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DISCUSSING THE RELATIONSHIP BETWEEN SOIL PHYSICAL PROPERTIES AND THE YIELD POTENTIAL OF TABLE GRAPES: COMMERCIAL RESULTS FROM SOUTH AFRICA

Authors: Marnus Ferreira¹

¹ Agritechnovation

Corresponding Author E-mail Address: elmi.lotze@Agritechnovation.com

Background

South Africa is well known for high quality table grapes and a variety of cultivars being produced from the different climatic regions. In addition, the Western Cape is also notorious for poor and varying soil types, often with differences within blocks. Soil classification can identify potential limitations before establishment and can aid towards timeous amelioration and management strategies to ensure that future plantings are sustainable and economically viable.

Introduction

With table grapes rootstocks often being associated with poor soils and irrigation challenges, the benefits of performing a detailed characterization of soil physical properties, on commercial table grape farms, to alleviate this stress, are discussed for five commercial sites in South Africa (2019 – 2023). Insights gained from these investigations, will contribute towards the determination of optimal soil cultivation techniques and adjustments of irrigation block designs (accounting of major soil variations) to achieve the block's yield potential despite specific soil limitation.

Method

The individual blocks from five commercial table grape farms in different regions of South Africa were physically classified, on a grid basis, to determine the soil classification and influence of soil physical properties (soil type, depth to limiting layer etc.). Then, precision yield data per vine, using Picklogger™ data, was fitted onto the soil maps to quantify the influence of abovementioned factors on the yield of individual vine and related to soil precision maps.

Results

Individual vine yield data indicated a major contribution of soil characteristics towards vine performance. Various cultivars and soil types were compared. Depending on the type and severity of the physical limitations present in the soil, yield declined significantly in the areas where poorly suited subsoils were mixed with topsoil, which resulted in suboptimal yields. The soil physical limitation that had the greatest influence on suboptimal yields was consistently related to shallow gleyic horizons and unsuitable cultivation practices. In addition to standard cultural practices and climate, the contribution of deep-seated poor subsoil drainage (up to 1m deep) causes significant yield and/or quality losses during extreme climatic conditions.

Conclusion

Due to the economic challenges that table grape growers face - all factors influencing the sustainable production of a block should be optimised as early and efficiently as possible. The above study clearly indicated the important contribution of the hidden role of soil classification on vine performance. As this is a factor that can be quantified before establishment, addressed by management practices and clearly showed to impact permanently on vine performance, it should be illustrated and communicated again to producers for implementation in future plantings.