

Nutritional alternatives to worm control

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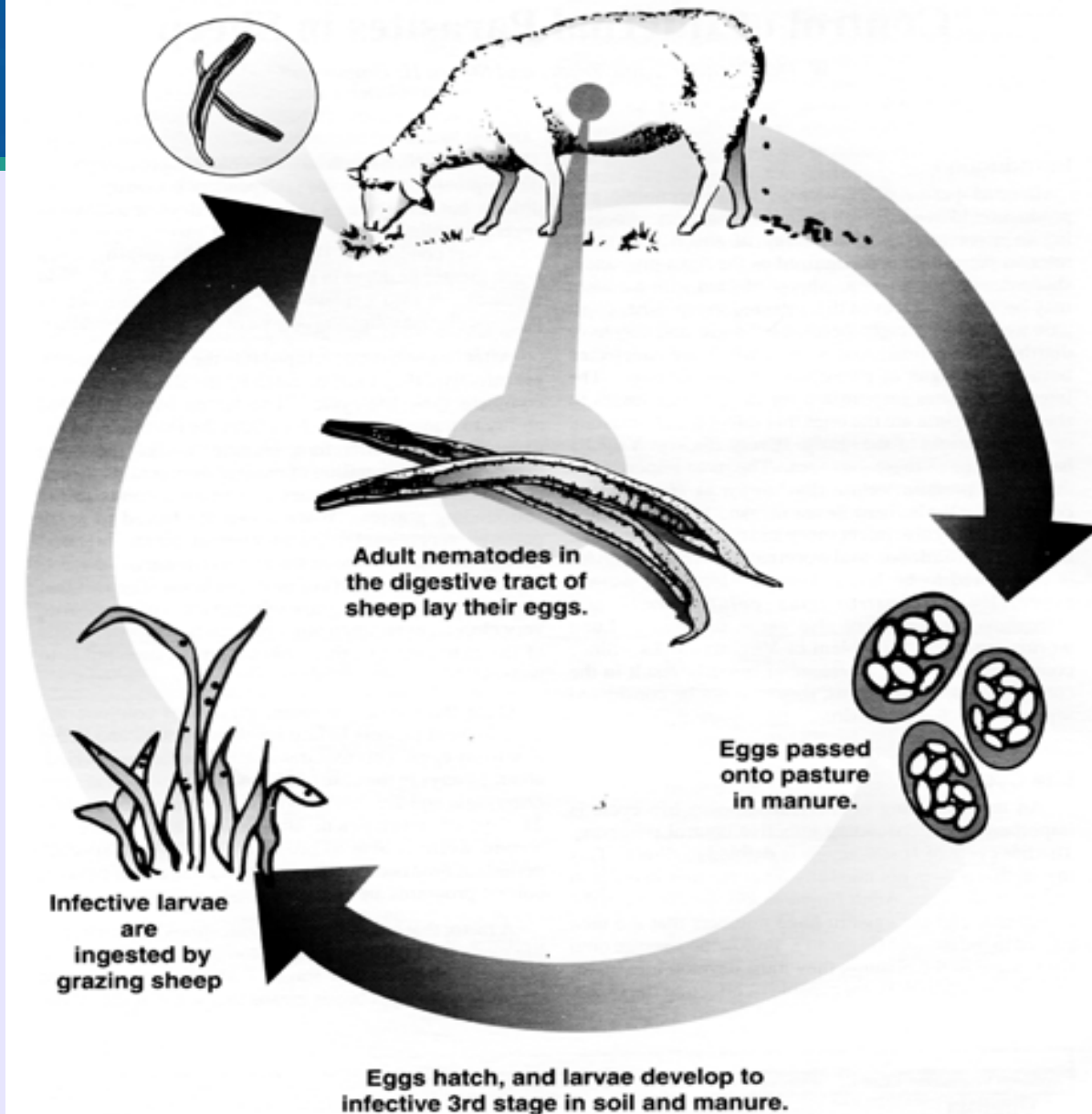
Animal Nutrition and Health Team

S  **ccess** through **Knowledge**

- Penalties of parasitism
- Protein supplementation
- Bioactive forages
- Current work
- Basket of options
- Summary

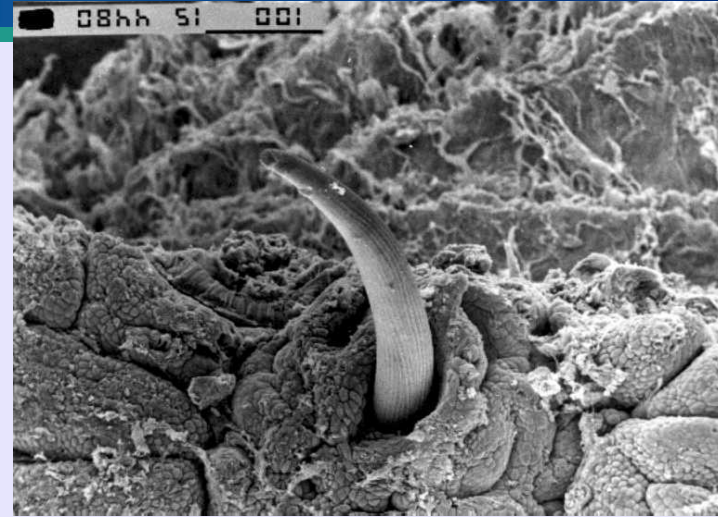
Gastrointestinal nematodes

- Roundworms
- Site of infection
 - abomasum
 - small intestine



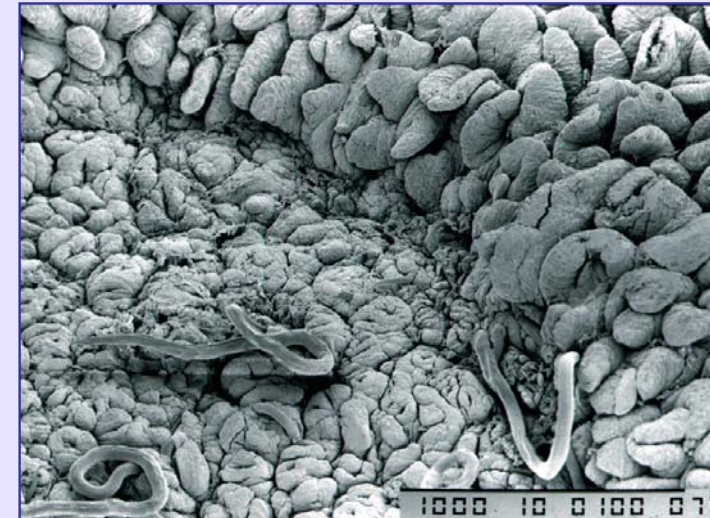
Parasites cost growth

- Worm infections reduce performance
 - reduced food intake
 - impaired food digestion
 - protein leakage, gut damage



Disrupted stomach function

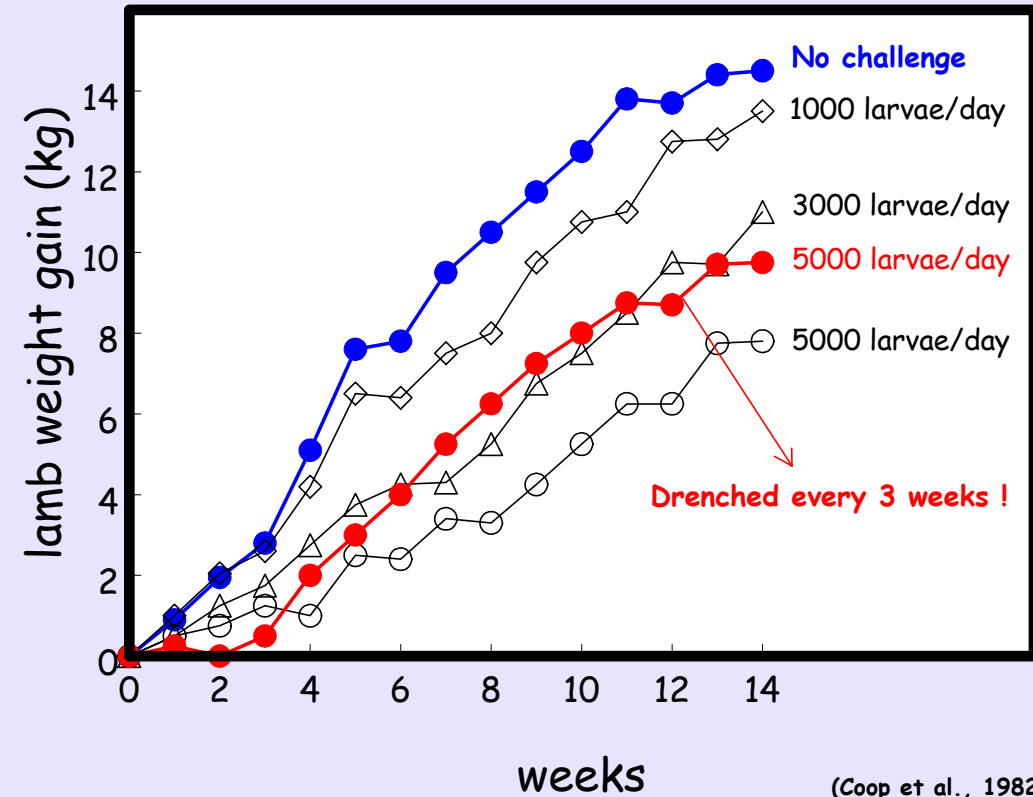
- **Damaged tissues need repair: less nutrients left for growth**



Gut damage in small intestine

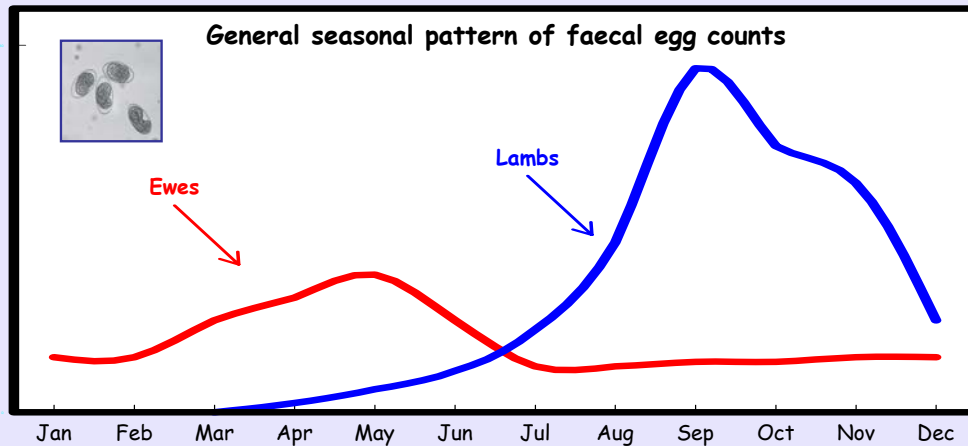
Parasites cost growth

- Worm intake reduces growth by up to 50%
- Regular drenching improves growth
- Drenched lambs still grow ~30% **less** than low challenged ones



Sources of infection

- Worm larvae: where do they come from?
 - over-wintered larvae
 - eggs from wormy ewes (spring rise)
 - eggs from wormy lambs (autumn rise)



Typical dirty pasture: high tussock density

- Opportunities for nutritional worm control

Eggs from periparturient ewes

- Lambing ewes
 - nutritional stress: protein is often scarce
 - reduced immunity: spring rise in egg output
 - often main source of infection for lambs
- Not all ewes are equally infective
 - single vs multiple rearing ewes
 - well-conditioned vs thin ewes
 - breed differences
- **Thin, multiple-rearing ewes are the major contributors to pasture infectivity**

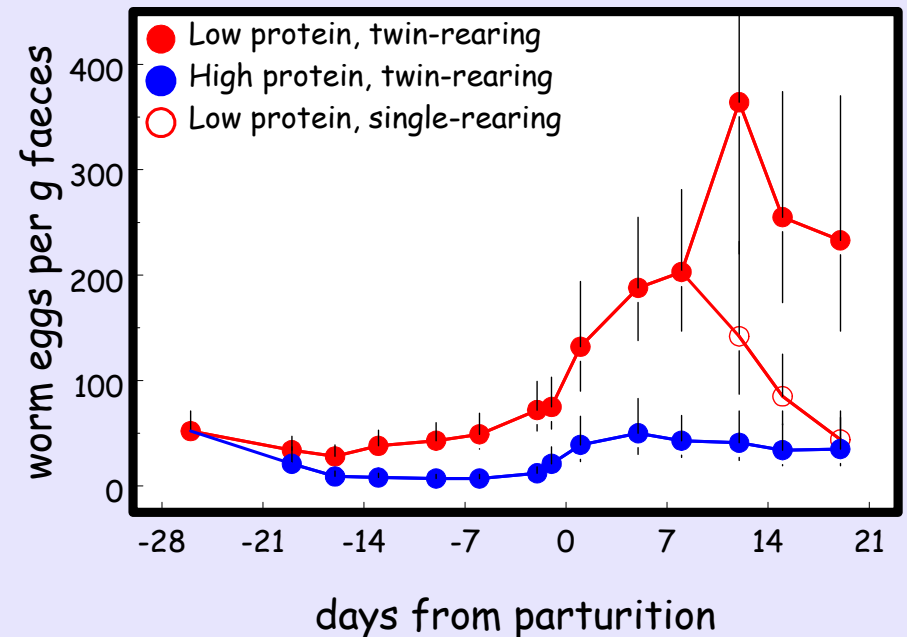
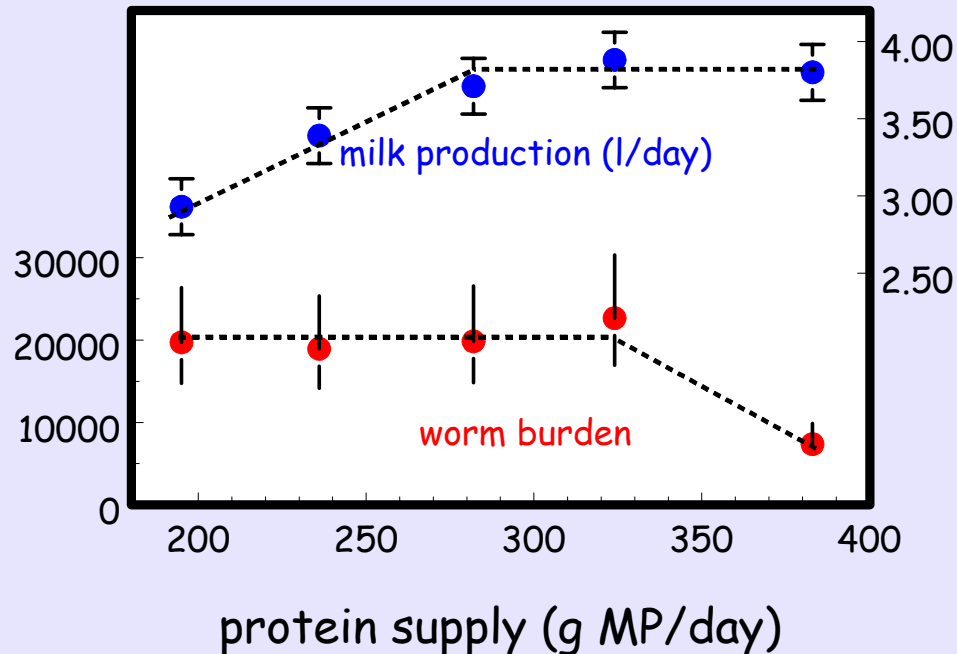


Worm control through protein supplementation

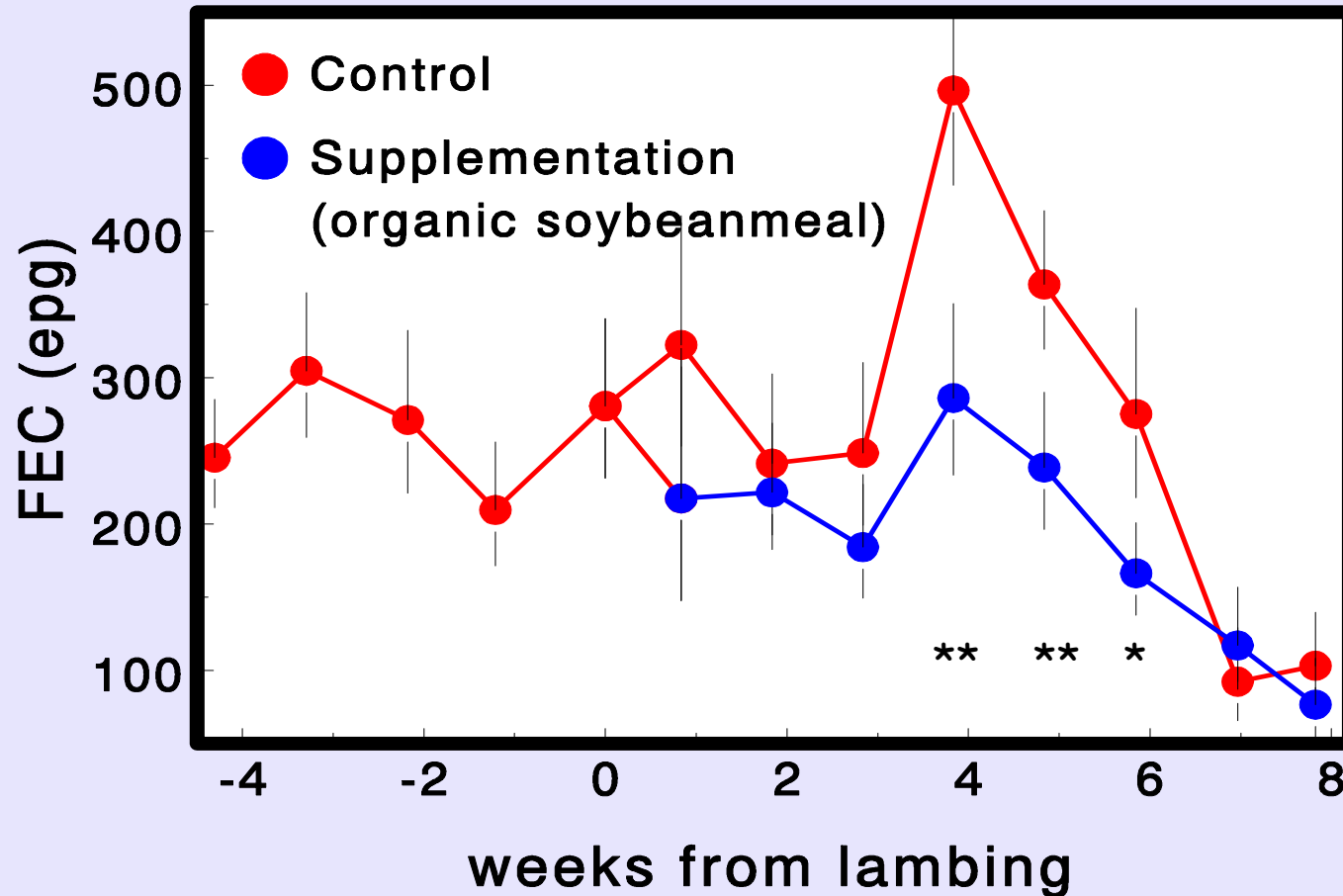
Target: periparturient ewes

Indoors studies: individually penned ewes

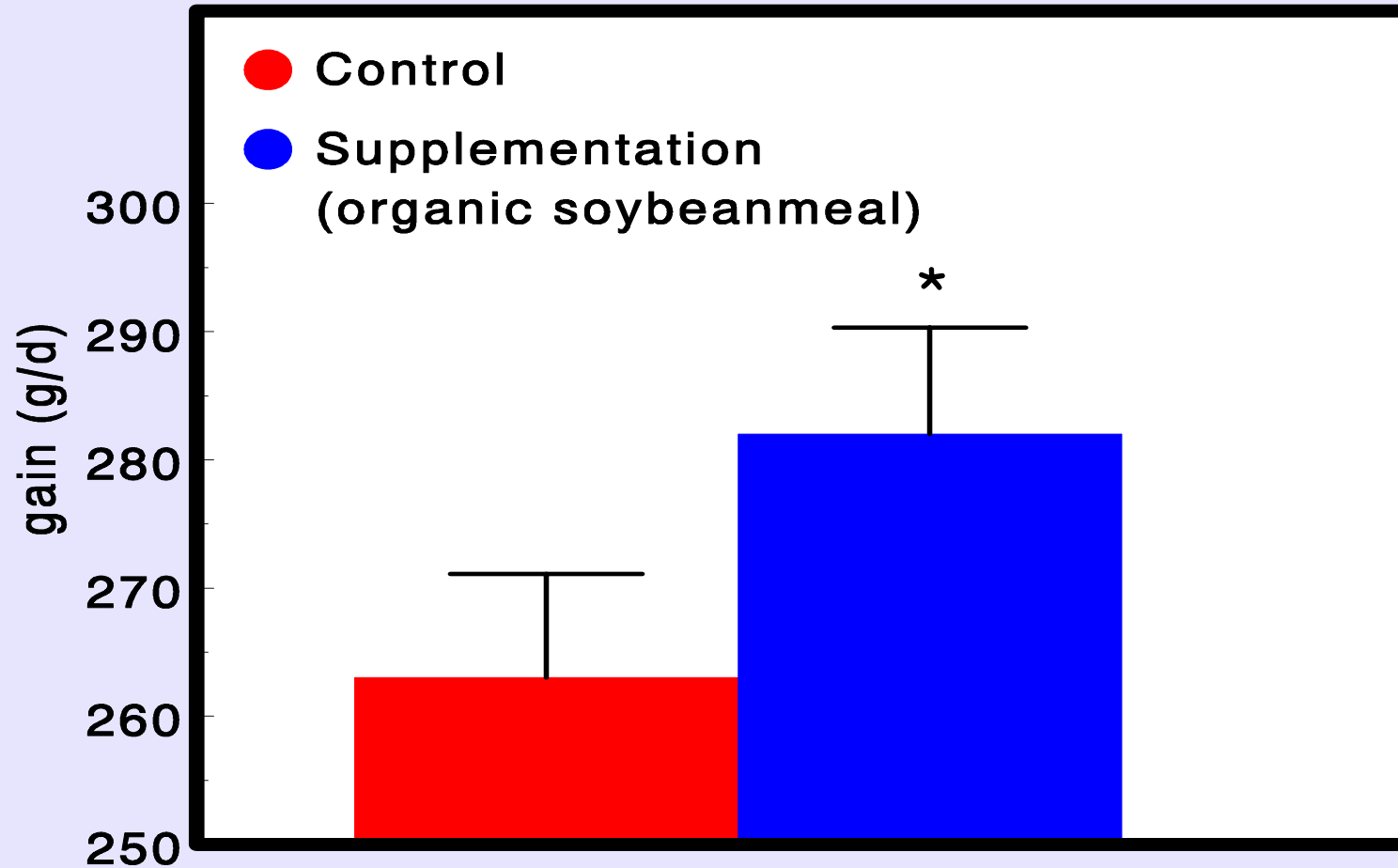
- Protein supplementation (e.g. by-pass soya) to twin-rearing ewes:
 - fewer worms, reduced egg output and more milk
 - expect rapid effects



Outdoors studies: naturally infected, organic ewes



Outdoors studies: lamb weights



Worm control through bioactive forages

Target: periparturient ewes and growing lambs

Bioactive forages: plants with antiparasitic properties



Chicory



Sainfoin



Lotus

Chicory (*Chicorium intybus*, *puna*)

- highly palatable and good nutritional value
- readily grown in Scotland
- anti-parasitic properties



*Experimental plots near
Bush Estate*



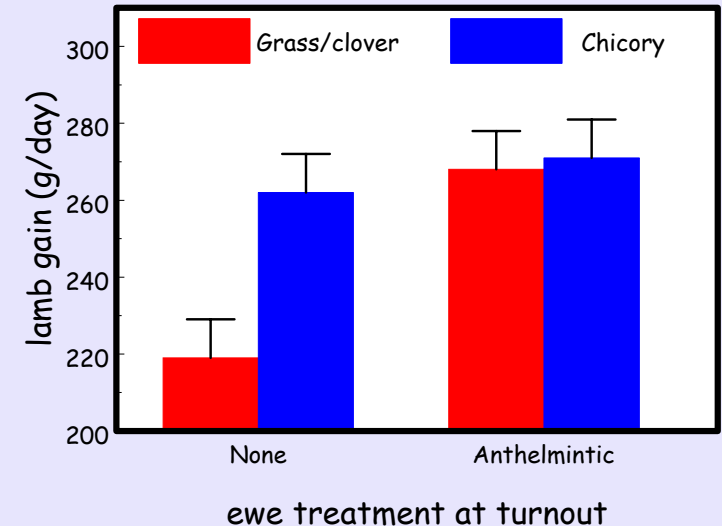
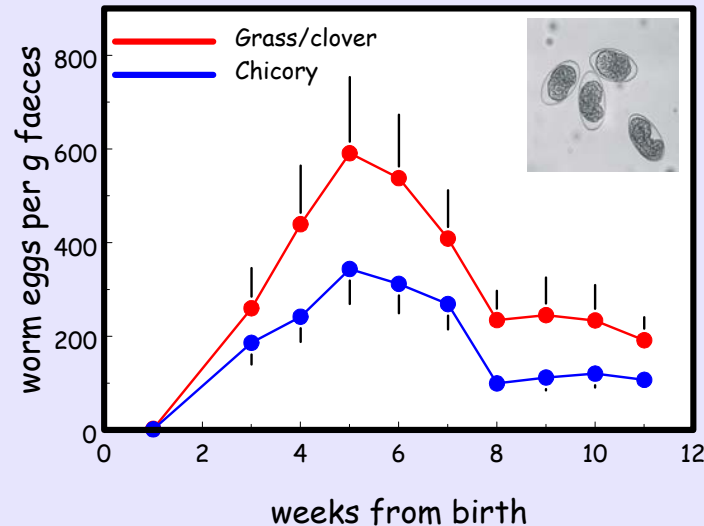
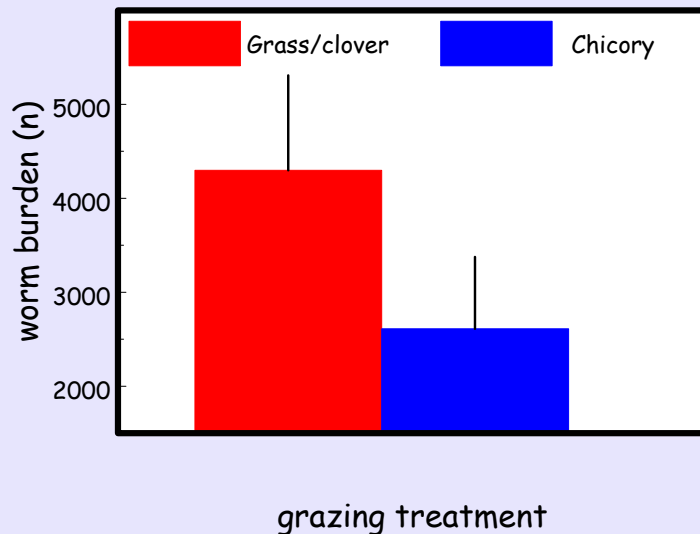
*Structure reduces
worm intake*



*Ewe and lamb grazing
on chicory*

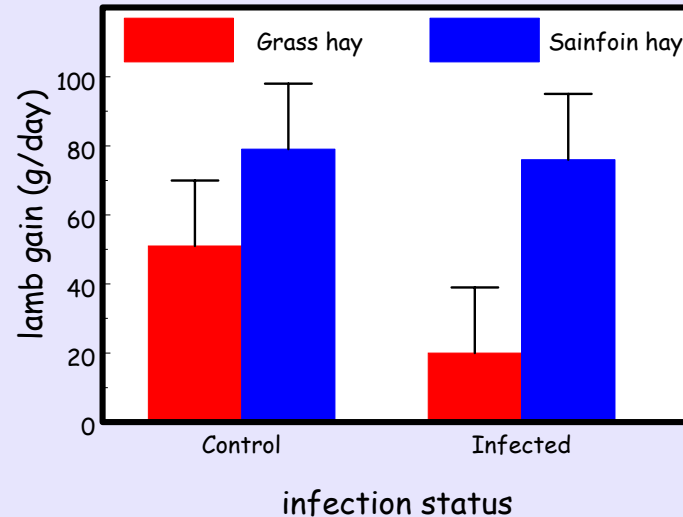
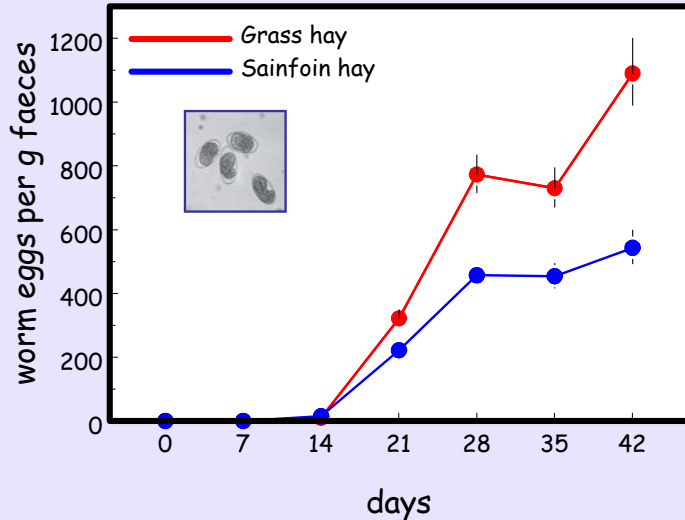
Lambs grazing on chicory:

- reduced worm burdens and reduced egg output
- better growth than on grass
- ewe drench at turn out may not be needed



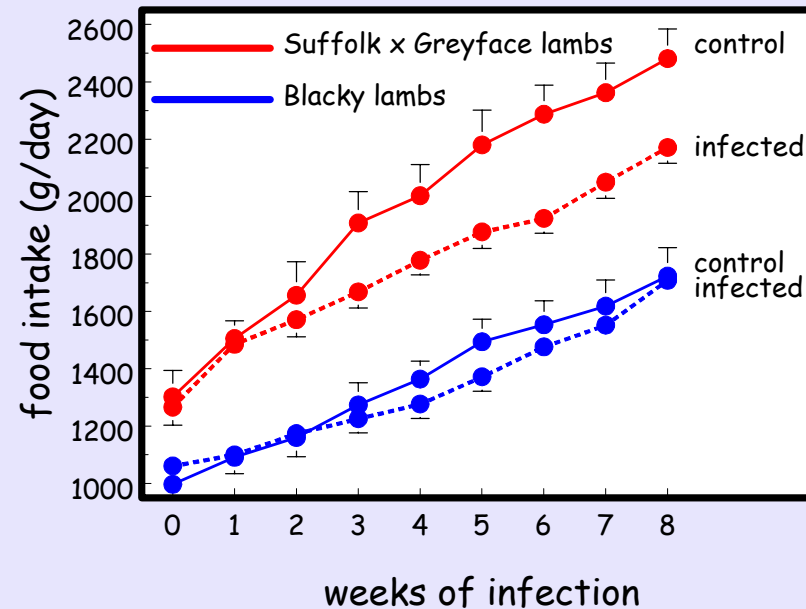
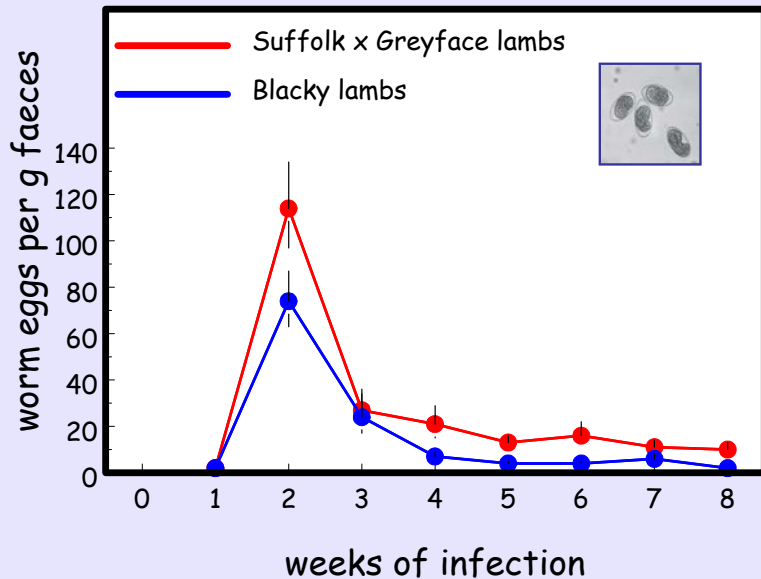
Sainfoin

- may be used in conserved form for Scottish climate
- feeding sainfoin hay increased resilience and reduced faecal egg counts



Current work

- Protein supplementation + Chicory
- Worm infection and growth potential



- Non-chemical worm control
 - protein supplementation
 - bioactive forage
 - breeding for resistance
 - vaccination
 - biological control



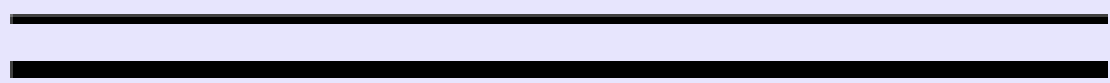
- **Worm management: zero FEC are not necessarily required!**

Alternative methods for parasite control

- Reduction of pasture infectivity
- Nutritional worm management strategies
 - Protein supplementation and grazing on chicory
 - Fewer worms, reduced worm egg output and increased lamb weight gain
- Combination of strategies to achieve satisfactory worm management



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land-based industries
for over a century



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Success through **Knowledge**