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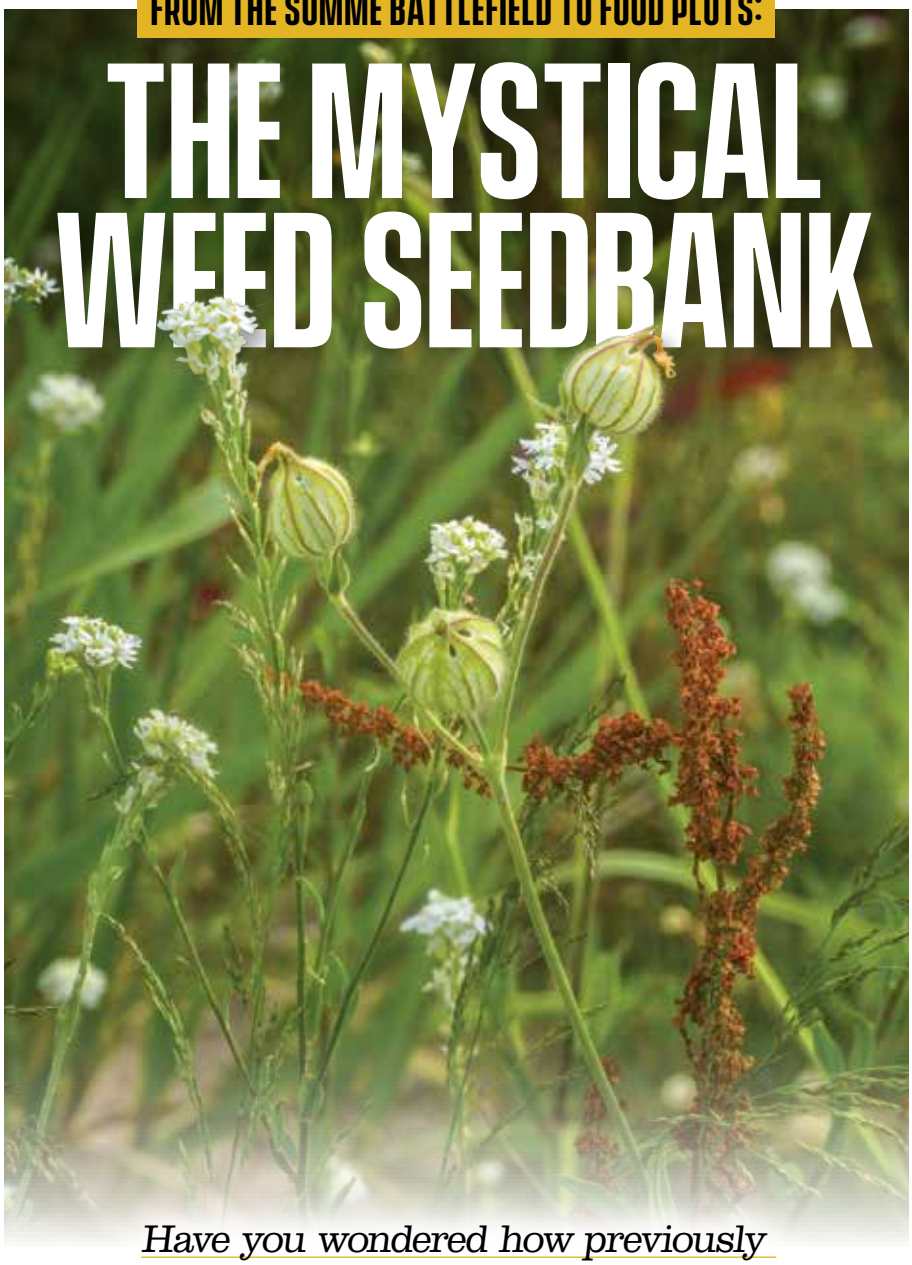
FROM THE SOMME BATTLEFIELD TO FOOD PLOTS:

THE MYSTICAL WEED SEEDBANK



Have you wondered how previously unseen weeds sometimes pop up in your plots? The answers lie beneath the soil, but weed seeds are very difficult to see and comprehend.

It's predictable with almost 100 percent accuracy that by midsummer, customers begin contacting me through our main office about weeds infesting their food plots, and they had never seen those weeds until they planted our food plot seed.

The discussion then pivots to how those weed seeds got into their food plot, especially because those weeds had not been seen previously. My response, which is not rote, is that the weeds came from dormant weed seed already in the soil. Weed seed in the soil (called the weed seedbank) is a seemingly mystical concept. Even with 40 years of experience in weed science and agronomy, I have a difficult time wrapping my head around weed seed in the soil. Part of the reason for the abstract nature of the weed seedbank is the small size of weed seed and the formless mass of dirt in which weed seeds are dispersed. Simply, weed seeds in the soil are very difficult to see and thus comprehend. The number of weed seeds per cubic foot of soil could number in the tens of thousands. Convert that value to number of weed seeds per acre and the result is a figure that's best expressed as 10 with an exponent.

AMAZING EXAMPLES

For me and my limitations with understanding abstract events, I find it useful to correlate with real-life observations. My family has a small cabin on Lake Martin in the piedmont region of central Alabama. This reservoir was completed in 1926 to generate electricity and help control flooding. As a result of the latter use, the lake elevation is intentionally lowered in autumn by 8 feet to create storage capacity for winter rain. In 1986, there was severe drought in the region, and the lake never reached full pool during summer. Near our cabin, a small stream flows into the lake, with a delta of sediment deposited in a broad plain — an artifact from when the erodible landscape was in subsistence crop production more than a century ago. That summer, the sediment dried. The result was about 5 acres of cocklebur and smallflower morningglory — common weeds of crop production. That small stream currently drains a watershed that is now totally woodland. Weed seeds in the sediment remained dormant since the delta was normally underwater during summer. The dry summer of 1986 created conditions that were conducive for weed seed germination — in that case, adequate oxygen and sunlight. Weeds appeared where they were not expected.

Another example of weeds sudden-

ly appearing was documented during World War I on the Somme Battlefield in France. Like many battles in World War I, combat was largely in a restricted area for an extended period. What had once been serene pastures and small woodlots was transformed into a wasteland of trenches and artillery impact craters. War had destroyed the topography of the countryside. The next summer, after hostilities moved elsewhere, the battlefield was transformed into a sea of red poppies in full bloom, broken only by the humbling array of white crosses that marked the location of soldiers hurriedly buried where they fell in combat. The Somme Battlefield was the location of a detailed plant ecology study that catalogued the suddenly changed flora and factors that influenced plant diversity. Repeated artillery barrages pulverized the soil and basically plowed the entire area. Soil disturbance caused by combat exposed dormant red poppy seeds to oxygen, sunlight and water. What was once pasture and woodland was destroyed by war but later transformed to a sea of red poppies.

■ Weed seeds come in all shapes and sizes, and it might amaze you how many are in the soil.

PERTINENT FACTORS

Understanding the phenomenon of weed seed in the soil will help anticipate the problem and minimize food plot losses. Several underlying factors affect the weed seedbank, including previous land use, weed seed production, seed dormancy and tillage systems.

Previous land-use patterns: There are few stands of true virgin timber in the eastern United States, and much of our current timber land has been harvested for timber or previously cultivated as farmland, later reverting back to forest. These disruptions will directly influence rapid changes in plant species diversity. If cleared timber land becomes reforested, during the long transition, weeds become scarce and eventually disappear as the new forest matures. Similar processes occur in cultivated sites after crop production ceases. This is what plant ecologists call old-field succession, but starting at different points in the process. Throughout old field succession, the weeds produce large amounts of seed that are stored in the soil.

Numbers of weed seed: Have you ever wondered how many seeds a weed can produce? Weed seed production is influenced by species, weed density and growing conditions. Consider an occasional escaped pigweed in a food plot. Perhaps it's an eyesore but not necessarily enough to affect forage growth on a large scale. However, multiplying the number of escaped pigweeds by 200,000 seeds per pigweed plant produces an enormous number. This does not consider the unknown number of pigweed seeds already in the soil. Using this example, would it not be prudent to pull or mow the escaped pigweed plants before they produce seed?

Weed seed dormancy: Dormancy is controlled by a genetic code unique to each plant species and environmental conditions. During dormancy, weed seeds are in a protected state that might last for many years. A useful strategy to break weed seed dormancy and then reduce weed seedbank numbers in fallow sites is to stimulate large-scale weed seed germination by harrowing the food plot and then controlling the emerged weeds by another harrowing, a nonselective herbicide such as glyphosate, or both. The sequence of tillage to stimulate weed emergence followed by control and then repeating that several times will partially deplete numbers of viable weed seeds in the soil. The longer this sequence is repeated, the better the results. Yes, this is costly and intensive. However, this sequence reduces numbers of viable weed seeds in the soil to a manageable level.

Tillage system: Some contend that tillage brings weed seeds from deep in the soil profile back to the soil surface where germination occurs. That's partially correct, but it's not the complete story. Research has shown that when fields are tilled, 80 percent of the weed seeds near the soil surface are buried, with later tillage bringing only 38 percent of those seeds back to the soil surface. In other words, tillage buries far more weed seeds than it brings back to the soil surface — a significant net reduction. In contrast, sustained minimum-till production systems cause an accumulation of weed seeds near the soil surface, where they can readily germinate when conditions are right. This phenomenon is currently occurring nationwide in minimum tillage systems, with widespread infestations of herbicide-resistant pigweeds (which produce thousands of tiny seeds).

CONCLUSION

It's prudent to assume that large numbers of weed seeds are already in food plot soils. Aggressive measures are needed to reduce the weed seedbank and prevent weed seed production in food plots. Otherwise, weeds will continue to appear in unexpected places. Of equal importance is the understanding that in a food plot, an unpleasant surprise might appear, with a new weed species suddenly appearing from dormant seed. Use that knowledge to be prepared.