Sustainable uptake of insect proof net tunnels among farmer multipliers: What do we need to consider?

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Introduction

Sweetpotato production in Tanzania is hampered by high virus incidences. The Sweet potato virus disease (SPVD) caused by synergistic interaction between the Sweet potato Feathery Mottle poty-Virus (SPFMV) and Sweet potato Chlorotic Stunt crini-Virus (SPCSV) can cause up to 98% yield losses and is difficult to control. SPCSV is spread by whiteflies, and SPFMV is spread by aphids. It is not economically viable to control the vectors using chemicals. It is therefore important to equip farmers with simple and affordable technologies which they can use to manage the spread of SPVD. Such technologies include insect-proof net tunnels which have been on test with farmer multipliers in Tanzania and Uganda for two and a half years now. However, being a new initiative among multipliers it is not well known what will influence the technology's long term sustainability. We are therefore studying parameters that affect the technical feasibility of the technology. The following aspects are being investigated: the effect of different closing methods on durability of the nets; plant spacing in the net tunnels; and socioeconomic factors influencing use and potential uptake.

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Objective

To determine the technical feasibility of the net tunnel technology in limiting virus infection and the potential for commercialization of vines as part of an enterprise.

What are we doing?

- Four experimental sites were established in October 2014 in Sengerema district, Lake Zone, Tanzania.
- Two net tunnels were constructed at each site, one with a zip door and the other closed by tying the two ends together with a nylon string. The second method was first developed in Mozambique but still requires a few binding wires for fastening the main frame net. Additionally, more net material is required to give some allowance for the knots. The cost of buying and sewing one zip on the net is TZS. 7000 (approx. US$ 4) whereas a nylon string (11.5m/net tunnel) costs TZS. 5000 (approx. US$ 3). The effect of different closing techniques on wear and tear of the net is scored on a scale of 1–5 (1 being low and 5 very high).
- Exploring different closure methods is important because binding wires which are currently used rust and break. They also contribute to wear and tear of the insect proof net by causing holes every time the net tunnel is opened and closed.
- One variety (Kabode) was planted in both net tunnels but with different spacing (10cm by 15cm and 10cm by 20cm). The effect of spacing on soil nutrient depletion is scored on a scale of 1 – 5 based on "stay green ability" of the leaves. Data on vine yields is also being collected.
- A mini-survey was conducted with a sub-sample of decentralized vine multipliers in Tanzania and will soon be replicated in Uganda. The purpose is to document DVMs' experiences with the technology, in particular the profile, skills and capacities needed to manage the net tunnels.
- Using the project's larger scale socio-economic survey we will determine socio-economic factors affecting uptake of the technology.

Photos 1 (A & B): *Rusty binding wire on a poorly closed net tunnel (A) and net tunnels set up to compare different closing methods (B) in Zanzibar and Sengerema, Tanzania respectively.*

What are we learning?

- The two different spacing regimes being compared have not shown any significant influence on both vine yields and stay green ability of the leaves (Figure 1). This might be due to the fact that the difference in plant density is only 60 plants.

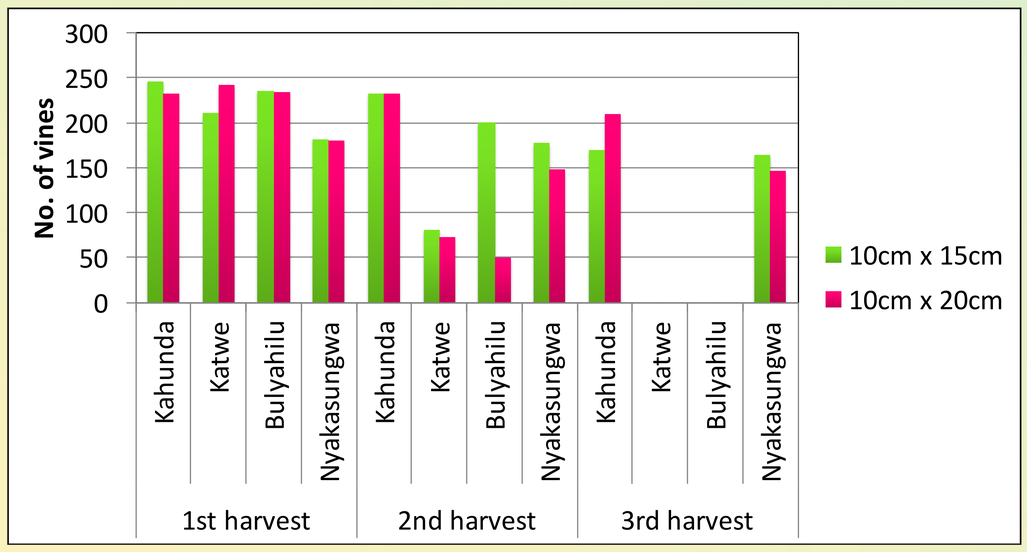

Fig. 1: Effect of different plant spacing regimes on vine production in a net tunnel

- Use of knots and zips for closing reduces damage caused on the net tunnels by binding wires. Damage is even further reduced when knots are utilized.
- Availability of water is a major factor in successful adoption of the net tunnel technology. However, the current techniques for irrigation (use of buckets and watering cans) are very cumbersome and time consuming.
- Other management challenges noted include weed and caterpillar infestation after harvesting.
- Poor market linkages discourage DVMs from expanding.
- The other factor that will influence adoption of the technology is local availability of the insect proof nets. At the moment OPTINET 50 is sourced from Nairobi, Kenya which is expensive and takes a lot of time. Identifying local suppliers in the different countries where interested parties can easily purchase the nets is therefore crucial.

Conclusions

- The net tunnel technology can be cascaded down to farmer-multipliers successfully provided there is proper management.
- We recommend adoption of zips for opening and closing since they are easier to open and close compared to knots. However, nylon strings should be used to attach the net to the wooden frame.
- There is need to continuously train multipliers on the importance of good agricultural practices. This will contribute toward reducing the weed and caterpillar issues. Regular follow ups by extension officers can also contribute in providing multipliers with necessary management skills e.g. in opening and closing the net tunnels.
- Reliable irrigation is important otherwise the material will dry out and get lost. In addressing this concern we will conduct irrigation trials to assess different irrigation regimes and recommend the best.
- Coordinating demand and supply of planting material is crucial for successful uptake of the net tunnel technology. This will ensure that the DVMs are able to sell the planting material they produce hence get returns for their investments. Multipliers should also be equipped with business skills.

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