Rijksinstituut voor Volksgezondheid
en Milieu
*Ministerie van Volksgezondheid,
Welzijn en Sport*



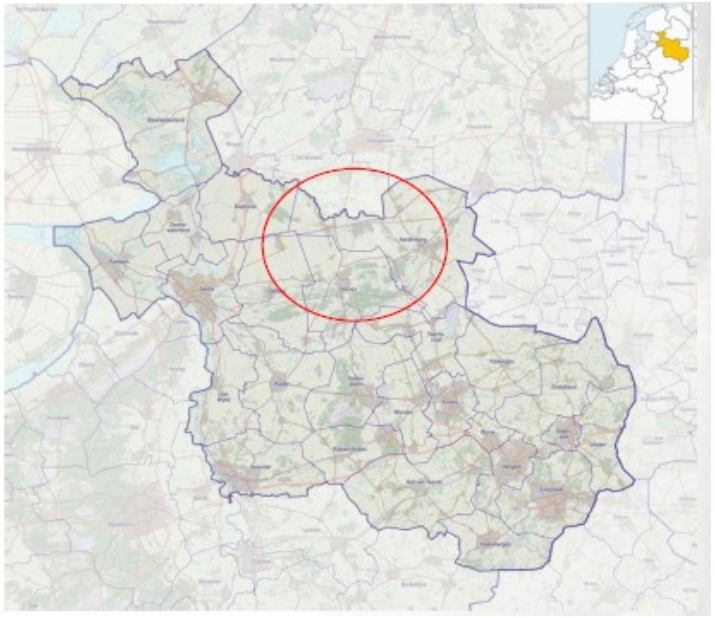


Coenurosis in a sheep: Reintroduction of the zoonotic tapeworm *Taenia multiceps* in the Netherlands?

Marieke Opsteegh

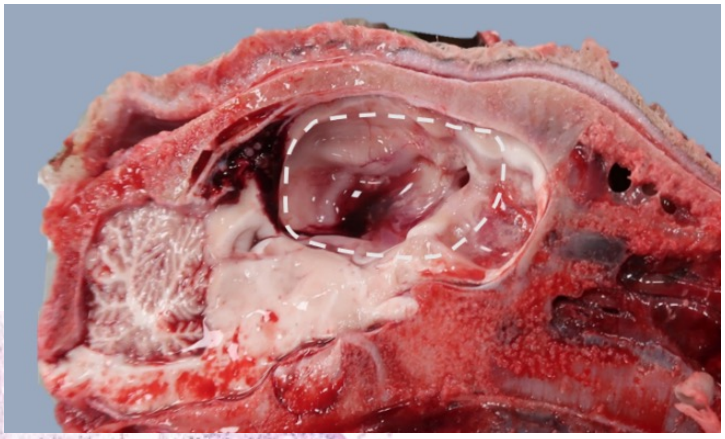
EURL-P Workshop, Rome
October 29th 2026

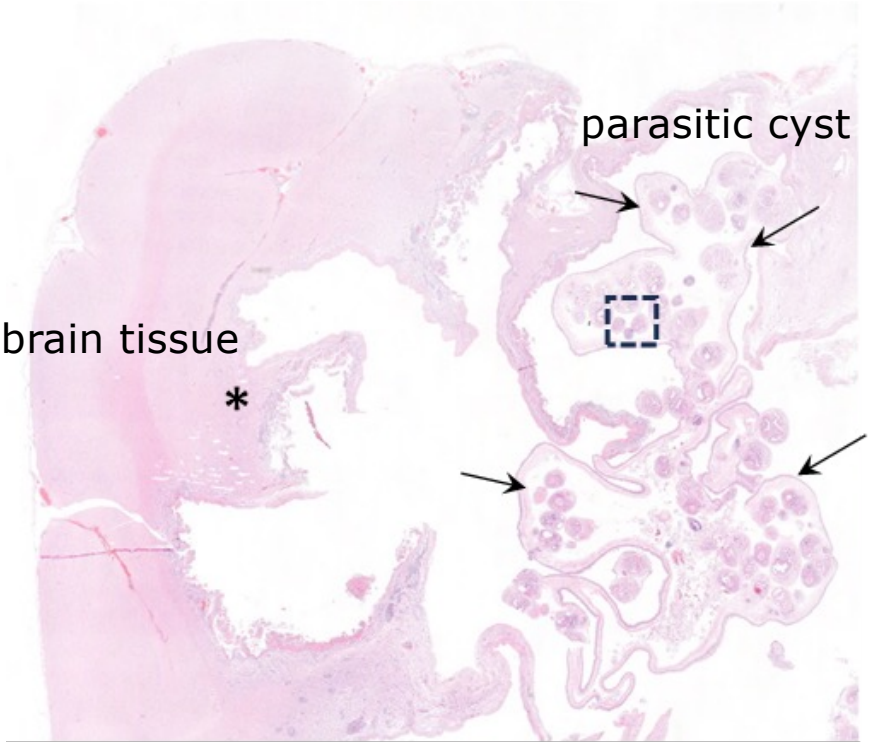
Case

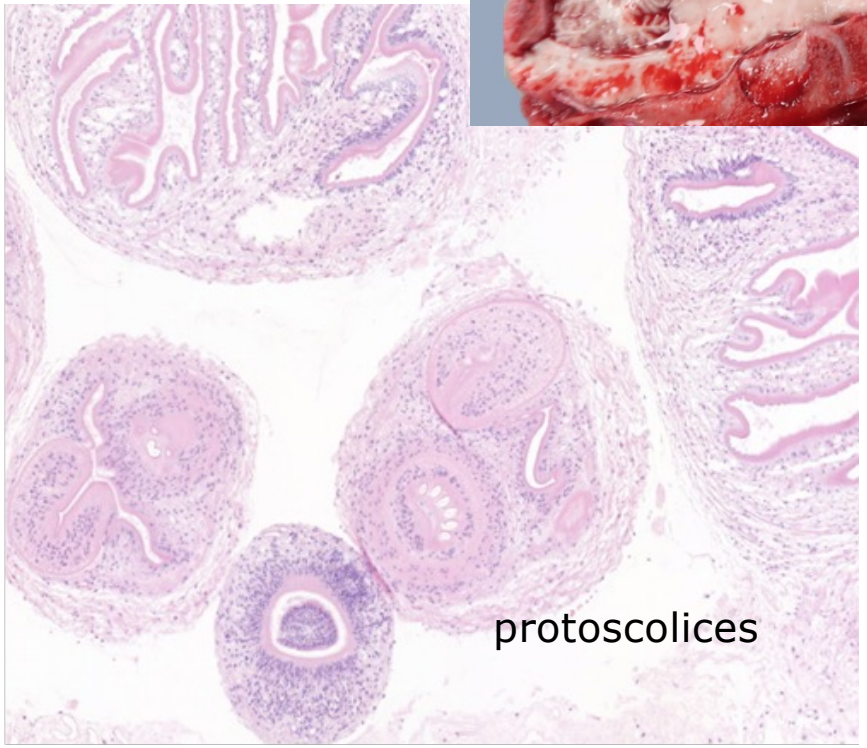


- Herd of 15 breeding sheep
- Ewe born March-2024
- Lambed 1-June-2026
- Fever, abnormal behavior
- Euthanasia

Pathological examination



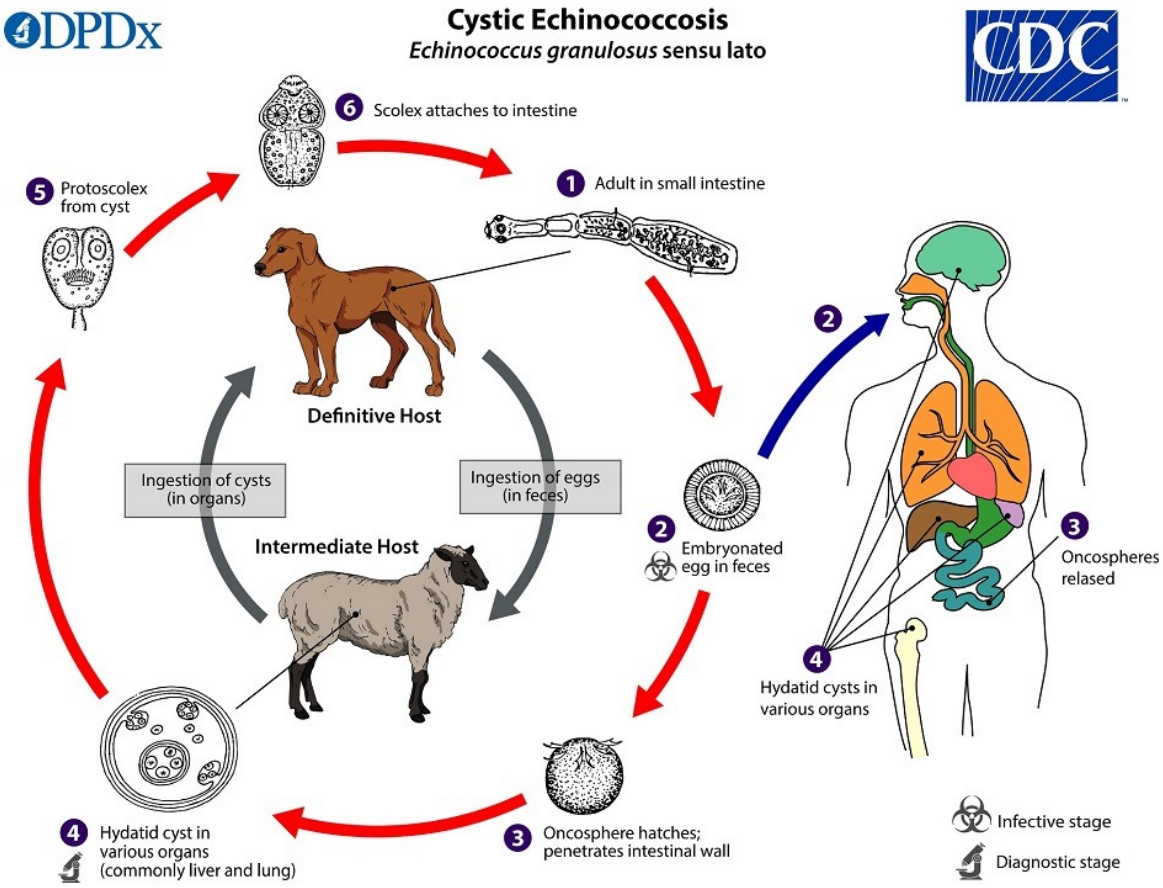




Royal GD

Species

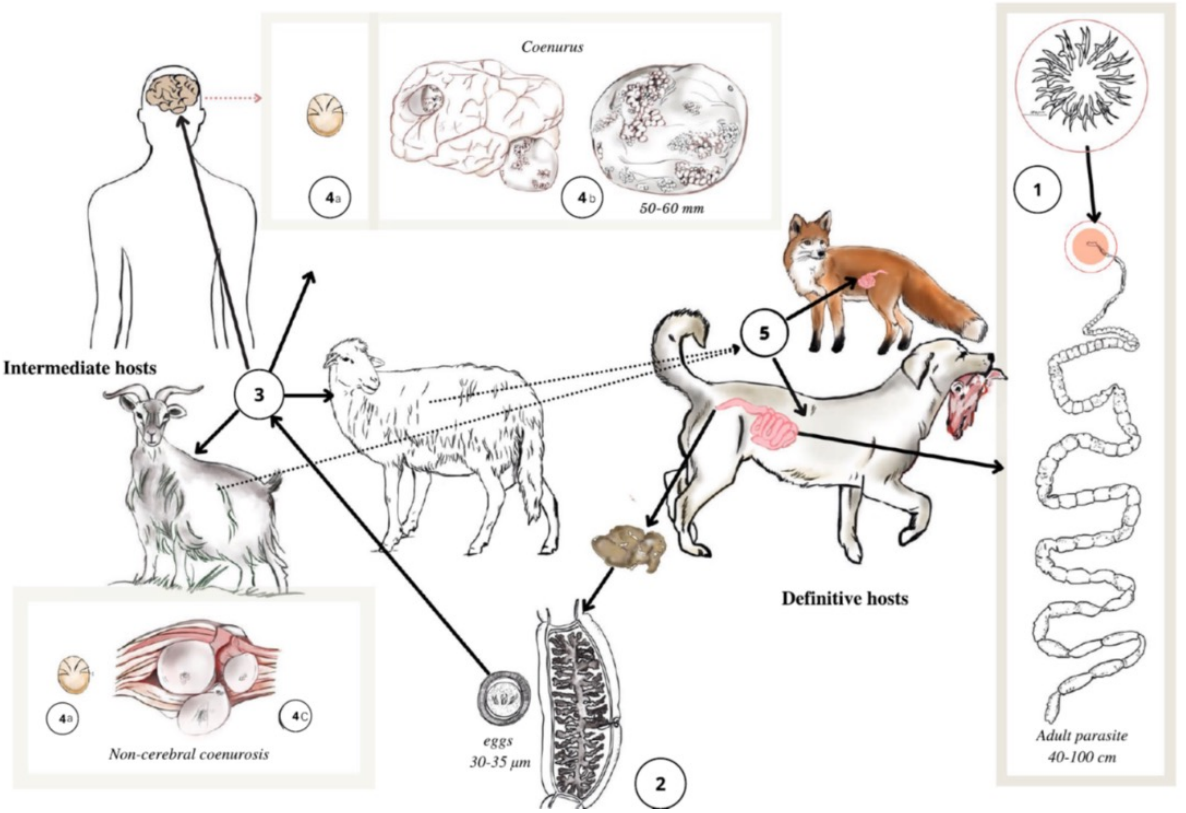
- Metacestode of tapeworm
- Echinococcosis*?*
- Notifiable NVWA
- NRL-P
  - CO1 PCR and Sanger seqencing
  - *Taenia multiceps*



Taenia multiceps

- Dog (canids) – Sheep/Goat (ungulates)
- Coenurosis
- Zoonotic





Varcasia, A., Tamponi, C., Ahmed, F. *et al. Taenia multiceps* coenurosis: a review. *Parasites Vectors* **15**, 84 (2022). https://doi.org/10.1186/s13071-022-05210-0

Epidemiology

- Sheep-herding
- Dogs eating organs (brains) of affected sheep
- Wild Canidae: grey wolf, red fox, golden jackal, (coyote), (raccoon dog)

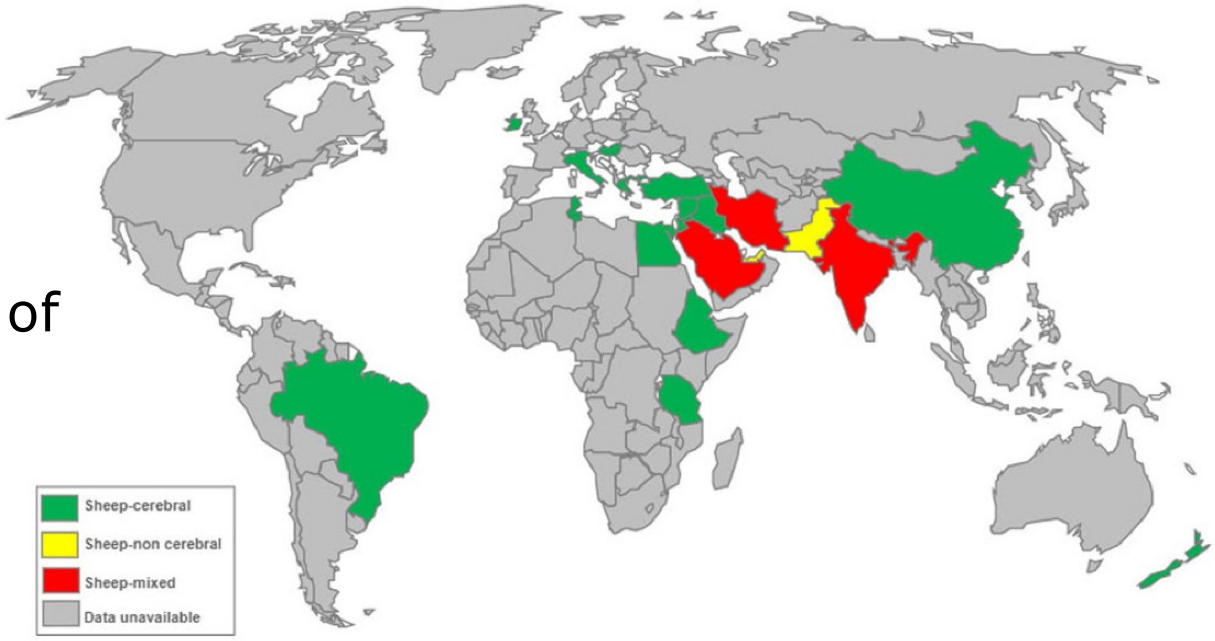


Fig. 2. World geographical distribution of cerebral and non-cerebral coenurosis in sheep.

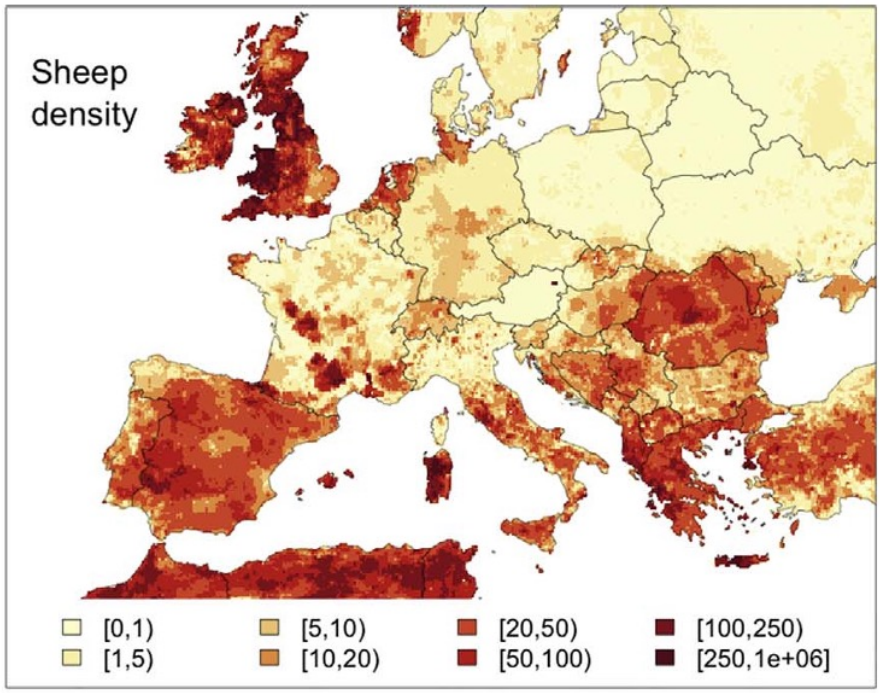
- ~100 human cases worldwide

Abbas I, El-Alfy E-S, Saleh S, Tamponi C, Varcasia A. Global epidemiology and molecular biology of Taenia multiceps: a comparative meta-analysis and in silico analysis study. *Parasitology*. 2022;149(12):1607-1622. doi:10.1017/S0031182022001123

Sheep in the Netherlands

- Meat production

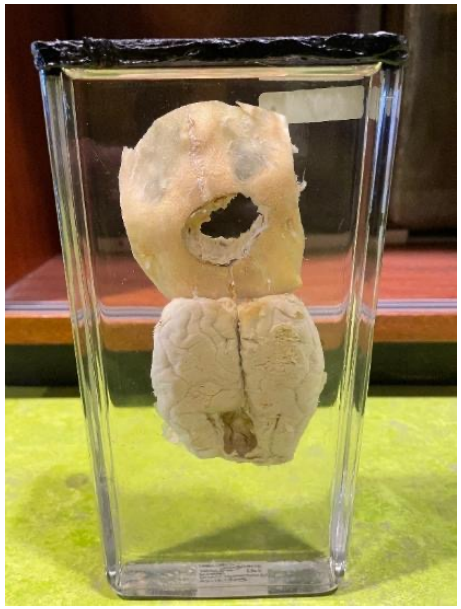
	2000	2005	2010	2015	2020	2025
Sheep	1 304 567	1 360 509	1 129 500	946 179	890 471	676 021
Farms	17 574	14 360	12 871	11 378	8 283	7 619



T. multiceps in the Netherlands

- Dutch Species Register:
  - naturally occurring
  - 1/69 dogs (Klarenbeek et al. 1918)
- Reader veterinary students in 1824 (Alexander Numan)
- Not in foxes 2010-2012 (Franssen et al. 2014)
- No cases in sheep (scrapie testing)

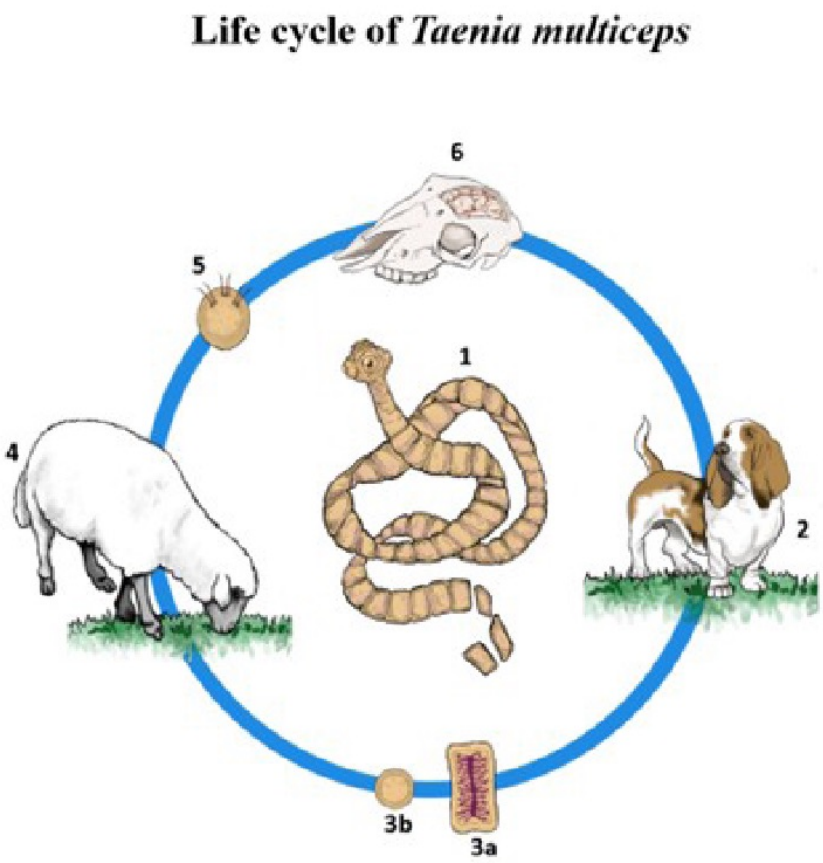




Case

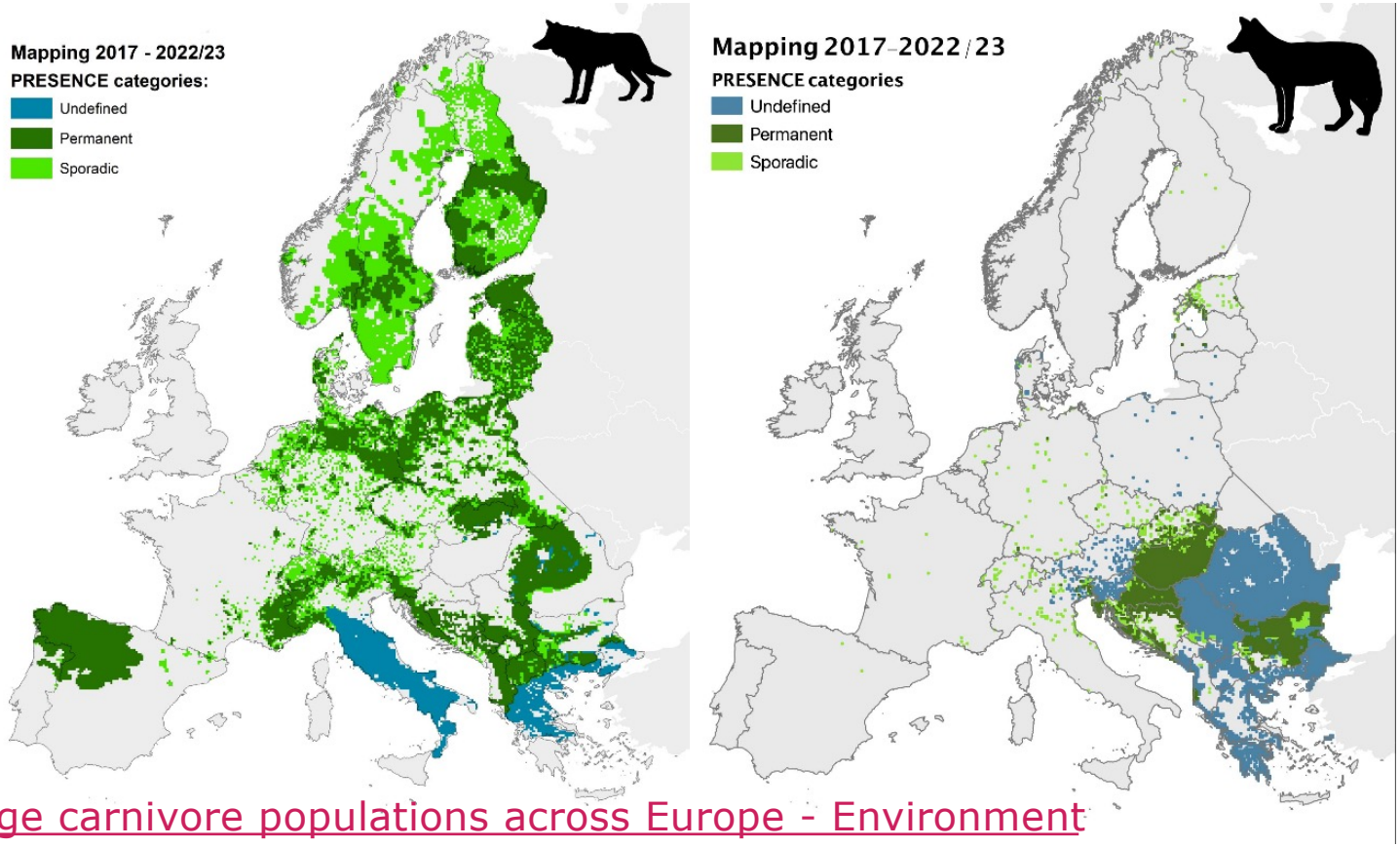
- Sheep always on the farm
- Only two dogs, no raw food
- Foxes and wolves present

Diagnosis & Treatment

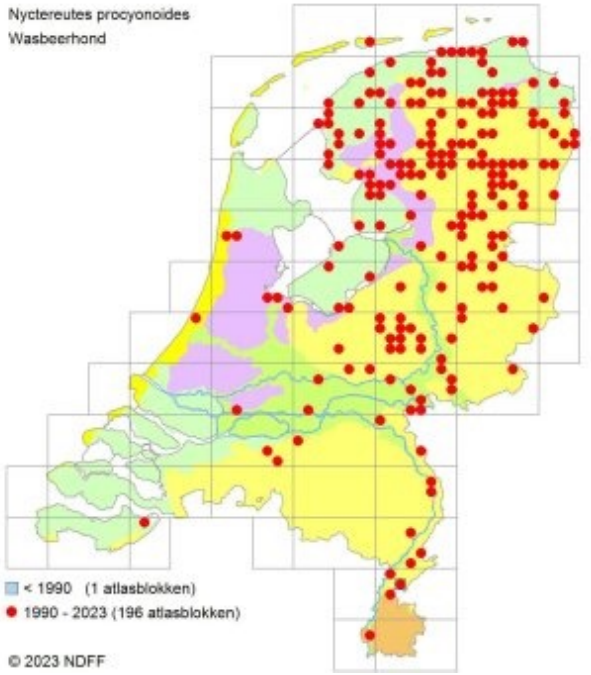


Stigger, A. L., Pavarini, S. P., Guterra, I., Pereira, F. F., Paz, M. C., Silva, E. M. S. da, Barros, C. S. L., & Rissi, D. R. (2025). Coenurosis in sheep. *Brazilian Journal of Veterinary Pathology*, *18*, e018S103. https://doi.org/10.24070/bjvp.1983-0246.018S103

Wild canids



[Large carnivore populations across Europe - Environment]



[Wasbeerhond | Invasieve Exoten]

Dogs

- KNMvD 2021:

  Approx. 50.000 imported dogs/year
  - Pups bred in eastern-European countries
  - Stray dogs Southern-Europe
- Guard dogs
- No mandatory anthelmintic treatment for import

Importierte Coenurose beim Schaf
G. Schweizer[1], F. Grünenfelder[2], T. Sydler[3], N. Rademacher[4], U. Braun[5], P. Deplazes[6] (2006), DOI 12.1024/0036-7281.148.09.490

Thirteen sheep from a milk producing farm in the Canton of Grisons that presented chronic coenurosis were examined and subjected to treatment trials at the veterinary hospital in Zurich. Symptoms were first observed around two months after the import of two dogs from Italy (Abruzza) of which one was infected with *Taenia multiceps* and *Echinococcus granulosus*. The most frequently observed clinical symptoms of the sheep were reduced general condition, circling, reduced menace reflex, apathy, unsteady gait and head tilt. Analyses of cerebrospinal fluid revealed an increased leucocyte count in 3 sheep and eosinophilia in 4 sheep. In 4 animals that underwent computertomography, one or more hypodense, definable lesions were found in the brain. In 2 sheep surgical treatment and in 10 animals medical treatment with either Praziquantel (n = 8) or Oxfendazol (n = 2) was attempted. Only one animal treated with Praziquantel needed not to be euthanized. At necropsy, one or two coenurus cysts could be found either in a side ventricle (n = 2), in the cerebellum (n = 3) or in the cerebrum (n = 7). The locations corresponded with the clinical findings. Despite Praziquantel or Oxfendazol treatment, living protoscoleces could be found in the parasite cysts.

Eradication and reintroduction?

ERADICATION

- Introduction of dog food
- Meat inspection and destruction of carcasses
- Eradication of wolf ~1868

REINTRODUCTION

- Grey wolf (2018), golden jackal (2016), racoon dog (1986/2012)
- Import of (stray) dogs
- Raw meat diet for dogs

Prevention and control

- Prevention - sheep
  - Removal and destruction of carcasses
  - Prevent predation
  - Keep out dogs from pasture and remove carnivore feces
- Prevention - dogs
  - No raw dog food
  - Risk-based anthelmintic treatment (praziquantel) (import)
- Prevention - human
  - General hygiene measures hand washing and washing of vegetables and fruits

Follow-up

- Surveillance in wildlife
  - Passive surveillance with parasitological examination for wild carnivores needs to meet the increasing numbers of wolves send in
  - Identify *Taenia* species present in intestines of wild canids
  - Request to send in suspected metacestode lesions in intermediate hosts
- Alertness
  - Sheep farmers and vets, veterinary pathologists, hunters and meat inspection, physicians/medical microbiologists
  - SO-Z (Jul-2026), EURL-P (Oct-2026), TvD (Nov-2026), NVP (Dec-2026)

Other tapeworms

- Hunter observed increase in metacestodes in game
  - 3x deer: *Taenia krabbei*
  - 2x wild boar: *Taenia hydatigena*

- Parasitological examination of wolves
  - 23/49 colon content samples positive in CO1 PCR
  - Sanger sequencing:
    - often double peaks > mixed infections?
    - *Taenia krabbei* (3x, and only *Taenia* identified)

Acknowledgements

René van den Brom[1], Rachel Tiessen-Thomas[1], Denise Hoek[2], Deborah van Doorn[1,3], Eveline Dijkstra[1], Adriaan Vandermeer[4], Marcel Spierenburg[5]

1 Royal GD, 2 Cib-RIVM, 3 FD-UU, 4 DKL Balkbrug-Nieuwleusen, 5 NVIC-NVWA

Questions

- Notifiable?
- Deworming dogs in import regulation?