

Snake mite (*Ophionyssus natricis*)

Fact sheet

Introductory statement

Ophionyssus natricis, called the snake mite (in the family Macronyssidae) is the most common and clinically significant mite found on captive snakes worldwide. These mites cause dermatitis, irritation, anaemia and have been implicated in the transmission of *Aeromonas* spp. and inclusion body disease. Though there are anecdotal reports, there are no confirmed reports of snake mite in free-ranging reptiles in Australia. Prevention of introduction of this parasite into wild populations of reptiles in Australia is important. Greatest risk activities include: 1) release of rehabilitated reptiles that have been held in captivity back into the wild and 2) if people working with free-living reptiles have also been working with captive reptiles.

Natural hosts

All captive snake species, and other captive reptiles including lizards and (rarely) chelonians, are susceptible to infection, although infestation is most common in snakes (Šlapeta et al. 2017).

World distribution and occurrences in Australia

The parasite occurs worldwide in captive reptile collections, including in Australia. There are no confirmed reports in wild reptiles in Australia. There are, however, anecdotal reports of *O. natricis* presence on free-living reptiles in Australia.

Epidemiology

Mites parasitise the reptile and suck blood. Eggs are laid in the environment; larval and late nymph stages are free-living. Early nymph and adult stages are parasitic, living on the reptile host, attaching underneath the host's scales and sucking blood. Adult mites live for up to 40 days. Engorgement of the adult female takes up to eight days; they then lay approximately 20 eggs. Adult females feed two to three times at one to two week intervals. Mites prefer a temperature range of 20-23 C and die above 50 C. Eggs need at least 85% humidity and temperature above 20 C to hatch, and larvae need at least 75% humidity to complete their moult. The life cycle can be very short, however mites are hardy and can survive in the environment for up to 90 days (Fitzgerald and Vera 2006; Šlapeta et al. 2017).

In the captive environment, the mite life cycle is completed within the reptile's enclosure. Infestations spread easily between enclosures and the parasite can be very difficult to eradicate from collections of animals.

Clinical signs and diagnosis

Clinical signs include anorexia, depression, unusual behaviours such as frequent rubbing against cage furniture, increased frequency or abnormal sloughing and prolonged soaking in the water bowl. As mites attach underneath scales and are photophobic, burdens may be difficult to detect unless the host is carefully inspected. Mites are small (1 mm or less) and turn red once engorged with blood. The eggs are off-white to tan. Mites faeces may be seen as small specks on the skin or environment (Šlapeta et al. 2017). Anaemia and concurrent disease can occur (Fitzgerald and Vera 2006). Diagnosis is based on clinical signs and finding mites or mite faeces on the snake, or non-feeding mites in the enclosure (sometimes in the water bowl) or on the shed skin of the host.

Clinical pathology and diagnostic specimens

Snakes may become anaemic with heavy infections. Laboratory testing is generally not required.

Treatment, prevention and control

Both the host and the environment must be effectively treated for eradication of the parasite. Temperatures above 50 C and humidity below 50% will kill mite stages. Mites can be easily drowned, however eggs may survive submersion. Most effective regimes will require a combination of treatments for environment and host. This generally includes:

- Isolation and treatment of affected reptiles in a simple environment (repeat treatment may be required to break the mite life cycle)
- Cleaning and treatment of environment including all enclosure furnishings and substrates, and the environment outside the enclosure, as mites can be highly motile.

Currently used chemicals for treatment of the reptile include fipronil and ivermectin. Any chemical treatment has the potential for toxicity. Caution is advised in use of pyrethrins, pyrethroids, organophosphates and carbamates because of the risk of toxicity (Šlapeta et al. 2017).

Snakes newly arriving in a collection should be placed in a clean environment and quarantined. They should be checked regularly and treated for mites while still in quarantine. Care should be taken when working with free-living reptiles, or releasing reptiles to the wild, to ensure there is no inadvertent introduction of *O. natricis* into wild populations.

Surveillance and statistics

There is no targeted surveillance program for *O. natricis*.

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 are no cases of *O. natricis* infection listed in wild snakes in the National Wildlife Health Surveillance Database.

Research

Surveillance to determine the presence and prevalence of the mite in wild populations is recommended.

Human health implications

In humans the mites can, rarely, cause a papular vesiculo-bullous eruption of the skin (Schultz 1975; Amanatfard et al. 2014).

Conclusions

O. natricis is one of the most common parasites affecting snake collections. Because the status of Australia's wild snakes is unknown, care is required when releasing injured and rehabilitated snakes back to the wild to avoid introducing this parasite into potentially naïve populations.

References and other information

Amanatfard E, Youssefi MR, Barimani A (2014) Human Dermatitis Caused by *Ophionyssus natricis*, a Snake Mite. *Iranian journal of parasitology* **9**, 594.

Fitzgerald K, Vera R (2006) Acariasis. In 'Reptile Medicine and Surgery.' (Ed. D Mader.) pp. 720-738. (Saunders Elsevier: St. Louis, Missouri).

Schultz H (1975) Human infestation by *Ophionyssus natricis* snake mite. *British Journal of Dermatology* **93**, 695-697.

Šlapeta J, Modrý D, Johnson R (2017) Reptile Parasitology in Health and Disease. In 'Reptile Medicine and Surgery in Clinical Practice.' (Eds B Doneley, D Monks, R Johnson, B Carmel.) pp. 425-439.

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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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