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酸雨胁迫下小麦微弱延迟发光及其生理、生态变化相关性研究

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摘要 以小麦幼苗为对象，研究了在酸雨胁迫下小麦叶片延迟发光强度变化与小麦叶 片内生理物质，包括叶绿素a，叶绿素b，类胡萝卜素，丙二醛，CAT，POD，SOD含量变化及小麦生态变化的相关性．实验结果说明，在酸雨胁迫下延迟发光强度与小 麦抗逆过程中CAT，POD，SOD，类胡萝卜素和丙二醛含量变化，具有明显的一致性 ．CAT，POD，SOD指示着小麦组织内活性氧自由基和过氧化氢含量的变化，类胡萝卜素和丙二醛也反映出小麦组织内氧化性物质含量的变化．说明延迟发光强度与植物体内活性氧含量及还原性物质含量具有明确的相关性．由于上述各种生理变化与 植物抗病、抗逆机制密切相关，因此可以利用延迟发光结合生态变化作为综合性反 映植物抗逆过程的指标．

关键词 小麦 酸雨 环境污染 抗逆性

分类号 X5

Study on the Correlation among Wheat Delayed Ultraweak Bioluminescence-Physiology-Ecology Change under the Stress of Acid Rain

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Abstract This research describes the influence of acidic stress on wheat delayed ultraweak bioluminescence (DUB). Wheat seedling was selected to investigate correlation among the DUB change, ecology change and content changes of such endogenous physiological chemicals as chlorophyll a, chlorophyll b , carotenoid and malonyldialdehyde in wheat leaves. The results showed the coherence of carotenoid and malonyldialdehyde content with the intensity of DUB. The activities of such endogenous antioxidation enzymes as POD, SOD and CAT under the stress of acid rain, which indicated the free racial and EfeOx quantities in plant tissue, were studied. It was also found that within the first six days after treatment acid rain stress significantly increased POD, CAT and SOD activities, while catalase activity was restrained, both POD and SOD activities were enhanced and contributed to the scavenging and detoxification of active oxygen species. The result demonstrates that DUB can be used to detect pollution and to measure the influence of environmental factor on plant growth and development.

Key words WHEAT ACID RAIN ENVIRONMENTAL POLLUTION ADVERSITY RESISTANCE

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