

Australian tubeworm infestation of freshwater turtles in the Murray River

Fact sheet

Introductory statement

In early 2008 infestation of two freshwater turtle species, the eastern long-necked turtle, *Chelodina longicollis*, and the Murray short-necked turtle, *Emydura macquarii*, with the Australian tubeworm (*Ficopomatus enigmaticus*) was reported at the mouth of the Murray River in South Australia. The worms form calcareous tubes on a range of artificial and natural surfaces. This emergent condition in turtles is thought to be a consequence of high water salinity in the region.

Aetiology

Ficopomatus enigmaticus (Fauvel 1923); Phylum: Annelida; Class: Polychaeta; Order: Sabellida; Family: Serpulidae

Natural hosts

There is no preferred host for *F. enigmaticus*. It is a ubiquitous organism attaching itself to both animate and inanimate objects.

Habitat

The tubeworm, *F. enigmaticus*, is found as a single tube or as aggregations on hard substrates in the intertidal and shallow subtidal areas where salinities are between ten and 30 ppt.^{1,2}

Life history

Fertilisation is external. The larvae remain within plankton for 20-25 days, after which they settle and attach to a substrate building calcareous tubes.²

World distribution

Ficopomatus enigmaticus, is native to Australia and the Indo-Pacific region.^{2,3} It has been introduced to waterways in Argentina, Europe, Japan, New Zealand, Uruguay, and United States including Hawaii, and the Black and Caspian Seas.^{2,3,4} Vectors include ballast water and hull fouling. Gregory (1998) points out that many marine fouling organisms have achieved a global distribution through natural methods, such as attachment to passively drifting logs, seaweed and pumice, or active marine animals such as turtles.⁵ However, an increasing role is being played by marine debris, particularly plastics. Studies of beach-cast pelagic plastics have shown that they can support a varied community of encrusters and fouling epibionts as well as a diverse motile biota.⁵

Occurrences in Australia

F. enigmaticus occurs in Australian waters.² In the Murray River estuary, particularly the Lower Lakes and Goolwa Channel regions of South Australia two freshwater turtle species, the eastern long-necked turtle, *Chelodina longicollis*, and the Murray short-necked turtle, *Emydura macquarii*, are becoming increasingly infested with the tubeworm.

Epidemiology

Morbidity rate

Exact figures are not available. Approximately 2000 freshwater turtles have been treated for *Ficopomatus enigmaticus* encrustation since April 2008 in the Murray River estuary (Bartley personal communication).

Mortality rate

Exact figures are not available. Turtles will succumb once the weight of the carapace impedes mobility and the ability to feed.

Incubation period

The time between the initial epibiont impact and the manifestation of clinical signs directly attributed to *F. enigmaticus* is not known.

Transmission

- Transmission is via larvae released from tubules, particularly as the consequence of mechanical trauma.
- Tubeworm larvae have a preference for settling on tube structures of their own species.

Sources of agent

Damage to the calcareous tubules will trigger mass spawning of larvae. Wildlife carers need to take care to prevent spreading the organism when cleaning affected turtles.

Clinical signs

- Encrustations, tubules on the carapace
- Ill thrift, weight loss and eventual death, often by drowning due to the increase in weight of the carapace.
- “Shell rot” and chronic weakness have been reported in recovering turtles (Bartley personal communication).

Diagnosis

Clinical signs, physical examination.

Clinical pathology

Clinical pathology techniques are not required in making a diagnosis.

Pathology

- Grossly, tubular, calcareous encrustations of the carapace are obvious.
- Microscopic examination is unnecessary in making a diagnosis.
- There are no case reports available through the Australian Registry of Wildlife Health.

Differential diagnoses

The clinical signs are pathognomic for tubeworm infestation.

Laboratory diagnostic specimens

Calcified tubules and tubeworms.

Laboratory procedures

None, other than identification of the tubeworm by direct techniques such as physical examination or magnification.

Treatment

- Quarantine affected turtles
- Soak turtles in warm (25 °C) freshwater for 24 hours to soften the tubules
- Remove tubules with a blunt metal or plastic scraper
- Cleaning of turtles can trigger mass spawning and should not take place near natural waterways
- Wipe the carapace surface with 70% methylated spirits and 30% water
- Keep under observation for 10 days in freshwater tanks
- Move to larger tank after 10 days for extended rehabilitation

Prevention and control

The condition is directly attributed to increased salinity of waterways in the Murray Darling Basin. Early identification of affected turtles will aid recovery. Treated turtles should be returned to appropriate habitats suitable for their survival.

Surveillance and management

There is no targeted surveillance for the Australian tubeworm (*Ficopomatus enigmaticus*). There is no AUSVETPLAN or Import Risk Analysis for the species.

Statistics

Wildlife disease surveillance in Australia is coordinated by Wildlife Health Australia. The National Wildlife Health Information System (eWHIS) captures information from a variety of sources including Australian government agencies, zoo and wildlife parks, wildlife carers, universities and members of the public. Coordinators in each of Australia's States and Territories report monthly on significant wildlife cases identified in their jurisdictions. NOTE: access to information contained within the National Wildlife Health Information System dataset is by application. Please contact admin@wildlifehealthaustralia.com.au.

There is no information available on tubeworm infestation of freshwater turtles in the National Wildlife Health Surveillance Database (www.wildlifehealthaustralia.com.au).

Research

More information needs to be made available to the general public and stakeholders on the biology and distribution of the tubeworm and its impact on the natural and artificial environment.

Investigation of tubeworm (*F. enigmaticus*) distribution and settlement substrate preferences - Assoc Prof Sabine Dittman, Flinders University, South Australia.

Human health implications

There are no associated human health implications.

Conclusions

Tubeworm encrustation is a symptom of increasing salinity in the major waterways of Australia. Strategies need to be developed to manage the welfare issues of large numbers of freshwater turtles being infested with tubeworm.

References and other information

1. Edgerton BF, Evans LH, Stepens FJ, Overstreet RM. Synopsis of freshwater crayfish diseases and commensal organisms. *Aquaculture* 2002; 206: 57–135.
2. Power A, Mitchell M, Walker R, et al. Baseline Port Surveys for Introduced Marine Molluscan, Crustacean and Polychaete Species in the South Atlantic Bight. NOAA's National Sea Grant Aquatic Nuisance Species Program. National Oceanic and Atmospheric Administration – US Department of Commerce. 2006. http://www.marsci.uga.edu/gaseagrant/pdf/Port_Survey.pdf. Accessed 15 December 2009.
3. Database Ecology of *Ficopomatus enigmaticus* National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG) <http://www.issg.org/database/species/ecology.asp?si=1382&fr=1&sts=sss&lang=EN> Accessed 15 December 2009.
4. Read GB, Gordon DP. Adventive occurrence of the fouling serpulid *Ficopomatus enigmaticus* (Polychaeta) in New Zealand. *New Zealand Journal of Marine and Freshwater Research* 1991;25: 269–273.
5. Gregory M. Pelagic plastics and marine invaders. *Aliens* 1998; 7: 6–7.

6. Roberts S. Rehabilitation and release of fresh-water tortoises rescued from the Lower Lakes and Goolwa Channel. Guidelines for Community Volunteers and Managers. Department for Environment and Heritage. Government of South Australia. 2009.

Acknowledgements

The following people have had input into this document: Robert Johnson.

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To provide feedback on this fact sheet

We are interested in hearing from anyone with information on this condition in Australia, including laboratory reports, historical datasets or survey results that could be added to the National Wildlife Health Information System. If you can help, please contact us at admin@wildlifehealthaustralia.com.au.

Wildlife Health Australia would be very grateful for any feedback on this fact sheet. Please provide detailed comments or suggestions to admin@wildlifehealthaustralia.com.au. We would also like to hear from you if you have a particular area of expertise and would like to produce a fact sheet (or sheets) for the network (or update current sheets). A small amount of funding is available to facilitate this.

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