



Emerging Multi-resistance of *Rhipicephalus microplus* to key acaricides: A One Health challenge in subtropical cattle farms of Ecuador

Ximena Pérez-Otáñez^{1,3}, Valeria Paucar^{1,4}, Claude Saegerman⁴, Lenin Ron-Garrido¹, Richar Rodríguez-Hidalgo^{1,2}, Sophie O. Vanwambeke³

¹ Instituto de Investigación en Zoonosis (CIZ), Universidad Central del Ecuador, Quito, Ecuador

² Facultad de Medicina Veterinaria y Zootecnia, Universidad Central del Ecuador, Quito, Ecuador

³ Centre for Earth and Climate research, Université Catholique de Louvain, UCLouvain, Louvain-la-Neuve, Belgium

⁴ Research Unit of Epidemiology and Risk Analysis applied to Veterinary Science (UREAR-ULg), Fundamental and Applied Research for Animals & Health (FARAH) Center, Faculty of Veterinary Medicine, University of Liege, Liège, Belgium

INTRODUCTION

Ticks infest over 80% of cattle in tropical/subtropical regions globally, with Ecuador's cattle farms particularly vulnerable (75% in tick-endemic zones). *Rhipicephalus microplus* drives significant economic losses via reduced productivity, hide damage, and disease transmission (e.g., babesiosis), costing Ecuador ~19 USD/animal annually in treatments. While synthetic acaricides remain the primary control method, resistance (linked to overuse, incorrect dosing, and environmental factors) threatens efficacy. This study evaluates resistance dynamics of *R. microplus* to **amitraz**, **ivermectin**, and **alpha-cypermethrin** across two subtropical Ecuadorian zones over two years, examining associations with farm management practices to identify possible drivers of multi-resistance.

METHODOLOGY

F
I
E
L
D
W
O
R
K



L
A
B
W
O
R
K

1) Identify and Incubate ticks and eggs



6) Counting alive larvae



2) 14 days larvae



5) Open package 24 hours later



3) Filter paper with acaricide



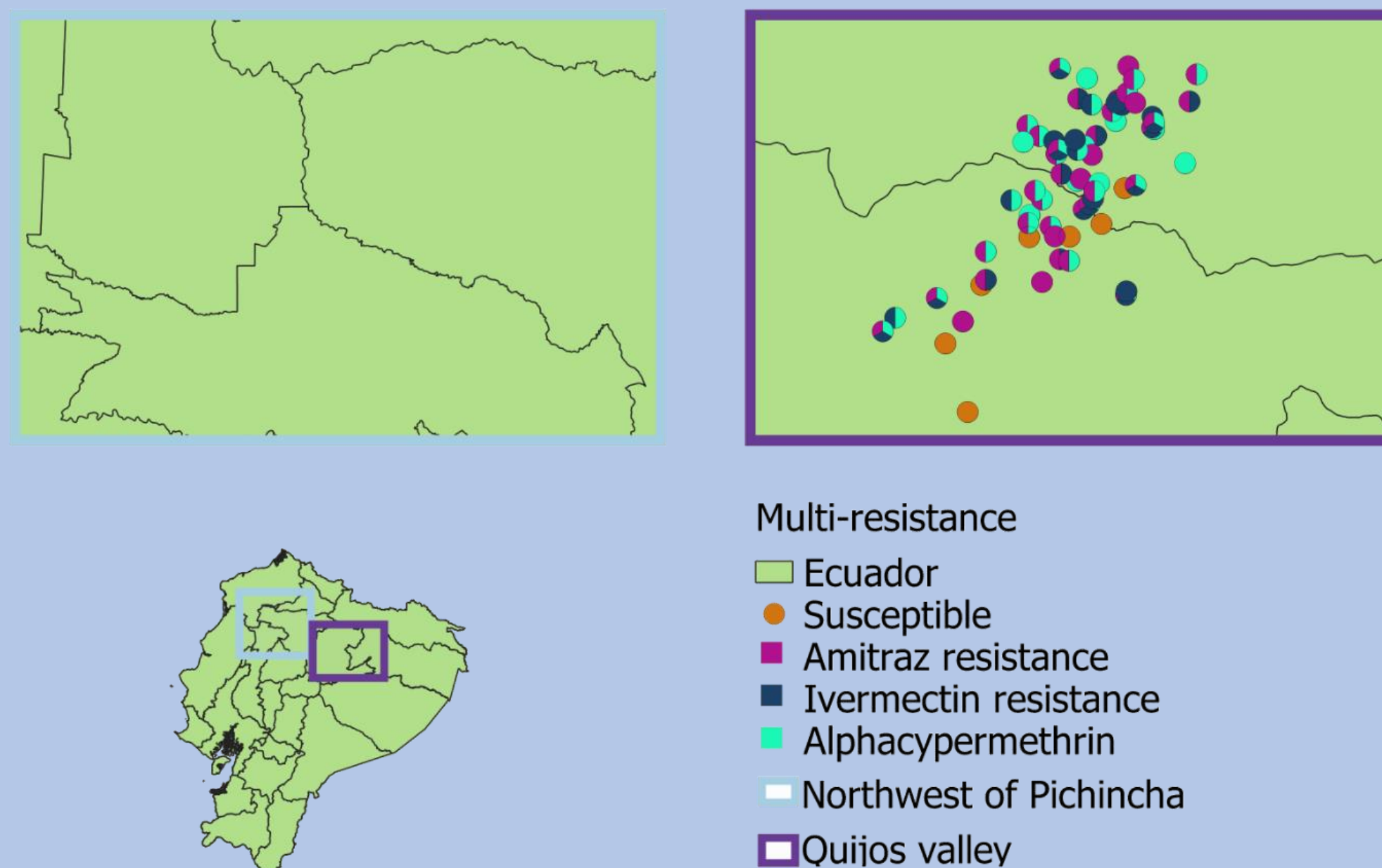
4) 100 larvae per package



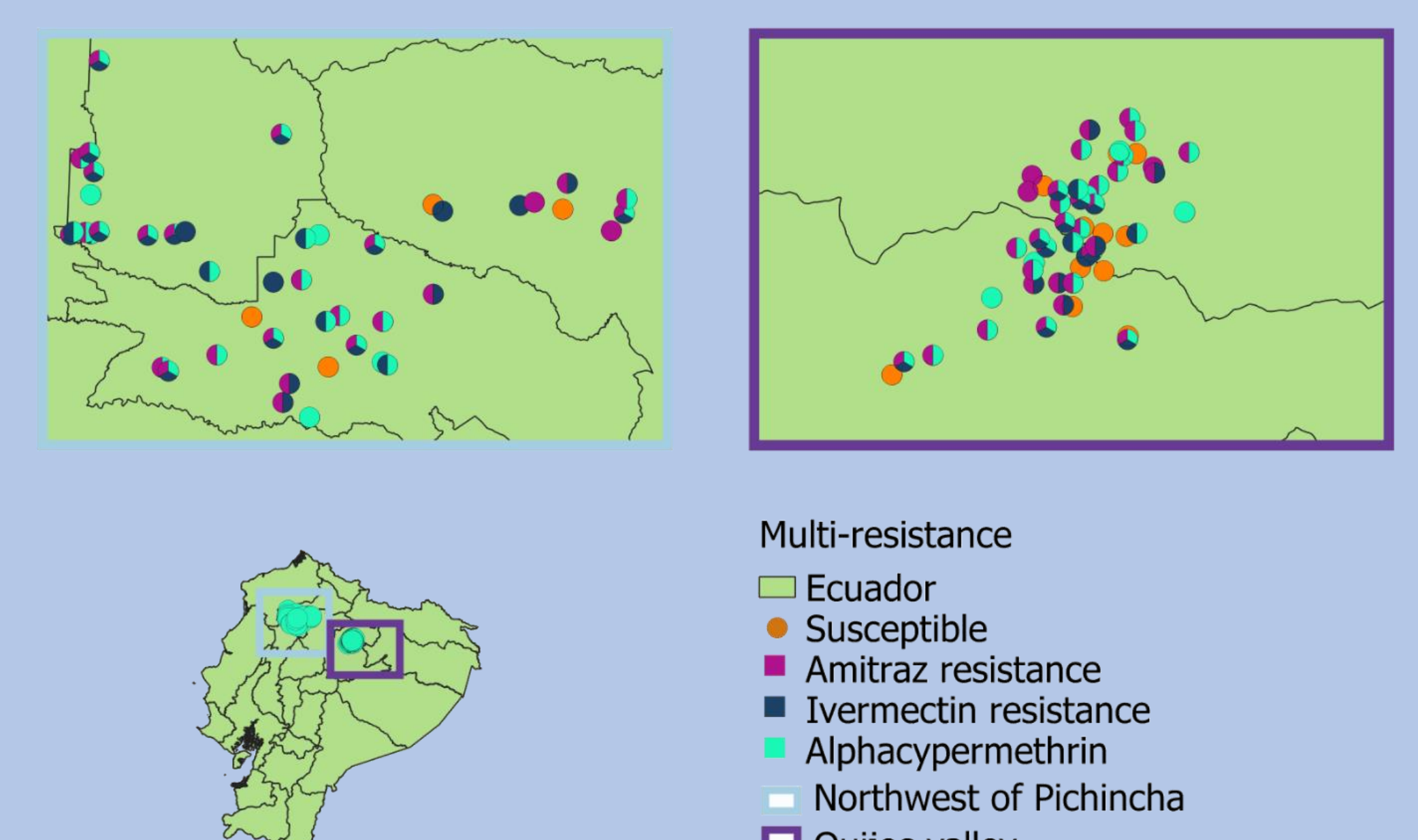
LARVAL PACKAGE TEST (LPT)

RESULTS

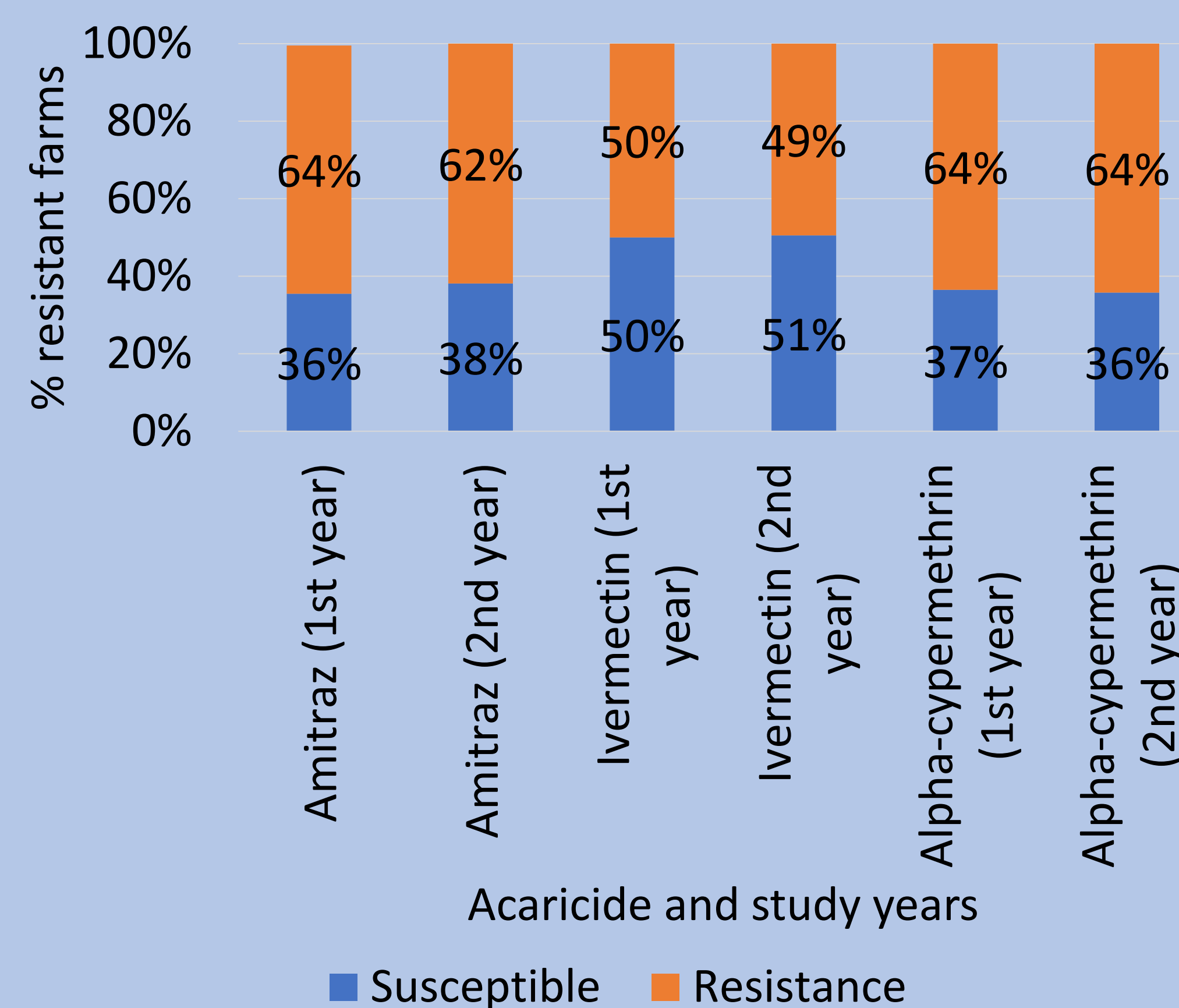
Resistance first year



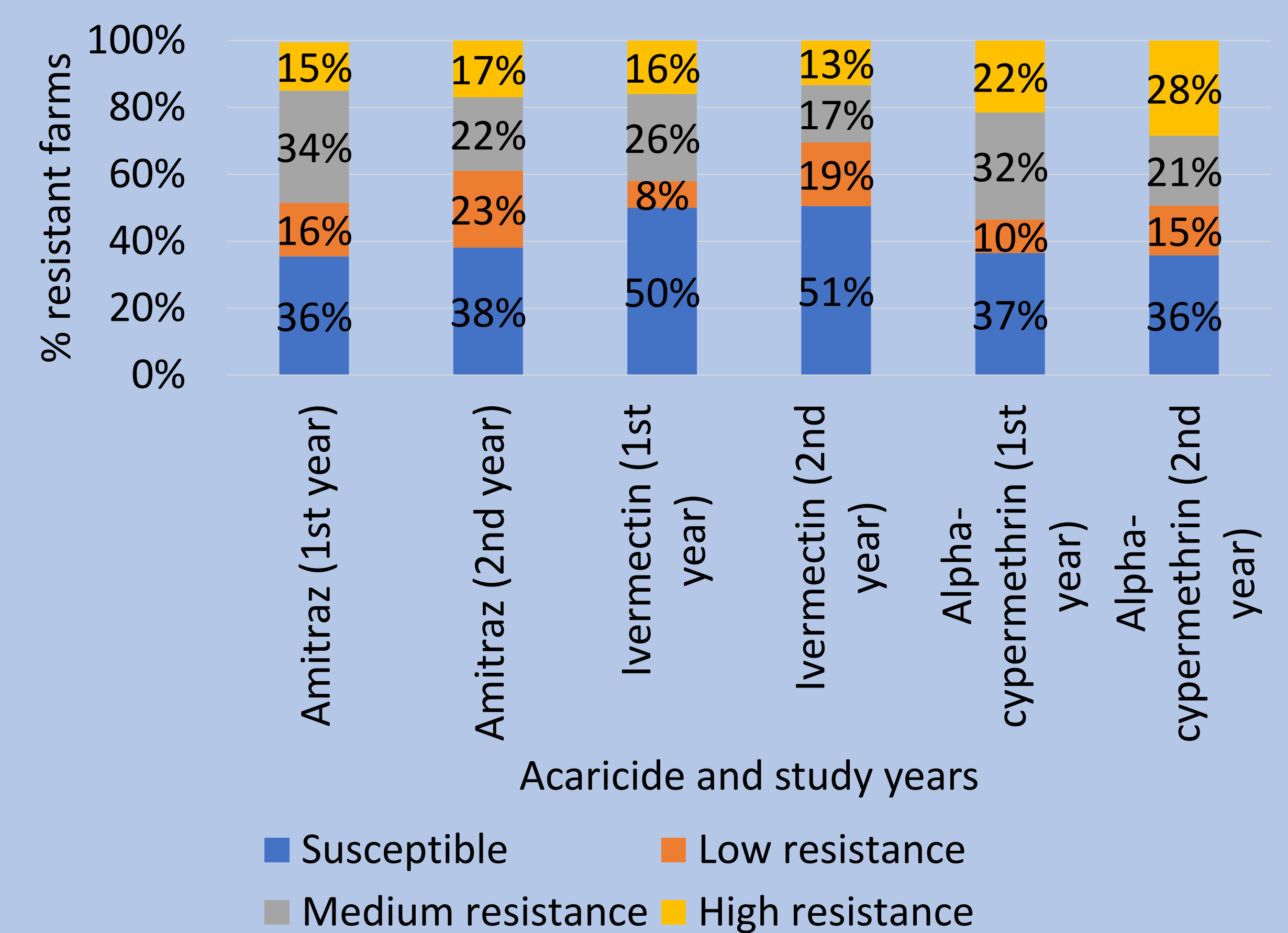
Resistance second year



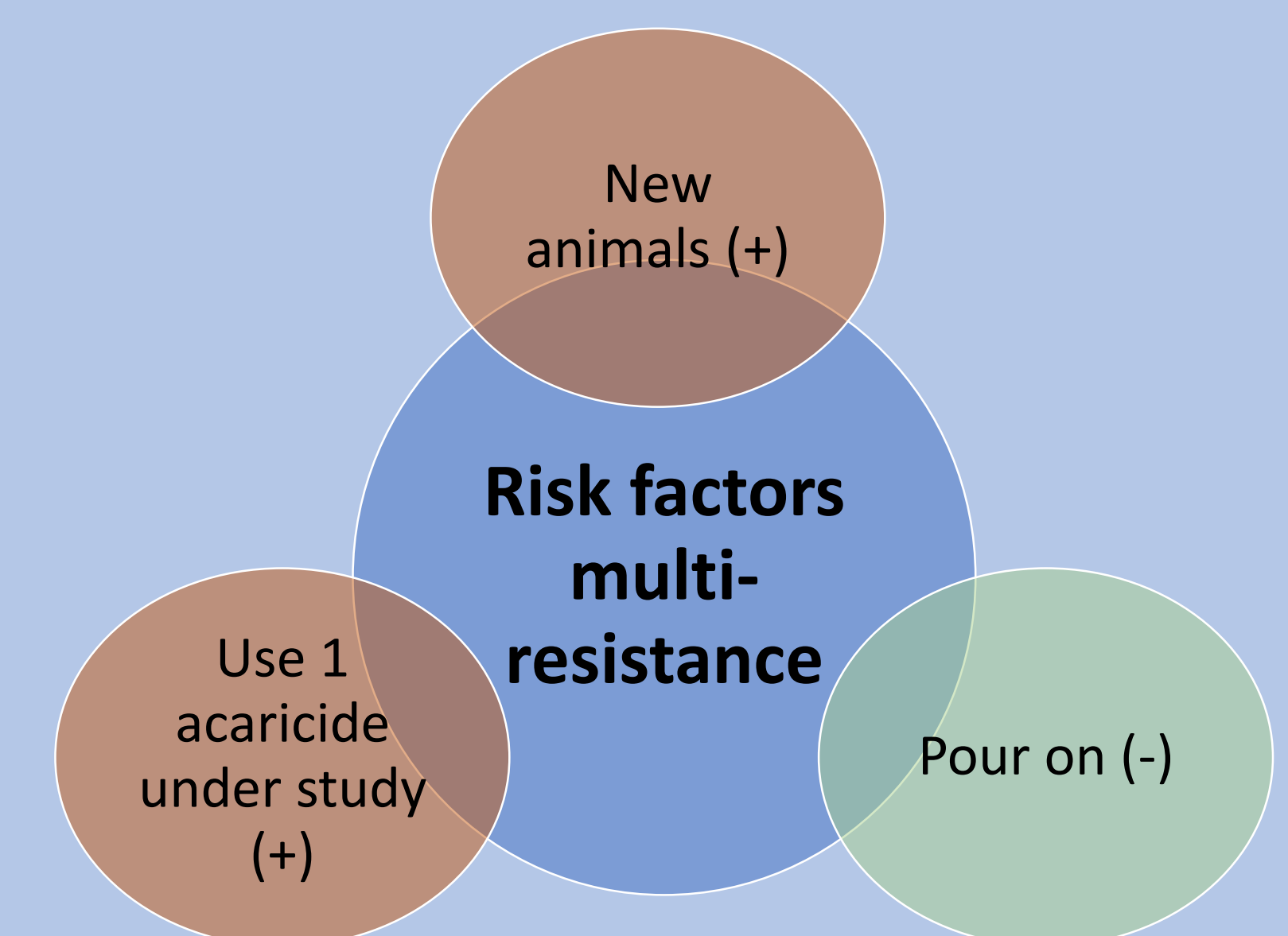
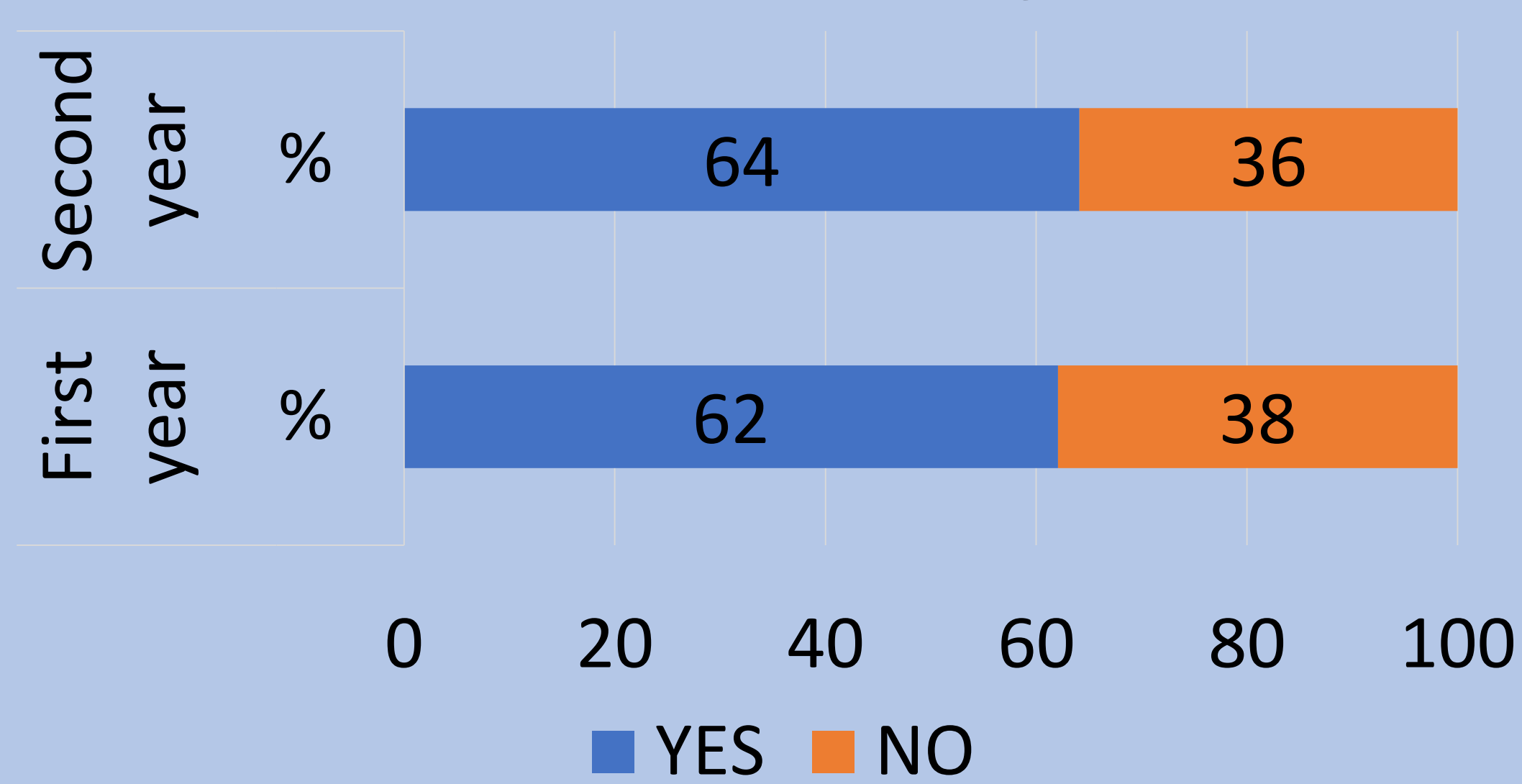
Resistance in two years



Levels of resistance



Multi-resistant two years



CONCLUSIONS

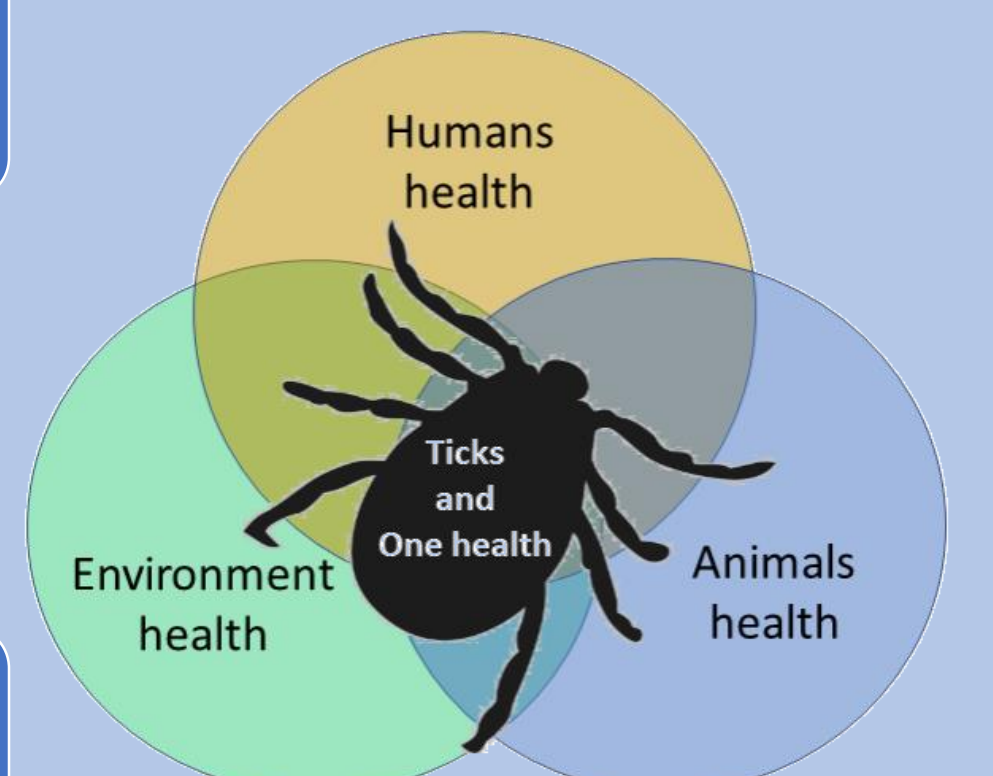
The escalating threat of acaricide resistance and multi-resistance in *Rhipicephalus microplus* populations across Ecuador demands urgent, coordinated action. Our findings reveal alarming resistance rates to:

- Amitraz 63%,
- Ivermectin 50%, and
- Alpha-cypermethrin 64%
- **63% of farms** battling multi-resistant ticks.

Critically, poor management practices—such as acaricide overuse, lack of rotation, and incorrect dosing—amplify resistance, jeopardizing livestock health and agricultural sustainability.

To curb this crisis, **integrated strategies** are imperative:

- **Farm-level interventions:** Enforce acaricide rotation, precise dosing, and combine chemical control with pasture management.
- **National surveillance:** Establish real-time resistance monitoring to guide adaptive policies.
- **Stakeholder collaboration:** Unite farmers, veterinarians, researchers, and policymakers to implement science-backed solutions.



C
O
N
T
A
C
T
D
E
T
A
I
L
S



ximena.perezotanez@uclouvain.be

REFERENCES AND ACKNOWLEDGMENTS



SCAN ME

DID YOU PAY ATTENTION?
PLAY HERE

