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Module 5.1-7 Split potassium application improves cotton lint yield and economics in China.

Cotton is a major cash crop that requires more potassium (K) than most field crops. Potassium can improve cotton photosynthesis, carbohydrate metabolism, N metabolism and resistance to cyanosis (bronze wilt). Therefore, K fertilization plays an important role in yield and lint quality. Previous research showed that rapid K accumulation by cotton occurs from flowering to boll opening stage; about 49 to 73% of total plant K accumulated after flowering, suggesting that adequate soil K supply in the later growing stage would be important for K nutrition of cotton. Traditionally, all the K fertilizer was applied as basal at planting, which did not match the K uptake pattern by cotton plant.

Field experiments on K application time were conducted in Hebei, Henan and Xinjiang provinces during 2012 to 2013. There were four treatments: 1) check (no K), 2) 100% of K applied basally at planting, 3) 50% of K applied basally and 50% at flowering, 4) 50% of K applied at bud stage and 50% at boll stage. The two-year average results indicated that split application of K increased lint yield and economic benefit compared with 100% of K applied basally. The best time of K application was one half of K fertilizer applied at bud stage and the other half at boll stage, which produced 5% to 33% more lint yield and US\$340 to US\$1,590/ha more income than 100% of K applied as basal at planting (**Table 1**). This ratio may change some between soils with differing K levels, but clearly shows that some mid-season K application is required to optimize yield and profits.

Table 1. Effect of K application time on cotton yield and economic benefit (2012-2013). **Source:** Unpublished data, IPNI China program.

	Lint yield, kg/ha			Income from fertilizer application, US\$/ha		
	Hebei	Henan	Xinjiang	Hebei	Henan	Xinjiang
Check	1,401b	864d	1,399c	-	-	-
100% basal K	1,477a	997c	1,622b	244	445	1,035
50% basal, 50% flowering	1,480a	1,184b	1,634b	259	1,360	1,088
50% bud stage, 50% boll stage	1,545a	1,322a	1,715a	584	2,036	1,494

Rates (kg N-P₂O₅-K₂O/ha) in Hebei, Henan and Xinjiang in 2012 and 2013 were: 225-45-150, 240-135-240, and 240-150-75, respectively. Prices in 2012: N = US\$0.73/kg, P₂O₅ = US\$0.89/kg, K₂O = US\$0.91/kg, Lint = US\$4.8/kg. Prices in 2013: N = US\$0.75/kg, P₂O₅ = US\$0.83/kg, K₂O = US\$0.80/kg, Lint = US\$5.0/kg.

Means within the same column followed by the same letter are not significantly different at p = 0.05.

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