

Using Transplants to Establish Native Grasses, Sedges, Rushes and Forbs (Plug Planting)

Article by John Anderson, originally published in the Yolo Resource Conservation District's handbook, Bringing Farm Edges Back to Life. <http://www.yolorcd.org/> www.hedgerowfarms.com

Reasons for Using Transplants

There are several benefits to using transplants to establish native grasses, sedges or rushes. One of these is **rapid establishment**, which could be an important consideration in some restoration projects. For some species, sufficient seed of locally adapted biotypes may not be available in large enough quantities to direct seed. In this case, greenhouse grown transplants provide a much **more efficient use of available seed** and weed control can be optimized during the first season. Mechanical or chemical means can be used in advance of planting to provide a "clean slate" for young plugs and minimize weed competition. Another advantage is that with advanced maturity of transplants, many will **produce seed the first season** and begin the process of filling in non-vegetated areas.

Transplant Types

Thanks to the vegetable transplant industry, techniques to economically reproduce large quantities of high quality transplants have been developed. Small transplants grown in **flats of 200 plants** (1-1/4 inch x 1-1/4 inch x 2-1/2 inch cells) are easy to grow and plant. If planting is done correctly, survivorship is excellent. Smaller transplants are also available. They can also work well, but tend to not keep as long as the 200 cell trays. Transplants grown in larger "stubby" cells are excellent, but the plants are more costly and planting them requires more labor. In most cases where there is adequate soil moisture at the time of planting, the large size transplants are not necessary.



Plug transplants grown in flats of 200 cells. Photo by J. Anderson.



The plug plant nursery at Hedgerow Farms. Photo by J. Anderson.

Ordering and Storing Transplants

Most cool season grass transplants require 10-14 weeks of growing time before they are ready to plant. **Order in September or early October to be ready for a December or January planting.**

Long-term plug storage:

Many of the perennial natives can be held as plugs for several months and even up to a year if cared for properly. Regular watering is very important but overwatering can create anaerobic conditions that will promote fungal diseases. Regular mowing and removal of thatch will keep plugs healthy. It is important to fertilize with a balanced commercial liquid fertilizer, but do not over fertilize. Diseases that can be a problem are rusts, mildews, and other fungi. Commercial lawn care fungicides can be used to manage these problems.

Short-term plug storage:

If holding plugs for a few days to a few weeks, the key is frequent watering if temperatures are hot. On a hot, windy day plugs can desiccate within a matter of hours. To avoid this, water plugs 2 times a day during the hottest days. During cool, wet winter months, as long as rain comes regularly and plugs remain moist plugs should be fine without supplemental irrigation.

Site Preparation

Ground Treatment

Plug transplants can be put in almost **any type of soil as long as it is moist**. The roots of healthy transplants penetrate the surrounding soil in just a few days depending on the outside temperature. In weedy areas where there can be a heavy layer of thatch that contains weed seed, fire is recommended to **remove the thatch**. Fall burns just after the first rain usually kill all early germinating weeds. Mowing and raking may be an option for smaller areas.

Weed Control Prior to Planting

In weedy sites, it is ideal to **practice one year of vigorous weed control** to reduce the weed seed bank. If that is not possible, weeds should be controlled just prior to planting in the fall or winter. The most effective controls are **broad-spectrum herbicide** applications, two days to two weeks prior to planting. If weed growth begins early in the fall and scheduled planting is in January, an additional before-planting application is almost always required. Propane weed flamers can be used in place of herbicides, but weeds must be small at the time of flaming for the process to be effective. Solarization by tarping of the soil is an excellent technique to deplete the soil seed bank.

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Planting Time

In the Sacramento/San Joaquin Valley and adjacent foothills, assuming there is no irrigation available, **planting should be done in December, January or early February**. In very wet springs as in the El Nino year of 1998, planting could be as late as March. If there is reliable irrigation available, planting can begin earlier and go into mid-April or even May, depending on the plant species being used. There **must be good ground moisture at the time of planting** and in weedy sites, maximum weed germination is desirable before planting. The more weeds that have germinated and killed early on, the fewer the weeds to control later.

Pictured at left: A dibble has a heavy pointed metal end and easily makes plug-sized holes. Photo by E. Allen.

Planting Techniques

A hole is made with a **dibble stick that easily penetrates the ground** and makes a hole similar to the size and shape of the plug. A plant is placed in the hole and the top is **sealed by pinching it with fingers** or compacting the surrounding soil with a blunt stick. It is important not to make the holes too deep; the base of the plant should be at the same level as the surrounding soil or a tiny bit deeper. The most effective method for planting is to work in teams of three: a hole-puncher, a planter who also carries the plants, and a follow-up sealer. Depending on the site, a good team of three can plant 300-500 plants per hour. Transplants respond well to nitrogen fertilizers that are applied just prior to planting or while plugs are still in their containers.

Planting Density

Low-density plantings would include 3-6 plants per square yard. This density may not be the desired end result density, but it provides seed-producing plants rapidly. Under proper management (fire, grazing, mowing), those species that are best adapted to the site will reseed and have good seedling survival. As additional plants are added to the population, a self-evolution of the local ecosystem can theoretically occur. Large or rhizomatous species such as Barber's sedge or deer grass will easily fill up a square yard with one plant.

Most commonly used **mid-density plantings** put plugs on 12-18" centers.

Higher-density plantings would include 9-27 plants per square yard. High density planting should be used where rapid and complete cover is desired by the end of the first year. These are generally small or highly visible projects.



Once holes are made using a dibble or other tool (1), the plug plant should be pushed into the hole so the base of the plant is even with the surrounding soil and no air pockets exist between the plug plant and the field soil (2). Pinch or compress the field soil over and around the plug plant soil (3). Photos by E. Goebel and J. Anderson.

Follow-up management

Post planting management centers around the **control of weeds**. Some pre-emergent herbicides can be used immediately following planting. Be sure to follow label recommendations. In low-density plantings, management strategies should **encourage reseeding** from the established plugs and here the use of pre-emergent herbicides would be inappropriate. Some **soil disturbance to provide a seed bed for the newly dropped seed and additional weed control would be needed**.



Pictured at left: Plug planting a canal bank. Photo by J. Anderson. Below: A finished plug planting project. Here, *Carex pansa* was planted with close spacing with wood chip mulch for a sidewalk landscaping project. Photo by L. Brazil.

Hedgerow farms is located in Winters, CA. We produce and sell California native grassland seed and plug plants. Please call us at **530-662-6847** or visit our website at www.hedgerowfarms.com for more information.

