

## CONSIDERATIONS TO MAXIMIZE NUTRIENT SUPPLEMENTATION OF FEEDER INSECTS

*Shannon E. Livingston, MSc\*, Kathleen E. Sullivan, MS, and Eduardo V. Valdes, PhD*

*Animals, Science and the Environment, Disney's Animal Kingdom, Orlando, FL 32830 USA*

### **Abstract**

Providing a nutritionally appropriate diet to amphibians and other insectivores under human care has long proved challenging. The number of available insect species is limited and typically deficient in key nutrients such as calcium and vitamin A. Until more nutritionally balanced options are available, actions should be undertaken to improve the nutritional quality of feeder insects such as the domestic cricket (*Acheta domestica*), commonly used to feed amphibians and other insectivores. Common practices involve gut loading and dusting (Livingston et al., 2014; Oonincx and van der Poel, 2011). Gut loading utilizes a nutrient dense diet to feed the insect with hopes of improving its nutrient content through retention of the diet. Dusting involves coating the live insect in a powdered supplement prior to offering to the insectivore. Both methods of supplementation have been studied with regards to certain nutrients, specifically calcium and vitamin A/carotenoids, with inconsistent results reported in the literature (Livingston et al., 2014). Maximizing the efficacy of gut loading would require additional husbandry modifications for species like the domestic cricket. Utilization of recommendations involving temperature, supplementation regimen, water provisions, storage and preparation of vitamin supplements, particle size, and growth stage of the cricket, may to help maximize the effect of gut loading and supplementation of crickets (Attard, 2013; Livingston et al., 2014). Although considering factors such as the growth stage of crickets would help to optimize delivery, in practical systems this level of detail can be challenging, leading to a call for more streamlined and reliable products that deliver the most impact with the least labor intensity. There are a multitude of products available for gut loading and dusting, the reliability of which can vary significantly. One study previously reported that of four dry cricket gut loading diets tested, only three provided guaranteed calcium content and only two of those met their minimum guarantee (Finke et al., 2005). Some products are designed to provide only a specific nutrient or group of nutrients, and may be lacking other key nutrients. For example, insects raised to have enhanced vitamin content had calcium to phosphorus ratios ranging from 0.07-0.14 (unpublished), instead of the desired 1-2, and thus would still require gut loading or dusting to improve their overall nutritive value for the insectivore. When evaluating nutrient content and product efficacy, as is done at regularly at Disney's Animal Kingdom, often a gap exists between guaranteed analysis and reality. By evaluating current differences between product claims and analyzed values, we aim to demonstrate the need for scrutiny and consumer awareness to ensure delivery of proper nutrition to amphibians and other insectivores under human care. A multi-faceted approach to cricket care and feeding is necessary to ensure a nutritionally adequate diet for amphibians and other strict insectivores.

## Literature Cited

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