# Estimating Cotton Yield Using Boll Counting

Dr. Randy Boman
OSU Southwest Research and Extension Center, Altus

By desire or necessity, it sometimes becomes important to estimate cotton yields. This is generally a risky endeavor. Estimating yield by counting bolls can often be misleading due to several factors. Variation in boll size, variation in lint percent, future weather conditions, harvest losses and ginning losses can all affect how boll counts relate to final yield. In my opinion, because of variety planted, location on the plant, boll size, seed set, and other factors, yield estimation should be approached with trepidation, especially in drought years. The following is a general suggestion for using boll counts for production estimation.

A. Take counts from at least 10 feet of row from several representative places in the field. At least four to five locations are recommended.

B. Make a sound estimate of boll size. This may be accomplished in several ways. As a suggestion, randomly pick all the seed cotton from 50 to 100 bolls. For better results, do not only pick the largest bolls for this sample. These bolls should represent all fruiting sites with open bolls on the plant and should not be biased toward a single section of the plant or boll size. Weigh the composite sample on an accurate scale calibrated in grams. Divide the weight (in grams) by the number of bolls picked and this will give an approximate average boll weight for the field. This determination should be made for several samples taken in order to provide a better representation of the field.

Tables 1 and 2 below consider many factors such as numerous row spacings, boll sizes, and two estimated lint percentage levels including 35% and 38% picked lint percentages (also called lint fraction) of the SEED COTTON. When looking at several years of boll sizes from drought stressed dryland sites, the 35% picked lint percentage (Table 1), and 2-3 g per boll boll size are probably appropriate to use. In lower yielding irrigated cotton, the 38% chart (Table 2) and 3-4 g per boll boll size are probably acceptable. For higher yielding irrigated cotton, the 38% chart (Table 2) and 4-5 g per boll size are likely best.

About 155,500 normal bolls are required to produce a 480-pound bale of cotton (average of 4.0 g seed cotton/boll = 1.4 g lint assuming a lint percent for seed cotton of 35%). This is equivalent to about 325 bolls per pound of lint. For 40-inch rows this calculates to 11.9 bolls per row-ft for a one bale per acre yield (155,500 bolls/13,068 row-ft per acre for 40-inch rows). This is very close to the “one boll per inch = one bale

per acre" number that crop watchers have used for many years to estimate yields in 40-inch rows. For 30-inch rows this calculates to 8.9 bolls per row-ft for a one bale per acre yield (155,500 bolls/17,424 row-ft per acre for 30-inch rows). **For drought stressed bolls the boll number required will increase substantially.**

**Additional Comments Concerning Insurance Crop Yield Adjustment Using the Boll Count Method**

The USDA Cotton Loss Adjustment Standards Handbook released in 2010 describes the Boll Count Method which begins at the top of page 26. A chart is included at the top of page 28. Although work is underway to possibly refine this technique, "picker" and "stripper" varieties are separated and have varying numbers of bolls per pound of lint for some boll diameters. Historically, "stripper" varieties tended to have somewhat larger bolls than "picker" types. This chart presents the "number of bolls per pound factor" based on predominant boll size and how the crop is planted. This is true for predominant boll diameters of greater than 2.5 inches down to greater than 1.5 inches but less than 2 inches. Once boll diameter drops to smaller than 1.5 inches the number of bolls required to make a pound of lint is equal for both "stripper" and "picker" varieties.

Using this table, adjustments for cotton with 1.5 inch diameter open bolls would be based on an assumed 450 bolls per pound of lint (450 bolls per pound of lint x 480 pounds of lint per bale = 216,000 bolls per bale of lint, or about 16.5 bolls per row-ft in 40-inch rows). For 30-inch rows, this value is about 12.4 bolls per row-ft.

If boll size is extremely small (less than 1 inch), the value becomes 550 bolls per pound of lint (550 bolls per pound of lint x 480 pounds of lint per bale = 264,000 bolls per bale of lint, or about 20 bolls per row-ft in 40-inch rows). For 30-inch rows, this value is about 15.2 bolls per row-ft.

Table 1. **Bolls per row-foot** necessary to produce one bale (480 lbs) per acre at various row spacings and boll weights. Boll weight is expressed as grams of seed cotton.

**Lint fraction of seed cotton is assumed to be 35%.**

| ---------- | | Boll Weight (grams of seed cotton per boll) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Row width (inches) | Row-ft/acre | 5.0 g | 4.5 g | 4.0 g | 3.5 g | 3.0 g | 2.5 g | 2.0 g |
| 40 | 13,068 | 9.5 | 10.6 | 11.9 | 13.6 | 15.9 | 19.1 | 23.8 |
| 38 | 13,756 | 9.1 | 10.1 | 11.3 | 12.9 | 15.1 | 18.1 | 22.6 |
| 36 | 14,520 | 8.6 | 9.5 | 10.7 | 12.3 | 14.3 | 17.2 | 21.4 |
| 32 | 16,335 | 7.6 | 8.5 | 9.5 | 10.9 | 12.7 | 15.2 | 19.1 |
| 30 | 17,424 | 7.1 | 7.9 | 8.9 | 10.2 | 11.9 | 14.3 | 17.9 |
| 20 | 26,136 | 4.8 | 5.3 | 6.0 | 6.8 | 7.9 | 9.5 | 11.9 |
| 15 | 34,848 | 3.6 | 4.0 | 4.5 | 5.1 | 6.0 | 7.1 | 8.9 |
| 12 | 43,560 | 2.9 | 3.2 | 3.6 | 4.1 | 4.8 | 5.7 | 7.1 |
| 10 | 52,272 | 2.4 | 2.6 | 3.0 | 3.4 | 4.1 | 4.8 | 6.0 |
| 9 | 58,080 | 2.1 | 2.4 | 2.7 | 3.1 | 3.6 | 4.3 | 5.4 |
| 8 | 65,340 | 1.9 | 2.1 | 2.4 | 2.7 | 3.2 | 3.8 | 4.8 |
| 7 | 74,674 | 1.7 | 1.9 | 2.1 | 2.4 | 2.8 | 3.3 | 4.2 |
| 6 | 87,120 | 1.4 | 1.6 | 1.8 | 2.0 | 2.4 | 2.9 | 3.6 |

**Bolls Per Square Foot** necessary to produce one bale (480 lbs) per acre at these boll weights. Boll weight is expressed as grams of seed cotton per boll.

**Lint fraction of seed cotton is assumed to be 35%**.

| ---------- | 2.9 | 3.2 | 3.6 | 4.1 | 4.8 | 5.7 | 7.1 |
|---|---|---|---|---|---|---|---|

**Bolls Per Acre** necessary to produce one bale (480 lbs) per acre at these boll weights. Boll weight is expressed as grams of seed cotton per boll.

**Lint fraction of seed cotton is assumed to be 35%**.

| 5.0 g | 4.5 g | 4.0 g | 3.5 g | 3.0 g | 2.5 g | 2.0 g | |
|---|---|---|---|---|---|---|---|
| 124,526 | 138,362 | 155,657 | 177,894 | 207,543 | 249,051 | 311,314 | |

Table 2. **Bolls per row-foot** necessary to produce one bale (480 lbs) per acre at various row spacings and boll weights. Boll weight is expressed as grams of seed cotton per boll.

**Lint fraction of seed cotton is assumed to be 38%**.

| ---------- | | Boll Weight (grams of seed cotton per boll) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Row width (inches) | Row-ft/acre | 5.0 g | 4.5 g | 4.0 g | 3.5 g | 3.0 g | 2.5 g | 2.0 g |
| 40 | 13,068 | 8.8 | 9.8 | 11.0 | 12.5 | 14.6 | 17.6 | 21.9 |
| 38 | 13,756 | 8.3 | 9.3 | 10.4 | 11.9 | 13.9 | 16.7 | 20.8 |
| 36 | 14,520 | 7.9 | 8.8 | 9.9 | 11.3 | 13.2 | 15.8 | 19.7 |
| 32 | 16,335 | 7.0 | 7.8 | 8.8 | 10.0 | 11.7 | 14.0 | 17.6 |
| 30 | 17,424 | 6.6 | 7.3 | 8.2 | 9.4 | 11.0 | 13.2 | 16.5 |
| 20 | 26,136 | 4.4 | 4.9 | 5.5 | 6.3 | 7.3 | 8.8 | 11.0 |
| 15 | 34,848 | 3.3 | 3.7 | 4.1 | 4.7 | 5.5 | 6.6 | 8.2 |
| 12 | 43,560 | 2.6 | 2.9 | 3.3 | 3.8 | 4.4 | 5.3 | 6.6 |
| 10 | 52,272 | 2.2 | 2.4 | 2.7 | 3.1 | 3.7 | 4.4 | 5.5 |
| 9 | 58,080 | 2.0 | 2.2 | 2.5 | 2.8 | 3.3 | 3.9 | 4.9 |
| 8 | 65,340 | 1.8 | 2.0 | 2.2 | 2.5 | 2.9 | 3.5 | 4.4 |
| 7 | 74,674 | 1.5 | 1.7 | 1.9 | 2.2 | 2.6 | 3.1 | 3.8 |
| 6 | 87,120 | 1.3 | 1.5 | 1.6 | 1.9 | 2.2 | 2.6 | 3.3 |

**Bolls per Square Foot** necessary to produce one bale (480 lbs) per acre at these boll weights. Boll weight is expressed as grams of seed cotton per boll.

**Lint fraction of seed cotton is assumed to be 38%**.

| ---------- | 2.6 | 2.9 | 3.3 | 3.8 | 4.4 | 5.3 | 6.6 |
|---|---|---|---|---|---|---|---|

**Bolls Per Acre** necessary to produce one bale (480 lbs) per acre at these boll weights. Boll weight is expressed as grams of seed cotton per boll.

**Lint fraction of seed cotton is assumed to be 38%**.

| 5.0 g | 4.5 g | 4.0 g | 3.5 g | 3.0 g | 2.5 g | 2.0 g | |
|---|---|---|---|---|---|---|---|
| 114,695 | 127,439 | 143.368 | 163,850 | 191,158 | 229,389 | 286,737 | |

**Acknowledgment: Some of this information was taken from a 1999 publication by Dr. Will McCarty, Extension Cotton Specialist (currently retired), at Mississippi State University. It was updated in 2012.**