



Resistance of selected potato varieties to *Phytophthora infestans* in Nyamagabe, Musanze, and Gicumbi districts, Rwanda.

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ABSTRACT

Objectives: This study aimed to evaluate the resistance of selected farmer-preferred potato varieties to late blight disease (*Phytophthora infestans* (Mont.) de Bary) and to determine their yield performance under field conditions in major potato-growing regions of Rwanda.

Methodology and Results: Nine potato varieties (Gisubizo, Kazenzeza, Izihirwe, Nkunganire, Twihaze, Kirundo, Kinigi, Gikungu and Victoria) were evaluated across Nyamagabe, Musanze, and Gicumbi districts during the 2021–2022 growing seasons using a Randomized Complete Block Design. Disease severity was assessed and the Area Under Disease Progress Curve (AUDPC) was calculated and analysed for significant difference at $P \leq 0.05$. Potato varieties Twihaze, Kirundo, and Gikungu exhibited the highest resistance (mean scale 1.29 – 3.57), while Victoria was highly susceptible (scale 9). Resistant varieties, particularly Nkunganire and Kinigi, produced significantly higher healthy tuber yields (up to 12.5 t/ha). A strong negative correlation ($r = -0.82$ to -1) was found between AUDPC and yield. Significant differences ($P < 0.001$) in resistance were observed.

Conclusions and application of findings : The findings demonstrate that varietal resistance can be a key strategy for managing late blight and improving potato productivity in Rwanda. Varieties such as Twihaze, Kirundo, Nkunganire, and Kinigi exhibited both high resistance and superior yield performance, making them suitable candidates for wider adoption. Promoting these resistant cultivars can significantly reduce reliance on chemical fungicides, lower production costs, and enhance environmental sustainability. Furthermore, the strong inverse relationship between disease severity and yield highlights the importance of integrating resistant varieties into national crop improvement and extension programs. These results provide practical guidance for farmers, researchers, and policymakers in selecting appropriate potato varieties to enhance food security and resilience in late blight-prone regions.

Keywords: *Phytophthora infestans*, late blight resistance, potato varieties, AUDPC, Rwanda, yield performance.