

# BLINDNESS IN SOME EASTERN GREY KANGAROOS

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## Introduction

Environment and SA Water staff noticed what appeared to be an increasing number of Kangaroos affected by blindness and staggering.

Staff who are employed in culling operations regularly have to shoot badly affected kangaroos, on welfare grounds. The syndrome appears to have spread to another Reservoir area near Myponga in the past few months, and there was a concern that the condition may be infectious, and a desire to have a diagnosis to determine what actions may be taken, if any, to prevent spread.

Although a syndrome of blindness in kangaroos has been observed and described in the late 1990s<sup>1</sup>, this syndrome appeared slightly different, in that kangaroos of all ages and sexes seemed to be affected, and affected animals had bluish or discoloured eyes.

## History

Management at the SA Water catchment described their concerns, observations and request for an investigation, in early July 2022. I visited the catchment area on the afternoon of 14<sup>th</sup> July and accompanied some officers and a qualified shooter to an area where cases might be observed. We observed groups of 10–20 eastern grey kangaroos, possibly 100 in total, and in that time observed 2 cases.

Affected kangaroos were:

- Of any age (mature) and sex
- The animals appeared ataxic—stumbled and fell to the side when running, and when they got up demonstrated uncoordinated gait
- Advanced cases waste away
- All cases have 'blue discolouration' of the eye/ cloudy eyes
- Ears droop and they do not look well
- Kangaroos can still hear, and there is not total blindness.

I was shown videos of cases, and an advanced case in a large adult male eastern grey was shot, and I collected blood, brain and eyes from this case for laboratory submission. There appeared to be a keratitis/scar on the L eye (possibly a fight/scratch), and the right eye had subtle opacity—possibly a uveitis. In observing this animal ante mortem, it appeared affected by a Central Nervous System (CNS) disorder, rather than blindness.

There is abundant *Phalaris* sp pasture in this area (mostly young and short) that appears to be heavily grazed. *Phalaris tuberosa* has been implicated in CNS disturbances in kangaroos and other species in the past.<sup>2</sup>

In late September 2022, a further 2 wallabies were sampled from another National Park area about 30km away, with similar symptoms. These wallabies had very similar gross and histopathological changes, and it was reported that there seemed to be more of these cases this year at that sight than previously.

## Results summary

Samples submitted to the lab included fresh and fixed brain, a swab from the cranial cavity, and both eyes. Ocular fluid samples were normal for calcium, magnesium, urea and hydroxy butyrate—indicating that nervous signs were unlikely to be metabolic in nature.

Swab grew a plant pathogen, probably a contaminant.

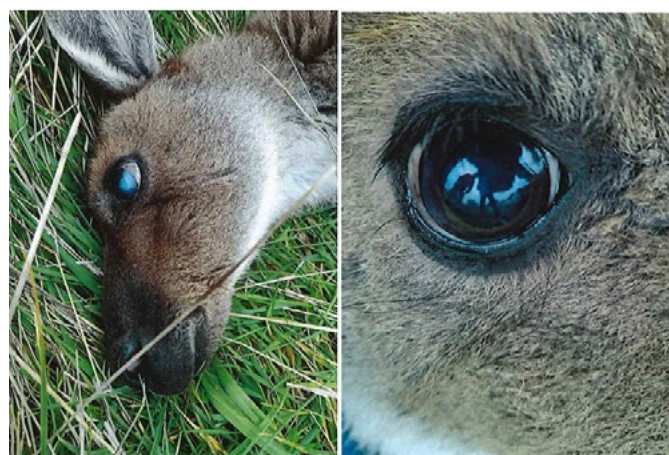


Figure 1. L eye has slight scar on surface, R eye appears 'cloudy' internally

## Diagnosis

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Brainstem and spinal cord: Neuronal pigmentation with neuroaxonal degeneration and Wallerian degeneration compatible with *Phalaris* toxicity.

Eye: Conjunctivitis and scleritis, lymphoplasmacytic, multifocal, minimal; with glaucoma and cataract

## Comments

Brainstem and spinal cord histopathology of perinuclear brown granular pigment in neurons, with neuroaxonal degeneration and mild lymphoplasmacytic meningoencephalitis, is compatible with *Phalaris* toxicity. The intramyelinic oedema in the white matter tracts is typical of exposure to high levels of ammonia and could suggest toxic impairment of urea-cycle enzymes.

Cataract is a common sequel to inflammatory-associated changes in the eye. Glaucoma would cause the iris to bow forward and adhere to the cornea (iris bombe); clinically, the eye would be painful rather than blind in the absence of RPE and optic nerve pathology. The perivascular lymphoplasmacytic infiltrations in the conjunctiva and sclera suggests probable immune mediated response to antigenic stimulation (e.g. Bacterial, viral, chemicals, foreign proteins) or initiating traumatic events. Possible viral diseases affecting eyes of kangaroos (e.g. Wallal, Warrego, and Herpes) cannot be excluded in this case.

In general, *Phalaris* toxicity causes a stagger syndrome associated with the ingestion of *Phalaris aquatica* species containing toxic alkaloids. Characteristic findings involve storage of perinuclear green-brown granular pigment within neurons of the brain stem nuclei, spinal gray matter and dorsal root ganglia, and in macrophages of cerebral spinal fluid. Typically, there is concurrent damage to descending motor tracts characterized by Wallerian degeneration of the spinal cord and brainstem. Clinical onset of staggers syndrome may be delayed for several months after exposure to toxic plants. Nervous signs can persist for two months and have been known to manifest up to five months after animals have moved off *Phalaris*.

## Discussion

Orbiviruses of the Wallal and Warrego serogroups were isolated from kangaroos affected with blindness in a major epidemic in south-eastern Australia in 1994 and 1995 and extending to Western Australia in 1995/96. Histopathological examinations showed severe degeneration and

inflammation in the eyes, and mild inflammation in the brains. In affected retinas, Wallal virus antigen was detected by immunohistochemical analysis and orbiviruses were seen in electron microscopy. There was serological variation in the newly isolated Wallal virus from archival Wallal virus that had been isolated in northern Australia.<sup>1</sup>

In this case there was some concern that observed blindness in these kangaroos may have been a reappearance of these viruses; however, it appears that in this case *Phalaris* grass toxicity is responsible. Further tests are pending in this case to detect viruses, if present.

This kangaroo may not have been typical of previous cases but consistent observations were made that the eyes appeared to be opaque or discoloured in most other cases- and this was not the case here.

Environment and SA water staff supplied two further wallabies from another nearby Water catchment area on 20/9/2022. These animals were reported as suffering very similar symptoms to the kangaroo earlier described, with the comment that 'there have been a lot of these this year, but not many seem to die from it'. Histopathological changes in these two wallabies also confirmed *Phalaris* toxicity.

*Phalaris* toxicity has been documented previously in Kangaroos in SA<sup>2</sup> in 2014 and elsewhere in Australia<sup>3</sup> but it is helpful to investigate unusual syndromes in animals where they occur. Some reasons for this include:

- Confidence in the public that animal welfare and health is being cared for in National Parks, particularly in close urban areas
- Investigation adds to the pool of published information that builds over time
- Investigations may assist in a diagnosis that might reduce impacts, or therapies may be available in some cases

## References

1. PT Hooper, RA Lunt, AR Gould, AD Hyatt, G M Russell, J A Kattenbelt, S D Blacksell, LA Reddacliff, P D Kirkland, R J Davis, P J Durham, AL Bishop, J Waddington Epidemic of blindness in kangaroos--evidence of a viral aetiology *Aust Vet J* 1999 Aug;77(8):529-36
2. B Bacci, PL Whiteley, M Barrow, PH Phillips, J Dalziel and CM El Hagea Chronic phalaris toxicity in eastern grey kangaroos (*Macropus giganteus*) *AVJ* 92, No 12, December 2014 ♦