

## KCl 处理对百合柱头生理及结实的影响

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**摘要:** 以百合(*Lilium*)品种‘Pollyanna’为材料,研究了KCl处理对柱头中SOD、POD及CAT等3种保护酶活性、可溶性蛋白含量以及电阻率的影响。结果表明,处理后3种酶的活性均表现出不同程度的应激性升高,其中SOD活性在花开当天和花开1d显著升高,在蕾期与花开2d极显著升高;花开当天及花开1d的POD活性极显著升高;CAT活性在花开1d升高显著,花开2d及3d时升高极显著。柱头可溶性蛋白含量及电阻率无显著变化,表明KCl处理削弱了细胞膜的膜脂过氧化作用,延缓了柱头衰老,提高了授粉受精作用,且与结实率升高表现出一定相关性。

**关键词:** 百合; 酶活性; 膜脂过氧化; 电阻率; 结实率; 远缘杂交

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## Effects of KCl Stress on Physiology of *Lilium* Stigma and Seed Setting

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**Abstract:** The effects of KCl stress on the activities of protective enzymes (SOD, POD and CAT), the content of soluble protein and resistivity of *Lilium* ‘Pollyanna’ stigma were studied. The results showed that the activities of the three enzymes were increased by stress in different degree. Compared to control, the SOD activity increased on bloom day and one day after anthesis and significantly increased on the bud stage and two days after anthesis. The POD activity increased significantly on bloom day and one day after anthesis. The CAT activity increased on one day after anthesis and significantly increased on two and three days after anthesis. But the content of soluble protein and resistivity had no significant difference between the control and the treatments. These indicated that KCl treatments retarded membrane lipid peroxidation, delayed the stigma senescence, improved the pollination and fertilization, which correlated with the seed setting.

**Key words:** *Lilium*; Enzyme activity; Membrane lipid peroxidation; Resistivity; Seed setting rate (SSR); Distant cross

远缘杂交是百合育种的重要途径之一,但往往存在受精前和受精后障碍,导致亲和性降低,甚至完全不亲和。为克服受精前障碍,西方育种者设计了切割柱头、嫁接柱头、激素处理、花粉蒙导及离体受精等经典方法,取得了较为显著的效果<sup>[1]</sup>。国内研究者应用这些方法也获得了一些有价值的杂交种<sup>[2,3]</sup>。采用盐处理柱头打破受精前障碍,是克服百合远缘杂交不亲和的一个创新<sup>[4]</sup>,在克服油菜<sup>[5]</sup>等作物自交不亲和中也有类似的研究,但未见深入探讨其内在作用机制。本试验在测定超氧化物歧化酶(SOD)、过氧化物酶(POD)和过氧化氢酶(CAT)等保护酶及可溶性蛋白(soluble proteins)等生理指

标的同时,还进行了电阻率的测定。因其非破坏性地测定组织胞外(re)、胞内电阻(ri)<sup>[6]</sup>,较其它指标更接近真实地反映柱头生理生化和结构变化,故将其作为一项新的生理参考指标。通过比较KCl处理前后柱头的生理变化以及相互之间的相关性,以期揭示组织内保护酶、蛋白之间的协同作用及与结实的内在联系。

### 1 材料和方法

试验以亚洲百合‘多安娜’(*Lilium* ‘Pollyanna’)为材料,2006年秋将其种植于河北农业大学西校区标本园,2007年夏开花后处理取材。

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