

A REVIEW OF THREE EMERGING PARASITOSIS IN THE CANINE SPECIES AND THE FACTORS THAT FAVOR THEIR INTRODUCTION

OBJECTIVES

Review of three zoonotic parasites in Europe: *Thelazia callipaeda*, *Onchocerca lupi* and *Echinococcus multilocularis*

To determinate the factors that favor the new introduction of these parasites

Proposing control measures

INTRODUCTION

EMERGENT DISEASE

«A new occurrence in an animal of a disease, infection or infestation, causing a significant impact on animal or public health»

Approximately **75%** of emerging diseases are zoonoses

EMERGENT PARASITOSIS

DEFINITIVE HOSTS

INTERMEDIATE HOSTS

VECTORS

ENVIRONMENT

Thelazia callipaeda

VECTORIAL PARASITE: *Phortica variegata* as a vector

INCREASED FOX POPULATION
DOG MOVEMENT BETWEEN COUNTRIES
INCREASED POPULATION OF VECTORS



Figure 1: Distribution of *Thelazia callipaeda*

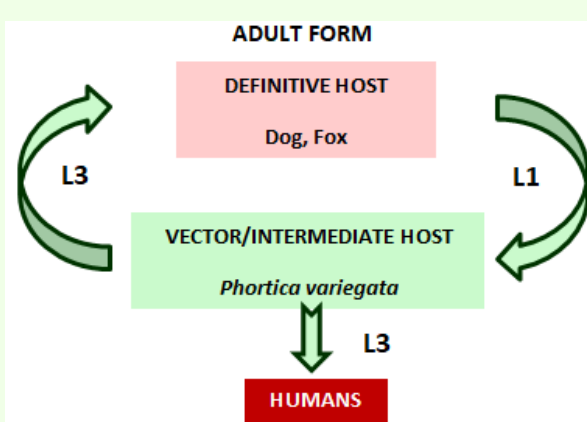


Figure 2: *Thelazia callipaeda*



Figure 3: Male of *Phortica variegata*

LIFE CYCLE



LIFE CYCLE

THE LIFE CYCLE OF THIS PARASITE IS CURRENTLY UNKNOWN

DOG MOVEMENT BETWEEN COUNTRIES
INCREASED POPULATION OF VECTORS



Figure 4: Distribution of *Onchocerca lupi*

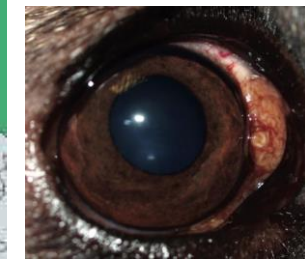


Figure 5: Ocular nodule in a dog

Onchocerca lupi



Figure 6: Simulid

VECTORIAL PARASITE:
Simulid as a potential vector

Echinococcus multilocularis

Rodents of Cricetidae family as intermediate hosts:

- *Microtus arvalis*
- *Arvicola terrestris*

INCREASED FOX POPULATION

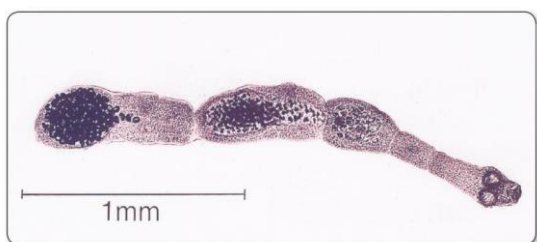


Figure 7: *Echinococcus multilocularis*

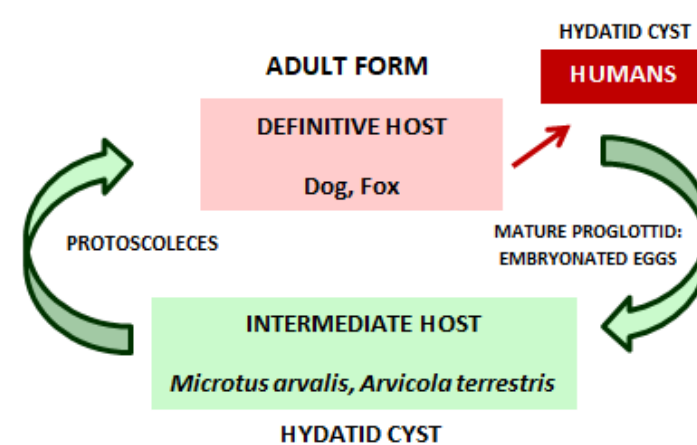


Figure 9: *Microtus arvalis*



Figure 8: Distribution of *Echinococcus multilocularis*

LIFE CYCLE



ALVEOLAR ECHINOCOCCOSIS

- Human disease
- Ingestion of contaminated berries and vegetables
- Hepatic carcinoma of parasitic origin

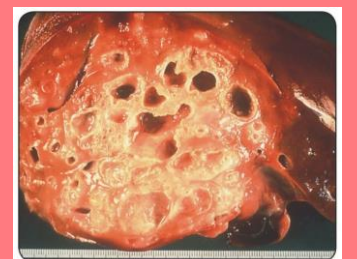


Figure 10: Liver with hydatid cyst

WHY ARE EMERGING PARASITOSIS?

DEFINITIVE HOSTS

- Increased fox population
- Increased dog's movement

INTERMEDIATE HOSTS/VECTORS

- Increased vector population

ENVIRONMENT

- Global warming
- Urbanization
- Habitat destruction

CONTROL

FOX

Epidemiological surveillance plan

DOG

Ophthalmologic examination, PCR, Antihelmintic and repellent treatment

VECTOR

INTERMEDIATE HOST

Distribution surveys

CONCLUSIONS

The red fox is the most important species as a reservoir. The increase in their population is the main factor facilitating the emergence of these parasitosis.



Figure 11: Red fox (*Vulpes vulpes*)

Increased dog movement and the increase in vector populations are other factors that are important in the emergence of these parasitosis

Standardized surveillance plans are needed in Europe

Further studies are needed to determine the life cycle of *Onchocerca lupi*

REFERENCES

- do Vale, B., Lopes, A.P., da Conceição Fontes, M., Silvestre, M., Cardoso, L., Coelho, A.C. (2019). Thelaziosis due to *Thelazia callipaeda* in Europe in the 21st century-A review. *Veterinary Parasitology*, 275.
- Goodfellow, M., Shaw, S., Morgan, E. (2006). Imported disease of dogs and cats exotic to Ireland: *Echinococcus multilocularis*. *Irish Veterinary Journal*, 59(4), 214-216.
- Marino, V., Gálvez, R., Colella, V., Sarquis, J., Checa, R., Montoya, A., Barrera, J.P., Domínguez, S., Lia, R.P., Otranto, D., Miró, G. (2018). Detection of *Thelazia callipaeda* in *Phortica variegata* and spread of canine thelaziosis to new areas in Spain. *Parasites and vectors*, 11(1), 195.
- Miró, G., Montoya, A., Hernández, L., Dado, D., Vázquez, M.V., Benito, M., Villagrasa, M., Brianti, E., Otranto, D. (2011). *Thelazia callipaeda*: infection in dogs: a new parasite for Spain. *Parasites and vectors*, 4, 148.
- Oksanen, A., Siles-Lucas, M., Karamon, J., Possenti, A., Conraths, F.J., Romig, T., Wysocki, P., Mannocci, A., Mipatrin, D., la Torre, G., Boufana, B., Casulli, A. (2016). The geographical distribution and prevalence of *Echinococcus multilocularis* in animals in the European Union and adjacent countries: A systematic review and meta-analysis. *Parasites and Vectors*, 9(1), 519.
- Otranto, D., Giannelli, A., Latrofa, M.S., Dantas-Torres, F., Trumble, N., Chavkin, M., Kennard, G., Eberhard, M.L., Bowman, D.D. (2015). Canine Infections with *Onchocerca lupi* Nematodes, United States, 2011-2014. *Emerging Infectious Diseases*, 21(5), 868-871.
- Pradera, C. (2015) [Internet]. Barcelona; [consulted on May 27, 2022]. <https://desinsectador.com/2015/06/01/imagenes-de-un-simulido-simulium-diptera-simuliidae/>
- Rojas, A., Morales-Calvo, F., Salant, H., Otranto, D., Baneth, G. (2021). Zoonotic Ocular Onchocercosis by *Onchocerca lupi*. *Yale Journal of Biology and Medicine*, 94(2), 331-341.
- Silar, (2020) [Internet]. Bieszczady; [consulted on May 27, 2022]. https://commons.wikimedia.org/wiki/File:02020_0073_Vulpes_vulpes_in_Bieszczady.jpg
- Zwerver, R. - Saxifraga. s.d. [Internet]. Veldmuis; [consulted on May 31, 2022]. <http://www.freenatureimages.eu/animals/mammalia/%20zoogdieren,%20mammals/microtus%20arvalis/index.html>