

Calculating Proper Seeding Rate for Food Plot Success



By Craig Harper and Ryan Basinger

Ryan Basinger is a Certified Wildlife Biologist and serves as the Wildlife Consulting Manager and Hunting Lease Manager for Westervelt Wildlife Services. He received his B.S. in Wildlife Science from Mississippi State University and an M.S. in Wildlife Science from The University of Tennessee.

Craig Harper is a Professor of Wildlife Management at the University of Tennessee. He has conducted research on food plots for more than 20 years and recently published a new book, **“A Guide to Wildlife Food Plots and Early Successional Plants”**, available through the University of Tennessee at https://secure.touchnet.com/C21610_ustores/web/product_detail.jsp?PRODUCTID=764.

Crimson clover and wheat that shows plant population that should be expected following using the proper seeding rate and properly inoculated (or preinoculated) seed. The plants are very green and healthy. The plot was properly amended with lime and P and K as recommended from a soil test. The rate of wheat was 40 pounds PLS. The rate of clover was 20 pounds PLS. The wheat was top-sown, lightly disked in, cultipacked, clover then was top-sown and then the plot cultipacked again.

Have you ever gone to great lengths to make sure you are planting your food plots correctly, but they don't turn out as you had hoped? Perhaps too thin, choked with weeds, or failed altogether? There are many reasons why food plots may not establish or grow well. Poor seedbed preparation, improper seeding technique or seeding depth, inadequate moisture or soil nutrients, incorrect timing, lack of weed control, and excessive grazing pressure are common reasons why many food plots fail or do not perform as you had hoped. Here, we will cover an insidious reason for poor food plot performance that is often overlooked.

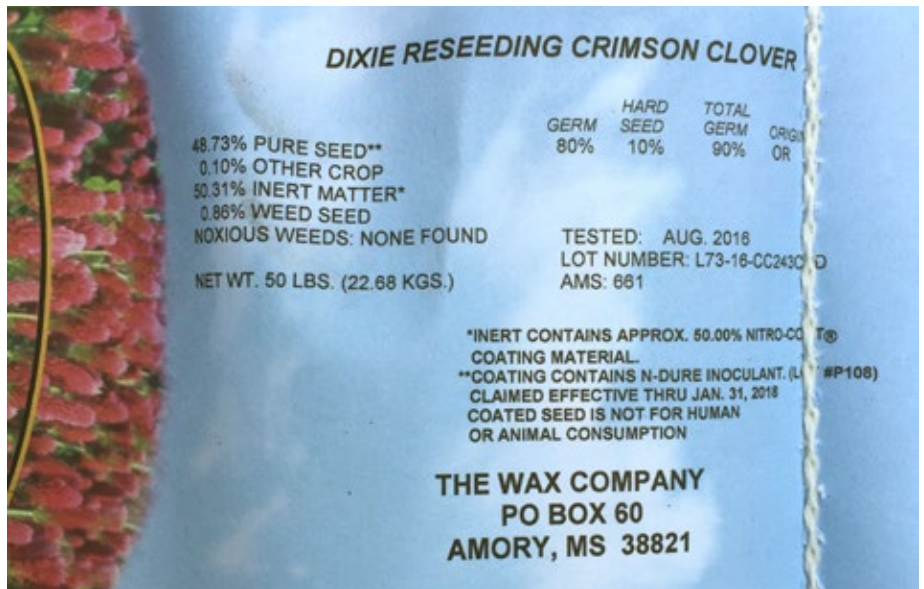
Let's assume you have used proper agronomic practices. You have prepared an adequate seedbed and planted properly. You planted in a relatively moist seedbed and it rained not long after you planted. Germination was good and the plot established well. You installed an exclusion cage after planting, and you know grazing pressure is

not excessive because there is not a big difference in forage height outside and inside the cage. However, you notice your forage planting is relatively thin, and you notice weeds are taking advantage of the exposed area. Why is your planting thin? In this scenario, the most likely reason is improper seeding rate.

Even though you calculated the area of the food plot before planting, and you weighed the seed and are confident you planted the recommended pounds per acre of seed, you still did not use enough seed unless you calculated what we call **Pure Live Seed (PLS)**, which is the amount of live seed in the bag that is likely to germinate. In fact, it was stated on the bag of seed you planted that the contents would cover one acre, and you planted one acre. So, your seeding rate surely was accurate, correct? Wrong.

Do not be misled by advertisements on commercial food plot mixtures that claim the bag will cover "X" acres. You must read the seed tag attached to the bottom of the bag and calculate PLS in order to know how much of the seed that is in that bag to plant per acre. By law, when selling certified seed, seed suppliers must provide information to consumers about the seed, such as the variety, where it was grown, lot number, percentage of pure seed in the bag, the germination rate of the seed, and the date it was tested. This information is provided on a seed tag, which is either attached to the bag or printed on it. If the seed does not contain a seed tag, do not buy it.

Beyond knowing seed origin, date of testing, and germination rate, important information related to seed coating is provided on the tag. Nowadays, it is common for seed to be coated prior to packaging. Legumes often come preinoculated with the proper bacteria to help ensure nodulation for nitrogen production. Other seed may be coated with various materials, such as fungicide, insecticide, or micronutrients. Preinoculated legume seed (such as clovers and alfalfa) are relatively convenient because you do not have to inocu-



SUMMIT SEED COATINGS INDIANA

Get peak performance in coated seed

Apex™

Turner Seed
 PO Box 739
 LaVergne, TN 37086

ADVANTAGE LADINO CLOVER

LOT:	L91-15-100	GERMINATION:	50%
PURE SEED:	64.00%	HARD SEED:	40%
OTHER CROP SEED:	0.15%	TOTAL:	90%
INERT MATTER:	1.75%	ORIGIN:	OR
WEED SEEDS:	0.10%	TESTED:	07/16
COATING MATERIAL:	34.00%	NET WT:	50 LBS., 22.68 KG
Noxious Weed Seeds:	None Found		

late the seed yourself. Seed are coated with a protective material (usually lime) that contains the inoculant with live bacteria. This coating is usually gray, blue, pink, or off-white in color. However, the coating material is relatively heavy and the extra weight must

be considered when calculating seeding rates for your food plots. This factor is overlooked by most people, which causes many plots to be under-seeded.

Recommended seeding rates for each crop species are established by various state and university agricultural

Extension agencies after extensive testing to determine the amount of seed necessary for a healthy, productive stand. The seeding rate is calculated in pounds per acre. However, the rate given represents PLS, which does not factor in the germination rate or the weight of



Pre-inoculated ladino clover seed. Notice the pinkish coating. The seed on the left is wheat for comparison.

coating material. This is important!

Preinoculated clover seed typically contains 34-50% coating material, depending on the producer. This means that if you purchase a 50-pound bag of preinoculated clover that contains 50% coating material, there is only 25 pounds of seed in the bag. The rest of the weight (25 pounds) is coating material.

Furthermore, if the germination rate of this bag of seed is 80%, then there is only 20 pounds (0.8 x 25 lbs.) of viable clover seed in the 50-pound bag!

As previously discussed, seed should be sown according to the percentage of PLS. Determining PLS is simple, but requires some basic math from the information contained on the seed tag. In the example used below, the seed tag is from a bag of crimson clover that was recently purchased, which is an excellent forage for deer. This seed has been preinoculated as specified by the percentage of "inert matter" or "coating material" listed on the tag, which is 50%. The recommended seeding rate (broadcast, not drilled) for crimson clover is about 25 pounds of PLS per acre if planting a pure stand.

To determine the appropriate seeding rate from the crimson clover seed above, multiply the percentage of pure seed contained in the bag (48.73%) by the germination rate of the seed (80%).

$$0.4873 \times 0.80 = 0.39$$

Next, divide the desired seeding rate for crimson clover by 0.39 (this number determined above).

25 lbs. per acre / 0.39 = 64 lbs. of crimson clover seed in that bag per acre.

Based on the crimson clover seed in this example, with an 80% germination rate and roughly 49% pure seed contained in this bag, you would need to plant about 64 pounds of the seed in this bag (or in this lot) per acre to be equivalent to the recommended seeding rate of 25 pounds per acre of crimson clover. That is more than double the stated seeding rate for crimson clover! Therefore, if you only planted 25 pounds of this seed per acre, you would

have applied less than half the seed that is needed for a successful stand.

Do not let someone tell you that you can plant the recommended rate and disregard the weight of the seed coating because the seed coating leads to increased germination rates, increased seedling survival, and thicker stands. It is possible that the coating can lead to increased seedling survival, especially if the coating contains a fungicide or insecticide and there was a problem with a fungus or insect pest on the site (more common with grains, such as corn). However, seeding rates are based on the assumption that the seedlings will live. If you do not plant enough seed to realize a sufficiently dense planting, do not expect the stand to "thicken" over time just because the seed had a coating around it! Notice in the picture on the bag that it shows the germination rate is 80%, "hard seed" is 10%, and the total germination rate is 90%. The total germination rate provided is misleading. Although some people may tell you to use the "total germination rate" stated on the seed tag to calculate PLS, we recommend against it. **Hard seed represents those seed that are dormant and are not expected to germinate until they experience freezing and thawing.** These seed will not germinate after a rain or two when you expect your seed to germinate. We do not care how much of the seed may germinate after winter, or in another year. We want to know what can be expected to germinate now so the deer and turkeys can begin using the plot! **Do not include the percentage of hard seed into your PLS calculation.**

You should calculate PLS for all of your plantings, not just clovers. In general, cool-season grains, such as winter wheat and oats, usually have an 80% germination rate, which actually is convenient because it just so happens that 80% of 50 pounds is 40 pounds, which is a perfect complement to a clover mixture. The PLS of clovers, alfalfa, and other seed, such as chicory, vary greatly. One bag may have a 90% germination

rate, whereas the next bag may have a 60% germination rate. Therefore, if you mix seed yourself to form a blend, and you do not calculate and plant according to percentage of PLS, then some of the seed mixture (such as wheat or oats) may appear relatively thick and as it should, but the clovers, for example, may be relatively sparse (because the clover had a low germination rate).

Planting methods can be very influential with regard to thin coverage of clover or other small seed. If, for example, you cover the clover seed by disking, you will cover it too deep and germination will suffer. This is another problem with some commercial blends that contain both large and small seed in the same bag. You cannot plant all of the seed at the correct depth. Relatively large seed, such as wheat, oats, or winter peas, will germinate best if they are covered ½ - 1 inch deep. Clovers should not be covered any more than ¼ inch. Therefore, if you are planting with conventional cultivation, to sow relatively large seed, cover by disking, tilling, or dragging, then cultipack to get a good firm seedbed, then sow the small seed, then cultipack again to ensure good, firm, seed-to-soil contact.

Considering the example above, it's easy to see how failing to calculate the proper seeding rate using PLS can lead to sparse coverage of planted forages and less than desirable results. Not only does it result in less forage being available in your plots for wildlife, it also provides an avenue for weeds to invade the "empty space" created from a low seeding rate. Additionally, if you rely on the reseeding capabilities of annual clovers (such as crimson and arrowleaf) to reduce annual planting costs, not planting enough seed initially will result in lower clover seed production that would be available in the seedbank to germinate the following year. Don't let this simple step limit you from realizing the fruits of your labor and achieving successful food plots to benefit your deer or turkey management program.