

Brucella suis in feral pigs

Fact sheet

January 2023

Introductory statement

Swine brucellosis occurs in feral pigs in areas of Australia. The infection is easily transmitted from feral pigs to dogs and humans. Disease may be seen in dogs which have been exposed to infected feral pigs. Swine brucellosis is a zoonosis and humans may become infected directly from pigs, or via infected dogs.

Aetiology

Swine brucellosis is caused by infection with the Gram-negative bacterium *Brucella suis*, family *Brucellaceae*.

Natural hosts

Domestic, wild or feral pigs are the natural hosts for *B. suis*. Outside Australia, European hares, reindeer, caribou and rodents may be reservoir hosts for different strains of *B. suis* (CFSPH 2018). Other mammals, including cattle, horses, dogs and humans may become infected following contact with pigs or pig products, but rarely show clinical signs.

World distribution

Brucella suis is widely distributed in many parts of the world including the USA, Europe, Latin America and Asia (CFSPH 2018).

Occurrences in Australia

The disease is considered endemic in feral pigs in eastern Qld and northern NSW (Mason and Fleming 1999; Ridoutt et al. 2014; Mor et al. 2016; DAF Qld 2018; Kneipp et al. 2021; AHA 2022; Orr et al. 2022). There are recent reports in one person and in feral pigs in the Top End of the NT, and in a feral pig in far north SA (PIRSA 2022; Stedman et al. 2022).

Swine brucellosis has not been reported in domestic piggeries since 1991 (DAF Qld 2018; AHA 2022).

B. suis has been reported in pig hunting dogs in northern NSW, where feral pig density is highest, especially around Moree, and in Qld (NSW DPI 2014; Mor et al. 2016; Kneipp et al. 2021; AHA 2022; Orr et al. 2022). It is estimated that between 100,000 and 200,000 hunters kill up to 500,000 feral

pigs each year in Australia and dogs are commonly used in feral pig hunting practices (Mor et al. 2016).

Epidemiology

Venereal transmission is the primary method of spread between pigs. From pigs to dogs and humans, infection is spread by direct contact with bacteria-contaminated body fluids, via ingestion, abraded skin or exposure of mucous membranes. Infection may also occur via aerosol spread or exposure to food or water contaminated by infected pigs. Urine, placenta, and discharges from infected sows at farrowing are all important sources of the bacteria. Pigs may remain infected for life, as may other mammals.

Dogs acquire infection after direct contact, through hunting, with infected feral pigs, or after eating raw, infected pig meat (AHA 2022). Infected dogs are a potential source of infection for people, pigs, and other dogs through contact with urine, saliva and reproductive materials.

In conditions of high humidity, low temperature and no sunlight, *Brucella* organisms can remain viable for several months in water, aborted fetuses, manure, wool, hay, equipment and clothes. *Brucella* can withstand drying, particularly when organic material is present, and can survive in dust and soil. Survival is longer when the temperature is low, particularly when it is below freezing. Direct sunlight kills the organism quickly (CFSPH 2018).

Clinical signs

Clinical signs in pigs are variable. Infected pigs may show no clinical signs or may become lame with swollen joints. Infected boars may develop swollen testicles and there may be reproductive failure. There may be signs of incoordination and hind limb paralysis. Sows may abort and develop sterility. Piglets may be born dead or weak.

Infected dogs may not develop clinical signs, but occasionally develop fever, enlarged lymph nodes and swollen testicles.

Humans with brucellosis generally develop signs 5 to 60 days after exposure, although in some cases onset of signs is delayed for several months. Symptoms include intermittent fever, sweating, lethargy, loss of appetite, headaches, joint and body pain. Typically, symptoms persist for 2 to 4 weeks, followed by spontaneous recovery. Some people develop chronic 'undulant' fever. Abscessation of organs and endocarditis are rare complications in humans. Pregnant women may suffer spontaneous abortion (CFSPH 2018).

Diagnosis¹

Diagnosis may be made on presence of characteristic clinical signs, supported by confirmatory testing. Direct microscopy of stained smears of fluids may be useful for a presumptive diagnosis. Most serological tests detect non-specific Brucella antigens and there is no specific serological test for *B. suis*. Cross-reaction with other Brucella antigens may occur, however in Australia *B. melitensis* and *B. abortus* are no longer present, making positive serology fairly indicative for exposure to *B. suis*. In pigs, serology is generally considered suitable for herd screening, rather than individual animal diagnosis. ELISAs, buffered Brucella antigen tests and complement fixation are used (CFSPH 2018).

PCR testing and immunostaining techniques may be used. A brucellin allergic skin tests can be used in pigs (CFSPH 2018). Chronic brucellosis can be very difficult to diagnose.

Aborted foetuses, infected tissues, lymph nodes and blood can be cultured for the organism (CFSPH 2018).

Pathology

Aborted foetuses may appear normal or may be autolysed and there may be subcutaneous oedema or blood-stained fluid in body cavities. There may be placentitis with necrosis or inflammation. In adults, granulomatous or purulent lesions may be found in the reproductive tract, mammary gland and associated lymph nodes, bones, joints and other tissues and organs. Males may have unilateral or bilateral epididymitis or orchitis (CFSPH 2018).

Differential diagnoses

Not identified.

Laboratory diagnostic specimens

Serum is required for serology. Numerous tissues and organs can be used for culture including aborted foetal material, vaginal secretions, semen, joint fluids, uterus, lymph nodes, abscesses, spleen and liver.

Laboratory procedures

Culture and serology are the main diagnostic methods used to confirm *B. suis* infection.

¹ For detailed information please contact your local animal health laboratory.

Treatment

Treatment of feral pigs is not attempted, and treatment of domestic pigs is not considered practical. Although long-term treatment of dogs is sometimes successful (CFSPH 2018), relapses may occur and euthanasia of infected dogs is recommended to reduce risk to people (NSW DPI 2012). Humans are treated with extended courses of antibiotics.

Prevention and control

Although *Brucella* organisms may survive for extended periods in the environment they are readily killed by most available disinfectants and sterilisation procedures (CFSPH 2018). Control of *B. suis* in feral pigs is not possible however dog owners should prevent dogs from consuming raw feral pig products. People who are at an increased risk of brucellosis infection, including feral pig hunters, farm workers, vets and abattoir workers should practise good personal hygiene and wear protective clothing when in close contact with potentially infected animals (DoH NSW 2019).

In domestic piggeries, testing and slaughter has been used to develop *B. suis*-free herds (DAF Qld 2018). There is no vaccination available.

The NSW Department of Primary Industries recommends that dogs confirmed as infected be euthanased to reduce risk to people (NSW DPI 2012).

Additional information on control and management, including hygiene, test and slaughter and disinfection processes can be found in the Brucellosis: *B. suis* fact sheet provided by the Center for Food Security and Public Health (CFSPH 2018).

Surveillance and management

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. See the WHA website for more information: <https://wildlifehealthaustralia.com.au/ProgramsProjects/eWHIS-WildlifeHealthInformationSystem.aspx>.

Brucella suis is included in the list of diseases with wildlife as part of their ecology targeted as part of Australia's general wildlife health surveillance system. It is a nationally notifiable disease (DAWR 2016) and a multiple species WOAHL-listed disease (WOAHL 2022). Brucellosis is also a nationally notifiable disease of humans in Australia (DoHAC 2016). There is no AUSVETPLAN for *B. suis*.

In Qld there is a voluntary industry Swine Brucellosis Accreditation Scheme for domestic piggeries (DAF Qld 2018). The National Wildlife Health Information System (<https://wildlifehealthaustralia.com.au/ProgramsProjects/eWHIS-WildlifeHealthInformationSystem.aspx>) includes reports of cases from feral pigs in NSW and NT. The majority of surveillance and testing information on *B. suis* is, however, maintained in the relevant

jurisdiction's databases. Those interested in detailed information on the *B. suis* status of feral animals in their area are referred to these sources.

WHA is 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. Negative data are also valuable. If you can help, please contact us at admin@wildlifehealthaustralia.com.au.

Research

More information is needed on the true distribution and prevalence of *B. suis* in feral pig populations across Australia.

Human health implications

Brucellosis is a serious and potentially fatal zoonotic disease in humans. Advice regarding human health implications of *B. suis* should be sought from your local public health department. Although the available data on the prevalence of *B. suis* antibody in feral pigs in Australia suggests the risk of human exposure is low, the human health risk for those in contact with feral pigs should be regarded as high because of the severity of the disease in humans (Ridoutt et al. 2014).

The NSW and Qld Government Departments of Health have fact sheets (see www.health.nsw.gov.au/Infectious/factsheets/Factsheets/brucellosis.pdf and www.health.gov.au/diseases/brucellosis).

Conclusions

Brucella suis is serious zoonotic disease with confirmed presence in feral pig populations in Qld, northern NSW and the NT, and one case in far north SA. The disease may be present more widely throughout Australia and it is safest to assume that all feral pigs pose an infection risk with *B. suis*. Dogs exposed to feral pigs or feral pig meat may acquire infection and develop disease. Humans are at risk of disease either through direct exposure to feral pigs and their products, or through infected dogs. People at risk of exposure to *B. suis* should practise good personal hygiene and wear protective clothing when in close contact with potentially infected animals. Further information on the prevalence and distribution of *B. suis* within feral pig populations throughout Australia will help to refine the disease risk for domestic animals and humans.

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To provide feedback on this fact sheet

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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