研究简报

常见生物生长模型的时差性分析及其应用

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摘要   生长曲线是估计生物年龄的重要方法之一. 在实际工作中, 有时会出现对生物年龄的计算起点时间存在着一定差异的情形. 例如在一些有关哺乳动物生长的研究中, 年龄有出生年龄和受精年龄的区分. 这种年龄计算时间上的差异可能导致一些生物生长模型出现不同的拟合结果. 本文分析了4种常见的三参数生长模型（Spillman、Logistic、Gompertz和Bertalanffy）的时差性特征. 结果表明, 这4个方程均具有时差不变性, 即无论时间(年龄)起点如何, 它们对生物生长数据的拟合结果都一致. 文中还引用了小毛足鼠体质量生长数据, 采用两种年龄进行了实例比较.

关键词   生长模型   时间漂变   拟合差异

分类号

Time shift invariant properties of commonly used growth models and their application.

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Abstract

Growth analysis is of significance in estimating the age of organisms, but in reality, the initial time for this estimation adopted by different authors is not always the same. For example, in the growth analysis of mammals, the age could be birth age or conceptional age. Such a discrepancy in time, the so-called time shift, may generate different results in parameter-simulating process. In this paper, the time-shift invariant properties of commonly used three-parameter growth models, *i. e. ,* Spillman, Logistic, Gompertz and Bertalanffy models, were analyzed, and the results showed that these four models all had the invariant characters under any time shift, namely, no matter which initial time (age) of estimation was adopted, the same fitness was obtained. A case study was made with the growth data of *Phodopus roborovskii* and by adopting both birth age and conceptional age.

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