

# Utilizing Drought-stressed Soybeans for Forage

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Drought-stressed soybeans can be grazed or harvested as hay or silage.

Although soybeans are commonly grown as a grain crop, they can be grazed or harvested as either a hay or silage crop. This most commonly occurs when the grain potential of the soybean crop has been reduced by drought, hail damage, or early frost. A realistic forage yield expectation for drought-stressed soybeans would be 1.5 to 2 tons of dry matter per acre. The objective of this article is to provide practical tips for successfully, grazing, conserving, and feeding drought-stressed soybeans.

## Considerations before Utilizing for Forage

Before grazing or harvesting drought-stressed soybeans for forage there a number of important considerations that should be taken into account.

**Consult crop insurance agent.** Consult your crop insurance agent prior to taking any action including grazing, harvesting as forage, destroying the crop, or replanting. Failure to do so may result in the loss of indemnity payments.

### Consult with USDA Farm Service Agency.

Consult with your local Farm Service Agency representative to make sure that any actions that you take including harvesting drought-stressed soybeans as forage will not preclude you from receiving disaster relief payments or participating in subsequent farm programs.

**Consider the value of the grain.** Although the value of the grain that could be harvested is hard to determine, it should always be considered prior to grazing or harvesting as conserved forage. In some years, the price of soybeans may be high enough to justify the harvest of fields with lower yields. More information on estimating soybean yield can be found at <https://agcrops.osu.edu/newsletter/corn-newsletter/2015-26/estimating-soybean-yield>.

**Consider harvest restrictions for herbicides used.** Many herbicides labeled for soybean use do NOT allow for grazing or harvest as hay or silage. Always consult herbicide labels prior to grazing or harvesting as hay or silage. A list of grazing and harvest restrictions for commonly used herbi-

### Key Points

- Consult crop insurance and USDA Farm Service Agency before grazing or harvesting.
- Estimate grain value prior to grazing or harvest.
- Determine harvest restrictions for the herbicides used.
- Harvest before leaves yellow and fall off.
- Mow early in the day to maximize wilting time.
- Use a mower-conditioner adjusted to the widest possible swath to crush stems.

### Grazing Considerations

- Never turn hungry animals into soybeans.
- Provide access to a palatable dry hay or silage.
- Use feed additives to reduce chances of bloat.
- Strip graze soybeans to increase utilization rate.

### Baleage Considerations (preferred baling option)

- Wilt to 55 to 65 percent moisture.
- Use at least 6 layers of high-quality UV resistant silage film.
- Wrap bales same day as baling.

### Dry Hay Considerations

- Do not rake if moisture is below 40 percent.
- Do not ted soybean hay.
- Bale at 16 to 18 percent moisture.
- If hay becomes too dry, wait to bale.
- Store bales under cover.

### Feeding Considerations

- Provide access to clean water and free choice mineral.
- Feed in a hay ring to minimize feeding losses.
- Only put out enough baleage for two to three days.
- If high in grain, limit to one-half of dry mate intake.
- Avoid feeding raw soybeans in diets containing urea.

cides can be found in the UK Publication AGR-6: *Weed Control Recommendations for Kentucky Grain Crops*.

**Harvest or graze before leaves yellow and fall off.** Drought-stressed soybeans will contain very little grain. So, it is essential to harvest or graze soybeans when the leaves are still green. If harvested prior to leaf loss, drought-stressed soybeans with no bean development can have 12 to 15 percent crude protein and 55 to 60 percent total digestible nutrients.

**Baling soybean residue is NOT recommended.** In most cases, soybean residue remaining after grain harvest is poor in nutritional value. Typical composition of soybean residue is 4 percent crude protein and 35 to 40 percent TDN and palatability tends to be low. Corn stalks typically yield more and have a higher nutritional value.

## Grazing Drought-stressed Soybeans

If fields are fenced, grazing may be the simplest way to utilize drought-stressed soybeans. Unfortunately, most crop fields are no longer fenced. It is possible to quickly erect temporary electric fences, but they are generally NOT recommended as perimeter/containment fences. If electric fencing is used, it is imperative that animals are trained to it prior to grazing.

**Allow animals to adapt to soybeans.** Abrupt changes in ruminant livestock diets can result in nutritional disorders. Since cattle are not used to grazing soybeans, slowly introduce soybeans. This is accomplished by either limiting initial access to soybeans or by providing an alternative forage source such as dry hay, silage, or access to other pasture. Once adapted, animal performance should be good.

**Grazing soybeans may cause bloat.** Although there is a chance of bloat when grazing soybeans, it is considerably lower than that of clover or alfalfa. To mitigate the chances of bloat, never turn hungry animals into soybeans, do not graze wet soybeans, provide access to a palatable grass hay or silage, and use feed additives designed to reduce the chances of bloat such as surfactants and ionophores. More information on bloat

is available in the following publication ID-186: *Managing Legume-Induced Bloat in Cattle*.

**Strip-graze soybeans.** Strip-grazing soybeans will increase utilization and reduce trampling losses. In addition, it reduces selective grazing of just pods and leaves. Since soybeans will not regrow after grazing, no back fence is needed. Simply start at your water source and set up a temporary electric fence that provides only enough forage for two to three days of grazing. The smaller the strip provided, the more efficient the utilization (less will be trampled). Some producers may choose to move the fence every day. Make sure and set up a second fence before taking the first fence down.

## Harvesting Drought-stressed Soybeans as Baleage

If grazing is not possible then the next best option is to harvest drought-stressed soybeans as chopped silage or as baleage. Harvesting soybeans as silage/baleage reduces leaf shatter and results in a higher quality conserved forage. The following tips will help to optimize harvest as baleage or silage.

**Mow early in the day.** Mowing early in the day, after dew has dried off, maximizes wilting time. Rapid wilting and ensiling will result in higher nutritive value and lower dry matter losses.

**Use mower-conditioner.** Always use a mower-conditioner to crush stems. More roller pressure than normal will be needed to crush the larger diameter stems of soybeans.

**Adjust mower-conditioner to leave the widest possible swath.** Make mower swaths as wide as possible to maximize surface area exposed to solar radiation. This will shorten wilting time and result in more uniform drying.

**Wilt to 55 to 65 percent moisture.** Wilting to the proper moisture range ensures rapid and complete fermentation.

**Make dense bales.** A slower ground speed during baling allows for the formation of dense bales that ensile well. Since bales will be considerably heavier than dry hay, make bales small enough that they can

be safely handled with your equipment.

**Use plastic twine or net wrap.** Do NOT use treated sisal twine. The treatment reacts with the UV inhibitors in the plastic causing it to breakdown.

**Wrap bales immediately after baling.** Delaying wrapping allows undesirable microbial growth and delays the start of fermentation. Rapidly excluding oxygen from the forage is essential for fast and complete fermentation.

**Use at least six layers of high-quality silage wrap.** A minimum of six layers of a high-quality UV stabilized wrap designed for bale silage should be used. This is NOT the place to save money. Not applying enough layers or using poor quality wrap will result in poor fermentation, lower nutritive value, and higher dry matter losses.

**Wrap at storage site.** If possible, wrap bales where they will be stored. This minimizes handling and the chances of damaging the silage film.

**Immediately patch holes in plastic.** It is very important to check bales regularly for damage, even small holes can compromise entire bales. Use a UV stabilized tape designed for silage wrap to patch holes.

**Allow bales to ferment six to eight weeks prior to feeding.** Baleage should be allowed to complete fermentation prior to feeding. In most cases, this occurs six to eight weeks following ensiling. Although not ideal, if feed is needed more quickly, bales can be fed after four weeks of fermentation.

**Silage inoculants may improve fermentation.** Silage inoculants are generally not needed with soybean baleage or silage. However, they can improve fermentation if ensiling conditions are less than ideal.

## Harvesting Drought-stressed Soybeans as Dry Hay

If it is not possible to harvest drought-stressed soybeans as baleage, they can be harvested as dry hay. However, leaf shatter during raking and baling can be high. The following tips will help to minimize leaf loss and maintain nutritive value when soybeans are conserved as dry hay.

**Mow early in the day.** Mowing early in the day, just after dew has dried off, maximizes first day drying time. This shortens the curing period, reducing dry matter losses to respiration.

**Use mower-conditioner.** Always use a mower-conditioner to crush stems. More roller pressure than normal will be needed to crush the larger diameter stems of soybeans.

**Adjust mower-condition to leave the widest possible swath.** Make mower swaths as wide as possible to maximize surface area exposed to solar radiation. This will shorten curing time and result in more uniform drying.

**Do not rake when leaves are dry.** Raking soybean hay that is below 40 percent moisture will result in high levels of leaf loss. This reduces the nutritive value and palatability of the hay, and ultimately dry matter intake by livestock.

**Do NOT ted soybean hay.** Tedding soybean hay will result in high levels of leaf loss. It is better to gently turn windrows over with a side delivery rake.

**Bale at 16 to 18 percent moisture.** Baling hay above 18 percent moisture will result in mold growth, heating of hay, and reduction in nutritive value. Excessive heating can also result in hay fires.

**If hay becomes too dry, wait to bale.** Soybean hay that becomes excessively dry can experience very high levels of leaf loss during baling. Leaf loss can be minimized by baling in late morning after the dew has dried off, or late evening after higher humidity levels have made leaves more pliable.

**Store hay undercover.** If at all possible, store soybean hay in a shed or covered with a well secured heavy duty tarp to prevent dry matter and nutritive value losses. Like other legumes, soybean hay tends to be more susceptible to weathering than grass hay. The stems and leaves of soybeans do not shed water as readily as grass hay.

## Feeding Considerations for Soybean Forage

**Make sure livestock have unrestricted access to clean and fresh water.** Water is the single most important nutrient in livestock production and the nutrient required in the largest quantities.

**Make sure that livestock have access to free choice mineral.** Livestock require macro- and micro-nutrients to support growth, maintenance, and lactation. Make sure livestock have access to a free choice mineral supplement that meets UK Beef IRM Mineral Supplement Requirements.

**Test forage prior to feeding.** In general, soybean hay and silage are relatively high in forage quality. However, excessive leaf loss during harvesting, heating, or poor fermentation can significantly alter the nutritional value, which can result in varying nutrient contents. Obtain a forage test and supplement as needed.

**Feed soybean hay or baleage in a ring feeder.** Placing bales in a ring feeder will help to reduce waste.

**Only put out enough baleage for a maximum of two to three days.** When the plastic wrap is removed from baleage, oxygen starts to degrade the fermented forage. By putting out smaller quantities more frequently, aerobic deterioration is limited.

**If high in grain, limit soybean forage to one-half of dry matter intake.** While not normally a problem with drought-stressed soybeans, high amounts of mature soybean seeds in the forage can result in excessive amounts of fat. This can negatively impact fiber digestion and limit dry matter intake. Keep total dietary fat below 6 percent.

**Soybean hay may cause bloat.** The risk of bloat when feeding soybean hay is low. If this risk is a concern, it can be mitigated by allowing access to a palatable grass hay or silage along with the soybean hay or pasture.

**Do not feed raw soybeans with diets containing urea.** Soybeans produce an enzyme called urease that can cause rapid degradation of urea to ammonia in the rumen. When ammonia is produced too rapidly it can be absorbed in the blood stream and cause toxicity.

**Do not feed raw soybeans to cattle less than 300 lb. or monogastrics.** Raw soybeans contain an enzyme known as trypsin-inhibiting enzyme, which can inhibit protein digestion in young cattle and monogastric animals. Avoid feeding raw soybeans to cow-calf pairs, since calves may also be able to consume the raw soybeans.

## Resources

For more information on utilizing soybeans for forage, contact your local extension agent or visit the UK Forages webpage.

- ID-186: *Managing Legume-Induced Bloat in Cattle*
- AGR-6: *Weed Control Recommendations for Kentucky Grain Crops*
- University of Kentucky Beef IRM Mineral Supplement Requirements
- AGR-229: *Warm Season Annual Grasses in Kentucky*