

Tape it or leave it: Should we worry about tapeworms? Or any worms for that matter?

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- I have personally received honoraria for lectures and articles presented for Idexx and other ESCCAP sponsors in the last 12 months including this one.



Echinococcus spp



Tapeworms

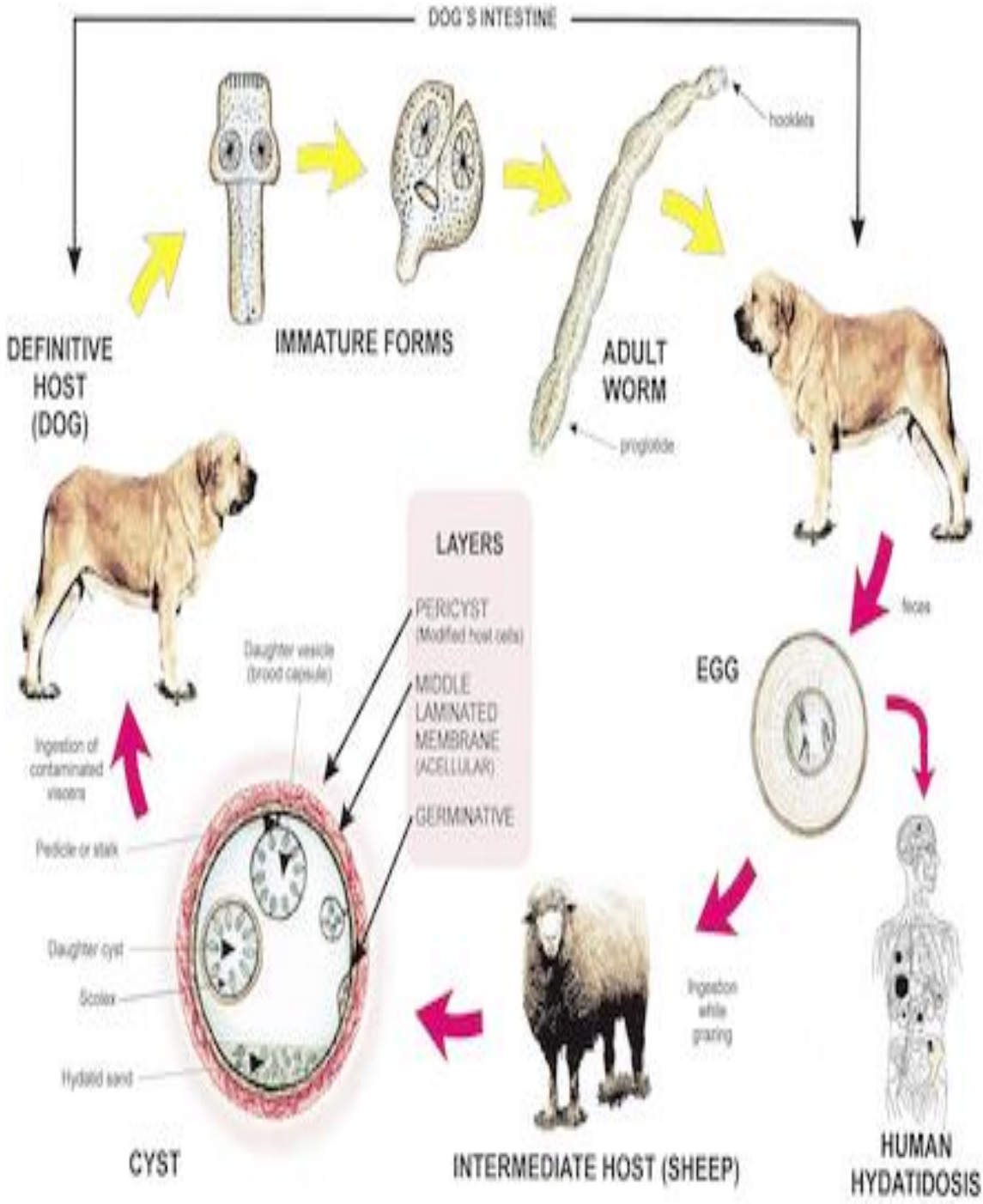
Taenia spp



Dipylidium caninum

Echinococcus granulosus

- Non pathogenic in canids
- Domestic cycle between dogs and sheep
- Significant zoonosis – cystic echinococcosis
- Cysts can form in wide range of organs
- One of WHO's top neglected zoonoses



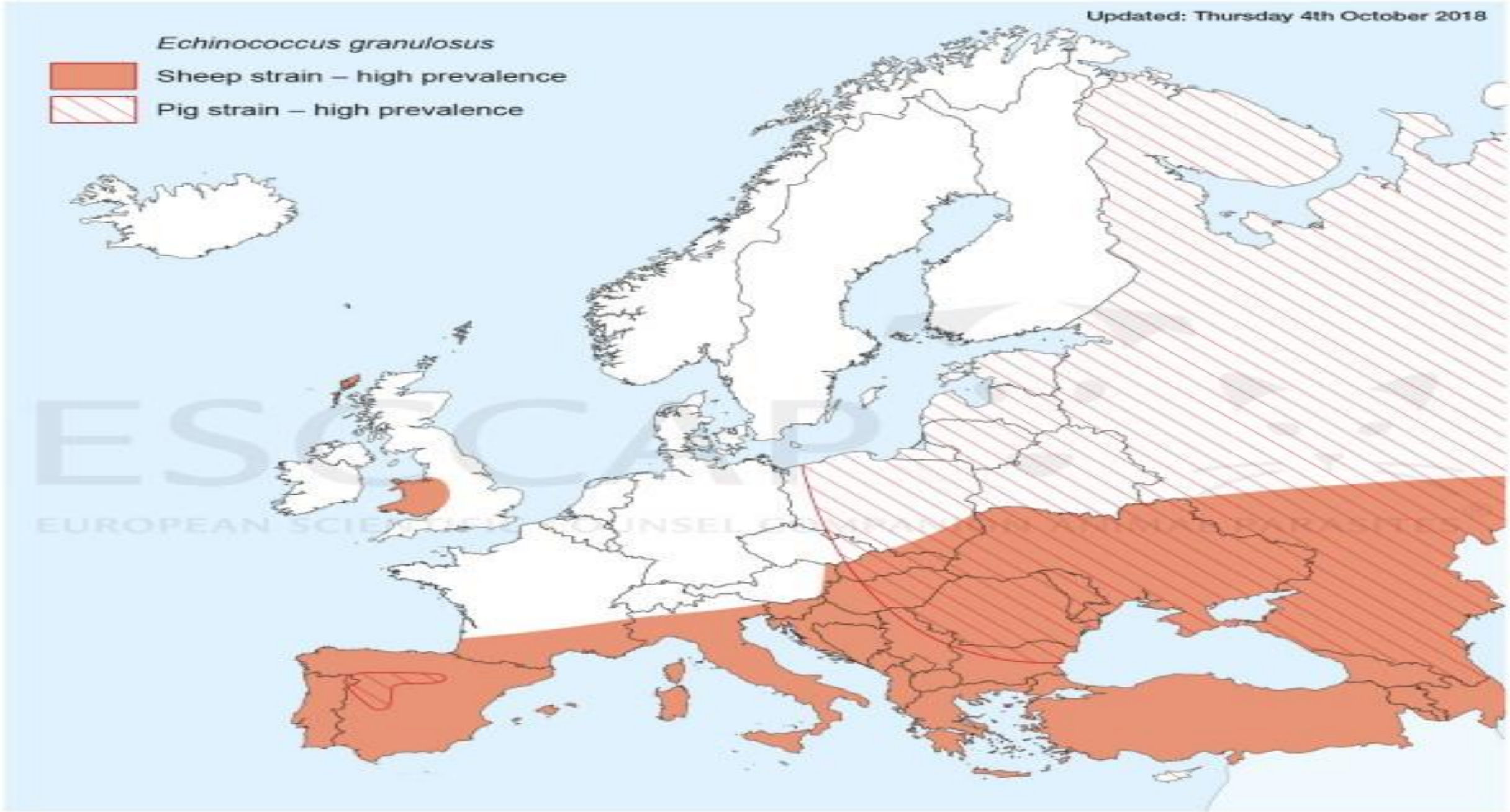


Fig. 9: Approximate summary of distribution of *Echinococcus granulosus* and related species in Europe (© ESCCAP)

Distribution in the British Isles

- Endemic in Wales and Western Isles of Scotland



- Absent in Ireland?
- Would be at least 7-10 years before any current increase in incidence of human exposure seen
- Similar time lag trends have been seen in Eastern European countries
  - “Orphan disease”
  - Largely neglected while uncommon
  - Leads to later spike in cases
  - Balkan Peninsula remain areas of high prevalence in Europe



Risk to the public

Is risk to general public significant if infection centred around foxhound packs and farms?

2004 hunting act – 178 foxhound packs still registered with MFHA

Occupational risk. Farmers and kennel hands at greater risk of infection

Wider environmental contamination risk. Fruit and vegetables, pasture, silage, food stores

Food chain risk. Raw food diet trend continuing

People with no association with livestock or hunt industry still being infected

Taenia spp in dogs

- Ubiquitous distribution
- Similar life cycle to *E. granulosus*
- Well tolerated in livestock host
- Considerable economic loss from liver (822,034 ovine livers being condemned in 2021) and carcass condemnation (900,000 lambs affected at a cost of £11 million in 2021).
- Owner revulsion and reduction of human-animal bond



Control of tapeworm transmission requires an integrated approach

Preventing dog access to pasture off lead	Picking up dog faeces	Adequate freezing of raw diets
Feeding cooked diets	Avoid access to fallen carcasses on pasture	Protection of ruminant feed stores
	Regular deworming of high risk pets	





Risk factors and routine tapeworm treatment for *E. granulosus* and *Taenia* spp in dogs

- Lifestyle
  - Access to pasture/fallen livestock
  - Unmonitored off lead activity
  - Unprocessed raw diets
  - Presence of *Taenia* spp segments as sentinels
- Geographic
  - Known foci for *E.granulosus*
  - The rest of the UK?



- 4-12 times a year with licensed praziquantel product depending on degree of risk

Role of testing in canine tapeworm control

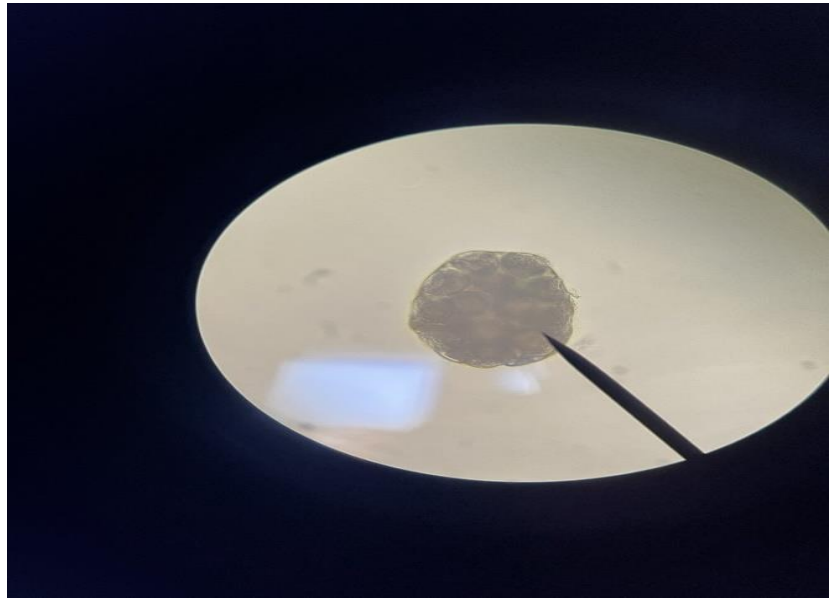
- Testing not a replacement for risk-based treatment in dogs
  - At point of positive *E. granulosus* diagnosis, zoonotic egg shedding already occurring
  - Potential pasture contamination at point of diagnosis
  - Visible segments often an indicator in cats

- Useful to demonstrate exposure and geographic distribution
  - Vital component of geographic risk assessment for *E. granulosus*
  - Zoonotic exposure

- Faecal flotation/sedimentation low sensitivity

- Coproantigen test for *Dipylidium caninum*

- PCR and faecal antigen tests for Taeniids/*Echinococcus*



Taenia infections in cats

- Number of species and commonly infecting cats worldwide
- Active segments in faeces – Cause of human revulsion!
- Prevalence dependent on risk factors
- Variety of intermediate hosts – Hunting/predation risk factors



- Well tolerated but loss of condition and even intestinal obstruction in heavy infections
- Taenid eggs rarely seen in faecal flotations
- Control based on
  - Regular deworming
  - Preventing hunting behaviour
  - Pre freezing/avoiding raw diets



Dipylidium caninum

- Fleas intermediate host
- Zoonotic potential though accidental consumption of fleas
- Presence of motile segments reduces human-animal bond
- Treatment with praziquantel
  - Anecdotal cases of drug resistance
  - Rescue with nitroscanate
- Prevention dependent on flea control
- Faecal antigen test useful for
  - Identifying infection as sentinel for flea control loss
  - Surveillance
  - Early detection of resistance





Echinococcus multilocularis

- Significant zoonosis
- Morbidity and reduction in Life expectancy
- Sylvatic life cycle
- Rodents and foxes primary reservoir hosts.
- Wolves, racoon dogs and golden jackals also potential definitive hosts









Clinical signs

- Adult tapeworms in canids well tolerated with no disease
- Intermediate hosts
  - Spread of the cysts is similar to malignant neoplasia.
  - Local destruction of tissue and metastases.
  - Hepatopathies with subsequent liver failure.
- Treatments have improved but life expectancies still significantly reduced.
- Canids can also act as intermediate hosts



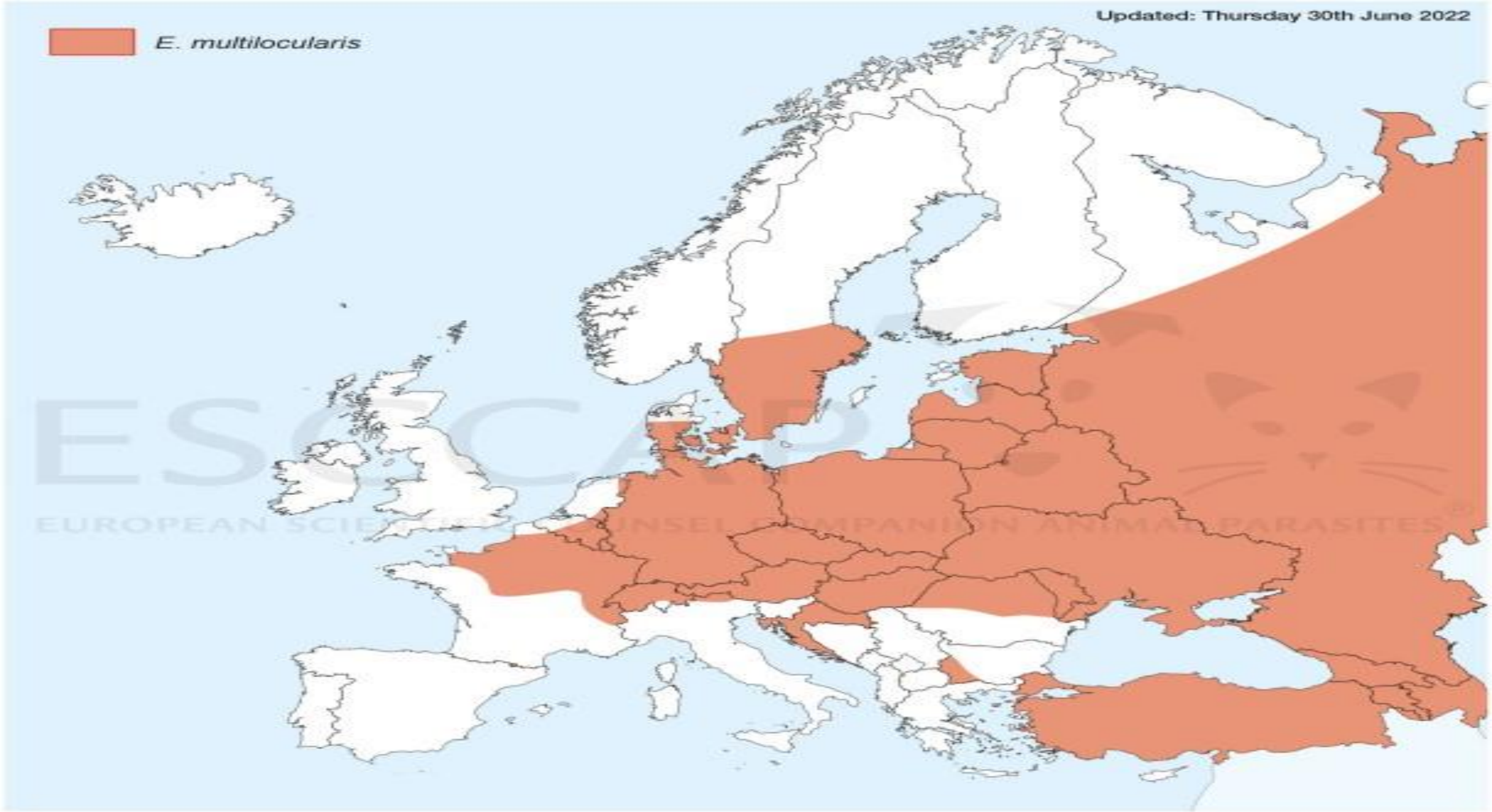


Fig. 10: Approximate distribution of *Echinococcus multilocularis* in the fox in Europe (© ESCCAP)

Risk of UK establishment





- Large numbers of reservoir hosts
- Risk of introduction of positive dogs
- Potential 10-15 year lag time before human clinical cases appear
- For every 10,000 dogs travelling on a short visit to an endemic country such as Germany, the probability of at least 1 returning with the parasite is approximately 98%.
- 5-day window allows opportunity for reinfection before entry.

Strategies for prevention

Minimising UK establishment and individual risk

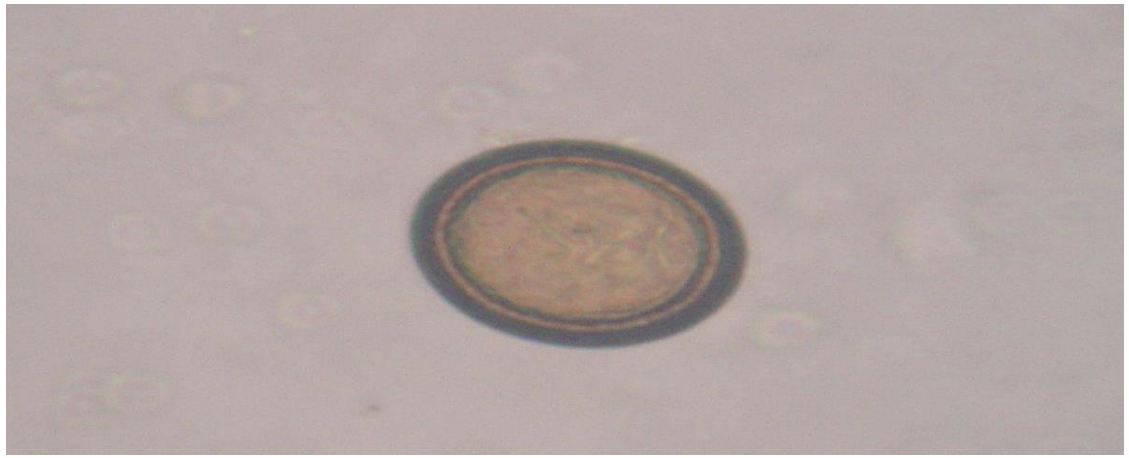
Screening

Avoiding importation of infected intermediate hosts

Strategic treatment – compulsory and additional risk-based treatments

Screening

- Not a substitute for treatment but important for surveillance and to limit zoonotic risk
- Hygiene measures essential for people in contact with infected pets
- Ova detection in faeces by faecal flotation is a relatively insensitive method of detection
- Coproantigen ELISA and PCR
  - Not always species or genus specific



Strategic treatment

- Praziquantel 5mg/kg in canids
- Dogs bridging hosts for zoonotic infection, cats less important
- Pre patent period minimum 30 days
- Treat monthly with praziquantel while in endemic countries with off lead activity
- Compulsory treatment 1-5 days before UK entry
- Praziquantel short half life so opportunity for reinfection under rules – repeat treatment required within a month of return to UK

Summary

Routine preventative treatment for tapeworms remains an important limiting disease risk in humans and pets.

Testing for tapeworms is not a substitute for risk based treatment but is important for surveillance and assessing zoonotic risk

Echinococcus multilocularis remains a threat to the UK and both the compulsory tapeworm treatment and a further treatment within 30 days after arrival in dogs is vital for national biosecurity.

Tapeworm testing options are evolving all the time

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