

Implications of Herbicide Applications on Replanting Decisions

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There are several herbicides that could be used for the control of both grass and broadleaf weeds in forage crops. The type of herbicide and mode of action can impact how long herbicides stay in the soil. Most herbicides are broken down by soil microbial decomposition, but such herbicides must be free from binding with soil particles or organic matter to be degraded by soil microorganisms. The chemical degradation of herbicides can also be affected by soil pH and soil moisture levels. Herbicide breakdown and herbicide activity increase as soil pH increases but the rate of breakdown decreases in dry conditions.

Although planting cool-season annual grasses and legumes for winter grazing can offer great grazing benefits in the southern USA, they also add another layer of complexity that may unfamiliar to may forage producers. This means that is it important to look at herbicide labels and determine the residual effect of pre- and post-emergent herbicides used earlier in the spring. The two biggest items to look for in the label will be the plant back interval for a specific forage crop, the use rate related to the plant-back interval, and the type of soil.

Although the goal of an herbicide application is to provide long-term weed control during the growing season, it is important to make sure that the herbicide will dissipate to a safe level and therefore allowing the planting of the forage crop. Regardless of whether an herbicide is primarily a pre- or postemergence product, some have the potential to persist in the soil for long periods of time. The plating interval or plant-back restriction is the required amount of time from herbicide application to subsequent legally crop es-tablishment for grazing or hay production. It is important to follow label recommendations on application rates, planting, haying, and grazing restrictions. In some cases, legumes can be more sensitive to residual herbicides that grasses. The potential of residual herbicide injury depends on complex interactions between herbicide chemical formulation, soil type, soil moisture, temperature, and the sensitivity of the forage crop. Table 1 shows the rotational forage crop planting intervals based on the chemical properties of the herbicide, the persistence of the herbicide, environmental conditions, and forage crop sensitivity. These restricted times are established by herbicide company's test examining the reside levels of the herbicide in various forage crops.

Herbicide residues may vary in strength and be variable thought the field depending on management and environmental conditions. A bioassay is often required or recommended prior to establishing forage crops following residual herbicides. It is a test that measures the effects of residual herbicides in the soil on a forage crop in a controlled manner. There are two types of bioassay: field and controlled setting. For those herbicides in Table 1 that require a field bioassay, it is recommended to plant several strips of the desire crops across the pasture in a perpendicular way to the direction in which the herbicide was applied. It will be a great idea to space the strips to account for differences in soil conditions such as texture, pH, temperature, and drainage. If no injury is observed after germination, then the pasture will be ready for new seeding. Symptoms of some herbicide's injury might develop until 2 to 3 weeks after emergence. If an injury occurs, then it is recommended to wait at least several months and repeat the bioassay the safety of the forage crop to the existing herbicide residue. The controlled bioassay consists of collecting a small amount of treated soil from the pasture and placing it in pots. The intended forage crop in then planted in these plots and monitor for any type of injury. These containers should be placed in an environment with enough light sufficient moisture.

Finally, herbicide selection is important for crop safety, protection from yield losses from weed pressure, and in-season plant-back restrictions for residual herbicides. Before applying a herbicide, follow and understand the label before making management or consult the Forage section in the Mississippi Weeds Control Guidelines (Publication 1532), http://extension.msstate.edu/sites/default/files/publications/publications/P1532_web.pdf. Label information allows making decisions about forage crop sequence related to which herbicides to use or

avoid depending on the rotations and understanding rate and timing of applications. No following planting restrictions or operating off label (using not labeled herbicides or operating outside the recommended rates) means that the manufacturer of the herbicide will assume no responsibility for any herbicide damage to the planted forage crop. On the other hand, if these restrictions are not followed and residues are detected in the grazing livestock or the people that will consume the meet, the forage or livestock producer could be held legally responsible. **READ THE LABEL!**

Table 1. Replanting restrictions for different forage crops following herbicide applications. Adapted from 2020 Mississippi Weed Control Guidelines (Publication 1532)².

Product	Legumes		Pasture Grasses			
	<i>Alfalfa</i>	<i>Clover</i>	<i>Bahia</i>	<i>Bermuda</i>	<i>Fescue</i>	<i>Ryegrass</i>
2,4-D + Dicamba + Metsulfuron at 0.25 oz/A plus 1 pt/A	4 m	4 m	-	4 m	4 m	4 m
2,4-D+Picloram	1 y	1 y	3 w	3 w	3 w	3 w
2,4-D+Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Chaparral	bioassay	bioassay	ns	ns	fall	ns
Cimarron Plus at 0.25 oz/A	4 m	4 m	--	4 m	4 m	4 m
Dicamba (per pint applied per acre)	120 d	120 d	30 d	30 d	30 d	30 d
Diuron	2 y	2 y	2 y	2 y	2 y	2 y
Glyphosate	1 w	1 w	1 w	1 w	1 w	1 w
Grazon Next	bioassay	bioassay	--	--	--	--
Imazapyr	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Lineage Clearstand	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Metsulfuron	bioassay	bioassay	ns	ns	fall	fall
Milestone	bioassay	bioassay	-	-	-	-
Maverick/Outrider	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Overdrive	30 d	30 d	30 d	30 d	30 d	30 d
Paraquat	0 d	0 d	0 d	0 d	0 d	0 d
Pastora	12 m	12 m	-	4 m	-	4 m
Pasturegard	1 m	1 m	3 w	3 w ²	3 w	3 w
Pursuit	4 m	4 m	40 m	40 m	40 m	4 m
Redeem R&P	bioassay	bioassay	14 d	14 d	14 d	14 d
Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Surmount	bioassay	bioassay	12 m	12 m	12 m	12 m
Telar	bioassay	bioassay	bioassay	bioassay	bioassay	bioassay
Velpar	2 y	2 y	2 y	2 y	2 y	2 y

¹D, m, w, and y following numbers in this table indicate days, months, weeks, and years, respectively.

²http://extension.msstate.edu/sites/default/files/publications/publications/P1532_web.pdf.