SEEDS OF DIVERSITY

Iowa DNR Prairie Resource Unit **March 2008**

Variability Affecting Harvest in a Native Grass Field

How much seed can you harvest from a native grass field? I am asked that question often. The answer is not a simple one because there are many variables affecting the yield from year to year. Burning, fertilizer (Ni), age of the field and weather are factors that affect the yield on any given year. Most of these factors are related to adaptations plants have made through their life in the prairie ecosystem.

On the following page, seed production is documented from individual fields of Side oats, Little bluestem, and Indian grass. The fields were planted in 2001 and enlarged in 2003. 2001 field size is about seven acres per species and about sixteen acres in 2003. The fields were burned in 2003, 2005, and 2006. Nitrogen was applied in 2005 to the original seven acre production field. Weather affected harvest of 2006 Indian grass; a heavy wind blew down the Indian grass and made it difficult to harvest. This left much of the Indian grass seed unharvested.

IN THIS ISSUE:

The non-burn year of 2004 is easily depicted in the graph. Burning is a straightforward way to increase harvest. Burning blackens the area speeding the warming of the soil for the warm season grasses. Litter removal gives newly emerging plants unfiltered access to the sun, speeding the development of the grass.

Nitrogen also increases seed production. Warm season grasses act very similar to corn when nitrogen is applied. The correct amount will greatly increase harvest, but if too much nitrogen is applied, plants can get so large that they become lodged and lay on the ground from a strong wind. Nitrogen needs to be applied when plants are actively growing and before seed production begins, but late enough that weeds will not be encouraged.

Field age is also a factor for productivity. These fields do not show loss of productivity yet because they are relatively young. Seed production in a field goes up for the first four to five years, levels off for two to three years, and then shows a decline in production. This is caused by competition among the plants. New plants emerge annually and eventually these new plants compete for the limited resources. Seed production is impacted as the plants begin to compete. Weather such as drought can magnify loss of productivity due to competition. Disturbance such as disking can set back the competition by removing some of the plants. This can also introduce weed competition back into the field. The early years (four to six) are when fields are the most productive seed producers. In a prairie or prairie reconstruction this is also the case. When there are large gaps between the plants, seed production is high. High seed production fills in the gaps of the prairie. When a prairie reconstruction is well established after seven to eight years most of the gaps are gone. Competition for resources begins and a decline in seed production occurs. Disturbances constantly occur in a prairie, such as a badger excavating a hole. Nature's disk cues plants surrounding the area to produce more seed and fill in the newly created hole in the prairie sod.

Native grass seed production varies due to weather, fire, age of the field and fertilizer (Ni). These key factors of seed production are linked plant adaptations to life in the prairie.

The Short-Eared Owl

By Henry Narigon

For the many prairie species that remain, the biggest obstacle facing them today is lack of suitable habitat. Most of the original prairie species declined sharply with European settlers' arrival to Iowa in the 1830s. One unique species that has dealt with these changes is the Short-eared Owl (short-ears).

This owl species is one of two native grassland owls; the other is the Burrowing owl. With native prairie decline and the influx of farms and their associated trees, Short-ears are now antagonized by more common species of owls, such as the Great Horned Owl. Short-eared owls tend to inhabit prairies, marshes, and sloughs, usually flying low to the ground. These owls are somewhat diurnal, hunting in late afternoon and early evening, as well as night, and are identifiable by their twilight feeding periods and moth-like flight patterns. They also sport very large heads for their size, as well as dark wing patches underneath, near the bend of the wing. Both males and females grow to a length of 13 – 17 inches. Females have a slightly larger wingspan measuring around 42 inches, while males are slightly smaller - around 41 inches from wing tip to wing tip. Plumage is mottled brown on back, chest and belly. Back and wings are barred with black as well. Facial features include large yellow eyes circled with black, then surrounded by whitish facial discs around each eye. The beak is black, ear tufts are usually not visible, and males tend to have slightly lighter plumage.

The short-ear primarily preys upon small rodents, especially meadow voles, as well as the occasional bird, bat, or insect. Thus, the local vole population greatly affects the distribution of these predators. For example, if a habitat has a high concentration of prey items such as voles, these owls will concentrate in the same area. During winter, if dense snow-cover is present, short-ears will occasionally roost together. Short-eared owls are unusual in that they carry prey in their talons instead of their beaks, as most other owls do.

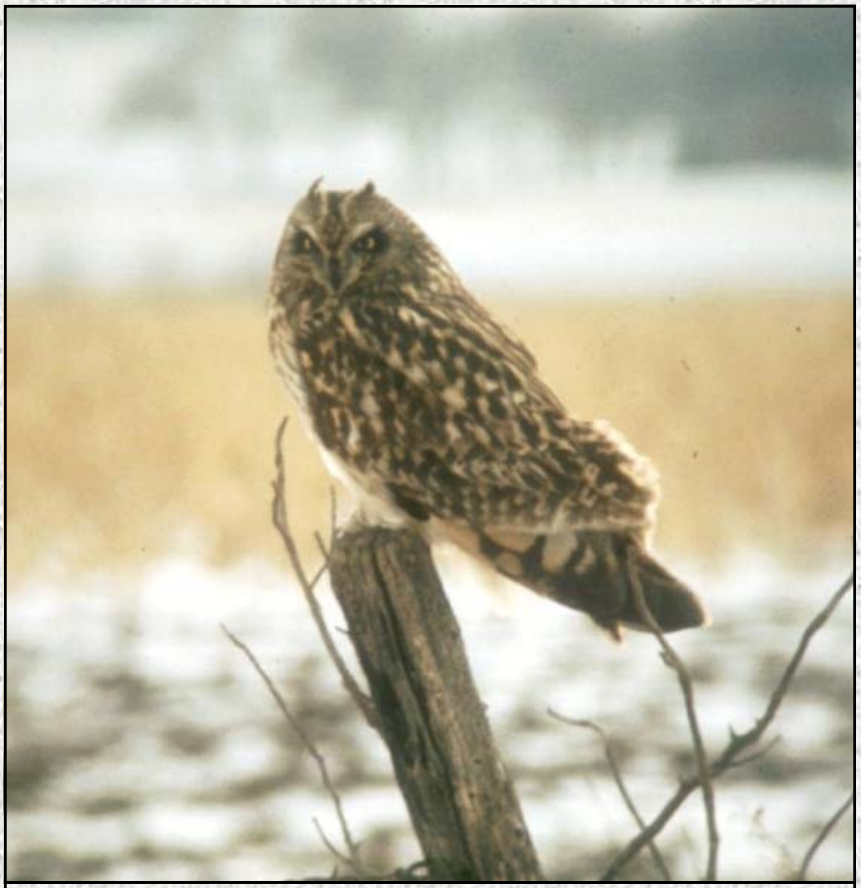

Photo by Fred Kent

Mating pairs meet after the male's aerial courtship display. This flight is summarized by an ascent followed by tight circles and some hovering, while singing a series of repeated *hoo* notes, and sometimes followed by a descending glide which may include several wing claps. Then, the process is repeated. Several other display flights have been documented along with some ground displays. At times the female may join the male in flight, and copulation follows directly afterward on the ground. Nests are built on the ground in dense grass on a dry substrate, such as a small crest or knoll, and usually are constructed of grasses and feathers. Females exclusively brood the eggs while the male forages. Clutch size is generally between five and eight eggs (although 11 has been reported). The eggs hatch an average of 21 days later and

have an average of 75% hatch success rate.

Globally, Short-eared is one of the most widespread owl species, ranging from the Arctic Circle to South America, and also parts of Europe. In winter (non-breeding time), they range from southern Minnesota to southern Mexico. Their breeding range (summer) extends from the Arctic down to northern Missouri, then from British Columbia across to Oregon. About 20 years ago, short-ears were most commonly seen in northern Iowa, especially in the boggy areas of northwest Iowa. Today, potential nesting birds are showing up at large grassland reconstruction sites, especially in such areas as Neal Smith National Wildlife Refuge (Jasper Co.), Chichaqua Wildlife Area (Polk Co.), and Kellerton Bird Conservation Area (Ringgold Co.).

Historically, a common species in the Midwest, this species has seen great decline in Iowa in recent decades. Because it needs large areas of unbroken grassland, these owls have been pushed out by the increase of wooded areas and loss of marshes and prairies. Because of this bird's smaller size, larger owl species, such as the Barred Owl and Great Horned Owl will eat short-ears if they can find them. Both of these larger owl species are common in woody stretches of land. Loss of primary hunting grounds is the main reason for the short-ears' decrease. In Iowa, meadow voles, the owl's primary food source, prefer riparian scrublands and native tall-grass prairies, especially bluestem based communities. Meadow voles are also very damaging to all kinds of crops at all stages of growth, so a healthy owl population is recommended to keep these pests in check.

Overall, Short-eared Owls have survived the devastating effects of early American settlers but are in no way close to historic populations. Effects of habitat fragmentation have given them no secure area to inhabit. The abundance of wooded stretches has given habitat to other, larger owls which feed upon short-ears. The Short-eared Owl is an Endangered species in Iowa, and it is one of our rarest nesting raptors. It is also endangered or threatened in many other Midwest states. This species is an integral part of the Iowa native tall grass prairie ecosystem and should therefore be considered in prairie management plans. Many of the grassland management practices which aid waterfowl can also help this bird. Hopefully, we can continue to count this bird as a regular in our few remaining prairie communities.

Photo by: Aust Warth

Species Spotlight: Blue-eyed grass

By Jacob Hart

Photo by MJ Hatfield

Blue-eyed grass *(Sisyrinchium campestre)* is part of the iris family and is common to Iowa's prairies. Blue-eyed grass prefers dry upland prairies and sandy soils. It's a species found throughout Iowa and the tall grass prairie region. This perennial is usually less than a foot tall, with leafless stems only about an eighth of an inch in diameter. It has smooth grass like leaves, similar in width to its stem but shorter. Several flowers can be found at the top of its stem between two leaf-like bracts. Each delicate flower has its own stalk and is only about a half an inch wide. The flower looks like it has six petals but really has three sepals and three petals that all look similar. Each of the petals and sepals are anywhere from white to dark blue turning yellow at the center and have a sharp tip at each end. Blue-eyed grass can be seen flowering from May through June. The fruit is pea sized, light brown in color, and is split into three segments. Inside it is filled with tiny round black seeds. Blue-eyed grass fruits are difficult to find in a prairie. We often flag or mark blooming plants in order to harvest seed in June or early July. Blue-eyed grass can be grown from seed or from bulb division. It establishes well and is usually seen in patches. Because of its small size and grass-like leaves, it may be hard to spot, especially when not in bloom, but when you do spot this species in bloom, it's a real treat.

Photo by MJ Hatfield

Photo by MJ Hatfield

Seed Storage Tips

I planned on seeding it this year, BUT!!! How should I store seed if my plans change when planting time comes along? This scenario happens to everyone from time to time. Weather, vacations, and tenants can all make your prairie reconstruction plan come to a screeching halt.

Ideally, seed should go in the ground as soon as possible, but here are some storage tips to help keep the viability of your seed intact. **One hundred** is the magic number; the combination of temperature plus humidity should not be over one hundred for **ideal** seed storage. The uninsulated pole building is not the best place for the seed in the summer! The office maybe a more controlled environment if it is air conditioned. Just put the forb seed in the freezer? No. Many of today's freezers are frost free and will kill the embryos of the seeds. The refrigerator may be a better place. If some seed can be stored, what seed is more critical to store correctly? Forbs tend to degrade faster in warm, humid conditions than native grass seed; they are more critical to keep in a cool, dry place. Also, forb seed has a much higher dollar value per pound than native grass seed. Storing seed properly in a cool dry environment can **improve** germination of native species. Dormancy is in most native seed from Big bluestem (*Andropogon gerardii*) to Golden Alexander (*Zizia aurea)*. Sometimes freshly harvested seed has reduced germination of seed because of dormancy in the seed. Store the seed in a refrigerated environment and the germination improves. This is the species adaptation to the change of seasons. If a Big bluestem seed drops and germinates in October, then a period of cold weather hits a few days later (like Iowa weather), the seedling dies, and the seed is wasted. If it has to go through a cold period before germination (winter) and then germinate (spring), it is much more likely to survive.

Rodent damage control is another key to keeping the viability of seed intact. How do I keep the mice out of the seed? No building is mouse proof so this is another key to keeping seed viability. Suggestions? Set a trap line and check it throughout the season. This is very labor intensive and may not work for everyone. Another solution we have found placing seed on a pallet with poison underneath the bags reduces the rodent damage. Rodent poison has negatives associated with it, also. A smelly, dead mouse in stagnant August air is never a pleasant experience. And non-target animals eating poison is also a concern. A mouse proof storage area is another possible solution. ¼ inch hardware cloth wrapping the exterior of 2 by 4 walls may be a solution if you will be storing seed on a regular basis. No method is fool proof, but wasted time planting non-viable seed can be a more frustrating experience.

When the perfect storm hits your prairie reconstruction plans, remember to properly store seed to insure seed viability. This is one key to a successful reconstruction.