

干旱胁迫对森林病虫害的影响*

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摘要：由于气候变化导致的高温干旱影响病虫害与寄主之间的关系，在很多地区明显增加了树木的死亡。近年对全球 88 个由高温干旱引起树木死亡的典型实例的分析表明，其中 56%(88 例中的 49 例)与病虫害等生物因子有关，其中 94% (46 例) 与森林害虫有关，35% (17 例) 与森林病害有关。与森林害虫有关的实例中有 57%与小蠹虫危害有关，33%与其他蛀干害虫有关，食叶害虫占 22%。与森林病害有关的实例中真菌病害占 82%。我们在云南对干旱与云南松抗小蠹虫伴生菌之间关系的研究进一步表明，干旱对云南松的抗性影响有一个水分条件的阈值，高于这个阈值时，抗性与水分缺乏呈正相关；而低于这个阈值，其抗性与水分缺乏呈负相关。也就是说轻度缺水抗性增强，而严重缺水抗性降低。该研究结果为预测未来气候变化对病虫害的影响提供了理论依据和参考。

关键词：全球气候变化；干旱；害虫；病害；云南松

Effects of Drought Stress on the Forest Pests

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Abstract: Projected climate change increases in warm and dry conditions have potential to interact with biotic agents like insect pests and diseases to markedly increase tree mortality in many regions. A recent global overview reported 88 documented examples of drought and heat-induced tree mortality. It is observed that 56% (49 of 88) of these examples reported associated biotic mortality agents. Among these cases 94% (46) involved insect pests and 35% (17) noted pathogens. For the insect cases, 57% noted bark beetles, 33 % mentioned other wood borer or engraver beetles, and 20% listed defoliators. Fungi dominated the pathogen examples, mentioned in 82% of cases. Our study on the effects of extreme drought stress on the resistance of Yunnan Pine (*Pinus yunnanensis*) to a bark-beetle-associated fungus (*Leptographium yunnanense*) confirms that there is a threshold value of water deficiency when the value is higher than that, the

resistance of the trees is positively correlated with drought degree while when the value lower than that, the resistance of the trees is negatively correlated with drought stress degree. This provided the important theoretical basis for the prediction of forest pests under global climate change.

Key Words: global climate change; draught; insect pest; disease; *Pinus yunnanensis*

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