

带状采伐下孕笋期土壤温湿度变化及发笋的影响因子分析

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摘要:【目的】带状采伐被用来解决传统经营中择伐费时费力的问题,而采伐对土壤扰动较大,带状采伐后孕笋期的土壤温湿度变化规律以及其对出笋数的影响尚不明确。【方法】本文监测 3 个带状采伐样地(采伐带宽分别为 3m、8m、15m)与未采伐样地(ck)各个土层(0-10cm、10-20cm、20-30cm、30-50cm)六月至十二月的土壤温湿度变化情况,探究温湿度变化规律。在采伐样地和参考样地采集 0-10cm、10-20cm、20-30cm、30-50cm 土壤,风干并制样。测定土壤中总氮含量、碱解氮含量、总钾含量、速效钾含量、总磷含量和有效磷含量。采用 PCA 分析孕笋期温湿度和土壤养分对发笋的影响。【结果】①温度变化特征:土壤表层与深层温度随采伐带宽增加而升高,采伐样地表层土壤温度均高于对照样地,深层温度均低于对照样地。温较差日变化:表层土壤温度变化差异显著,3m、8m 带宽采伐样地呈现昼升夜降,15m 带宽采伐样地呈现 10:00 至 14:00 下降。温较差月变化:采伐样地均呈现先降后升趋势,随着采伐带宽增加,表层土壤日较差最低值出现时间提前。②湿度变化特征:未呈现明显规律性,15m 带宽采伐样地湿度始终最低。③全氮、碱解氮、全磷、有效磷和速效钾呈现随土层深度加深而降低的趋势,全钾呈现随土层深度加深而升高的趋势。与 ck 对比,全氮含量里 15m 带宽的差异显著,各个土层深度中 15m 带宽含量均高于 ck;碱解氮含量里 8m 带宽和 15m 带宽差异显著,各个土层深度中 3m 带宽含量低于 ck,15m 带宽高于 ck;全磷含量里 3m 带宽和 15m 带宽差异显著,各个土层深度中 3m 带宽含量低于 ck,15m 带宽含量高于 ck;有效磷含量里 8m 带宽差异显著,各个土层深度中 8m 带宽含量均高于 ck;全钾含量里,3m 带宽差异显著,各个土层深度中 3m 带宽含量均高于 ck;速效钾含量均无显著差异。④发笋的影响因子分析:出笋量与最大温度、全磷、有效磷、碱解氮、速效钾、全磷和全氮成正相关关系。【结论】15m 带宽采伐样地出笋量最高,高温低湿、养分充足的环境更适合孕笋。

关键词: 毛竹; 土壤温度; 土壤湿度; 出笋

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Analysis of influencing factors of soil temperature and humidity change and bamboo shoot growth under strip cutting

Abstract : 【 Objective 】 Strip cutting is used to solve the problem of time and effort of selective cutting in traditional management. However, the change of soil temperature and humidity in the bamboo shoot stage after strip cutting and its influence on the number of bamboo shoots are still unclear. [Methods] In this paper, soil temperature and humidity changes in each soil layer (0-10cm, 10-20cm, 20-30cm, 30-50cm) were monitored from June to December in 3 ribbon-cut plots (logging bandwidths of 3m, 8m, 15m, respectively) and uncut plots (ck), and the law of temperature and humidity changes was explored. Soil of 0-10cm, 10-20cm, 20-30cm and 30-50cm was collected in the cutting sample and reference sample, air dried and prepared. The content of total nitrogen, alkali-hydrolyzed nitrogen, total potassium, available potassium, total phosphorus and available phosphorus in soil were

determined. The effects of temperature, humidity and soil nutrient on shoot growth were analyzed by PCA.

【 Results 】 ① Characteristics of temperature change: the surface and deep soil temperatures increased with the increase of cutting bandwidth, and the surface soil temperatures were higher than that of the control land, while the deep soil temperatures were lower than that of the control land. Diurnal variation of temperature difference: the variation of surface soil temperature was significant, and the logging plots with 3m and 8m bandwidth showed rising and decreasing at day and night, while the logging plots with 15m bandwidth showed decreasing from 10:00 to 14:00. Monthly variation of temperature difference: all the felling samples showed a trend of first decreasing and then increasing. With the increase of felling bandwidth, the occurrence time of the lowest daily temperature difference of surface soil advanced. (2) Humidity change characteristics: there is no obvious regularity, and the humidity of the harvesting sample with 15m bandwidth is always the lowest. (3) Total nitrogen, alkali-hydrolyzed nitrogen, total phosphorus, available phosphorus and available potassium decreased with the deepening of soil depth, while total potassium increased with the deepening of soil depth. Compared with ck, the difference of 15m bandwidth in total nitrogen content was significant, and the 15m bandwidth content in each soil depth was higher than ck. There was a significant difference in the content of alkali-hydrolyzed nitrogen between 8m bandwidth and 15m bandwidth. The content of 3m bandwidth was lower than ck, and that of 15m bandwidth was higher than ck. There was a significant difference between 3m bandwidth and 15m bandwidth in total phosphorus content. 3m bandwidth content was lower than ck and 15m bandwidth content was higher than ck in each soil depth. The difference of 8m bandwidth in available P content was significant, and the 8m bandwidth content in each soil depth was higher than ck. In total potassium content, 3m bandwidth has significant difference, and 3m bandwidth content in each soil depth is higher than ck. There was no significant difference in the content of available potassium. (4) Analysis of the influence factors of bamboo shoots: the amount of bamboo shoots was positively correlated with the maximum temperature, total phosphorus, available phosphorus, alkali-hydrolyzed nitrogen, available potassium, total phosphorus and total nitrogen. 【 Conclusion 】 The harvesting plots with 15m bandwidth produced the highest amount of bamboo shoots, and the environment with high temperature, low humidity and sufficient nutrients was more suitable for bamboo shoots.

Key words: moso bamboo; soil temperature; soil moisture; shoot.