

## ABSTRACT

Rose, is the leading cut flower crop in Kenya and enjoys high demand in both national and international markets. Low rooting and survival of the cuttings increases cost of production and may limit the use of some rose rootstocks, quality or yield virtues notwithstanding. This study was conducted to evaluate the effects of cutting position of rootstocks and exogenously applied auxins on rooting ability, growth and yield of *Rosa hybrida*. The studies included 1) self-rooting; the treatments involved three cutting positions (top, middle and bottom) on vertical shoots of two rootstock cultivars ('Rosa progress' and 'Natal briar') and treatment of the basal ends of the cuttings with i) IBA at concentrations of 0%, 0.2%, 0.4% and 0.6% and ii) NAA at concentrations of 0%, 0.2% and 1%, before planting; 2) Top grafting of scions of the variety 'Inca' onto the three cutting positions of the two rootstocks above and treating with 0.2%NAA and 0.4% IBA. The rooted grafts in the second experiment were later transplanted in the field to evaluate the flower yield. Both experiments were factorial laid out in a randomized complete block design. The rootstock cuttings were analysed for IAA (Indole-3-acetic acid) and cytokinins in the stem base and bud region. Carbohydrates and mineral nutrients were analysed in the stem base of cuttings. Cutting position significantly influenced the shoot and root growth parameters measured in both experiments. In the self-rooting experiment, the root and shoot growth was promoted acropetally and corresponded to higher endogenous carbohydrate, IAA concentrations, zinc and nitrogen levels and IAA: cytokinin in the stem base of cuttings and also high IAA and IAA: cytokinin in the bud region of top position cuttings than bottom position cuttings. The growth of grafts on the rootstock 'Rosa progress' was promoted basipetally and those grafted on 'Natal briar' acropetally and was attributed to high sucrose content in the stem bases of bottom and top position cuttings respectively. The grafts on 'Natal briar' produced higher rooting percentage and flowering stem weight but lower total number of harvestable stems and stem length than grafts on 'Rosa progress'. Exogenously applied auxins promoted rooting and concentrations of 0.4% IBA and 0.2% NAA recorded higher rooting responses than the other concentrations in the self-rooting experiment. In the grafting experiment, 0.4% IBA exhibited higher root number than 0.2%NAA. The top position cuttings should be used to multiply the two rootstock cultivars, but in grafting, the variety 'Inca' should be grafted on the bottom position cuttings of 'Rosa progress' and on top position cuttings of 'Natal briar' to achieve higher grafting take. The cuttings should be treated with auxins for enhanced rooting.