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G73-35 How to Plant Wheat

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How to Plant Wheat

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Winter wheat needs a seedbed that is firm enough to provide good seed-soil contact and is moist enough to provide water for germination and seedling establishment. Other Nebraska Experiment Station information is available on how to properly prepare the seedbed.

Planting Equipment

The type of planting equipment you need depends on the soil moisture content and the amount of residue present at seeding time. The drill you choose must be adaptable to the range of moisture and mulch conditions you normally expect in your area and specifically on your farm. You need a drill that will be able to plant through a dry soil layer and/or crop residue mulch and place the seed into moist soil. The seeds must be placed in moist soil so they can germinate quickly, thereby establishing the stand near the optimum date. In dryer areas the expected thickness of dry soil will be greater than in wetter climates; so a different drill may be required.

Types of drills commonly used for seeding winter wheat are:

1. surface drills -- usually single or double disc drills with row spacing of 6 to 8 inches,
2. semi-deep furrow drills -- usually single discs or small hoes spaced 9 to 10 inches apart, and
3. deep furrow drills -- usually hoes or shoes spaced 12 to 14 inches apart -- may be large discs spaced 12 to 14 inches apart.

Surface drills with disc openers are used where little residue is on the soil surface at seeding time. Disc opener drills are commonly used in the continuous wheat producing areas where the plow is the primary seedbed preparation implement. Disc openers are also used by growers who practice black fallow methods where no residues are on the surface at seeding.

Semi-deep and deep furrow drills are used for one or more of the following reasons.

1. Planting in furrows enables the grower to seed through a much thicker layer of dry soil than is possible with a disc drill. This is especially advantageous in the dryer areas.
2. Planting in furrows provides a rough soil surface which aids in wind erosion control.
3. Planting in furrows with hoe openers permits the grower to plant in mulched soils that result from stubble mulching tillage practices. This planting technique preserves the maximum amount of surface residues and anchors them securely for maximal wind erosion control. Furrow drills with large discs may also be satisfactorily used to plant in mulched soils.
4. Wheat drilled in furrows is better protected against winterkill.

Few specifications are necessary with disc opener drills because seeding is done in a "clean" seedbed where no residues or weeds are present. Seeding in a mulch system, however, will be easier if the semi-deep and deep furrow drills meet the following specifications:

1. at least 20 inches of clearance between ranks of openers;
2. at least 18 inches of vertical clearance between the tip of the hoe and the attachment of the hoe to the frame;
3. Row spacing of 10 to 14 inches. Wider rows for heavier residues;
4. Shoe or hoe opener width of not more than 4 inches;
5. Press wheels that pack the soil firmly and anchor residues in the ridge. Enclosed convex press wheels have proved very satisfactory.

Flexibility is necessary with any of the three types of drills if they are to be used on fields where the surface is irregular. Drills which flex in 6 to 9 foot sections are very desirable, especially on terraced land.

Since farmers frequently have fields 10 to 20 miles apart, transporting drills from field to field has also been a problem. Low road speeds must be maintained with steel press wheels. Drills 12 to 14 feet wide are dangerous to pull down the road. A drill transport must therefore be chosen so that the entire unit can be moved easily and safely on a road.

Row Spacing

Wheat is most usually drilled in rows spaced from 6 to 16 inches apart. Research in the Great Plains and Canada has shown that row spacing has little influence on grain yields. There are, however, other factors to consider in choosing a row spacing. The wider spacings (12"-16") have the following advantages:

1. Permit deeper furrows and thus placing of seed in moist soil even where the surface soil is dry without excessive soil falling back into the row.
2. Provide a potential for increased surface roughness for erosion control if the furrows are deep.
3. Provide more trash clearance in heavy residue conditions.
4. Less initial cost and maintenance expense.

The following are disadvantages of the wider row spacings:

1. Provide less protection for erosion compared to narrow spacings if the furrow is shallow.
2. Provide less shading of the soil, which favors weed growth in the spring.

Press Wheels

The seed must be pressed firmly into moist soil without destroying the surface structure above the seed to get uniform and rapid germination. If the soil structure is damaged by surface packing, rainfall will commonly cause puddling and then crusting, with poor emergence of the wheat seedlings. A press wheel which forces air pockets out of the soil and increases seed-soil contact without damaging soil structure is ideal.

Many types of press wheels are available. Large flat wheels or large rubber-tired wheels contribute to excessive surface packing, especially when the soil is wet or it rains heavily after drilling. A convex (higher in the center) press wheel removes air pockets better than the flat type, minimizes surface structure damage and thus decreases subsequent hazard of crusting. A convex wheel with an angle of at least 45 degrees is best. It establishes a well-defined ridge with anchored residues.

Enclosed or solid press wheels are desirable when drilling in heavy residues. Open press wheels have a tendency to pick up residues and soil from the ridge and distribute them over the row, which is undesirable.

Seeding Depth

Depth of soil over the seed is very important. Seed must be placed firmly in moist soil, and covered with sufficient soil to prevent rapid drying. Depth of soil over the seed should be 1 to 1 1/2 inches in medium- to fine-textured soils and 2 inches for coarse-textured soils. Seed should never be covered more than 3 inches. Wheat seedlings covered with more than 2 inches of soil definitely lose vigor and thus fail to emerge or if they do emerge will be more susceptible to winterkill or disease.

Deep or semi-deep furrow drills are advisable in areas where the surface soil may be dry at planting. They allow placement of the seed in moist soil without excessive soil covering over the seed.

Frequently, one or more openers on a drill plant too shallow or too deep. This results in erratic stands throughout the field, which decreases yield potential and increases opportunity for weed infestation. To insure uniform depth of seed placement, park the drill on a hard, level surface and adjust the openers as needed. Proper drill adjustment according to the manufacturer's specifications is essential prior to each planting season.

Speed of Drilling

In order to uniformly cover the seed to the desired depth the drilling speed should be less than 4 miles per hour for most drills. Speeds greater than 4 miles per hour tend to roll loose soil into the furrow, which covers the seed deeper on the forward ranks of openers. Size of shoe on hoe type drills also affects speed of drilling. The smaller the shoe the greater the speed at which accurate drilling can be done. Small shoes (1.5 - 3 inches in width) bury less residue and allow for optimum drilling speeds. Take time to plant properly, excessive speed will likely result in poorer stands and decreased yields.

Seeding Rate

Growers in Nebraska use seeding rates that vary from 15 to 75 pounds per acre. The lower rates are most

common in the dryer areas. The higher rates (over 60 pounds) are excessive for all areas of Nebraska. Optimum seeding rates are 30 to 45 pounds per acre for western Nebraska and 50 to 60 pounds per acre in eastern Nebraska.

Adjusting the Drill for Seeding Rate

Accuracy of seeding is necessary to achieve a crop stand which will produce maximum yields. Often, optimum stands can be attained with lower seeding rates if seeds are uniformly spaced. Most seeding equipment comes with charts which indicate the actual seeding rate. Factors such as size of seed, test weight, shape of seed, and the number of seeds per pound influence the actual seeding rate.

A simple method of calibrating seeding equipment is as follows:

1. Fasten a sack or container to one or more spouts.
2. Fill the drill with seed.
3. Collect the seed from the desired length of row.
    a. Drive 600 feet if one spout is used.
    b. Drive 300 feet if two spouts are used.
    c. Drive 200 feet if three spouts are used.
4. Weigh the seed in ounces from 600 feet of row.
5. Determine the seeding rate per acre from the accompanying chart.

Amount of Grain Seeded Per Acre

If ounces of grain collected from 600 feed of row is:	**Distance Between Rows**					
	7"	8"	9"	10"	11"	12"
	Pounds Per Acre					
2	15	13	12	11	9	8
3	23	20	18	16	14	12
4	31	27	24	22	18	16
5	39	34	30	27	23	19
6	47	41	36	33	27	23
7	54	48	42	38	32	27
8	62	54	48	44	36	31
9	70	61	54	49	41	35
10	78	68	60	54	45	39
11	86	75	67	60	50	43
12	93	82	73	65	54	47
13	101	88	79	71	59	51
14	109	95	85	76	63	54
15	117	102	91	82	68	58
16	124	109	97	87	73	62
17	132	116	103	92	77	66
18	140	122	109	98	82	70
19	148	129	115	103	86	74
20	156	136	121	109	91	78

A second method of determining seeding rate is to determine the number of seeds dropped per foot of row. One pound of wheat seed will contain approximately 15,000 kernels.

Catch and count the seed from 10 foot of row. Divide by 10 and use the following chart.

Spacing of Wheat Seed Per Foot of Row at Several Seeding Rates and Row Spacings. (Based on 15,000 seeds per pound).

Seeding Rate	Drill Row Spacing			
	8"	10"	12"	14"
Pounds/Acre	Seeds per foot of row			
15	3	4	5	6
20	5	6	7	8
30	7	9	10	12
40	9	11	14	16
45	10	13	15	18
50	11	14	17	20
60	14	17	21	24
75	17	22	26	30
90	21	26	31	36

Good wheat yields begin with proper stand establishment, which is highly dependent on planting technique. Consider the following questions before you begin this most important of operations: seeding.

1. Does my planting equipment choice fit my soil and residue management system?
2. Have I adjusted my drill for the recommended seeding rate for my area?
3. Have I adjusted the drill so that the seed will be placed in moist soil?
4. How deep will I be covering the seed?
5. Are my press wheels adequate?
6. How fast will I drive during seeding?

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