# 2010 Root-knot nematode variety trial results

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Root-knot nematodes infest approximately 40% of the cotton acreage in the Southern High Plains of Texas, and if not managed can reduce yields by an average of 26%. Effective chemical control is primarily by the use of Temik 15G at planting. In recent years, a few cultivars have been released with partial resistance to root-knot nematode. The known commercial cultivars with partial nematode resistance are Stoneville (ST) 5458B2RF, ST 4288B2F, Deltapine (DP) 174RF, and Phytogen (PHY) 367WRF. Since there are new commercial cultivars released every year, it is important to monitor how well these partially resistant cultivars and other more susceptible cultivars are adapted to areas infested with root-knot nematodes within the Southern High Plains. One issue with growing the partially resistant cultivars on large acreages is their lack of storm proof or general looseness. In the Lamesa test presented in this paper, storm proof ratings are provided for the different cultivars tested.

Three cultivar tests are presented in this paper, in two of the sites (Spade and Whiteface), each cultivar was tested both with and without Temik 15G, and in the third test (Lamesa), Temik 15G was applied to all plots at a low rate (3 lbs/acre). For all the tests, there are four replications of each cultivar, or cultivar x Temik combination, arranged in a randomized complete block design.

**RESULTS:**

At the Spade test site, Temik 15G increased yields by an average of 100 lbs of lint/acre. All cultivars responded positively to Temik 15G, so yield is presented by averaging a cultivar across both +/- Temik rates (Table 1). Yields were highest for DP 174RF, PHY 367WRF, DP 1032B2RF, ST 4288B2F, and ST 5458B2RF (Table 1). There were more galls in the absence of Temik 15G (average of 27/root system) than when Temik 15G was used (average of 18/root system) (Table 1). Root-knot nematode densities were lowest for DP 174RF.

At the Whiteface site, the cultivars yielded somewhat differently depending if Temik was absent or present, so these means are presented separately (Table 2). In the absence of Temik, 9 of the 12 cultivars yielded similarly (Table 2). When Temik 15G was present, 5 cultivars (DP 1032B2RF, ST 5458B2RF, PHY 367WRF, PHY 375WRF, and DP 174RF) yielded higher than the others. There was also a 100 lb/acre increase in yield across all cultivars at this site when Temik 15G was used (Table 2), which resulted in a $52/acre increase in lint value, not counting the cost of Temik 15G. Galling was higher in the absence of Temik (10 galls/root) than in its presence (7 galls/root). Root-knot nematode population density was lowest for ST 4288B2F, DP 174RF, and PHY 367WRF (Table 2).

At the Lamesa site, three diseases were present and all would have some contribution towards the final yield. It is of our opinion that the nematode pressure was the most important disease factor contributing to yield, but that resistance or susceptibility to Verticillium wilt and bacterial blight also had some role in affecting which cultivars performed the best. There were 14 cultivars out of the 40 tested that were in the top yield ranking (Table 3, highlighted in bold). Of this group, the cultivars with the least amount of nematode reproduction included PHY 367WRF, ST 5458B2RF, DP 1044B2RF, DP 174RF, and All-Tex Epic RF (Table 3).

**CONCLUSIONS:**

The partially resistant cultivars ST 5458B2RF, PHY 367WRF, and DP 174RF were in the top yielding group at all three sites. ST 4288B2F was in the top yielding group at the two

shorter season sites and close to the top yielding group at Lamesa. Nematode reproduction was also consistently lower with these four cultivars compared to others at all sites. The susceptible cultivar DP 1032B2RF did well at the two shorter season sites, but not at Lamesa. There were a number of cultivars that did well at Lamesa, but either did not do as well at themore northern sites, or were not tested.

**Table 1. Affects of cultivars and Temik 15G (T) on root-knot galling, nematode population density, and yield for a test near Spade.**

| Cultivar | Lbs of Lint/acre | Galls/root at 35 days | | Root-knot /500 cc soil[a] | Plants /ft. row | % Lint | Lint Yield X Loan Value |
|---|---|---|---|---|---|---|---|
| | | T=0 | T=5 | | | | |
| Deltapine 174RF | **1,727 a[b]** | 15.3 | 16.4 | 913 c | 1.98 bcd | 30.5 a | **934 a** |
| Phytogen 367WRF | **1,605 ab** | 20.7 | 15.0 | 1,134 abc | 2.41 abc | 27.6 cd | **866 ab** |
| Deltapine 1032B2RF | **1,563 ab** | 26.0 | 16.9 | 3,631 a | 1.22 e | 30.7 a | **893 ab** |
| Stoneville 4288B2F | **1,526 ab** | 23.4 | 10.6 | 1,403 ab | 1.96 bcd | 27.6 cd | **856 ab** |
| Stoneville 5458B2RF | **1,526 ab** | 16.6 | 11.8 | 1,989 ab | 2.28 abc | 28.5 bc | **807 abc** |
| Deltapine 0935B2RF | 1,432 bc | 26.9 | 21.3 | 4,084 a | 1.62 de | 30.3 a | 756 b-e |
| NexGen 4010B2RF | 1,425 bc | 30.8 | 28.5 | 3,923 a | 1.30 e | 28.3 cd | 798 a-d |
| Deltapine 0912B2RF | 1,370 bcd | 33.0 | 18.1 | 2,208 a | 2.19 abc | 30.5 a | 774 b-e |
| Deltapine 1044B2RF | 1,337 bcd | 27.9 | 9.5 | 3,343 a | 2.62 a | 27.7 cd | 747 c-f |
| All-Tex Epic | 1,222 cde | 25.9 | 10.9 | 4,588 a | 2.01 bcd | 29.9 ab | 695 c-g |
| NexGen 3348B2RF | 1,222 cde | 21.4 | 18.1 | 2,399 ab | 2.20 abc | 27.5 cd | 649 d-h |
| NexGen 2549B2RF | 1,194 cde | 36.5 | 20.8 | 2,163 abc | 1.89 cd | 26.9 d | 607 fgh |
| Fibermax 9180B2F | 1,155 cde | 28.7 | 24.9 | 5,043 a | 2.47 ab | 27.0 cd | 638 e-h |
| Americot 1532B2RF | 1,118 de | 30.2 | 13.3 | 2,276 ab | 2.00 bcd | 27.7 cd | 597 fgh |
| Phytogen 375WRF | 1,086 de | 43.8 | 31.0 | 4,385 a | 2.16 a-d | 28.4 bcd | 570 gh |
| BCSX EXPB2F | 1,034 e | 27.4 | 18.6 | 1,393 bc | 2.00 bcd | 23.7 e | 500 h |
| **Temik 15G (lbs/acre)** | | | | | | | |
| 0 | 1,294 | 27.1 | --- | 3607 | 1.91 | 28.0 | 703 |
| 5 | 1,394 | --- | 17.8 | 2001 | 2.13 | 28.4 | 758 |

[a]The nematode counts were subjected to a log10 transformation, and the separation is based on the transformed values.

[b]Different letters indicate that cultivars are significantly different at P = 0.05.

**Table 2. Affects of cultivars and Temik 15G (T) on root-knot galling, nematode population density, and yield for a test near Whiteface.**

| Cultivar | Yield (lbs of lint/acre | | | Galls/ root | Root-knot /500 cc soil[a] | Plants /ft. row | % Lint | Lint x loan value/acre | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Average | T=0 | T=5 | | | | | Average | T=0 | T=5 |
| Deltapine 1032B2RF | **2,300 a[b]** | **2,201 a** | **2,399 a** | 8.0 | 7,600 a | 1.73 d | 31.2 a | 1,321 a | 1,264 ab | 1,377 a |
| Stoneville 5458B2RF | **2,290 ab** | **2,206 a** | **2,374 a** | 10.1 | 2,905 ab | 2.57 abc | 28.2 cd | 1,307 ab | 1,259 ab | 1,355 ab |
| Deltapine 174RF | **2,290 ab** | **2,277 a** | **2,303 ab** | 8.7 | 1,555 de | 2.84 ab | 29.9 b | 1,307 ab | 1,300 a | 1,314 abc |
| Phytogen 367WRF | **2,263 ab** | **2,177 a** | **2,349 ab** | 6.8 | 1,380 cde | 3.04 a | 27.8 de | 1,287 abc | 1,238 ab | 1,336 abc |
| Phytogen 375WRF | **2,227 abc** | **2,110 ab** | **2,344 ab** | 10.2 | 7,920 a | 2.27 c | 29.1 bc | 1,237 cde | 1,172 bc | 1,302 bc |
| Stoneville 4288B2F | **2,202 abc** | **2,156 a** | 2,248 bc | 7.8 | 520 e | 2.27 c | 27.0 def | 1,259 bcd | 1,232 ab | 1,285 cd |
| Deltapine 0935B2RF | 2,194 bc | **2,143 ab** | 2,245 bc | 5.4 | 2,070 bcd | 2.20 cd | 29.5 b | 1,254 b-e | 1,225 ab | 1,284 cd |
| All-Tex Epic RF | 2,136 cd | **2,132 ab** | 2,141 cd | 5.8 | 2,010 bcd | 2.35 c | 29.7 b | 1,216 de | 1,213 ab | 1,218 de |
| Fibermax 9180B2F | 2,090 de | **2,124 ab** | 2,056 d | 9.2 | 8,338 ab | 2.53 bc | 26.8 ef | 1,202 e | 1,221 ab | 1,182 ef |
| BCSX EXPB2F | 1,998 e | 1,965 bc | 2,030 d | 10.1 | 2,130 ab | 2.48 bc | 25.4 g | 1,113 f | 1,095 cd | 1,131 fg |
| NexGen 2549B2RF | 1,864 f | 1,852 c | 1,877 e | 9.3 | 1,335 bcd | 2.25 c | 27.0 ef | 1,053 g | 1,046 d | 1,060 h |
| Americot 1532B2RF | 1,861 f | 1,818 c | 1,904 e | 9.4 | 2,115 abc | 1.74 d | 26.4 fg | 1,051 g | 1,027 d | 1,076 gh |
| **Temik 15G (lbs/acre)** | | | | | | | | | | |
| 0 | 2,097 b | --- | --- | 10.1 a | 3,213 | 2.26 b | 28.0 | 1,191 b | --- | --- |
| 5 | 2,189 a | --- | --- | 6.7 b | 3,434 | 2.45 a | 28.4 | 1,243 a | --- | --- |

[a]The nematode counts were subjected to a log10 transformation, and the separation is based on the transformed values.
[b]Different letters indicate that cultivars are significantly different at P = 0.05.

**Table 3. Affects of cultivars on yield and root-knot nematode reproduction at a site in Lamesa[a].**

| Cultivar | Lbs of Lint/acre | % Lint | Storm[b] resistance | Root-knot /500 cc soil | Bacterial blight rating[c] |
|---|---|---|---|---|---|
| NexGen 4111 RF | **1357** | 28.0 | 4 | 4200 | R |
| Deltapine 174 RF | **1353** | 28.6 | 4 | 690 | S |
| PhytoGen 519WRF | **1297** | 28.2 | 5 | 1410 | S |
| PhytoGen 367WRF | **1287** | 26.6 | 4 | 488 | S |
| Deltapine 1044 B2RF | **1284** | 26.6 | 5 | 560 | S |
| NexGen 4012 B2RF | **1282** | 26.6 | 4 | 2285 | R |
| Deltapine 1133 B2RF | **1224** | 29.2 | 4 | 1680 | R |
| PhytoGen 569WRF | **1196** | 27.5 | 4 | 2100 | S |
| Croplan Genetics 3035RF | **1171** | 28.7 | 4 | 2120 | S |
| All-Tex Epic RF | **1171** | 28.8 | 4 | 715 | S |
| NexGen 3410 RF | **1168** | 26.2 | 5 | 1410 | R |
| Monsanto EXP | **1164** | 29.3 | 6 | 1590 | R |
| FiberMax 9170B2F | **1160** | 28.3 | 5 | 1440 | R |
| Stoneville 5458B2RF | **1157** | 26.7 | 5 | 535 | S |
| Stoneville 4288B2F | 1137 | 25.6 | 4 | 265 | S |
| All-Tex 81144 B2RF | 1126 | 25.4 | 5 | 1170 | R |
| BCSX EXP | 1111 | 25.8 | 4 | 975 | S |
| Americot 1532 B2RF | 1105 | 26.0 | 5 | 1170 | S |
| Deltapine 1032B2RF | 1105 | 28.2 | 4 | 1580 | P |
| Stoneville 5288B2F | 1098 | 27.3 | 5 | 1930 | R |
| Croplan Genetics 3520B2RF | 1097 | 25.1 | 4 | 300 | S |
| Croplan Genetics 4020B2RF | 1091 | 25.1 | 4 | 1440 | S |
| NexGen 3348 B2RF | 1089 | 24.7 | 6 | 960 | P |
| FiberMax 1845LLB2 | 1069 | 25.7 | 5 | 1320 | P |
| Deltapine 164 B2RF | 1060 | 27.9 | 4 | 2460 | S |
| BCSX EXP | 1052 | 27.1 | 4 | 2340 | S |
| Monsanto EXP | 1036 | 28.8 | 4 | 385 | S |
| FiberMax 1740B2RF | 1034 | 26.1 | 5 | 4807 | R |
| NexGen 4010 B2RF | 1033 | 25.6 | 5 | 2370 | R |
| Croplan Genetics 3020 B2Rf | 997 | 22.5 | 4 | 930 | R |
| BCSX EXP | 990 | 22.4 | 5 | 1140 | R |
| NexGen 2549 B2RF | 987 | 25.2 | 7 | 1350 | S |
| PhytoGen 375WRF | 986 | 27.8 | 3 | 2015 | R |
| PhytoGen 565WRF | 976 | 24.2 | 4 | 2160 | S |
| Croplan Genetics 3220B2RF | 963 | 26.6 | 5 | 5220 | S |
| Deltapine 1137 B2RF | 950 | 27.4 | 4 | 715 | S |
| Monsanto EXP | 947 | 28.1 | 4 | 820 | S |
| Deltapine 0935 B2RF | 928 | 27.8 | 5 | 1680 | S |
| FiberMax 1773LLB2 | 900 | 24.2 | 5 | 1272 | S |
| Croplan Genetics EXP | 878 | 22.6 | 4 | 530 | S |
| Mean | 1100 | 26.6 | 4 | 1558 | --- |
| c.v.% | 13.6 | 5.4 | 17.5 | 111.6 | --- |
| **LSD 0.05** | **209** | **2.0** | **1** | **3533** | --- |

[a]Other diseases that impacted the test were Verticillium wilt and bacterial blight. [b]Storm Resistance: Visual rating from 1 (very loose boll type, considerable seed cotton loss) to 9 (very tight boll type, no seed cotton loss).
[c]R=Resistant, S=Susceptible, and P=partial resistance.