COMBAR
combatting anthelmintic resistance in ruminants

KREAVET

Anthelmintic resistance in ruminants: challenges and solutions

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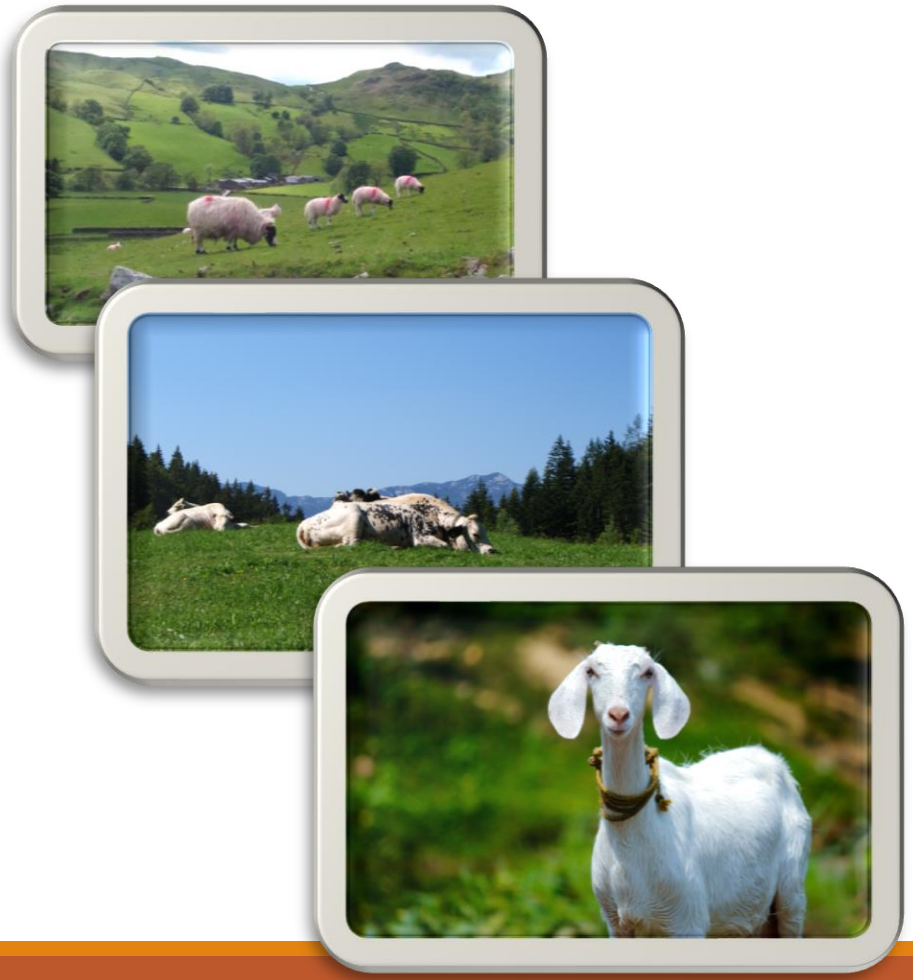
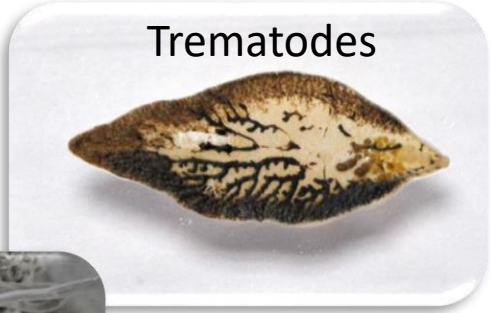
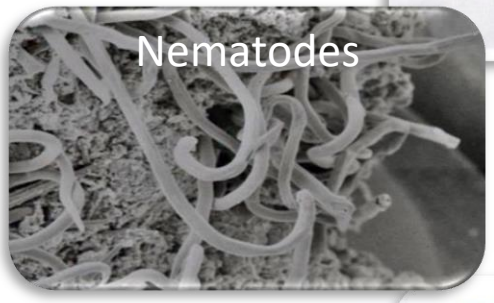
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

EAAP meeting Ghent, 26 August 2019

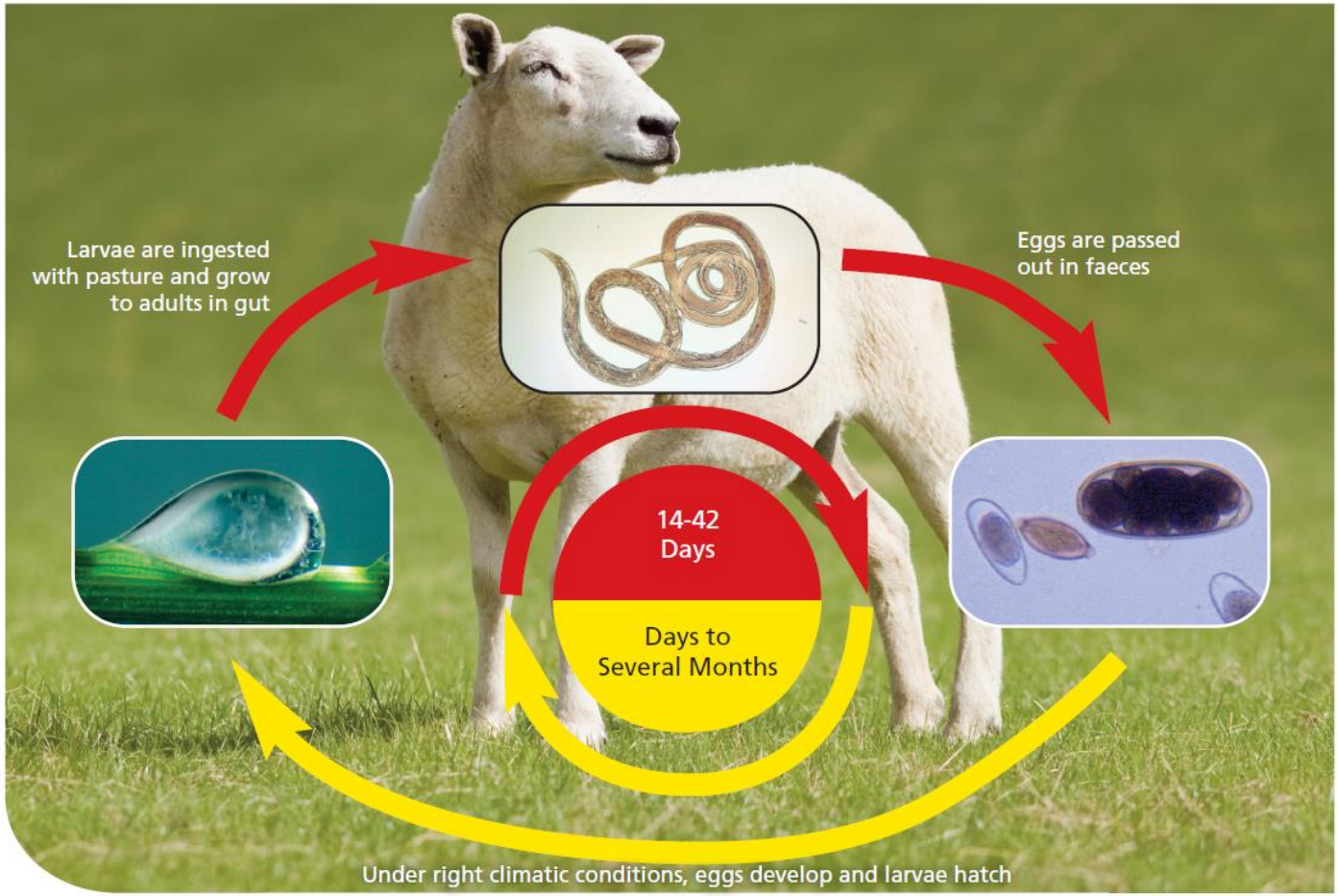
Helminths of grazing livestock







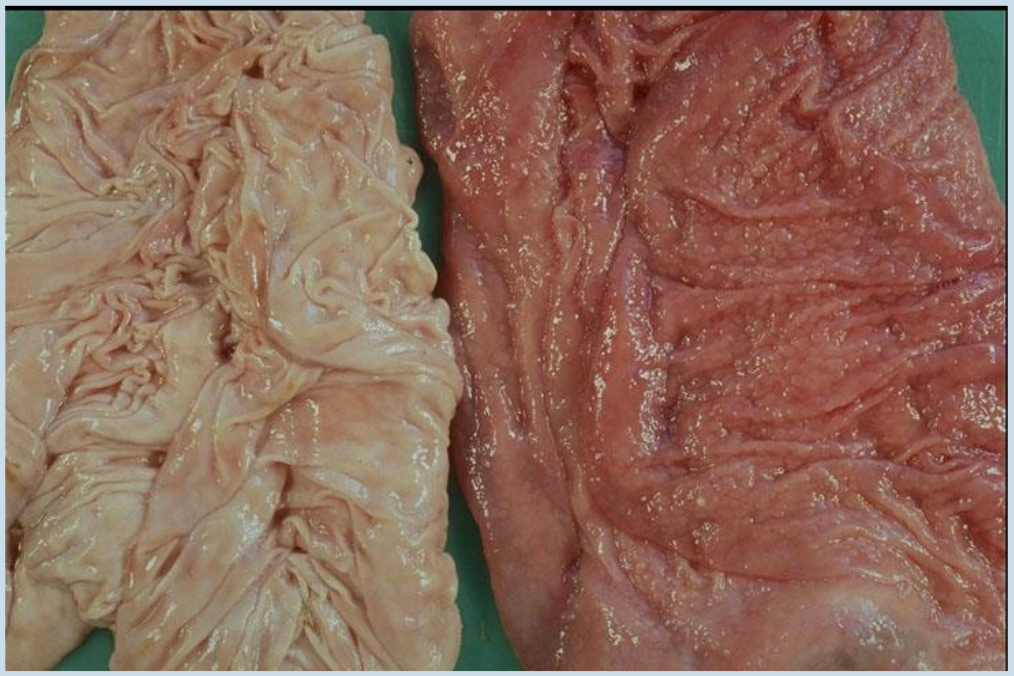
Life cycle


Larvae are ingested with pasture and grow to adults in gut
Eggs are passed out in faeces
14-42 Days
Days to Several Months
Under right climatic conditions, eggs develop and larvae hatch

Why control parasites of livestock?

Livestock

- Improved health
- Improved Welfare



Why control parasites of livestock?

Livestock

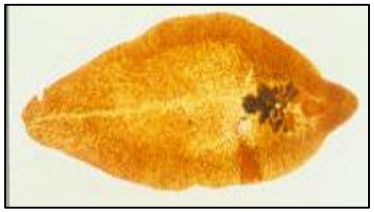
- Improved health
- Improved Welfare

People

- Ensure food security
- Safe, high quality food

ELISAs for production losses

Ostertagia – Fasciola - Dictyocaulus



0.7 kg/day

0.5 kg/day

Charlier et al., 2014. Trends Parasitol 30

Why control parasites of livestock?

Livestock

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People

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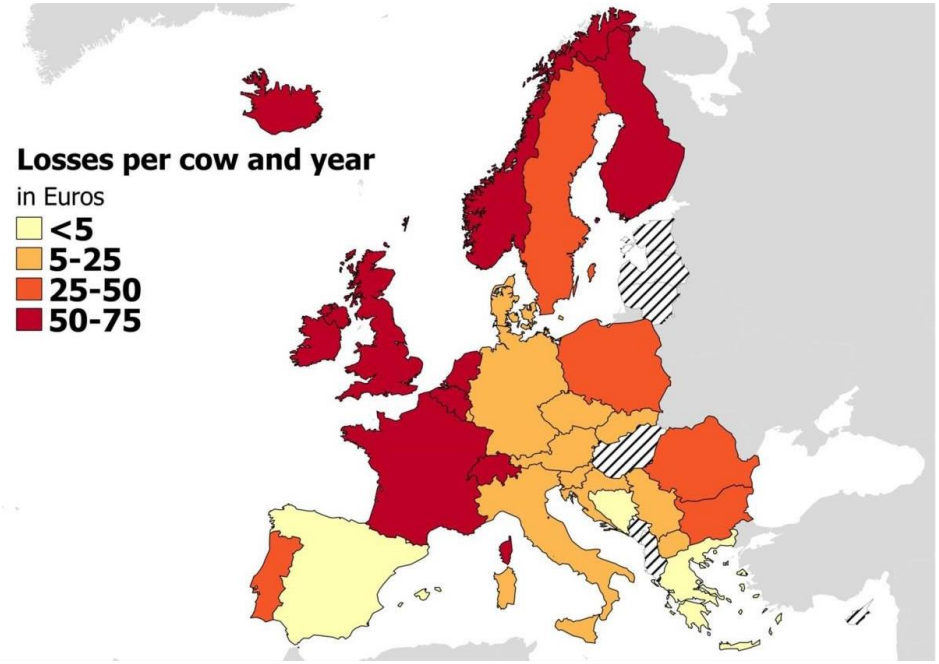
- Safe, high quality food

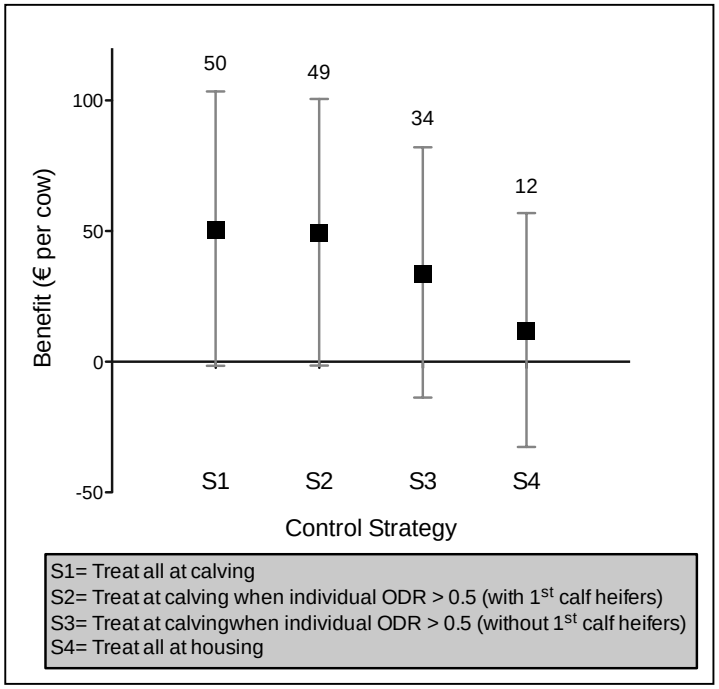
Profitability

- Improve productivity
- Support farming sector

Economic burden of parasitic roundworms on EU livestock industry



F. Mavrot, PhD dissertation University of Zürich, 2016



Charlier et al., 2012. J Dairy Sci 95

Why control parasites of livestock?

Livestock

People

and wellbeing

Profitability

food production

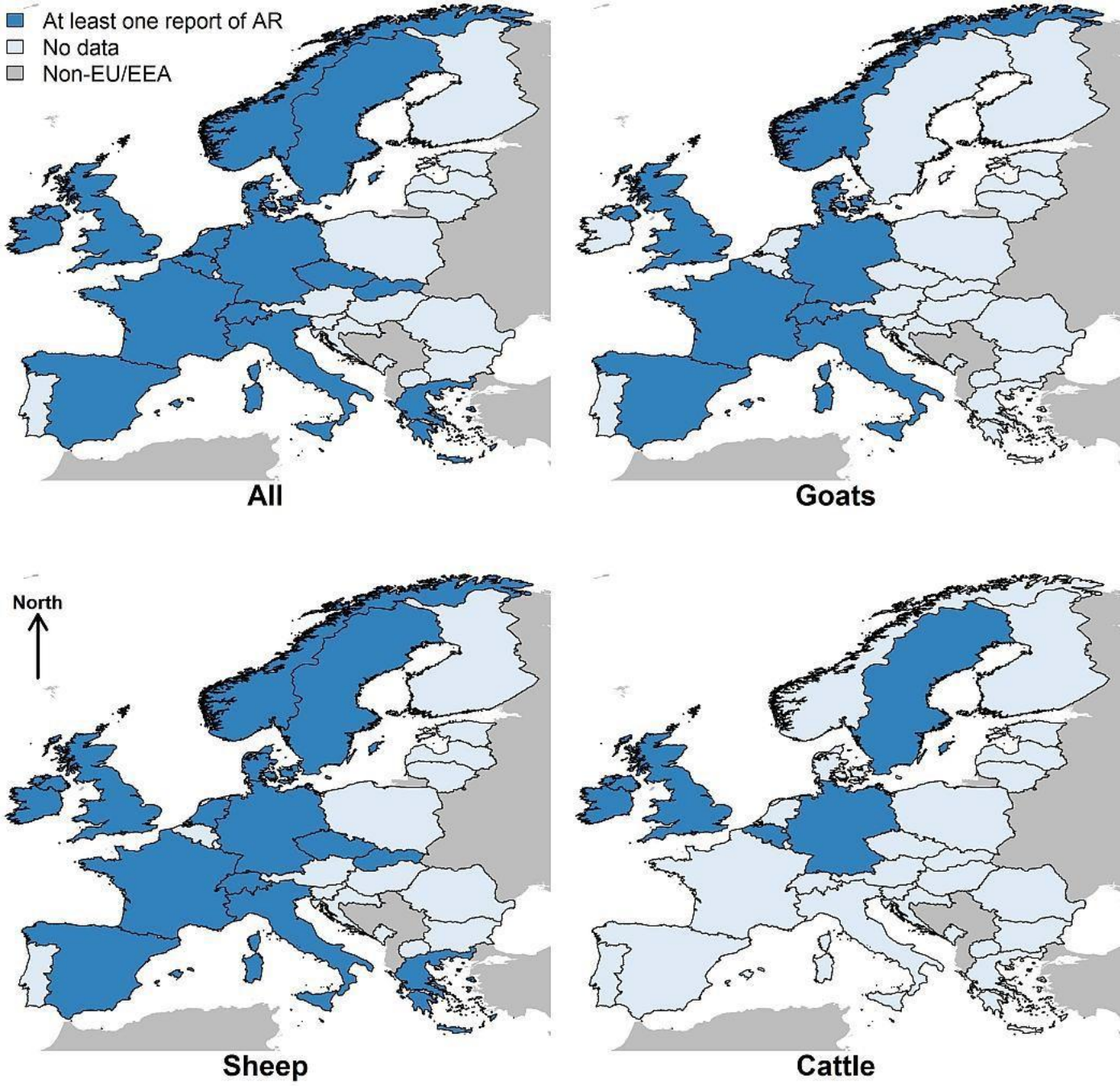
Environment

production

ALL AT RISK?

AR in Europe

(nematodes)



Rose et al., 2015. Vet Rec 176, 546

AR - species

Host	Species	Benzimidazoles	Levamisole	Macrocyclic lactones	Other
Cattle	*Cooperia spp.* *Haemonchus placei* *Ostertagia ostertagi* *Trichostrongylus axei* *Fasciola hepatica*	X X X X X	 X X	X X X	
Sheep & Goats	*Haemonchus contortus* *Teladorsagia spp.* *Trichostrongylus spp.* *Nematodirus spp.* *Fasciola hepatica*	X X X X X	X X X	X X X	Monepantel Monepantel Monepantel
Horses	Cyathostominae *Parascaris equorum*	X		 X	Pyrantel
Pigs	*Oesophagostomum spp.*	x	x	x	

Costs of AR

- Use of fully effective wormer vs. a non-fully effective wormer
  - LAMBS : a 10 % increase in mean daily live weight gain and 13 days earlier reaching slaughter weight (Geurden et al., 2014)
  - BEEF CALVES: increased weight gain by 5-18 kg over 3 month period = losses of AR ~ 45-50% (Canton et al., 2017)

Drivers of resistance?

Management factors

Frequent treatments
Under-dosing
Long term use of same anthelmintic class
Inappropriate timing of treatment
Poor storage/past use-by date
Lack of effective quarantine treatment

Parasite factors

Lack of *refugia*
Genes frequency at onset of treatment
Minimum generation time
Adult and larval longevity

Drug factors

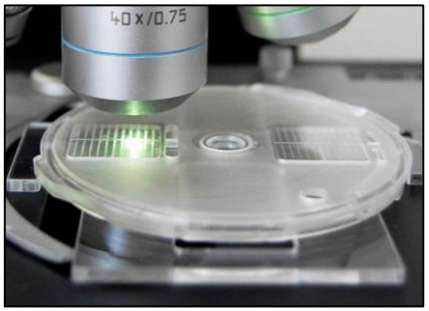
Delivery route
Quality

Falzon et al., 2014; Suarez & Cristel, 2014.

Improving diagnosis

- Faecal Egg Count Reduction Test (FECRT)
- Post Drench Efficacy Check (PDEC)
- Molecular tests for AR and species diversity

  => Database and maps of AR



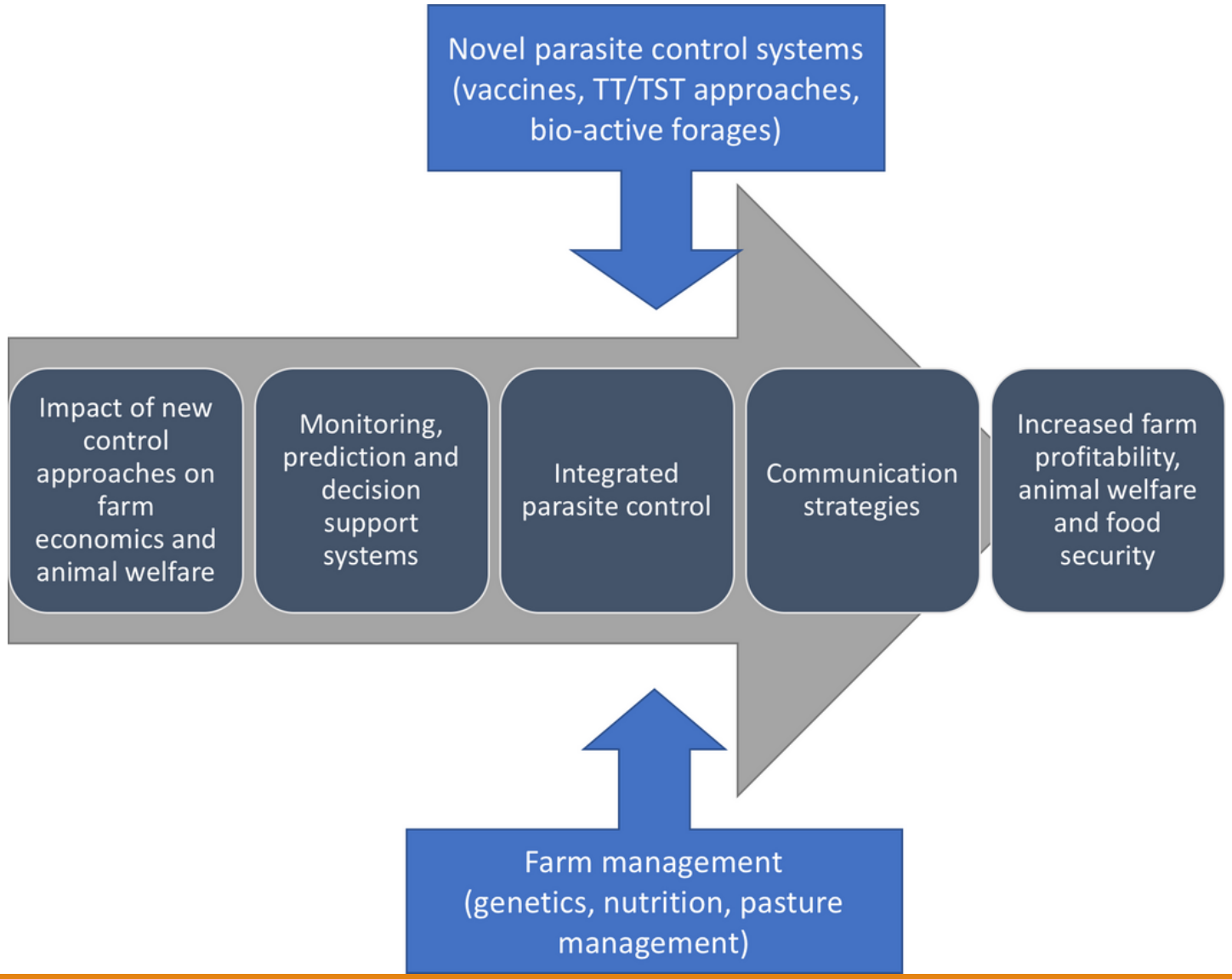
Preserving efficacy

- Targeted Treatments
  - Epidemiological knowledge
- Targeted Selective Treatments (individual animals)
  - Individual diagnostics / “precision livestock farming”
  - Random
- Pharmaco-Parasitology
- Maintaining pipeline of new anthelmintics
  - New mode of action

Alternative control options

- Parasite Vaccines
- Bio-active forages
- Nematode destroying fungi
- Breeding for resilience/resistance

Integrated parasite control



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