

**EFFECTS OF TIMING OF APPLICATION OF THE PLANT GROWTH REGULATOR  
ARYSTA-EXP-NP321 ON PETIOLE NITRATE-NITROGEN IN COTTON**

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**Abstract**

Active ingredients of ARYSTA-Exp-NP321 are sodium-p-nitrophenolate (0.3%), sodium-o-nitrophenolate (0.2%), and sodium-5-nitroguaiacolate (0.1%). It has been reported that foliar application of this plant growth regulator to hydroponically-grown cotton increased the uptake of K, Mg, and Ca. Petiole nitrate-N - an indicator of N nutrition (uptake) status- declines more or less rapidly during boll growth in cotton, thus indicating that boll growth increasingly depends on N translocation from leaves which is one of the processes that eventually leads to cut-out. Delaying or slowing this decline of N uptake during fruiting would help sustaining growth rate, delay cut-out and, possibly, improve yield. The objective was to determine if application of ARYSTA-Exp-NP321 at different times during the fruiting stage affects the ability of the cotton plant to uptake soil nitrogen as assessed by the post-application progression of nitrate-nitrogen content in leaf petioles. The study was conducted at the Texas A&M University Agricultural Research and Extension Center in Corpus Christi, TX, in 2002. Cotton cv. Deltapine 458 BG/RR was planted on April 4 to a plant population of 35,000 plants/ac. Plots were 4 rows wide 100 ft long with four replicates in randomized complete blocks. Plots were hand-picked (1 ac/1000) on August 22. The growing season was droughty with rainfall amounts of 1.5 in. from first square to first bloom, 1.25 in. two to three weeks after first bloom, 1.5 inch 4 weeks after first bloom, and 1.0 in. at first open boll. Timing treatments consisted in single applications of ARYSTA-Exp-NP321 at 5.0 oz./acre starting at first bloom (June 6) and following at weekly intervals for 5 weeks. The progression of petiole nitrate content in the fifth leaf from the top of the stem was measured weekly in each treatment after application using a Cardy Nitrate meter. Petiole nitrate-N concentration of untreated cotton declined rapidly after the first week into bloom, as was also reported in other studies. This decline was halted and slightly reversed momentarily by the occurrence of moderate rainfall about the third week into bloom. Treatments applied at first bloom and 1, 2, and 3 weeks after first bloom showed a significant petiole nitrate-N concentration increase about 2.0 fold over the untreated control three weeks after first bloom and 1.2 to 1.5 fold over the untreated control four weeks after first bloom. The treatment applied four weeks after first bloom showed an immediate increase 1.75 fold over the untreated control. Treatment applied five weeks after first bloom had no effect on petiole nitrate concentration. The coincident increases in petiole nitrate concentration observed three and four weeks after first bloom were explained by the occurrence of 1.1 inches of rain shortly before the third week after first bloom. These results indicate that (a) once applied this compound is stable and remains effectively active on the plant, (b) it can produce an immediate response, and (c) soil water availability securing transpiration flux may be required to elicit a response in petiole nitrate-N concentration.