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

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
Coprological examination of ~3000 donkeys:

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Prevalence</th>
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<tbody>
<tr>
<td>Strongyle spp.</td>
<td>99%</td>
</tr>
<tr>
<td>Fasciola</td>
<td>80%</td>
</tr>
<tr>
<td>Parascaris</td>
<td>51%</td>
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<tr>
<td>Tapeworm</td>
<td>8%</td>
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Irrespective of age!

Ethiopia

55% of donkeys had FEC >1000epg:

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

Comparison of strategies

Mean FEC of 24 working donkeys in South Africa

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

• 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)

Seasonality - Ethiopia

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

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

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

Does it work? Morocco

Treatment group:
• Owners more likely to report improved general health
• More likely to report improved work ability

Does it work? Morocco

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

80% of the parasites are in 20% of the hosts
Targeted drug treatment

Test all horses on premises

Heavily infected

Zero/low infection

Retest in 3-4 months

Determine interval for periodic testing
usually 3 - 12 months

TREAT
Ethnoveterinary treatments:

Papaya

African Peach / Tafashiya (*Nauclea latifolia*)

Horse Elder
Papaya latex \textit{in vitro}:

Graph showing the effect of plant cysteine proteinases on \textit{H. microstoma} adult worms. The graph indicates a decrease in mean motility ± S.E.M. over time with papaya latex, ficin, Hanks/cysteine, and Hanks conditions.

30 mins Incubation with papaya latex.

Challenges:

• Affordability
• Sustainability
• Measuring benefits
• Implementation