Growth and yield response of three sweet potato (*Ipomea batatas* L.) varieties to different seasons of a subtropical environment of KwaZulu–Natal, South Africa

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INTRODUCTION

Sweet potato is among the oldest crops in the world and was among the first staple crops before the introduction of cereals. It is the third most important root crop in Sub-Saharan Africa after cassava and yam and is mainly grown for its starchy roots and immature leaves (Ewell & Mutuura, 1994). It plays a major role as a food security crop; the orange-fleshed varieties are reported to alleviate malnutrition, especially vitamin A deficiency (Laurie *et al*., 2012). Its ability to grow even with low inputs on marginal soils and under adverse weather conditions (Iheagwara, 2013), has since increased the attention of researchers. Limited research does however, indicate that it is sensitive to differences in environment, especially temperature (Abidin *et al*., 2005). There is a need therefore to evaluate its adaptation to different seasons even within a climatic region. The objective of this study was to assess agronomic and physiological performance of locally bred sweet potato varieties over different seasons in a subtropical region of KwaZulu-Natal, South Africa.

Figure 1: Sweet potato vines

MATERIAL & METHODS

Three varieties (Fig. 1) of sweet potato (A40, A45 and 199062.1) were planted in a randomized complete block design with three replications using local knowledge (Fig. 2 & 3). Field experiments were carried out during the winter and summer seasons of 2012/13. Growth and physiology data collected included vine length, leaf number, stomatal conductance (SC) and chlorophyll content index (CCI), measured bi-weekly. At harvest, root yield and biomass were determined.

Figure 2: Preparation of ridges for planting

Figure 4: The harvest

Figure 3: Planting of vines using local knowledge

RESULTS & DISCUSSION

Different varieties exhibited significantly different ($P<0.05$) growth patterns (vine length, leaf number and branching habit) within a specific season, while physiological responses (Fig. 5) were affected by plant growth stage and varieties (CCI was higher in A45 and 199062.1 than A40; the opposite was true for SC). Biomass and storage root yield (Fig. 6)varied significantly ($P<0.05$) between the two seasons. The summer season recorded 88% higher yield compared with the winter yield (Fig. 4).

CONCLUSION

Growth, physiology and yield of sweet potato varieties varied with seasons. Varieties A45 and 199062.1 were shown to be more adapted to subtropical winter and summer conditions and tended to avoid drought stress by maintaining uniform chlorophyll content throughout the season than variety A40. Variety A40 produced higher yield in summer although not significantly different from the rest of the varieties.

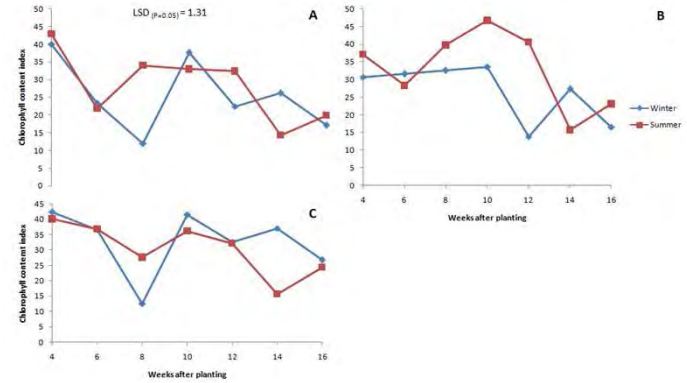

Figure 5: Chlorophyll content index of three sweet potato varieties (A: A40; B: A45; C: 199062.1) grown during winter and summer seasons

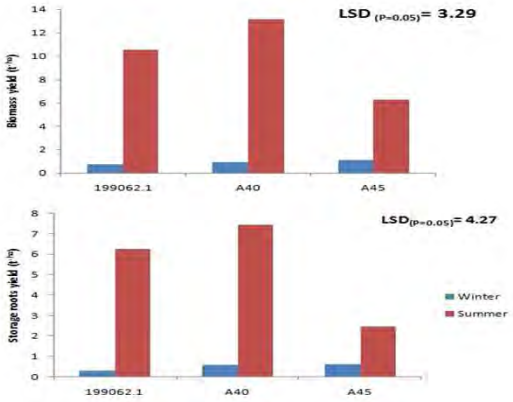

Figure 6: Biomass and storage root yield of sweet potato grown during winter and summer season

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