Conventional Cotton Varieties and Management of the Bollworm/Budworm Complex

R. G. Luttrell, Ryan Jackson, and Clint Allen

USDA ARS Southern Insect Management Research Unit, Stoneville, Mississippi

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TIMELY, RELIABLE INFORMATION FOR MID-SOUTH AGRICULTURE

Cotton, rice, soybean yields climb higher

By Elton Robinson
Farm Press Editorial Staff
erobinson@farmpress.com

USDA forecasted higher average yields for cotton, rice and soybeans in its Oct. 11 Crop Production report, and lowered average yield for corn once again. Several Mid-South states are projecting record rice yield.

U.S. rice production in 2012-13 is forecast at 198.9 million hundredweight, up

(See MID-SOUTH, Page 2)

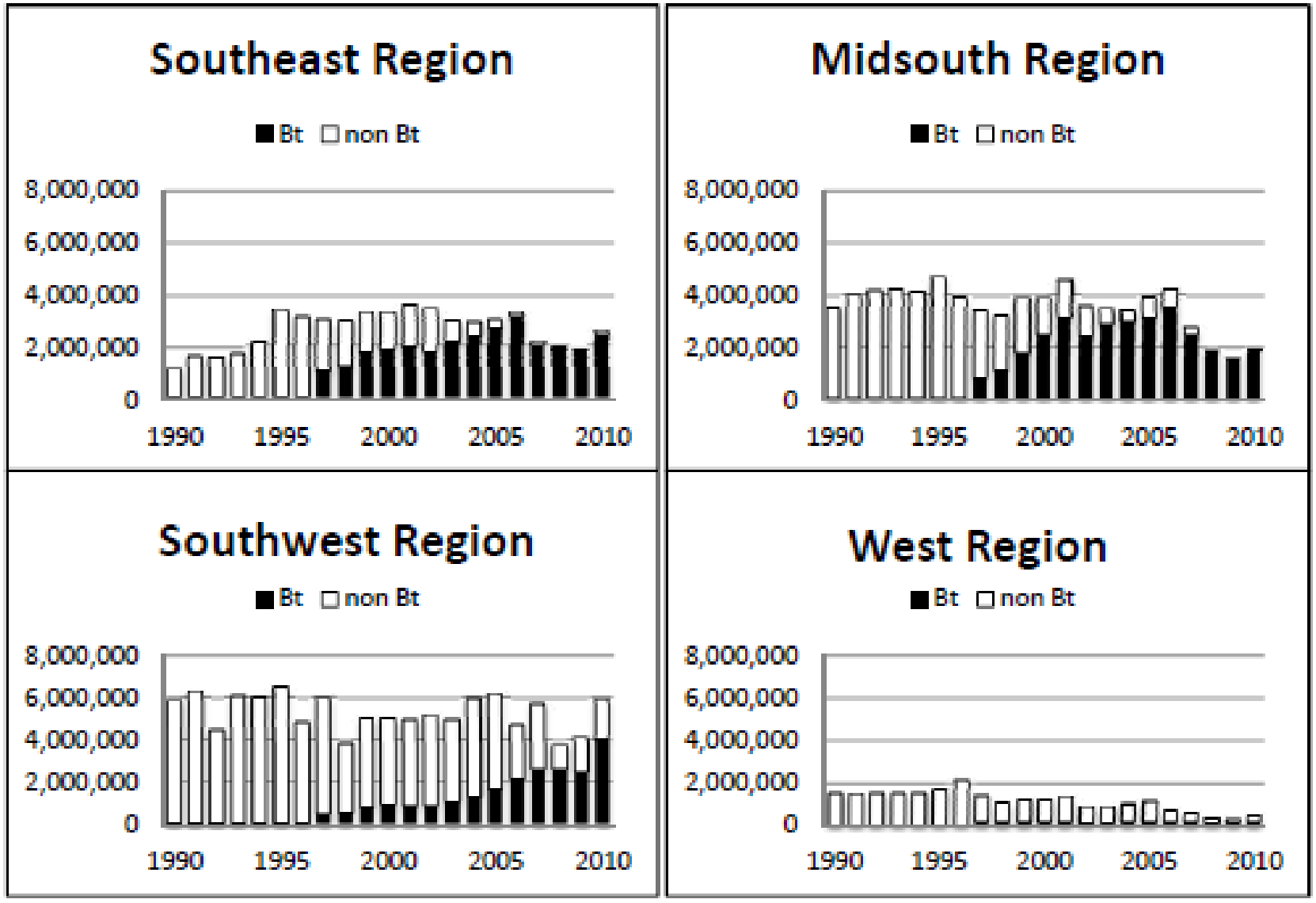
Conventional cotton variety promising

By Elton Robinson
Farm Press Editorial Staff
erobinson@farmpress.com

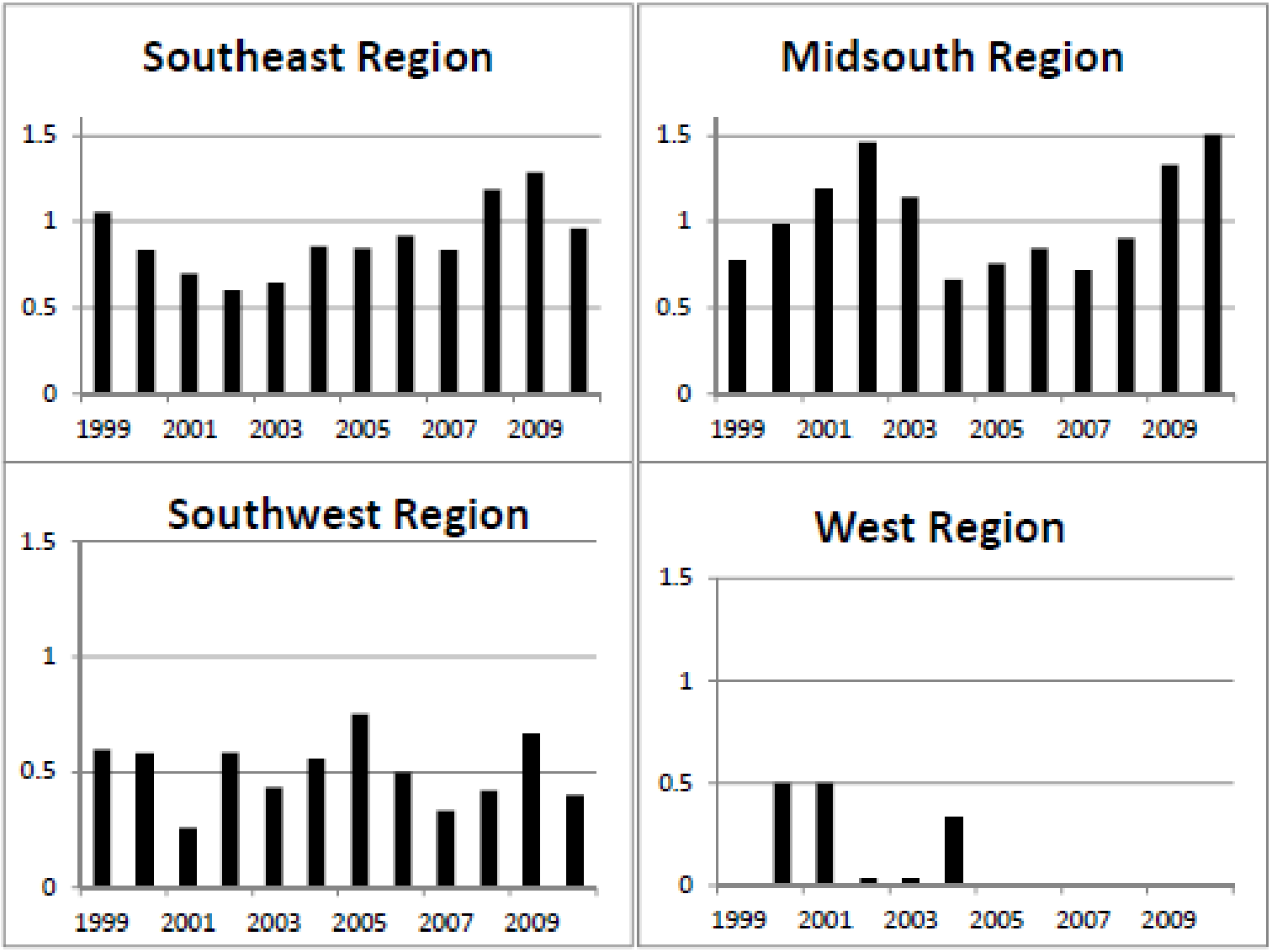
Are the stars aligning for a revival of conventional cotton varieties? They could be for producer Keith Mayberry, who farms around Essex, Mo. This season, he planted 200 acres of AM UA48, a conventional variety developed by University of Arkansas plant breeder Fred Bourland and which was subsequently commercialized by Americot.

The variety boasts some interesting fiber properties — a staple range of 39-41, which is solidly in the premium range, and strength of 34-35. As the season was coming to a close, yield potential was also very promising for Mayberry.

Mayberry farms about 800 acres of cotton, 1,000 acres of corn, and 1,200 acres of soybeans with his sister, Kim Mayberry-Holifield, a sales representative for BASF



Adoption of Bt Cotton in U.S. Cotton Belt



Average Number of Bollworm Sprays Per Acre

Components of 2011 & 2012 Studies

- Cotton Varieties
  - Early Maturity Lines
    - Bourland Variety (BVAR) – ARK48
    - Conventional (non Bt) Comparison – DP121
    - Bollgard 2 Comparison – DP0912
    - Widestrike Comparison – PHY375
  - Full Season Lines
    - Meredith Variety (MVAR) – MD25
    - Conventional (non Bt) Comparison – DP174
    - Bollgard 2 Comparison – DP1048
    - Widestrike Comparison – PHY499
- Insecticide Spray Options
  - Untreated
  - Sprayed with Karate (pyrethroid)
  - Sprayed with Prevathon (diamide)

Components of 2011 & 2012 Studies

- Cage Studies (1/8 acre)
  - Release of high densities of H. zea and H. virescens moths
  - 1 or 2 applications of Karate, Prevathon (Coragen)
  - Weekly plant maps, end-of-season box map
- Replicated Plot Studies – Stoneville
  - Split plot – untreated, Prevathon (Coragen), Karate sprays based on average scouting data for treatment and MSU larval thresholds
- On-Farm Comparisons
  - 4 locations in 2011, 10 locations in 2012
  - Same treatments as Cage and Replicated Plot studies, varieties varied to some extent, no ARK48 or MD25

2011& 2012 Cage Studies

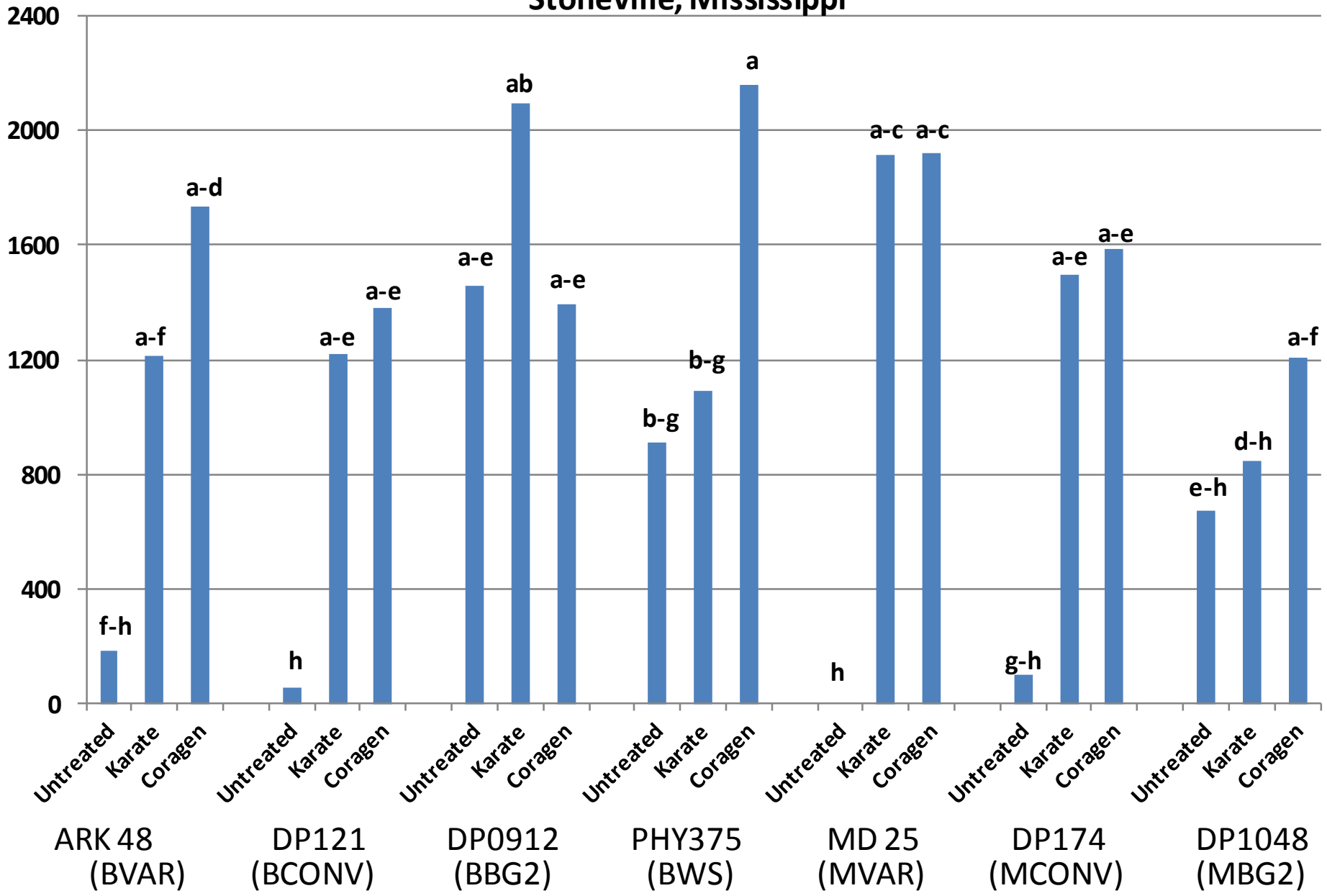
- Three 1/8 acre cages – each with seven varieties managed without insecticide, treated with Karate twice, treated with Coragen twice
- Cages infested three times (1st bloom, 1st bloom + 2 weeks, 1st bloom + 4 weeks) – 400 *H. zea* and 400 *H. virescens* released each time
- Plants mapped weekly for insect damage and fruit retention on first positions
- Plants box mapped at harvest for yield and maturity
- Data studied by AOV and yield plotted versus estimated time post cotyledon (assume 3 days for mainstem node expansion and 6 days for branch nodes)

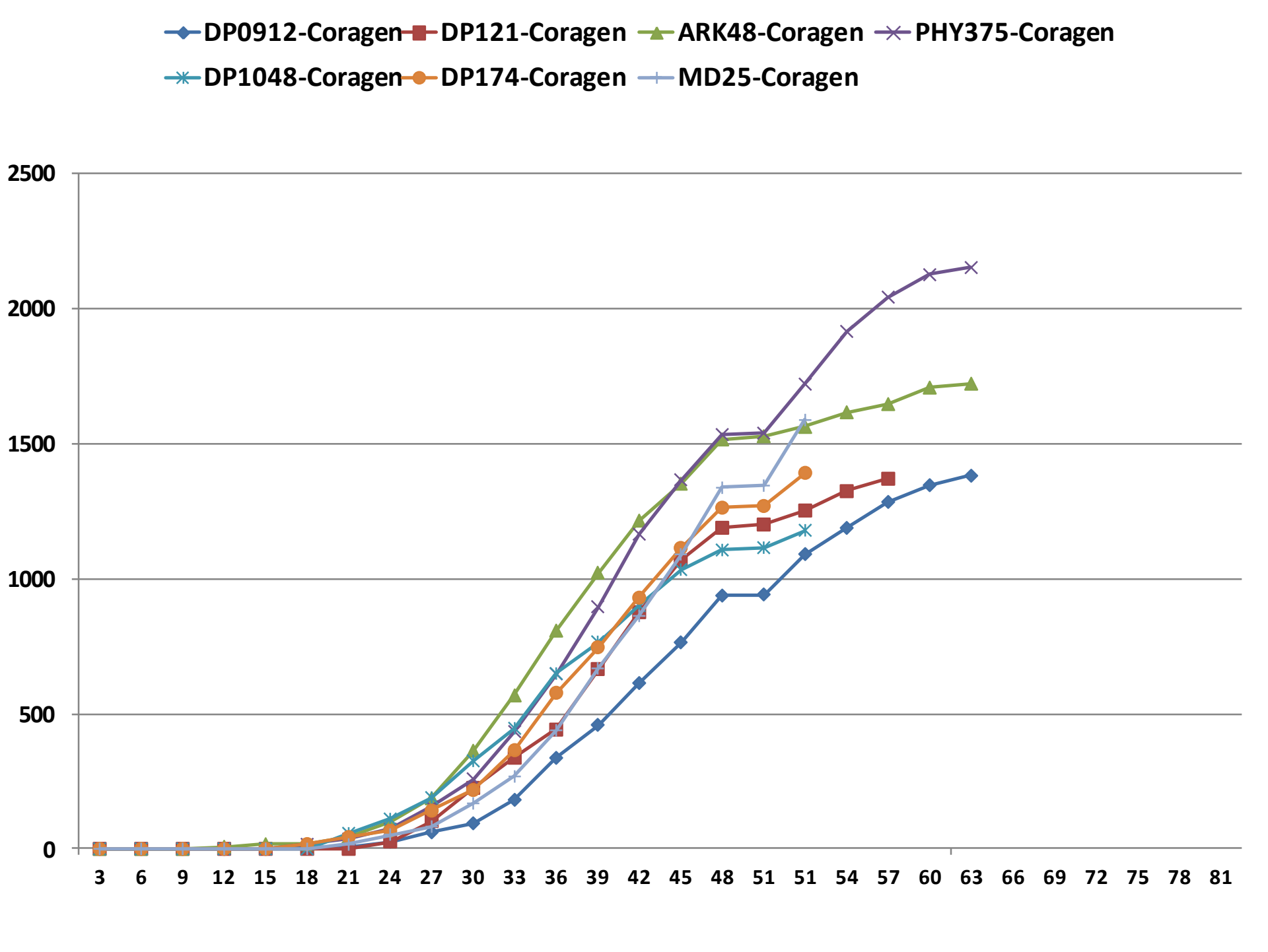
Analysis of Variance

Response – Lint Yield Per Acre (Box Mapping of Cage Study)

Source	df	F ratio	Prob. > F
Variety	6	1.8089	0.1206
Insecticide	2	19.6442	<0.0001
Variety * Insecticide	12	1.4745	0.1728

Lint Yield Per Acre – 2011 Value Added – Box Mapping of Cage Study
USDA, ARS Southern Insect Management Research Unit
Stoneville, Mississippi




DP0912-Coragen
DP121-Coragen
ARK48-Coragen
PHY375-Coragen
DP1048-Coragen
DP174-Coragen
MD25-Coragen
2500
2000
1500
1000
500
0
3
6
9
12
15
18
21
24
27
30
33
36
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72
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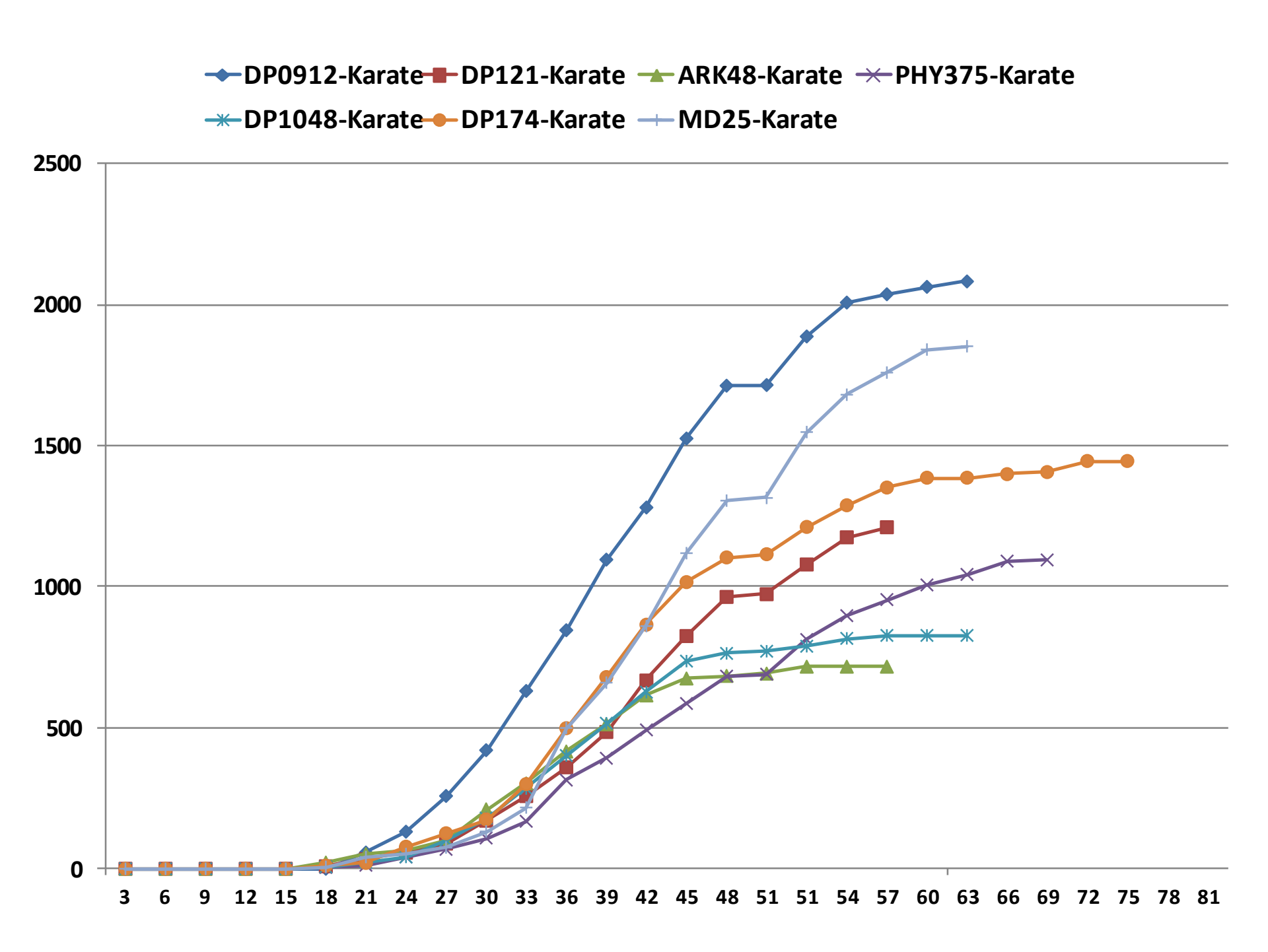
78
81


DP0912-Karate
DP121-Karate
ARK48-Karate
PHY375-Karate
DP1048-Karate
DP174-Karate
MD25-Karate
2500
2000
1500
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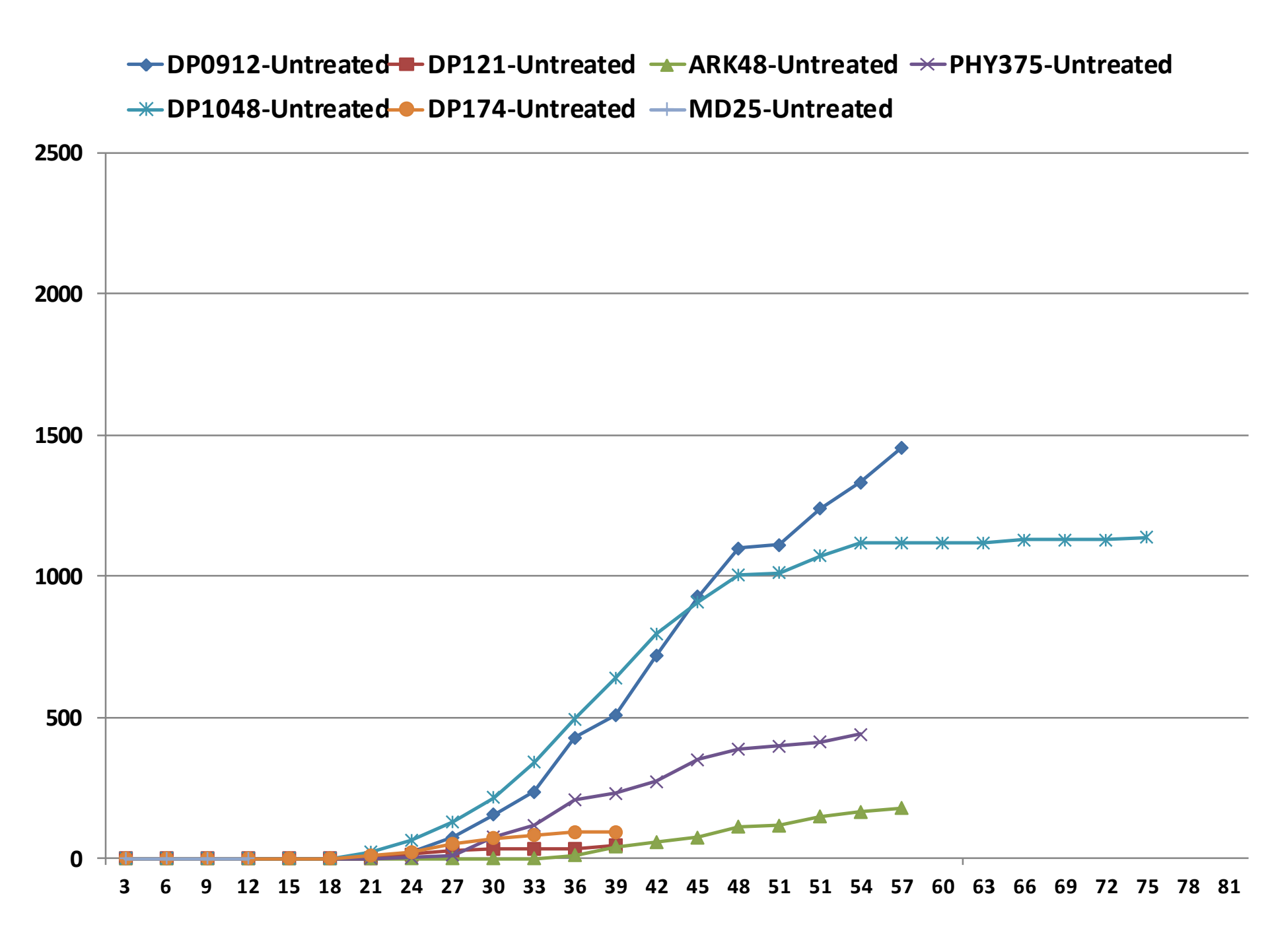
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 51 54 57 60 63 66 69 72 75 78 81


DP0912-Untreated
DP121-Untreated
ARK48-Untreated
PHY375-Untreated
DP1048-Untreated
DP174-Untreated
MD25-Untreated
2500
2000
1500
1000
500
0
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 51 54 57 60 63 66 69 72 75 78 81

Summary

- Under conditions of extreme insect damage, unsprayed non-Bt did not produce economic yield. No yield in some instances.
- No difference observed among varieties in yield when treated with Coragen.
- Yields of most varieties treated with Karate were statistically similar to those treated with Coragen, except for PHY375.

Summary

- Coragen treated non Bt cottons (ARK 48, DP121, MD25, and DP174) were as good as or better than some untreated Bt cottons.
- First year results suggest that high yielding non Bt cottons can be protected from extreme insect pressure if managed correctly.
- Additional work needed to refine estimates of damage rates and repeatability of first year observation.

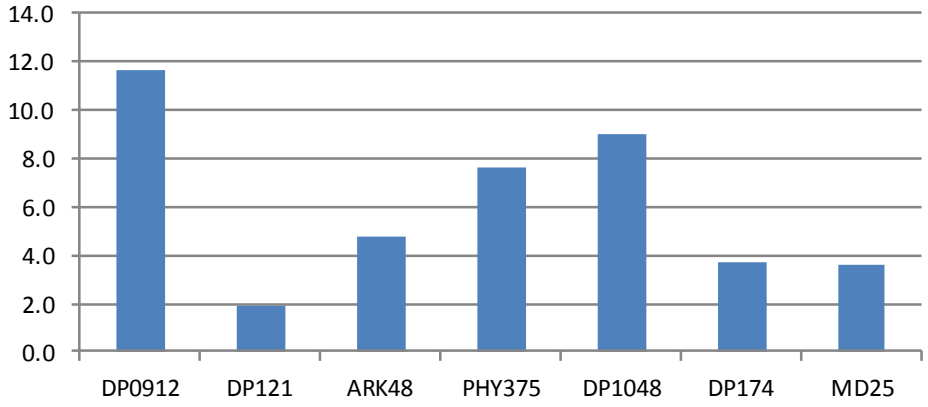
Total Bolls Counted on Plant Maps on August 15

Release 200 zea and 200 virecens/cage on 7/18 and 7/24

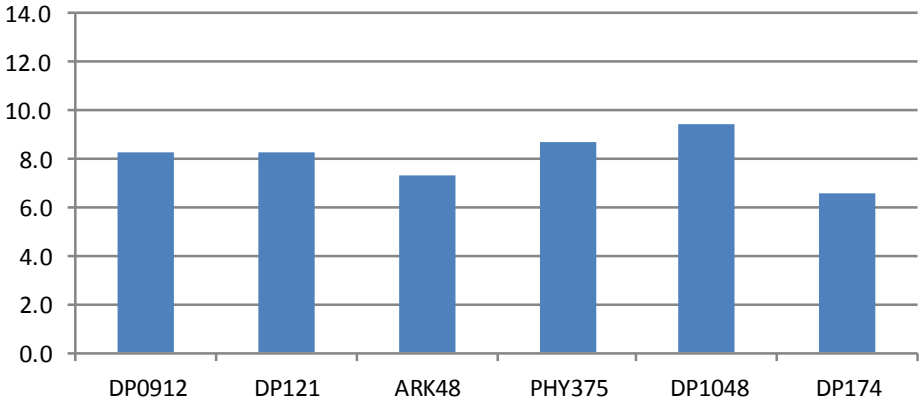
Spray 1st time on 7/24, Spray 2nd time on 8/2

Plant Map – Cage Study
August 15, 2012

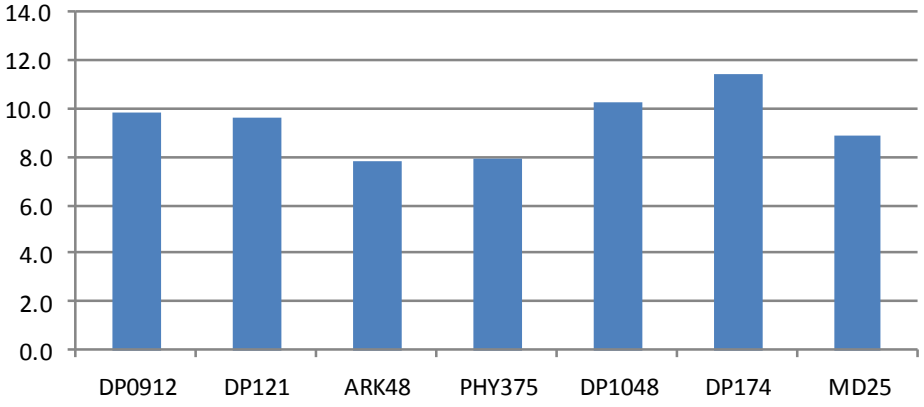
Bolls/Plant
Untreated



Bolls/Plant
1 Spray Karate

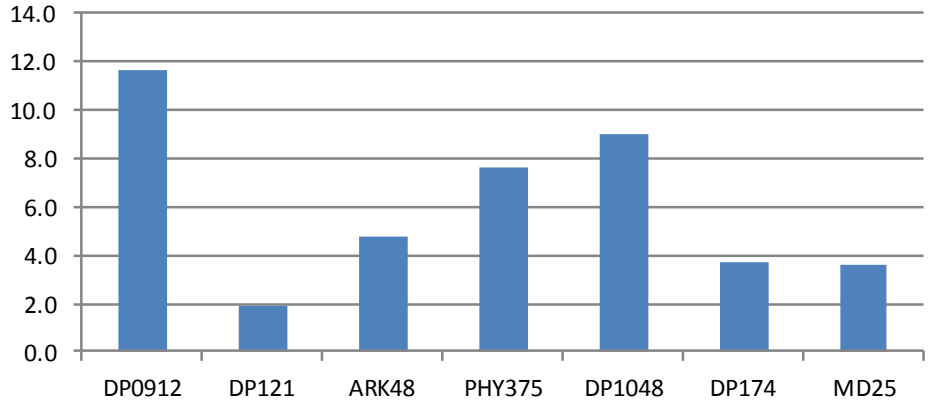


Bolls/Plant
2 Sprays Karate

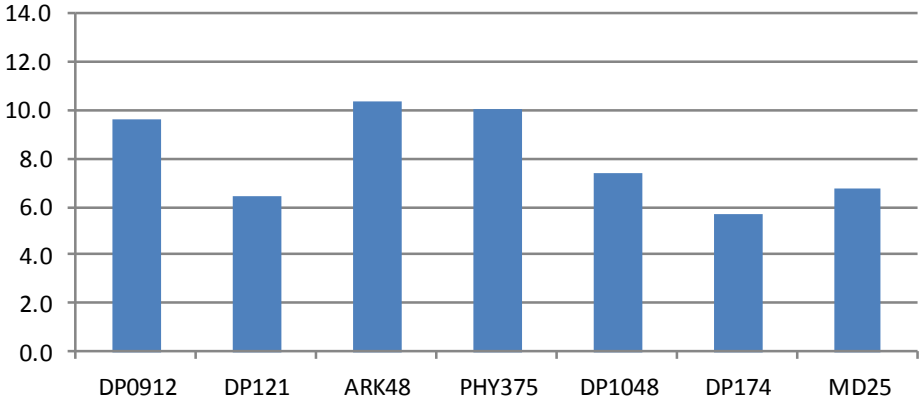


Plant Map – Cage Study
August 15, 2012

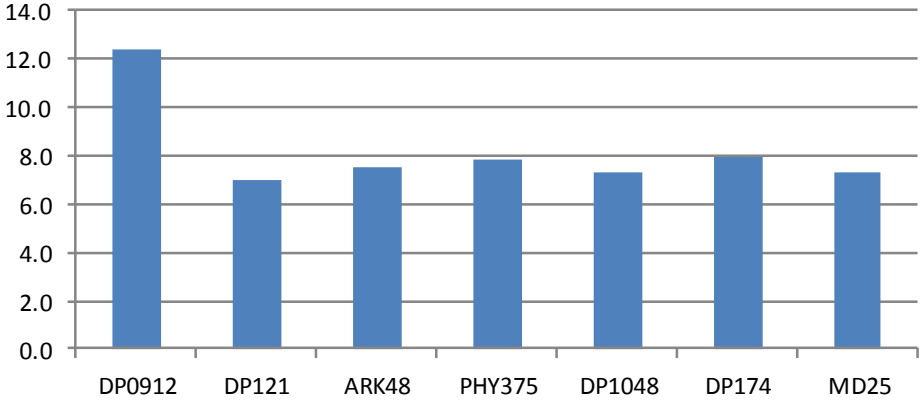
Bolls/Plant
Untreated



Bolls/Plant
1 Spray Prevathon

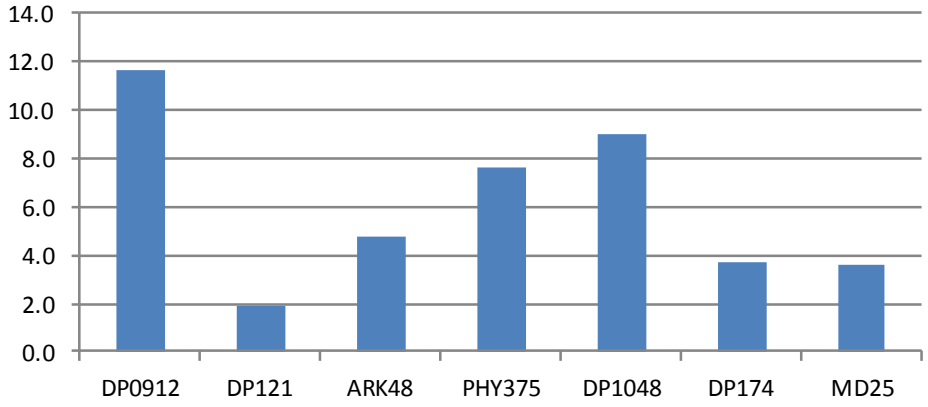


Bolls/Plant
2 Sprays Prevathon



Plant Map – Cage Study
August 15, 2012

Bolls/Plant
Untreated



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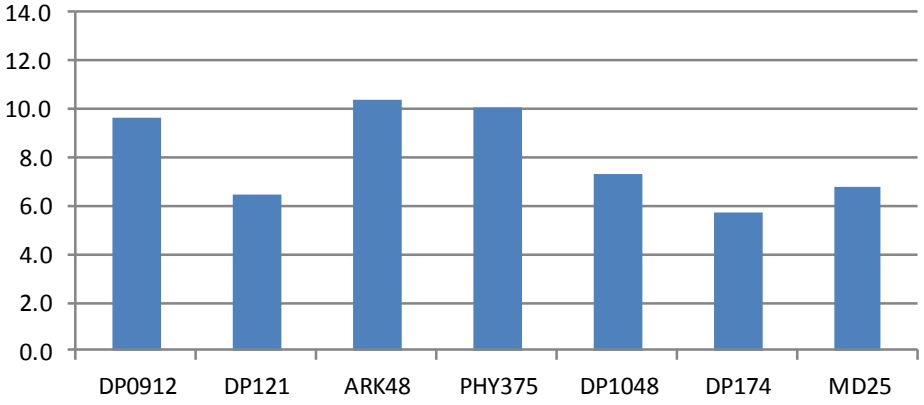
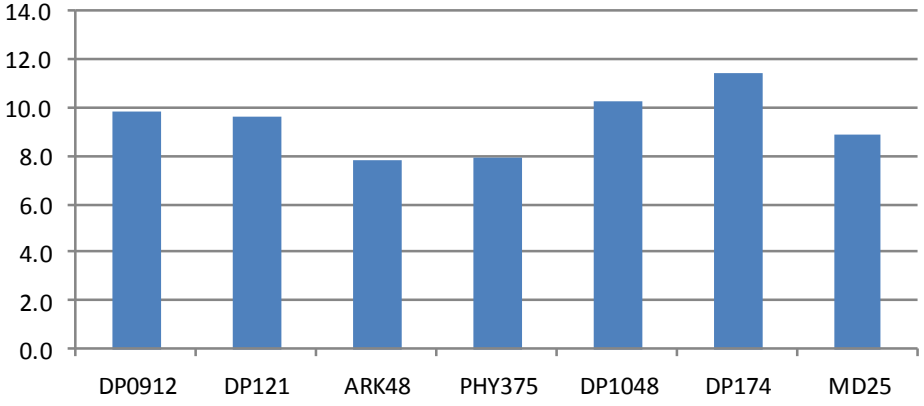


Bolls/Plant
2 Sprays Karate



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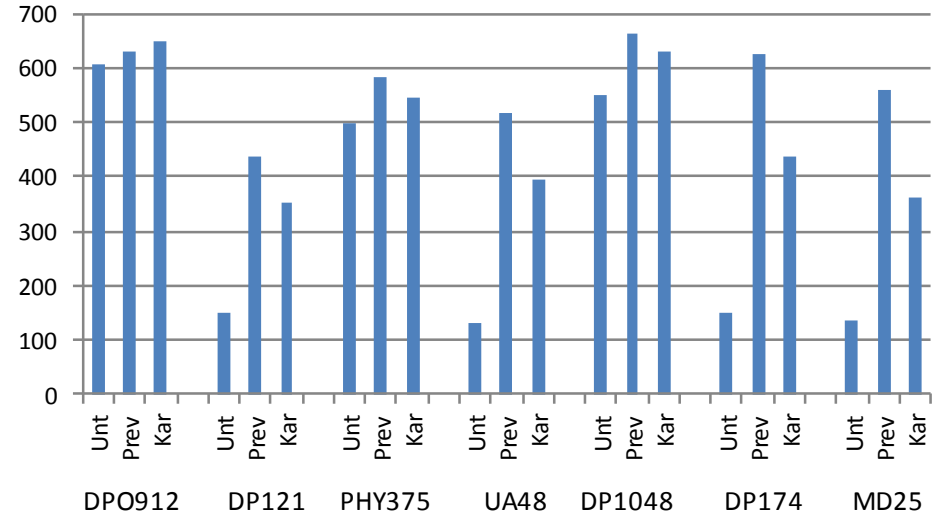
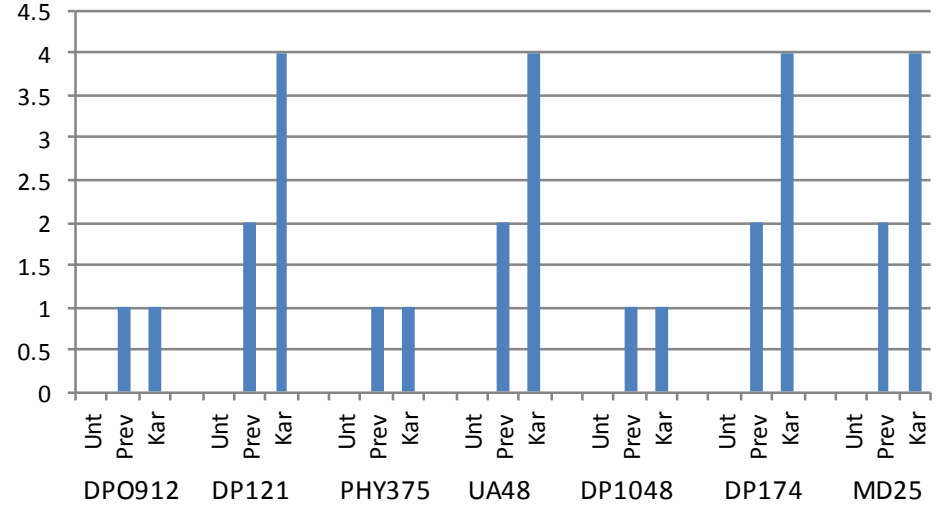
Yield (lb lint/acre)

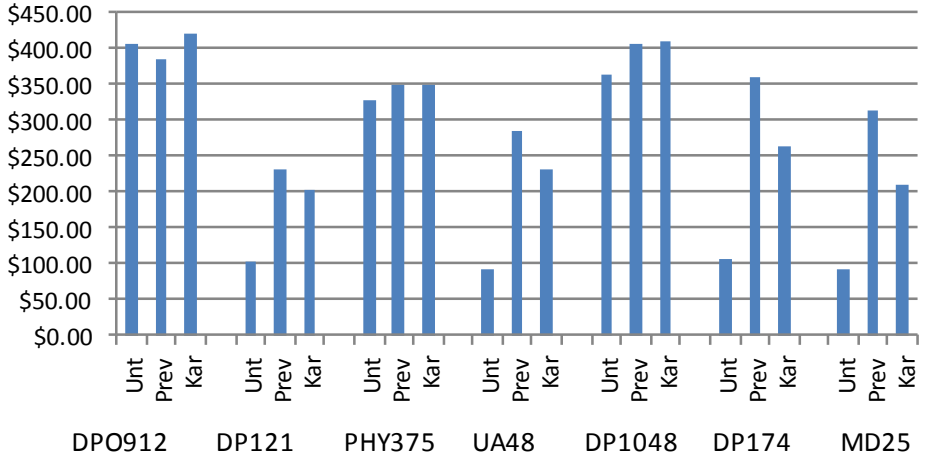


No. Sprays



Ryan Jackson Plot Study
Stoneville, Mississippi
2011

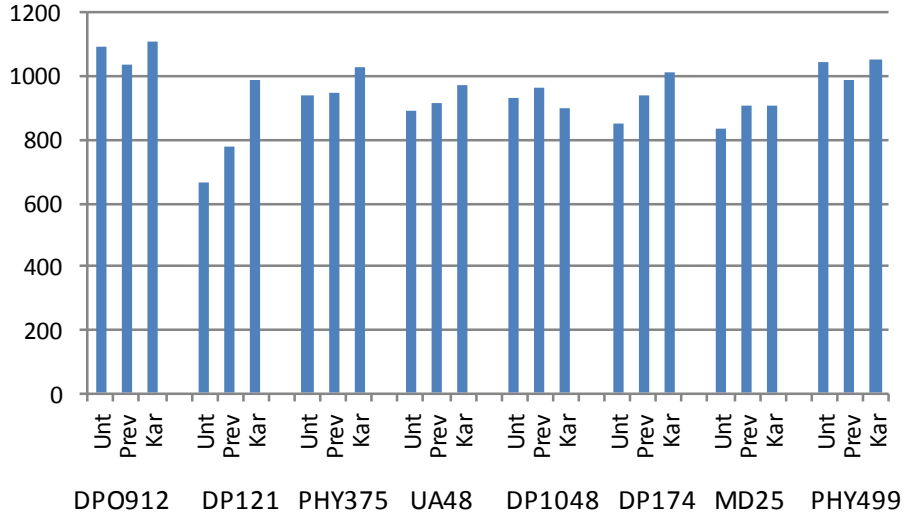
Returns Above Lepidoptera Control ($0.70 cotton -- 2011)



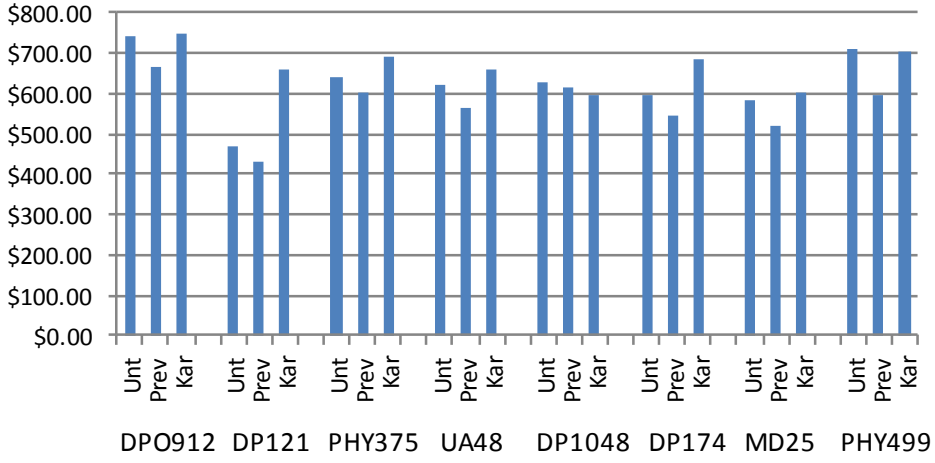
Estimated Lepidoptera Control Costs/Acre
Bt Technology Fee -- $20.25
Karate + Application -- $11.00
Prevathon + Application -- $37.75

Ryan Jackson Plot Study
Stoneville, Mississippi
2012

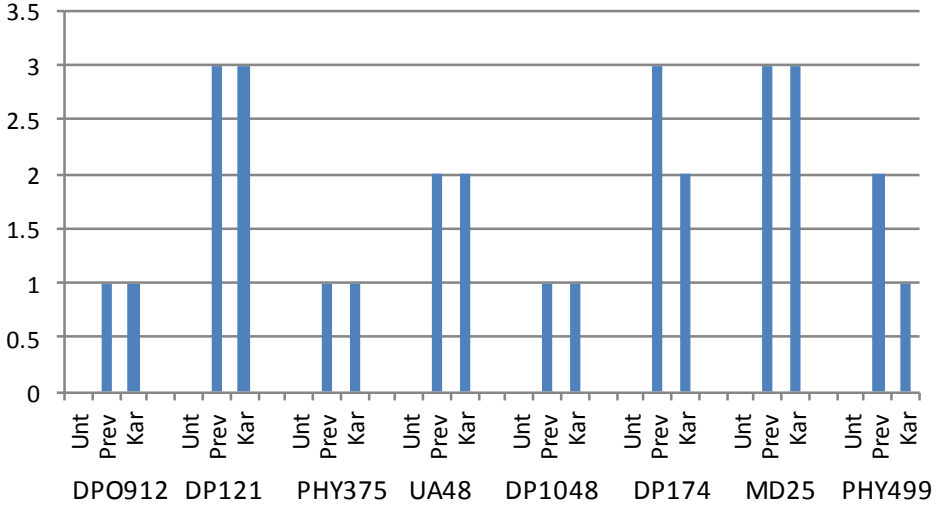
Yield (lb lint/acre)



Returns Above Insect Control
($0.70 cotton -- 2012)



No. Sprays



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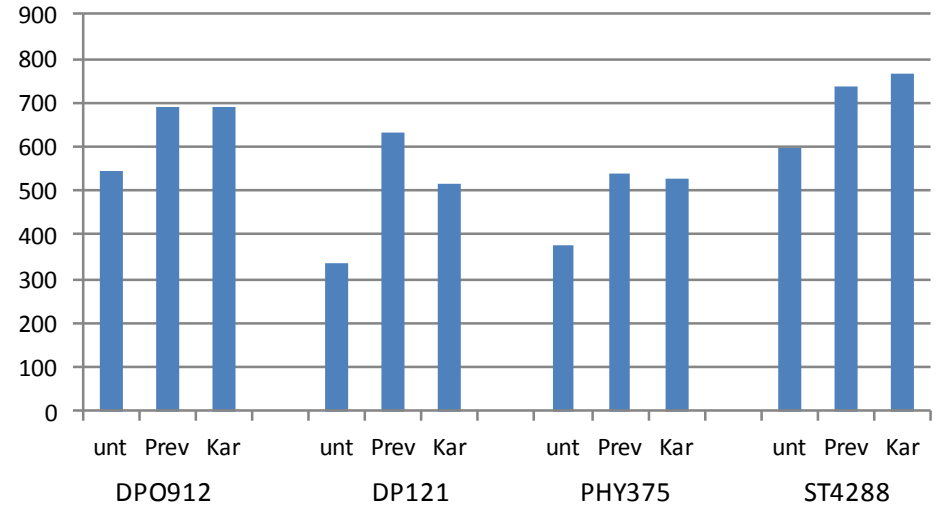
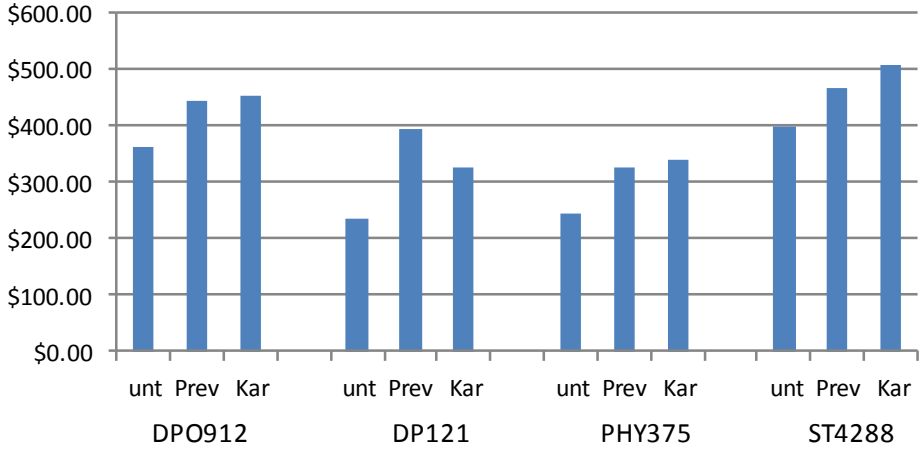
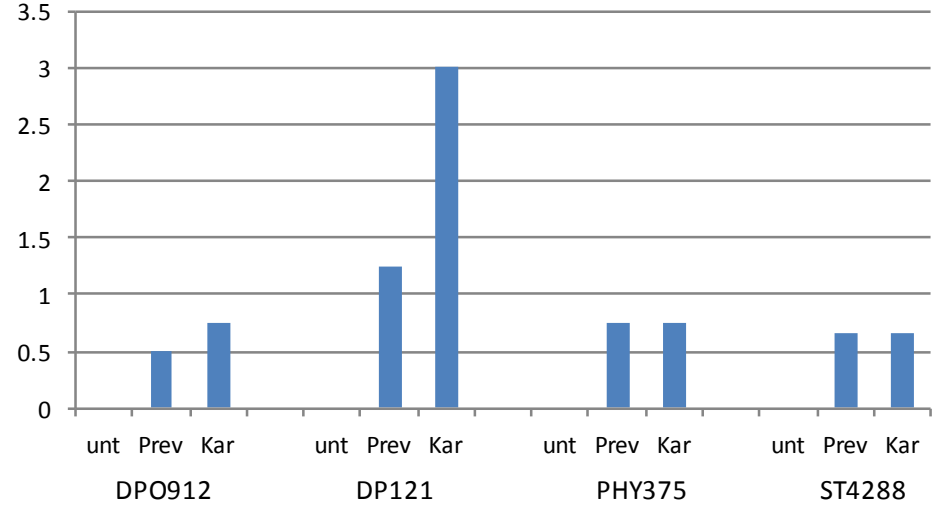


Ryan Jackson Delta Farm Plot Study 2011

Returns Above Lepidoptera Control (&0.70 cotton)



No Sprays



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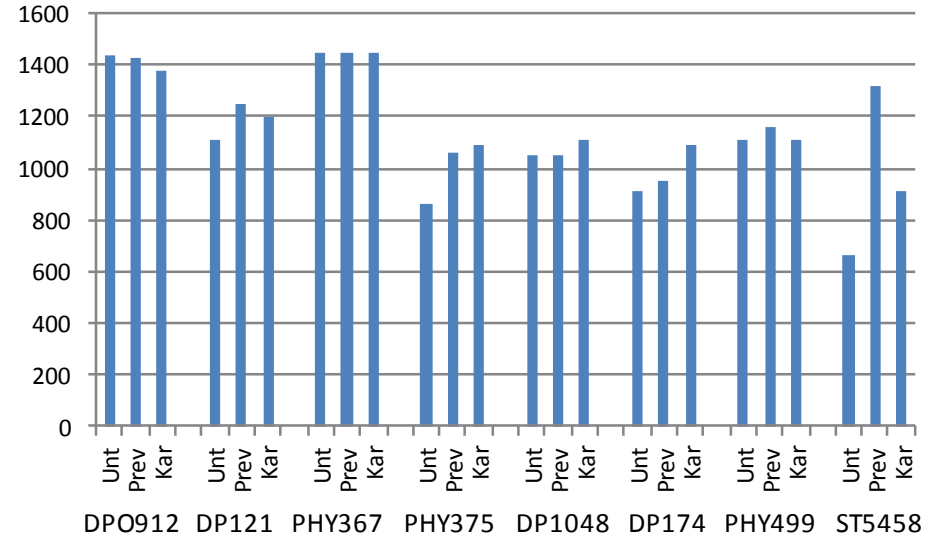
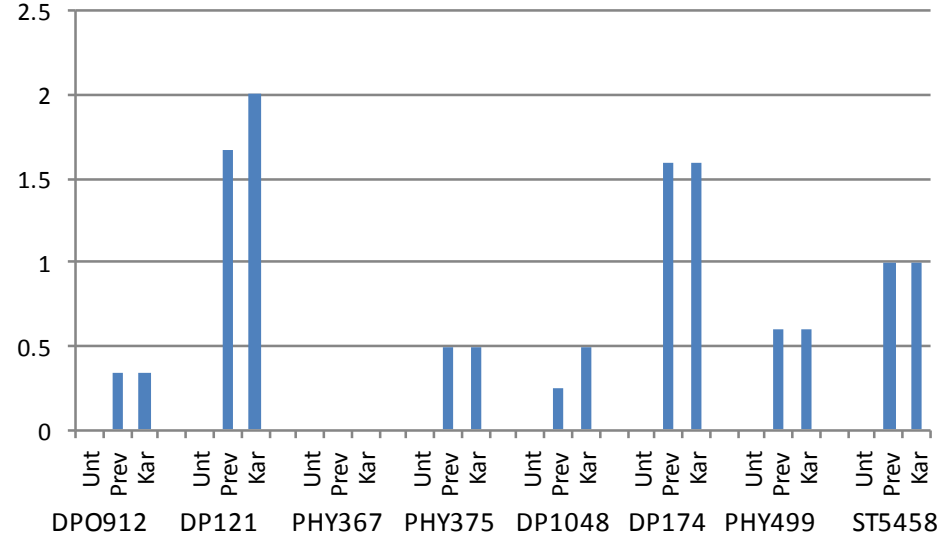
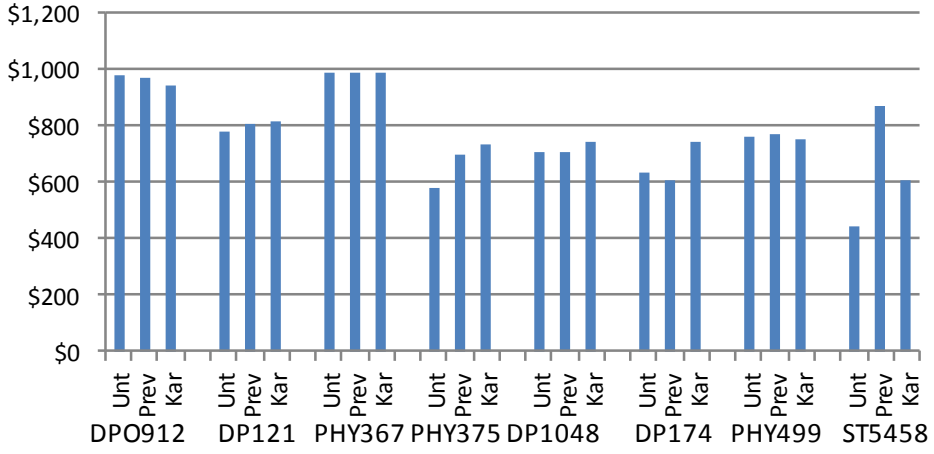


No. Sprays



Ryan Jackson Delta Farm Plot Study 2012

Returns Above Lepidoptera Control ($0.70 cotton -- 2012)



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Ranked Yield Response

	Cage 2011	Cage 2012	Stn Fld 2011	Stn Fld 2012	Combined
BG2	10.8	11.0	9.7	8.0	6.9
WS	10.0	5.6	4.2	7.0	9.7
nonBt	11.3	13.7	14.8	13.8	13.4
Prevathon	6.7	12.0	6.8	11.0	9.1
Karate	9.4	6.7	11.1	7.7	8.7
Untreated	16.8	14.3	15.0	14.3	15.1
early	9.5	10.8	11.3	9.5	10.2
full	14.0	11.3	10.6	13.0	12.1

Interactions must be considered.

Different environments require different combinations of insect management options.

- Bt technologies provide economic control of Lepidoptera.
- Options for managing Lepidoptera include new insecticides (Prevathon) and high yielding nonBt varieties.
- Spraying Bt cotton may be cost effective. Choice of insecticide and efficient management depends upon a knowledge of the abundance and types of insect pests present.
- Under some situations early maturing varieties avoid late season insect damage.
- Controlling bollworm/tobacco budworm is important when damaging densities are present.
- Damaging densities are not always present.