

Bed Preparation and Plant Selection for Successful Garden Beds

David C. Zlesak, Ph.D., University of Wisconsin-River Falls

Garden beds are typically highly visible areas in landscapes and serve as glorious focal points themselves and/or frames or diversions to surrounding features. As designers and maintenance professionals, having the opportunity to work with the same beds year after year definitely offers advantages. One can really get to know their site. Steps to improve the soil can be implemented as well as other aspects of the site to increase the potential as time goes by. Proactively approaching garden bed implementation and care can avoid problems later and position oneself for greatest success.

When acquiring responsibility for a planting bed, one may be starting from scratch with a clean slate, or be inheriting an existing bed with perennials and other features. Whichever the case, it is important to carefully assess the site to know what one is dealing with in order to proceed making sequential, informed decisions that that will build towards greater and greater success.

Assessing your site:

Soil: Soil is our most valuable resource and should never be taken for granted. Our plants use it for anchorage and as a reservoir for nutrients and water. The most wonderful and easy to grow plants will suffer if planted in soil that cannot effectively meet their growth needs. Oxygen penetration into soil is also essential for health and effective function of roots. One of the most simple and best investments a gardener can make is have a professional soil test done, typically available through your local university. Professional soil tests tend to be more accurate and provide more information than do-it-yourself kits. From a professional soil test you will learn very valuable information about your soil's properties, and even more importantly, recommendations for amendments to add in order to get it within appropriate ranges to best support the growth of the types of plants you indicate you will be growing.

Key features you will see on your soil test include pH, levels of key nutrients, and texture. The pH is critically important because it effects how easily nutrients can be released from soil particles and made available to plants. Some plants are more adapted to higher (alkaline) or lower (acidic) pH's and one can choose to grow plants that match existing pH or, if necessary, try to modify the pH to better grow the types of plants you want. Nitrogen is routinely limiting in soils and will need to be added over time through inorganic or organic sources for strong growth. Basic soil tests indicate phosphorus and potassium levels. Most regional soils are high in phosphorus and knowing that helps to manage fertilization. Adding more phosphorous to soils already high in this element not only wastes money, but also can lead to problems. Pollution of phosphates is of growing concern as well as excessive levels of phosphorous can limit a plant's ability to take up other important elements like iron. Bottom line is to know the nutritional status of your soil and provide what is needed. Do not be tempted to just keep applying a fertilizer out of tradition or habit. The cost of a soil test can quickly be recovered in only purchasing nutrients that are needed and result in healthy plants and minimized pollution.

Water and drainage: Water holding capacity and drainage goes hand in hand with soil management. Assess the slope and drainage of your garden bed to understand how water moves from the site. Are there some areas that stay wetter or drier than others? Modifications can be made to try to make the site more homogenous or one can carefully select plants adapted to the varying conditions across the bed. If one has poor drainage or soils that dry out fast, the best thing to add is composted organic matter. Organic matter helps dry sandy soils hold more moisture and nutrients and it helps aggregate clay soils to allow for better water filtration in heavy poor draining soils. Raised beds are also another option to use in combination or alone to improve drainage. Adding sand typically causes more problems than benefits to try to increase the drainage of heavy clay soils. It is true that sand drains readily, but what makes that possible is the air spaces between the relatively large sand particles. If sand is mixed with clay, those valuable air spaces become filled with clay. Unless one adds so much sand to overwhelm the native clay, it does not help. Organic matter is typically the best solution to drainage issues and also benefits the soil in additional ways. There are increasing options for commercial sources of compost. If one can add amendments preplant (organic matter, lime or sulfur to change pH, deficient nutrients, etc.) it is recommended to spread amendments over the soil at the appropriate rate and incorporate them at least 6-8" deep for a relatively uniform soil mass for roots.

In addition, what resources do you have to supply water to the garden bed throughout the growing season? If one has an irrigation system adding supplemental water when needed is a minor concern. If irrigation is more challenging or rarely an option, that is important to know. That may lead one to using more mulch to help conserve limited moisture and/or choosing more drought tolerant plant materials.

Light: How much light does your garden bed receive? What time of day does sunlight reach the bed? When the bed is shaded, is it light dappled shade from a nearby tree or deeper shade from that of a solid building? Understanding the light a bed receives is very helpful in order to select adapted plants. It can also influence your design. For instance, if the amount of light varies dramatically across your bed, it can be problematic to use a symmetric design where one has the same type of plant across the whole bed and expect it to grow uniformly. In that situation having an asymmetric design may make more sense.

Weeds: What kind of weeds are present in the garden bed? Being proactive with weeds can really pay off with hours of saved labor and headaches later. Perhaps weeds are not a major issue for the bed and that would be the best case scenario. If there are mainly annual weeds, using mulch and preemergent herbicides can go a long way in saving labor later. If one has persistent perennial weeds that spread aggressively like quack grass or Canada thistle, working towards eradicating it would be very helpful. Consider non-selective herbicide applications in the spring before planting or at the end of the season. Tilling the bed can ultimately make matters worse by breaking rhizomes of weeds and actually propagating them.

Plant Competition: Recognizing competition from other plants and trying to work within that limitation is very useful. Large trees or shrubs adjacent to our garden beds can pull a lot of water and nutrients out of the bed that are meant for the plants we desire to cultivate there. Tillage to periodically break up the invaders root system and applying extra moisture and nutrition to some portions of the bed can help counter competition. In addition, recognize that some plants are allelopathic. They emit chemicals that hinder the growth and development of other plants. The classic example is black walnut trees emitting juglans. Another example is daffodils and them emitting narciclasine, a chemical that particularly affects things in the mint family like coleus and basil. Cosmos and zinnias are less affected. When utilizing daffodils in beds for a colorful display of spring flowering bulbs, match what you want to grow in that area later with something that has some resistance.

Assess Your Resources: Assess what you have to devote budgetwise for purchase of materials and ongoing labor for maintenance throughout the growing season. This can influence or limit the kinds of plants you choose and how they are cared for. Some very ornamental plants need some deadheading to continue looking good for instance. Some plants have great limited-season impact and can be used as accents such as spring flowering bulbs and chrysanthemums and flowering kale for fall. Does the budget allow for such plant turnover?

Plant Selection

Designing garden beds and selecting what plants to use and how to integrate them is a very creative and rewarding component to the whole process. It is the place where art and science meet. Plants need to be chosen that are well suited to garden bed conditions so they survive and prosper, yet also have the aesthetic components necessary to build the desired theme or intention of the design. Having one without the other leads to disappointment.

Here are some useful tips for plant selection:

-Avoid monocultures or using different plants all susceptible to the same disease to try to avoid disease epidemics. For instance, planting a garden of different types of marigolds and cosmos have the risk of a quick demise if aster yellows comes in as all plants are susceptible. Different plants from different plant families typically spreads risk of disease epidemics.

-Take advantage of the many wonderful resources at your disposal of what has proven to do well in your area. Visit regional public gardens where plants are well labeled to see how well different genera and cultivars perform in person. One fantastic regional resource that needs to be more widely known is www.florifacts.com Each year the University of Minnesota hosts trials of recent or upcoming annual and perennial varieties in St. Paul, Morris, and Grand Rapids MN and puts the data on the florifacts website. If you want to know for instance what petunias do especially well in Minnesota generally or at the trial site most near you, you can. In addition,

the winter survival of the trialed perennials is made known. What a great resource!!! Regional garden centers can make better use of this information in variety selection and even retail promotion to consumers of what earns the top performance awards at each trial site.

-Set yourself and your garden beds apart. Planting the same materials everyone uses in the same sort of manner is boring and reflects mediocrity. Planting easy to grow plants that are generally very successful is great, but try to use them or combine them in ways that gives you a unique signature while fully meeting the needs and desires of your clients or bosses. Be open to finding and trying new plant materials to use while still taking advantage of your proven favorites.

-Take advantage of landscape design and other artistic design principals as you select plants to help develop your desired themes and intentions for your beds. Things such as color, form, and texture should be carefully considered in the aesthetic component of plant selection. There are a lot of great resources written on design. One very useful resource with articles on design as well as general landscaping topics is the Sustainable Urban Landscape Information Series at www.sulis.umn.edu For instance, integrating plants with slightly different heights and forms can slow down ones eye and provide greater interest compared to a bed where all the plants were the same height and general form. Slowing the eye and encouraging time for greater inspection is particularly valuable when people routinely encounter garden beds in close proximity versus at a long distance. Viewed from a distance, one may try to have stronger blocks of color or other features that help the bed stand out.

-Consider the desired season long effect of your garden bed and choose and combine plants that are particularly ornamental and take center stage at different times of the season. Think of yourself as a conductor of your garden bed symphony, understanding your different instruments and when each are showcased. Some plants flower continually, while others have more limited periods of bloom. Those plants that flower continually or have colorful foliage that has continual ornamental appeal are especially nice to work with and make things easier. Such plants are typically annuals. Having plants with more limited seasons of unique interest help to keep your garden beds interesting and keep people coming back and anticipating seeing something new.



For instance, osteospermums (cape or sunscape daisies), snapdragon, and pansies reduce or stop flowering during the heat of summer, but flower again once the temperatures cool down. Mixing plants so that something of interest is taking a featured role at any given time throughout the bed is the goal and is a goal that is possible to achieve. This can be more challenging for perennial beds as in general most perennials have a more limited flowering season than annuals. In order to have season-long interest in a garden heavily focused on perennials, annuals which typically have a more extended season of bloom are often incorporated as accents.

-Using plants adjacent to each other with similar growth rates and compatible plant habits helps to prevent slower growing plants from being smothered by vigorous neighboring plants. A very vigorous spreading petunia cultivar, for instance, may choke out a neighboring spreading verbena. Know mature plant sizes of the plants you use and give them the space they need and put them by neighbors they would be compatible with. Otherwise, it takes extra labor continually intervening and holding back aggressive plants.

-On a similar vein to growth rate, is combining plants with compatible plant habit. Some plants have looser, more open, airy growth habits and tend to intermingle and complement each other, while other plants have denser growth and have more difficulty growing with other plants. Growth habits also vary between upright, mounding, or trailing. Loose-growing trailing verbena and bidens cultivars can intermingle and flower well together, while geraniums, tuberous begonias, and spreading petunias tend to make a thick, mounded plant or a relatively dense mat of growth, respectively, capable of crowding out neighbors. Upright, taller growing plants are often placed towards the center or back of a bed, while spreading or trailing plants are placed near the edge where they can hide the bases of the more upright plants and serve as a living ground cover.

- Group plants with similar cultural requirements and provide them the conditions they do well in. Following are some examples:

Light- Combine plants that share similar light requirements. Plants that do well with half a day or more of full sun include ageratum, marigolds, petunias, and zinnias. Plants that need to be shaded most of the day include common impatiens, tuberous begonias, and fuchsia. Higher and lower light-requiring plants can sometimes be successfully combined. For example, combine larger, higher light-requiring plants that cast shade over smaller, more shade-tolerant plants. Temperature preference is often closely allied with light requirement. Heat loving annuals like gazania and moss rose also prefer full sun and are also more tolerant of drying out between waterings.

Water- Combine plants with similar moisture needs and match them to the moisture conditions of your site. Plants that can tolerate or prefer being kept on the dry side include gazania, moss rose, verbena, and zinnia. Those that need to have a consistent supply of moisture include coleus, impatiens, tuberous begonias, and fuchsia.

pH- Often not thought about enough, the pH of the growing medium influences nutrient availability and other aspects of plant growth. In addition to the starting pH, pH can change over time in response to water quality and type of fertilizer used. Often the pH of city water is elevated to over 7.5 with sodium hydroxide or other bases to protect metal pipes from slowly deteriorating and the bicarbonates in the water can cause our pH to increase over time. Knowing your pH will aid in selecting appropriate plants. For instance, geraniums, celosia, and marigolds prefer a higher pH (alkaline) and petunia, pansy, and bacopa a lower pH (acidic). It often becomes clear in mixed plantings of for instance petunia and geranium if the pH is shifting more towards the acidic or alkaline side based on which is performing better.

General Maintenance Considerations

Planting time- Annuals vary in terms of the relative cold they can tolerate. They can be classified into hardy (take some frost), half-hardy (take a light frost), or tender (damaged by temperatures below 50F and cannot tolerate frost). Don't plant your beds before the appropriate time for what you are planting. A map of Minnesota with the typical last frost date is found at http://climate.umn.edu/pdf/frost_dates/spring_frost_free_dates.pdf

Weed control- Consider using mulch to not only suppress weeds, but also retain moisture. Preemergent herbicides are also frequently used. Spacing plants so they touch at maturity and form a natural groundcover can also help suppress weeds after they mature. Cultivation and hand pulling are also options, although more labor intensive.

Watering- Water thoroughly and deeply, especially right after transplants are planted. The use of drip irrigation can reduce leaf wetness and disease. If overhead irrigation is necessary try to irrigate in the morning so the sun is more apt to quickly dry foliage.

Fertilization- Water soluble fertilizers make nutrients most quickly available to plants, but are more labor intensive to apply. Granular and especially slow release granular fertilizers are easy, relatively low labor, methods to provide nutrition to flower beds with nutrients dissolving with each rain or irrigation.

Deadheading- Since the mission of plants are to provide seeds before they die for the next generation, removing spent flowers of many plants will help them continue to produce new flowers. Once the hormonal signal from developing seeds is removed, new growth and additional flowers can be triggered. Some species benefit more from deadheading (e.g. zinnias) to continue to bloom than others (e.g. fibrous rooted begonias and many of the newer very vigorous, spreading petunias).

Additional resource: www.extension.umn.edu/gardeninfo has links to many informative publications including the Yard and Garden Newsletter.