



氮钾营养对棉花主茎功能叶衰老的生理效应研究

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Physiological Effects of Nitrogen and Potassium Nutrition on the Senescence of Cotton Functional Leaves

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摘要

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摘要 在大田试验条件下,以转基因抗虫棉鲁棉研28为材料,设置适氮适钾(N₂K₂)、适氮轻钾(N₂K₁)、轻氮适钾(N₁K₂)、无氮钾(N₀K₀)4个处理,研究氮钾营养对转基因抗虫棉主茎功能叶叶绿素含量、叶绿素荧光参数、蛋白质含量和抗氧化酶系统特征的影响。结果表明,盛铃期一天内棉花主茎功能叶荧光参数Fv/Fm、ΦPSII、qP总体呈现高、低、高的“V”字型变化趋势,以ΦPSII最为明显。不同处理间各荧光参数多以N₂K₁处理值最高,N₀K₀处理最低。盛铃期叶绿素含量N₂K₂、N₁K₂和N₂K₁分别比N₀K₀高38.0%、24.0%和20.7%。处理间主茎功能叶蛋白质含量、SOD活性在生育中后期均以N₀K₀最低,MDA、ABA含量则以N₀K₀最高。说明维持一定氮钾营养水平利于保持棉花中后期主茎功能叶生理活性,从而有效延缓衰老。

关键词: 棉花 氮钾营养 生理特征

Abstract: Physiological effects of nitrogen and potassium nutrition on cotton functional leaves were studied by using the material of SCRC 28. Four treatments were conducted with N₂K₂, N₂K₁, N₁K₂ and N₀K₀. The results indicated that fluorescence parameters Fv/Fm, ΦPSII and qP of the functional leaves showed “V”-shaped changing trend of high-low-high in a day at boll forming stage, typically the ΦPSII. The value of each fluorescence parameter under N₂K₁ treatment was generally the highest, while the lowest under N0K0 treatment. Chlorophyll content under N₂K₂, N₁K₂ and N₂K₁ treatments increased by 38.0%, 24.0% and 20.7% than of N₀K₀ at the boll forming stage. In addition, the soluble protein content and SOD activity of functional leaves were lowest under N₀K₀ treatment at middle and later stages, while the MDA and ABA contents were the highest. It can be concluded that maintaining a certain level of nitrogen and potassium nutrition is helpful to improve physiological performance of functional leaves and delay in senescence.

Keywords: cotton nitrogen and potassium nutrition physiological characteristics

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