# Diseases of crustaceans Fungal diseases—**Crayfish plague**

# Signs of disease

Important: animals with disease may show one or more of the signs below, but disease may still be present in the absence of any signs.

# Disease signs at the farm level

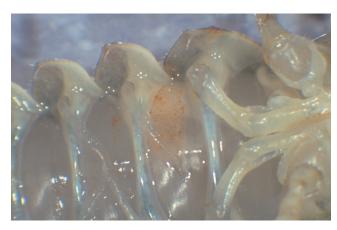
- high mortality at time of initial outbreak
- many dead or weak crayfish floating or lying in watercourses or ponds (mortalities may go unnoticed in the wild)
- crayfish in open water with an unsteady and raised gait ('walking on stilts')
- rapid tail escape response weakens
- crayfish fall over, unable to right themselves (more evident out of water)

# Clinical signs of disease in an infected animal

- fungal growth on soft, noncalcified parts of shell
- browning or blackening spots on the carapace, where fungal hyphae proliferate
- white necrotic musculature in tail instead of the pearl grey of healthy crayfish
- fine black lines on the soft shell underneath the tail
- melanised (black) shell in chronically infected individuals
- death, within weeks, of nonresistant European crayfish

## Disease agent

Crayfish plague is caused by infection with the freshwater oomycete fungus, *Aphanomyces astaci*.



Crayfish plague. Segment with brown markings shows signs of typical infection from fungus. Segments either side indicate healthy muscle tissue

Source: D Alderman



Crayfish plague, showing classic darkening at base of walking legs

Source: D Alderman





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# **Crayfish plague continued**

# **Host range**

Crustaceans known to be susceptible to crayfish plague:

Japanese crayfish\* (Cambroides japonicus)
Louisiana swamp crayfish\* (Procambarus clarkii)
noble crayfish\* (Astacus astacus)

signal crayfish\* (Pasifastacus leniusculus) stone crayfish\* (Austropotamobius torrentium)

Turkish crayfish\* (Astacus leptodactylus) white-clawed crayfish\* (Austropotamobius pallipes)

Chinese mitten crab (Eriocher sinensis)
freshwater crayfish (Cherax spp)
giant Tasmanian crayfish (Astacopsis gouldi)
Gippsland spiny crayfish (Euastacus kershawi)

It is believed that all species of freshwater are susceptible.

#### Presence in Asia-Pacific

EXOTIC — Crayfish plague has not been officially reported in the Asia–Pacific region under the NACA–FAO–OIE quarterly aquatic animal disease reporting program.

## **Epidemiology**

- Mortalities of up to 100% have occurred in Europe, with extermination of susceptible populations.
- The North American crayfish is largely resistant and is a carrier of the disease agent and source of transmission among less resistant species of crayfish.
- All species of freshwater crayfish are believed to be susceptible to infection with crayfish plague
- The disease was introduced into Europe in American freshwater crayfish and has decimated European crayfish stocks (both wild and cultured). There has been no evidence of developing resistance to the disease among European species during the 100 years since its introduction.
- Crayfish plague can occur at any time of year, but is more likely in the summer months.
- Death can occur 5–50 days (or more) from initial infection, depending on water temperature and the initial number of zoospores.
- The fungal infestation releases motile zoospores direct to the water column when the crayfish dies, and these infect other crayfish.
- Transmission is horizontal through the water column.

<sup>\*</sup> naturally susceptible (other species have been shown to be experimentally susceptible)





# **Crayfish plague continued**

- Translocation and migration of fish, birds and other wildlife can allow them to act as vectors, transporting the disease to previously unexposed waters.
- The fungus can be introduced to a new susceptible population on contaminated ropes, traps, fishing gear, boots, nets and other equipment.

# **Differential diagnosis**

The differential diagnostic table and the list of similar diseases appearing at the bottom of each disease page refer only to the diseases covered by this field guide. Gross signs observed might well be representative of a wider range of diseases not included here. Therefore, these diagnostic aids should not be read as a guide to a definitive diagnosis, but rather as a tool to help identify the listed diseases that most closely account for the gross signs.

None of the other diseases featured in this field guide result in the rapid mortality or other gross signs of crayfish plague. In Australia, infection with the microbial parasite *Thelohania* (or porcelain disease) may cause similar clinical signs.

In a few cases, examination by light microscopy can further define a diagnosis. However, further laboratory examination is always required for a definitive diagnosis.

# **Sample collection**

Because of uncertainty in differentiating diseases using only gross signs, and because some aquatic animal disease agents might pose a risk to humans, you should not try to collect samples unless you have been trained. Instead, you should phone your national hotline number and report your observations. If samples have to be collected, the agency taking the call will advise you on what you need to do. Local or district fisheries/veterinary authorities could advise you on sampling.

## **Emergency disease hotline**

For your national emergency disease hotline number, see Whom to contact if you suspect a disease.

## **Further reading**

http://www.oie.int/aac/eng/cards/en\_diseasecard.htm

The currently accepted procedures for a conclusive diagnosis of crayfish plague are summarised at http://www.oie.int/eng/normes/fmanual/A\_00054.htm

These hyperlinks were correct and functioning at the time of publication.



