

Estado actual de la resistencia a alfa-cipermetrina, ivermectina y amitraz de la garrapata del ganado bovino (*Rhipicephalus microplus*) en Ecuador.

Rodríguez-Hidalgo, R.,
Perez-Otañez, X.,
Garcés-Carrera, S.,
Vanwambeke S.O.,
Madder M.,
Benítez-Ortiz, W.

ECUADOR

TICKS AND CATTLE

Fig 1. Political map of Ecuador; Provinces sampled

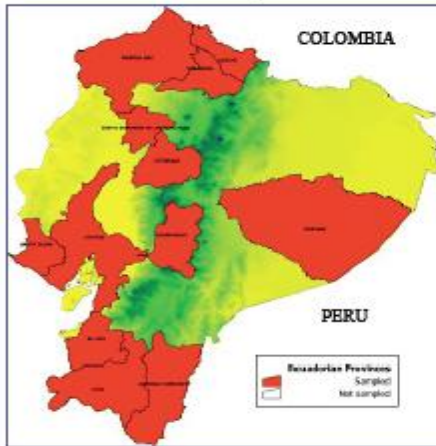


Fig 2. Spatial distribution of *Rhipicephalus (Boophilus) microplus*

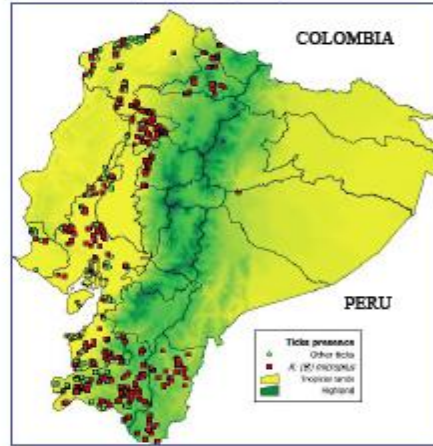


Fig 3. Spatial distribution of *Amblyomma cajennense*

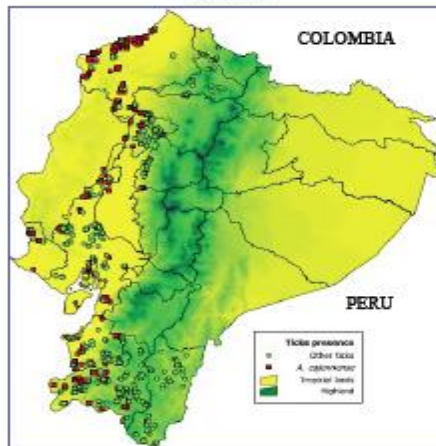
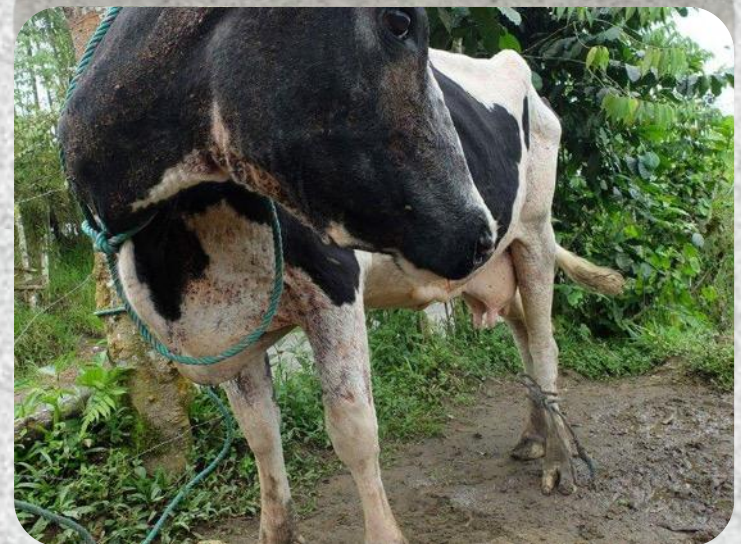
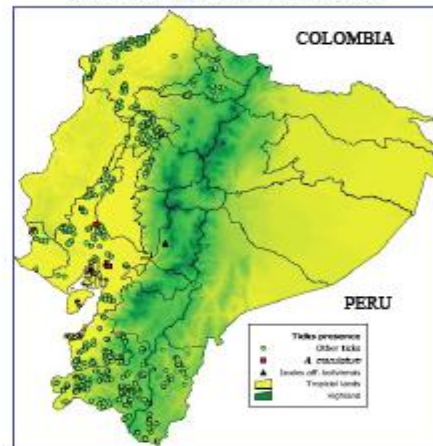
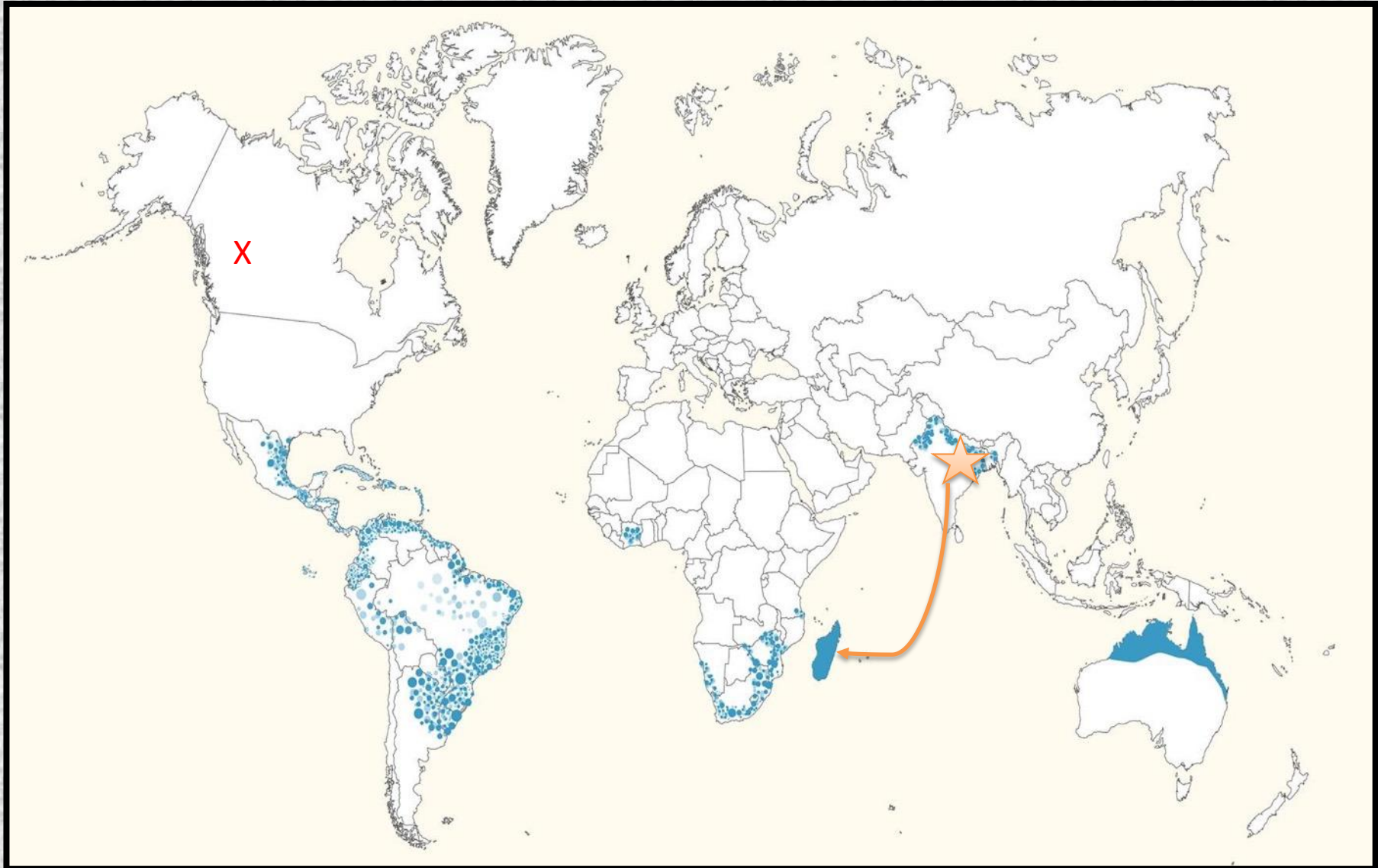


Fig 4. Spatial distribution of *Amblyomma maculatum* and *Ixodes aff. boliviensis*



Rhipicephalus microplus WORLDWIDE



Source: (Valencia et al. 2009; Cortés Vecino et al. 2010)

Modificado de Lovis, 2012

Orden Ixodida

Family Ixodidae

Family Argasidae

Family Nutalliellidae

Family Laelaptidae

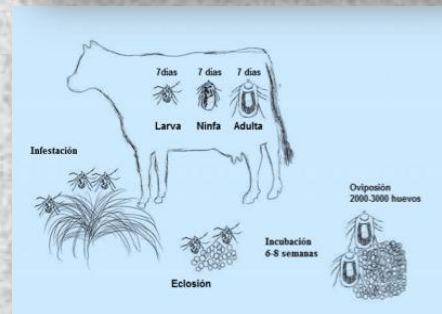
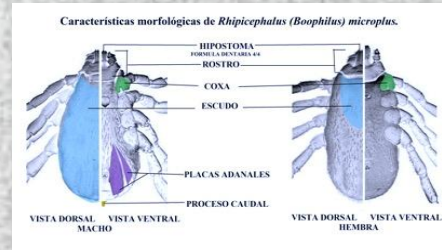
Genus:
Rhipicephalus

R. microplus

CLASIFICACIÓN CIENTÍFICA



- Reino: [Animalia](#)
- Filo: [Arthropoda](#)
- Clase: [Arachnida](#)
- Subclase: [Acari](#)
- Superorden: [Parasitiformes](#)
- Orden: [Ixodida](#)
- Familia: [Ixodidae](#)



MORPHOLOGY

LIFE CYCLE

Source: (Barros et al, 2006; Álvarez & Bonilla 2007; López-Arias et al. 2014; Horak et al. 2003; Alvarez et al. 2003; (Barandika, 2010)

Daños al ganado bovino



Bloodsucking
ectoparasites



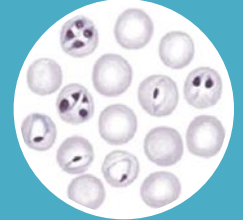
*Pérdida de peso,
Disminución de
producción de
leche y carne*



Mechanical
damages or
injuries.

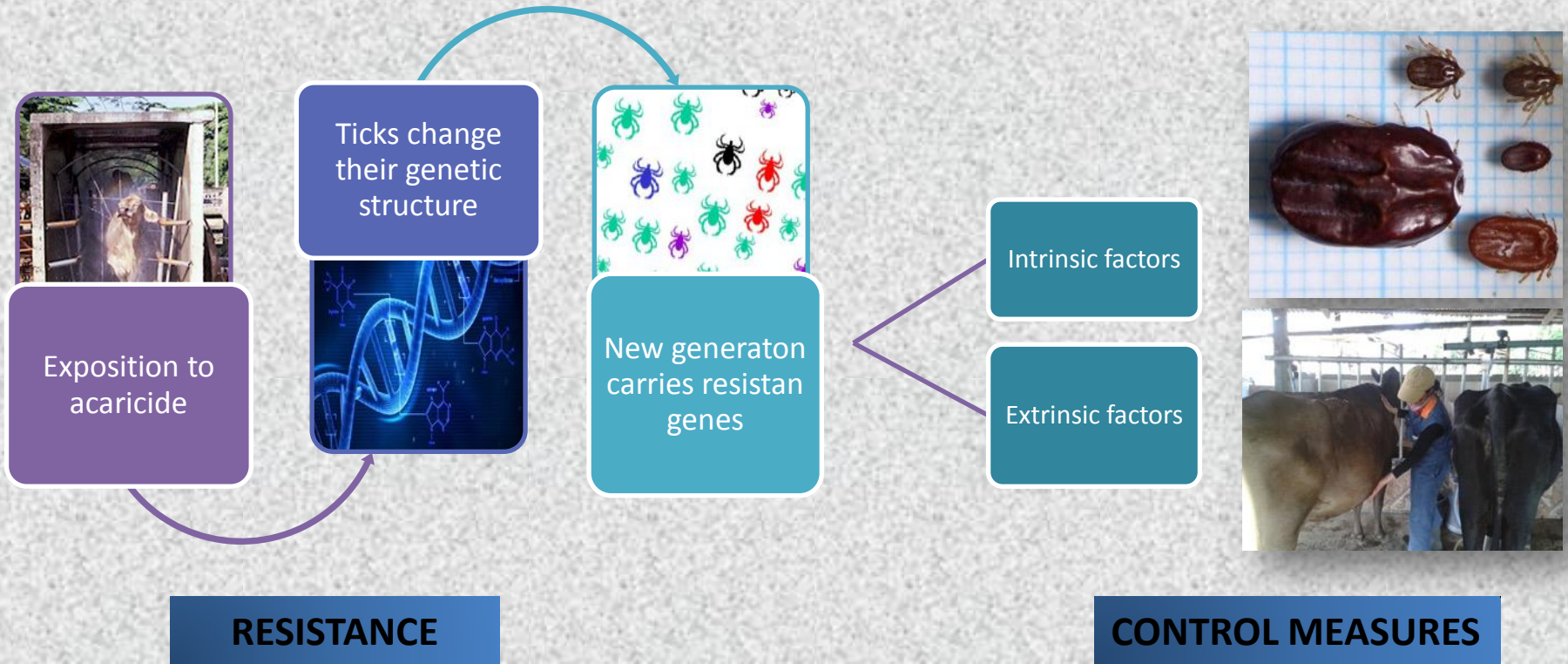


Immuno
suppression



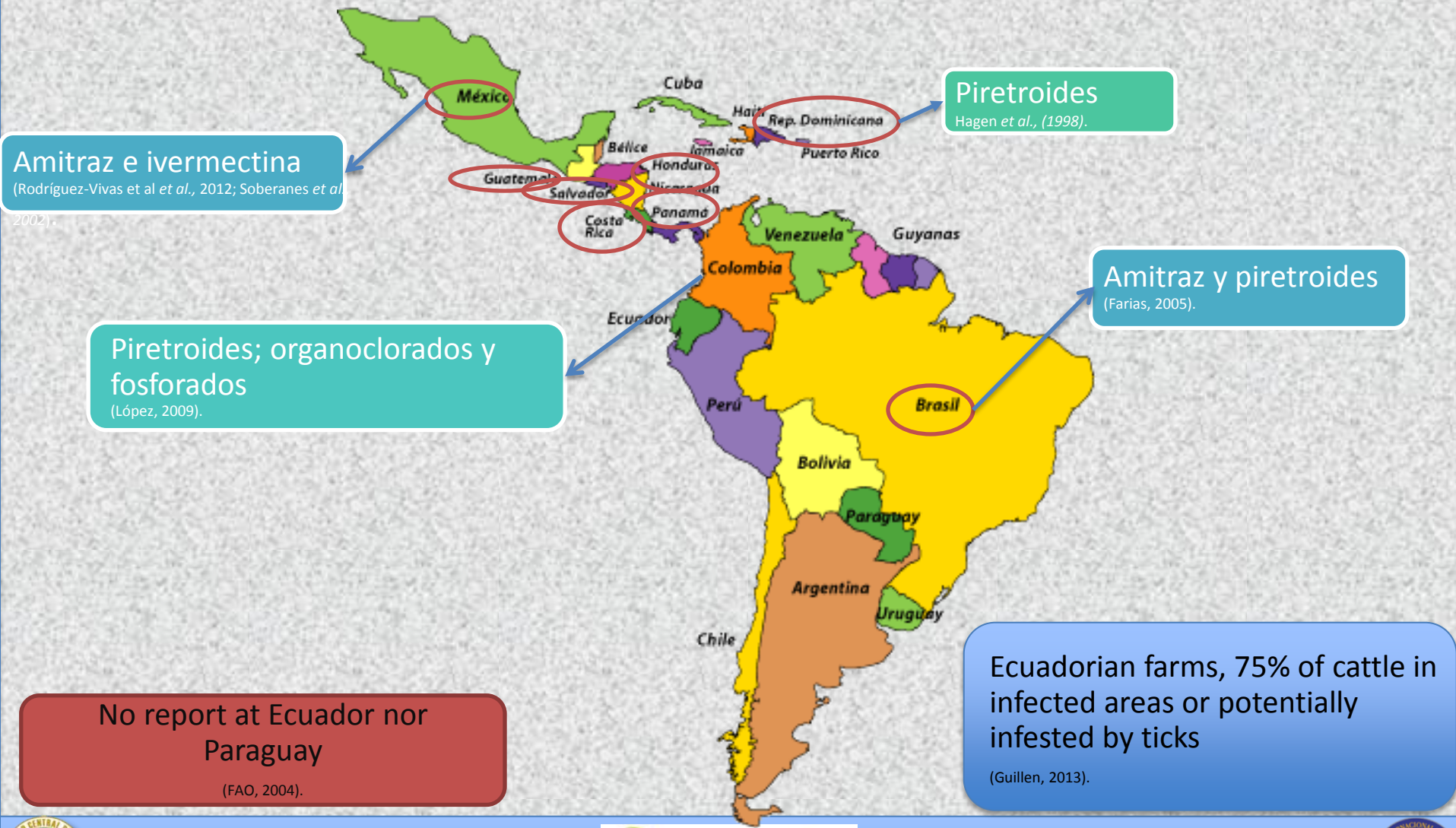
Ticks borne
diseases
(Vector)

What is acaricide resistance?



Source: (FAO, 2004, Guerrero *et al.*, 2012, Alonso *et al.*, 2006).

Acaricide resistance background



CHEMICAL CONTROL



Amitraz:

Octopamine antagonist
Used since 60's.



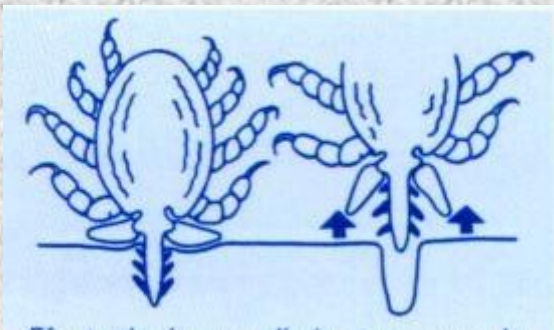
ALFACIPERMETRINA 10%

Alpha-cypermethrin:
Knock out effect.



Ivermectina:

Increases production of
Gamma Aminobutyric acid



Source: (Castelli et al. 2013; Soberanes et al. 2002; Baron et al. 2014; Palomino et al. 2007; Mendes et al. 2013; Rodríguez-Vivas et al. 2014).

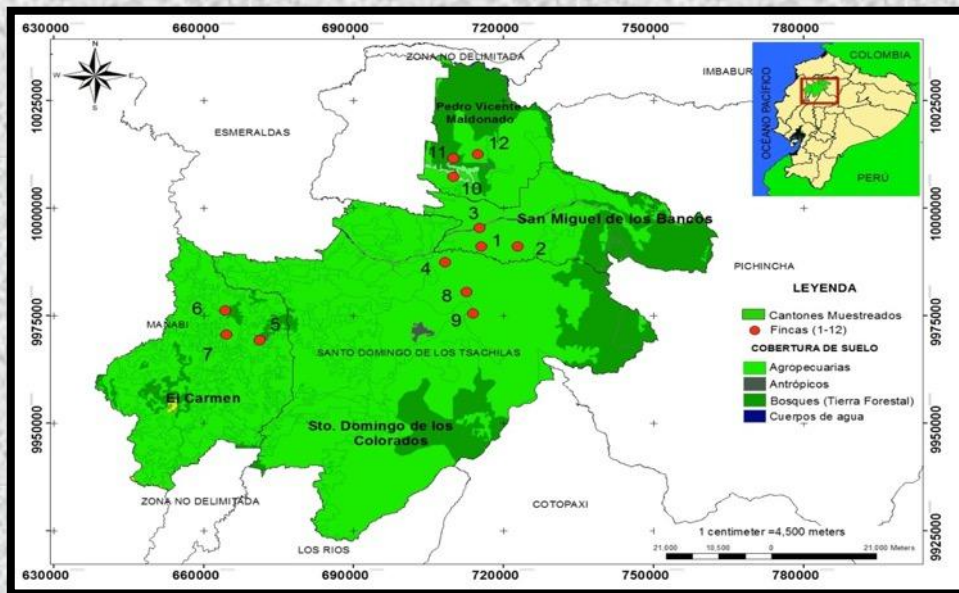
GENERAL OBJECTIVE:

- To determine acaricide resistance to alphacypermethrin, ivermectine y amitraz

ESPECIFIC OBJECTIVES:

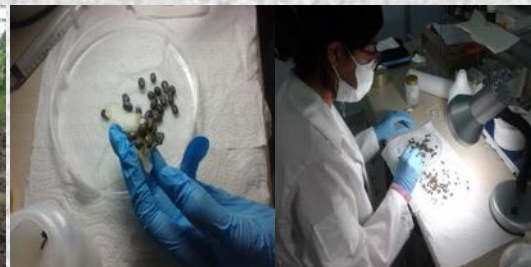
- To establish acaricide resistance levels
- To compare among exposition methods and to determine the chemical products effectiveness

Methodology



12 farms in 4 different areas

Sampling
250 female ingurgitated
ticks



Field phase

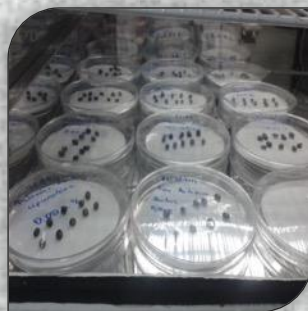
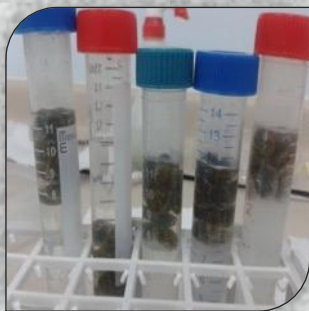


Lab phase

BIOASSAYS

AIT

Adult
Immersion
test



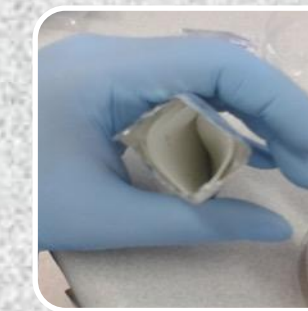
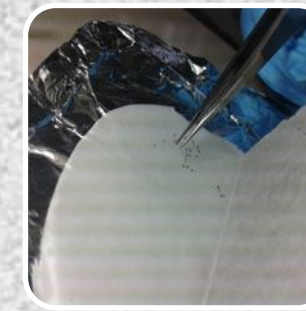
LPT

Larval
Package
test



LIT

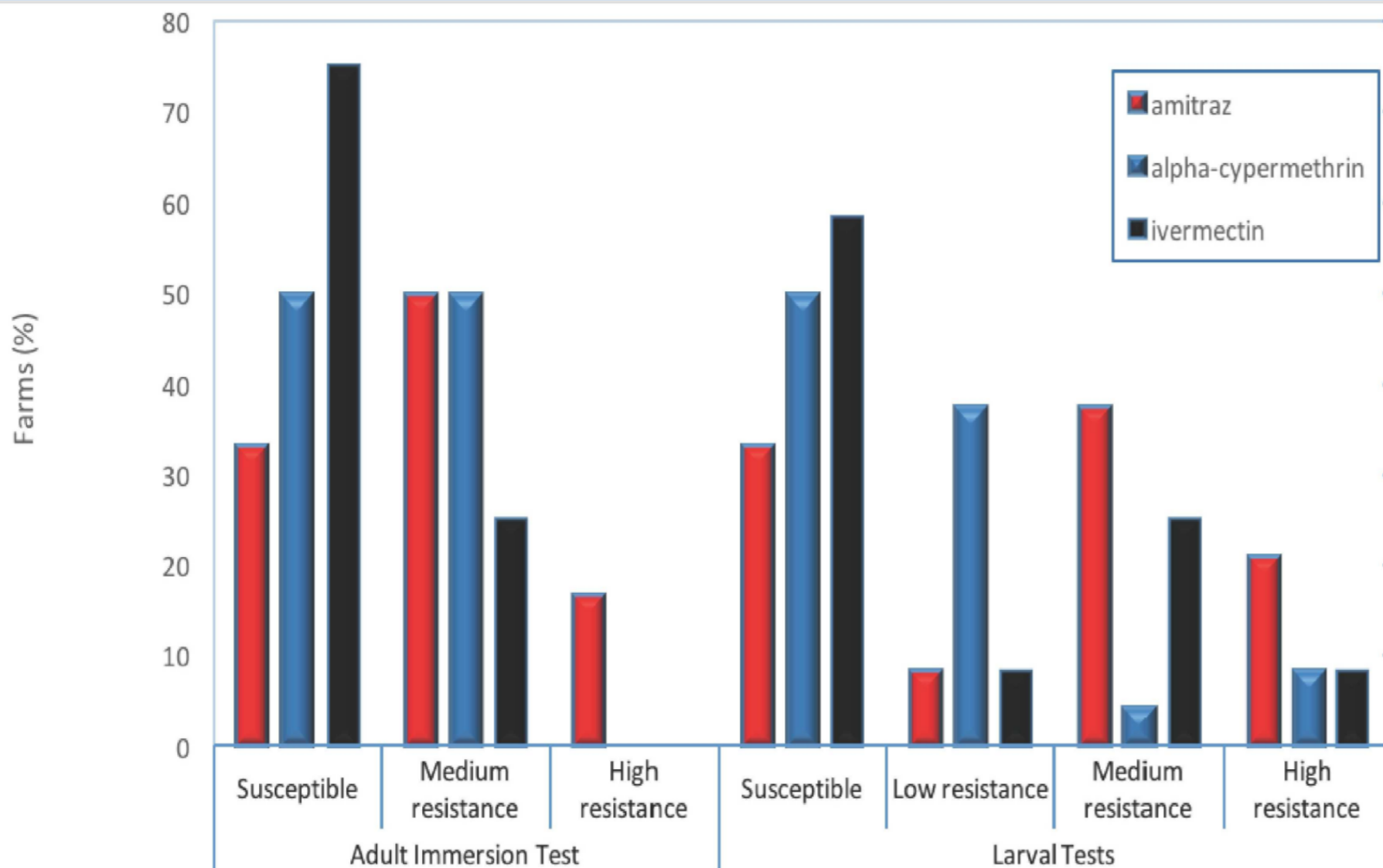
Larva
Immersion
test



Protocolo de: Drummond (1973), modificacion FAO (2004); Bettin, 2013; Junte, 2008; Shaw, 1966, y modificado por Mekkonen, 2005

RESULTS Y DISCUSSION

Acaricides /Bioassay									
Farm	Amitraz			Alpha-cypermethrin			Ivermectin		
	AIT	LIT	LPT	AIT	LIT	LPT	AIT	LIT	LPT
1	X	X	X		X	X	X	X	X
2					X	X	X	X	X
3	X	X	X	X				X	X
4	X	X	X	X	X	X			
5	X	X	X	X	X	X			
6	X	X	X	X	X	X			
7	X	X	X						
8									
9	X	X	X				X	X	X
10				X	X	X			
11	X	X	X						
12				X				X	X
Total	8	8	8	6	6	6	3	5	5
%	67	67	67	50	50	50	25	42	42



CONCLUSIONS

Acaricide resistance:

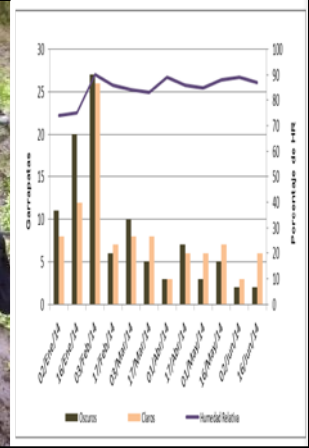
- Amitraz 67%
- Alpha-cypermethrin 50%
- Ivermectin 25% - 42%

Acaricide resistance levels:

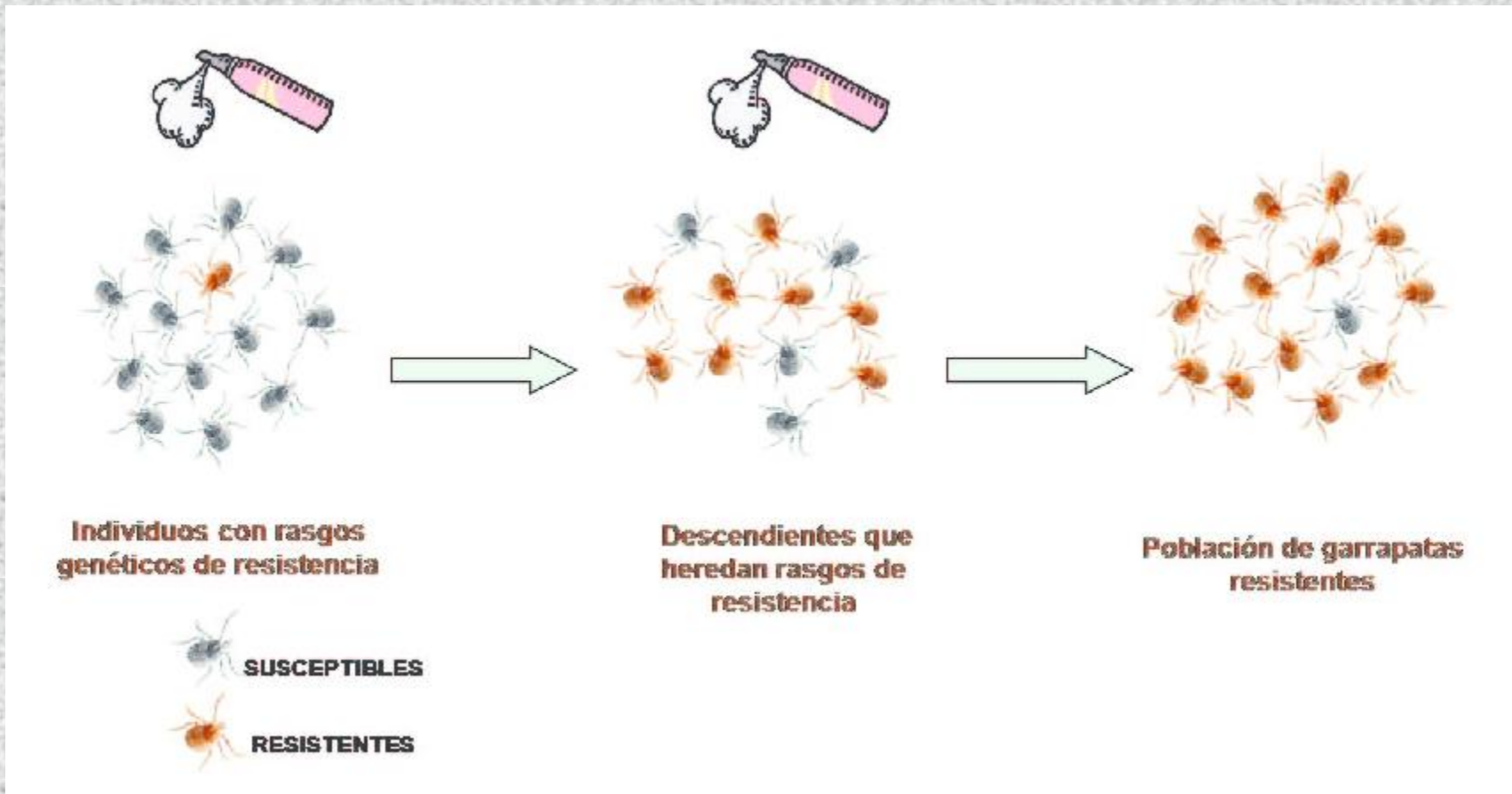
- | | | | |
|----------------------|-----------|--------------|------------|
| • Amitraz | low R 13% | medium R 42% | high R 19% |
| • Alpha-cypermethrin | low R 25% | medium R 25% | high R 6% |
| • Ivermectina | low R 13% | medium R 25% | high R 14% |

No significant differences among analysis test

GRACIAS



Development of resistance



Source: Rosario-Cruz et al., 2009.