scion-stock interaction did not affect root growth, However more data on different scion-stock clonal combinations is necessary before a firm conclusion can be drawn on the effect of scion-stock interaction on root growth. The plants obtained from these grafts have now been planted in the field to study their yield potential and resistance to drought.

## REFERENCE

- NAGARAJAH, S. and RATNASURIYA G. B. (1981). Clonal variability in root growth and drought resistance in tea (*Camellia sinensis*). *Plant and Soil*. In press.