The Changing Face of Small Animal Parasitic Zoonoses in Australia

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Overview

- Changing prevalences of nematodes
- Changing usage of veterinary pharmaceuticals, and changes in efficacy

Changing *Toxocara* prevalences

- Ingestion of infective eggs; OLM, VLM

  *Toxocara canis* in Brisbane stray dogs

  - Mid 1970s;
    - 81% (26/32) pups,
    - 56% (28/50) adults (faecal floats)
  - 2003; 2.7% (3/110) (necropsies)
Changing *Toxocara* prevalences

- *Toxocara cati* in Brisbane refuge cats
  - 1979; 24.5% of 400 cats (necropsy)
  - 2005; <1% of 103 cats (faecal float)

Note: cats uncommonly receive monthly heartworm prophylaxis

*Toxocara* in Australia

*Toxocara* eggs in soil samples
- 1/180 soil samples in Melbourne parks (Carden et al., 2003)
- 0/266 sand samples Perth beaches & parks (Dunsmore et al., 1984)

Victorian annual incidence of ocular toxocariasis
- 1:1.6 million (Carden et al., 2003)

Hookworm prevalences – *Ancylostoma caninum*

- *Per cutaneous* penetration by infective larvae; pruritic skin papules, eosinophilic enteritis
  - 1973; 67% of 66 Brisbane dogs (necropsy)
  - 2004/05; ? Brisbane
    - 11.4% of 568 refuge dogs in across Australia
    - 10.2% of 274 Qld dogs (pcr)
Ancylostoma caninum is seasonal

![Graph showing seasonal influence of enteric infection by Ancylostoma caninum.](https://via.placeholder.com/150)


- Can establish patent infections in people, although clinical implications of this are unclear
  - Very common in regions of S E Asia, e.g. Cambodian rural village; 57% of people, 92% of dogs infected
- Likely moderately pathogenic in dogs
- Ancylostoma ceylanicum in 10/1391 canine faecal samples from across Australia
  - 4 samples from Broome, Brisbane, Sunshine Coast, Melbourne & Alice Springs
  - 0/1027 feline samples were positive

Hookworm prevalences – *Ancylostoma ceylanicum*

Hookworm prevalences – *Ancylostoma braziliense*

- Classic, and most likely cause, of cutaneous larva migrans
- Likely moderately pathogenic in dogs
- Reported from tropics 1920-1980s
  - Tropicaux savannah
  - Dogs and cats
- Not found in 1991 canine faecal samples from across Australia (2004/05)
  - Including 412 samples from tropical zones
  - 0/1027 feline samples were positive
**Summary – GI parasite prevalences in Australian dogs**


<table>
<thead>
<tr>
<th>Parasite</th>
<th>Refuge dogs (n=590)</th>
<th>Vet clinic dogs (n=810)</th>
</tr>
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<tbody>
<tr>
<td>Giardia spp.</td>
<td>14.4 (11.6 - 17.2)</td>
<td>5.5 (3.9 – 7.1)</td>
</tr>
<tr>
<td>Hookworm</td>
<td>10.7 (8.2 - 13.2)</td>
<td>3.9 (2.6 – 5.2)</td>
</tr>
<tr>
<td>Toxocara canis</td>
<td>2.4 (1.2 – 3.6)</td>
<td>0.4 (0 – 0.8)</td>
</tr>
<tr>
<td>Cryptosporidium spp.</td>
<td>0.7 (0.03 – 1.4)</td>
<td>0.5 (0.01 – 1.0)</td>
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Faecal samples, pcr

Among Cryptosporidium, Cryptosporidium canis predominates

Low prevalence of zoonotic genotypes in Giardia isolates

**Summary – GI parasite prevalences in Australian cats**


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<td>1.0 (0.2 – 1.8)</td>
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<td>Toxoplasma/Hammondia</td>
<td>0.2 (0 – 0.6)</td>
<td>0</td>
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Faecal samples, pcr

Among Cryptosporidium, Cryptosporidium felis predominates

Low prevalence of zoonotic genotypes in Giardia isolates

**Summary**

- Declining prevalence of *Toxocara* spp
- Declining prevalence of *Dirofilaria immitis*
- Likely declining prevalence of *Ancylostoma caninum*
- Need more research in to distribution of
  - *Ancylostoma ceylanicum*
  - *Ancylostoma braziliense*
Changing usage of parasiticides, and changes in efficacy

Parasites in refugia are not selected for resistance by drug treatment

- Refugia in dog and cat populations
  - Environmental stages of parasite not targeted by parasiticide
  - Diverse range of products applied to individual hosts
  - Arrested developmental stages that are not susceptible to drug treatment
- But....

Drug resistance in parasites of dogs & cats

**Ancylostoma caninum**
- Controlled (drench & slaughter) trial; 25.7% efficacy of pyrantel
- Brisbane pooled isolates

**Ctenocephalides felis**
- Resistance to OP, SP, carbamates is common
- Report of lufenuron resistance
- Several studies with decreased protective period of monthly products (but often laboratory flea strains)

**Dirofilaria immitis** (heartworm)
- Pockets of likely macrocyclic lactone-resistant strains of heartworm in USA
- No reports in Australia
Questions?