



**SPHI Seed System Community of Practice
Summary of Discussion Topic**

Title: Topic 1-Positive and negative selection

1. Summary of participation statistics

Table 1 shows the summary of participation statistics under this topic.

Duration	Lead discussant; institution & country	No. of contributions	No. of unique respondents (M/F)	No. & type of institutions	No. of countries
11 days 16 -27/3/2015	Tom Remington (CIP Malawi)	13	9 (5 Male, 4 Female)	NARI (1), CIP (6), ARI/others (2)	7

2. Introduction

The topic “*Positive and negative selection*” in essence kicked off the SP-SS CoP online discussions. It was proposed by Tom Remington who, at that time, was interested in a simple but effective system for farmer vine management that can prevent or slow degeneration, and from where farmers can select planting materials that are healthy and vigorous. He was looking for advice and support (including resource documents and persons from within and outside CIP). Members were to share their experience of what works for whom and under what conditions. The knowledge sought was to support their on-going work in Malawi involving 132 farmer-managed variety demonstrations with over 2.0m cuttings of 5 new varieties distributed to individual farmers. 13 contributions were posted from 9 unique respondents, and resource documents including web-links, where information on this subject could be found, were shared. This summary highlights key areas of consensus, disagreement, insights and learning points. It also identifies and tracks any follow-up actions suggested or taken to further learning and develop practice.

3. Key points and areas of consensus/disagreement.

Much of discussion revolved around the definitions of positive selection and negative selection, contrasting what is done in each and for what purposes (i.e. what they are used for in the sweetpotato seed system work), and to some extent who is likely best suited to conduct either or both of these processes (e.g. trained vine multipliers such as DVMs, untrained farmers). It also brought perspectives from members who have used positive selection in Irish potatoes. With respect to definition and purpose, there is a consensus on what each of these techniques or processes is defined and used for:

- **Negative selection** is the removal from a multiplication plot of unsatisfactory plants, e.g. unhealthy/seriously diseased plants and off-types. It is synonymous to ‘roguing’, whereby plants that show virus symptoms/signs of disease or off-type are removed to leave only healthy vigorous looking plants of the variety being multiplied. It is done to try stop spread of the disease and to remove off types within a multiplication plot.
- **Positive selection.** Its definition is given in different ways e.g. what it involves or what it is expected to achieve. The selection is said to be somewhat more involving in the sense that it is based on whole plant performance, including storage root productivity, trueness to type and vine vigor and health. By and large, the process refers to selection of individual plants that appear

healthy, true to type, and which produce ‘good’ yield of storage roots. Another contributor adds that it is a process that requires careful monitoring of the growth of the plants to ensure that the planting material is selected from the right mother plant. In this sense, multipliers who have undergone some basic training on seed production can manage positive selection well. Yet another contributor felt the process, which refers to actual selection of individual plants to serve as foundation stock for multiplication, has been neglected in sweetpotato seed work in Sub-Saharan Africa (SSA).

The discussion had started with an attempt to understand whether what is being introduced or being done with the ‘farmer vine management’ in Malawi is positive selection or negative selection. Through the discussions supplemented by extracts from annual report of the project ‘Rooting Hunger in Malawi with Nutritious Orange –fleshed sweetpotato,’ it turns out that what is being done with the farmers is negative selection. Farmers who have been trained on roguing are removing plants with sweetpotato virus disease (SPVD) symptoms. Also, positive selection seems to be part of what is being done in Malawi since breeders at Bvumbwe Research Station have conducted this process prior to distributing the planting material to farmers who try to slow degeneration through negative selection. This brought up the issue of which comes first: either conduct positive selection first without negative selection, or begin with negative selection and follow it with positive selection. However, no discussion or conclusion was made on this issue.

Another key point that came out of the discussions is that though removing SPVD is the main thrust of negative selection in sweetpotato, it should not be the only thing. It should include anything (e.g. plants not true to type or affected by fungal diseases) that makes a plant unsatisfactory and deserving to be removed from the plot. Thus, while negative selection works for removal of all SPVD affected plants, it leaves plants that may look fine but could be infected with ‘minor’ viruses (e.g. Sweetpotato feathery mottle virus-SPFMV or Sweetpotato mild mottle virus-SPMMV). It is noted that following this with “positive selection” could solve the problem though perhaps only with resistant varieties.

An experience from Mozambique of doing positive selection based on selecting large roots, which are then sprouted was shared peripherally. However, there seems not to be much research reported on this to confirm whether it really works, can result in virus free planting material and /or reduces the number of virus species present in field.

No ideas for follow up action came out directly from the discussion, other than the thought that positive selection based on selecting roots and sprouting them could have practical benefits, but there is little research on it.

4. Status on suggested follow up actions on emerged ideas or techniques (to filled/updated at CoP meeting)

Table 2: Status of suggested follow up actions on ideas or techniques

Suggested idea for action	Follow up action taken	Where (country) & institution	Feedback to CoP