Surveillance to protect Irish wildlife, pets and people from *Echinococcus multilocularis*

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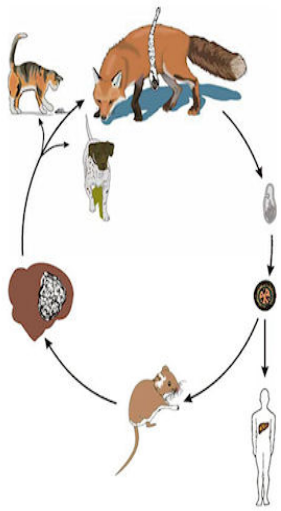
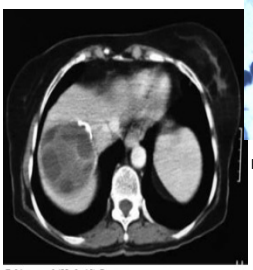
Introduction

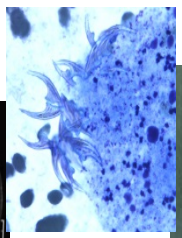
- *Echinococcus multilocularis (EM)* is a zoonotic cestode parasite
- It occurs widely in continental Europe
- Can cause human alveolar echinococcosis (AE)
- Red fox (*Vulpes vulpes*) is the final host
- Vole and rodent species (and man) act as Intermediate hosts with larval cysts containing protoscolices

Echinococcus multilocularis adult





Echinococcal (Hydatid) Cyst



Protoscolex image CDC

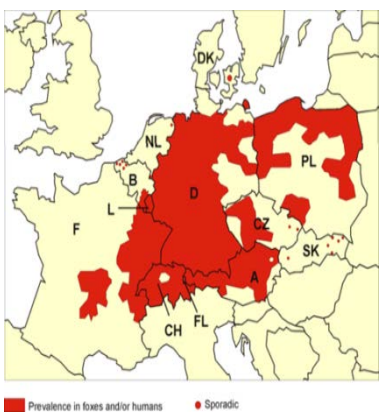
Human liver with *Echinococcus multilocularis* cyst

Zoonosis: Alveolar echinococcossis

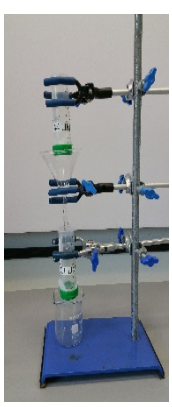
- People may become infected (AE) by ingestion of *Echinococcus multilocularis* eggs
- *Echinococcus* cysts containing protoscolices develop in tissues e.g. liver
- The EM larval mass resembles malignancy in appearance and behaviour - it proliferates by exogenous budding of cysts

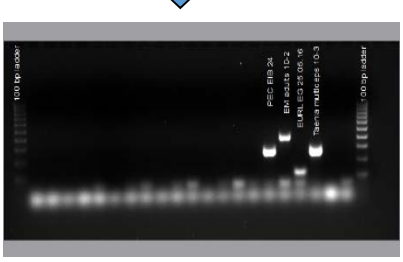
Geographic distribution & surveys

- *Echinococcus multilocularis* occurs widely in Asia and continental Europe.
- Autochthonous EM has never been reported in foxes in Finland, Ireland, Malta or the UK.
- EU Regulation 1152/2011 allows "free" MSs to require effective anthelmintic treatment of pets prior to entry.
- Reg 1152/2011 requires "Free" MS to undertake annual survey.
- European Food Safety Authority reviews annual surveys and publishes report annually.



Approximate geographic distribution of *Echinococcus multilocularis* in central Europe (1999) Institute of Parasitology, University of Zurich (J. Eckert, F. Grimm and H. Bucklar)





PCR method of Trachsel et al, 2007

Materials and methods ; cestode egg flotation and multiplex PCR

- Culled foxes were presented to the six regional veterinary laboratories.
- Fox faeces were removed and stored at - 20°C.
- The samples were stored at - 80°C for a week to eliminate helminth pathogenicity.

Samples of faeces were prepared and mixed in a saturated solution of Zinc Chloride in order to float any cestode eggs.

- The supernatant was collected and subjected to multiplex Polymerase chain reaction for *Echinococcus* and *Taenia* species DNA detection. The products of PCR were examined by gel electrophoresis for presence of amplicons similar to those of *E. multilocularis* or *E. granulosus* or *Taenia* species.
- If an amplicon was detected similar to any of these, the PCR product was sequenced and the sequence subjected to a BLAST search for species-specific sequences .

Results & Conclusions

- *None of the 4 MSs … has detected E. multilocularis through the surveillance activities reported"*
- *".. (Finland, Ireland and the UK) and Norway implemented surveillance activities able to detect E. multilocularis at 1% prevalence maximum, with a 95% confidence level, fulfilling the requirement of Regulation (EU) No 1152/2011."*
- The requirement to treat pets with an anthelmintic between 1 to 5 days before entry into "free" MS was retained.

Acknowledgements
The help and co-operation of colleagues in DAFM Laboratories Backweston, Regional Veterinary Laboratories, Regional Veterinary Offices, Agriculture House and the Irish Equine Centre is much appreciated.

Survey Period	No. tested	Test applied	No. positive
Oct 2009 – Feb 2010	395	SCT*	0
Sept 2010 – Nov 2010	190	SCT	0
2011	326	SCT	0
2012	324	SCT	0
2013	357	SCT	0
2014	331	SCT	0
2015	398	$ZnCl_2$ cestode egg flotation & PCR**	0
2016	405	$ZnCl_2$ cestode egg flotation & PCR**	0
2017	405	$ZnCl_2$ cestode egg flotation & PCR**	0
2018	403	$ZnCl_2$ cestode egg flotation & PCR**	0

*Sedimentation and Counting Technique
**Trachsel et al, 2007

Number of fox samples examined for *Echinococcus multilocularis* by year and method and results of examination.