

WEED CONTROL, TOLERANCE, AND PHYSIOLOGICAL BEHAVIOR OF FIRSTRATE POST AND POST-DIRECTED IN COTTON

John W. Wilcut, Ian C. Burke, Andrew J. Price,

Scott B. Clewis and Alan C. York

North Carolina State University

Raleigh, NC

A. Stanley Culpepper

University of Georgia

Tifton, GA

Abstract

A series of experiments were conducted to evaluate weed control, cotton response to Firstrate applied postemergence-directed or postemergence (POST), and the physiological behavior of Firstrate in cotton. In the first study, cotton varietal tolerance to Firstrate applied POST in a weed free environment was evaluated in North Carolina in 1997 and 1998. Cotton varieties included Suregrow 125, Deltapine 90, Deltapine 51, Deltapine 33B, Paymaster 1330RR, Stoneville 474, and Stoneville BXN 47. Herbicide treatments included an untreated weed free check, Staple at 0.063 lb ai/ac, and Firstrate at 0.0156 or 0.0312 lb ai/ac. Firstrate and Staple were applied with a nonionic surfactant (NIS) at 0.25% (v/v). All cotton varieties were injured 11% or less with Staple, Firstrate at the low rate and high rate injured cotton 20% or less, and 40% or less, respectively, at 6 to 8 DAT. BXN was injured numerically more by Staple and either rate of Firstrate than other varieties. Injury from all herbicides in all varieties was transitory and was not apparent at harvest. Yields were not influenced by herbicide treatment. A weed-free study was conducted at Lewiston-Woodville, NC in 1997 and 1998. Firstrate was applied at 0.0156 or 0.0312 lb/ac alone or with MSMA on 6 inch or on 12 inch cotton. These treatments were compared with an untreated check and with Cotoran at 1.0 lb ai/ac plus MSMA at 2.0 lb/ac on 6 inch cotton and with Bladex at 0.8 lb ai/ac plus MSMA at the aforementioned rate on 12 inch tall cotton. The herbicides were kept within one inch of the soil surface (precise application). The cotton variety was Suregrow 125. Cotton was injured 3% or less with all treatments at all growth stages. Yields were not affected by Firstrate in a weed-free environment. A study at Moultrie, GA reported 16-25% injury when Firstrate at 0.0156 lb/ac plus 1.0% COC and was applied 3 to 4 inches up the stem of 6-8 inch tall cotton. Injury was transitory and was 2% or less at 23 DAT. Treatments made 4-6 inches up on the stem of 13-16 inch tall cotton injured cotton 4% or less early season. Yields of Deltapine 458RRBG were not negatively influenced by Firstrate treatment.

Experiments were conducted at 10 locations over a two year period to evaluate weed control with Firstrate at 0.0156 lb/ac, Roundup at 1.0 lb ai/ac, and a tank mixture of Firstrate plus Roundup. Emerged weeds at the time of application were evaluated 20-25 days after treatment. All weeds were present in two or more locations. Firstrate failed to control broadleaf signalgrass (*Bracharia platyphylla*), crowfootgrass (*Dactyloctenium aegyptium*), fall panicum (*Panicum dichotomiflorum*), goosegrass (*Eleusine indica*), large crabgrass (*Digitaria sanguinalis*), and Texas panicum (*Panicum texanum*). Roundup and a Roundup plus Firstrate tank mixture controlled these species at least 98% with no differences among treatments. Firstrate alone controlled Palmer amaranth (*Amaranthus palmeri*), redroot pigweed (*Amaranthus retroflexus*), and smooth pigweed (*Amaranthus hybridus*) less than 30% while all Roundup treatments controlled 100% of these populations. Firstrate and Firstrate plus Roundup controlled entireleaf (*Ipomoea hederacea* var. *integriuscula*), ivyleaf (*Ipomoea hederacea*), pitted (*Ipomoea lacunosa*), and tall (*Ipomoea purpurea*) morningglories in the cotyledon to 5L growth stage 100% while Roundup alone controlled less (90%). Firstrate controlled common lambsquarters (*Chenopodium album*), sicklepod (*Senna obtusifolia*), and prickly sida (*Sida spinosa*) 30% or less while all Roundup treatments controlled 100%. All herbicide treatments controlled cotyledon to 4L common ragweed 100%.

In laboratory studies, ¹⁴C-Firstrate was rapidly absorbed by the leaves and stem of Deltapine 5415RR cotton. Over 40% of the herbicide was absorbed within 4 hours and absorption increased to approximately 90% at 48 HAT. The herbicide was translocated to an appreciable extent both acropetally and basipetally when foliar applied (POST) or when applied on the stem (PDS). When applied on 12L cotton PDS, Firstrate translocated to reproductive tissues. Very little metabolism (10% or less) was seen over a 48 hour period when applied on the 3rd leaf of a 4L cotton plant.