Sudangrass

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History

Sudangrass (Sorghum bicolor L. Moench) was introduced into Texas in the early 1900s and soon became established as an important pasture crop. After its introduction, many improved varieties were developed. They have greater disease resistance, sweeter stems, less toxic chemical content, and more leaves than previous varieties.

This is the same species as cultivated sorghum. In recent years, sorghum-sudangrass hybrids were developed that produce a higher yield of forage and have increased vigor, making the plants more resistant to adverse conditions. Hybrids also recover and grow back more rapidly following harvest than the older sudangrass varieties.

Description

Sudangrass is a fine-stemmed, summer annual that fits well in short rotations. Like sorghum, sudangrass is tolerant of drought and warm temperatures.

The plant stands 4 to 6 feet tall. The stems are about ¼ inch in diameter and have many soft leaves. The plant develops only fibrous roots and does not have rhizomes, but a single seed can produce many stems (tillers), depending on spacing. Sudangrass plants tiller extensively and have rapid regrowth potential.
The seed head is about 15 to 30 inches long and about half as wide. The seed is the same size as a wheat kernel, brown, and enclosed in dark brown, yellow, or purple smooth hulls. The hulls stay attached to the kernel after threshing.

**Uses**

Sudangrass is grown in the United States for pasture, grazing, green chop silage, hay, or seed. The crop is used as pasture for dairy and beef cows, sheep, and hogs, and as a range plant for poultry, especially turkey.

As a pasture crop, sudangrass has a higher carrying capacity than other annual grasses or legumes, especially in regions with hot, dry summers. Where the growing season is long, growers can make as many as five cuttings a year.

Growers also can plant it as an emergency crop when other forage crops have failed, which fills an important need in many regions.

**Conditions for growth**

**Climate**

Sudangrass has low tolerance for cold. During cold periods, if plants are not killed, they remain dormant and resume growth only when conditions are favorable. Plants cannot withstand frosts during the growing season.

The crop grows poorly at higher altitudes due to cool or cold weather conditions and untimely frosts. In eastern Oregon, sudangrass grows well in the warmer areas along the Columbia and Snake rivers and the lower elevation of the Mid-Columbia Basin.

In periods of drought, the plant becomes dormant and resumes growth when moisture conditions improve. However, extended periods of drought can cause wilting.

**Soil**

The crop grows successfully on almost every type of soil, but it does best on loams. Coarse, porous, sandy, or gravelly soils are generally not good for production. Usually, soils that are good for growing sorghum are also good for sudangrass production. Even though the crop is not particularly sensitive to acidic soils, when soil pH falls below 5.5, you should add lime.

**Cultural practices**

**Seedbed preparation**

A well-prepared, firm, moist seedbed is best, but acceptable stands can grow in grass sods, stubble, or where you use no-till.
Seeding date

Purchase seed that is adapted to your locality. In eastern Oregon, you can plant sudangrass between May 1 and June 1. It is important to wait until soils are warm enough before seeding, as cool soils slow growth and give weed seeds advantage over the crop. Seed when soil temperatures are at least 60°F.

Late planting also is not recommended, especially if you grow sudangrass for seed. Very hot summers or early fall rains reduce yields.

Seeding method and rate

Use grain drills to seed the crop. Plug drill holes to plant at the desired row spacing. Under high rainfall or irrigated conditions, use a row spacing of 6 inches or more. Under dryland conditions, row spacings of 12 to 18 inches are common. If the crop will be grazed, consider using at least a 20-inch row spacing to allow cattle room to move in the field without trampling the crop.

Depending on available moisture and soil type, planting depths can range from 1 to 1.5 inches. Cover seed with soil to enhance germination.

Growers usually drill or broadcast sudangrass at a rate of 25 to 35 pounds of pure, live seeds per acre. Recommended rates from Texas are 7 to 10 pounds per acre in 36- to 42-inch rows, and 20 to 25 pounds per acre when using a standard grain drill.

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**Table 1*. Nitrogen recommendations for the production of summer annual grasses.**

<table>
<thead>
<tr>
<th>Previous crop</th>
<th>Yield goal (tons dry matter/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3–4</td>
</tr>
<tr>
<td>Good legume stand (more than 4 plants/ft²)</td>
<td>40</td>
</tr>
<tr>
<td>Average legume stand (2 plants/ft²)</td>
<td>70</td>
</tr>
<tr>
<td>Soybeans, corn, small grain, sorghum, grass</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 2*. Phosphorous (P₂O₅) and potassium (K₂O) recommendations for production of summer annual grasses.**

<table>
<thead>
<tr>
<th>Soil test range</th>
<th>Bray P₁ (lb/a)</th>
<th>Exchangeable K (lb/a)</th>
<th>Soil test level</th>
<th>Yield goal (tons dry matter/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–10</td>
<td>0–80</td>
<td>Very low</td>
<td>P₂O₅</td>
</tr>
<tr>
<td></td>
<td>11–20</td>
<td>81–150</td>
<td>Low</td>
<td>K₂O</td>
</tr>
<tr>
<td></td>
<td>21–30</td>
<td>151–210</td>
<td>Medium</td>
<td>P₂O₅</td>
</tr>
<tr>
<td></td>
<td>31–50</td>
<td>211–300</td>
<td>High</td>
<td>K₂O</td>
</tr>
<tr>
<td></td>
<td>51+</td>
<td>301</td>
<td>Very high</td>
<td>P₂O₅</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K₂O</td>
</tr>
</tbody>
</table>

higher rates (8 to 12 pounds per acre and 25 to 35 pounds per acre, respectively) are recommended for hybrids.

Generally, lower seeding rates are better for dry areas. Higher rates are better for irrigated plantings or where rainfall is adequate. Research has shown that total forage yield is about the same regardless of the row spacing, because both sudangrass and its hybrids tiller extensively.

**Fertilizer**

Use soil tests to determine the crop’s nutrient needs. Fertilizer requirements are usually similar to those of other annual grass crops. Nitrogen (N) is the most limiting nutrient in sudangrass production. Phosphorous moves slowly in the soil, so apply it before planting or band it at seeding.

Adjust the amount of fertilizer you need based on the previous crop. Adjust rate and time of application of fertilizer to moisture supply and forage needs for optimum production.

Split applications are important in order to reduce the possibility of nitrate poisoning in animals. Divide applications equally (depending on the number of harvests) and apply after each grazing or harvesting operation.

Tables 1 and 2 give recommendations for fertilizer use in summer annual grass production in Indiana. Adjust these rates to suit local needs.

**Weed control**

Use both cultural and chemical control methods to control weeds. Use cultivation methods if row spacing is adequate. Plant weed-free seed, because weed problems in annual grasses most often come from the seed source. Buy seed from reputable dealers. Also, check the seed tag to determine percent seed purity.

Consult the Pacific Northwest Weed Management Handbook or your local Extension agent for information on registered herbicides. Always read product labels for specific instructions and restrictions for each herbicide.

**Insects**

Cutworms frequently injure sudangrass, millets, and sorghum. They are especially injurious to seedlings, cutting them off above or below the soil surface. They are most active at night. A full-grown cutworm is about 1 to 2 inches long, smooth, and either striped green, brown, or gray or mottled in color.

Grasshoppers also harm sudangrass. Eastern Oregon is especially susceptible to migratory grasshopper attacks. Chinch bugs and greenbugs attack sudangrass in other states. You can spray with approved insecticides if these insects reach economic thresholds. Consult the Pacific Northwest Insect Management Handbook or contact your local Extension agent to determine when to spray and to find out which chemicals are approved for use.

**Birds and mammals**

Pheasants and quail dig seeds out of the ground, reducing stand establishment. Crows and pheasants feed on seedlings. Blackbirds and sparrows feed at seed ripening stage. Birds are most destructive when the crop is grown for seed.

Birds are most difficult to control. There is no single effective method. To minimize damage, do not plant fields near timbered or scrub brush areas.

Ground squirrels, woodchucks, mice, jackrabbits, and gophers can cause considerable harm. Field mice usually eat planted seed. Moles and pocket gophers do a lot of underground damage. You can use standard control methods for squirrels, moles, and gophers.

**Diseases**

The two major diseases affecting sudangrass plants are leaf blights and downy mildew. Leaf blights cause elongated, straw-colored lesions with reddish margins on leaves. The best control is to use resistant varieties, if they are available. Rotations with other crops break the disease cycle.

Plants infected with downy mildew have deformed yellowish and reddish leaves. Once
again, use of resistant varieties is the best control method. Also, remove infected debris from the fields.

Treat seed to help control kernel and head smut.

Provide the crop optimum growing conditions to help minimize the outbreak of diseases.

Harvesting

Pasture

Graze the crop when plants are at least 18 inches tall (6 to 8 weeks after seeding) to reduce the risk of nitrate poisoning. Stock the pasture enough to graze it down before heading begins. Graze the pasture rapidly to a 6- to 8-inch stubble. Then, discontinue grazing until growth again reaches at least 18 inches high, and graze again. It usually takes 3 to 4 weeks for sufficient regrowth.

Consider using at least a 20-inch row spacing to allow cattle room to move in the field without trampling the crop.

Short rotational grazing systems work well. Subdivide fields into three or more pastures, and graze down each pasture in 7 to 10 days. Stagger the planting dates for each pasture about 10 days apart so that grazing can begin on each pasture when the sudangrass is at the right height.

Animals trample and feed selectively when growth reaches 40 inches high or higher. If you cannot set cattle to graze the field at the proper time, harvest the crop for hay or silage.

Green chop

This is high-protein forage. Growers usually feed it to dairy cattle and other high-producing livestock.

Harvest plants when they are 18 to 24 inches tall. Harvest before heading, as dry matter intake and digestibility are reduced after this stage. Feed harvested forage to animals immediately.

Hay

Yields are greatest when the heads reach the soft dough stage. However, thick stems at this stage make drying difficult, so it is best to cut before heads emerge.

Seed

Seed should be uniformly mature before harvest. Sudangrass seed heads normally do not shatter, so harvesting the crop is comparatively easy. Use a standard combine.

Potential hazards

Hydrocyanide or prussic acid poisoning

Young, actively growing leaves of sudangrass and sorghum contain varying amounts of cyanide, a chemical that breaks down and releases a poison known as prussic acid or hydrocyanide (HCN) when ingested. Cyanide compounds form if the plant is under stress, such as drought, light freeze, or hail. When livestock eat plants that are high in this poison, they can die. Take the following precautions to avoid this problem:
1. Do not graze fields until plants are at least 18 inches high. The danger of poisoning is minimal at this stage.
2. Do not graze or green chop soon after a killing frost. High levels of toxic compounds are produced within hours afterwards. Wait until the entire plant has dried down. The cyanogenic compounds usually dissipate within several days.
3. Don’t graze after a nonkilling frost for several days. Wait until regrowth is at least 18 inches high.
4. Drought also can raise cyanogenic compound levels. Again, let plants dry totally before harvesting.

Nitrate poisoning

Animals can be poisoned if they ingest forage containing high concentrations of nitrates. These compounds change in the digestive tract and are absorbed into the blood stream, where they interfere with oxygen transport. Symptoms include labored breathing, muscle tremors, and staggering.

The most common cause of nitrate poisoning is using high rates of nitrogen fertilizer in one application. Stress from
drought, frost, or temperature extremes also causes plants to accumulate nitrates. Highest levels are usually in the lower stems.

Take the following precautions to avoid nitrate poisoning:
1. Apply N fertilizer in split application.
2. Raise the cutter bar 6 to 12 inches when harvesting to avoid the basal stalks.
3. Do not graze or green chop immediately after a killing frost or drought.
4. Graze when plants are at least 18 inches tall.

For more information

**OSU Extension publications**

*Pacific Northwest Weed Management Handbook* (revised 2002). $35

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**Bibliography**

http://www.ianr.unl.edu/PUBS/range/g171.htm


http://www.agry.purdue.edu/ext/forages/publications/ay263.htm
