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Production and Performance of Different Grades of Shangi Potato Variety under Uniform Environmental and Management Conditions at ADC Sirikwa Farm, Kuresoi North

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ABSTRACT

This study analyzed the productivity of different grades of the Shangi potato variety under uniform environmental and management conditions. The trial included Charts, Size 1, Size 2, Ware, Apical Cuttings, and Undergrade potatoes. Results indicated significant variability in productivity, with Ware grade achieving the highest yield per plant (1 kg) and Charts the lowest (0.4 kg). Apical cuttings failed to perform due to adverse climatic conditions. The findings provide insights for optimizing Shangi potato production and inform recommendations for seed grade usage and policy adjustments.

Keywords: *Solanum tuberosum*, Shangi potato variety, ADC Sirikwa

INTRODUCTION

Potato (*Solanum tuberosum*) production is a critical agricultural activity that contributes significantly to food security and income generation. Shangi matures fast, is relatively disease resistant, and has relatively high productivity per unit area with yields of 30,000 – 40,000 kg per acre (Irungu et al., 2022). This variety has multiple uses, especially in the table and industrial processing. Thus, it is preferred by most Kenyan potato farmers. The Shangi variety is widely cultivated in Kenya due to its early maturity and high market demand (Thariq Muchiri (NPCK), 2021). Shangi is a highly prolific variety; it has very versatile uses, and it can grow up to 1m high, with upright growth. It has broad leaves that are light in colour. Shangi is also very well known for having abundant flowers. Shangi has oval tubers that are uniform while grading. The tubers are in white flesh with Medium to deep eyes with pink pigmentation. Shangi is known to have a very short dormancy, such that it matures in 3-4 months (Jerotich, 2022). Under conventional farming, Shangi can yield up to 30,000-40,000kg per acre. Shangi is moderately susceptible to late blight. Shangi is good for mashing, boiling, roasting, and chips. It does perform and can be grown in the altitude range of 1500-2800m ASL (Project, 2019). However, productivity can vary based on the grade of seed used. This research aimed to evaluate the performance of different Shangi seed grades under similar management and environmental conditions. Understanding these differences will guide farmers and seed merchants in selecting optimal seed grades for maximum productivity.

MATERIALS AND METHODS

Study Site and Experimental Design

The trial was conducted on 20th July 2024 at the ADC Sirikwa farm. The experiment included six Shangi seed grades: Charts, Size 1, Size 2, Ware, Apical Cuttings, and Undergrade. The trial utilized a Completely Randomized Block Design (CRBD) with replicates, each consisting of three rows (3 meters each).

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Planting and Agronomic Practices

- *Fertilizer application:* NPK (23:23:0) Yara fertilizer at a rate of 2.8 bags per acre.
- *Spacing:* 75 cm x 15 cm between plants.
- *Planting method:* Surface planting technology.
- *Management:* All agronomic practices were uniformly applied. No top dressing was conducted.
- *Harvesting:* Conducted after tubers reached 70% seed size

RESULTS AND DISCUSSION

Results

Table 1: Productivity of Different Grades

Grade	No. of Plants	Total Weight (kg)	Average Production per Plant (kg)	Productivity per Acre (kg)	Productivity per Acre (50kg bags)
Charts	17	6.52	0.4	7,155	143
Size 1	16	11.61	0.73	13,058	261
Size 2	15	11.20	0.75	13,416	268
Ware	13	13.10	1.0	17,888	358
Undergrade	16	10.40	0.65	11,627	233
Apical Cuttings	18	-	-	-	-

Discussion

The trial demonstrated that the Ware grade outperformed all other grades, achieving the highest yield per plant and per acre. This can be attributed to the larger tuber size, which provides more food reserves and eyes, resulting in more stems and vigorous growth. In contrast, Charts and Undergrades yielded the lowest due to damaged eyes and a higher likelihood of disease.

The failure of Apical Cuttings highlights their susceptibility to adverse climatic conditions. This suggests that Apical Cuttings should be cultivated under controlled environments such as greenhouses to enhance survival and productivity.

Interestingly, Size 1 and Size 2 grades showed similar productivity levels. This similarity suggests that either grade can be used interchangeably without significantly affecting yields.

CONCLUSION

The findings indicate that Ware grade seeds offer the highest productivity and should be considered for large-scale cultivation. Conversely, Charts and Undergrades should be avoided due to their lower productivity. Apical Cuttings require controlled environments for optimal performance.

Seed Grade Selection: Farmers should prioritize Ware grade seeds for higher productivity.

Policy Adjustments: Stakeholders should lobby for the inclusion of Ware grade in the list of certified seed sizes by KEPHIS.

Controlled Cultivation: Apical Cuttings should be grown in greenhouses to mitigate climatic risks.

Farmer Sensitization: Farmers purchasing by-products should be advised on their lower productivity compared to certified seeds.

FUTURE RESEARCH

Further research should explore:

- Strategies to improve the climatic adaptation of Apical Cuttings.
- Economic viability assessments of various Shangi grades.
- Breeding programs targeting high-yielding, climate-resilient Shangi varieties.

This research provides a foundation for enhancing Shangi potato production and contributes to informed decision-making among farmers and policymakers.

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