

# FEEDER INVERTEBRATES - NUTRITIONAL COMPARISONS

(all values on an “as is” basis)

	Moisture <sup>1</sup>	Protein <sup>2</sup>	Fat <sup>3</sup>	Vitamin A <sup>4</sup> (IU/kg)	Vitamin D <sub>3</sub> <sup>5</sup> (IU/kg)	Vitamin E <sup>6</sup> (IU/kg)	Calcium <sup>7</sup>	Phosphorous <sup>8</sup>	Metabolizable Energy <sup>9</sup> (kcal/g)
Mealworm	61.9	18.7	13.4	< 1,000	< 256	< 5.0	0.02	0.29	2.06
Giant Mealworm	61.0	18.4	16.8	< 1,000	< 256	< 5.0	0.02	0.27	2.25
Superworm	57.9	19.7	17.7	< 1,000	< 256	7.7	0.02	0.24	2.42
Waxworm	58.5	14.1	24.9	< 1,000	< 256	13.3	0.02	0.20	2.75
Cricket (2-3 week)	77.1	15.4	3.3	< 1,000	< 256	9.6	0.03	0.25	0.95
Cricket (adult)	69.2	20.5	6.8	< 1,000	< 256	19.7	0.04	0.30	1.40
Silkworm	82.7	9.3	1.4	1,580	< 256	8.9	0.02	0.24	0.67
Earthworm	83.6	10.5	1.6	< 1,000	< 256	NA	0.04	0.16	0.71
Cockroach	61.3	20.9	11.0	NA	NA	NA	0.08	0.19	1.82

1 - Since all animals need water, the moisture in food is an important source of water. Older feeder animals generally contain less moisture than younger feeder animals.

2 - Proteins are the building blocks of muscle and other tissues. Proteins (and carbohydrates) each contain about 4.0 kcal/g of Metabolizable Energy.

3 - Dietary fat helps in the absorption of vitamins A, D and E, and is a concentrated source of energy (about 9.0 kcal/g of Metabolizable Energy). Animals metabolize fat at a much higher rate than do humans.

4 - Vitamin A is a fat soluble vitamin that is required for healthy skin, mucous membranes, the retina of the eye, muscles, teeth and other tissues. Vitamin A deficiency is probably the second most common contributor to premature reptile and amphibian death.

5 - Reptiles need Vitamin D<sub>3</sub> in order to metabolize calcium. Vitamin D<sub>3</sub> is acquired through the sun’s rays, through proper UVB lighting and/or through supplementation. It is interesting to note that chameleons that are fed crickets gut-loaded with this vitamin will spend less time basking.

6 - This fat soluble vitamin is an important anti-oxidant and is essential for proper cell function. As with the other vitamins, there is no scientifically-supported recommended level for this vitamin in the diet of reptiles and amphibians. At this point, it is educated guess-work taken from other species.

7 - Proper Calcium levels are important for bone and tooth growth, heart health and proper metabolic functioning. Calcium deficiency is one of the leading causes of Metabolic Bone Disease and probably the leading cause of premature reptile and amphibian death.

8 - Phosphorous is a chemical element that, combined with Calcium, forms the majority of bone in the body and it is used in nearly all the body’s metabolic processes. Too much phosphorous can inhibit the absorption of calcium. Generally speaking, reptiles need a calcium to phosphorous ratio of between 1:1 and 2:1.

9 - Metabolizable Energy (ME) is a combination of the gross energy of the feeder animal + how digestible it is + a factor for metabolizing the nutrients it contains. To illustrate the importance of ME, a 450 gram bearded dragon will need approximately 10.8 kcal/g of energy per day, and a 1200 gram ball python will need approximately 25.8 kcal/g of energy per day.

NA = Not Available/Not Analyzed

## Data Sources

AZA, Nutrition Advisory Group Handbook, 14. Finke, 2002. Complete Nutrient Composition of Commercially Raised Invertebrates Used as Food for Insectivores. Zoo Biology 21:286-293. Bernard and Ullrey 1997. Feeding Captive Insectivorous Animals: Nutritional Aspects of Insects as Food. AZA, Nutrition Advisory Group Handbook, 8. Nagy, Girard and Brown 1999. Energetics of Free-Ranging Mammals, Reptiles and Birds. Annual Review of Nutrition 19:247-278.