

SHORT CONTRIBUTION

Tick paralysis of dogs in Victoria due to *Ixodes cornuatus*

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Paralysis of domestic animals by ticks in Australia may be caused by either *Ixodes holocyclus* or *I. cornuatus*.¹ Paralysis by *I. holocyclus* is well documented, the tick occurring in coastal regions from north Queensland to eastern Victoria.¹ Extralimital cases of paralysis in Victoria have also been recorded on rare occasions.² The closely related species, *I. cornuatus*, occurs in Tasmania, southern Victoria and the south-east of New South Wales.³ Instances of *I. cornuatus* causing paralysis in Tasmania have been documented,⁴ but the situation on the mainland is not clear with the most recent review of the topic concluding that there was no convincing evidence that *I. cornuatus* caused paralysis of hosts on mainland Australia.¹ Evidence advanced for *I. cornuatus* as a cause of paralysis on mainland Australia is based upon a report of paralysis in a dog and a calf at Orbost,³ in an area in which *I. holocyclus* is also common, in a flock of sheep in east Gippsland in which equal numbers of both *I. holocyclus* and *I. cornuatus* were present,⁵ and paralysis of a child in southeastern Queensland⁶ by a tick identified as *I. cornuatus*, even though this location is well beyond the established distribution of *I. cornuatus*.³ In addition, a 3-year study of ticks in east Gippsland found no specimens which were identifiable as *I. cornuatus* using genetic markers.⁸ The current state of uncertainty may be due in part to difficulties associated with identifying these two species of ticks based on morphological characteristics,⁷ since some of the features previously used to distinguish the species have been shown to be unreliable.⁷ Recent genetic studies of *I. cornuatus* have demonstrated differences between Tasmanian and mainland populations of the species, raising the possibility that only Tasmanian populations can cause paralysis.⁸ These case reports describe two presumed instances of tick paralysis due to *I. cornuatus* in Victoria.

Case 1

A 3-year-old dog from Musk near Daylesford, Victoria, presented with hind-quarter paralysis and voice changes on the 3 April 2002. A single, almost fully engorged tick was present in the left jugular area and was removed and preserved in ethanol. In spite of the removal of the tick, the signs of paralysis worsened and the dog subsequently died, despite treatment, late in the course of the disease, with antiserum against *I. holocyclus*. The tick was identi-

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fied as *I. cornuatus* using recently established morphological criteria,⁷ specifically the distance between the auriculae and a discriminant function analysis of the measurement of 12 morphological parameters which are more reliable than those previously available.³ The dog had not travelled from Daylesford. However, between 25 December 2001 and 15 January 2002, the owners had taken a caravaning holiday at Wilson's Promontory, Victoria, an area in which *I. holocyclus* is not known to occur.³ Paralysis occurred more than 6 weeks after the return of the owners to Daylesford, suggesting that the tick had been acquired locally.

Case 2

A 9-year-old, dsexed male Maltese terrier cross from Leongatha, Victoria, presented with a 12 hour history of hind-limb paresis, progressing to paralysis, with evidence of increasing respiratory distress. A fully engorged tick was found on the sternum of the dog. The tick was removed and the dog was treated with *I. holocyclus* antiserum. However, the condition of the dog deteriorated and the dog died 15 hours after presentation. The dog had not travelled from Leongatha. The tick was identified as *I. cornuatus* using recently established morphological criteria.⁷

The cases reported above suggest that mainland populations of *I. cornuatus* occurring outside the zone of sympatry with *I. holocyclus* are capable of causing paralysis in dogs. It should be noted however that while the clinical signs observed in the cases reported were consistent with tick paralysis, it is rarely possible to provide conclusive evidence that the signs are specifically due to the ticks found on paralysed animals. In one instance, the owners of the dogs had travelled to areas closer to the known limits of the distribution of *I. holocyclus* (Wilson's promontory) so that the possibility was considered that the ticks may have been transported to Daylesford inadvertently by the owners. This hypothesis seems unlikely due to the time which elapsed between the travel and the onset of clinical signs, but cannot be entirely excluded. The ticks were clearly identifiable as *I. cornuatus* and the occurrence of paralysis resembled that due to populations of the same species of tick in Tasmania. *Ixodes holocyclus* does not occur in Tasmania.^{3,7,8} As is the case in Tasmania, instances of paralysis in domestic animals are relatively uncommon in Victoria, suggesting that this species of tick does not necessarily cause paralysis in its hosts. By contrast, hosts infested with adult *I. holocyclus* frequently display signs of paralysis. The reasons for this apparent difference are not clear.⁹ The extent of repeated infestations and hence the development of immunity to the toxins of *I. cornuatus* have not been examined and the possibility exists that variation exists within *I. cornuatus* in terms of the ability of individual ticks to cause paralysis. However, allozyme electrophoresis studies of populations of *I. cornuatus* from both Victoria and Tasmania revealed relatively little genetic variability within populations.⁸ The significance of the current report is to demonstrate that *I. cornuatus* is capable of causing paralysis in domestic animals in Victoria and that as its geographic range extends beyond that generally accepted for the related species *I. holocyclus*, cases of paralysis may present themselves in areas in which tick paralysis is not a common occurrence.

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