DETERMINING THE SIGNIFICANCE OF A TREPONEMA-LIKE ORGANISM ISOLATED FROM AUSTRALIA’S MOST CRITICALLY ENDANGERED MAMMAL, THE GILBERT’S POTOROO (Potorous gilbertii)

Rebecca Vaughan, BSc, BVMS,1,2* Nicky Buller, BSc, PhD,3 Tony Friend, BSc, PhD,4 Cree Monaghan, BSc, BVMS MSc,1 Stan Fenwick, BVMS, MSc, PhD,2 and Kristin Warren, BSc, BVMS, PhD2

1Veterinary Department, Perth Zoo, 20 Labouchere Road, South Perth WA 6151 Australia; 2School of Veterinary and Biomedical Sciences, Murdoch University, South Street, Murdoch, WA 6150 Australia; 3Western Australian Department of Agriculture and Food, 3 Baron Hay Court, South Perth WA 6150 Australia; 4Department of Environment and Conservation Science Division, Albany Research, 120 Albany Highway, Albany WA 6330 Australia

Abstract

The Gilbert’s potoroo (Potorous gilbertii) is Australia’s most critically endangered mammal with an estimated population of less than 30 individuals.2 There has been a long history of balanoposthitis (inflammation of the penis and prepuce) in individuals from both wild and captive populations of this species.1 Clinically, this is evident as crusty green tenacious preputial exudates with associated ulceration. Bacteriologic examination has revealed a number of potential pathogens amongst the mixed bacteria isolated. The most significant is a Treponema-like organism. Sequencing results from these spirochetes identified a 164 nucleotide segment of 16S ribosomal RNA, which had 92% similarity to Treponema species. Prevalence of infection with the Treponema-like organism was 17/26 (65.38%).

Tissue biopsy for culture, silver staining, and histopathology revealed a chronic inflammatory response with secondary epithelial hyperplasia in conjunction with moderate numbers of spirochetes strongly suggesting a causative relationship. Numerous coccobacilli were also found. These were from the Actinobacillus/Pasteurella group identified by partial 16S rRNA sequencing. Epidemiologic studies involved relating the nature and severity of the discharge and the subsequent identification of spirochetes (via dark field microscopy and via urogenital swabbing for PCR) to sex affected, time of year, age of animal and geographic location. These studies revealed a higher prevalence in males; however, there was no difference in prevalence between seasons or by geographic location.

This infection appears to play a highly significant role in the recovery program of the critically endangered Gilbert’s potoroo given the severity of balanoposthitis and reproductive dysfunction that is especially evident in the reproductively quiescent captive population.

LITERATURE CITED