



# *Metarhizium anisopliae*: A potential tool for the management of tick acaricide-resistant strains

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## INTRODUCTION

Ticks and tick-borne diseases cause serious economic losses to the cattle industry (Grisi et al., 2014). They are vectors of pathogens that cause diseases such as East coast fever, anaplasmosis, redwater, and heartwater. Current control strategies for these vectors rely on extensive use of chemical acaricides, but ticks have developed resistance to them (Ghosh et al., 2015). There is a need to develop alternative methods for tick control. Biological pesticides are natural, environmentally friendly and less expensive. Entomopathogenic fungi are perceived as a promising alternative to acaricides.

## OBJECTIVES

To evaluate the efficacy of *Metarhizium anisopliae* ICPE 7 in controlling on-host ticks under field conditions.



*Amblyomma variegatum*



*Rhipicephalus appendiculatus*

## METHODS



- Control
- Met 7 alone ( $1 \times 10^9$  conidia/ml)
- Combination Amitraz and Met 7 (125 ppm +  $1 \times 10^8$  conidia/ml)
- Amitraz alone (250 ppm)

Animals were treated once a week and data recorded 3 times a week.

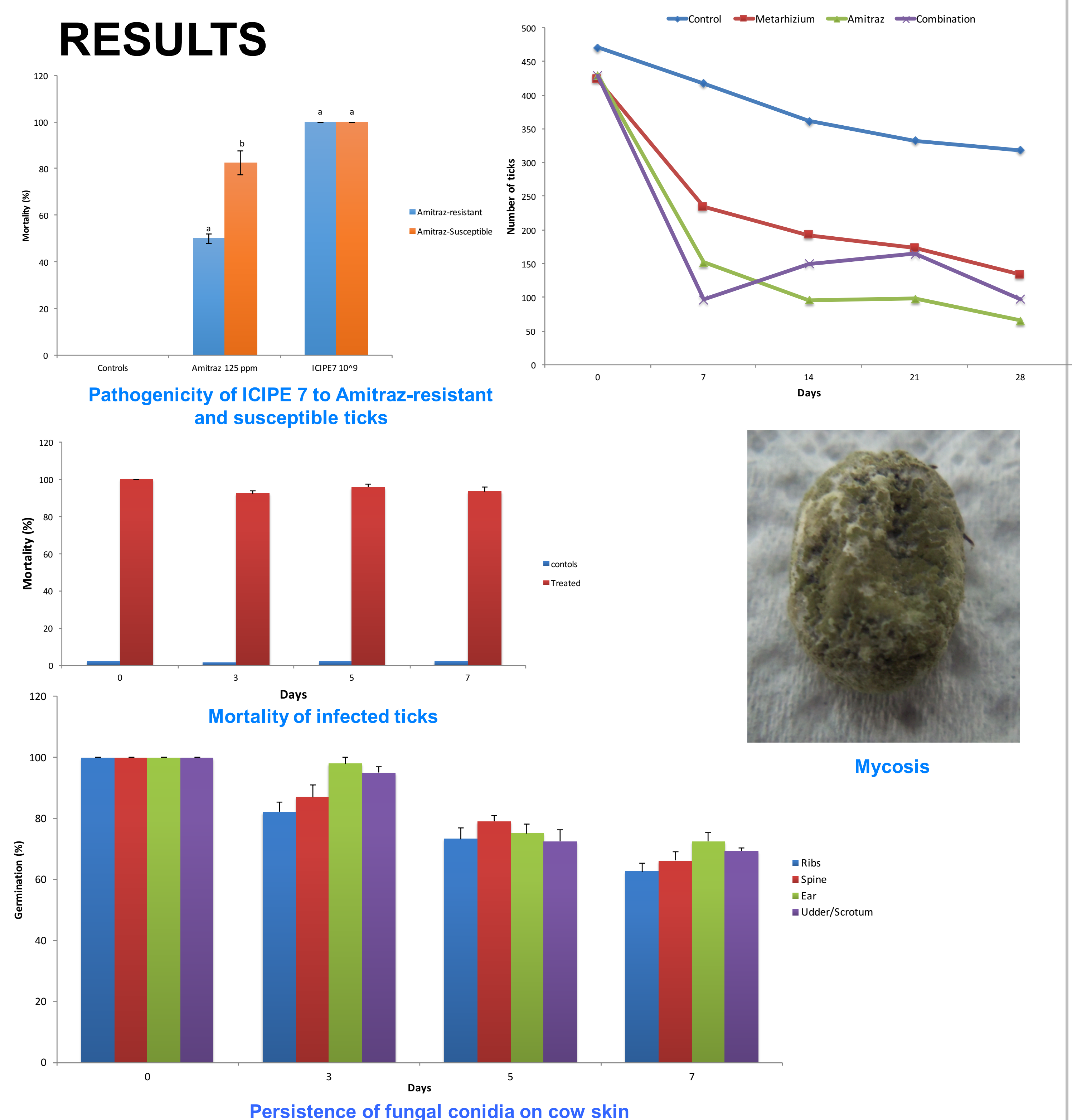
## CONCLUSIONS

- Field efficacy trial data confirm the potential of *M. anisopliae* ICPE 7 for controlling ticks on-host.
- Persistence of conidia on the animal skin suggests a weekly application of *M. anisopliae* on the animal to achieve effective control of ticks, which is similar to acaricide application.

## IMPACT

- Conidia of *Metarhizium anisopliae* are effective in reducing the number of ticks on-host; moreover, *M. anisopliae* can persist over one week on the cattle skin.
- Metarhizium anisopliae* is effective against ticks resistant to acaricide.
- It is, therefore, possible to use the fungus ICPE 7 as alternative, or in association with chemical, to reduce the negative impacts on the environment.

## RESULTS



## REFERENCES

Grisi L., Leite R.C., Martins J.R., Barros A.T., Andreoti R., Cancado P.H., Leon A.A., Pereira J.B. and Villela H.S. (2014) Reassessment of the economic impact of cattle parasites in Brazil. *Revista Brasileira de Parasitologia Veterinaria* 23, 150–156.

Ghosh S., Kumar R., Nagar G., Kumar S., Sharma A.K., Srivastava A., Ajith Kumar K.G. and Saravanan B.C. (2015) Survey of acaricides resistance status of *Rhipicephalus (Boophilus) microplus* collected from selected places of Bihar, an eastern state of India. *Ticks and Tick Borne Diseases* 6, 668–675.