Timing and Use of Harvest Aids in Louisiana Soybean

Todd Spivey, Josh Copes, Sebe Brown, Daniel Stephenson, Donnie Miller

Over the last several weeks, we have received numerous calls about soybean harvest aid timing, products, and general recommendations. The use of harvest aids in Louisiana soybeans has become a popular practice, with timely applications improving seed quality and harvest efficiency while potentially resulting in a soybean harvest 7 to 10 days earlier when compared to non-treated beans. However, producers must be careful to not make these applications too soon resulting in a reduction in yield.

Timing

The goal of harvest aid use is to promote an earlier, more efficient harvest. To achieve both, harvest aids must be applied in a timely manner. Once seed have separated from the white membrane inside the pod, they have reached physiological maturity and will no longer increase in size. At this time soybean seed are at about 50% moisture content and seed will begin to dry. Any use of a harvest aid prior to the majority of seed reaching physiological maturity will result in a loss in yield.

Figure 1. *R6.5 soybean seed (LSU AgCenter)*

Research conducted in Louisiana by Dr. Jim Griffin and Joey Boudreaux established that harvest aids could be applied to soybean without yield penalty as long as the field is at reproductive growth stage R6.5 or later. At this growth stage the soybean seed have separated from the white membrane within the pod and seed margins are prominently defined (figure 1). Plant appearance at growth stage R6.5 will vary by variety so close attention should be made to pods collected from the field and specifically whether seed have separated from the white membrane (figure 2, 3) (Griffin and Boudreaux 2011 Louisiana Agriculture magazine Vol. 54, No. 2, Spring 2011).

Figure 2. *Soybean pods showing, from left to right, youngest to oldest. Middle pod is an R6.5 seed. (LSU AgCenter)*

Applying harvest aids too early not only goes against a product's label, but can result in significant yield loss due to reduced seed weight. Dr. Griffin and Joey Boudreaux's research showed that the maturity group IV soybean yield was reduced by 15.4% when applied to soybeans at seed moisture of 60%, before R6.5 (Boudreaux and Griffin 2011; Weed Technology vol. 25: 38-43). Harvest aid application prior to R6.5 or 40% seed moisture, resulted in yield loss of 15.6 and 4%, respectively, for maturity group V and VI varieties.

Determining when a soybean reaches R6.5 is not the only consideration that must be made before making a harvest aid application. Table 1 gives the label requirements for harvest aid application timing of several products labeled in soybean. Each product label provides the timing of when an application can be made. To gain the greatest advantage from a harvest aid application, producers should first determine when their field has reached R6.5, then the application should be made as soon as the label allows. Producers should also understand that if a harvest aid application is missed or delayed, it may be quicker to allow the field to naturally

desiccate than to delay harvest by allowing for the required preharvest interval (PHI) associated with some products.

Figure 3. *Soybean seed within pods showing, from left to right, youngest to oldest. Middle pod is an R6.5 seed. Notice the more defined seed margins as you move from left to right. (LSU AgCenter)*

Products

Producers have several harvest aid options, with the typical application consisting of paraquat plus the addition of a nonionic surfactant or crop oil concentrate. In fields with excessive morningglory pressure, growers might consider including carfentrazone (Aim) or saflufenacil (Sharpen) with paraquat to improve desiccation of vines. In situations with high grass pressure, a tank-mix of paraquat with sodium chlorate may be warranted to improve the desiccation of grassy weeds prior to harvest.

Table 1. Proper application timings based on label of harvest aid products for soybeans.

Gramoxone SL (Paraquat)	
Indeterminate varieties	65% of pods have reached a mature brown color or seed moisture is less than 30%
Determinate varieties	Plants are mature; beans are fully developed, 50% of leaves have dropped and remaining leaves are yellowing.
Defol 5 (Sodium Chlorate)	
All soybean varieties	Make application 7 to 10 days prior to anticipated harvest
Sharpen	
	Spray over the top of soybeans that have reached physiological maturity (all pods and seeds have no more green color)
Indeterminate varieties	Greater than 65% brown pods and greater than 70% leaf drop or when seed is 30% moisture or less
Determinate varieties	Beans are fully developed, more than 50% leaf drop, and leaves are yellowing

Environmental conditions should be considered when choosing a desiccant. Gramoxone SL label states that it is rain fast in 15 to 30 minutes after application. Defol 5 label (sodium chlorate) states that applications should not be made if rainfall is anticipated within 24 hours, and as stated on the label, defoliation will be best on sunny, hot, and humid days. The longer it remains on the plant the better it will perform.

It is also imperative that producers consider the required PHI associated with each product. When using multiple products, the longest PHI must be adhered to. Labeled rates and comments are presented below in the excerpt from the 2018 Louisiana Suggested Weed Management Guide.

PREHARVEST DESSICANTS:

carfentrazone @ 0.023 lb/A	Aim 2EC @ 1.5 oz/A Add 1% v/v crop oil concentrate	Better on morninglories than pigweed, sicklepod, etc.	Apply after crop has matured and grain has begun to dry down. More effective on annual vines. Do not apply within 3 days of harvest. Apply in 10 gal. by ground, 5 gal. by air.
saflufenacil @ 0.022-0.045 lb/A	Sharpen @ 1 - 2 oz/A Add 1% MSO + 8.5 lb/100 gal AMS	Morninglories and other broadleaf weeds	Apply once soybean has reached physiological maturity (all pods and seeds have no green color). Indeterminate varieties: 65% brown pods, more than 70% leaf drop, 30% or less seed moisture. Determinate varieties: more than 50% leaf drop and remaining leaves are yellowing. Preharvest interval is 3 days.
paraquat @ 0.126 - 0.25 lb/A	paraquat (2 lb/gal formulation) @ 8 - 16 oz/A; paraquat (3 lb/gal formulation) @ 5.4-10.7 oz/A Add 0.25% v/v nonionic surfactant	Desiccation of weeds and soybeans only	Indeterminate varieties: 65% of pods are mature or moisture content is 30% or less. Determinate varieties: 50% leaf drop and remaining leaves are yellow. Some drought stressed weeds will not be desiccated. Do not graze or harvest for hay. Apply in 20 gal. by ground or 5 gal. by air. Preharvest interval is 15 days. Immature soybeans will be injured.
sodium chlorate @ 6 lb/A	6 lb/gal formulation @ 1 gal/A 5 lb/gal formulation @ 1.2 gal/A 3 lb/gal formulation @ 2 gal/A	Desiccation only. Level of weed control is affected by environmental conditions.	Apply 7-10 days before harvest. Apply in 20 gal. by ground, 5 gal. by air. Check label for environmental conditions most favorable for desiccation. Apply under high temperatures and humidity.

Redbanded Stink Bug Considerations

Across the state, redbanded stink bug (RBSB) numbers are down in 2018 compared to 2017. As the season progresses, producers should continue monitoring RBSB levels and should not rule out the inclusion of an insecticide with the application of a harvest aid. LSU AgCenter entomologists recommend the control of threshold populations of RBSB until the soybeans are out of the field. This means that the inclusion of an insecticide for the control of RBSB with a harvest aid application could be necessary (**sodium chlorate cannot be tank-mixed with any organophosphate insecticides**). It is important to keep in mind the restrictions placed upon many of the products at this point in the season. These restrictions may include total active ingredient restrictions and PHIs. Acephate, a common recommendation for RBSB control, can only be applied up to 2 lb ai per acre per year in Louisiana. Another insecticidal option that has demonstrated late season control of RBSB similar to Acephate is Lannate. Lannate has the same PHI as Acephate (14 days) and mixes well with paraquat. Lannate, however, is a restricted use pesticide that carries the "Danger-Poison" signal words and applicators should follow all label requirements and exercise caution when mixing, loading and applying. Other insecticides also have increased PHI such as the pre-mix product Endigo, with a PHI of 30 days. It is important to read all label materials prior to any use of labeled product. When label restrictions prevent the inclusion of an insecticide with the harvest aid application, growers should not delay the harvest of soybeans so that the seed can be removed from the field as quick as the label allows.