

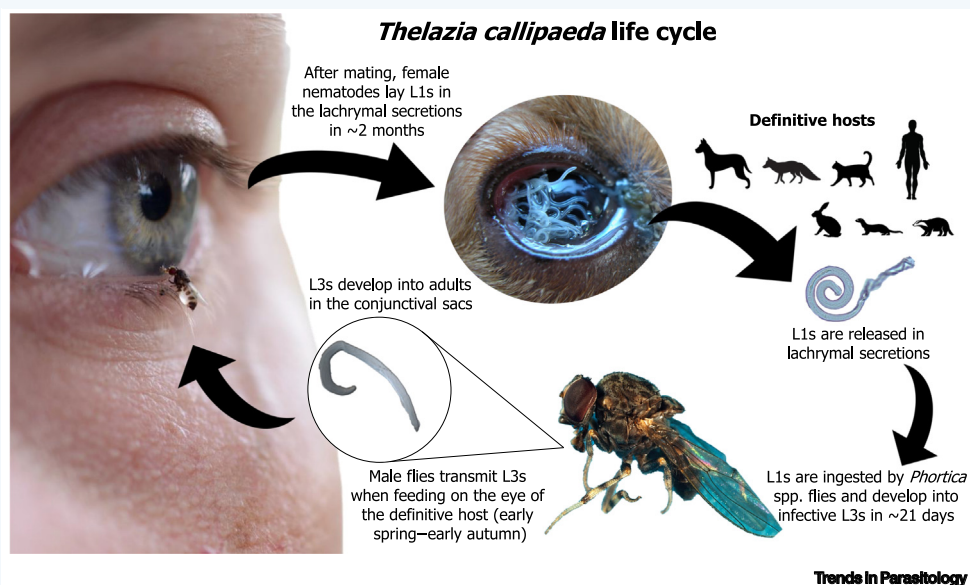
Thelazia callipaeda

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KEY FACTS::

The *Phortica variegata* male fly is the vector of *T. callipaeda* in Europe, whereas *Phortica okadai* is the vector in China.

T. callipaeda first-stage larvae (L1s) are ingested while the flies feed on the lachrymal secretions of infected animals.

Inside the fly, L1s develop within ~21 days to L2s and L3s, the infective stage.

The parasites are transmitted when male flies harbouring L3s feed on the eye of a suitable host.

P. variegata may overwinter and transmit *T. callipaeda* in early spring until summer, and adult nematodes can survive in the definitive host during winter.

Thelazia callipaeda is a nematode living on the surface of the eyes of domestic and wild carnivores and lagomorphs, being transmitted by zoophilic drosophilids belonging to the genus *Phortica*. It also infects humans, mainly children and the elderly in poor economic settings. For a long time it has been referred to as the oriental eyeworm for its distribution in many areas of southeast Asia (i.e., from China to Indonesia) and India. Since the early 1990s it has also been reported in Europe, arising in some spots in Italy. In the last 30 years this parasite has been detected throughout Europe in almost all countries as well as in the Balkans. *T. callipaeda* may cause from mild clinical signs (e.g., lachrymation, conjunctivitis, and keratitis) to corneal ulcers and even blindness, depending on the parasite burden and individual susceptibility. Control strategies are focussed on topical or systemic anthelmintic treatments, whereas the use of repellents seems to be ineffective against the vectors.

Experimental infections have demonstrated that *T. callipaeda* may develop in *P. variegata* flies from the USA, suggesting the potential occurrence of its infection in that country.

DISEASE FACTS::

T. callipaeda adults may cause variable clinical signs, including inflammation, lachrymation, and a foreign-body sensation.

In heavy infections, other clinical signs may occur, such as photophobia, oedema, corneal ulceration, conjunctivitis, and even blindness.

The use of anthelmintic drugs is useful for curing a pre-existing infection and even for preventing new infections.

TAXONOMY AND CLASSIFICATION:

PHYLUM: Nematoda

CLASS: Secernentea

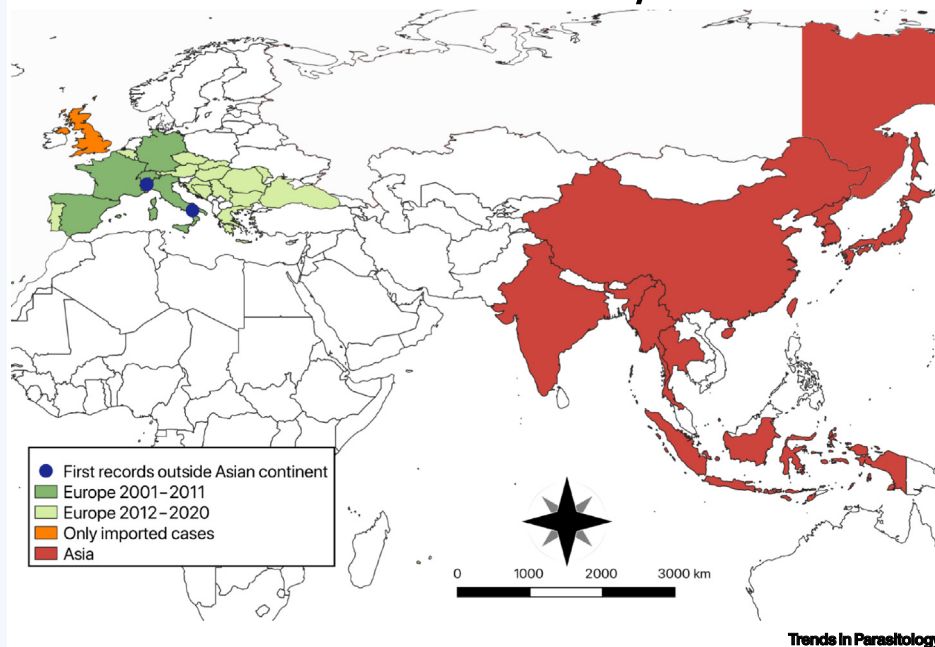
ORDER: Spirurida

FAMILY: Thelazidae

GENUS: *Thelazia*

SPECIES: *T. callipaeda* (Railliet and Henry 1910)

Distribution of *Thelazia callipaeda*



Acknowledgments

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Resources

www.cvbd.org/en/triatomine-and-fly-borne-diseases/thelaziosis/
www.cdc.gov/dpdx/thelaziosis/index.html
www.troccap.com/

Literature

1. Arme, T.M. *et al.* (2020) Survival of *Phortica variegata* experimentally and naturally infected with *Thelazia callipaeda*. *Med. Vet. Entomol.* 34, 201–206
2. Marino, V. *et al.* (2020) Spain as a dispersion model for *Thelazia callipaeda* eyeworm in dogs in Europe. *Prev. Vet. Med.* 175, 104883
3. Otranto, D. *et al.* (2006) *Phortica variegata* as an intermediate host of *Thelazia callipaeda* under natural conditions: evidence for pathogen transmission by a male arthropod vector. *Int. J. Parasitol.* 36, 1167–1173
4. Otranto, D. *et al.* (2003) Current status and epidemiological observation of *Thelazia callipaeda* (Spirurida, Thelaziidae) in dogs, cats and foxes in Italy: a 'coincidence' or a parasitic disease of the Old Continent? *Vet. Parasitol.* 116, 315–325
5. Otranto, D. *et al.* (2004) Biology of *Thelazia callipaeda* (Spirurida, Thelaziidae) eyeworms in naturally infected definitive hosts. *Parasitology* 129, 627–633
6. Otranto, D. *et al.* (2005) Nematode biology and larval development of *Thelazia callipaeda* (Spirurida, Thelaziidae) in the drosophilid intermediate host in Europe and China. *Parasitology* 131, 847–855
7. Otranto, D. *et al.* (2019) Effectiveness of the spot-on combination of moxidectin and imidacloprid (Advocate®) in the treatment of ocular thelaziosis by *Thelazia callipaeda* in naturally infected cats. *Parasit. Vectors* 12, 25
8. Palfreyman, J. *et al.* (2018) Predicting the distribution of *Phortica variegata* and potential for *Thelazia callipaeda* transmission in Europe and the United Kingdom. *Parasit. Vectors* 11, 272
9. Pombi, M. *et al.* (2020) Temperature is a common climatic descriptor of lachryphagous activity period in *Phortica variegata* (Diptera: Drosophilidae) from multiple geographical locations. *Parasit. Vectors* 13, 89
10. do Vale, B. *et al.* (2019) Thelaziosis due to *Thelazia callipaeda* in Europe in the 21st century – a review. *Vet. Parasitol.* 275, 108957