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Effect of Nitrogen, Phosphorus and Biofertilizers on Quinoa Plant (*Chenopodium quinoa*)

Elham F.Gomaa

Department of Agricultural Botany, Faculty of Agriculture, Cairo University, Giza, Egypt.

ABSTRACT

Field experiments were carried out in Janaklees Farm, Ministry of Agriculture, Noharia, Egypt; during the two successive growing seasons of 2010/2011 and 2011/2012. Quinoa plants (*Chenopodium quinoa* Willd.) were fertilized with ammonium nitrate (34 %N) at 0, 50, 100, 150 kg/fed. with combination of nitrobin (as a biofertilizer) or calcium super phosphate (15.5%P₂O₅) at 0, 50, 100, 150 kg/fed. with combination of phosphorin (as a biofertilizer) or used the same source and levels of chemical nitrogen and phosphorus together in combination with nitrobin and phosphorin (as a biofertilizers) to study the effect of interaction between biofertilizers and different levels of mineral fertilizers on growth, yield characters, chemical composition and anatomical structure of quinoa plant. The obtained results could be summarized as follows: The highest values of all growth and yield characters in the first and second season were recorded at treatment of 100 Kg ammoniums nitrate/fed. in combination with nitrobin, 50Kg calcium super phosphate/fed. in combination with phosphorin and 100 Kg ammonium nitrate and 100Kg calcium super phosphate per fed. in combination with biofertilizers (nitrobin and phophorin) compared with other treatments or control too. Applied nitrogen and phosphorus (bio-and chemical fertilization) increased crude protein and mineral elements (phosphorus, potassium and calcium) in seeds. The increases in stem diameter of quinoa plant due to application of 100 Kg ammonium nitrate/fed. in combination with nitrobin, 50 Kg calcium super phosphate/fed. with phosphorin and 100 Kg ammonium nitrate plus 100Kg calcium super phosphate/fed. with nitrobin and phosphorin could be attributed to the prominent increase in all included tissues (the thickness of epidermis, cortex, vascular tissues and pith). Likewise, biofertilizers increased thickness of both midvein and lamina of leaf of quinoa plant. The increase in lamina thickness was accompanied with increments in thickness of palisade and spongy tissues. Also, the main vascular bundle of the midvein was increased in size as a result of treatment with biofertilizers.

Key words: *Chenopodium quinoa*, Nitrogen, Phosphorus, Biofertilizers,

Nitrobin, Phosphorin, Growth, Yield, Chemical composition, Anatomy.

