

Botulism in bats

In March 2019, a North Coast wildlife carer reported the sudden onset of paralysis and deaths in flying foxes at a release facility at Alstonville, North Coast of NSW. Within 24 hours all twenty-nine flying foxes were affected. Signs were a protruding tongue, reduced ability to swallow, weakness, progressing to loss of ability to perch and respiratory difficulty. The clinical course was from several hours to five days. The majority (25) were Black Flying Fox (*Pteropus alecto*), and four were Grey-headed Flying Fox (*Pteropus poliocephalus*). Both genders were represented. Twenty-six were juveniles almost ready for release, another was a juvenile still on its mother, and two were adults. Over the next five days, twenty-seven died or were euthanised, with only two recovering.

The flying foxes were sourced from three carers, with the majority (23) from the one carer. Twenty-seven arrived at the release facility on 3 March; 23 from one carer ("Carer A") and four from another. Another two arrived on 10 March from a third carer. One flying fox was found with paralysis on the evening of 11 March (Day 1) and died soon after. Because of previous incidents of this condition at the aviary, the remaining 28 were moved that evening to "Carer A".

On the morning of 12 March (Day 2), seven were found dead, and all twenty-one live flying foxes developed signs to varying degrees. The District Veterinarian (DV) examined these bats, and the twenty-one live bats were transported to a wildlife hospital. A total of fifteen died or were euthanised that day (Day 2). On 13 March (Day 3), six died. Three died on 14 March (Day 4) and two on 16 March (Day 6).

It is important to note that at "Carer A" there were in-contact flying foxes, which had not been to the release facility and all these remained in good health.

On 12 March the DV autopsied and sampled five flying foxes and a further two were sent whole to Laboratory Services at Elizabeth Macarthur Agricultural Institute (EMAI). Apart from pulmonary congestion in two, there were no gross lesions.

Botulinum C toxin gene quantitative Polymerase Chain Reaction (qPCR) was positive in samples from the gastrointestinal tract of two of the five bats sampled. All seven were negative for Australian Bat Lyssavirus (ABLV). Histopathology on a range of tissues including brain from the five autopsied had no significant pathology, except for lung congestion and oedema; suspected to be due to shock. One had acute severe bacterial pneumonia; unclear as to was pre-existing or secondary.

The condition followed similar, but less severe events at the same release facility in 2014 and 2017. Between 6 March and 17 April 2014 a total of six juvenile flying foxes (both species and gender) presented with the same clinical signs; tongue protruding, inability to swallow and weakness. Two died, and four recovered.

In four days 27 February to 2 March 2017, eight of thirty-three juvenile flying foxes (both species and gender) developed the same signs. Four died, and four recovered.

The DV examined and sampled live and dead bats. Acute allergic reaction, ABLV or botulism were suspected as the possible cause. One of the bats autopsied was ABLV positive, and no samples were tested for botulism.

At the time of the events, there were high blowfly numbers at the release facility. The flying foxes are fed chopped fruit to which a protein supplement is added each afternoon. The water was the town's supply. The flies were attracted to the food. It is suspected that fly egg masses contaminating the feed were the source of the botulism toxin.

It is understood that this is the first time that botulism has been documented in flying foxes. Wildlife and bats, in particular, are considered important sources of new and emerging viral diseases of both domestic species and humans. For this reason, it is critical that unusual disease events in wildlife are reported and investigated.

For further information, contact Phillip Kemsley, District Veterinarian, North Coast Local Land Services on 0427 896 822.



Figure 1: Live Black Flying Foxes with tongues protruding. Image by P. Kemsley.



Figure 2: Dead Grey-headed Flying Fox flying fox with tongue protruding. Image by P. Kemsley.