Epidemiology of parazitozoonoses in Hungary – new results

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Proficiency test on the digestion method to detect Trichinella larvae in pork samples

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Short summary

- 24 public laboratories participated.
- The protocol of EURLP was followed.
- Number of samples: 1 negative and 4 positive (containing 3-5 larvae)
- Results: according to ICT criteria 8 laboratories (33%) had negative evaluation
- Training on critical points of the method was organized, and validation samples were provided.
- Repeated PT: according to ICT criteria 4 laboratories (17%) had negative evaluation
- On-site visits revealed several problems in critical points

Environmental factors underlying distribution patterns of Echinococcus multilocularis in red foxes of Hungary

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Materials and methods

• Altogether 1612 red fox (Vulpes vulpes) carcasses were randomly collected from the whole Hungarian territory from November 2008 to February 2009 and from November 2012 to February 2013.

• The intestinal mucosa from all the foxes was tested by sedimentation and counting technique.

• Home ranges of infected and uninfected foxes were analysed on the background of geographic vector data of altitude, land cover types, permanent waters, mean annual temperature and annual precipitation by Quantum GIS 1.8.0 software.

• Multiple regression analysis was performed with environmental parameter values and E. multilocularis counts.

Temporal distribution of *Echinococcus multilocularis* infected red foxes collected in Hungary

• Although spreading and emergence of the parasite was observed in Hungary before 2009, a non-significant decrease of prevalence and intensity of infection was noted between the two collection periods.

• It can be explained by the considerably different mean annual precipitation in 2007–2008 and 2011–2012 (541–572 mm vs. 382–440 mm) and the high sensitivity of *E. multilocularis* eggs to desiccation (Veit et al., 1995).

• The mean annual temperature of the two periods did not differ significantly.

• These results indicate that precipitation is a significant determinant of the temporal distribution of the parasite in Hungary.

Spatial distribution of *Echinococcus multilocularis* infected red foxes collected in Hungary

The size of the circles are proportional with the number foxes coming from the location (n = 1–3). The darkness of the circles is in line with the intensity of infection (light grey: < 10 worms; grey: 10–100 worms; black: > 100 worms).

2008-2009 2012-2013

Spatial distribution of *Echinococcus multilocularis* infected red foxes collected in Hungary

• Multiple regression analysis revealed multicollinearity with altitude and non-forested areas and no significant relationship with other land cover types and permanent waters.

• Based on the statistical analysis, mean annual temperature (P < 0.0001) and annual precipitation (P < 0.005) were the major determinants of the spatial distribution of *E. multilocularis* in Hungary.

• It can be explained by the well known sensitivity of *E. multilocularis* eggs to high temperature and desiccation (Veit et al., 1995).

• The partly different environmental determinants in the historically endemic region of Europe and the new endemic areas of Hungary might be explained by the different climate in these regions.
Echinococcus multilocularis and Trichinella spiralis in golden jackals (Canis aureus) of Hungary

Z. Széll, G. Marucci, E. Pozio, T. Sréter
NRLP, Hungary and EURLP
Veterinary Parasitology (in press)

Expansion range of golden jackal in Hungary

1997

2006

Hunting bag data of golden jackals in Hungary


First record of Echinococcus multilocularis in a jackal in Europe

Infected with 412 mature E. multilocularis

Echinococcus multilocularis in red foxes (n = 90; filled circles) (Casulli et al., 2010) and in one golden jackal (n = 1; filled square) of Hungary

**First record of *Trichinella spiralis* in a jackal in Hungary**

Trichinella spiralis in red foxes (n = 4, filled circles), wild boars, backyard pigs (n = 8, filled triangles) (Széll et al., 2008, 2012), and in one golden jackal (n = 1, filled square).

**Conclusion**

- Thanks to conservation efforts, the density of the Balkan population of golden jackals increased in the past decades.
- New populations were established in Turkey, Ukraine, Romania, Serbia, Croatia, Slovenia, Hungary and Austria. Vagrant individuals were also recorded in Italy, Slovakia, Germany and Czech Republic. Further spread of the golden jackal can be postulated in Europe.
- Jackals trot for large distances (up to 50 km) in search of food. Vagrant animals (mainly sub-adult males) may migrate for hundreds of kilometres.
- Jackals may play a significant role in the long distance spread of several zoonotic and animal pathogens (e.g., rabies virus, *E. multilocularis*, *G. granulosus*, *T. spiralis*).
- Monitoring zoonotic parasites in these animals can be recommended in the European Union.

Thank you for your attention.