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MODELING FISH GROWTH WITH VON BERTALANFFY GROWTH FUNCTION

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The individual body growth of fish is required for the fisheries population analysis, fish stock calculation and fisheries management. The body growth of fish is considered as the increase of length or weight in terms of its age. Therefore, there is a need for a mathematical expression of the mean body growth or mean body weight of individual fish related to its age to address this situation. Several models have been introduced to predict the mean length or mean weight of fish. The most studied and popular model is the von Bertalanffy growth model. This is the most commonly used model among all the length-age models in which the fish growth is assumed to be asymptotic. The underlying principle of this model is that the growth rate of fish tends to decrease linearly with its size. The most common form of this model is

$$L_t = L_\infty(1 - e^{-K(t-t_0)})$$

where L_t is the length of the fish at time t, L_∞ is the asymptotic length (unit-year^{-1}), t_0 is the "age" when an individual fish would have been of zero length if it had always grown in a manner described by the above equation and K is the relative growth rate parameter (unit- time^{-1}). In this work, we predict the growth parameters for the von Bertalanffy growth model of the Tilapia fry during nursing period in an eastern region of Sri Lanka. For this calculation, we use the "Gulland and Holt" plot (GH-plot) which is the most used method to predict the growth parameters in the fish growth model given above. The above model can be written in the following form to apply the GH-plot as

$$\frac{L_2 - L_1}{t_2 - t_1} = a + b\left(\frac{L_1 + L_2}{2}\right)$$

where, L_1 and L_2 are the lengths at time t_1 and t_2 respectively. From this equation, the growth parameters will be $K = -b$ and $L_\infty = a/-b$. Applying the GH-plot, we get the growth parameters as $K = 0.219$ and $L_\infty = 6.393$ for the Tilapia fry during nursing period in an eastern region.

Keywords*: Bertalanffy, Fish growth, GH-plot, Modeling, Tilapia.*