

Assessing irrigation approaches for production of sweetpotato planting material in net tunnels and open fields

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This study explored the importance of four factors in irrigated vine production. These were production in net tunnels and open plots, varietal differences, different water delivery systems and water stress levels. All the experimental plots performed better than the control (farmer practice) with both varieties attaining higher yields under net tunnel compared to open field management.



Fig. 1 On-station trial at Nyakasanga village, Misungwi district. (credit K. Ogero)

➤ What was the problem?

Water is a major requirement for successful production of sweetpotato planting material. Most farmer-multipliers in the Lake Zone, Tanzania rely on rain, which limits vine production, especially during the dry months of mid-May to September. A few farmer-multipliers irrigate using buckets or petrol-powered pumps. However, use of buckets is cumbersome for women; whereas petrol-powered pumps, where water is often applied directly on the crops, are wasteful. Reliable irrigation is important to avoid the loss of improved sweetpotato varieties. Therefore, we need to identify alternative ways to irrigate that are simple to use and affordable for different types of farmers.

➤ What did we want to achieve?

This study sought to identify appropriate and cost-effective irrigation approaches for sweetpotato vine production under net tunnels and open field multiplication. The influence of four factors on vine production was assessed. The factors were:

- Management in net tunnels and open field;
- Varietal performance – comparison between Kabode and Mataya varieties;
- Performance of two irrigation systems - drip and furrow;
- Three water stresses at 10, 40 and 70 kPa¹ of soil water tensions (SWT).

¹ kPa refers to kilopascal which is a unit of measurement, in this case for soil water content; 0 kPa = very wet and 100 kPa = very dry.

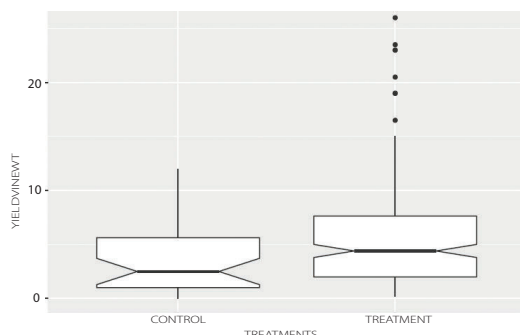


Fig. 2 Vine production in kilograms under controlled irrigation (treatment) compared to farmer practice (control).

➤ Where and with whom did we work?

We collaborated with the Lake Zone Agricultural Research and Development Institute (LZARDI) which provided the site for the on-station trial at Nyakasanga village, Misungwi district (Fig. 1). On-farm trials were conducted in collaboration with two male farmer-multipliers in Mwasonge village, Misungwi district, and Nyasenga village, Sengerema district, and one female multiplier in Kanyala village, Sengerema district. Village extension officers assisted in monitoring on-farm trials.

➤ How did we make it happen?

There was one on-station trial and three on-farm trials. The effect of irrigation schedules, irrigation types and varietal differences on vine production in the net tunnels and open beds were assessed. Three irrigation schedules and two water delivery systems were tested. The irrigation schedules were based on 10, 40 and 70 kPa of SWT. The controls followed normal farmer practice and were irrigated using watering cans. SWT was measured using tensiometers. The amounts of water utilized per irrigation criterion were measured and compared vis a vis vine production. Two irrigation types, drip and furrow, were

compared. The response of two sweetpotato varieties, Kabode and Mataya, to the different irrigation approaches was also determined.

➤ What did we learn?

The results demonstrated how critical irrigation is to produce quality sweetpotato planting material. All the experimental plots performed better than the control (Fig. 2).

For the on-station experiment, highest vine yields were realized under 10 kPa followed by 40 kPa and 70 kPa, respectively (Fig. 3). The variety Kabode performed significantly better than Mataya on all occasions. For the on-farm trials, highest vine yield (27.7 Kg) was realized under 10 kPa. The control and 70 kPa produced similar results averaging 19.2 Kg and 19.8 Kg, respectively. Vine production (18.7 Kg) was lowest under 40 kPa.

Significantly longer vines were produced under net tunnel management than in open fields for both on-station and on-farm trials. For the on-station trial, the mean length of vines produced in the net tunnels was 60.1 cm whereas those produced in the open field plots measured 38.2 cm on average. Water delivery type did not influence yield. Production in the net tunnels was significantly better compared to open fields for both varieties under various water stresses for both on-farm and on-station trials.

➤ What's next?

- Socioeconomic analysis between drip and furrow systems;
- Sharing these findings in a journal;
- Translating the scientific findings into simple irrigation recommendations for different types of farmer-multipliers.

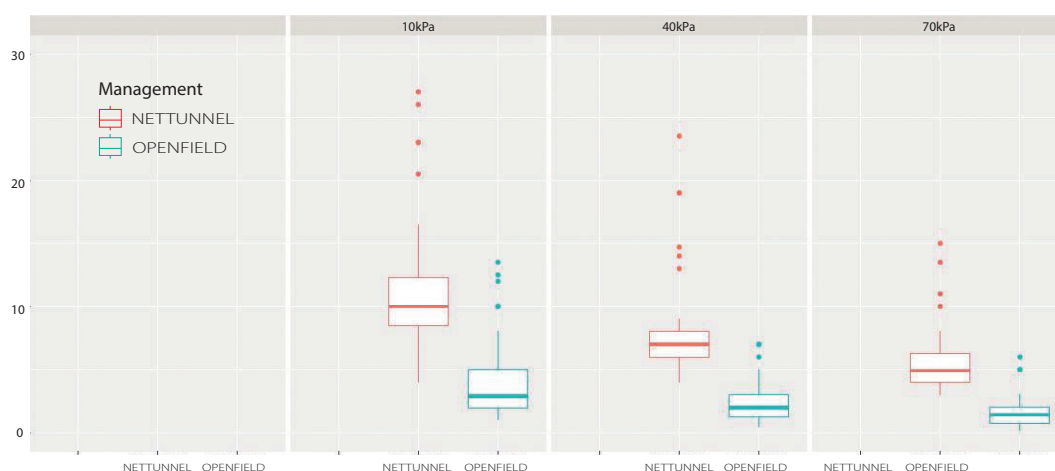


Fig. 3 Vine production in kilograms in net tunnel and open fields under various irrigation schedules on-station.

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