

## Soybeans as forage for grazing, hay or silage

Early in September Jim Dunphy, NCSU Soybean Specialist, wrote “Have we run out of time to make a grain crop from our drought-stressed soybeans? In many parts of the state, probably yes. I don’t expect soybeans to develop a flower into a physiologically mature seed in less than 45 days, and parts of the state are already within 45 days of the average first killing frost. Much of the state which is not there yet will be soon.”

With the continuation of the drought, few soybean fields will make a profitable bean crop, but they may have significant value as a forage crop. Soybean forage can definitely help North Carolina livestock producers who are short on feed because of the drought. This is a summary of information on salvaging soybeans for forage use.

If producers have soybean herbage, making hay or silage for their own stock or for sale is an economic calculation. Remember, a field should have at least enough forage to pay for the fuel to harvest it. A yield of 2 tons dry matter (DM) per acre (five to six 700 lb round bales) is possible with waist-high beans, but much less is likely in the current drought-stressed conditions.

**Two cautions** before salvaging soybeans as forage:

1. The label for any pesticides used on the soybeans should state that use as forage is permitted. Some herbicides and insecticides forbid using soybeans treated with that pesticide for forage. See [www.ces.ncsu.edu/disaster/drought/Soybean\\_Hay.pdf](http://www.ces.ncsu.edu/disaster/drought/Soybean_Hay.pdf) for complete information.
2. Contact a crop insurance agent before harvesting for forage. They will advise each producer on how harvesting a crop for forage may affect insurance payments. The status of the crop may need to be documented for possible disaster payments before haying or grazing. Insurance adjustors may require leaving some unharvested strips to allow later bean yield estimation.

### **Grazing**

Grazing is the most efficient means of harvesting the forage. Strip grazing soybeans will result in less waste due to trampling, fouling with manure etc. Grazing is the best option, especially if the beans made very little growth, but the field must be fenced, and water needs to be provided to the animals.

*If there are still animals grazing perennial pastures, use the beans (or corn stalks or cotton fields) to get the animals off the permanent pastures. This may allow pastures to survive the drought. At this point in the season and the drought, pastures need to put all their energy into recovery and survival. **Feed alternatives now and let pastures recover for next season.***

### **Soybean silage**

In Kentucky, Wisconsin, and Maine, silage is recommended as the best preservation option for soybean forage. But silage is not as portable/movable (nor therefore) saleable as hay. For those who have experience with silage, beans will work. Chop at 3/8". For silage the plants need to be more than 50% green, at 35-40% DM. This may require wilting many NC beans in their current stage of growth. Peak digestibility is at beginning to late pod (R3-R4) stage. The fat in more mature beans may interfere with fermentation. Dry matter testing (using the microwave method) is advisable, since most of us don't have experience estimating soybean forage DM.

Soybean forage made into balage can be slightly drier. Balage is long cut forage made into bales at moisture of 40% to 65% (about 50% is usually ideal). The bales are wrapped with plastic to exclude air to encourage fermentation. There is less information about soybean balage; but several North Carolina producers have been making balage, and are satisfied with the process so far. Balage will be more portable than silage. We don't have information on the final product yet, but they are hoping for good outcomes. The big challenge (as with soybean hay) is the moisture in the stems is so much greater than moisture in the leaf portion of the plant. This makes fermentation (as well as drying hay) difficult, and may adversely affect final quality of the feed.

### **Soybean hay**

Soybean hay is routinely produced in the northeast and north central areas of North Carolina. Here are some guiding comments from experienced NC producers of soybean hay:

"It is best to harvest at early pod stage. It makes a high quality feed. We have not experienced feeding problems associated with soybean hay. Feeding one round bale of soybean hay and two round bales of grass hay at the same time makes a good system. Yield is usually approximately half of first cutting fescue hay. If soybean hay is stored outside, use netwrap. String is o.k. inside shelter but loss could be as much as 35% when stored outside with string. Soybean hay is worse than peanut hay about leaf shatter, so minimize the number of times it's mechanically handled (raked, tedded)."

"I have had lots of experience with soybeans for hay. It works great if the beans are cut with a mower-conditioner. If not, it takes forever for them to dry. Also, stage of maturity has a big effect on the final quality of the hay. The beans should be cut early for optimal quality. The best stage to cut is when the pods are not filled out and there are still a lot of leaves. The biggest issue is when to bale, too soon and they will mold, too late and the leaves shatter. I try to bale in the evening to cut down on leaf loss and the dust while baling is not so bad. They will change color and look brown not green after baling. The cattle consume them well and I typically cut some every year to stretch my other grass resources."

"Soybeans are difficult to get cured, and a tedder will do a lot of damage to them even when they are green. The best method is to just swath them leaving about a 4 inch stubble, and then let them get almost totally dry before doing anything else. Then, rake them before they get crispy dry in the morning and don't make the windrows too big. Once they are raked they will dry very slowly, so raking too soon is often a problem. Once they dry in the windrow for at least

several more hours, you can invert the windrows to continue the drying process. It is very sensitive to shattering so rake slow and gentle. Tedding after the leaves dry will knock most of the leaf off and reduce yield and quality. It is best if it is rolled in the late evening. Be aware that the leaf will get crispy after only one day of drying, but the stems take more like 3 or 4 days to cure especially if they are big and if there is a high yield."

"We do make soybean hay in our area. The strategy is to work it like alfalfa so leaf shatter is minimized. It takes a while to dry; only stir it or bale it in the morning or evening when the humidity is higher."

"Myself, along with several other producers in our area have fed soybean hay. The only thing you should be aware of is that cattle have an increased tendency to bloat on this hay... You can limit the risk by mixing it with grass type hay."

Note, ironically, at least three dry days are needed for making soybean hay. The key with making good soybean hay is limiting leaf loss; don't be tempted to bale too quickly after cutting because the stems need time to dry down, or you will have heating, mold, and spoilage losses.

**Storage:** Soybean hay, even round bales, will need protection from rain. Bales need to be put in a shed or covered with a tarp or plastic. Soybean round bales will not shed rain as does unprotected grass hay, and moisture will penetrate the bales. A high level of spoilage will result.

**Feed value:** If you are able to use soybeans for forage they can provide excellent feed. The best soybeans for forage are in the beginning pod stage (harvested at R3 - when one of the top four nodes with a fully developed leaf has a 3/16-inch long pod). Less mature soybeans have lower protein and digestibility. Soybean silage runs 14-20 % protein, Soybean hay is high protein (averaging around 15%) and beef cattle fed soybean forage should also be fed a lower quality forage. Feed the soybean hay or silage (or pasture) as 20-30% of the ration. This will stretch the higher quality feed and balance the lower quality forage. It will also avoid problems with bloat. Bloat has been reported so use good bloat management. Most importantly, don't feed soybean hay to very hungry cattle; fill them up on grass hay before offering soybean hay. Horses can consume soybean hay safely if it is put up properly. Wisconsin farmers have noted that soybean silage was not as palatable to cows as alfalfa or corn silage, but dairy animal production not affected.

**Timeliness:** Given the condition of the crop and possible damage by rain or wind, we suggest you begin the forage harvest as soon as you have followed the procedures necessary for crop insurance and disaster payments. Harvesting before leaves start to drop, even if the plants are still flowering, is advised to get the best value from the crop.

Baling soybean stalks or stover after soybean harvest is not recommended. The feed value of soybean stover is reportedly very low; making it uneconomical to bale or feed.

**Marketing:** There is absolutely a market for soybean hay. Contact a county agent or the NCDA for assistance with marketing. They may also be able to connect you with custom haymakers who will come to your farm and bale. If you are interested in purchasing or selling soybean forage, contact NCDA&CS or your county agent. Moving soybean forages around or into the state may require permits if your county has fire ants or noxious weeds.

**Conservation:** Remember to leave some residue and cover in the field to protect the soil when the rain finally arrives. Plant a cover crop to help reduce soil erosion after you harvest the hay.

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