

宁夏罗山 4 种灌木各器官生态化学计量特征及其影响因子

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摘要:【目的】为探讨宁夏罗山灌木植物叶、枝、根生态化学计量特征及其主要影响因子。【方法】以宁夏罗山自然保护区内的蒙古绣线菊、虎榛子、准噶尔栒子、柠条4种典型灌木为研究对象,于2022年7-8月在罗山布设样地并采集各灌木的叶、枝、根样品,测定各器官C、N、P含量。【结果】4种灌木C的变化范围为303.82-478.18 (g/kg), N的变化范围为9.83-43.33 (g/kg), P的变化范围为0.40-1.60 (g/kg), C/N的变化范围为10.18-44.55, C/P的变化范围为305.83-1199.08, N/P的变化范围为17.29-34.39。不同器官、不同灌木及其交互作用对C、N、P含量及其比值均有显著影响(灌木×器官交互作用对N/P的影响不显著)。天然林各器官C含量较人工林高。叶、枝、根N含量均在准噶尔栒子中最低,在柠条中最高。4种灌木各器官C、N、P含量均表现为叶>枝>根(P含量在准噶尔栒子中表现为叶>根>枝除外)。N/P在4种灌木叶、枝、根中均大于16。各器官中C含量与N含量、P含量表现为负相关关系,N含量与P含量间表现为正相关关系。坡度、土壤P含量是影响叶化学计量的主导因子,坡位、坡度、土壤N含量是影响枝化学计量的主导因子,坡度、土壤C含量是影响根化学计量的主导因子。【结论】罗山灌木植物主要受P元素限制,柠条人工林枝、根N、P含量均较高,可适当种植柠条等其它豆科植物以缓解罗山植物受P元素限制状况。地形因子和土壤因子均会对灌木各器官C、N、P含量及其比值有不同程度的影响,具体影响原因和影响机理还需要今后的研究补充和完善。

关键词:生态化学计量特征;灌木器官;影响因子;宁夏罗山国家级自然保护区;

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Ecological stoichiometric characteristics and influencing factors of organs of 4 shrubs in Luoshan, Ningxia

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Abstract: 【 Objective 】 In order to investigate the ecological stoichiometric characteristics of leaves, branches and roots of shrubs and their main influencing factors in Luoshan, Ningxia, 【 Methods 】 Four typical shrubs of *Spiraea mongolica*, tiger hazelnut, *Cotoneaster jungei* and *Caragana koragana* in Luoshan Nature Reserve of Ningxia were selected as research objects, and leaf, branch and root samples of these shrubs were collected in Luoshan from July to August 2022. The contents of C, N and P in each organ were determined. 【 Results 】 The range of C was 303.82-478.18 (g/kg), the range of N was 9.83-43.33 (g/kg), the range of P was 0.40-1.60 (g/kg), and the range of C/N was 10.18-44.55. The range of C/P is 305.83-1199.08, and the range of N/P is 17.29-34.39. Different organs, different shrubs and their interactions had significant effects on C, N and P contents and their ratios, while shrub × organ interaction had no significant effect on N/P. The C content of organs in natural forest was higher than that in artificial forest. The content of N in leaves, branches and roots was the lowest in *Cotoneaster jungei* and the highest in *Caragana*. The contents of C, N and P in all organs of the four shrubs were leaf > branch > root (except for leaf > root > branch in *Cotoneaster Jungei*). N/P was greater than 16 in the leaves, branches and roots of the four shrubs. There was a negative correlation between C content and N content and P content, and a positive correlation between N content and P content. Slope and soil P content are the leading factors affecting leaf

stoichiometry, slope position, slope slope and soil N content are the leading factors affecting branch stoichiometry, slope and soil C content are the leading factors affecting root stoichiometry. **【Conclusion】** The shrub plants in Luoshan were mainly restricted by P element, and the contents of N and P in the branches and roots of *Caragana Koragana* plantation were high. It is suitable to plant other legumes such as *Caragana Koragana* to alleviate the P element restriction in Luoshan plants. Both topographic factors and soil factors have different degrees of influence on the C, N and P contents and their ratios in each shrub organ. The specific causes and mechanisms of influence still need to be supplemented and perfected in future studies.

Key words: ecological stoichiometric characteristics; Shrub organ; Influence factor; Ningxia Luoshan National Nature Reserve;