



## MANAGING FORAGE AND GRAZING LANDS

### Pasture Seed Banks



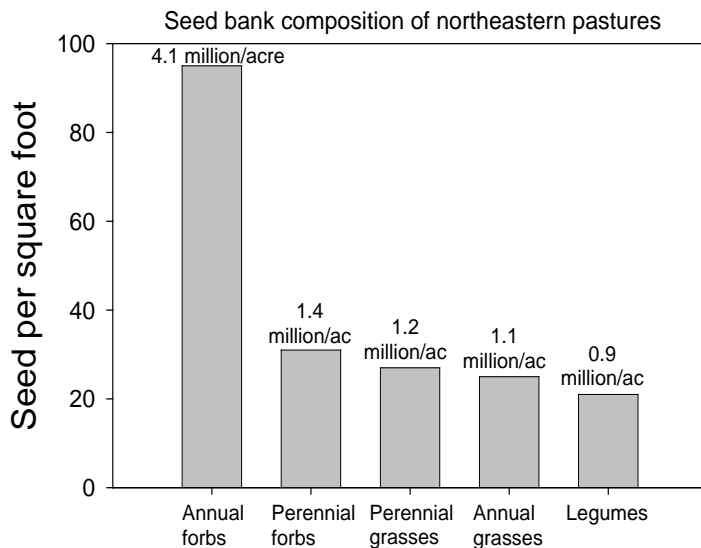
#### What is a Seed Bank?

It is a reserve of dormant seeds in the soil that enables some types of plants to re-establish themselves after a drastic disturbance of the established vegetation. In some ways it forms a “memory” for the pasture, a record of its vegetation history.

#### What Types of Plants Occur in Seed Banks of Northeastern Pastures?

In our surveys of northeastern pastures, we found the equivalent of more than 8 million seeds per acre in the surface soil (the top four inches) from the seed bank study. These seeds came from 58 species of plants.

The annual forbs (all broadleaf plants with the exception of legumes and trees) dominated the seed bank with more than 4 million seeds per acre in the top four inches of soil. This class of plants included mainly weeds such as yellow rocket, lambsquarter, mustard, and shepherd’s purse. Dandelion and broadleaf plantain contributed most of the 1.2 million seeds per acre of perennial forbs in the seed bank. Green and yellow foxtail along with annual bluegrass and barnyard grass dominated the 1 million seeds per acre we found of the annual grasses. Kentucky bluegrass was the most abundant perennial grass seed found in pasture soils, equivalent to about 1 lb of seed per acre. White clover contributed to about 1 to 2 lbs of seed per acre in the legume component of the seed bank. Thus, in the northeastern U.S., bluegrass and white clover will supply most of the forages in the seed bank that may contribute to maintaining a pasture stand.



Even though most of the seeds in the soil seed bank were annual forbs, the plants growing above ground were nearly all bluegrass and white clover. There was only a 44% correspondence between the plant species found in seeds below ground and the plants found growing aboveground. Thus, you cannot exactly know what is in the soil seed bank by looking at what is growing in the pasture.



**-Weedy plants dominate the seed banks of pastures**

**-Bluegrass and white clover are the most common forage species in pasture seed banks of the northeastern U.S.**

## The plant species found in pasture seed banks fall into four main categories

The first type of seed bank is a short-term (usually lasting less than one year) seed bank formed from plants that shed seed in the summer, germinate in the fall, and grow mainly in the early spring of the following year. These plants fill in gaps, holes, or bad spots in pastures that predictably occur in fall, winter, and early spring.

The second type of seed bank is also short-term but the plants that contribute to this seed bank shed their seed in the fall, germinate the following spring, and make most of their growth in late spring and summer. These are the summer-annual plants such as common ragweed, the foxtails, and crabgrass. These plants fill in pasture gaps that predictably occur in late spring and autumn.

The third and fourth types of seed banks are both long-term seed banks that differ in how much of each seed germinates right away and how much remains dormant. For example, the bluegrasses and bentgrasses produce a lot of seeds, most of which germinate quickly and the small remainder stay dormant and persist in the soil. On the other hand, hard-seeded legumes such as white clover do not germinate right away. Instead their hard seed coat and seed dormancy ensure that the bulk of seeds persist for a long time in the soil.

## How can a Farmer Draw Upon the Seed Bank for Pasture Management?

There are three main items to focus on. First, a supply of seeds must be present from desirable plant species. Remember, in our survey, the most abundant supply of forage seeds came from Kentucky bluegrass and white clover (about 1 to 2 lb per acre of each). Thus, forage in pastures developing mainly from the soil seed bank will be mostly bluegrass and white clover. Second, seeds from undesirable species (weeds) must be absent or few. Unfortunately, these types of plants dominated that pasture seed bank in our surveys. This means that producers must emphasize the third item, maintain suitable conditions for the germination, establishment, and maintenance of the desired forage species. In other words, producers need to do the right things to foster the desirable species including maintaining optimal soil pH (6.0 to 7.0) and fertility levels (especially phosphorus for legumes) along with appropriate grazing and clipping management to control weed growth and encourage forage growth.

The large number of weedy seeds in the pasture seed bank means that any gaps or bare spots in the sod will likely be filled by a weed from the seed bank. If not controlled, these weeds can contribute more seeds to the seed bank in a vicious cycle of weed invasion. Thus, maintaining a dense, vigorous pasture is critical.

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