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生态系统的可靠性及其稳定性的维持

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Ecosystem reliability and its stability maintenance

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摘要 生态系统的营养结构是由营养级组成的.可靠性模型实验表明,营养级的可靠性取决于物种的失效率大小,物种丢失对物种丰富、失效率高的营养级的可靠性影响甚微,而对物种贫乏、失效率低的营养级略大,换言之,营养级的可靠性与物种的丰富度无紧密关系.其次,在营养级可靠性相同的条件下,简单系统的可靠性普遍略高于营养级多或食物链长的复杂生态系统.生物多样性与生态系统的稳定性没有必然联系,只要营养级还存在(无论剩下几个物种),那么按串并联方式组合成的生态系统就不会崩溃.生态系统的稳定性是冗余结构的稳定性.生态系统经常遭受干扰,但物种和个体的丢失可以通过来自其内外源源不断的冗余补充,以维持生态系统营养结构的稳定性.

关键词： 生态系统 可靠性 冗余 稳定性

Abstract： Trophic structure of ecosystems is composed of several trophic levels.According to reliability model,the reliability of trophic level is depended on species failure rate,and there are little effects on the reliability of trophic levels with abundant species and high failure rate by species losing,but obvious effects on the trophic level with few species and low failure rate.In another word,there is no closely relationship between the reliability of trophic levels and species richness.In addition,if the reliability of trophic levels is same,simple ecosystems have higher reliability than complicated ecosystems with more trophic levels or longer food chains.So,there is no certain relationship between biodiversity and ecosystem stability.If trophic levels remained (no matter how many species left),ecosystems structured by series and parallel connection would not collapse.Ecosystem stability is a kind of the stability of redundancy structure.If ecosystems were frequently disturbed,species and individual loss would make up by inside and outside redundancy recruitment to maintain the stability of ecosystem trophic structure.

Key words： ecosystem reliability redundancy stability

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