



Local crop diversity, soil properties and altitude as indicators of Carabidae beetles' distribution and occurrence on Mount Elgon, Uganda

Ijala A.R.^{1*}, Kyamanywa S.¹, Cherukut S.¹, Sebatta C.¹, Mugisha J.¹, Nuppenau, EA.², Hoehner M.², Domptail S.², Hilger T.³, and Karungi J.¹

¹Department of Agricultural Production, Makerere University, P.O Box 7062, Kampala, Uganda.

²Justus-Liebig University, ZEU, Senckenbergstraße 1, D-35394 Giessen, Germany.

³Hans-Ruthenberg-Institute of Agricultural Sciences in the Tropics and Subtropics, Stuttgart, Germany.

Introduction and objective

Carabidae are very important arthropods in the agro ecological systems, as generalist predators. Altitude and farming systems can moderate soil properties and vegetative, causing direct and/or indirect influence on the Carabidae preferences and assemblages. The aim of the study was to determine the effect of altitude and farming system on the abundance and distribution of Carabidae.

Methods

- Two years' study in 72 coffee Arabica farms was done, considering two independent factors: Altitude and farming system. Three levels of Altitude : low (1400-1499 m.a.s.l); mid (1500-1679 m.a.s.l) and high (1680-2100 m.a.s.l); and Four levels of farming system: Coffee monocrop; Coffee+annual; Coffee+banana; and Coffee+banana+shade tree; were used.
- Pit fall trapping was used to trap the insects, and sequencing, and morphological identification done.
- Data on microclimate, soil properties, and understand vegetation was also collected at farm level to their relationships with Carabidae.

Discussion

There was a significant effect of altitude and farming system and their interactions on the Carabidae numbers. In addition, the Carabidae had a significant relationship with soil properties and vegetation, and these could explain the challenges in realizing numbers for use predations purposes

Conclusion

Chlaenius spp. were higher in coffee farms with intercrops of coffee with banana and shade tree especially at mid altitudes. while *Harpalus* spp. were higher in the coffee mono farms especially at lower altitudes, and *Anisodactylus* spp. preferred higher altitude conditions, especially with coffee annual conditions.

Research needs

Rearing and field predation studies on coffee pests.

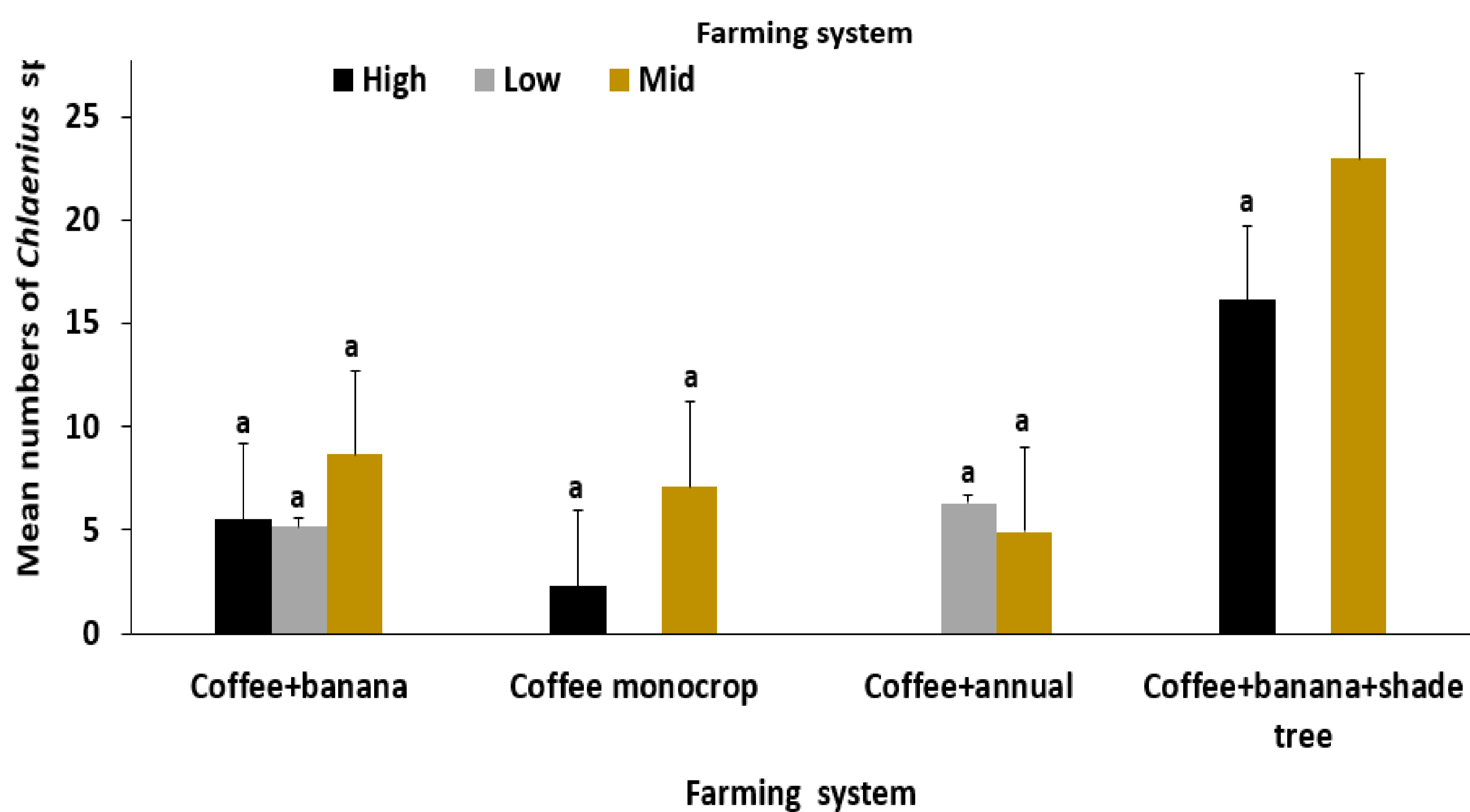
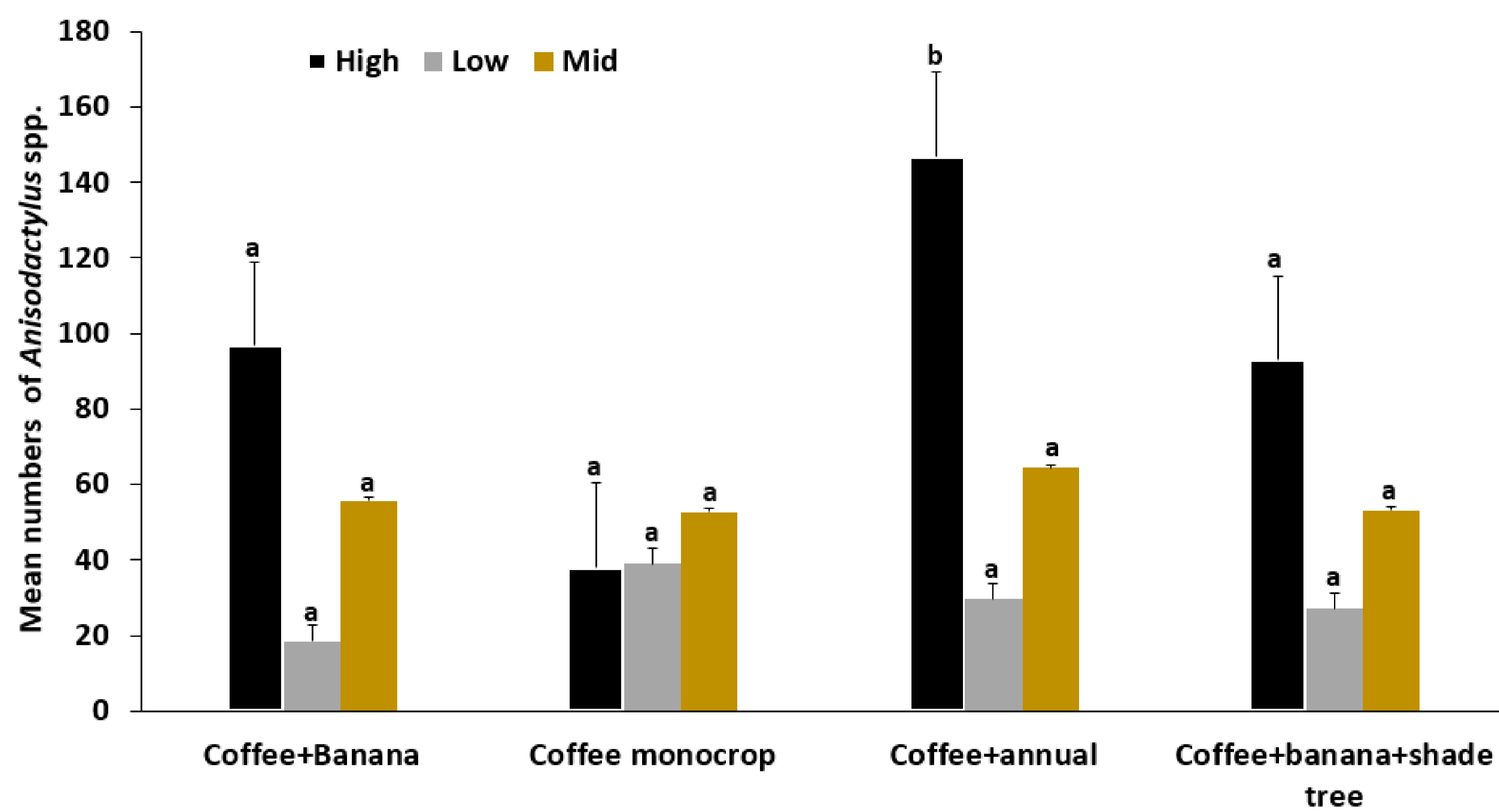
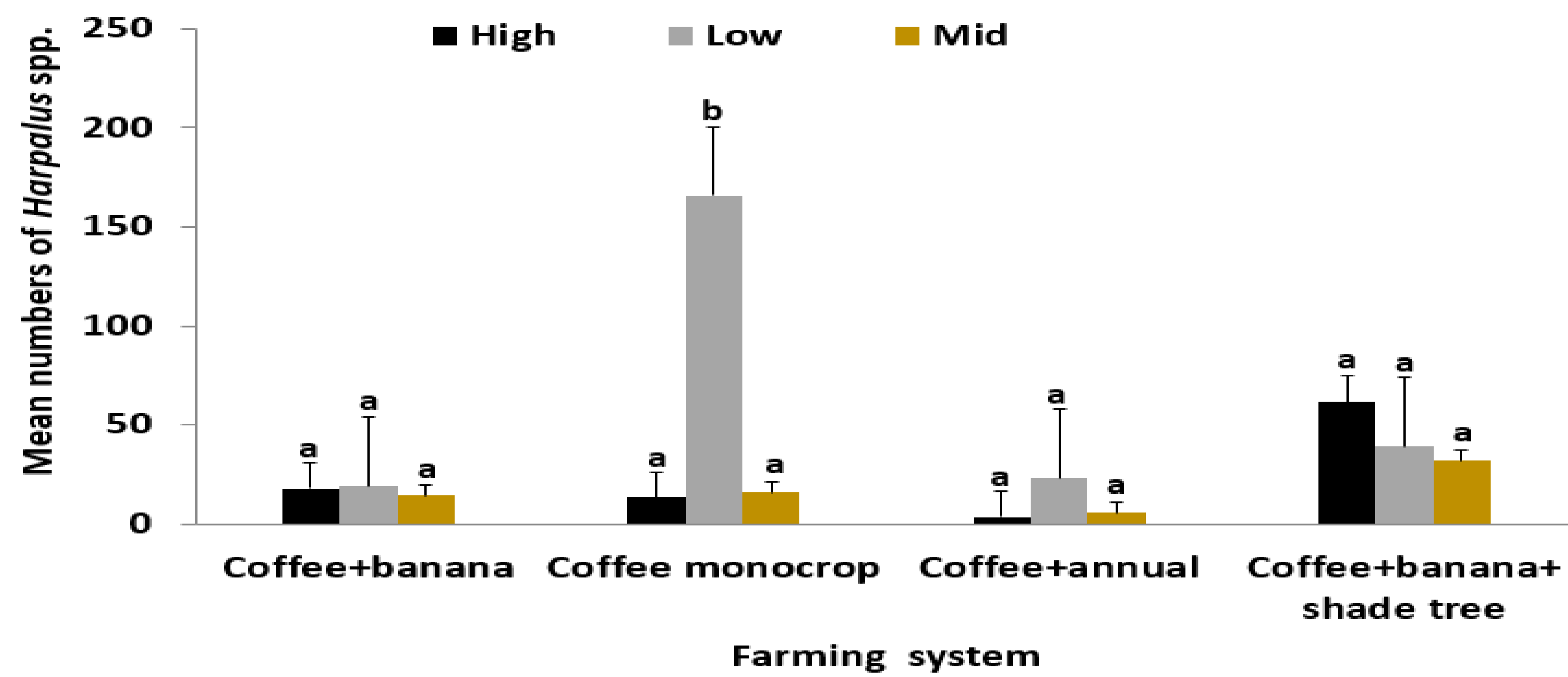
Acknowledgement

Funded by the Volkswagen Foundation through the African Initiative Project (#89 365). Support from farmers, extension staff, technical advisors, and assistants. EaTSANE project team.

Contact: e-mail: tonyijala209@gmail.com



Results



Figures : Effect of altitude and farming system on Carabidae occurrence

Regression parameter estimates for Carabidae relationship with soil properties & vegetation

Carabidae	Soil property	Estimate	SE	t	t Pr
<i>Anisodactylus</i> spp.	soil moisture (VWC ± 0.03 m ³ /m ³)	3.21	1.22	2.63	0.01
<i>Harpalus</i> spp.	soil EC (± 0.05 dS/m)	7.13	1.26	5.68	<.001
	soil moisture (VWC ± 0.03 m ³ /m ³)	-6.8	1.84	-3.7	<.001
<i>Chlaenius</i> spp.	Soil pH	-0.259	0.128	-2.03	0.046
	Semi natural vegetation	0.183	0.332	0.55	0.049

t Pr at p ≤ 0.05