



Lady Bird Johnson

Wildflowercenter

Bluebonnet (*Lupinus texensis*)

by Wildflower Center Staff

With a little patience, Central Texas gardeners can create a patch of Bluebonnets in their own yards. Members of the legume family (*Leguminosae*), considered winter annuals, five species of *Lupinus* grow in Texas, and all have been designated as the state flower. The most common species is *Lupinus texensis*, the Texas Bluebonnet, which starts flowering in mid-March. The peak blooming period is usually in mid-April, although the exact date is impossible to predict due to many environmental factors. Other prominent species include *L. subcarnosus*, a species that grows in the sandy soils of South and East Texas, and *L. havardii*, a tall species found in West Texas, especially prominent in Big Bend National Park.



Joseph A. Marcus

Although species of this beautiful wildflower are found each spring across Texas, and can be very abundant along Texas roadsides, it may take several years to establish a good stand of Bluebonnets in your yard. Be patient! Once they are established, your Bluebonnets will reseed and reappear each spring.

Planting Tips

Adapted to the rocky, alkaline soils of the Hill Country - and to its frequent droughts - Bluebonnets produce large, hard-coated seeds that may cause them to have a low germination rate the first year or two. This is Nature's "insurance" so that, in case of drought, residual seeds are left in the soil for the following year. As the hard seed coats wear down from abrasion and decay, with some water the seedlings begin to sprout.

While a hard seed coat is an excellent mechanism for species survival during unfavorable years, it can frustrate the gardener who wants a spring display of colorful blooms the first year after planting. Adding to a gardener's frustration, not all seedlings that germinate successfully establish and grow to maturity. This is possibly because they require the presence of *Rhizobium*, a nitrogen-fixing bacterium that serves as an inoculant, which may or may not be present in the soil.

But don't despair. Over the years, researchers and gardeners have given many tips about propagating and cultivating Bluebonnets, including the following:

Seed Scarification

As noted, Bluebonnet seeds have hard seed coats that often delay germination for a year or more. To increase the germination rate the first year, growers often scarify seeds. Scarification means scratching or nicking the seed coats to simulate natural weathering processes. Once scarified, most seeds will germinate quickly, and should be watered for several weeks, especially if the weather is dry.

You can use the following methods to scarify seeds

- physically nick the seeds with a knife (for small quantities)
- rub the seeds with sandpaper
- freeze the seeds overnight, then quickly pour boiling water over the seeds and soak for several hours at room temperature

- soak the seeds in concentrated sulfuric acid for about an hour, then rinse thoroughly in fresh water. (Caution: Sulfuric acid requires special handling procedures and should not be attempted without proper equipment such as gloves, masks, and a ventilation hood.)

It is not recommended to scarify Bluebonnet seeds that will not be receiving water during dry periods in the winter and early spring. Scarifying stimulates all of the seeds to germinate and does not leave residual seeds for subsequent years in the event of a drought. In addition, scarification can damage some seeds. It increases the number of seeds vulnerable to extreme weather conditions and disease-causing organisms. Scarification does increase the number of seeds that germinate, but will not guarantee a healthy, self-seeding stand of Bluebonnets; many other factors influence the growth and flowering of Bluebonnets once the seeds have germinated. The goal may not be to have a high rate of initial germination, but rather a productive stand of flowering Bluebonnets that reseed on their own without the need for replanting each year.



Norman G. Flaigg

are planted probably is the most efficient and easiest method. Lightly dampen the seeds so the Rhizobium powder will stick easily.

Before broadcasting the seeds, consider the need for applying the bacterium Rhizobium, which improves plant growth and flowering. Rhizobium allows nitrogen fixation, (the conversion of atmospheric nitrogen to a form usable by plants) to take place. Many soils already have naturally occurring Rhizobium, which makes an application unnecessary. One way to determine whether Rhizobium inoculation has occurred is to look at the roots of an established plant. If there are nodules (small, rounded lumps containing nitrogen-fixing bacteria) on the roots, the Bluebonnets have been inoculated by the bacteria. If you are not sure if Rhizobium is present, go ahead and add it. Rhizobium can be applied to the seeds before they are planted, or to the soil after germination has taken place. Applying the bacteria before the seeds

Gardeners often use inoculants for legumes, such as peas. Most inoculants, including Rhizobium, are species-specific, which means that you cannot use any one inoculant for every legume. Be sure to match the legume species with the correct inoculant. Rhizobium is not yet commonly available through retail sources. Some nurseries offer pre-inoculated seeds, but if the seeds were not stored properly after inoculation, the bacteria may not be alive. Be sure to ask about storage procedures before purchasing inoculated seeds. Inoculant that is stored alone or coated on seeds should be placed in an airtight container and refrigerated. The inoculant has a maximum storage life of about six months.

For most successful results, plant seeds in the fall - no later than mid-November. A fall planting will give seeds the advantage of early fall rains that induce germination and encourage vigorous root growth. Bluebonnets winter over as seedlings, and are not susceptible to freezing. The plants have a head start on growth when warm, wet weather arrives in February and March.

How Much to Plant

The Texas Department of Highways and Public Transportation recommends a seeding rate of 10 to 12 pounds per acre. At that rate, an ounce (which contains between 850 and 1,000 seeds) will cover about 200 square feet. This is approximately 5 seeds per square foot. Using that rate, maximum display probably would be reached the second or third year after planting. If cost is not a consideration, your area is small, or you want a good display more quickly, seed companies recommend using 8 to 10 seeds per square foot. At that rate an ounce will cover approximately 135 square feet, and 1/2 pound covers 1,000 square feet. An acre will require 20-30 pounds of seeds. (Keep in mind those seeding rates have been determined on a singlespecies basis, and should be modified if you are planting other species with Bluebonnets.)

Choose a sunny, well-drained location with slightly alkaline soil for *L. texensis*. South- and west-facing slopes will encourage earlier spring growth and flowering. *L. subcarnosus*, which prefers the sandy soils found in areas of East Texas, is also available commercially in limited amounts, and also requires a sunny, well-drained site.

How to Plant Bluebonnet Seeds

If your site is not weedy and you plan only to interseed Bluebonnets into existing vegetation, the process is relatively easy. Mow the vegetation to 6-8 inches, and rake up the thatch. Try to open up some bare areas to allow the seeds to make contact with the soil. Prepare weedy ground by using the techniques outlined in Soil Preparation in Gardening and Landscaping with Native Plants. For bare ground, plant seeds on a lightly tilled or slightly roughened soil surface for optimum seed-soil contact.

One rule applies to all wildflower planting. Good seed-soil contact is essential. Contact with the soil helps retain moisture around the seeds, which is necessary for germination, and provides a substrate for seedling growth. Hand broadcasting is the simplest seeding method, and hand broadcasters work well. You may dilute the seeds by mixing them with sand to easily achieve even coverage. Press seeds firmly into the ground with your hands or walk over the area.

Maintaining Your Bluebonnet Patch

Water your Bluebonnets if possible, using light, well-spaced waterings. Although Bluebonnets require some moisture to germinate and grow, they do not like saturated soil. If fall or winter rainfall is low, an occasional watering will help ensure success.

As a general rule, you do not need to fertilize. *L. texensis* is adapted to alkaline soils that can be low in nutrients, perhaps because of the presence of Rhizobium. Fertilizing is not recommended and may encourage leggy and weak plants with more leaves than flowers. However, if your seedlings do not appear to be growing vigorously, they may need Rhizobium, or you may want to fertilize lightly in early spring.

Do not mow until the plants have formed mature seedpods. Bluebonnet seeds usually mature six to eight weeks after flowering. When mature, the pods turn yellow or brown and start to dry. By mowing after the seeds have matured, you will allow the plants to reseed for next year.