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## Stubble Mulch Judging : Extension Circular 18-84-2

C. R. Fenster

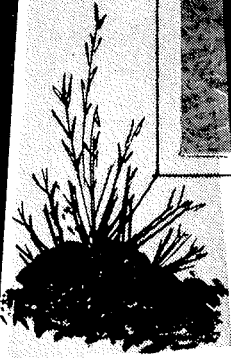
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# Stubble Mulch Judging

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## INTRODUCTION

Farmers, agricultural leaders, businessmen, 4-H'ers, and FFA students have frequently asked, "how do we recognize a good stubble mulch program?"

This publication outlines a standard for stubble mulch judging, including the most important prerequisites for keeping residues on the surface of the land. This circular will serve as a guide in the appraisal of a stubble mulch program as well as help interpret the stubble mulch judging score card.



By C. R. Fenster, Extension Agronomist<sup>1</sup>

Stubble mulch farming is a year-round system of managing plant residues in which all tilling, planting, cultivating, and harvesting operations are performed to keep a sufficient amount of residue for soil protection on the surface at all times.

Residues are remains of plants. They can be straw, corn, sorghum stalks, stubble, weeds, or other plant remains.

Stubble mulch farming is the simplest and surest way of preventing wind and water erosion. It also increases the intake of water into the soil and tends to check the decline of organic matter.

Protection of soil by residues depends upon a number of factors, including the amounts and kinds of residue, length of residue, type and quality of residue, uniformity and distribution of the residue, and anchorage of residue.

## INTERPRETATION OF SCORE CARD

### Part 1 Ground Cover

A. The amount of residue per acre necessary to protect the land from wind erosion is approximately 1,000 pounds on moderately heavy soils, 1,500 pounds on medium textured soils, and 2,500 pounds on sandy soils.

As a rule of thumb, each bushel of wheat harvested will mean about 100 pounds of residue. However, this figure may vary because of weather conditions, insects, or disease.

A complete shading of the ground with small grain residue will mean approximately 3,000 pounds of residue per acre.

U.S.D.A. Agricultural Handbook 136 entitled *Estimating the Amounts of Crop Residues on the Field* will aid in determining the amounts of residue on a field.

<sup>1</sup> Box Butte Experiment Station, Alliance, Nebraska.

**B. Uniformity and distribution of residue.** Residues of uniform length usually make tillage and seeding operations easier. Uniform distribution of residue is essential for protection of the soil from wind and water erosion and to aid in obtaining good stands of planted crops. An ample supply of residues, uniformly distributed, will break up the raindrops and keep the soil from puddling. This, of course, will increase the intake of water into the soil and reduce water erosion.

**C. Anchorage of residue.** Residues should be anchored in the soil so as to prevent them from being blown or washed away. Residues can be anchored in the soil by roots or clumps of roots on the stubble. Some of the residues may be partially buried in the soil. Standing residue provides a greater protection against wind erosion.

**D. Adequate residue for protection of the soil.** Consider the proper amount of residue per acre to protect the land from wind erosion according to the texture of the soil.

Sandy to sandy loam soils—1,750 to 3,000 lbs.

Very fine sandy loam soils to silt loam soils—1,200 to 2,500 lbs.

Clay loams to silty clay loams—750 to 2,000 lbs.

Silty clay loams to clay soils—1,000 to 2,000 lbs.

## **Part II Cloddiness**

A particle .84 of a millimeter (.033 of an inch) or larger in diameter (about the size of coarse sand) is considered to be a non-erodible particle. Particles of soil .84 of a millimeter or larger are considered clods.

From the standpoint of good soil management numerous small clods are better than a few larger ones. Small clods are non-erodible and yet at the same time allow a good seed bed to be prepared. Large clods are difficult to work and often cause excessive drying of the soil. During the winter, clods will often break down by freezing and thawing and become erodible.

## **Part III Soil Management**

**A. Weeds under control.** A weed is under control when it is consuming less moisture than a tillage operation would waste. Weeds should not be allowed to produce seed. A weed is any plant growing out of place.

**B. Moisture.** At least 2-3 feet of moisture is necessary for the production of a crop. Depth of moisture can be determined with a probe. A guide for determining dry soil based on soil types is as follows:

Loamy sands, and sandy loams are dry, loose, and flow through the fingers.

Very fine sandy loams and silt loams are powdery, sometimes slightly crusted, but easily broken down into powdery condition.

Silty clay loams and clay loams are hard, baked, cracked, difficult to break down into powdery condition.

**C. Top Soil Condition.** A seed bed should be firm and mellow—one that will permit the roots to penetrate well into the soil and yet firm enough to hold the moisture in the soil.

## STUBBLE MULCH SCORE CARD

Contestant No. .... Field No. ....

Indicate your answer by an X in this column ✓

**Part I. Ground Cover (Possible score 60 points)**

**A. Amount of Residue per Acre**

(Possible score 20 points)

- Less than 500 lbs. ....
- 501 lbs.-1000 lbs. ....
- 1001 lbs.-1500 lbs. ....
- 1501 lbs.-2000 lbs. ....
- 2001 lbs.-2500 lbs. ....
- 2501 lbs.-3000 lbs. ....
- Over 3000 lbs. ....

**B. Uniformity and Distribution of Residues**

(Possible score 10 points)

- Excellent ....
- Good ....
- Poor ....

**C. Anchorage of Residues**

(Possible score 10 points)

- Poor—no anchorage to 25% .....
- Good—25% anchored to 50% .....
- Excellent—50% anchored or more .....

**D. Adequate residue for protection of soil**

(Possible score 20 points)

- High ....
- Low ....
- Good ....

**Part II. Cloddiness (Possible score 20 points)**

- Poor—Less than 30% of surface clods .....
- Medium—30-60% of surface composed of clods .....
- Excellent—60% of surface composed of clods .....

**Part III. Soil Management (Possible score 20 points)**

**A. Weeds under control (Possible 7 points)**

- Good ....
- Medium ....
- Poor ....

**B. Moisture (Possible 7 points)**

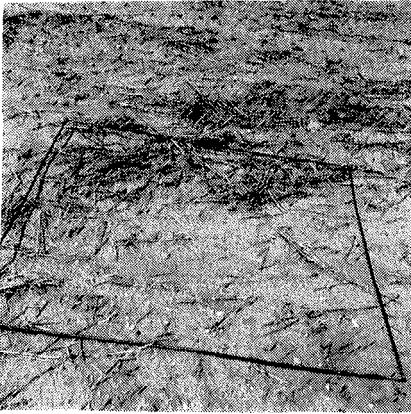
- Dry 0-2 feet .....
- Medium—2-4 feet of moisture .....
- Good—4 feet or better of moisture .....

**C. Top Soil Condition (Possible 6 points)**

- Loose ....
- Firm-Mellow ....
- Compacted ....

**Official Total Score** \_\_\_\_\_

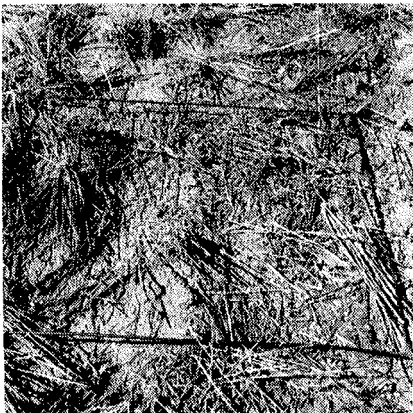
Pictures can be helpful in learning how to estimate amounts of residue per acre. However, actual measurements of residues for stubble mulching are usually determined by weighing the amount of residue anchored on the surface of the soil. Following are some pictures of residues and the amounts per acre.



665 pounds of wheat residue per acre.



1,525 pounds of wheat residue per acre.



2,075 pounds of wheat residue per acre.



3,000 pounds of wheat residue per acre.

## SELECTING THE CONTEST SITE AND MAKING OFFICIAL PLACINGS

### For use of Judging Officials

Select a uniform area.

Mark the site with a stake in each corner. Stretch a string around the site. The site of the judging area should be a minimum of 8 feet square. This will take care of approximately 20 contestants at one time. If larger groups are desired, allow 1½ feet of perimeter for each contestant.

Determine the actual amount of residue on the soil to a depth of 1 inch by sample method. The samples should be taken outside of the judging site. Where residues are distributed uniformly, as in drilled stubble, weigh the residues from 3 random samples, 3 feet square. The amount of residue in ounces multiplied by 100 equals pounds of residue per acre. The residue should be air dried and free of soil. For row crops, take samples along the row. One square yard will require the following:

<i>Rows</i>	<i>Will Require Sample</i>
40 in.	32 in. long
36 in.	36 in. long
28 in.	46 in. long
24 in.	54 in. long
20 in.	65 in. long

Anchorage of residues can be checked by actually weighing the amount of anchored and the total amount of residue on the plot. The percentage of residue anchored can be determined by dividing the total amount of residue into the amount which was anchored.

If in doubt as to the texture of the soil, have a soils man or soil conservationist determine the texture and adequate residue can then be scored properly.

Cloddiness can be determined by actually seiving the dry soil in the surface inch through an .84 of a millimeter (.033 of an inch) sieve. Weigh the sample, then sieve the soil. Weigh the sample remaining in the sieve. Divide the total amount of soil into the amount remaining in the sieve. This figure will be the percentage which is clod.

For ease in determining the amount of moisture in the profile, it is advisable to sample the soil at various depths, and place the samples in sealed plastic bags. Be sure to label each of the sample bags, by depth. Moisture can be estimated by feeling the soil through the various plastic bags.

For ease and accuracy of grading the score card, use acetate overlays that have been scored properly. All scoring and recording should be checked by another individual.



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