

**16 YEARS
PENNSYLVANIA
SOYBEAN YIELD CONTEST**

PENNSYLVANIA SOYBEAN BOARD

John O Yocum

SUMMARY

| | Average | | | | |
|-----------------------|----------------|--------------|--------------|--------------|--------------|
| | 93-08 | 93-96 | 97-00 | 01-04 | 05-08 |
| <u>Entries</u> | 19 | 10 | 24 | 23 | 21 |

The number of completed entries varied from a low of 8 to a high of 31. The number of entries each year were approximately 50 to 75, but completed entries only averaged 19 over the 16 years. The main problem in getting completed entries appears to be getting a person to verify the harvest.

Yield BU/A

| | | | | | |
|------|----|----|----|----|----|
| High | 77 | 69 | 73 | 82 | 83 |
| Mean | 62 | 57 | 61 | 62 | 68 |
| Low | 45 | 42 | 42 | 45 | 52 |

Whether looking at the high, mean or low yield, soybean yields increased over the 16 years. The highest yield 96 Bu/A was recorded in 2003.

Herbicide Tolerance (% of Entries)

| | | | | |
|------|-----|----|----|-----|
| None | 100 | 29 | 05 | 000 |
| STS | 000 | 20 | 00 | 000 |
| RR | 000 | 51 | 95 | 100 |

Development of RR soybean was the most important and rapid change growers encountered during this 16 year period.

| | | Average | | | |
|--------------|--------------|----------------|--------------|--------------|--|
| 93-08 | 93-96 | 97-00 | 01-04 | 05-08 | |

Planting Date (% of Entries)

| | | | | | |
|-----------|----|----|----|----|----|
| May 10 < | 41 | 24 | 45 | 41 | 53 |
| May 11-20 | 30 | 24 | 31 | 31 | 33 |
| May 21-30 | 19 | 36 | 14 | 18 | 11 |
| May 31 > | 10 | 16 | 10 | 10 | 03 |

Planting Date (Bu/A)

| | | | | | |
|-----------|----|----|----|----|----|
| May 10 < | 66 | 60 | 63 | 66 | 72 |
| May 11-20 | 63 | 56 | 62 | 62 | 68 |
| May 21-30 | 61 | 54 | 61 | 60 | 67 |
| May 31 > | 56 | - | 57 | 52 | 61 |

One of the bigger changes during the 16 years was the change in planting date. Fifty-two percent of the growers during the period 93-96 planted after May 21. By 05-08, 86% planted by May 20 or before. The yield data indicates the advantage of earlier planting.

Row Spacing (% of Entries)

| | | | | | |
|--------|----|----|----|----|----|
| 10" < | 60 | 72 | 59 | 60 | 50 |
| 11-20" | 29 | 17 | 27 | 34 | 38 |
| 21" > | 11 | 11 | 14 | 06 | 12 |

Row Spacing (Bu/A)

| | | | | | |
|--------|----|----|----|----|----|
| 10" < | 62 | 50 | 60 | 61 | 69 |
| 11-20" | 63 | 54 | 60 | 62 | 70 |
| 21" > | 62 | 62 | 63 | 64 | 60 |

The majority of growers planted in rows 10" or less in all time periods listed above, but in 2008 row spacing of 11-20" became 50 % of the entries. The yield of different row spacing does not appear to be significant.

| | Average | | | | |
|--|----------------|--------------|--------------|--------------|--------------|
| | 93-08 | 93-96 | 97-00 | 01-04 | 05-08 |

Tillage (% of Entries)

| | | | | | |
|------|----|----|----|----|----|
| NT | 43 | 37 | 37 | 42 | 56 |
| MT | 47 | 42 | 55 | 50 | 42 |
| Conv | 10 | 21 | 08 | 08 | 02 |

Tillage (BU/A)

| | | | | | |
|------|----|----|----|----|----|
| NT | 62 | 50 | 61 | 61 | 68 |
| MT | 62 | 54 | 61 | 62 | 68 |
| Conv | 63 | 62 | 59 | 64 | 66 |

The period 05 to 08 indicates no-till became the major way of planting soybean by the contest entrants. There appears to be no yield advantage to any tillage system.

Planting Equipment (% of Entries)

| | | | | | |
|--------------|----|----|----|----|----|
| Drill | 66 | 69 | 68 | 73 | 56 |
| Corn Planter | 34 | 31 | 32 | 27 | 44 |

Planting Equipment (Bu/A)

| | | | | | |
|--------------|----|----|----|----|----|
| Drill | 62 | 51 | 61 | 61 | 69 |
| Corn Planter | 63 | 58 | 61 | 63 | 67 |

Based upon the above data, the drill is the major planting instrument: but in 2008, the corn planter became the major planting instrument. It will be interesting to see if corn planters continue to be the planter of choice. The yield indicates no significant difference between the planters.

Seed Drop/A (1,000)

| | | | | | |
|--------------|-----|---|-----|-----|-----|
| Drill | 201 | - | 220 | 204 | 184 |
| Corn Planter | 185 | - | 182 | 185 | 188 |

Plants/A (1,000)

| | | | | | |
|--------------|-----|-----|-----|-----|-----|
| Drill | 182 | 175 | 194 | 178 | 179 |
| Corn Planter | 156 | 156 | 154 | 162 | 153 |

Seed drop and plants per acre were consistent for corn planters, but not consistent for drills. This data should be taken with a grain of salt. As an example in 2005, the seed drop for drills was reported as 145,000, but the plants per acre were reported at 160,000 (more Plants than seed sowed).

| | <u>Average</u> | | | | |
|--|----------------|--------------|--------------|--------------|--------------|
| | 93-08 | 93-96 | 97-00 | 01-04 | 05-08 |

Soil Test Within 3 Yrs (% of Entries)

| | | | | | |
|------|----|----|----|----|----|
| Test | 66 | 55 | 52 | 64 | 91 |
|------|----|----|----|----|----|

Applied Fertilizer or Manure (% of Entries)

| | | | | | |
|---------------|----|----|----|----|----|
| PK or P or K | 52 | 60 | 46 | 44 | - |
| Soil Nitrogen | 30 | 45 | 28 | 32 | 20 |
| Foliar | 26 | - | - | - | 26 |

About half of the growers applied some P or K fertilizer or manure. About one-third used soil nitrogen; and starting in 2006, about one-fourth applied foliar fertilizer.

Rhizobia Inoculation (% of Entries)

| | | | | | |
|-----------|----|----|----|----|----|
| Inoculate | 89 | 83 | 97 | 91 | 86 |
|-----------|----|----|----|----|----|

Herbicide (Lbs Active/ A)

| | | | | | |
|------|------|------|------|------|------|
| NT | 1.96 | 1.99 | 2.04 | 1.82 | 2.05 |
| Till | 1.33 | 1.72 | 1.12 | 1.25 | 1.40 |
| Mean | 1.64 | 1.86 | 1.58 | 1.54 | 1.78 |

Notill growers used more herbicide than growers that tilled. The notill growers used 0.63 Lb Active/A more herbicide (Example: 16 oz more Roundup WeatherMax per acre).

Harvest Date (October)

| | | | | | |
|------|----|---|----|----|----|
| Date | 19 | - | 26 | 15 | 15 |
|------|----|---|----|----|----|

Applied Lime (% of Entries)

| | |
|------|----|
| Lime | 28 |
|------|----|

Average
06-08

| | |
|--|----|
| <u>Treated Seed (% of Entries)</u> | 67 |
|--|----|

| | |
|---|----|
| <u>Calibrate Equipment (% of Entries)</u> | 59 |
|---|----|

| | |
|--|----|
| <u>Foliar Fungicide (% of Entries)</u> | 43 |
|--|----|

| | |
|--|----|
| <u>Foliar Insecticide (% of Entries)</u> | 38 |
|--|----|

| | |
|--|----|
| <u>Cover Crop (% of Entries)</u> | 28 |
|--|----|

YEARLY DATA

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|--------------------------------------|------|------|------|------|------|------|------|------|
| Number of Entries | | | | | | | | |
| Entries | 17 | 8 | 8 | 8 | 17 | 30 | 25 | 24 |
| Yield Bu/A | | | | | | | | |
| High | 75 | 62 | 70 | 69 | 68 | 80 | 73 | 71 |
| Mean | 58 | 56 | 52 | 62 | 59 | 64 | 60 | 60 |
| Low | 37 | 46 | 32 | 55 | 35 | 44 | 40 | 47 |
| Planting Date (% of Entries) | | | | | | | | |
| May 10 < | 06 | 38 | 29 | - | 67 | 10 | 44 | 58 |
| May 11-20 | 18 | 12 | 43 | - | 24 | 41 | 48 | 12 |
| May 21-30 | 29 | 50 | 28 | - | 09 | 34 | 04 | 08 |
| May 31> | 47 | 00 | 00 | - | 00 | 15 | 04 | 22 |
| Planting Date (Bu/A) | | | | | | | | |
| May 10 < | - | 77 | 43 | - | - | 66 | 62 | 61 |
| May 11-20 | - | 51 | 60 | - | - | 66 | 57 | 64 |
| May 21-30 | - | 56 | 52 | - | - | 64 | 64 | 54 |
| May 31> | - | - | - | - | - | 54 | 63 | 54 |
| Row Spacing (% of Entries) | | | | | | | | |
| 10" < | 82 | 75 | 57 | 75 | 56 | 55 | 60 | 67 |
| 11-20" | 18 | 25 | 14 | 12 | 33 | 35 | 16 | 25 |
| 21" .> | 00 | 00 | 29 | 12 | 11 | 10 | 24 | 08 |
| Row Spacing (Bu/A) | | | | | | | | |
| 10" < | - | 55 | 46 | - | - | 62 | 58 | 60 |
| 11-20" | - | 58 | 50 | - | - | 65 | 58 | 58 |
| 21" > | - | - | 62 | - | - | 65 | 64 | 59 |

YEARLY DATA

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|--------------------------------------|------|------|------|------|------|------|------|------|
| Number of Entries | | | | | | | | |
| Entries | 31 | 15 | 25 | 20 | 26 | 22 | 19 | 16 |
| Yield Bu/A | | | | | | | | |
| High | 78 | 71 | 96 | 84 | 77 | 78 | 90 | 88 |
| Mean | 64 | 55 | 61 | 68 | 61 | 64 | 73 | 73 |
| Low | 46 | 42 | 34 | 58 | 48 | 51 | 59 | 51 |
| Planting Date (% of Entries) | | | | | | | | |
| May 10 < | 57 | 29 | 38 | 40 | 65 | - | 37 | 56 |
| May 11-20 | 20 | 21 | 38 | 45 | 27 | - | 52 | 19 |
| May 21-30 | 13 | 36 | 12 | 10 | 04 | - | 11 | 19 |
| May 31> | 10 | 14 | 12 | 05 | 04 | - | 00 | 06 |
| Planting Date (Bu/A) | | | | | | | | |
| May 10 < | 69 | 58 | 64 | 71 | 62 | - | 79 | 75 |
| May 11-20 | 66 | 56 | 61 | 67 | 61 | - | 70 | 74 |
| May 21-30 | 63 | 55 | 57 | 66 | 72 | - | 65 | 65 |
| May 31> | 59 | 50 | 42 | 58 | 49 | - | - | 73 |
| Row Spacing (% of Entries) | | | | | | | | |
| 10" < | 62 | 60 | 62 | 55 | 58 | 55 | 47 | 38 |
| 11-20" | 38 | 33 | 30 | 35 | 31 | 30 | 42 | 50 |
| 21" .> | 00 | 07 | 08 | 20 | 12 | 15 | 11 | 12 |
| Row Spacing (Bu/A) | | | | | | | | |
| 10" < | 65 | 56 | 56 | 67 | 60 | 66 | 74 | 75 |
| 11-20" | 63 | 53 | 64 | 66 | 64 | 66 | 74 | 75 |
| 21" > | - | 50 | 68 | 73 | 64 | 57 | 64 | 57 |

YEARLY DATA

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|--|------|------|------|------|------|------|------|------|
| Tillage (% of Entries) | | | | | | | | |
| NT | 18 | 50 | 42 | 38 | 29 | 46 | 36 | 38 |
| MT | 53 | 50 | 29 | 38 | 53 | 54 | 60 | 54 |
| Conv | 29 | 00 | 29 | 25 | 18 | 00 | 04 | 08 |
| Tillage (Bu/A) | | | | | | | | |
| NT | - | 58 | 43 | - | - | 61 | 60 | 62 |
| MT | - | 54 | 53 | - | - | 65 | 60 | 58 |
| Conv | - | - | 62 | - | - | - | 60 | 58 |
| Planting Equipment (% of Entries) | | | | | | | | |
| Drill | - | 75 | 57 | 75 | 67 | 63 | 68 | 75 |
| Corn Planter | - | 25 | 43 | 25 | 33 | 37 | 32 | 25 |
| Planting Equipment (Bu/A) | | | | | | | | |
| Drill | - | 55 | 46 | - | - | 63 | 59 | 60 |
| Corn Planter | - | 58 | 58 | - | - | 64 | 62 | 57 |
| Seed Drop (1,000) | | | | | | | | |
| Drill | - | - | - | - | - | 250 | 207 | 204 |
| Corn Planter | - | - | - | - | - | 175 | 184 | 186 |
| Plants/A (1,000) | | | | | | | | |
| Drill | - | 177 | 173 | - | 211 | 196 | 182 | 189 |
| Corn Planter | - | 160 | 151 | - | 171 | 176 | 156 | 115 |
| Soil Test Within 3 Years (% of Entries) | | | | | | | | |
| Test | 62 | 38 | 57 | 62 | 61 | 45 | 56 | 46 |

YEARLY DATA

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|--|------|------|------|------|------|------|------|------|
| Applied Fertilizer or Manure (% of Entries) | | | | | | | | |
| PK or P or K | 37 | 47 | 42 | 51 | 71 | - | - | - |
| Soil Nitrogen | 30 | 33 | 21 | 45 | 50 | 00 | 16 | 12 |
| Foliar | - | - | -- | - | - | 25 | 21 | 31 |
| Rhizobia Inoculation (% of Entries) | | | | | | | | |
| Inoculate | 94 | 100 | 76 | 93 | 95 | 85 | 89 | 75 |
| Herbicide (Lbs active/A) | | | | | | | | |
| NT | 1.95 | 1.71 | 1.88 | 1.73 | 1.94 | 1.85 | 2.08 | 2.32 |
| Till | 1.26 | 1.15 | 1.42 | 1.18 | 1.13 | 1.29 | 1.52 | 1.67 |
| Mean | 1.57 | 1.45 | 1.67 | 1.46 | 1.53 | 1.60 | 1.88 | 2.09 |
| Harvest Date (October) | | | | | | | | |
| Day | -16 | 34 | 23 | 21 | 17 | 18 | 10 | 14 |
| Applied Lime (% of Entries) | | | | | | | | |
| Lime | 13 | 27 | 33 | 30 | 43 | - | - | - |
| Treated Seed (% of Entries) | | | | | | | | |
| Seed Treated | - | - | - | - | - | 45 | 74 | 81 |
| Calibrate Equipment (% of Entries) | | | | | | | | |
| Calibrate | - | - | - | - | - | 44 | 63 | 69 |
| Foliar Fungicides (% of Entries) | | | | | | | | |
| Fungicide | - | - | - | - | - | 39 | 47 | 44 |
| Foliar Insecticides (% of Entries) | | | | | | | | |
| Insecticide | - | - | - | - | - | 33 | 32 | 50 |
| Cover Crop (% of Entries) | | | | | | | | |
| Cover Crop | - | - | - | - | - | 16 | 37 | 31 |

YEARLY DATA

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|------|------|------|------|------|------|------|------|
| Variety Information (% of Entries) | | | | | | | | |
| University | - | - | - | - | - | 05 | 03 | 06 |
| Seed Dealers | - | - | - | - | - | 95 | 95 | 94 |
| Consultants | - | - | - | - | - | 00 | 03 | 00 |
| Other | - | - | - | - | - | 00 | 00 | 00 |
| Culture Information (% of Entries) | | | | | | | | |
| University | - | - | - | - | - | 05 | 03 | 12 |
| Seed Dealers | - | - | - | - | - | 62 | 84 | 81 |
| Consultants | - | - | - | - | - | 29 | 10 | 04 |
| Other | - | - | - | - | - | 04 | 03 | 03 |
| Herbicide Information (% of Entries) | | | | | | | | |
| University | - | - | - | - | - | 05 | 16 | 12 |
| Seed Dealers | - | - | - | - | - | 58 | 63 | 75 |
| Consultants | - | - | - | - | - | 21 | 21 | 12 |
| Other | - | - | - | - | - | 16 | 00 | 01 |

YEARLY DATA

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|------|------|------|------|------|------|------|------|
| Herbicide Tolerance (% of Entries) | | | | | | | | |
| None | 100 | 100 | 100 | 100 | 41 | 30 | 32 | 12 |
| STS | 0 | 0 | 0 | 0 | 35 | 23 | 12 | 12 |
| RR | 0 | 0 | 0 | 0 | 24 | 47 | 56 | 76 |
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| None | 10 | 7 | 4 | 0 | 0 | 0 | 0 | 0 |
| STS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RR | 90 | 93 | 96 | 100 | 100 | 100 | 100 | 100 |