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The effect of ageing errors on Von Bertalanffy parameters estimation using a Bayesian sensitivity analysis approach.

Lucie Aulus Giacosa*, Matthias Vignon, Philippe Gaudin, Jean-Christophe Aymes, François Guéraud
Ecologie Comportementale et Biologie des Populations de Poissons (UMR ECOBIOP), France

The analysis of age and growth information contained in the scales of fish has become a standard technique in fish population dynamics model. Commonly modeled using Von Bertalanffy growth function (VBGF), inferring growth for fish is dependent upon an accurate description of the age-length relationship, which may be undermined by ageing errors. Ageing errors frequently arise either from disagreements between scale readers or inability of scales to reflect true age (i.e. erosion, false growth ring). Here we use a Bayesian approach to infer *Salmo trutta* (L.) VBGF's parameters from scales sample with ageing errors. Inferred from scale readings of 60 fish, age at capture (for all fish) and age at migration (for the anadromous fish) were extracted based on a hierarchical design with blind double reading using 4 scales per fish. We estimated VBGF's parameters by sequentially integrating an increasing proportion of fish for which age determination is uncertain. By doing so, we can empirically determine the robustness of VBGF's parameters at a population scale when using mixed-effects models as an alternative to fixed-effects models. This will result in more efficient analyses of growth patterns for stock assessment, life history trait evolution, and environmental monitoring.

Keywords: Ageing-errors, Von Bertalanffy parameters estimation, Bayesian sensitivity analysis