Wheat acreage in Alabama has increased in recent years. Although most of the wheat grown within the state is harvested for grain, this versatile crop can also be grazed or used as a silage or hay crop. It is possible to graze wheat up to early March and then to allow it to make a grain or silage crop. This practice may slightly lower the grain or silage yield, but it may meet a need for early grazing.

Small grains include wheat, rye, oats, barley, and triticale. Of these, wheat has the most general appeal as a silage crop. This publication discusses Auburn University’s recommendations for producing and utilizing wheat silage. Much of the information is also applicable to other small grain or grass silages.

Site Selection
Wheat can be successfully grown on a wide range of Alabama soils, but it is best adapted to deep, well-drained soils of medium to high fertility. Although wheat will tolerate poorly drained, heavy-textured soils better than other small grains, it may “drown out” in extremely wet areas. Wheat will be more susceptible to diseases under such high-humidity conditions.

Variety Selection
Auburn University agronomists conduct small grain variety trials each year at numerous locations throughout Alabama. The trials determine which varieties are best adapted, highest yielding, and have the most desirable characteristics for various purposes. The recommended varieties are annually compiled into lists based on evaluations. Only varieties that are known to be adapted to and productive in an area should be grown.

There are also lists compiled of varieties recommended for grain only, for forage only, and for grazing plus grain. This information, published by the Alabama Agricultural Experiment Station, is available at Alabama Extension county offices. In addition to selecting a good variety, use good quality seed. Auburn University agronomists recommend the use of certified seed. If that is not available, test any non-certified seed that is to be used to make sure it is free of weeds and has a good germination level.

Seed Treatment
Fungicide seed treatments are an effective and inexpensive method of protecting wheat seed and seedlings from seed- and soil-borne diseases. In general, certified seed purchased through a seed distributor is treated with a fungicide, usually captan or thiram. Wheat seed purchased from local sources often is not treated.

A contact fungicide such as captan, maneb/mancozeb, PCNB, or thiram should be used on all wheat seed to prevent seedling diseases (Table 1). These fungicides may be formulated for machine application, as drill box treatments, or both. Machine-applied products are cheaper and provide better protection than drill box treatments. However, mechanical seed treaters are not available in some areas.

Drill box treatments can provide good protection from most seed- and soil-borne diseases. The real key to the performance of drill box treatments is thorough coverage of the seed. To obtain good distribution of the fungicide on the seed, you should add half of the required amount of fungicide to a hopper half full of seed and thoroughly mix it. Then add the remaining seed and fungicide to the drill box and mix until all seed are covered.

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captan</td>
<td>Isotox Seed Treated F, Captan 400</td>
</tr>
<tr>
<td>Orthocide</td>
<td>Soil Treater 3X</td>
</tr>
<tr>
<td>4 Captan + PCNB</td>
<td>Orthocide-Vitavax 2020, Vitavax-Captan 20-20 Enhance</td>
</tr>
<tr>
<td>Captan + Carboxin</td>
<td>Dithane M-22, Manzate 200, Manzate D</td>
</tr>
<tr>
<td>Maneb [EDBC]</td>
<td>LT2GN</td>
</tr>
<tr>
<td>PCNB</td>
<td>Thiram</td>
</tr>
<tr>
<td>Thiram</td>
<td>Thiram 42S</td>
</tr>
</tbody>
</table>
Seedbed Preparation
A smooth, firm, vegetation-free seedbed is necessary for precise planting. It will also help to obtain a good wheat stand. Disking is probably the most common method of seedbed preparation for wheat in Alabama. Recent studies suggest, however, that some sort of deep tillage prior to planting may be beneficial on Coastal Plain soils.

Planting Dates
The optimum time for planting wheat depends on the location within the state. Wheat grown for silage should be planted earlier than wheat grown for grain alone. The following are recommended dates for planting wheat for silage:
- North Alabama—September 15 to November 1.
- Central Alabama—September 15 to November 1.
- South Alabama—October 1 to November 15.

Planting Rate And Depth
Wheat grown for silage should be seeded at a rate of 90 to 120 pounds (1 1/2 to 2 bushels) per acre. A planting depth of 1 to 2 inches is recommended. The optimum method of planting wheat seed is with a grain drill or other drill-type planter that allows very precise planting. If the seed are to be broadcast and disked into the soil, the higher seeding rate (near 120 pounds per acre) should be used.
If seed are to be aerially seeded with no cultivation to cover them (a high-risk operation), the seeding rate should be 120 to 180 pounds (2 to 3 bushels) per acre.

Fertilization And Liming
There is no substitute for soil testing in determining the quantity of lime and fertilizer to apply to wheat or any other crop. When taking soil samples, take numerous subsamples from various parts of the field and mix to obtain a composite sample. Avoid depressions or eroded areas. A good fertilizer recommendation depends on a good soil test.

Lime
The recommended pH range for wheat production is 5.8 to 6.5. Lime should be incorporated into the topsoil prior to planting. All liming should be based on a soil test.

Nitrogen
For the production of a wheat silage crop that will not be grazed, 20 pounds per acre of nitrogen should be applied at planting or soon after wheat emergence. An additional 60 pounds per acre of nitrogen should be applied around the middle of February. If wheat is to be grazed during the early season, 60 pounds per acre of nitrogen should be applied at or near planting followed with 60 pounds per acre in February. When wheat is planted behind soybeans or peanuts, assume that a residual nitrogen level of 20 to 30 pounds per acre will be in the soil. Reduce fall nitrogen application by this amount.

Nitrogen sources have generally shown little or no difference in their effectiveness, provided the application requirements of the source used are met. However, gaseous losses from urea or liquids containing urea can be important under conditions of high evaporation, high soil pH (7.0 or higher), and where large quantities of plant material cover the soil surface. Under these conditions, ammonium nitrate would be the preferred nitrogen source.

Phosphorus And Potassium
Both phosphorus and potassium are important in wheat production. Requirements vary from field to field, and fertilization with these elements should be based on a soil test.

Other Nutrients
Available magnesium is routinely determined on soil samples received by the Auburn University Soil Testing Laboratory. If magnesium is low and liming is needed, dolomitic lime is recommended. Calcium, also supplied by lime, is generally not deficient in areas where there is a suitable soil pH.

Sulfur may be deficient on soils where little or no sulfur has been applied recently. Sulfur deficiency is most common on sandy, rather than clay, soils. Application of 10 pounds per acre of sulfur each year is suggested to prevent sulfur deficiencies.

Micronutrients are generally available in Alabama soils in adequate amounts for wheat production. Routine application of micronutrients to wheat is not recommended.

Insect Control
Armyworms and greenbugs (aphids) are occasionally a problem in wheat production, either during the fall before frost or in March and April. Armyworms should be sprayed when there are two to three worms per linear foot of row or when damage is observed. Circular ANR-458, Integrated Pest Management 1989, Small Grains, or Circular ANR-500, 1989 Alabama Pesticide Handbook, contain specific insecticide rates and restrictions. Greenbugs (aphids) should be sprayed when small yellow and dead areas are observed. Frequent monitoring of fields to detect early signs of insects before severe damage occurs is the key to successful control.

Mixtures Of Wheat With Other Winter Annuals
Wheat is commonly grown with other winter annual forage species in pastures. In such situations, wheat may be planted with other small grains as...
well as ryegrass and any of several annual legumes. If this pasture growth becomes excessive, it is beneficial to harvest the excess growth as hay or silage.

With mixtures of winter annuals, it is more difficult to decide when to harvest because of the difference in heading dates between species. Generally, the harvest date for a mixture of winter annuals should be intermediate between the optimum dates for each species but closest to the optimum date for the species that was ready first.

Normally, mixtures of winter annuals are high in moisture and require several hours of wilting. The addition of mixtures with a readily available carbohydrate such as cracked corn or molasses increases the likelihood of making good silage.

When it is known at planting time that a field will be harvested for silage, wheat and vetch are a good mixture to use. Vetch uses wheat for support, increases the protein content of the silage, and is ready to harvest at about the same time as wheat. The new Auburn common vetch varieties, Vantage, Vanguard, Cahaba White, and Nova II, are best for Central and South Alabama; hairy vetch, a more cold-hardy type, should be used in North Alabama. When planted together, 60 to 90 pounds of wheat and 25 to 35 pounds of vetch are a good seeding rate.

**Silage Harvest**

Harvest dates for silage are critical. As wheat plants go from the boot stage through the heading and early grain development stages, protein and energy levels drop while the fiber level rapidly increases. (Figure 1 and Table 2 illustrate these trends and show energy requirements for milk production.) Although there is a general increase in dry matter yield as wheat matures, the increased dry matter yield is more than offset by the reduction in forage quality. Consequently, the *best time to cut wheat for silage is during the boot to early head stages*.

### Table 2. Nutrient Content Of Wheat Silage At Different Stages Of Growth.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Crude Protein</th>
<th>Digestibility</th>
<th>NE, Mcals/100 lb*</th>
<th>TDN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot</td>
<td>20.87</td>
<td>89.22</td>
<td>76</td>
<td>73</td>
</tr>
<tr>
<td>Early-head</td>
<td>15.31</td>
<td>83.12</td>
<td>68</td>
<td>66</td>
</tr>
<tr>
<td>Mid-head</td>
<td>11.26</td>
<td>78.89</td>
<td>61</td>
<td>59</td>
</tr>
<tr>
<td>Late-head</td>
<td>10.27</td>
<td>67.51</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Milk</td>
<td>8.99</td>
<td>64.84</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>Dough</td>
<td>8.49</td>
<td>72.07</td>
<td>56</td>
<td>55</td>
</tr>
<tr>
<td>Ripe seed</td>
<td>6.78</td>
<td>71.22</td>
<td>55</td>
<td>54</td>
</tr>
</tbody>
</table>


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![Figure 1. Energy and crude protein content of wheat silage harvest at different stages.](image-url)
In Alabama, the heading date for wheat varies from around the first week in April in the southern third of the state to about the third week in April in the northern third of the state. Furthermore, there is about 7 to 10 days difference in heading dates between the earliest and latest heading varieties available. Information on date of heading can be obtained from a review of the Small Grain Variety Report published annually by the Agricultural Experiment Station at Auburn University.

If wheat is harvested for silage at the recommended stage, there is time to plant corn in rotation on the same land. This allows production of around 5 to 7 tons of wheat silage per acre from land that is also used for corn silage production.

Wheat cut earlier than the soft dough stage will generally require wilting in order to make high-quality silage. The required length of wilting time may vary from 1 to 6 hours, depending on drying conditions and stage of maturity. A value of 35 to 40 percent dry matter is a good average for which to aim. Producers having large acreages may need to start harvesting in the late milk or early dough stages. The boot stage lasts about 10 days, the milk stage 10 to 14 days, and the dough stage 10 to 14 days.

One of the keys to silage production is to pack it tightly to exclude as much air as possible. Since small grain silage is more difficult to pack than corn silage, this is particularly important in making wheat silage. Length of cut has a great influence on ease of packing, and for this reason, it is important to keep the length of cut down to ⅛ to ½ inch. As silage becomes drier, it is usually more difficult to maintain the optimum length of cut. Water should be added at the silo if the silage becomes too dry.

Adding energy to grass crops such as wheat as it is being ensiled may be beneficial. This provides readily available carbohydrates, which facilitate the activity of the microorganisms that cause silage fermentation. Cracked corn can be added to grass silage at the rate of around 200 pounds per ton of silage, but care must be taken to get the grain mixed well into the silage and to maintain a sufficiently high (60 to 70 percent) moisture level after the grain is added. Molasses or other high energy materials (other grains, soyhulls, etc.) are also acceptable.

Several silage additives are currently on the market. Some (primarily those with propionic acid) may be beneficial if the silage is high in moisture. The value of many commercial silage additives has not been clearly demonstrated by research, and the cost may be prohibitive.

**Nutrient Content And Feeding**

Wheat silage is normally higher in protein and lower in energy than corn silage, but the stage of maturity at harvest has a great influence on nutrient content. A high-producing dairy cow should receive a total ration containing 70 to 75 percent TDN and 16 to 18 percent protein. Even though wheat cut at the boot or early head stages may contain a sufficient amount of energy and protein to sustain milk production, cows cannot eat enough wheat silage to meet their needs. Thus, a concentrate supplement will be needed in addition to the wheat silage.

Wheat cut for silage at soft dough and later stages contains insufficient energy and protein to meet the requirements of high producing dairy cows. In addition, the feed intake and rate of digestion of such silage will be insufficient to meet the high producers' needs. Therefore, supplementing extra concentrates cannot compensate for the lower energy levels in late-harvested, low-energy silages.

Wheat silage is extremely low in calcium so extra calcium must be used in the grain mix to meet recommended levels. The grain ration should be reformulated when switching to wheat silage.

Wheat silage is also an excellent feed for growing dairy heifers and beef cattle. Yearling cattle fed rations containing most of the dry matter from wheat silage will gain 1.5 to 2.5 pounds per day. Wheat silage can be substituted for corn silage and other roughages in high-grain finishing rations.