

植物生产层

紫花苜蓿越夏期的生理生化反应及评价

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摘要:

高温胁迫会致使植物发生一系列生理、生化及形态上的变化, 为了研究在自然高温条件下不同紫花苜蓿 (Medicago sativa) 品种的生理生化变化情况, 本研究选取22个紫花苜蓿品种, 采用随机区组设计, 测定在夏季高温期不同自然温度下叶片的相对含水量、相对电导率、可溶性蛋白含量、SOD和POD活性的动态变化, 并通过聚类分析的方法, 初步评价不同紫花苜蓿品种对夏季高温的耐受力, 秋眠级与抗热性之间以及各评价指标之间的相关性。结果表明, 1) 随着温度由低—高一低的变化, 相对含水量、可溶性蛋白含量、SOD和POD活性先升高后降低, 叶片相对电导率逐渐上升, 第4次样品平均相对电导率是第1次样品的3.36倍; 2) 通过层次聚类将参试品种对高温的耐受力分为3类, 其中耐热类品种为赛特、德宝、皇冠、皇后2000、8925MF、金皇后和WL414, 中等耐热品种为赛迪7号、南霸天、丰宝、WL 525HQ、阿尔冈金、猎人河、苜蓿王、牧歌401和四季旺, 其余参试品种耐热性较差; 3) 相关性分析表明, 秋眠级与相对含水量极显著负相关 ($P < 0.01$), 与可溶性蛋白含量和POD活性显著负相关 ($P < 0.05$), 与电导率和SOD活性之间相关系数为0.138和-0.405; 测定5个生理生化指标之间呈现极显著相关关系。

关键词: 高温 秋眠 电导率 SOD POD

Evaluation of physiological and biochemical response of alfalfa cultivars during summer

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Abstract:

High temperature induces a series of responses in physiology and morphology. In order to study this changes, 22 alfalfa (Medicago sativa) varieties were used to measure the contents of relative water content, soluble protein, relative electrical conductivity, and the activity of superoxide dismutase and peroxidase under different natural temperature in the summer. A randomized complete block design was conducted with three replicates. Using the method of cluster analysis, the heat resistance of these varieties were preliminarily evaluated. The results showed that, 1) the four indicators except the relative electrical conductivity, increased as the temperature progressed from 25 May to 21 June, and then dropped as the temperature dropped. However, the relative electrical conductivity increased by 3.36 times gradually; 2) in this study, 22 alfalfa varieties were divided into three types by hierarchical clustering, which are strong heat resistance type, weak heat resistance varieties and intermediate type, respectively. The varieties of heat resistant type included Sitel, followed Derby, Phabulous, Empress 2000, 8925MF, Gold Empress and WL 414, while the intermediate heat resistant varieties were Sardi 7, Alfasuper, Powerplant, WL 525HQ, Algonquin, Hunter River, Alfking, AmeriGraze401 and Siriver. The other varieties were weak heat resistant varieties; 3) there was very significant negatively correlation ($P < 0.01$) between FD class and relative water content. There were significant negatively correlations ($P < 0.05$) between FD class and soluble protein content, and FD class and POD activity. The relationships between FD class and the conductivity or FD class and SOD activity were not significant ($P > 0.05$). The correlation coefficient were 0.138 and -0.405. There were significant correlations among different

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1. 李争艳, 徐智明. 牧草和草坪草耐热性研究进展[J]. 草业科学, 2010,27(09): 128-133
2. 石永红, 万里强, 刘建宁, 王运琦, 吴欣明, 李向林. 多年生黑麦草高温半致死温度与耐热性研究[J]. 草业科学, 2010,27(02): 104-108
3. 张晓霞, 高永革, 严学兵, 王成章, 王彦华, 彭宝安. 紫花苜蓿抗热性鉴定与评价的研究进展[J]. 草业科学, 2010,27(02): 113-118
4. 徐大伟, 卢欣石. 北京地区光温因子对不同秋眠等级苜蓿秋后再生的影响[J]. 草业科学, 2010,27(04): 112-116
5. 江宏娟, 李建龙, 李良霞, 王艳. 高温胁迫下不同氮肥处理对高羊茅氮代谢的影响[J]. 草业科学, 2009,26(03): 102-107
6. 冯长松, 严秀将, 卢欣石. 北京地区不同秋眠型苜蓿叶片光合色素的比较研究[J]. 草业科学, 2009,26(05): 95-98
7. 史莹华, 王成章, 张伟毅, 王先科. 苜蓿秋眠型与其超氧化物歧化酶和过氧化物酶关系的研究[J]. 草业科学, 2009,26(08): 128-131
8. 耿繁军, 朱伟然, 李黎, 张亚军, 严学兵, 王成章. 郑州地区不同秋眠级苜蓿品种的生产性能评价[J]. 草业科学, 2009,26(06): 70-77
9. 严秀将, 冯长松, 卢欣石. 北京地区不同秋眠级苜蓿品种生长动态比较[J]. 草业科学, 2009,26(06): 78-83
10. 柳茜, 敖学成, 傅平, 陈艳. 非秋眠紫花苜蓿株系优选的性状分析[J]. 草业科学, 2009,26(11): 82-85
11. 樊文娜, 严学兵, 王成章. 苜蓿秋眠性调控机理的初步研究[J]. 草业科学, 2010,27(11): 109-114
12. 陈玮玮, 万里强, 何峰, 李向林, 刘树军. 温度和光照时间对3个秋眠型紫花苜蓿品种形态特征的影响[J]. 草业科学, 2010,27(12): 113-119
13. 赵海明, 刘君, 杨志民. 夏季高温对不同草地早熟禾品种坪用质量的影响[J]. 草业科学, 2010,27(1): 4-10
14. 江宏娟, 李建龙, 李良霞. 高温胁迫下水肥耦合对高羊茅生态性状的影响[J]. 草业科学, 2009,26(07): 152-157
15. 韩文军, 滨村邦夫, 杨劫. 海水灌溉条件下 *Salicornia bigelovii* 的种植密度对个体间养分积累及土壤盐分的影响[J]. 草业科学, 2008,25(11): 36-39