UNIVERSITI TEKNOLOGI MARA

THE EFFECTS OF VARIOUS PACLOBUTRAZOL CONCENTRATIONS ON THE GROWTH, YIELD AND BETA-CAROTENE CONTENT OF SWEET POTATO [*Ipomoea batatas* (L.) Lam.] var. VITATO GROWN ON SANDY SOIL

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ABSTRACT

The orange-flesh sweet potato cultivar known as VitAto was introduced by the Malaysian Agricultural Research and Development Institute (MARDI) in 2007. VitAto' storage root is high in β-carotene content, vitamin C, vitamin E and anthocyanin. It is a recommended crop under East Coast Economic Region (ECER) to replace tobacco cultivation on beach ridges interspersed with swales (BRIS) soil in Kelantan and Terengganu. The VitAto storage root is marketed in three grades based on sizes; big (A), medium (B) and small (C). Bigger sizes or better grades fetch higher price. However, most VitAto farmers cultivated on BRIS soil generally obtained low yield with majority of storage roots consisted of grades B and C only. To overcome this problem, a plant growth regulator paclobutrazol (PBZ) at various concentrations were given as an additional input to the existing inorganic fertilization practice in VitAto cultivation. Two experiments were conducted on sandy soil at MARDI Rawang Station, Selangor from November 2012 to June 2013. Both experiments used a randomized complete block design (RCBD) with four replications. These experiments utilized PBZ at various concentrations as additional input to the existing standard inorganic fertilization practice as recommended by MARDI. The standard NPK inorganic fertilizer was given at 28, 35 and 49 while soil drenching PBZ solution was given at 20, 40 and 60 days after planting (DAP) in both experiments. In the first experiment, high PBZ concentrations were used; 0 (control), 100, 200, 300 and 400 ppm while in the second experiment, low PBZ concentrations were used; 0 (control), 10, 20, 40 and 80 ppm. The effectiveness of PBZ at selected concentrations were compared to the existing recommended inorganic fertilization practice (control) based on several aspects such as growth and development, yield, mineral nutrients and β-carotene content. The results showed that the best PBZ concentrations which positively influenced most of parameters measured was the 10 ppm PBZ treatment. At the maturity stage, this treatment increased storage root number, fresh weight, dry mass and β-carotene content, by 40%, 41%, 31% and 13% if compared to control respectively. Similarly, this treatment increased storage root nitrogen (N), phosphorus (P) and potassium (K) concentrations by 2%, 42% and 30 % respectively and contents by 42%, 82% and 141% respectively. The 10 ppm PBZ also increased plant total N, P and K contents by 56%, 70% and 79% higher than control treatment. The 10 ppm PBZ increased the yield by increasing the plant total dry mass production and K nutrient content. High total dry mass production ensured enough assimilate that could be translocated to the storage root primarily at the final growth stage from storage root bulking to maturity stages. High K nutrient content increased the assimilate translocation from the shoot to the storage root. It can be concluded that the K nutrient increased the sink strength of storage root organ to attract greater assimilate. The application of 10 ppm PBZ probably the best option to be used as a supplement to the recommended inorganic fertilization practice for VitAto cultivation on sandy soil.

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