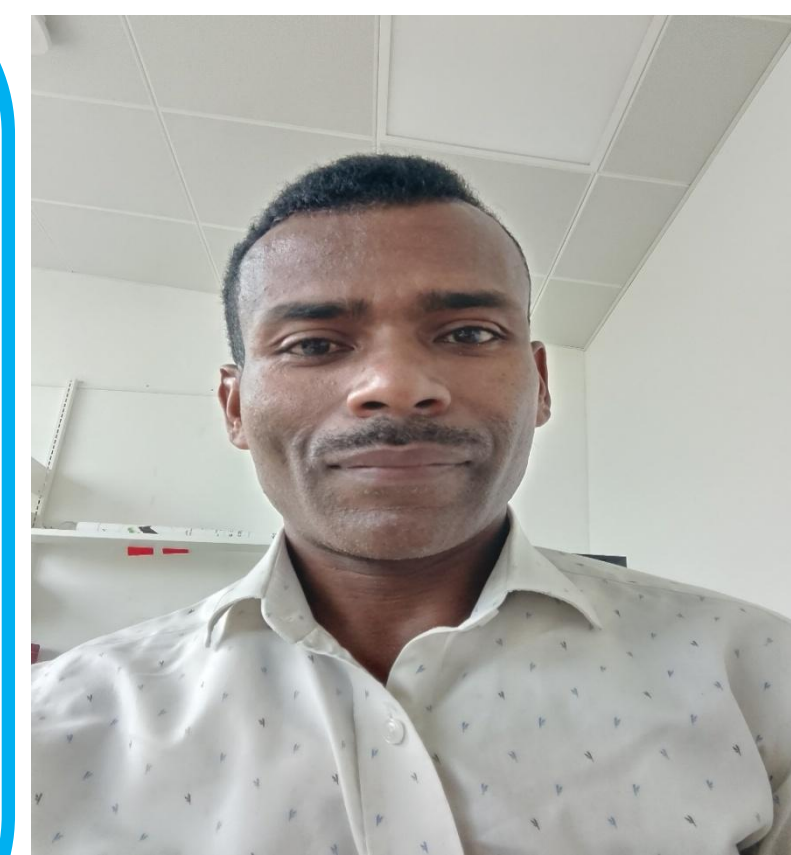


Farmers' Preferences for Larval Traits in Small-Scale Black Soldier Fly (*Hermetia illucens*) Production System

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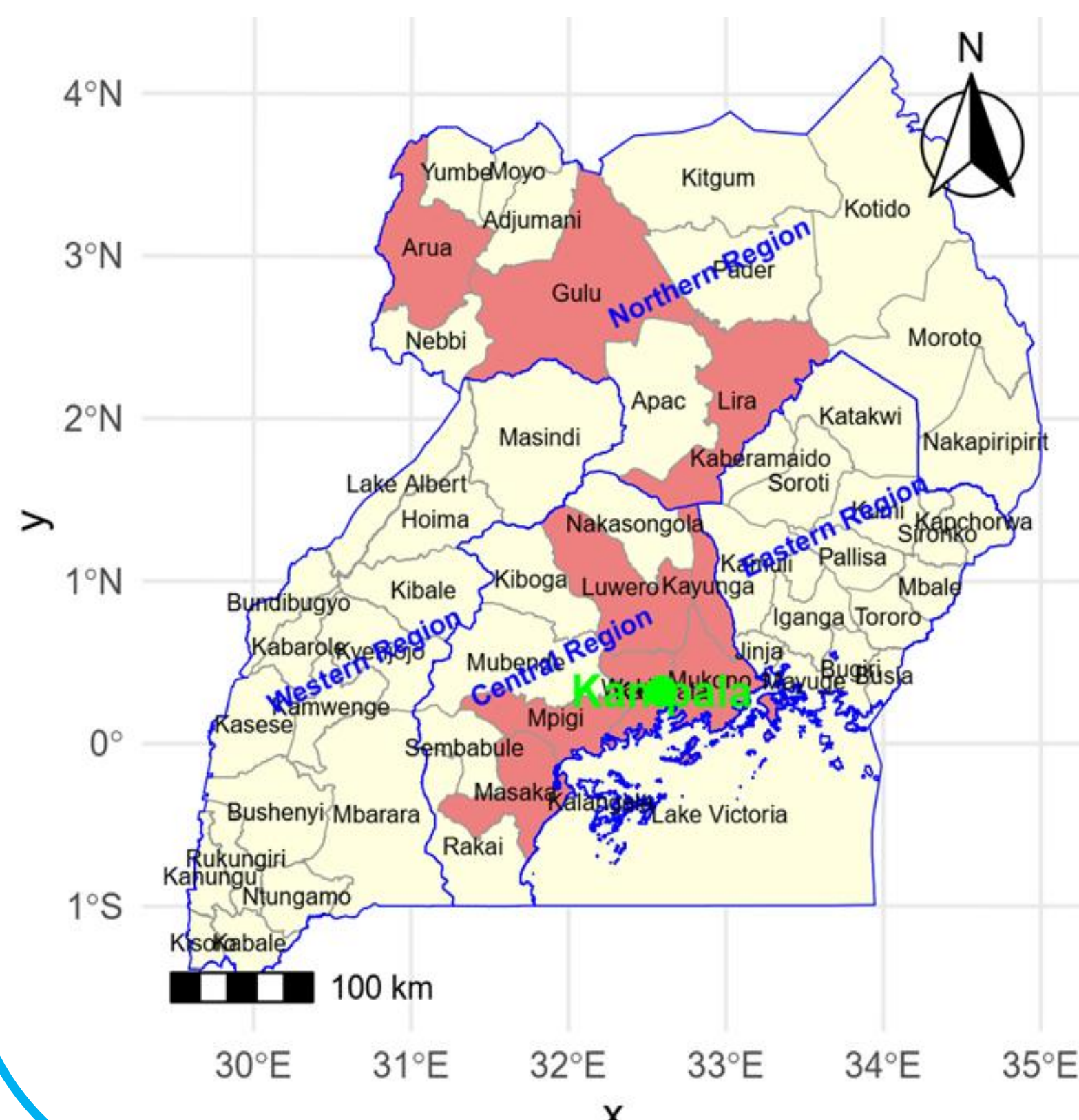
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Background

Black soldier fly (BSF) has emerged as a sustainable source of protein for animal feed and as an organic fertilizer, offering great potential for circular bioeconomy systems. However, unlike conventional livestock, structured breeding programs for BSF remain largely underdeveloped, limiting opportunities for systematic genetic improvement. In addition, little is known about the traits that farmers value most in BSF, particularly within small-scale production systems. To address this gap, this study aims to identify farmers' prioritized BSF traits in Uganda.

Materials and Methods

➤ Study area: Uganda



Legend
Study districts
Others

➤ Sample: 212 respondents

➤ Discrete choice experiment: 6 attributes

➤ Twelve choice sets/respondent: 3 alternatives

➤ Analysis: Random Utility Model (RUM) using Apollo package (R;v.4.5.0)

$$U_{nj} = V_{nj} + \varepsilon_{nj}$$

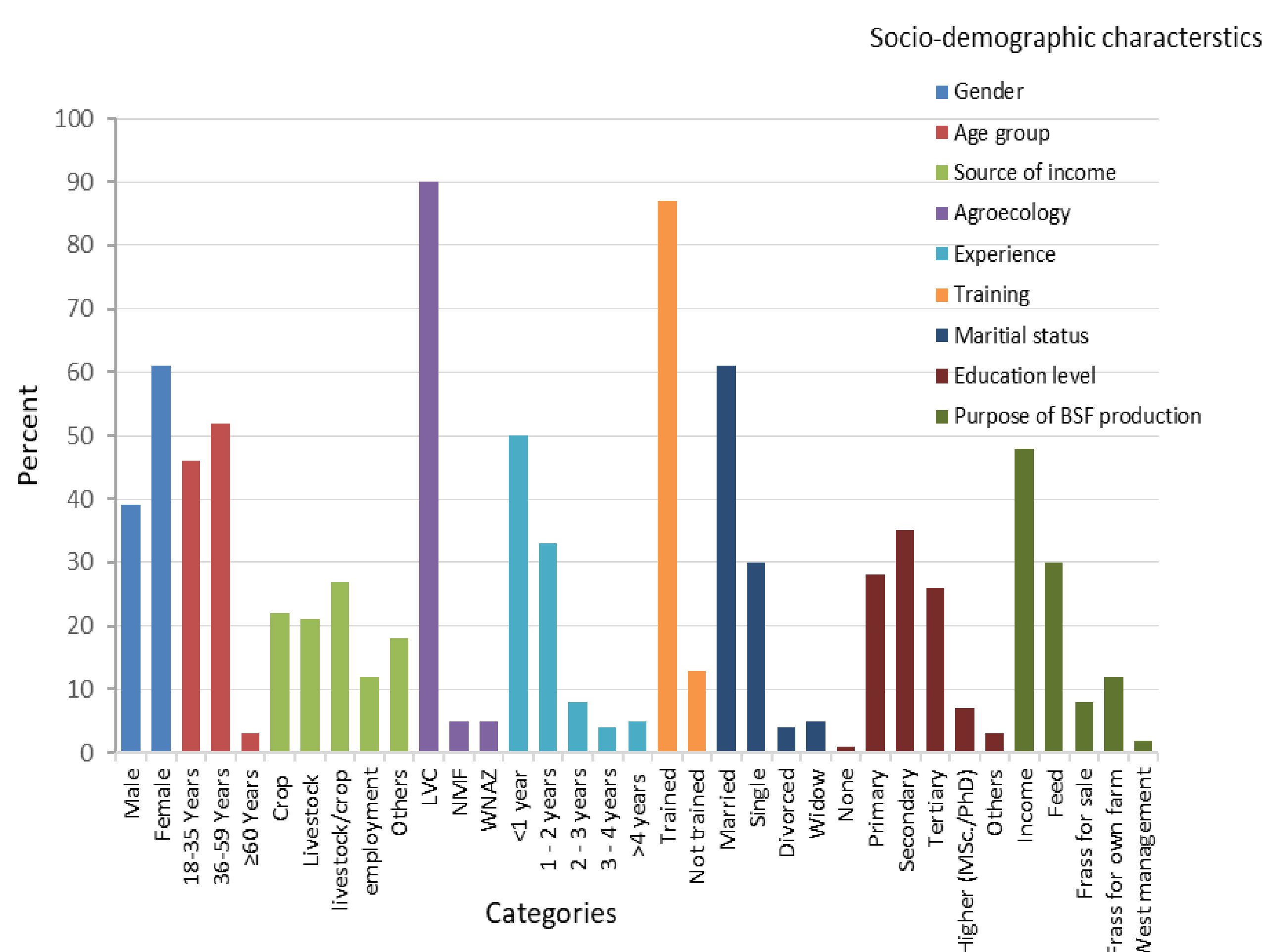
Where: U_{nj} = total utility; $V_{nj} = X_{nj}\beta_n$ = deterministic (observed) part; ε_{nj} = random (unobserved) part

➤ Choice Card

Attribute	Alternative 1	Alternative 2	Alternative 3
Protein content	25% protein source	Without protein	
Number of days to harvest	14 days	20 days	
Larvae size	15mm length	10mm length	
Tolerance to environmental fluctuation	20% survival	50% survival	Opt out
Organic solid waste composting efficiency	60% composting	40% composting	
Purchase	5000UGX	2500UGX	
Your choice			

Results

➤ Distribution of respondents across various socio-demographic categories



➤ Estimated coefficients of preferences including socio-demographic characteristics

Attribute	Coefficient (Mean ± SE)
Protein content	0.99 ± 0.12 ****
Time to harvest	-0.36 ± 0.09 ****
Larval length	0.05 ± 0.03 ns
Tolerance to environment	0.14 ± 0.02 ****
Waste composting efficiency	0.08 ± 0.03 ***
Price	2.64 ± 0.23 ****
Price*source of income	0.04 ± 0.15 ns
Price*gender	0.37 ± 0.28 ns
Price* level of education	0.06 ± 0.24 ns
Protein content*BSF farming status	0.29 ± 0.07 ****
Protein content*experience	-0.05 ± 0.03 ns
Larval length*training	-0.02 ± 0.03 ns
Harvesting time *level of education	0.04 ± 0.08 ns

asterisks denote statistical significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; ns=not significant

Conclusion: BSF farmers in Uganda value protein content, environmental tolerance, composting efficiency, and shorter harvest time. A single breeding program could serve most farmers, though hidden preference heterogeneity requires further investigation.

