

# Improving rooting in leafy stem cuttings of *Allanblackia floribunda* Oliver using fertilizers

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## Background of study

**Scientific name** : *Allanblackia floribunda* Oliver (Clusiaceae)

**Distribution zone**: humid forest zone of Africa.

**Importance**: fruits contain nuts rich in fatty acids highly appreciated by cosmetic and food industries; the bark is locally used for disease treatment (Attipoe *et al.*, 2006).

**Problem statement**: due to felling of trees during agricultural activities and overexploitation of the bark for medicinal purpose, *Allanblackia* is threatened by serious genetic erosion. Rooted leafy stem cuttings have been tested as a way to propagate and to protect the species but its implementation is still constrained by several factors such as low rooting percentage and poor growth of rooted cuttings. Rooted cuttings also produce few roots per cutting (1-2 roots) (Atangana *et al.*, 2006) that hinders the establishment and growth of rooted cuttings.

## Hypothesis

Manipulating the factors affecting carbohydrates content such as fertilization can significantly increase percentage of rooted cuttings and mean number of roots.

## Objective

This study examined the effect of foliar NPK (15-15-30, 20-20-20 and 30-10-10) applied on stem cuttings in propagators at different physiological stages of cutting growth on rooting ability.

## Method

Six months old *Allanblackia* stock plants

Collection of cuttings (Tchoundjeu, 1989)



Setting of cuttings inside propagator and management (Tchoundjeu, 1989; Leakey *et al.*, 1990)

- **Experimental design**: Split plot
- **2 factors**: Type of NPK fertilizers (15-15-30, 20-20-20 and 30-10-10) and period of application (at setting, callus initiation and two times application which are at setting and at callus initiation)
- **Number of blocks**: 02
- **Experimental unit**: cutting
- 35 cuttings/treatment/ block



Data: percentage of rooted cuttings and number of roots, starting after 4 weeks until 28 weeks

**Data analysis**: Genstat V. 14 using Linear Regression Model (P<5%)

## Results

Type of foliar NPK, period of application and their combination significantly affected percentage of rooted cuttings 28 weeks after setting in the propagator ( $p < 0.001$ ,  $p = 0.05$  and  $p < 0.001$ , respectively) (Fig. 1, 2 and 3).

Mean number of roots per rooted cutting of *A. floribunda* was significantly affected by type of fertilizer applied ( $p = 0.022$ ) (Fig. 4), contrary to period of application ( $p = 0.64$ ) and the combination of both ( $p = 0.41$ ).

Moreover, mean number of roots per rooted cutting was higher within cuttings that didn't receive any treatment than for treated rooted cuttings. The least mean number was observed in cuttings treated with 30-10-10 (Fig. 4).

The number of roots varied from 1 to 4 with the highest and lowest absolute frequencies of 1 and 4 roots, respectively. The greatest quantity of cuttings with 3 and 4 roots was noticed in NPK 20-20-20 applied at all stages.

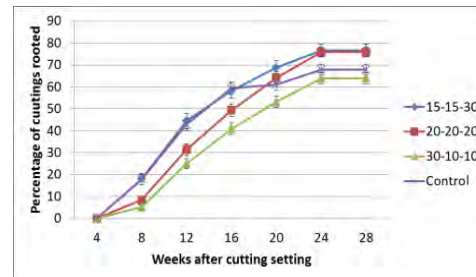


Figure 1: Effect of foliar NPK types on rooting percentage of *A. floribunda* ( $p < 0.001$ )

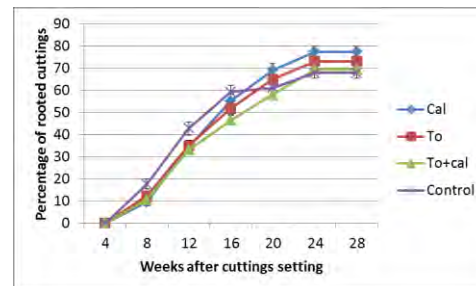


Figure 2: Effect of period of fertilizer application on rooting percentage of cuttings ( $p = 0.05$ ) (To=application at setting, Cal = application at callus initiation and To+Cal=two times applications, at setting and at callus initiation)

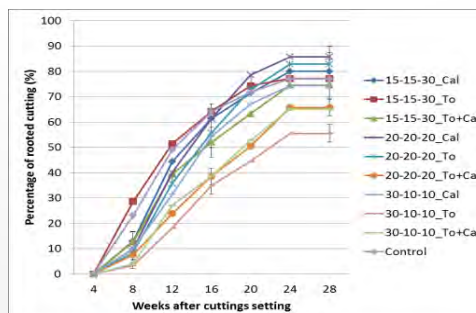


Figure 3: Combined effect of NPK foliar fertilizer type and period of application on percentage of rooted cuttings ( $p < 0.001$ )

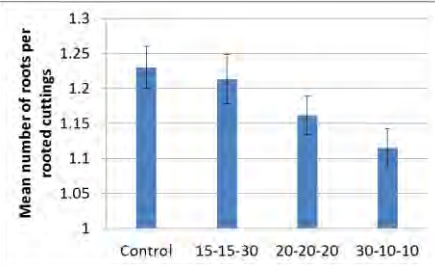


Figure 4: Mean number of roots per rooted cutting

## Discussion and conclusion

It can be concluded that *A. floribunda* rooting ability can be influenced by NPK fertilization and period of application. It could contribute to increasing carbohydrates (including indigenous auxins) reserves of the cuttings as they are important prerequisite for its rooting (Leakey, 2004).

To improve this result, the effect of different doses of nitrogen can be tested, in light of the apparent decrease in mean numbers of roots with increasing concentration of this element. Meanwhile, to fine-tune an appropriate combination for these factors, it can be recommended to apply 20-20-20 (at setting or during callus initiation) or 15-15-30 (during callus initiation) as the best treatments to improve rooting success of *A. floribunda* cuttings.

## Acknowledgements

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