

Breeding Conventional and Roundup Ready Soybean Cultivars with High Yield Potential and Multiple Disease Resistance

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A new conventional soybean cultivar ‘Osage’ was released in 2007 as a mid maturity group (MG) V (5.6) cultivar with wide adaptation, high yield potential, and moderately high protein content. In 2007, Osage yielded 69.6 bu/ac over seven locations in Arkansas Soybean Performance Tests. Osage is also resistant to several important diseases in the mid-south such as southern stem canker, sudden death syndrome, and frogeye leaf spot. A total of 2475 bags of foundation seeds were produced in 2007 by the University of Arkansas Foundation Seed Program at Stuttgart for commercial production in 2008.

Conventional cultivars of ‘Ozark’ and ‘UA 4805’, released in 2003 and 2005 respectively, remain as high-yielding cultivars in Arkansas. Ozark and UA 4805 yielded 70.3 and 68.6 bu/ac, respectively, over seven locations in the Arkansas Soybean Performance Tests in 2007. The Foundation Seed Program at Stuttgart had 35 acres each in 2007. In addition, nine seed companies carry certified seed for sale.

We have also developed several new RR lines that were evaluated throughout Arkansas in 2007. R02-3263 RR is an early MG V RR line and produced an average yield of 61.9 bu/ac in four irrigated environments in the Arkansas Soybean Performance Tests. R01-4834 RR and R04-1276 RR are mid-MG V RR lines and yielded 62.2 and 63.9 bu/ac over five irrigated environments in the Arkansas Soybean Performance Tests. Other promising mid-MG V RR lines include R04-170 RR, R04-1250 RR, and R04-1274 RR with yields ranging from 65.3 to 69.5 bu/ac on average in five Arkansas locations. We have begun to work on the second generation of RR technology. “RR2-Yield” is being incorporated into UA 4805 by Monsanto. We are also working on a research agreement with Pioneer on the GAT technology.

We have also evaluated high oil lines for crushing and biodiesel. A total of 64 high oil lines (MG IV and V with oil content ranging from 23.5 to 25%) were selected from 2006 yield trials and evaluated at Marianna and Rohwer, AR in 2007. R03-144 (early MG IV), R05-4256 (late MG IV), and R05-638 (early MG V) yielded 54.6, 58.5, and 59.5 bu/ac, respectively on average over two locations in 2007. Oil content of these lines ranged from 25.0 to 25.7% on average over two locations.

We evaluated 35 most advanced lines in the USDA Southern Regional Uniform Tests and 11 promising lines in the Arkansas Soybean Performance Tests in 2007. We also tested 95 advanced, 190 intermediate, 435 preliminary, 15 RR advanced, 165 RR preliminary, 45 Arkansas historical lines, 122 genetic diversity lines, and 241 drought tolerant lines. For specialty soybean, we evaluated 55 large-seeded line, 220 small-seeded line, 2550 natto lines, 25 vegetable soybean lines, 315 high protein lines, and 64 high oil lines. In addition, we evaluated 8622 progeny rows and 366 breeding populations.