Nitrogen deficiency increases basal branching and modifies visual quality of the rose bushes

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Résumé en anglais	Rosebush architecture resulting from the spatial organisation of the plant axes induces plant shape and consequently within ornamental horticulture context, its visual quality and commercial value. This architecture can be modulated by environmental conditions, particularly in the horticulture context in which the possibilities to control growing conditions are numerous. The objectives of the study were to determine, in young rose bushes, (1) whether short periods of nitrogen deficiency affect branching and (2) whether this effect is sufficient to modify the visual quality of the plant in a sustainable manner. Between vegetative bud burst and the petal colour visible stage of the generated primary branch, young rooted cuttings of bush rose (cv Radrazz) were subjected to one of three nitrogen regimes: (1) no nitrogen deficiency, (2) continuous nitrogen deficiency, i.e. 35 days of N deficiency, and (3) nitrogen deficiency restricted to the flowering stages, i.e. 18 days of N deficiency. After the petal colour visible stage, all three groups of plants were supplied continuously with nitrogen. We observed the morphology of the axes and the kinetics of axillary bud burst. Twelve weeks after the petal colour visible stage, the visual quality of the rose bushes was evaluated by an expert jury. We found that nitrogen deficiencies (1) increased bud burst ratios in the medial and basal zones of the primary branch, (2) delayed the bud burst in the apical zone of the primary branch and (3) had long-term effects on plant visual quality. The continuous nitrogen deficiency regime produced flatter, more asymmetric and less vigorous rose bushes than the no nitrogen deficiency regime. By contrast, nitrogen deficiency during the flowering stages only resulted in more symmetric, taller and more vigorous rose bushes than the no nitrogen deficiency regime. Based on these results, the role of nitrogen on bud burst was discussed and candidate processes at the origin of the visual quality modification were suggested. This new approach combining ecophysiology and sensory assessment of ornamental plants enabled the identification of some early architecture components to be correlated with later visual quality characteristics and then to better target the physiological processes of interest.
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