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European Rabbit Iberian Coordination Committee

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GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, PESCA Y ALIMENTACIÓN

Evaluation of new aversive and repellent compounds to mitigate agricultural damage by wild rabbits (*Oryctolagus cuniculus*)

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ECOLOGICAL IMPORTANCE

Keystone species in Mediterranean ecosystems

Landscape engineer

Included in the diet of more than 40 Iberian predators

Of particular importance to threatened species

Delibes-Mateos et al. 2007; Delibes-Mateos et al. 2008; Gálvez-Bravo et al. 2009

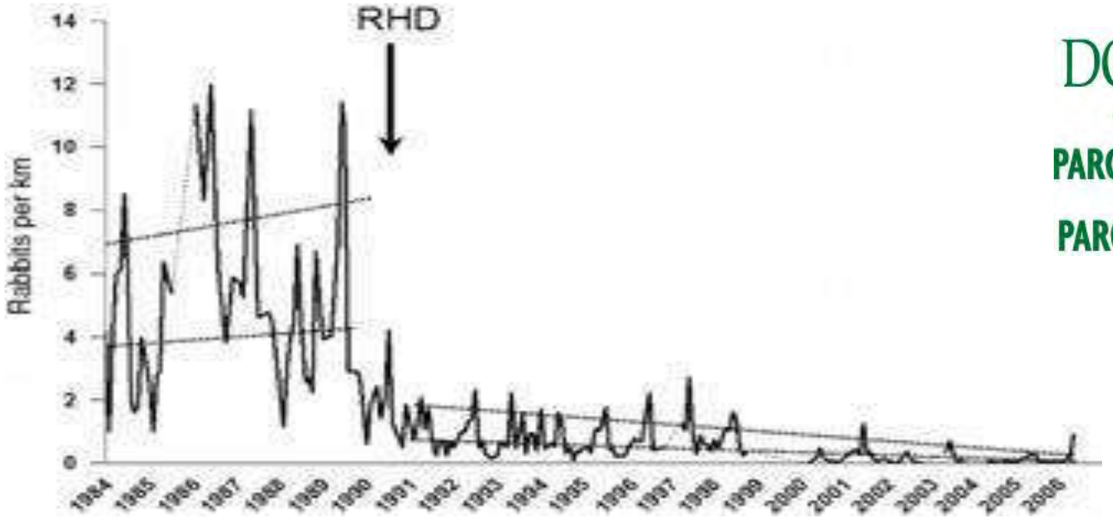
REDUCTION OF IBERIAN POPULATIONS

Loss of suitable habitat

Introduction of myxomatosis (1953)

Introduction of viral hemorrhagic disease (1988)

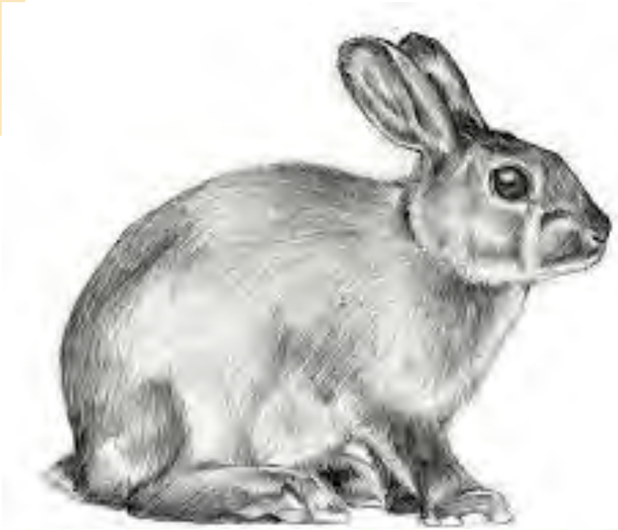
New strain of viral hemorrhagic disease (2012)

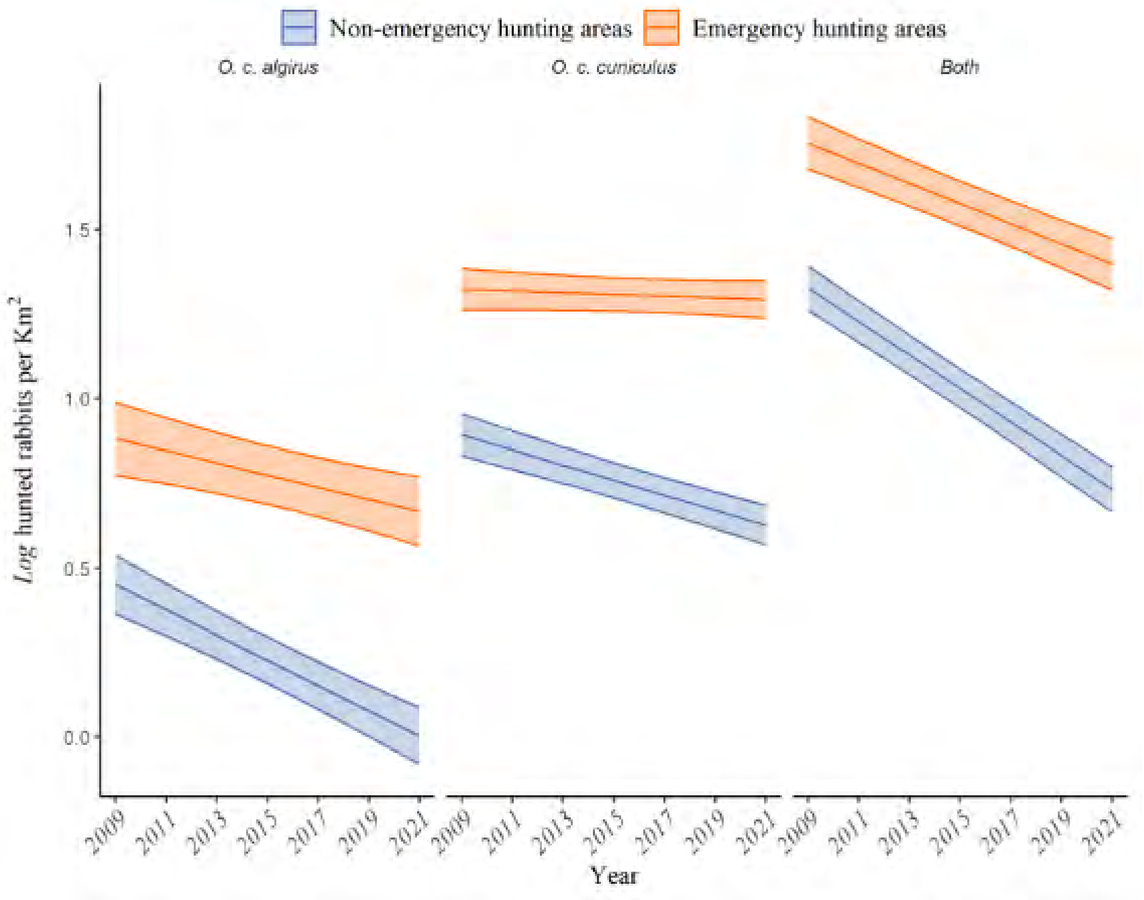


DOÑANA
PARQUE NACIONAL
PARQUE NATURAL

Argüello, Llanos & Perez 1988; Calvete et al. 2004; Moreno et al. 2007; Dalton et al. 2012;

SPATIAL MISMATCH IN RABBIT ABUNDANCE





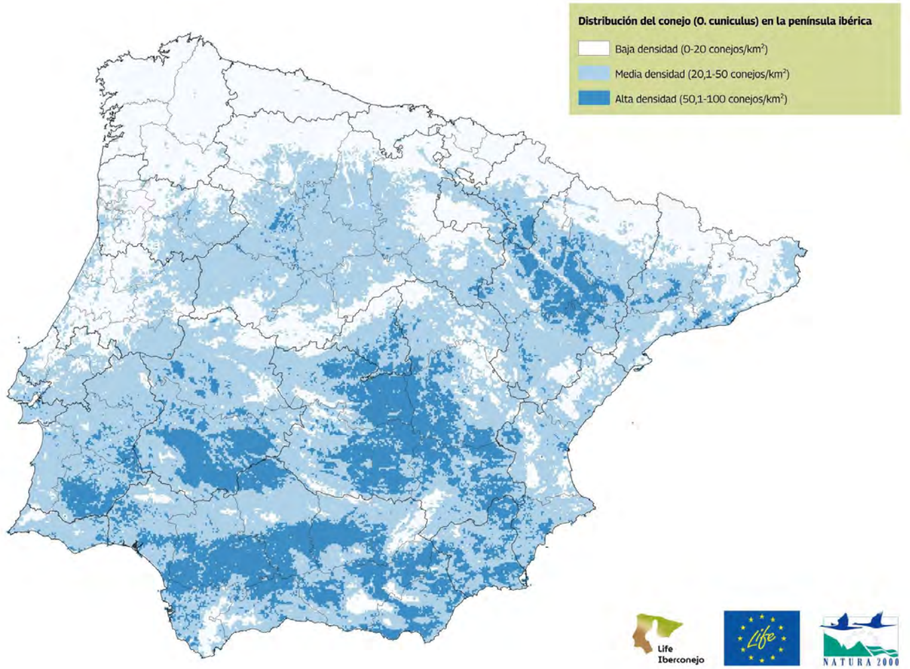
Marin-Sáez et al. 2024

IMPORTANT AGRICULTURAL DAMAGES

It causes the most damage to agriculture in Spain

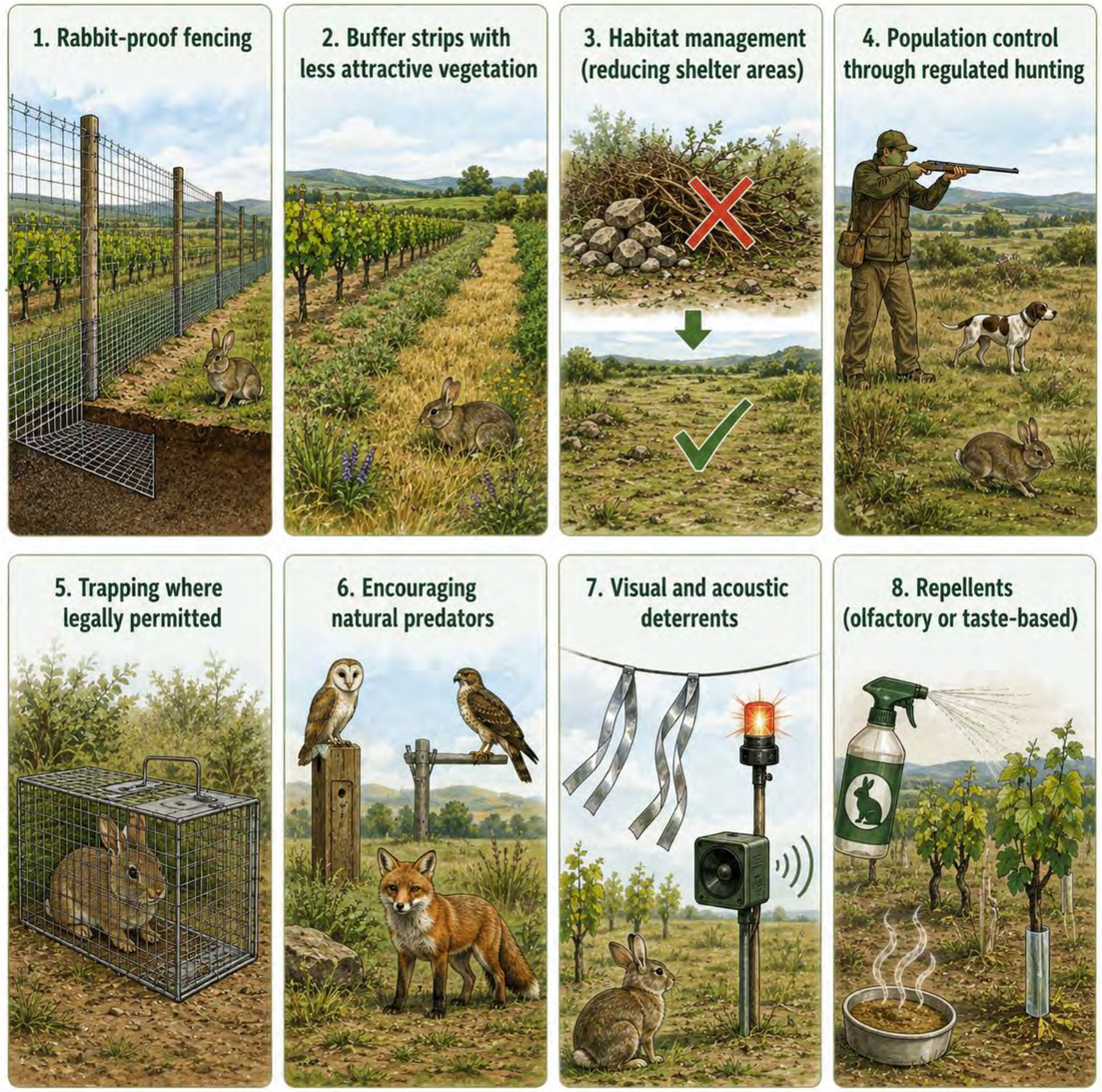
Affecting more than 800.000 ha and 800 M€ (COAG)

Important social conflict



METHODS TO REDUCE DAMAGES

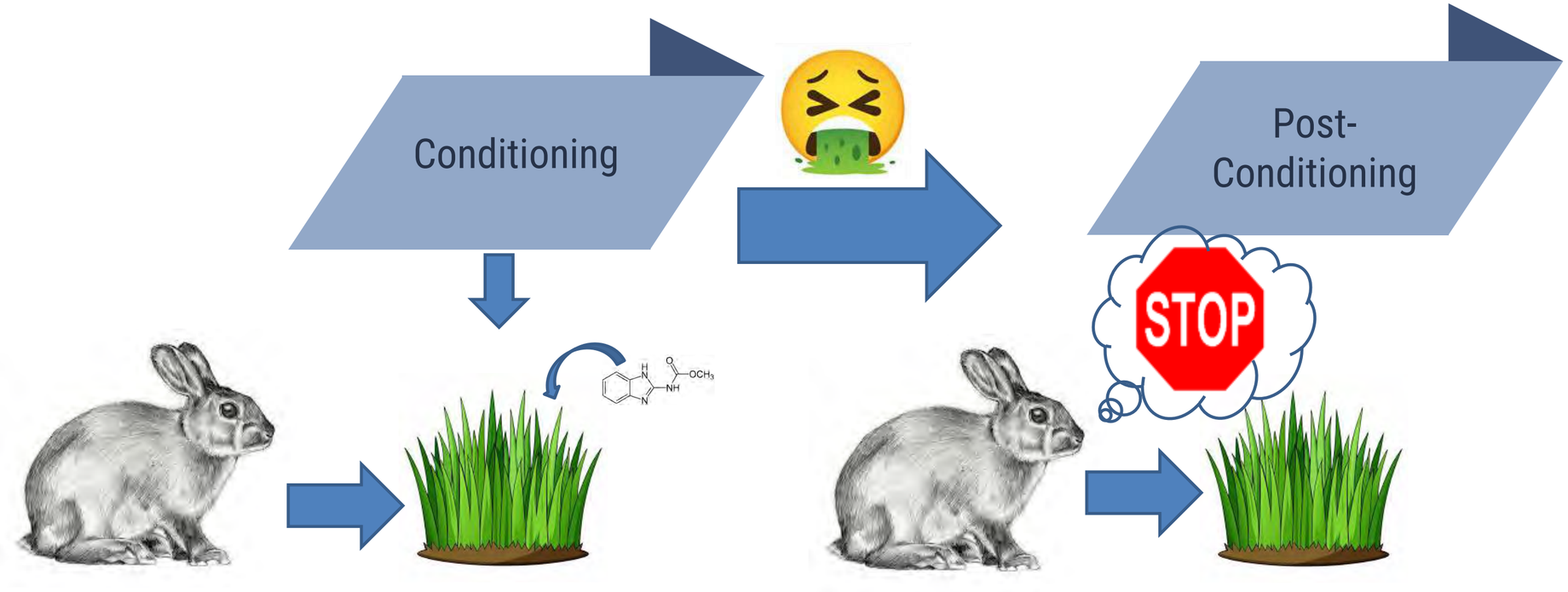
- Rabbit-proof fencing
- Buffer strips with less attractive vegetation
- Habitat management (reducing shelter areas)
- More resistant varieties (triticale)
- Population control through regulated hunting
- Trapping where legally permitted
- Encouraging natural predators
- Visual and acoustic deterrents
- Repellents (olfactory or taste-based)



CONDITIONED FOOD AVERSION AND REPELLENCY

- Similar processes
- Differences in application and effects
- Can be combined??

Conditioned Food Aversion (CFA)

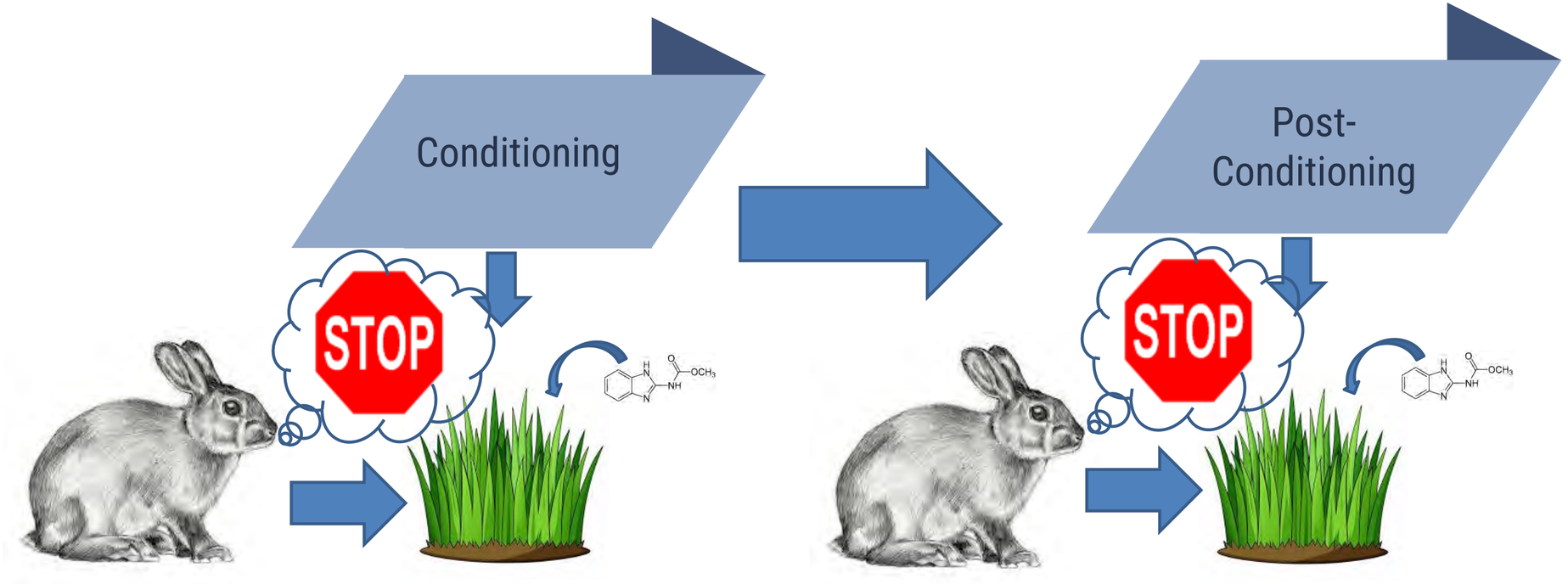


Tobajas et al. 2019a; 2019b; 2020a; 2020b; 2020c

CONDITIONED FOOD AVERSION AND REPELLENCY

- Similar processes
- Differences in application and effects
- Can be combined??

Repellency

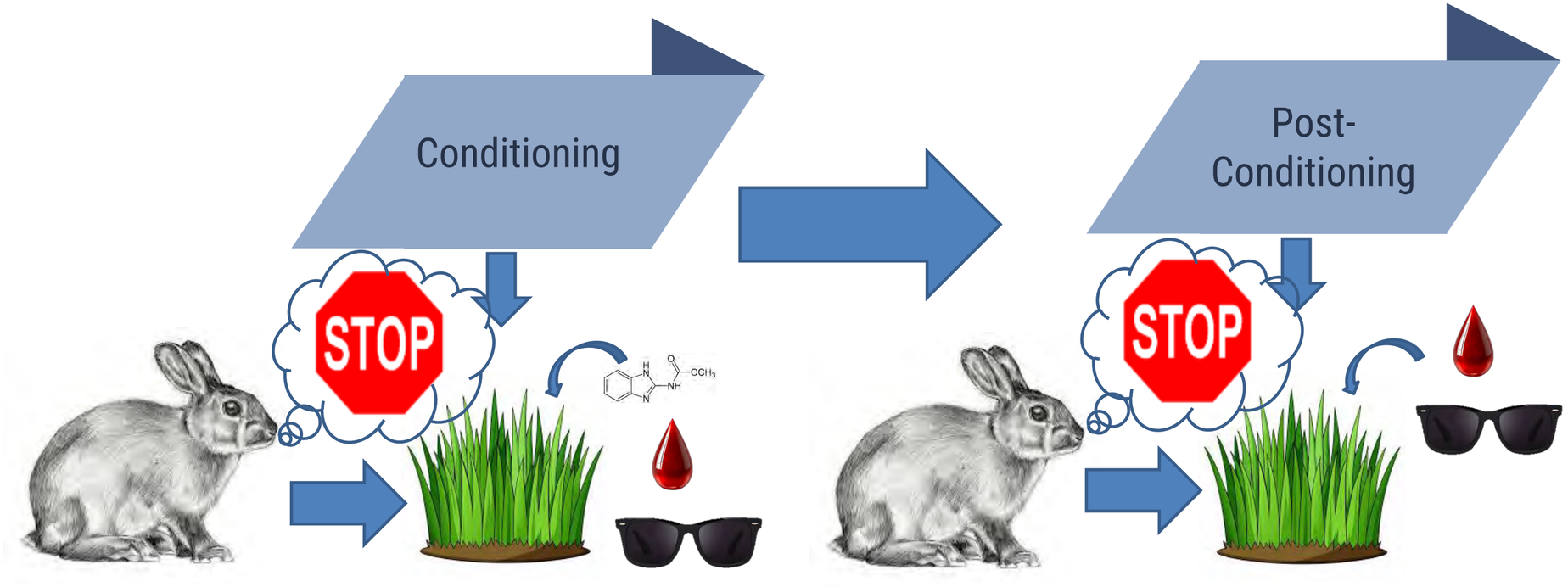


Snijders et al. 2021

CONDITIONED FOOD AVERSION AND REPELLENCY

- Similar processes
- Differences in application and effects
- Can be combined??

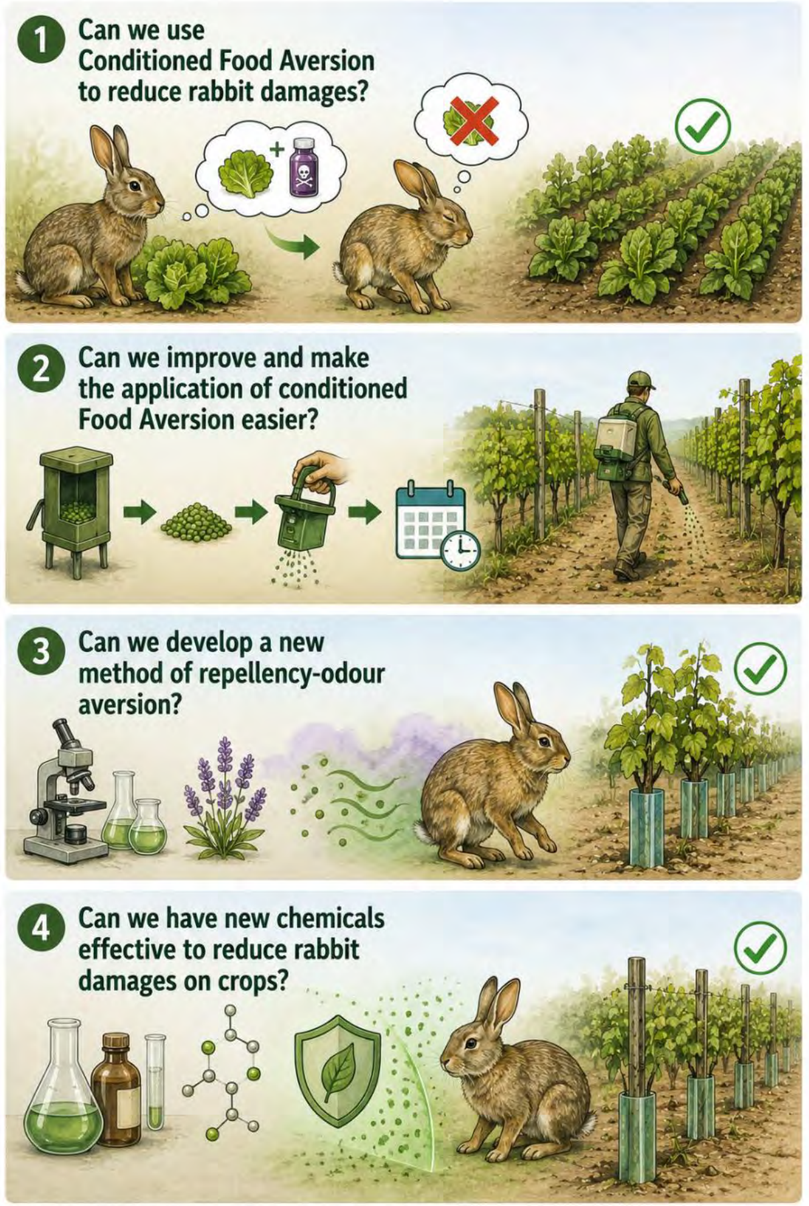
Repellency and Aversion



Tobajas et al. 2021

OBJECTIVES

- Can we use Conditioned Food Aversion to reduce rabbit damages?
- Can we improve and make the application of conditioned Food Aversion easier?
- Can we develop a new method of repellency-odour aversion?
- Can we have new chemicals from natural plants effective to reduce rabbit damages on crops?



METHODS

Literature review and selection of potential substances

- Web of Knowledge
- Scopus
- Toxonet
- Google Scholar
- Bases de datos (sustancias químicas registradas en España)

- ***Substances used in aversion to wildlife***
- ***Substances used in repellency to wildlife***
- ***Substances from the same chemical families used***
- ***LD50 of selected substances***
- ***Odour and taste of the selected substances***
- ***Potential dose to induce aversion in rabbits***
- ***Availability***

Tobajas et al. 2019a

Selected substances in the review

Top Ten → aversive or repellent??

Anthraquinone → aversive and repellent

Capsaicine → repellent

Daffodil bulb extract → aversive or repellent??

METHODS

Treatments

Odour

Visual

Top Ten

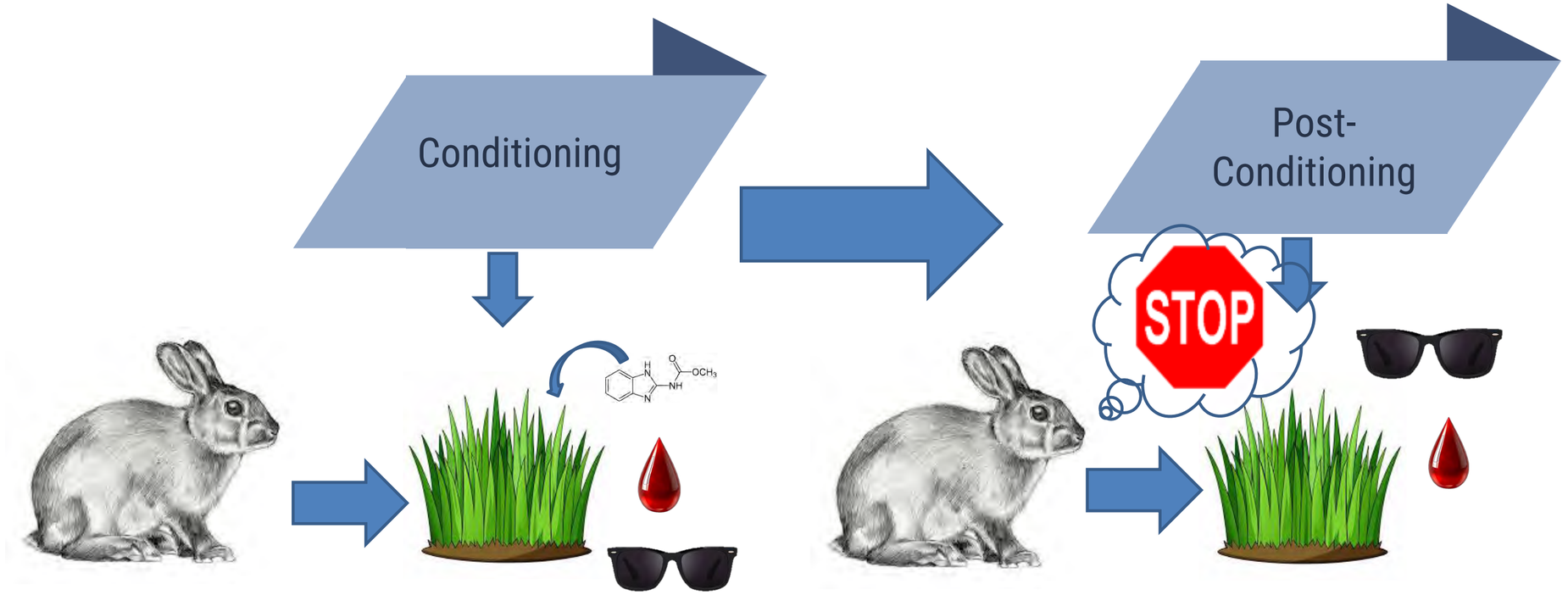
Anthraquinone + artificial odour + visual signal (alters UV reflectance)

Capsaicine + artificial odour + visual signal (alters UV reflectance)

Daffodil bulb extract + visual signal (alters UV reflectance)

METHODS

Treatment application



METHODS

- First experiment in captivity
- 12 New Zealand rabbits
- Three treatment of 4 rabbits
  - Top Ten
  - Anthraquinone + odour + visual
  - Control
- Reduction of hay consumption
  - Pre vs Post treatment
- 2 months

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METHODS

- Second experiment in captivity
- 16 New Zealand rabbits
- Four treatment of 4 rabbits
  - Capsaicine + odour
  - Capsaicine + odour + visual
  - Daffodil bulb extract + visual
  - Control
- Reduction of hay consumption
  - Pre vs Post treatment
- 2 months

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METHODS

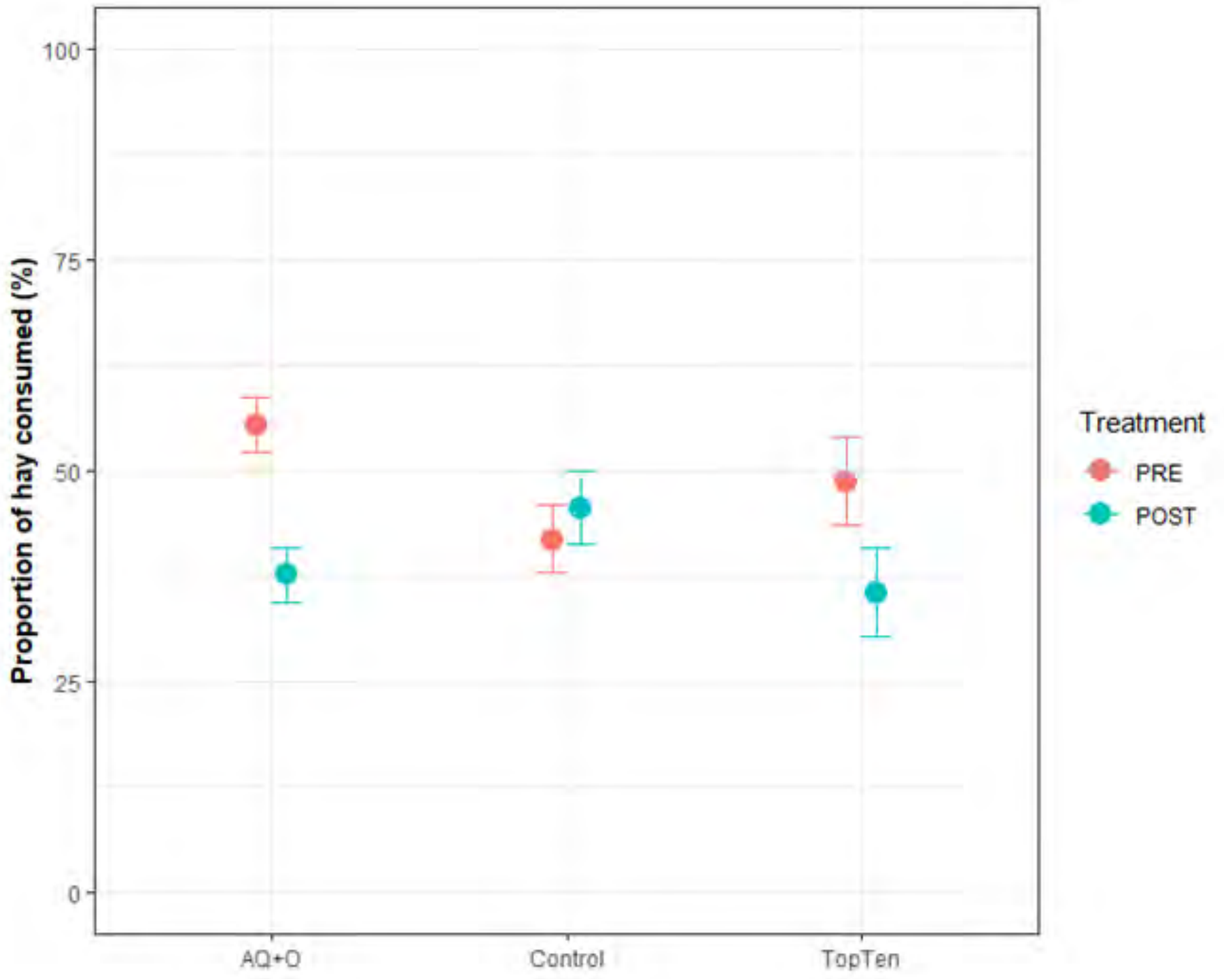
- Pilot test in wild rabbits
- 12 feeders
- Four treatment of 3 feeders
  - Top Ten
  - Anthraquinone + odour + visual
  - Control
- Reduction of pellet consumption
  - Pre vs Post treatment
- 2 months

RESULTS

- First experiment in captivity

Top Ten ↓ 27%

Anthraquinone + odour + visual ↓ 31.9%



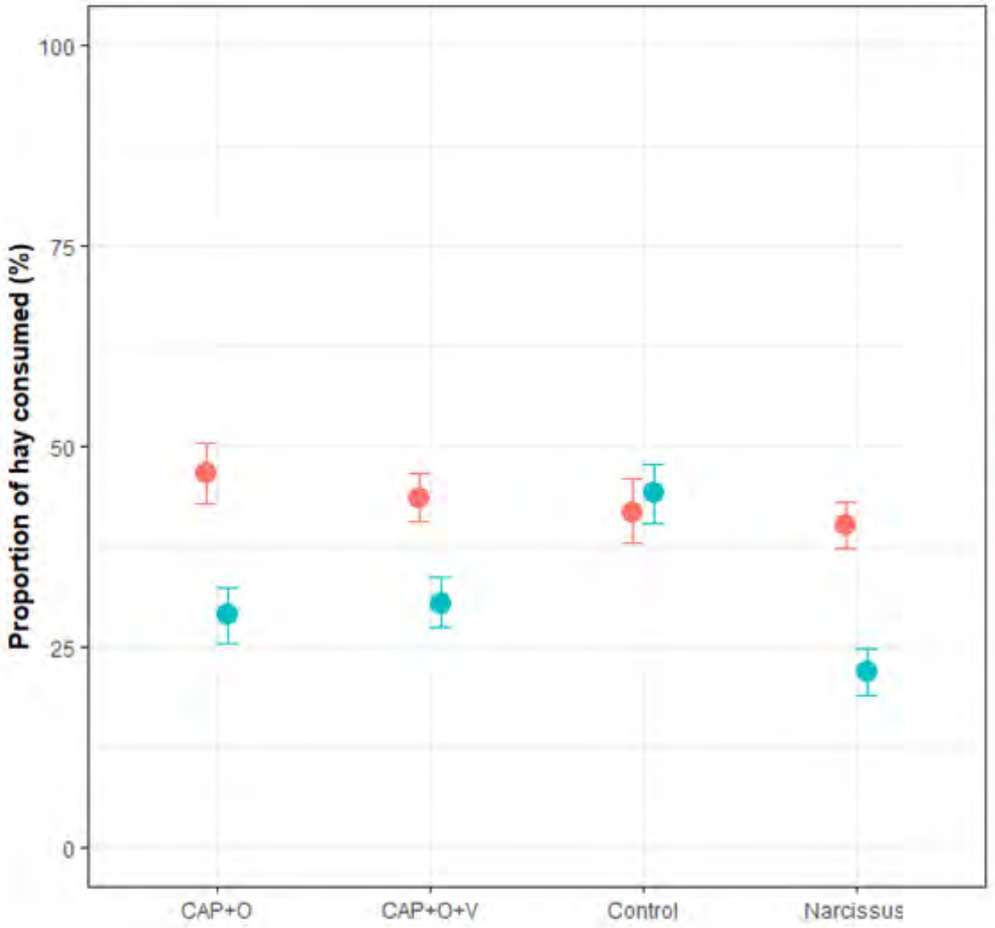
RESULTS

- Second experiment in captivity

Daffodil bulb extract + visual → 45.6%

Capsaicine + odour → 38.1%

Capsaicine + odour + visual → 30.3%



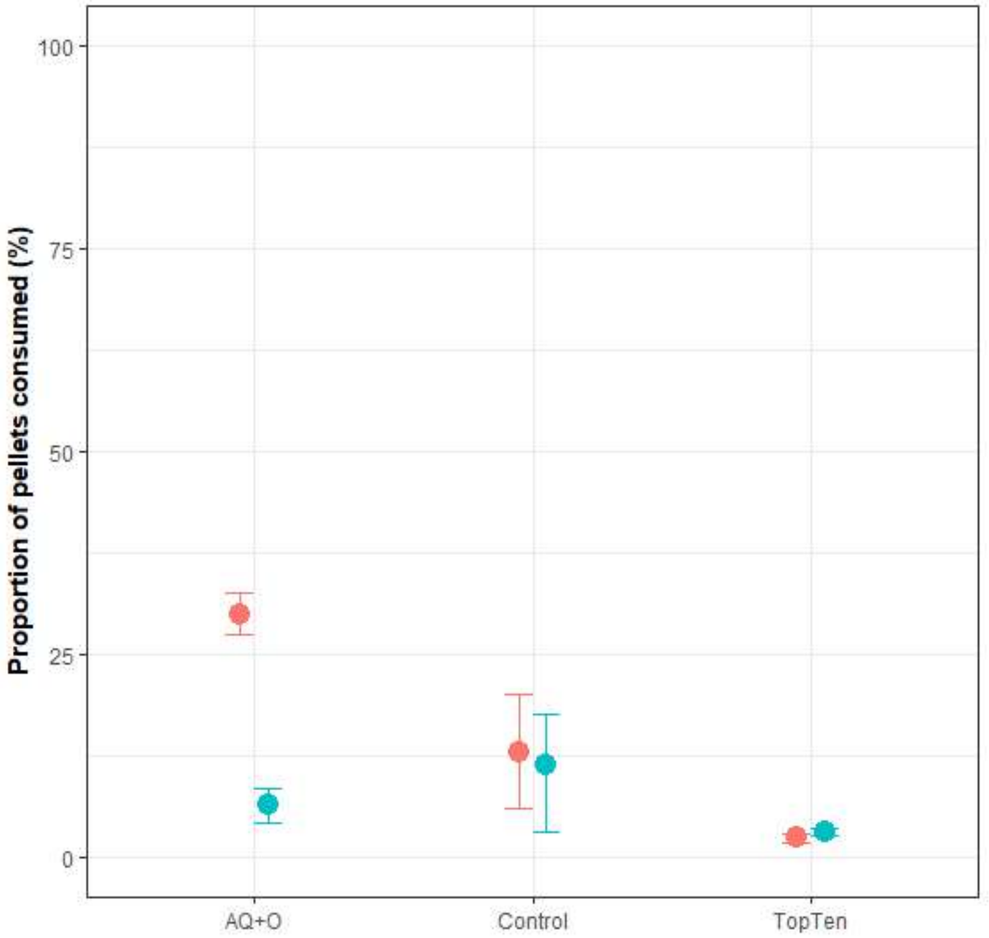
RESULTS

- Experiment in wild rabbits

Top Ten

Anthraquinone
+ odour + visual

79.3%



Take home messages…..

- Several aversive and repellent compounds have demonstrated promising potential
- Combining odour and visual cues can improve effectiveness and practical applicability
- Natural daffodil bulb extract has shown promising results
- Further research and field-based evaluations are required to validate these findings

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THANK YOU

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