

## 昆虫寄生对栓皮栎坚果特征和萌发行为的影响

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Effects of insect infestation on morphological traits and germination behavior of *Quercus variabilis* nuts

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### 摘要

有多种昆虫常寄生于栎属植物的坚果中, 进而影响种子的质量、萌发、幼苗建成等植物的更新过程。为探讨昆虫寄生与上述过程之间的关系, 本研究于2007年和2008年在太行山济源地区调查了昆虫对栓皮栎 *Quercus variabilis* 坚果的寄生情况, 同时探讨了昆虫寄生对坚果单宁水平、萌发和幼苗生长的影响; 并于2007年9月, 分别将完好的和昆虫寄生的栓皮栎坚果种植于土壤4 cm深处, 对坚果萌发情况、幼苗出土时间、叶片数量和生物量等进行了对比分析。结果表明: 1) 2007年栓皮栎坚果的虫寄生率为30.04%, 显著低于2008年(47.68%), 表现出年际变化; 2) 虫寄生坚果中单宁酸含量(11.54%±1.36%)显著高于完好坚果(7.36%±1.31%) ( $P=0.004$ ); 3) 虫寄生坚果的鲜重、直径、长度均小于完好坚果; 4) 虫寄生坚果的霉烂率(28%)和不完全萌发率(28%)均高于完好坚果(霉烂率0%, 不完全萌发率2%); 但虫寄生坚果幼苗建成率(56%)低于完好坚果(92%); 虫寄生坚果幼苗出土持续时间(埋藏后35周)短于完好坚果(埋藏后37周); 5) 在坚果埋藏和幼苗萌出当年的冬季, 由虫寄生坚果和完好坚果建成的幼苗的高度、叶片数间均无显著差异, 但在翌年的生长季节, 两项指标均出现显著性差异; 6) 经过一个完整的生长周期(1年)之后, 由虫寄生坚果所建成幼苗的根长、根重量和生物量3项指标显著低于完好坚果, 而叶片数、茎长、叶重和茎重指标在二者间无显著性差异。研究结果提示, 昆虫寄生会对栎类坚果的种子质量和萌发行为产生一定的影响, 这可能是栎类植物群落更新的适应性选择。

### 关键词:

### Abstract:

Acorns, nuts/seeds of *Quercus* plants, are commonly infested by insect larvae under natural condition, and consequently, seed quality, germination and seedling recruitment are impacted by infestation. From 2007 to 2008, insect infestation of nuts of Chinese cork oak, *Quercus variabilis*, was investigated in Jiyuan of Mt. Taihangshan area, and infested and perfect nuts were selected and planted in soil of 4 cm depths in Sep., 2007. We aimed to understand the effects of infestation on acorn quality, germination, seedling growth, and to clarify the interaction between infestation and above-mentioned procedure within plant recruitment. The results showed that: 1) infested rates of nuts were 30.04% and 47.68% in 2007 and 2008, respectively; 2) tannic acid (TA) content in infested nuts (11.54%±1.36%) was significantly larger than that in perfect ones (7.36%±1.31%) ( $P=0.004$ ); 3) the fresh-weight, diameter, and length of infested acorns were less than those in perfect nuts; 4) the rates of rotten nuts (28%) and partially germinated nuts (28%) in infested nuts were larger than those in perfect nuts (0% rotten and 2% partially germinated), while seedling establishment rate in infested nuts (56%) was less than that in perfect nuts (92%); germination duration of infested nuts (35 weeks after burial) was shorter than that of perfect nuts (37 weeks after burial); 5) at the time of early winter of experimental year, there were insignificant differences in height and leaf number of seedlings between infested and perfect nuts; and 6) at the end of experiment, June, 2008, there were no significant differences in leaf number, stem length, leaf weight and stem weight, except for root length, root weight and biomass, between seedlings derived from infested and perfect nuts. The results suggest that infestation would exert negative impact on seed quality and germination behavior; nonetheless, infestation is presumably reasonable for *Quercus* plant regeneration owing to decreased predation on infested acorns by other seed eaters.

Key words:

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