UNIVERSITY OF LIVERPOOL

Endoparasites of horses and donkeys in tropical regions

Chris Proudman

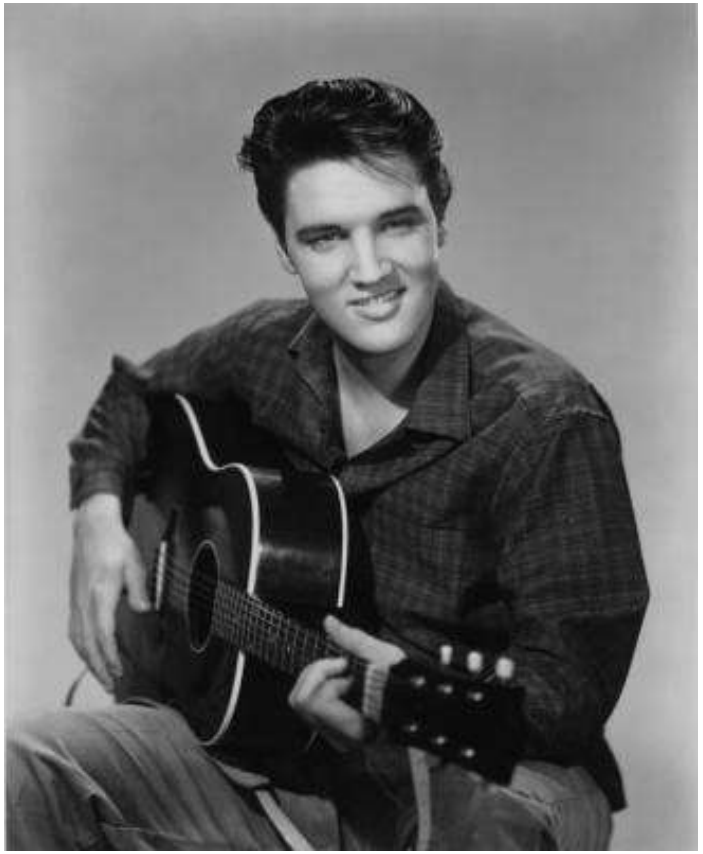
Situation in UK

Overcrowding

Resistance

Colic

The dangers of extrapolation



- When Elvis Presley died in 1977, there were 200 Elvis tribute bands

In 2007 there are approximately 200,000

- If this trend continues, by 2060 one in four people will be an Elvis impersonator

  From RSS publication “Significance”

An external perspective

Diseases and pathogens of equids with highest **impact** on the poor in Africa:

1. Trypanosomes
2. Helminths
3. Wounds & injuries

Perry, B.D., Randolph, R.F., McDermott, J.J., Sones, K.R., Thornton, P.K., 2002. Investing in animal health research to alleviate poverty. International Livestock Research Institute (ILRI), Nairobi, Kenya, 148 pp.

What do the owners think?

Participatory health evaluation in ethiopia – Andy Stringer / Gina Pinchbeck / Rob Christley:

- "Worms" not in the top 5 donkey conditions of concern to owners
- Poor recognition of signs of heavy intestinal parasite burden

The Gambia

Presenting signs of 538 horses and donkeys at GHDT clinics in 200%:

Colic or diarrhoea	8%
Poor condition	18%
Weakness	41%

Albendazole administered to 61% of cases

Ethiopia

Coprological examination of ~3000 donkeys:

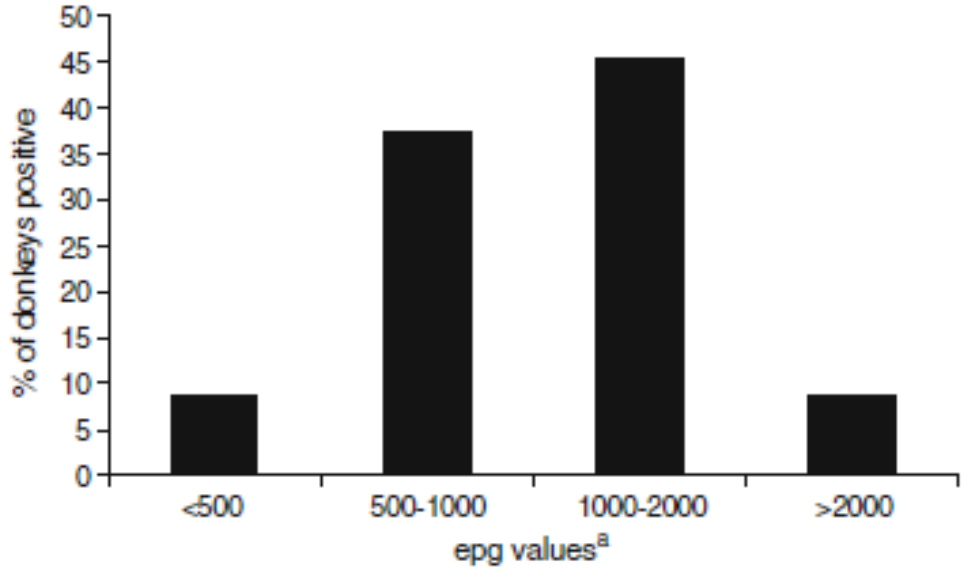
Parasite	Prevalence
Strongyle spp.	99%
Fasciola	80%
Parascaris	51%
Tapeworm	8%

Irrespective of age!

Getachew, Traford, Feseha, Reid (2009) Gastrointestinal parasites of working donkeys in Ethiopia. *Tropical Animal Health and Production.*

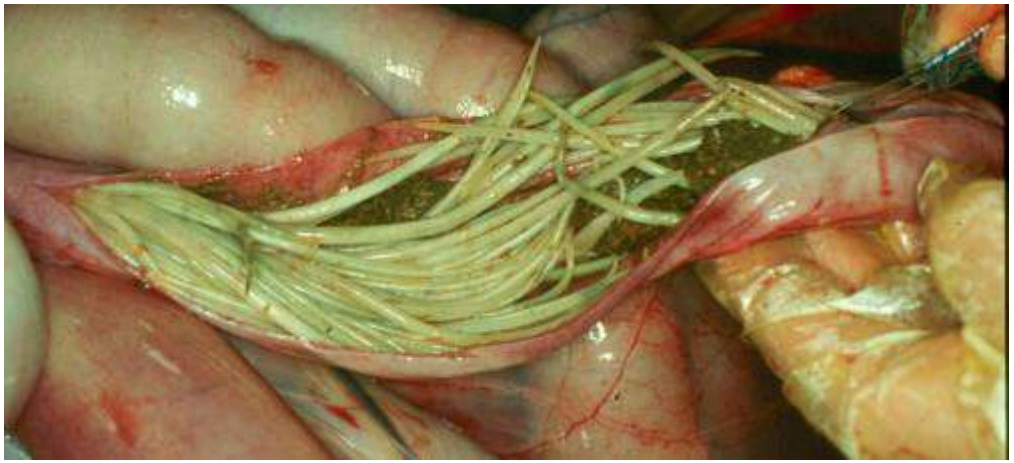
Ethiopia

55% of donkeys had FEC >1000epg:



Getachew, Traford, Feseha, Reid (2009) Gastrointestinal parasites of working donkeys in Ethiopia. *Tropical Animal Health and Production.*

Which parasites?



Europe & N. America: reliance on anthelmintics

Sustainable solutions

Options for worm control in tropical regions

Practical, affordable, available, appropriate.

1. Faecal removal
2. Strategic use of anthelmintics
3. Combination of 1 & 2

Krecek, R.C., Starkey, P.H., Joubert, A.B.D., 1994. Animal traction in South Africa: research priorities in veterinary science. J. S. Afr. Vet. Assoc. 65, 150–153.

Comparison of strategies

Mean FEC of 24 working donkeys in South Africa

	Control	Fec removal	moxi	Fec rem + moxi
Oct	842	681	548	550
Dec	869	883	936	444
Feb	1097	1005	790	1211
Apr	680	633	686	811
Jun	1005	766	6	5
Aug	1636	758	376	333
Oct	1186	1063	426	333
Dec	1341	1225	656	427

Moxi

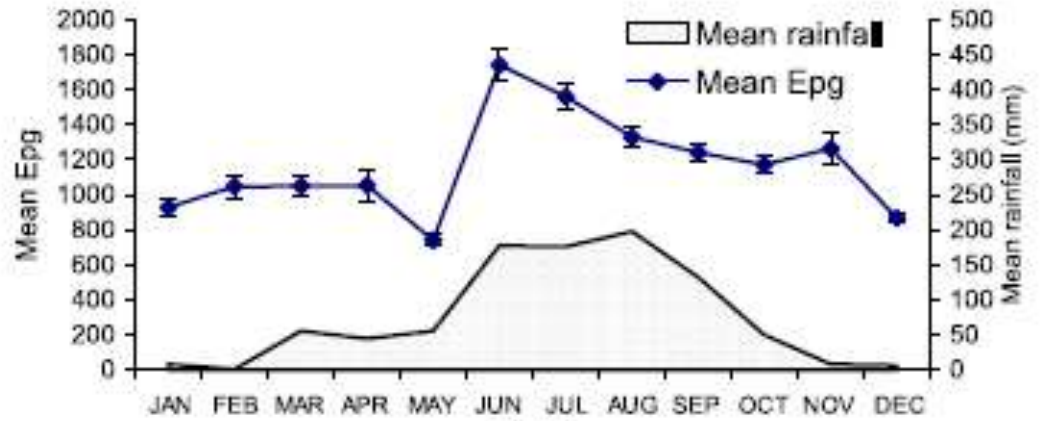
Matthee, S., Krecek, R.C., Milne, S., Boshoff, M., Guthrie, A.J., 2002a. Impact of management interventions on helminth levels, and body and blood measurements in working donkeys in South Africa. Vet. Parasitol. 107, 103–113.

S. Africa study cont.

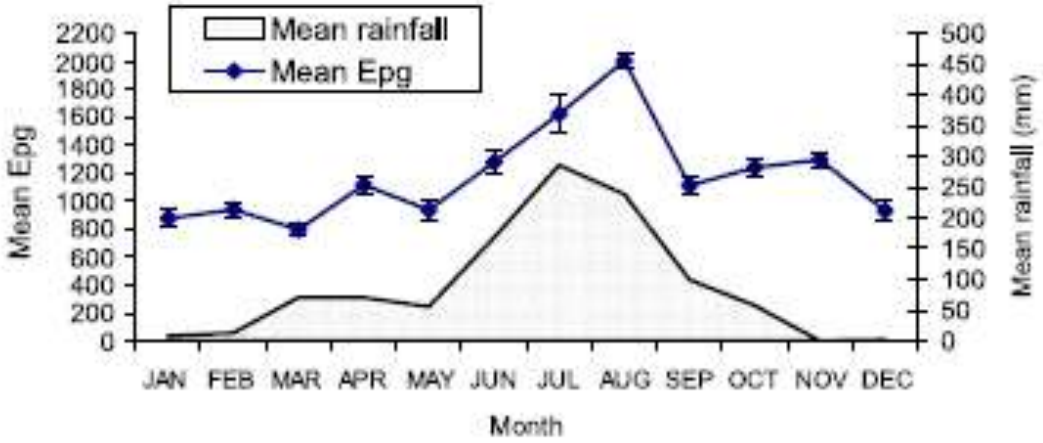
- Moxidectin treatment resulted in:
  - Improved **weight**
  - Improved **condition score**
  - Higher **PCV**
  - Higher **Hb**
- Monthly faecal removal demonstrated no benefit – too infrequent?
- Value of faeces as fuel or fertiliser
- Pre-Winter moxidectin treatment reduced re-infection rates (unfavourable environmental conditions of Winter)

Matthee, S., Krecek, R.C., Milne, S., Boshoff, M., Guthrie, A.J., 2002a. Impact of management interventions on helminth levels, and body and blood measurements in working donkeys in South Africa. Vet. Parasitol. 107, 103–113.

Seasonality - Ethiopia



Ada region



Akaki region

Getachew, Feseha, Trawford & Reid (2008) A survey of seasonal patterns in strongyle faecal worm egg counts of working equids of the central midlands and lowlands, Ethiopia. Tropical Animal Health & Production, **40**, 637-642.

Seasonality - Ethiopia

Using seasonality for worm control:

- **Strategic treatment at end of dry season**
  - pasture burden is lowest
  - Prolonged action of moxidectin will prevent egg production during high-risk wet season
  - Animal resistance to infection low due to decreased nutrition and increased workload in dry season

Getachew, Feseha, Trawford & Reid (2008) A survey of seasonal patterns in strongyle faecal worm egg counts of working equids of the central midlands and lowlands, Ethiopia. Tropical Animal Health & Production, **40**, 637-642.

Does it work? Ethiopia

Questionnaire study of regions with DS clinics vs. those without:

Areas with clinics:

- Healthier donkeys
  - Higher CS
  - Fewer harness sores
  - Longer ave. working life
  - Less colic
  - Less sudden death
- Wealthier owners
  - Ability to save
  - Less worried about donkey health
  - More money to spend on goods and services

Curran, Feseha, Smith (2005) Impact of access to animal health services on donkey health and livelihoods in Ethiopia. *Trop. An. Health Prod.* **37, 47-65.**

Effect of an anthelmintic programme for working equids in Morocco: a randomised, double-blind, trial.

Randomised: no selection bias
Double-blind: neither owners nor investigators were aware of allocations

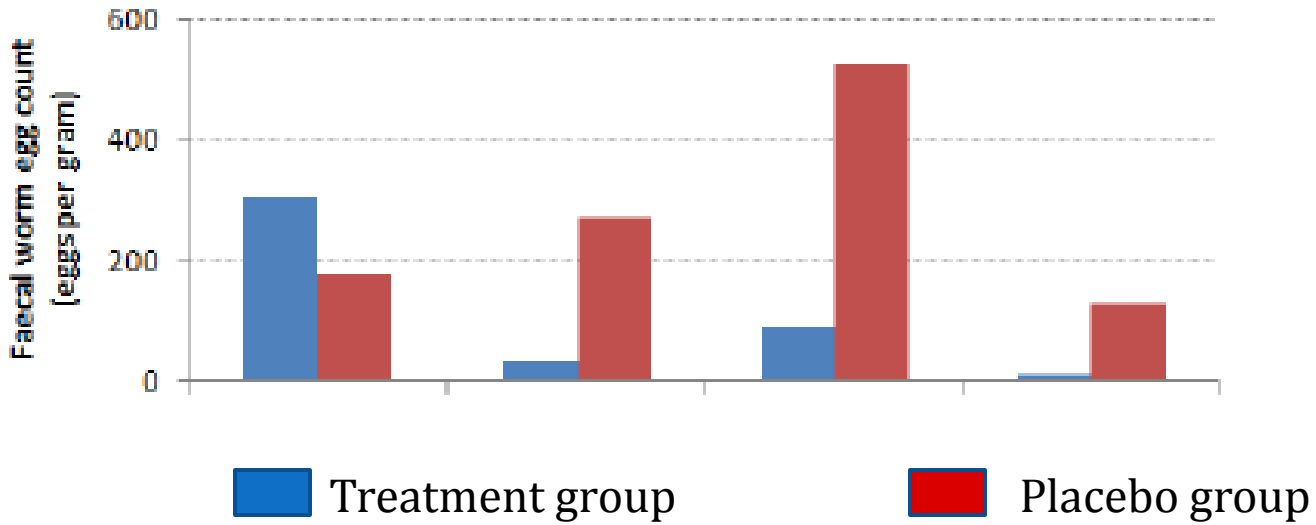
Highest standard of clinical evidence!

Study design:

- 238 equids recruited to study, identified and animal health q'aire administered
- Treatment or placebo administered x3
- Weight, CS, FEC and health q'aire repeated 3 times post-treatment

Crane, Khallaaayoune, Christley, Scantlebury & Faoud (2008) The effect of an anthelmintic programme for working equids in Morocco. Proc 9th Intl Coloc Res Symposium, Liverpool.

Does it work? Morocco

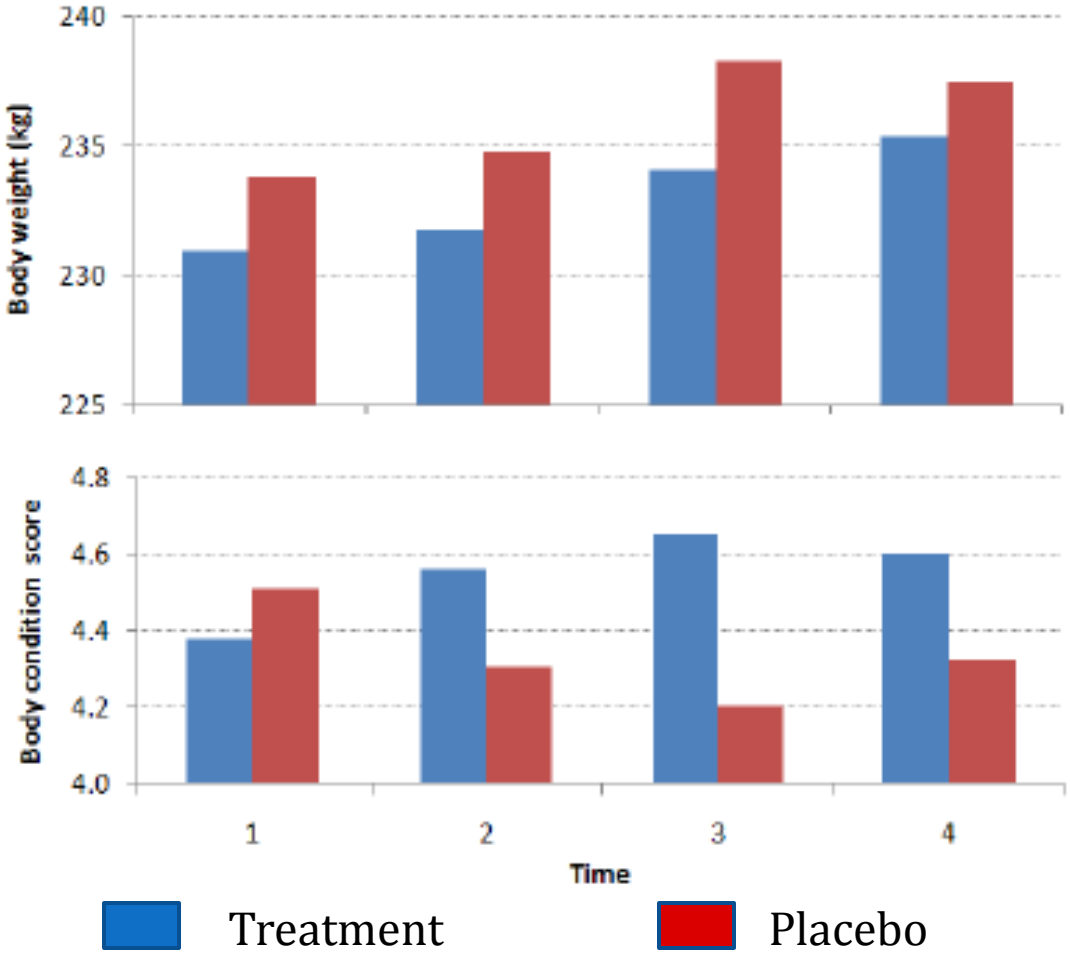


Treatment group:

- Owners more likely to report improved general health
- More likely to report improved work ability

Crane, Khallaaayoune, Christley, Scantlebury & Faoud (2008) The effect of an anthelmintic programme for working equids in Morocco. Proc 9th Intl Coloc Res Symposium, Liverpool.

Does it work? Morocco



Not significant

Significant

Crane, Khallaaayoune, Christley, Scantlebury & Faoud (2008) The effect of an anthelmintic programme for working equids in Morocco. Proc 9th Intl Coloc Res Symposium, Liverpool.

Further consideration?

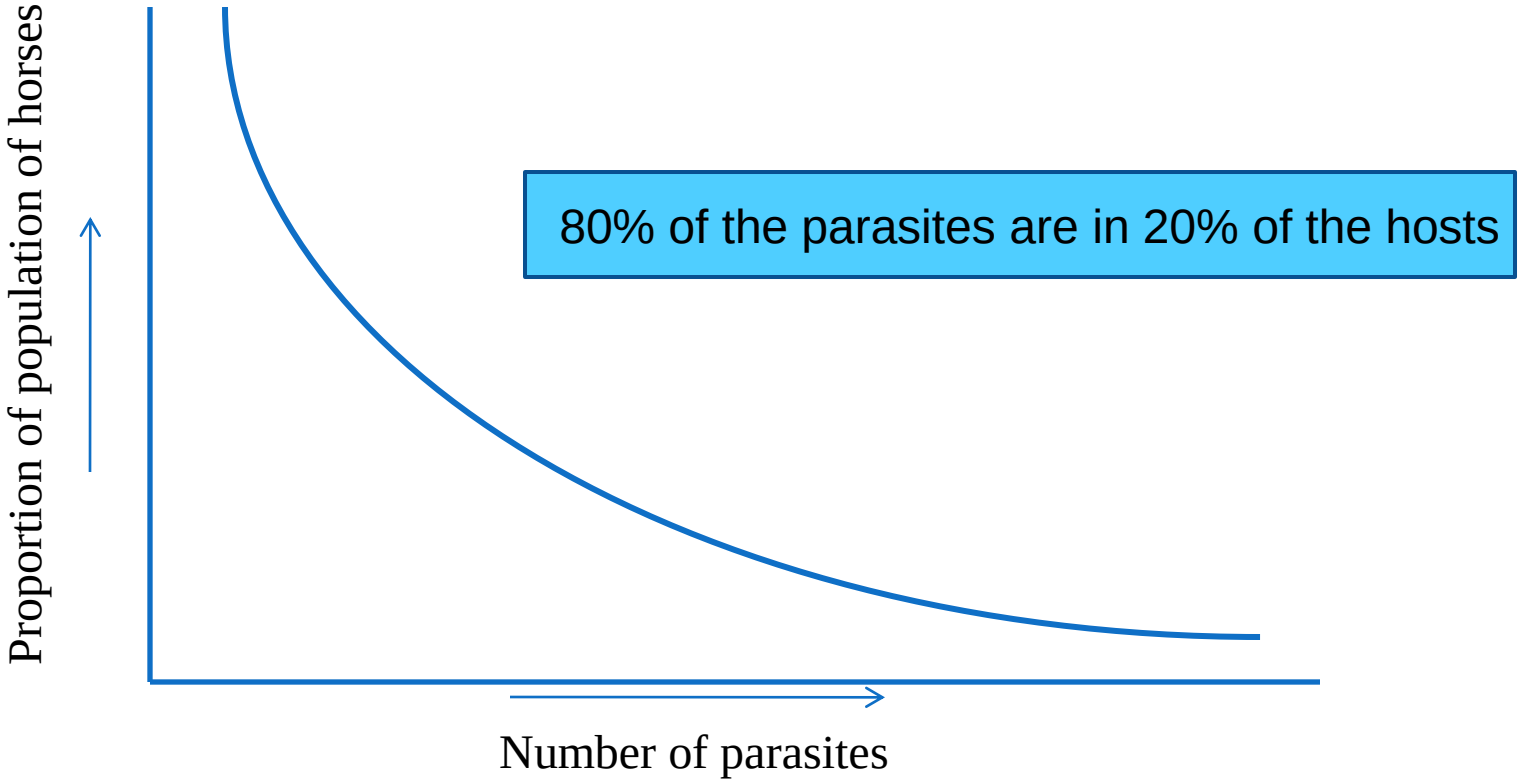
Faeces collection

- Excellent method of preventing transmission
- Economic value of faeces for fuel / fertilizer / barter.

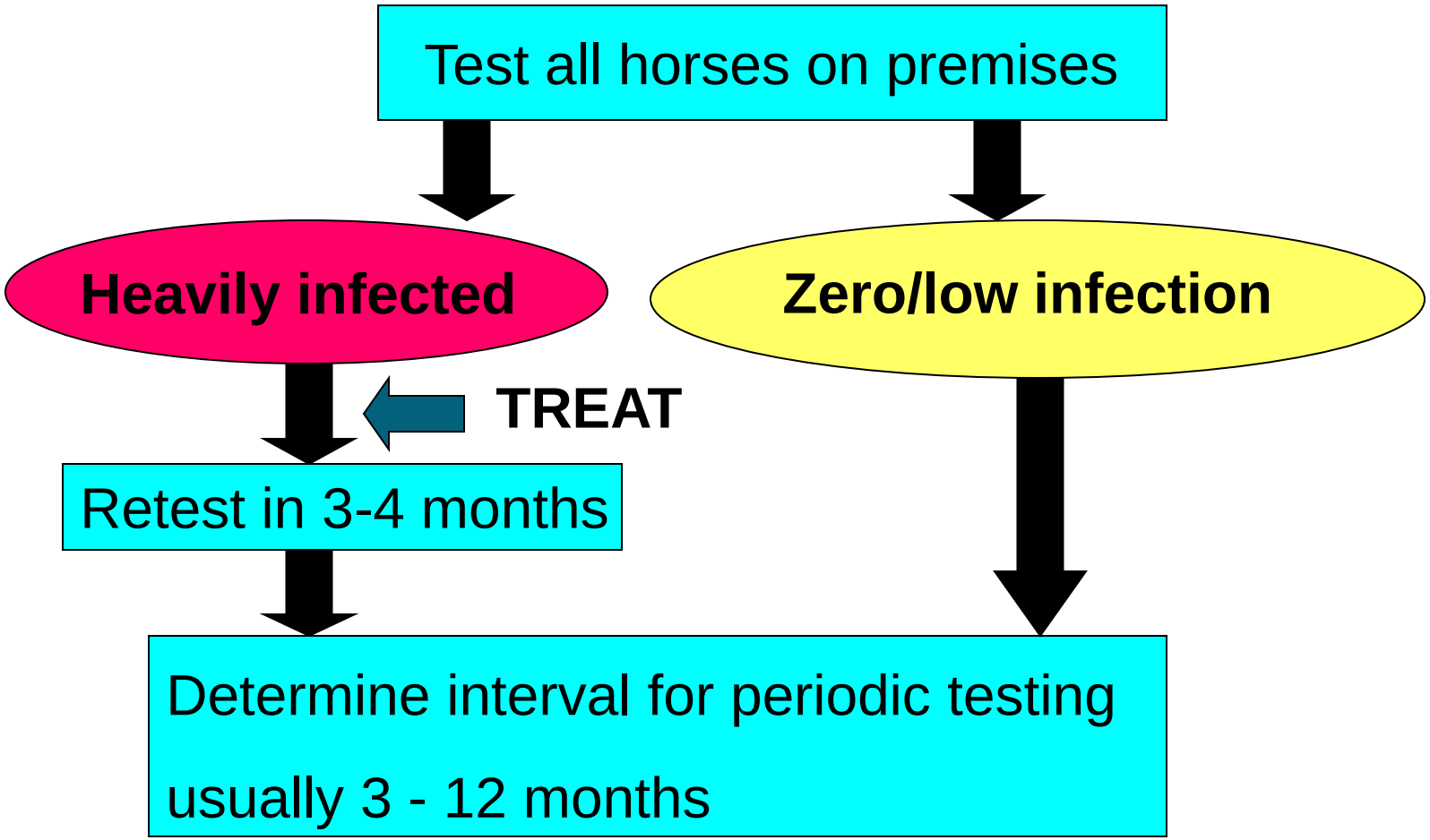
Targeted treatment

Targeted use of anthelmintic drugs

- Cost effective
- Recognises parasite distribution in host



Targeted drug treatment



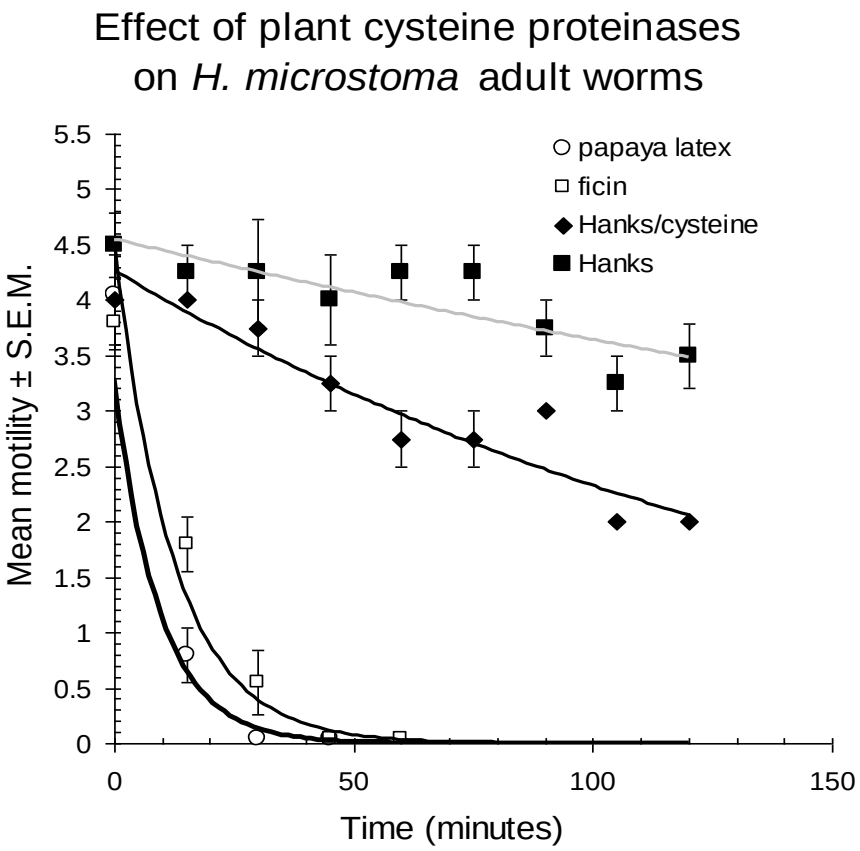
Ethnoveterinary treatments:

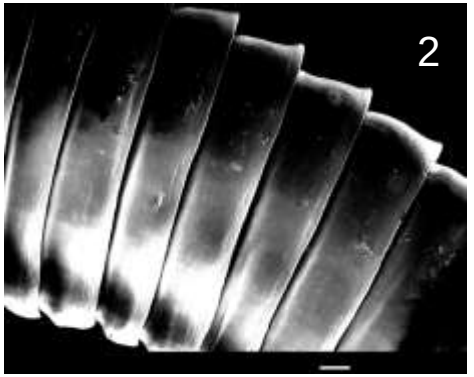
Papaya

African Peach / Tafashiya (*Nauclea latifolia*)

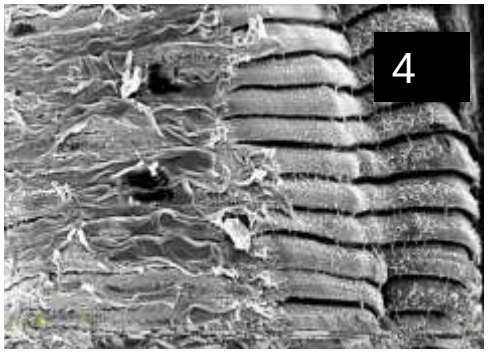
Horse Elder

Papaya latex *in vitro*:





30 mins Incubation with papaya latex



Stepek G, Buttle DJ, Duce IR & Behnke JM 2005. Assessment of the anthelmintic effect of natural plant cysteine proteinases against the gastrointestinal nematode, *Heligmosmoides polygyrus in vitro*. *Parasitol* **130**, 203-11. 23

Challenges:

- Affordability
- Sustainability
- Measuring benefits
- Implementation