Several species of sandbur infest the Southern Great Plains of the United States, including field sandbur (*Cenchrus spindex* Cav.), longspine sandbur (*Cenchrus longispinis* Hackel Fern.) and southern sandbur (*Cenchrus echinatus* L.). While they are different species, they all share the common trait of being undesirable in pastures and hay fields, and control measures are the same for each species. For the remainder of this paper, they will be lumped together and referred to collectively as sandbur.

**Identification and Life Cycle**
Sandbur generally behave as summer annual grasses, although they will sometimes act as weak perennials. They can grow as tall as 2 feet. Leaf blades are smooth, twisted and 2 to 5 inches long. Ligules have a fringe of hairs.

Flowers are a raceme of burs, the spikelets are two-flowered with one to three spikelets per bur. Plants reproduce from seeds, which are contained in a bur. The bur is covered with stiff, sharp spines and is painful when contacted. Burs generally overwinter on or near the soil surface. Seed can remain dormant in the soil for many years. They can emerge throughout the spring and summer, and a flush of sandbur can often occur after a rain in late summer. This complicates control techniques since a new crop of sandbur can emerge after control measures have been applied.

**Cultural Suppression Methods**
Some success in sandbur suppression can be achieved through cultural practices. Burning can sometimes reduce sandbur numbers, but is heavily dependent on the timing and intensity of the burn. In bermudagrass fields, it is often difficult to stockpile enough fuel for a burn that is intense enough to kill sandbur seeds. However, the burn may stimulate more seed to germinate due to reduced crop cover. This can allow the producer to kill more of the potential sandbur with control measures since more seed will emerge at one time. Dormant season tillage can sometimes cause the same effect of increasing germination of sandbur, enabling more to be killed at one time.

Improving the density and height of the bermudagrass through aggressive fertilization can reduce sandbur numbers by crop competition. However, fertilization, disking or burning should be thought of only as suppression methods and not as true control.

Some sandbur suppression can be achieved by not overgrazing and leaving 3 to 6 inches of bermudagrass stubble. Anything that minimizes bare soil and open areas in the grass will help suppress sandbur.

**Herbicides Available**
There are currently four herbicides labeled for sandbur control in bermudagrass pastures and/or hay fields. One is applied pre-emerge and the other three are post-emerge products. Two of these products have supplemental labels that are subject to change with little or no notice. Always consult the label when using herbicides to make sure your crop and intended use are on the label.
It is illegal to use herbicides in a manner inconsistent with the label. The pre-emerge product that is currently labeled is Prowl H₂O™ (38.7% pendimethalin). This product is available for established bermudagrass hay fields under a supplemental label. It can only be used on dormant established bermudagrass pastures and hay fields, not on any other forage species, not on newly planted bermudagrass and not after green-up of established bermudagrass. It is labeled at rates of 1.1 to 4.2 quarts per acre. A timely rainfall or sprinkler irrigation within two weeks after application is essential to incorporate the herbicide. It will not kill weeds that germinate before incorporation. Prowl H₂O™ can be split-applied as long as the second application is made before bermudagrass greens up and the rate for both applications does not exceed 4.2 quarts per acre. There is a 45-day grazing restriction and 60-day haying restriction after application. The label states that the treated area must be fenced separately to ensure that livestock do not have access to the area for the restricted time.

There are three post-emerge herbicides available. Be sure to check to see if they are still labeled for sandbur control in bermudagrass pastures and/or hay fields before using.

**Roundup WeatherMax™ (48.8% glyphosate)**
This product is available for established bermudagrass hay fields under a supplemental label. Roundup WeatherMax™ is labeled for sandbur control in bermudagrass at a rate of 11 ounces per acre, but only immediately after the first hay cutting. To clarify, only one application of Roundup WeatherMax™ per year is allowed, and for sandbur it must be after the first hay cutting. It is important to treat as soon as possible after cutting hay to avoid excessive crop injury. Animals must be removed before application, and there is a 28-day haying and grazing restriction when using Roundup WeatherMax™ immediately after the first hay cutting.

**Pastora™ (56.2% nicosulfuron plus 15.0% met-sulfuron methyl)**
This product has a full label for bermudagrass. No other forage species is listed on the label. Pastora™ is a combination of the active ingredients in two products with the trade names Cimarron™ (or Ally™) and Accent™. It is applied to small, actively growing sandbur at a rate of 1.0 to 1.5 ounces per acre. It has little soil activity and must be applied to sandbur leaves to be effective. A good way to use this product is to cut the bermudagrass for hay in mid-May and spray the field about three days after baling. Pastora™ will also control some grasses such as foxtails and seedling johnsongrass. It will control some broadleaf weeds, but the addition of a general broadleaf weed control product such as 2, 4-D, GrazonNext™, Grazon P+D™ or Range Star™ will greatly enhance the control of broadleaf weeds.

**Panoramic™, Plateau™ or Impose™ (23.3% imazapic)**
This product has a full label for general pasture and rangeland. It can be used on a variety of forage species. It is applied at a rate of 4 to 12 ounces per acre. It has both foliar and soil activity. It controls sandbur and many other weeds, including johnsongrass and foxtails. The label states that bermudagrass growth may be suppressed for 30 to 45 days after application and that some varieties of bermudagrass are injured more than others. The label states to not use these herbicides on drought-stressed bermudagrass, during the transition period from dormancy to green-up,
within 30 days of aeration, on newly established bermudagrass or on the variety World Feeder bermudagrass.

Research Results – Herbicide Efficacy

A test was conducted on the Noble Foundation Red River Demonstration and Research Farm near Burneyville, Okla., in 2010. Nine treatments were replicated four times. Treatments were: 1) untreated check; 2) Pastora™ at 1 ounce per acre; 3) Pastora™ at 1.5 ounces per acre; 4) Roundup WeatherMax™ at 6.5 ounces per acre; 5) Roundup WeatherMax™ at 11 ounces per acre; 6) Panoramic™ at 6 ounces per acre; 7) Panoramic™ at 12 ounces per acre; 8) Prowl H₂O™ at 2.1 quarts per acre; and 9) Prowl H₂O™ at 3.2 quarts per acre. Prowl H₂O™ was applied pre-emerge on April 1, 2010. All post-emerge treatments were applied on June 14, 2010, three days after the first hay cutting.

All treatments controlled sandbur compared to the untreated check (Figure 1). All the post-emergence herbicides had control ratings of >97%. The Prowl H₂O™ pre-emerge treatments had control ratings of 62% to 70%. These control ratings are consistent with those found in other studies. If sandbur are treated according to label instructions (correct growth stage of weed, correct rate of herbicide, well calibrated equipment, etc.), all labeled herbicides should do a fair to excellent job of controlling sandbur.

Bermudagrass Injury

A companion study was conducted on the same farm in a different location in the summer of 2010 to look at crop injury resulting from the post-emerge treatments (Roundup WeatherMax™, Panoramic™ and Pastora™). The applications were made three days after the first bermudagrass hay cutting. Visual crop injury symptoms were rated at 14 and 36 days after treatment, and then the forage was harvested to determine yield loss resulting from the treatments 36 days after treatment. (Figure 2.)

**Roundup WeatherMax™**

Roundup WeatherMax™, at rates of 6.5 and 11 ounces per acre, caused visual injury symptoms when rated 14 days after treatment that resulted in ratings of 19% and 35% injury, respectively. The visual injury symptoms had almost disappeared when rated 36 days after treatment, and visual injury ratings were <10%. When harvested for yield, there was no difference between the untreated check and the 1.0 ounce per acre Pastora™ treatment. The 1.5 ounces per acre treatment of Pastora™ reduced yields by about 20% compared to the untreated check.

**Panoramic™**

Panoramic™ was applied at rates of 6 and 12 ounces per acre. Visual injury symptoms were very severe for both rates at the 14 days after treatment.
rating with injury levels of 75% and 80%, respectively. At the 36 days after treatment rating, injury levels were 50% and 75%, respectively, for the 6 ounces and 12 ounces per acre treatments. Yields were correspondingly suppressed. The 6 ounces of Panoramic™ per acre treatment reduced yields by 40%, and the 12 ounces Panoramic™ per acre treatment reduced yields by 78%, compared to the untreated check.

**Summary**
All labeled products tested controlled sandbur. Roundup WeatherMax™ and Pastora™ both caused visual injury symptoms to bermudagrass early, but the symptoms largely disappeared 36 days after treatment, and there was no yield loss due to herbicide injury from these products when harvested 36 days after treatment.

Panoramic™ caused severe visual injury symptoms to bermudagrass early, and the injury persisted past the 36 days after treatment time frame. Severe yield losses resulted from the use of Panoramic™.

**Literature Cited**