

## **Seedling characteristics of open-pollinated Malaysian class 1 cacao clones**

### **ABSTRACT**

Commercially grown cacao (*Theobroma cacao*) is generally propagated by grafting. In grafting, the choice of rootstock is important because it affects the growth, vigor, and health of the resultant graft. Class 1 Malaysian commercial cacao clones (MCB C1, MCB C8, KKM 22, PBC 123, and QH 1003) could be proposed as rootstocks due to their superior agronomic traits. However, the growth characteristics of seedlings of Malaysian cacao clones are not known. In this study, the seedling characteristics of open-pollinated class 1 cacao clones and the UIT 1 clone were compared by measuring the number of leaves, hypocotyl length, stem girth, plant height, root length, and dry weight of shoots and roots. The study was conducted in pots under a rain shelter using a Completely Randomized Design with 30 replicates. ANOVA showed significant differences ( $p < 0.05$ ) in all growth parameters among the six cacao clones, except for root length and root dry weight. The results showed that KKM 22 and QH 1003 had better growth performance than the other clones. In terms of shoot dry weight, KKM 22 ( $3.89 \pm 0.24$  g) and QH 1003 ( $3.52 \pm 0.21$  g) had the highest shoot dry weight but were not significantly different from PBC 123 ( $3.41 \pm 0.03$  g) at 70 days after sowing (DAS). In terms of plant height, QH 1003 ( $28.3 \pm 0.92$  cm) and KKM 22 ( $26.4 \pm 1.33$  cm) also showed the highest plant height but were not significantly different from PBC 123 ( $26.4 \pm 1.16$  cm) and UIT 1 ( $27.7 \pm 0.65$  cm). In addition, KKM 22 and QH 1003 showed the highest number of leaves of  $15 \pm 0.45$  and  $13 \pm 0.39$ , respectively. This might indicate that KKM 22 and QH 1003 were more efficient in nutrient uptake and utilization. Finally, KKM 22 ( $0.64 \pm 0.02$  cm) had the largest stem girth, and QH 1003 ( $8.3 \pm 0.20$  cm) had the longest hypocotyl length. It has been shown that a large stem girth and a long hypocotyl contribute to grafting success in other plants. Therefore, KKM 22 and QH 1003 may be suggested as potential rootstocks to replace UIT 1, subject to further evaluation such as scion compatibility.