

Viable vs. Nonviable Seed / Bulk Seed vs. Pure Live Seed

Viable vs. Nonviable Seed

Seed testing labs classify seed either as viable or nonviable. A seed is deemed viable only if it is capable of germinating and producing normal plants under field conditions.

To determine the percentage of viable seed within a seed lot, a seed technologist conducts two tests. First, a germination test is conducted to determine the percentage of seed that develop into normal seedlings within the allotted time of the germination test. A seedling is classified as normal if it possesses all the structures necessary to develop normally. If any of the essential structures are lacking or underdeveloped, or if the seedling is obviously infested with a bacteria or fungus, the seedling is deemed nonviable. *Hence, a 'live' seed is not necessarily a viable seed.*

After the germination test, all nongerminated, nondiseased seed are subjected to a viability test to determine if any of those seed are alive. Typically, a tetrazolium (TZ) test is used to determine if any nongerminated seed are living. Seed that test positive in a postgermination TZ test are deemed viable (but keep in mind the last sentence of paragraph above) and classified as dormant; some seed labs refer to these seeds as 'hard'. Accurate TZ testing and interpretation of TZ test results requires considerable skill and experience.

NOTE 1: Some commercial seed labs conduct a TZ test as a stand-alone test to determine seed viability; this is known as a "pregermination TZ test". A seed viability value obtained in pregermination TZ test is often used to determine the percentage of dormant seed when the pregermination TZ test is run concurrently with a germination test; in such cases the postgermination TZ test is not conducted.

NOTE 2: Since native wildflower and grass seed are a very specialized commodity, the most accurate germination and viability tests are likely to be conducted by labs that specialize in testing of native species.

Bulk Seed vs. Pure Live Seed

A bag of wildflower seed is referred to as bulk seed, which is the sum of the viable wildflower seed, inert matter (all nonviable seed, and pieces of leaves, stems, and flowers) and possibly even some viable weed seed. The amount of Pure Live Seed (PLS) in a bag is a function of viability and purity, and is based on weight. *However, since the percentage of viable seed is determined under lab conditions it is unlikely that all viable seed will germinate and develop into mature plants under field conditions.*

The amount of Pure Live Seed in a bag of seed is calculated as:

$$\text{PLS (lb)} = \frac{\text{Total weight of seed in bag (lb)} \times \% \text{purity} \times \% \text{viable seed}}{10,000}$$

where the % viable seed = % germination + % dormant seed (often called hard seed), and 10,000 is a constant used so that the PLS value is expressed in pounds.

For example, in a 50 lb bag of wildflower seed that is 90% pure wildflower seed and the viability of that seed is 90%, there are 40.5 lb PLS in the bag:

$$\text{PLS (lb)} = \frac{50 \times 90 \times 90}{10,000} = \frac{405,000}{10,000} = 40.5$$

The bulk seed weight in the bag, % purity, % germination, and % dormant (or hard) seed should always be on the seed label per Florida seed law specifications. The total % viable seed might also be listed on the label; if listed, simply use the total % viable seed in the equation above.

*Suggested Pure Live Seeding Rates*¹

	PLS Seeding Rate	
	lb/acre	oz/1000 ft ²
<i>Coreopsis lanceolata</i> ²	5.5 to 7	2 to 2.6
<i>Coreopsis leavenworthii</i>	3	1.1
<i>Gaillardia pulchella</i>	3 to 5	1.1 to 1.8

Example: For a ½ acre site, how many pounds of bulk seed of *Gaillardia pulchella* need to be sown to achieve a seeding rate of 4 lb PLS per acre given that the 50 lb bag contains *Gaillardia pulchella* seed that is 98% pure, germination is 75%, and 10% of the seed is dormant?

First – calculate how much PLS needs to be sown

½ acre x 4 lb PLS per acre, means that 2 lb PLS needs to be sown

Second – calculate how much PLS is in the bag of seed

$$\text{PLS (lb)} = \frac{50 \times 98 \times (75+10)}{10,000} = 41.65 \text{ lb PLS}$$

Third – calculate how much bulk seed (that is, seed in the bag) needs to be sown

$$2 \text{ lb PLS} \times \frac{50 \text{ lb bulk seed}}{41.65 \text{ lb PLS}} = 2.4 \text{ lb bulk seed needs to be sown for } \frac{1}{2} \text{ acre}$$

¹ Florida ecotypes; based on research conducted in north Florida by the University of Florida/IFAS.

² Seed of the typical garden variety, which is often sold by large national companies, is much larger than seed of the Florida ecotype so PLS rates should be increased 1½ to 2 times.