Earth Kind Perennial Field Trials

Research Protocol

Prepared by
Dr. Greg Church, County Extension Agent – Horticulture
Texas AgriLife Extension Service - Texas A&M University System

The testing of plant material is an important part of Horticultural Sciences. The Earth Kind Environmental Stewardship Program has utilized the testing of roses to help achieve the goals of reducing water, pesticide and fertilizer use, while protecting the environment. The Earth Kind Program will be testing other ornamental plants which have good performance under the Earth Kind Landscape Principles. This document serves to assist in the establishment of an Earth Kind Perennials Field Trial.

Plant Selection

The selection of plants that will have the best chance of success under the Earth Kind landscape principles is very important. Perennial plant species that are known for having few problems with insects and diseases, limited fertility requirements, low water requirements, and low maintenance should be considered for testing. A list of plants should be develop by consulting with Extension Specialists, Horticulture Agents, Master Gardeners, nursery and landscape industry leaders and professionals, and other local experts. Scientific names and variety should be used to denote each plant on the list. It is important to obtain the average known size of each plant at maturity in order to properly space each plant in the beds. The number plants will be determined by the availability of the plants, space, and resources such as: compost, mulch, drip irrigation equipment, a sufficient quality and quantity of water, and financial resources to purchase the plants.

Site Selection

The selection of a site for the research is very important when establishing field trial. A site should have soil with adequate drainage, full sun (or partial shade or full shade depending on the plants being tested), adequate air movement, and have no history of contamination. The principles of Earth Kind landscape design should be considered when selecting a site for the field trial. Consideration should be given to the number of plants to be tested and selecting a site that has adequate space to accommodate the mature size and quantity of plants.

Experimental Design

The experimental design chosen for these trials is the Randomized Complete Block Design. It provides the scientist with strong statistical data, is easy to design, flexible in its arrangement, and reduces experimental error resulting in more precise results. A randomized complete block design utilizes randomized blocks or replications of individual plant varieties. Replication and randomization of a field trial helps account for the variability of the site and soil conditions across a field. The following steps...
should be used to design and layout a trial: (1) Divide the site into three or more distinct areas (or blocks) of equal size. The shape of each area should be similar. (2) The individual areas (or blocks) should include space for each plant being tested. Therefore a trial would require 3 times (or more) the number of varieties being tested. (3) The order or arrangement of the plants in each area (or block) should be randomized. In this experimental design we do not want a plant in the same location in every block. (4) Create a landscape design map of the site and map out the location of each plant based on the randomized order.

**Soil Preparation**

Start with collecting a soil sample and have the sample tested for pH, macronutrients and micronutrients at a university laboratory by submitting a sample through your local Extension office. Collect sample prior to adding compost. Purpose of this test is to establish baseline data characterizing the pH and nutrient status of the soil.

Kill existing grass and weeds within the beds with a glyphosate product (e.g. Roundup). Repeated applications of glyphosate may be necessary to kill certain weeds, depending on the weed species and time of year. Grass and weeds should be actively growing for the herbicide application to be effective. Read and follow all label directions on the glyphosate container.

Incorporate 3 inches of fully-finished (not half raw), plant-derived compost to a depth of 8 inches. Some manure may have a high salt concentration and large amounts of such materials can easily damage plants. Therefore, plant-derived compost is recommended. If you have any suspicion that the compost may not be fully finished, then do this tilling at least 3 months prior to planting. This will lessen danger of raw organic material in the compost robbing plants of nitrogen. There is no need to construct raised planting beds, even in heavy clay soils. Throughout the duration of the trial, do not add any commercial fertilizer. This means no commercial synthetic fertilizer and no commercial organic fertilizer. Make final reparations to the planting area. The soil should be tilled prior to planting.

**Plant Installation**

Install only high quality nursery plant material. Inspect plants upon receipt for insect, disease, nutrient deficiencies and overall health and vigor. Do not accept or install plants that do meet these standards. Plant installation should utilize the best horticultural practices to insure the proper establishment.

**Irrigation**

A drip irrigation system should be installed to assist in the establishment of the plants during the first full growing season and to provide supplemental irrigation during drought condition. Drip Irrigation should consist of drip irrigation tubing with inline emitters or individual emitter for each plant. The drip lines should be installed after planting and prior to covering the soil with mulch. Plants should be properly water immediately after planting. The soil moisture of the root ball should be checked daily during the first 6 weeks.
**Mulch**

The use of mulch is essential to the success of the study. The mulch provides the slow release of nutrients to the plant roots as it decomposes. The mulch should consist of (1) tree limbs, with leaves present, which have been run through a chipper, or (2) shredded hardwood bark. The mulch may contain all or a combination of these components from hardwood species from local sources. Other mulches may not possess the nutrients required for the plants and may not decompose at a sufficient enough rate. The mulch should be added to the surface of the soil around the plants at a depth of 3 inches. The mulch should not be incorporated into the soil. The mulch should be added regularly to maintain a 3 inch depth.

**Pesticides and Fertilizer**

No synthetic, natural, or organic pesticides or fertilizers will be applied to the plants or the soil during the duration of the trial.

**Maintenance**

One of the goals of Earth Kind is to provide a Landscape system that reduces the effort needed to maintain a landscape. Through these field trials we hope to identify plants that have low maintenance requirements. Any maintenance that is required of each test plant should be documented on data collection forms. Maintenance might include the remove of dead stems and leaves after the plant has entered dormancy, preferably prior re-emergence in the spring. This may or may not be necessary depend on the type of perennial being tested.

Weed control may be necessary. Removal of weeds from the beds should be perform by hand, with care taken not disturb the root system of the test plants. Properly applied and maintained mulch layer should provide adequate weed control.

**Data Collection**

Data should be collected monthly during active growing season, for the duration of the study. The study may last up to 5 years. Data to be collected will include but not limited to the following: Disease incidence and severity; insect population and damage; nutrient deficiency incidence and severity; water use/drought response; heat tolerance; plant height and width; flower: number, % coverage, timing, duration; foliage color and health; vigor; overall health; persistence (ability of the perennial to persistence from year to year).