

The Effect of Diet on Growth and Development of Puerto Rican Crested Toad (*Peltophryne lemur*) Tadpoles

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The Puerto Rican Crested Toad (*Peltophryne lemur*), an endemic toad of Puerto Rico, was the first amphibian to be considered suitable for the Species Survival Plan (SSP). Captive propagation for release of this species began in 1983, and the Toronto Zoo has reintroduced over 15,000 animals to their native habitat since 1985. Although these animals have been successfully reared in captivity, there is still little information known about the nutritional needs of this species. The purpose of this study was to compare three diets available for feeding anurans to determine which would give the best performance during the larval stage of life. This study compared the growth and development as measured by days to metamorphosis, snout-vent length (S-V), head width (HW), initial weight, final weight (FW) and leg quality status of tadpoles from the time of hatching until metamorphosis was complete. Tadpoles were fed one of the following diets: Control diet (C)-the Toronto Zoo commercial tadpole diet (Table 1), Mazuri 5Z94 Omnivore Aquatic Gel (T₁) or Mazuri 5Z93 Herbivore Aquatic Gel (T₂). Tadpoles were fed three times a day. Although no differences in dry matter intake (DMI) were observed among treatments, T₁ the greatest DMI. However, tadpoles in treatment C showed a similar gain:feed ratio than those on T₁ while having the lowest DMI. Despite the large differences in protein content among dietary treatments (dry matter basis) with values that ranged from 37.4 % (T₂), 47.6% (T₁) and 51.0 % (C), no statistical differences were found in crude protein intake. However, statistical differences in the intake of certain amino acids were observed among treatments (Table 2). Differences in fat content among dietary treatments (C=5.2%, T₁=11.9%, T₂=3.8%) resulted in T₁ tadpoles showing the highest total intake of crude fat (0.89 g), saturated, monounsaturated and polyunsaturated fatty acids (Table 2). The T₂ showed the highest (P<0.01) mineral, acid detergent fiber and total carbohydrates content among dietary treatments (Table 2). The C group of tadpoles began metamorphosing prior to either of the other dietary treatments and reached peaked metamorphosis first on day 19. The greatest number of animals to emerge by the end of the metamorphosis period were found in the C treatment. Tadpoles on T₁ were heavier by the end of the trial but no statistical differences were found among treatments for FW. Differences in S-V length were observed among treatments with the C toadlets showing the smaller values (Table 3). The C and T₁ toadlets showed an overall survival rate (OSR) of 82% compared to 74% for the T₂ toadlets. There was no significant differences in leg quality status among dietary treatments. However, the T₁ animals had a lower percentage of severe deformities but the C toadlets showed the lowest total number of deformed toadlets. Based on the number of animals metamorphosed, toadlet survival rates, overall leg quality, and general health of the animals, the C diet showed some advantages when compared to the other two treatments.

(Key words: Puerto Rican crested toad, nutrition, toadlet, leg quality, growth)

Table 1. Toronto Zoo Tadpole Diet

Component	%
1. Standard commercial flake mix	52.60
(consisting of:	
Aquarian Herbivore Diet	33.13
Tetra FD-Menu 4 in 1 blend	33.13
Sera San Colour Enhancing Flakes	33.13
Ascorbic Acid)	0.63
2. Sera Viformo Tablet Food	47.40

Table 2. Total feed and selected nutrient intake (DM basis) of Puerto Rican Crested Tadpoles within each treatment group.

	C	T1	T2	
Dry Matter Intake, g/d	6.4	7.4	7.3	NS
Gross Energy, kcal/g	31.2	35.4	30.8	NS
Crude Protein, g	3.27	3.52	2.72	NS
Crude Fat, g	0.33	0.89	0.28	P < 0.01
ADF, g	0.16	0.29	0.59	P < 0.01
Calcium, g	0.13	0.27	0.26	P < 0.01
Phosphorus, g	0.08	0.13	0.14	P < 0.01
Threonine, g	0.126	0.119	0.086	P < 0.05
Methionine, g	0.077	0.090	0.057	P < 0.05
Saturated Fatty Acids, g	0.047	0.275	0.073	P < 0.01
MonoUnsaturated Fatty Acids, g	0.033	0.152	0.009	P < 0.01

C: Control Diet (Toronto Zoo Mix)

T1: Mazuri 5Z94 Omnivore Aquatic Diet

T2: Mazuri 5Z93 Herbivore Aquatic Diet

Table 3. Survival rate and growth measurement parameter values for Puerto Rican Crested Tadpoles fed various diets.

Parameter	C	T1	T2	
Overall Survival Rate, %	82	82	74	(NS)
Leg Status (<5), % *	23	26	23	(NS)
Head Width, mm	4.06	4.018	3.929	P < 0.05
Snout-Vent Length, mm	10.462	10.880	10.810	P < 0.05
Final Body Weight, g	0.119	0.132	0.111	(NS)

* 5 = two legs emerged, both good.

C: Control Diet (Toronto Zoo Mix)

T1: Mazuri 5Z94 Omnivore Aquatic Diet

T2: Mazuri 5Z93 Herbivore Aquatic Diet