Participatory varietal trial of potato cultivars against late blight in Bajura, Nepal

Name: Kailash Bhatta[1], Pragati Raj Sipkhan[2], Sima Lamichhane[3] and Laxman Khatri[2]
Affiliation: [1]International Centre for Integrated Mountain Development, Kathmandu, Nepal
[2]Local Initiatives for Biodiversity, Research and Development (LIBIRD), [3]Far Western University
Contact number: +977-9866028563 | Email address: agrisima1999@gmail.com

Introduction

Late blight, caused by *Phytophthora infestans*, is a major threat to potato production in Nepal, especially in high-altitude regions like Bajura, where it can cause over 75% yield losses. Farmers in these areas largely depend on local cultivars that are vulnerable to recurring outbreaks. This study aims to assess the resistance of local potato varieties to late blight through a participatory varietal trial in Himali RM-7, Badhu, Nepal. By identifying resistant varieties, the research seeks to enhance potato productivity and support sustainable agriculture in the region.

Research questions

- Which cultivar has potential and is well suited to Himali RM Bajura with high yield and disease resistance traits?
- How can the identified varieties be a potential management strategy for late blight?

Methodology

The research was conducted in farmers' fields using a Randomized Complete Block Design (RCBD). The trial included five potato varieties: Cardinal, Axona, Desiree, Kuru Local, and Migu Local, with three replications.

- Date of 50% emergence & Plant growth (vigour – visual observation) – High, Medium and Low
- Plant height and no. of stems at 45, 60, and 75 DAS
- Disease severity (% disease infection and disease scoring: 1-10 scale)
- Days to maturity (days) and tuber yield per plot (kg/plot)

Key findings

- Axona showed statistically significant higher yield (19.82 MT/ha) and number of tubers (9.933) as compared to other cultivars.
- Axona and Migu Local showed significantly lowest percentage of disease incidence and disease severity than other varieties
- However, Axona, Cardinal and Desiree showed statistically similar yield.
- Accessing AUDPC resulted in Axona, Desiree and Migu Local as resistant cultivars.

Figure 1 Mean comparison of agronomic and disease incidence traits of potato cultivars

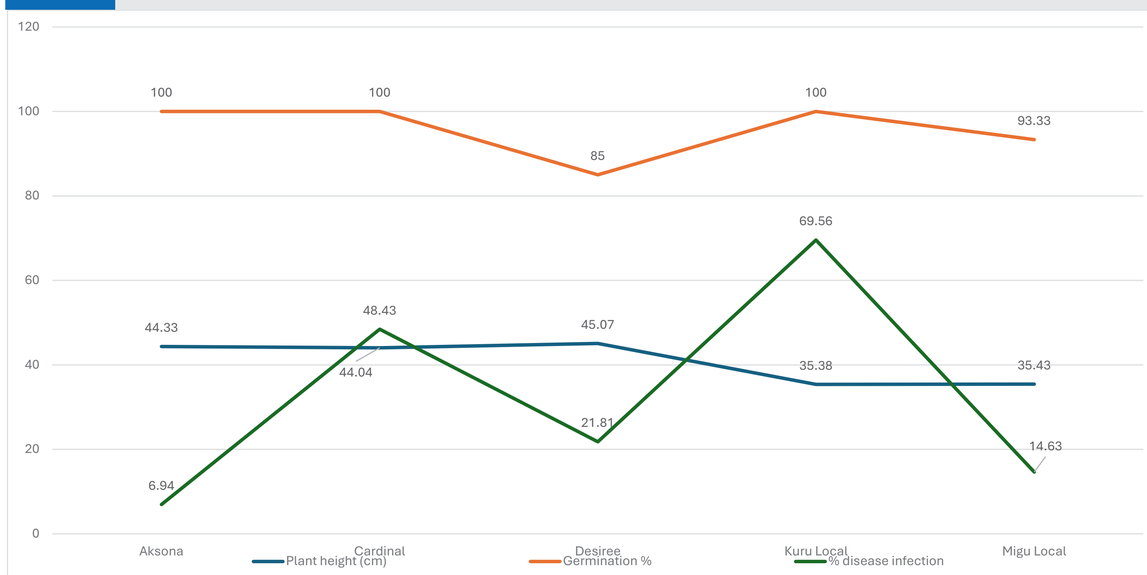

Figure 2 Mean Comparison of Area Under Disease Progression Curve and yield of of tested varieties

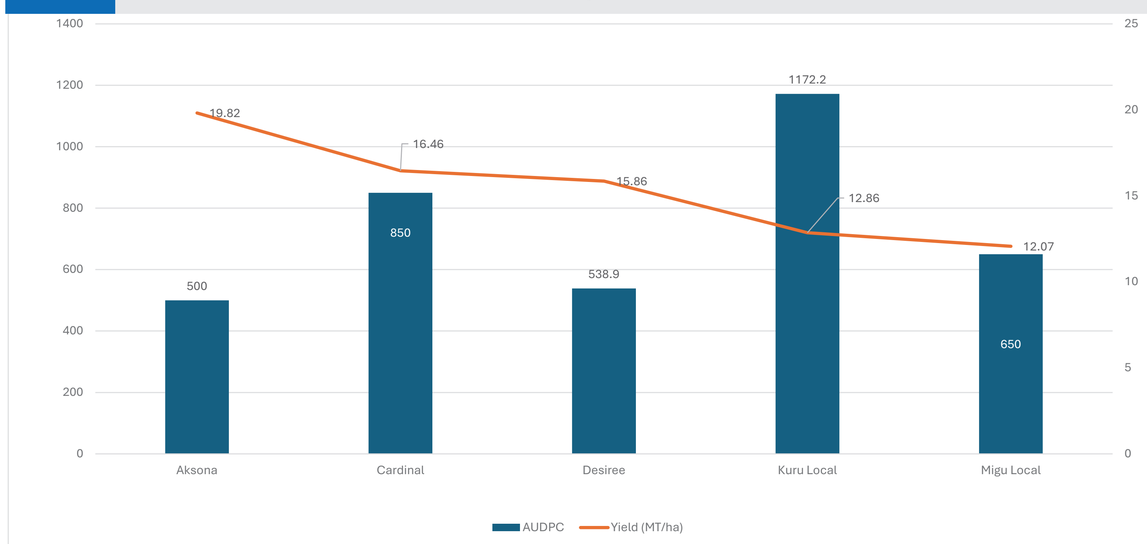

Table 1 Correlation analysis of agronomic traits and yield traits

	Yield	Days to 1st sprouting	Days to 50% sprouting	No. of stems per plant	Plant height
Yield	1				
Days to 1st sprouting	.768**	1			
Days to 50% sprouting	0.505	.765**	1		
No. of stems per plant	.590*	.873**	.670**	1	
Plant height	.562*	.696**	.785**	.617*	1

Table 2 Correlation analysis of disease resistant traits with yield traits

	% disease incidence	Disease severity	AUDPC	Yield
% disease incidence	1			
Disease severity	0.8**	1		
AUDPC	0.904**	0.898**	1	
Yield	-0.132	-0.136	-0.229	1

Conclusion

- Potato yield showed significant positive correlation with days to first sprouting, no. of stems per plant, and plant height.
- Multiple regression analysis showed that about 44% of the yield is governed by plant height, number of stems/ plants, % disease incidence, and disease severity.
- The Axona variety of potato exhibited the highest yield and lowest Percent Disease Incidence (PDI).
- Though *Migu* local had low yield performance, it showed lower disease incidence compared to other cultivars.
- This study suggested Axona as the best performing variety in the Himali RM and suggests *Migu* Local for further research on varietal improvement