

Residue and Tillage Management, Mulch Till

Conservation Practice Job Sheet FL-345-JS

Natural Resources Conservation Service, Florida

September 2011



Mulch Till on cropland

Mulch till is a conservation tillage system where a significant portion of plant residue is left on the soil surface after the entire field surface is tilled prior to planting. It is usually accomplished by using chisel plows, sweep cultivators, or disk harrows instead of moldboard plow or disk plow in primary tillage. The purposes of using a mulch till system is to reduce sheet and rill and wind erosion, maintain or improve the soil quality by adding organic matter, increasing moisture by adding cover to the soil surface, and reducing energy use.

Mulch till is used on cropland. Residue is partially incorporated using chisels, sweeps, field cultivators, or similar implements. When selecting these implements they should be operated to leave a specified amount of residue on the soil surface. The amount of residue required to meet conservation practice standards is 30 percent immediately following the planting of the crop. If the main purpose of this practice is to reduce evaporation from the soil surface, then a minimum of 60 percent surface residue cover shall be maintained throughout the year. When measuring residue amounts, refer to Residue and Tillage Management, No-Till/Strip Till/Direct Seed, Code 329 Guidance. Secondary removal of crop residue by baling or grazing shall be limited to retain the minimum required amount of residue. The residue shall not be burned. Planting implements should be equipped with coulters and disk openers designed to cut through surface residue. Row cleaners may be attached to the planters to move residue out of the row area and help warm and dry the seedbed.

Site-specific requirements are listed on the specifications sheet. Specifications included in this job sheet are prepared in accordance with the Florida NRCS Field Office Technical Guide and the Florida NRCS Conservation Practice Standard, Residue and Tillage Management, Mulch Till, Code 345. To reduce wind and water erosion and improve water and air quality the specified amount, timing, and orientation of residue will be in accordance with site specific data recorded in Table 1. Use data from RUSLE2 and the Florida Erosion Control Handbook for residue amounts to control water and wind erosion. When the objective is maintaining or increasing soil organic matter content, tillage will aerate the soil and increase decomposition of organic matter. Mulch till reduces tillage and leaves the necessary amount of residue on or near the soil surface for soil improvement. The required amounts of residue for soil protection are specified in Table 1. Tables 2 and 3 can be used to plan and record the crops, field operations, and management necessary to achieve a positive trend in soil organic matter content based on the NRCS Soil Condition Index (SCI).

Evaluate/measure the crop residues cover and orientation for each crop to ensure the planned amounts and orientation are being achieved. Certification of this practice can be done by completing the applied columns and signature in the certification section.

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Table 2 Design Worksheet for estimating crop residue produced (for planned rotation)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Crop	Harvest units	lb/unit	Yield	Residue/yield ratio	Est. lb residue/ac	Estimated percent ground cover	Instructions to estimate values for column 6 & 7
							Multiply columns 3x4x5 to estimate total pounds of residue available after harvest. Figure 1 can be used to convert pounds of residue (column 6) to percent ground cover (column 7). Figure 3 can be used for values for column 3 and 5.

Notes:

Information in column 7 is used in table 3 and an estimate of beginning ground cover for each crop in the rotation.

Table 3 Design worksheet for residue budget

Crop	Previous Crop	Beginning Residue	Operation	Date	Percent retained*	Percent residue left

Notes:

*Residue retention values are recorded on figure 2.

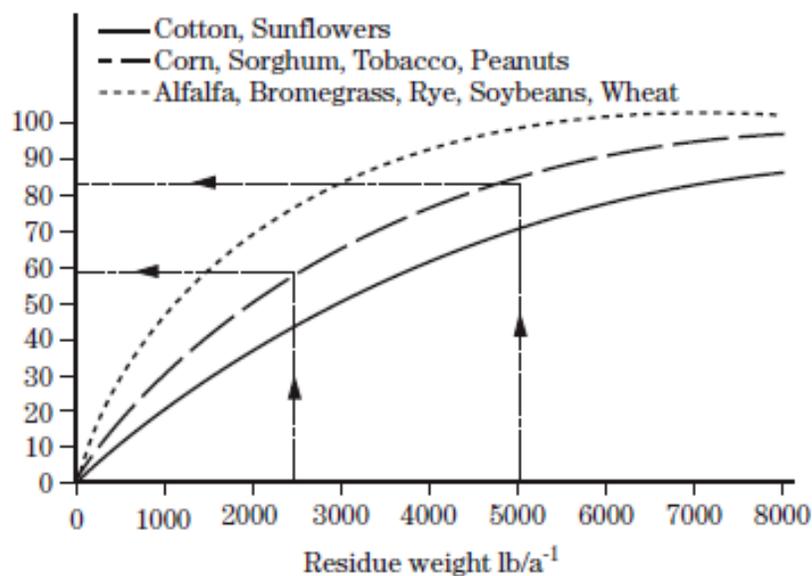
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Figure 1 Residue lb/percent cover conversion

Percent cover	Corn	Soybeans	Cotton	Grain sorghum	Small grains
10%	250	250	400	300	250
20%	600	400	1,000	650	400
30%	950	600	1,600	1,050	600
40%	1,400	850	2,300	1,550	850
50%	1,850	1,200	3,200	2,100	1,200
60%	2,400	1,600	4,150	2,700	1,550
70%	3,300	2,100	5,300	3,600	2,100
80%	4,400	2,800	6,900	4,800	2,750
90%	6,050	3,900		6,750	3,850

Adapted from table D-4 ,Figure 5-4, ARS Ag Handbook 703, and Figure 503-45 National Agronomy Handbook

Figure 503-45 Relationship of residue weight to percent residue cover for various crops



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Figure 2 Machinery table

Implement Values represent percent of ground cover left after operation	Percent for non-fragile residue (like corn)	Percent for fragile residue (like peanuts)
Over winter weathering following summer harvest	70 - 90	65 - 85
Over winter weathering following winter harvest	80 - 95	70 - 80
Paraplow / Paratill	80 - 90	75 - 80
V ripper/subsoiler	70 - 90	60 - 80
Drill w/ single disk opener	85 - 100	75 - 85
Chisel plow with straight or spike points	40 - 60	60 - 80
Disk, tandem or offset:		
9" or greater blade spacing	30 - 60	20 - 40
7 - 9" blade spacing	40 - 70	25 - 40
Planter conventional with:		
Staggered double-disc openers	90 - 95	85 - 95
Non-staggered double-disc openers	85 - 95	75 - 85
Notes: See Purdue Agronomy Guide AY-280 Table 1 for other residue amounts of tillage and planting implements at http://www.agry.purdue.edu/ext/pubs/AY-280-W.pdf For pictures of Tillage Implements go to: ftp://ftp-fc.sc.egov.usda.gov/IA/technical/TillageGuide.pdf		

Figure 3 Residue/yield ratio and Lb/unit

Crop	Residue/yield ratio	Lb/unit
Corn	1.00	56.0
Cotton	4.50	1.0
Millet	1.43	56.0
Oats	2.00	32.0
Peanuts	1.30	1.0
Rye	1.00	56.0
Sorghum	.20	56.0
Soybeans	2.00	60.0
Wheat	1.70	60.0