SOYBEAN RESIDUE

4,000 lbs/A 85 percent cover 3,000 lbs SGe

1,775 lbs/A 50 percent cover 1,250 lbs SGe

1,250 lbs/A 35 percent cover 750 lbs SGe

375 lbs/A 10 percent cover 180 lbs SGe

SUNFLOWER RESIDUE

2,000 lbs/A 430 lbs SGe

6,900 lbs/A 60 percent cover 2,000 lbs SGe

1,500 lbs/A 15 percent cover 250 lbs SGe

2,400 lbs/A 35 percent cover 475 lbs SGe

Estimating Soybean and Sunflower Residue

Maintaining crop residue is an integral component of practices to control soil erosion and will be part of most conservation plans written for the conservation compliance provision of the 1985 Farm Bill.

Residue amount can be reported in three ways: percent cover, pounds per acre (lbs/A) and small grain equivalent (SGe).

Percent cover: the percentage of soil surface covered with crop residue; commonly used where sheet and rill erosion (water erosion) is the primary concern and usually evaluated immediately after planting.

Pounds per acre: the weight of clean, dry residue expressed on a per acre basis; can be used where water and/or wind erosion is the primary concern.

Small grain equivalent (SGe): relates the type, amount, and orientation of residue to its equivalent in pounds per acre of small grain residue in a reference condition. (Reference condition is defined as 10-inch-long stalks of small grain parallel to the wind direction lying flat in rows spaced 10 inches apart). Small grain equivalent is commonly used where wind erosion is the primary erosion concern and is evaluated during the critical wind erosion period, usually November through April. The SGe of various residues or crops can be determined by using SGe charts (see Fig. 1 for soybeans and sunflowers). To use the chart, find lbs/A of soybean or sunflower residue on the x-axis, locate the plot of interest, and read the SGe from the y-axis. Example: 1,000 lbs/A of flat soybean residue is equivalent to 570 lbs/A of SGe.

Methods for estimating residue

Estimating residue can be useful in planning field operations to control soil erosion or to determine whether adequate residue remains to qualify for conservation compliance programs. Three methods are described.

Line-transect method: This is an easy, reliable method to determine percent cover. It involves stretching a 50- or 100-foot tape (or string with knots) diagonally across crop rows. Check residue *directly under* every 1-foot mark or knot. Percent cover is equal to the percentage of marks over residue "hits" compared to the total number of marks evaluated. Example: if 19 out of 50 marks are over residue, percent cover would equal 38. If there is any doubt that residue under a mark could absorb the impact of a raindrop, do not count it as a "hit."

Photo-comparison method: Comparing residue in the field to photographs of known amounts can be used to estimate residue expressed as percent cover, lbs/A, or SGe (see over). Visual estimates must be made looking straight down at the soil surface for flat residue and at an angle for standing residue. Scanning residue from the road is not adequate and will overestimate residue amounts.

Calculation method: The initial amount of residue after harvest (lbs/A) is calculated by multiplying the residue coefficient (45 lbs residue/bushel for soybeans and 36 lbs residue/bu or 1.5 lbs residue/lb of seed for sunflowers) by long-term yield (ex. 35 bu/A soybeans is equivalent to 1,575 lbs/A residue after harvest). Percent cover after harvest can be assumed at 80 for soybeans and 55 for sunflowers, although actual amount will vary by year, with production practices, and geographically, and should be adjusted accordingly. The initial amount of residue in lbs/A or percent cover can be reduced for overwinter weathering, grazing, tillage and planting operations by the following amounts.

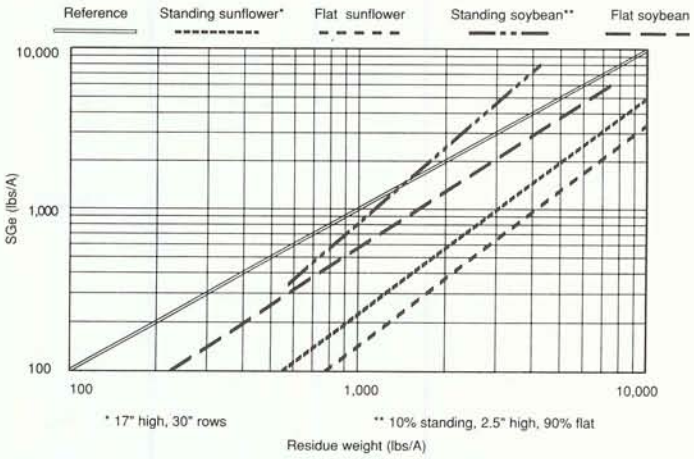
Tillage and planting implements	Percent of residue remaining after each operation
Moldboard plow	5
Chisel plow	
Straight shovel points	60
Twisted shovel points	30
Knife-type fertilizer applicator	45
Disk (tandem or offset)	
3 inches deep	40
6 inches deep	30
Field cultivator	50
Sweep	80
V-blade	85
Rodweeder	85
Planters	
No coulter or smooth coulter	90
Narrow ripple coulter	85
Wide fluted coulter	80
Sweeps or double disk furrowers	60
Drills	
Disk openers	90
Hoe openers	50
Winter weathering	70

Following is an example using the calculation method. This method gives only a rough estimate of residue cover because of the many assumptions involved.

Operation	Residue cover		Weight and SGe[1]	
	Soybeans	Sunflowers	Soybeans	Sunflowers
After harvest	80%	55%	1,575 lbs/A	2,700 lbs/A
Overwinter	x0.70	x0.70	x0.70	x0.70
Chisel (straight points)	x0.60	x0.60	x0.60	x0.60
Field cultivate	x0.50	x0.50	x0.50	x0.50
Plant (no coulter)	x0.90	x0.90	x0.90	x0.90
After planting	15%	10%	300 lbs/A	500 lbs/A
SGe			150 lbs/A	< 100 lbs/A

[1]Assuming 35 bu/A soybeans (35 bu/A × 45 lb/bu = 1,575 lbs/A) and 1,800 lbs/A sunflowers (1,800 lbs/A × 1.5 lbs/lbs = 2,700 lbs/A).

Figure 1: Small grain equivalents of soybean and sunflower residues.



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