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温度对矩形龟甲轮虫生命表统计学参数和形态特征的影响

葛雅丽,席贻龙,马杰,许丹丹**

安徽师范大学生命科学学院/安徽省高校生物环境与生态安全省级重点实验室/重要生物资源保护和利用研究安徽省重点实验室, 安徽芜湖 241000

Effects of temperature on *Keratella quadrata* life table demography and morphometric characteristics.

GE Ya-li, XI Yi-long, MA Jie, XU Dan-dan

Anhui Province Key Laboratory of Biotic Environment and Ecological Safety/Anhui Province Key Laboratory of Conservation and Utilization for Important Biological Resource, College of Life Science, Anhui Normal University, Wuhu 241000, Anhui, China

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摘要

应用单个体培养方法研究了温度（10 ℃、15 ℃、20 ℃和25 ℃）对双后棘刺、单后棘刺和无后棘刺矩形龟甲轮虫的净生殖率、内禀增长率、世代时间、平均寿命和后代混交率等生命表统计学参数以及后代体长、体宽、前中棘刺长、左右两前侧棘刺长、左右两后棘刺长、后棘刺数目等形态参数的影响.结果表明，各生命表统计学参数和后代形态参数在3种形态型轮虫间的差异因温度的不同而异，它们对温度升高的反应也因轮虫形态型的不同而异.温度显著影响轮虫的内禀增长率、世代时间、平均寿命和后代所有的形态参数（$P<0.05$）；形态型显著影响轮虫后代的体长、前中棘刺长和左右两后棘刺长（$P<0.05$），但对轮虫的生命表统计学参数均无显著影响（$P<0.05$）；而温度和形态型的交互作用显著影响轮虫的世代时间和后代的形态参数（$P<0.05$）.3种形态型轮虫间，双后棘刺轮虫后代的体长（122.1±0.6 μm）显著短于无后棘刺和单后棘刺轮虫后代的体长（分别为126.3±0.7 μm和125.1±0.7 μm），前中棘刺长（32.5±0.3 μm）显著长于无后棘刺和单后棘刺轮虫后代的前中棘刺长（分别为31.1±0.3 μm和30.8±0.3 μm），左后棘刺长（31.2±1.0 μm）和右后棘刺长（32.3±0.9 μm）均与单后棘刺轮虫后代的（分别为29.5±0.8 μm和31.5±0.6 μm）相似，但显著短于无后棘刺轮虫后代（分别为36.7±1.5 μm和37.3±1.6 μm）.矩形龟甲轮虫后代的棘刺长、体宽和体长之间的关系也受温度和形态型的影响.

关键词： 矩形龟甲轮虫 形态型 生命表统计学参数 形态特征 温度

Abstract:

By the method of individual culture, this paper studied the effects of temperature (10 ℃, 15 ℃, 20 ℃, and 25 ℃) on the life table demography (net reproductive rate, intrinsic rate of population increase, generation time, average lifespan, and proportion of mictic offspring) and the offspring morphometric characteristics (body length, body width, antero-median spine length, left and right antero-lateral spine lengths, left and right posterior-spine lengths, and posterior spine number) of two posterior-spined, single posterior-spined, and zero posterior-spined morphotypes of *Keratella quadrata*. All the test life table demographic parameters and offspring morphometric parameters differed with morphotype and temperature, and their responses to elevated temperature differed with morphotype. Temperature had significant effects on the intrinsic rate of population increase, generation time, average lifespan, and the offspring morphometric parameters ($P<0.05$); morphotype had significant effects on the offspring body length, antero-median spine length, and left and right posterior-spine lengths ($P<0.05$) but less effects on the life table demography ($P<0.05$); and the interaction of temperature and morphotype had significant effects on the generation time and all the offspring morphometric parameters ($P<0.05$). Among the three morphotypes, the two posterior-spined morphotype had shorter offspring body length (122.1±0.6 μm) than the zero and single posterior-spined morphotypes (126.3±0.7 μm and 125.1±0.7 μm, respectively). The offspring antero-median spine length (32.5±0.3 μm) of the two posterior-spined morphotype was longer than that of the zero and single posterior-spined morphotypes (31.1±0.3 μm and 30.8±0.3 μm, respectively). The offspring left and right posterior-spine lengths of the two posterior-spined morphotype (31.2±1.0μm and 32.3±0.9μm, respectivedy) were similar to those of the single posterior-spined morphotype（29.5±0.8 μm and 31.5±0.6 μm, respectively), but shorter than those of the zero posterior-spined morphotype (36.7±1.5 μm and 37.3±1.6 μm, respectively). The relationships between the offspring spine length, body width, and body length were also affected by temperature and morphotype.

Key words: *Keratella quadrata* morphotype life table demography morphometric characteristics temperature

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