



## 中国四种森林类型主要优势植物的C:N:P化学计量学特征

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**摘要** 为了评价不同森林类型的生态化学计量特征的差异, 以吉林长白山温带针阔混交林、广东鼎湖山亚热带常绿阔叶林、云南西双版纳热带季雨林和江西千烟洲亚热带人工针叶林为研究对象, 通过对2007年4月-2008年5月4种典型区域森林植物叶片和凋落物的碳(C)氮(N)磷(P)元素质量比与N、P再吸收率的分析, 探讨了4种森林类型N、P养分限制和N、P养分再吸收的内在联系。结果表明: 1)从森林类型上看, 温带针阔混交林叶片的C:N:P为321:13:1, 亚热带常绿阔叶林叶片的C:N:P为561:22:1, 热带季雨林叶片的C:N:P为442:19:1, 亚热带人工针叶林叶片的C:N:P为728:18:1; 凋落物的C:N:P也是亚热带人工林最高, 达1 950:27:1, 温带针阔混交林的最低, 为552:14:1, 热带季雨林的为723:24:1, 亚热带常绿阔叶林的为1 305:35:1, 不同森林类型凋落物的C:N:P的计量大小关系与叶片的结果一致; 2)从植物生活型上看, 常绿阔叶林叶片的C:N均显著高于常绿阔叶林及落叶阔叶林; 叶片C:P与森林类型的关系并不十分密切; 常绿阔叶林叶片的N:P最高, 常绿针叶林次之, 落叶阔叶林最低; 3)植物叶片的N:P与月平均气温有显著的负相关关系, 但叶片的C:P基本不受月平均气温影响, 叶片的C、N、P计量比与降水的线性关系不显著; 4)高纬度地区的植物更易受N元素限制, 而低纬度地区植物更易受P元素的限制; 但受N或P限制的植物并不一定具有高的N或P再吸收率。研究结果表明, 不同类型森林的叶片与凋落物的化学计量特征具有一致性, 但是环境因子对不同类型植物化学计量比的影响并不相同。

关键词: C N P' " href="#" ">

C N P 生态计量化学 森林类型 营养限制 养分再吸收率

**Abstract:** *Aims* The nitrogen and phosphorus characteristics of plants represent plant features and responses to environmental factors. Our objectives are to distinguish leaf and litter C:N:P stoichiometric characteristics, nitrogen and phosphorus resorption of trees, and the relationship between stoichiometric ratio and temperature and precipitation for four typical regions in China.

*Methods* We studied temperate coniferous, subtropical evergreen broad-leaved, tropical monsoon and tropical plantation forest in the Changbaishan, Dinghushan, Xishuangbanna and Qianyanzhou Ecological Stations, respectively. We analyzed leaf and litter C:N:P, N, P and the relation of N, P nutrition limitation at each station.

*Important findings* Leaf C:N:P in temperate needle and broad-leaved mixed, subtropical evergreen broad-leaved, tropical rain and subtropical plantation forests were 321:13:1, 561:22:1, 442:19:1 and 728:18:1, respectively. Litter C:N:P of the four forest types were 552:14:1, 1 305:35:1, 723:24:1, 1 950:27:1, respectively. The C:N of evergreen coniferous forest is higher than in evergreen broad-leaved and deciduous broad-leaved forests, but C:P has no relationship with forest type. Leaf N:P was highest in

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evergreen broad-leaved forest and lowest in deciduous broad-leaved forest. Plant N : P has a linear relation with latitude and mean monthly temperature, but neither N or P concentration has such a relationship. Plant at high latitude are easily limited by N, those in low latitude are easily limited by P, but results show that plants limited by N or P don't have higher N or P resorption. Stoichiometric ratios of leaf and litter are consistent, but environmental factors have different effects on different kinds of plant.

Keywords: [C N P](#), [ecological stoichiometry](#), [forest type](#), [nutrition limitation](#), [nutrition resorption](#)

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