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Effect of the K-N application levels on two oil palm genotypes in nursery stage

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Recently some researchers focus on the identification of planting material presenting a better efficiency towards nutrient applications and consumptions. Our work is focusing on the internal functioning of the mineral reserves of the plant, especially the absorption processes and the remobilization of some nutrients essential to oil palm as potassium, in addition with nitrogen. An experimental has been conducted in controlled conditions, with the objectives to study the effect of K-N gradient on the mineral allocation at the plant scale and to compare two progenies (G1 and G2), presenting contrasting leaf potassium content (G1 will be characterized as K- - and G2 as K++). Pre-germinated seeds, after 3 months of pre-nursery, were transferred to plastic pots (6 kg) with a growing medium composed of 50 % sand and 50 % vegetal commercial compost. The plants were submitted to four potassium levels (K0, K1, K2, K3) and two levels of nitrogen (N1, N2) in a block design with three repetition. A first set of measurements started with three months, a second eight months on 36 plants by progeny (G1 and G2) belonging to N1K0, N1K1, N1K2, N1K3, N2K0 and N2K3 treatments. The results concerning foliar mineral analyses show out high levels for nitrogen (N), potassium (K) and magnesium (Mg) for G2 genotype. The levels were N%=2.26 (± 0.17), K%=1.64 (± 0.21), Mg%=0.476 (± 0.04) for G2. For Genotype G1 the foliar levels were N%=1.89 (± 0.20), K%=1.478 (± 0.24), Mg%=0.394 (± 0.04). The evaluations of chlorophyll content, using SPAD 502 (Minolta, Japan) on the three youngest leaves of each plant, showed an increase of the chlorophyll content from leaf rank one to leaf rank three. The chlorophyll content was higher in K- of leaves than in K+ ones for the two measurement dates. The results concerning the biomass showed differences between genotypes in all evaluations. Leaf and roots biomass were higher for G1 in both dates of measurements. G1 and G2 showed contrasted “above ground/roots” ratios that increased during plant growth (first sampling of G1=1.65 (± 0.21) and G2=1.80 (± 0.19), second sampling G1=2.18 (± 0.40) and G2=2.63 (± 0.78). Significant differences were observed for starch between G1 and G2 with higher concentration for G1 compared to G2. The first investigations undertaken just after germination stage for the two genotypes do confirm their potassium characterization K- - for G1 and K++ for G2. This difference could be a genetic characteristic plant?.

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