

Sustainable agriculture for the future

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Beetroot Production

To Mulch or not to Mulch?

That is the question

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Beetroot (*Beta vulgaris* subsp. *vulgaris* Conditiva group) is well known as a vegetable and salad. It is a major root vegetable known as a garden beet or table beet belonging to Amaranthaceae. The green leaves, as well as the swollen root, are edible. The plant is rich in protein, carbohydrates, and vitamin C, contributing to a healthy diet. The red root colour is due to the presence of the betanin pigment.

Given that a large percentage of the country's croplands are in areas that do not receive rainfall during the winter season, winter crops such as beetroot are affected by

intermittent or insufficient water supply. Therefore, sustainable production practices include conserving soil moisture, improving soil structure and temperature, improving soil micro-organisms, and thus increasing plant growth and yield. Organic mulch material, including grass, straw, dry litter, bark, sawdust, and compost, contributes organic matter and nutrients to soils. A recent survey indicated that the smallholder farmers in the Vhembe District, Limpopo Province, adopted sustainable agricultural practices such as mulching to reduce vulnerability to extreme weather conditions, contribute to production and income generation.



Figure 1: The leaves (A) and roots (B) of beetroot in response to mulch (right) and no-mulch (left) application.

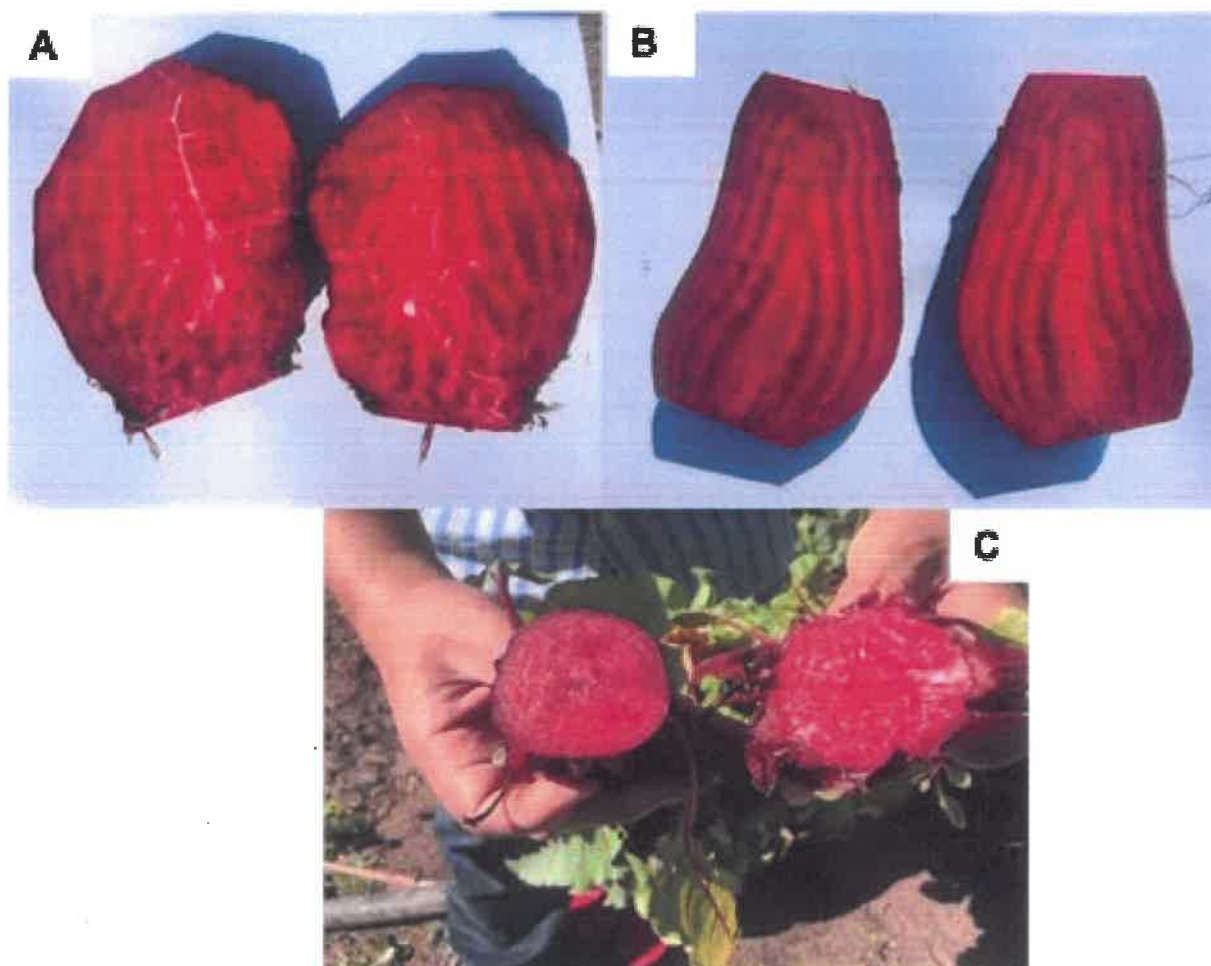


Figure 2: Beetroot without mulch (A), with mulch application (B) and comparison of the two roots (C) cultivated in farmers' fields in the Vhembe district.

A survey indicated that the grass seedless mulch application in beetroot production resulted in differences in growth, shape and colour of the roots compared to the non-mulch application (Fig. 1). The application of seedless grass mulch resulted in a more intense red colour and smooth texture of the roots (Fig. 2B) than roots harvested from the no-mulch treatment (Fig. 2A). As with the roots, the beetroot leaves showed greater biomass for the treatment subjected to the no-mulch application (Fig. 1A). However, the growth of beetroots that did not receive the mulch treatment showed a higher harvestable yield for the roots and the leaves attributed to the red root colour due to the presence of the betanin pigment.

In a study on the adoption of climate-smart technologies funded by the Water Research Commission (WRC), the Agricultural Research Council – Vegetable, Industrial and Medicinal Plants (ARC-VIMP) and WRC collaborated to

fill the production gaps (including agricultural interventions that focus on developing technologies and practices. The practices include the integrated management of water to ensure profitable farming systems that have been identified regarding the low adoption of climate-smart technologies. There is enormous potential for vegetable root crops and the role of organic mulches in sustaining or improving yield is essential, and further investigations are underway on the morphological, yield-related characteristics and consumer perceptions for beetroot.

The survey has motivated the ARC-VIMP to explore research on the growth and quality of beetroot in response to mulching treatments to ensure contribution to increasing vegetable production and quality thereof.

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