THE FORMULATION OF AN ARTIFICIAL DIET FOR CAPTIVE KIWI (*APTERYX MANTELLI*)

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Abstract

Population numbers of North Island brown kiwi (*Apteryx mantelli*) are estimated to have almost halved in the last decade. Despite some success of captive breeding, captive bred kiwi suffer higher embryonic and adult mortality rates, smaller eggs[1] and lower hatching rates than wild kiwi.[3] A major contributor to these problems is likely to be diet. The current diet fed to kiwi in captivity was formulated over 30 years ago with no reference to the nutrient requirements of the birds.

This preliminary study aimed to firstly, reformulate the captive diet so that it more closely matches the nutrient composition of the natural diet and secondly, to present this food in a manner that is both palatable and able to be physically consumed by kiwi.

The macronutrient composition of the average diet of wild North Island brown kiwi was sourced from the literature[2] and used as the basis for the formulation of the near-natural diet. Ingredients, such as crickets, grubs, berries and worms, known to be consumed by kiwi in the wild, were collected and processed into a form that could be readily eaten by kiwi. This 'near-natural' diet aimed to mimic the dietary items collected by wild birds. The relative digestibility of the near-natural diet in kiwi was determined through feeding trials. Although preferable, the collection and feeding of natural dietary items is neither practical nor cost-effective. Budget constraints in captive wildlife facilities made cost an important factor. Therefore an artificial diet was developed with a nutrient composition and relative digestibility that closely matched that of the near-natural diet (Table 1). Factors which needed to be taken into account were the eating behaviour of kiwi and palatability of the diet. Kiwi pick up a piece of food in their bill, shake it, toss it into the air and swallow it whole. This manner of dietary intake necessitated the diet to be:

- homogenous - to provide a consistent nutrient intake, thus preventing selection of preferred items
- of a firm or rubbery texture - to withstand vigorous shaking
- physically small items of food - to physically fit in the mouth
- moist - to slide down the throat (without help from the usual teeth and tongue that many other animals use to eat). Addition of sodium alginate and calcium chloride to the diet formed an outer layer similar to that of an earthworm.

The diet also needed to be packaged in a manner that was durable, non-perishable, as well as quick and easy for workers to feed. The formulated diet is now in the final stages of testing prior to being commercially produced.

LITERATURE CITED

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Table 1. Comparison of the natural diet, the near-natural diet as calculated and the near-natural diet as analysed, and the artificial diet as calculated of North Island brown kiwi (dry matter basis).

Diet	Ash g/kg	Crude Protein g/kg	Gross Energy (kJ/kg)	Organic Matter g/kg	Fat g/kg	Total Fatty Acids g/kg	Carbohydrate g/kg
Near-natural diet (calculated)	0.6	5.6	2.4	9.5	1.8	1.5	2.2
Near-natural diet (analysed)	0.8	5.3	2.4	9.2	1.6	1.5	2.3
Natural diet[1]	0.8	5.2	2.3	9.4	1.7	1.3	2.4
Artificial diet (calculated)	0.5	5.0	Not calculated	Not calculated	1.6	Not calculated	2.3