Poxviruses and Australian mammals

Fact Sheet

February 2026

Key points

- Poxviruses are a large group of viruses that can cause skin lesions in Australian mammals.
- Some poxviruses can be highly host specific and others can have a wide host range.
- In Australian mammals, poxviruses have been reported primarily in macropods, with cases also reported in possums, echidnas, bats and dolphins.
- In Australian mammals, infection rates appear to be low, and disease is usually relatively mild.

This Fact Sheet provides information on poxviruses in Australian native mammals. See also the WHA Fact Sheets "Poxviruses and Australian wild birds" and "Diseases of concern in wild Australian crocodiles".

Aetiology, natural hosts and world distribution

Poxviruses are found worldwide. There are seven genera of mammalian poxviruses. [1]. Pox in native Australian mammals is caused by viruses of the family *Poxviridae*, subfamily *Chordopoxvirinae*. Many poxviruses in Australian mammals have not been classified.

Poxviruses have been found in a range of Australian mammalian species. It is likely that all mammal species are susceptible to poxvirus infection.

One Health implications

Wildlife and the environment: Poxviruses do not appear to pose a threat to established populations of free-ranging Australian mammal species.

Domestic animals and humans: Poxviruses found in Australian native mammals are not currently known to cause significant disease in livestock**.** There are no known zoonotic risks from poxviruses found in Australian mammals.

Occurrences in Australia

Table 1 Australian native mammals reported with poxvirus disease

Taxon	Reference
Monotreme	
Short-beaked echidna (*Tachyglossus aculeatus*)	Whittington 1988 [2]
Bats	
Southern bent wing bat (*Miniopterus schreibersii bassanii*) Little red flying-fox Grey-headed flying-fox	McLelland et al. 2013 [3], O'Dea et al. 2016 [4], Valenza et al. 2024 [5]

Taxon	Reference
Macropods	
Red kangaroo (*Macropus rufus*) Eastern grey kangaroo Western grey kangaroo Common wallaroo (*M. robustus*) Tammar wallaby (*M. eugenii*) Agile wallaby (*M. agilis*) Swamp wallaby (*Wallabia bicolor*) Quokka (*Setonix brachyurus*) Tasmanian pademelon (*Thylogale billardierii*)	Bagnall and Wilson 1974 [6], McKenzie et al. 1979 [7], Bennett et al. 2017 [8], Arundel et al. 1979 [9], Speare and Thomas 1988 [10], Vogelnest and Portas 2019 [11], Speare 1988 [12], Rothwell et al. 1984 [13], Reece and Hartley 1994 [14], Presidente 1978 [15], Ladds 2009 [16]
Possums	
Common brushtail possum (*Trichosurus vulpecular*) Common ringtail possum	Ladds 2009 [16], Samuel 1989 [17], Vogelnest et al. 2012 [18]
Cetaceans	
Indo-pacific bottle-nosed dolphins (*Tursiops aduncus*) Common bottlenose dolphin (*T. truncatus*)	Fury and Reif 2012 [19], Wildlife Health Australia 2026 [20]

Poxvirus in common ringtail possums (*Pseudocheirus peregrinus*), was caused by an *Orthopoxvirus* [18], and in little red (*Pteropus scapulatus*) and grey-headed flying-foxes (*P. poliocephalus*) it was caused by a *Pteropopoxvirus*. Novel, unclassified poxviruses have been sequenced from free-ranging eastern grey (*Macropus giganteus*) and western grey kangaroos (*M. fuliginosus*) [8].

Epidemiology

In animals, disease due to poxviruses usually occur in juveniles and subadults and may be associated with environmental or anthropogenic factors, stress or immune suppression [5, 21].

Poxviruses are unable to penetrate intact skin and need to gain entry through breaks in the skin. Transmission is likely via arthropod vectors or close contact.

Macropod poxviruses are believed to be species-specific. There have been examples in captive macropod colonies where only a single species have developed disease, while other species did not [10].

Increasing global temperatures could potentially result in increased vector numbers and longer periods of vector activity possibly resulting in higher incidence and prevalence of poxvirus infections.

Clinical signs

Lesions in macropods may be solitary or multiple and vary in size from a few millimetres up to 5 cm. While they can be found anywhere on the body, lesions are most common on the extremities (tail, face and limbs) [6, 7, 9, 13, 15, 22]. Grossly, lesions can appear as a firm, raised mass containing creamy exudates of keratinised debris and purulent material or, more commonly, an irregular wart-type mass that becomes darker and hairless as it enlarges. There is no associated itching and lesions regress spontaneously over about three months, leaving a pigmented or non-pigmented hairless scar [6, 10, 14, 16].

In reports in possums, lesions were raised, red and ulcerated. They occurred on the tail, feet and tongue, and regressed over two months [16, 18]. Affected echidnas developed a severe proliferative dermatitis [2].

Lesions in affected cetaceans are typically circular areas of altered pigmentation with a central crater or black pinpoint patterned ("tattoo") lesions [21].

In affected flying-foxes circular areas of depigmentation were also found on the wings and neck. These lesions were vesicular and at times leaked a clear fluid [5].

Diagnosis

Diagnosis is often presumptive based on typical appearance of lesions, along with case history. Histopathology and electron microscopy of lesions can be used to confirm diagnosis [16].

Laboratory diagnostic specimens and procedures

Lesions should be excised and submitted, half in formalin for histopathology and half fresh/frozen for viral culture and PCR. Electron microscopy can be used to demonstrate typical poxvirus particles [2, 6, 7, 16, 18].

Pathology

Histologically, the epidermis is markedly thickened due to hyperkeratosis and acanthosis. The more superficial cells are enlarged, often vacuolated and may contain pink-staining inclusion bodies. Lesions may be secondarily infected by fungi and bacteria resulting in a variable leucocytic infiltrate.

Differential diagnosis

Differential diagnoses include diseases that can cause proliferative lesions, such as neoplasia, abscesses or granulomas. Hairless scars need to be differentiated from diseases that cause focal alopecia, such as ringworm.

Treatment

Treatment is usually not necessary as lesions resolve over several months. Surgical excision can be undertaken if lesions are inhibiting normal function (e.g. located near the eyes or mouth); once removed they do not recur. Secondarily infected masses can be treated with antimicrobials. Supportive treatment may aid recovery [23].

Prevention and control

Control of poxvirus in wild populations is not possible. Captive animals can be held in screened insect-proof enclosures to reduce risk of transmission via arthropod vectors. Any diseased animals should be isolated and held in separate screened enclosures to prevent the disease spreading. Poxviruses are extremely resistant, being able to survive in the environment for months to years. Equipment used for feeding and husbandry should be cleaned regularly with a disinfectant such as bleach.

Research

Relatively little is known about the poxviruses that have been reported in Australia. Many have not been characterised and there is little information on species specificity or transmission. More information on these areas, including the factors contributing to disease spread and expression, would be helpful.

Surveillance and management

Wildlife Health Australia administers Australia's general wildlife health surveillance system, in partnership with government and non-government agencies. Wildlife health data is collected into a national database, the electronic Wildlife Health Information System (eWHIS). Information is reported by a variety of sources including government agencies, zoo based wildlife hospitals, sentinel veterinary clinics, universities, wildlife rehabilitators, and a range of other organisations and individuals. Targeted surveillance data is also collected by WHA. See the WHA website for more information https://wildlifehealthaustralia.com.au/Our-Work/Surveillance and https://wildlifehealthaustralia.com.au/Our-Work/Surveillance/eWHIS-Wildlife-Health-Information-System.

The national wildlife health surveillance system records cases of poxviruses in native wildlife in the national database. There are over 30 cases of poxvirus infection in eWHIS. It is likely that poxvirus infection in native Australian wildlife is far more common than the figures in the database suggest, as the disease is considered "common" and is probably under-reported.

We encourage those with laboratory confirmed cases of this condition in native Australian or feral animals to submit this information to the national system for consideration for inclusion in the national database. Please contact us at admin@wildlifehealthaustralia.com.au.

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Wildlife Health Australia recognises the Traditional Custodians of Country throughout Australia. We respectfully acknowledge Aboriginal and Torres Strait Islander peoples' continuing connection to land, sea, wildlife and community. We pay our respects to them and their cultures, and to their Elders past and present.

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