

CROP AND LIVESTOCK



Update

Considerations When Using Soybeans as a Forage

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Late planting of soybeans and below-average hay and pasture yields are forcing soybean and ruminant livestock producers to consider harvesting the soybeans as a forage. Keith Johnson, forage specialist in Purdue University's Department of Agronomy, offers several items to consider before soybeans should be harvested as a forage.

1. What is the current maturity stage of the soybeans and what is the potential grain yield?

In mid-September, Ellsworth Christmas, Purdue University soybean specialist, provided the following information in Table 1 that may be helpful as you assess whether late-planted soybeans have an opportunity to reach physiological maturity. Farmers should assess individual soybean fields as there may be maturity stage and yield differences due to variety and/or rainfall received. Soybeans that won't reach physiological

maturity before a killing freeze do have value as a forage, as stored winter feed supplies are going to be lower than average and if the soybean crop can be harvested as forage at the proper stage of maturity. Current hay prices in Indiana have a wide range with low and superior quality hay selling for approximately \$40 and \$170 per ton, respectively, at northern Indiana auctions.

2. When should soybeans be harvested as a forage?

Feed composition tables provide an estimation of what the quality of soybeans harvested as a forage might be at a given maturity stage. Table 2 provides quality estimates for several soybean maturity stages. Testing the forage with a commercial feedstuff testing laboratory is recommended as results will more accurately reflect true forage quality and result in properly balanced rations. The measure of energy

Table 1. The normal 30° F fall frost date, average number of frost-free days after September 16, and the reproductive growth stage required on September 16 to avoid significant frost injury.

Indiana Crop Reporting District	Date of first 30° F frost, 30% probability	Days remaining after Sept. 16 to first frost	Stage of growth on Sept. 16 to avoid injury *
Northwest	October 10	26	R5.5
North central	October 10	26	R5.5
Northeast	October 10	26	R5.5
West central	October 15	31	R5.1
Central	October 15	31	R5.1
East central	October 10	26	R5.5
Southwest	October 20	36	R4.7
South central	October 20	36	R4.7
Southeast	October 20	36	R4.7

* R4=a 3/4-inch pod at one of the four upper nodes.
R5=a bean 1/8-inch in diameter in a pod at one of the four upper nodes.
R6=a bean that completely fills the pod at one of the four upper nodes.

found in the table, total digestible nutrients (TDN), doesn't follow the typical decline in energy found with commonly used perennial grasses and legumes. This difference, undoubtedly, reflects the contribution that the grain is making to harvested forage.

Since soybeans were commonly used in the early twentieth century as a forage, I searched the archives for recommendations regarding harvest stage. Unfortunately, no clear recommendation on time of harvest was apparent from reviewing this literature. One common theme was that the crop should be harvested as a forage before leaves begin to drop and before any pods begin to change to a non-green color. This is reflected in Table 2, also, as the mature crop had the poorest quality.

3. How should soybeans be harvested?

To reduce leaf loss, grain loss, and potential for rain damage, the soybeans should be made as silage rather than as hay. Soybeans should be wilted to a moisture that works best for the specific silo structure being used. The moisture should be 60 to 70 percent for soybeans ensiled in a trench, bunker, concrete stave or bag-type silo. If an oxygen-limiting silo is used, moisture level can be 50 to 60 percent. Of the harvested soybean forage, stems will have the lowest quality. If chopped and ensiled, livestock will less likely sort out the lower quality stem as compared to when soybeans are made and fed as long-stemmed hay.

If harvested as hay, a mower-conditioner should be used and a longer curing time expected as compared to alfalfa. Making hay of any type in late September and October is "easier said than done" because of cooler and shorter days as compared to summer time. If quality is good, protection from weather damage during storage is recommended.

In my opinion, grazing soybean forage is risky because it is difficult to control selective grazing of immature grain. Founder and off-feed problems could result if over-consumption of the seed occurs.

Table 2. Forage quality of soybeans harvested as hay at several maturity stages. (From: Atlas of Nutritional Data on United States and Canadian Feeds.)

Maturity Stage	Forage Quality Variable, Dry Matter Basis	
	Crude Protein, %	TDN, %
Early bloom	18.8	63.3
Mid-bloom	17.8	52.7
Late bloom	17.7	60.6
Early seed fill	16.8	54.8
Late seed fill	16.8	60.4
Mature	14.4	52.5

Table 3. Forage harvest restrictions associated with use of soybean herbicides.

Herbicide	Harvest for forage/hay/graze?
Assure II	no
Basagran	wait at least 30 days after application
Blazer	no
Broadstrike+Dual	no
Broadstrike+Treflan	no
Butyrac	wait at least 60 days after application
Canopy	no
Classic	no
Cobra	no
Command/Commence	no
Detail	no
Dual/Dual II	yes
FlexStar	no
Frontier 7.5E or 6.0E	no
Fusilade DX, Fusion	no
Galaxy	no
Lasso, Micro-Tech, Partner	yes
Pinnacle	no
Poast Plus	no restriction on label
Prowl	yes
Pursuit	no
Reflex	no
Resource	no
Roundup Ultra	Roundup Ready soybeans: no
Scepter, Squadron	no
Select	no
Sencor	wait at least 40 days after application
Stellar	no
Storm	no
Synchrony STS	no
Tornado	no
Trifluralin (e.g. Treflan)	yes
Tri-Scept	no
Turbo	wait at least 40 days after application

4. What herbicides were applied?

Unfortunately, most of the herbicides utilized on soybeans have not been registered for use when the soybeans are fed as a forage and not harvested as grain. Dan Childs, Purdue University weed specialist, provided the information in Table 3 that indicates whether soybeans can or cannot be legally harvested as a forage.

5. What are custom rates for forage harvest?

In many cases, the cash grain farmer's soybeans will be harvested by a livestock producer that will ultimately feed the soybean forage livestock, or the soybeans will be harvested on a custom-rate basis. Extension publication EC-130, Indiana Custom Rates for Power Operated Farm Machines, 1994, provides some basis as to cost associated with forage harvest operations.

Average prices charged in 1994 for cutting and conditioning, raking, making small square bales (58 lb. twine tied), and making large round bales (1269 lb.) were \$9.72 per acre, \$4.33 per acre, \$.38 per bale and \$7.42 per bale, respectively. The point is, assuming the soybean forage would be of similar quality, soybean hay will command a higher price per ton than a standing crop to be made into hay because of the harvest cost already incurred with the soybeans in storage.

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