Short Paper

Renal Hypertrophy in the "Cobalt" Variant of Rainbow Trout

Mikio Oguri^{*1}

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The "cobalt" is a blue-colored variant appearing in cultivated rainbow trout.¹⁾ The fish is devoid of the normal pituitary gland and has only its remnant, which is attached to the hypothalamus or is detectable as isolated small tissue in the region below the optic chiasma.^{1,2)} Previously I have reported enlarged liver in this variant, as well as obesity.³⁾ During this histological examination, I noticed also enlargement of renal tubules in the kidney tissue of the "cobalt."²⁾ Then, I thought that renal hypertrophy might be detectable in the variant. The present examination deals with this, using newly obtained specimens.

Morphometry was done using six specimens (10.6–16.4 cm in standard length and 25–91 g in body weight) of the "cobalt" variant of rainbow trout *Oncorhynchus mykiss*. Three of these specimens were obtained from Shiga Prefectural Samegai Trout Experimental Station, while the other three specimens were kindly supplied by Prof. K. Yamaguchi, Faculty of Agriculture, the University of Tokyo, who collected them at Ooguchi Fish Farming Branch, Kagoshima Prefectural Fisheries Experimental Station. Also, six specimens (13.5–18.5 cm and 42–96 g) of normal rainbow trout were used as control. These fish were obtained from commercial sources. Condition coefficient and renosomatic index were calculated in each specimen after the measurements of body length and weight, and kidney weight. Condition coefficient and renosomatic index are expressed as $\text{body weight} \times 1,000 / \text{body length}^3$ and $\text{kidney weight} \times 100 / \text{body weight}$, respectively.

The results obtained are shown in Fig. 1. The mean condition coefficient for normal fish and "cobalt" variant were 16.0 ± 0.4 (mean $\pm$ SEM) and 21.9 ± 0.8 , respectively. The difference between the means is statistically significant ($p < 0.001$). This indicates a corpulent condition in the "cobalt" variant, as described previously.³⁾ As for renosomatic index, the mean value for normal rainbow trout was $0.92 \pm 0.05\%$. This is similar to the index values (0.82–0.85%) reported previously.^{4,5)} On the other hand, mean renosomatic index in the "cobalt" variant was $1.51 \pm 0.07\%$. This mean value was significantly different ($p < 0.001$) from

Fig. 1. Comparison of condition coefficient (A) and renosomatic index (B) between normal and "cobalt" rainbow trout. Each value represents mean $\pm$ SEM (n=6).

that of the control fish. Thus, the present examination ascertained renal hypertrophy in the "cobalt" variant of rainbow trout.

In mammals it is well known that the anterior pituitary extract has a renotropic effect and hypophysectomy induces the reduction of kidney weight.^{6–8)} From these mammalian findings, it was fully conceivable that the regressive changes might occur also in the kidney of the "cobalt" variant lacking the normal pituitary gland. However, the reverse result (i.e. progressive change of renal hypertrophy) was obtained, providing an interesting finding on the reno-hypophyseal relationship.

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^{*1} Laboratory of Fish Biology, Faculty of Agriculture, Nagoya University, Nagoya, Aichi 464-01, Japan (小栗幹郎:名古屋大学農学部).

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