

43. Nutritional and metabolic diseases

Emaciation due to starvation or malnutrition and, to a much lesser degree, obesity due to excessive food intake are diagnoses often made only after the possible involvement of other injurious agents has been discounted. Especially in captive wildlife, for which the entire diet must be artificially provided, there is increased opportunity for error through ignorance or neglect, with resulting nutritional disease. For free-ranging wildlife, on the other hand, while the impact of human activity on diet is less direct, diagnosis is more likely to be compromised by lack of case or outbreak history, especially of clinical signs that might have been displayed.

A further complication in diagnosis, more in wildlife than domestic species – again due to stress factors such as altered habitat or inappropriate husbandry – is the possibility of dual or intercurrent disease. Diminished immunity in starved animals could, for example, precipitate septicaemia due to opportunistic bacteria. In such cases it may be difficult to determine whether nutritional disease was the cause or result of microbial infection.

Regardless of species, pathological changes in generalised nutritional deficiency are non-specific and consist primarily of low bodyweight with atrophy of many organs, notably liver and muscle, and loss or serous atrophy of body fat reserves.

NUTRITIONAL DISEASES IN TERRESTRIAL MAMMALS

General nutritional excess or deficiency

Obesity was considered a major nutritional problem in captive dasyurids, overweight animals appearing more

likely to have reproductive failure and to be more prone to prolapsed intervertebral discs (Finnie 1978).

Starvation is recorded in wombats which had difficulty in adjusting to captivity (Doube 1981), and starvation with exposure is reported as a cause of mortality in free-ranging platypuses. Juvenile animals, which appeared to have been displaced from their normal habitat, perhaps by dominant resident platypuses, were in poor body condition and died within days of being found (Whittington 1993; Connolly *et al.* 1997).

In Western Australia, quokkas on Rottne Island suffered severe starvation, weight loss and significant mortality during the summer months. Illness and mortalities were associated with increased excretion of *Salmonella* spp., considered to be related to digestive physiology altered by poor-quality feed during summer (Hart *et al.* 1985, 1987).

Pathological changes in adult kangaroos and other macropods dying during drought are inadequately studied but include lumpy jaw in red kangaroos, dehydration and cachexia, and a seasonal anaemia associated with reduced protein in vegetation (Speare *et al.* 1989). Other morphological changes in drought-affected red kangaroos include decreased or increased size of the pituitary glands in adult males and females, respectively, and in both sexes a decreased size of adrenal glands accompanied by cortical folding and nodulation – with indications in females of continued stimulation of the zonae fasciculata and glomerulosa, perhaps reflecting better adaptation (Myers *et al.* 1976).

Nutritional deficit due to drought, especially if combined with high environmental temperatures, has been shown histologically to cause testicular