



## William T. Kemper Center for Home Gardening

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### Best Plants for Problem Clay Soils: Annuals, Bulbs, Needled Evergreens, Ornamental Grasses

The perfect garden soil is well-drained, but moisture-retentive, loose enough to dig easily and rich in organic material and mineral elements plants need to grow well. This perfect soil is typically a mixture of sand, silt and clay in a proportion where each is more or less equal to the others. When clay dominates the mix, the soil can become undesirable with waterlogged clods of soil one week and rock-like clods the next. While clay soil does pose challenges to the gardener and is a difficult environment for many plants, it is usually a fertile soil that has great potential. By choosing suitable plants and by making even small changes to the soil structure, it is possible to have a garden with many kinds of beautiful and healthy trees, shrubs, perennials, and annuals.

#### **The problem**

The problem with clay soil is that the soil particles are so small and tightly packed together that there is no room for the air or water that plant roots need to grow. Gardeners often compound this problem by working clay soil when it is wet, actually decreasing the spaces in the soil. Clay soil may not drain well and when dry, water may run off without soaking in. Consequently plants have problems with root rot or drought and may do poorly because their roots have difficulty growing through the dense soil. There are plants that actually prefer clay soils, but most plants will benefit if the clay soil is improved by increasing the amount and size of pore spaces between particles for better air and water exchange.

#### **Soil improvement**

Most soil improvement methods involve adding something to the soil to separate or break up the clay particles. These amendments may be inorganic like sand, lime, calcined clay, vermiculite, or Perlite® or they may be organic like compost, aged manure, shredded leaves, decomposed sawdust or peat moss. Organic amendments are usually less expensive, add nutrients to the soil and are less likely to cause problems if too much is applied. For both types, improving the soil is an ongoing process as organic amendments decompose while inorganic amendments tend to migrate in the soil. Other methods for dealing with clay soil include simply replacing the clay with better soil, using raised beds, planting trees or shrubs slightly above ground level, using mulch to reduce soil compaction, and growing green manure crops.

#### **The right plants**

Since improving clay soil tends to be a slow process, it helps to grow the right plants. There are many plants that will do well in clay and as in other aspects of gardening, a little experimentation may be valuable. Keeping some basic concepts in mind when choosing plants to grow in clay soils may improve

your success rate. 1) Plants native to an area that has clay soil have adapted to that soil and are a good choice. It is especially helpful to learn the native habitat of these plants. For example, plants that naturally grow in an environment that is poorly drained or consistently wet are a good choice for a low wet area of the garden. 2) In general, plants that are aggressive and have a vigorous root system or spread by creeping along the ground do well in clay. This may include plants that are classed as invasive and gardeners should be careful not to choose plants that will take over the garden or are harmful to the environment. 3) Take advantage of microhabitats in your yard. A hilly area may drain well enough, even with clay soil, to grow plants that do better with good drainage. 4) Don't choose plants that would be difficult to grow in your area under the best circumstances. A plant that grows well in the heat of a Missouri summer will do better in clay soil than one that is better suited for a cool New England summer.

The following plants have been recommended by amateur gardeners and professional horticulturalists to tolerate clay soil. They are divided into sections by growth habit and include physical and cultural characteristics of each plant, plus a brief discussion of a few from each group.

## Annuals

### *Coreopsis tinctoria* — Tickseed

With its profuse yellow or yellow and maroon-banded flowers, tickseed is a beautiful addition to an annual garden, a border, or a wildflower meadow. The very thin, widely spaced leaves give this plant an airy appearance. Easily grown, it will tolerate dry soil.

### *Impatiens capensis* — Spotted jewelweed

Also known as touch-me-not because its seed capsules burst when touched, the flowers of spotted jewelweed are shaped like small cornucopias. This plant cannot tolerate drought and needs to be grown with consistent moisture. The watery stems of this Missouri native are reputed to alleviate the pain and itching of nettles and poison ivy.

### *Salvia farinacea* — Mealycup sage

Although mealycup sage is a hardy perennial in its native habitat, it is an annual in cold winter climates. Flowering from early summer to frost, it provides a continuous supply of dried and cut flowers while attracting bees and butterflies. Full sun is best for this plant, but it does well in part shade. It is not necessary to deadhead this low-maintenance member of the mint family.

**Sun:** F=Full sun, P=Part shade, S=Shade; **Water:** D=Dry, A=Average, W=Wet

| Scientific name             | Common name | Height (ft) | MO native | Zone | Bloom color            | Bloom time                  | Sun | Water | Notes   |
|-----------------------------|-------------|-------------|-----------|------|------------------------|-----------------------------|-----|-------|---|
| <i>Coreopsis tinctoria</i>  | Tickseed    | 0.5-3       | Yes       | 0    | Yellow with red center | Summer to fall              | F   | A     | May need staking; good cut flower; deadhead to increase flowering               |
| <i>Dianthus chinensis</i>   | China pink  | 0.5-1       | No        | 0    | Pink, red, white       | Late spring to summer       | F-P | A     | Part shade best in hot climates; deadhead to increase flowering; may overwinter |
| <i>Fagopyrum esculentum</i> | Buckwheat   | 2-4         | No        | 0    | White                  | 4 to 5 weeks after planting | F   | A     | Good green manure crop for improving heavy soil; edible seeds                   |
| <i>Gomphrena</i>            | Globe       | 0.75-2      | No        | 0    | Pink,                  | Summer                      | F-P | A     | Good bedding plant; attractive  |

|                           |                   |       |     |   |                                      |                           |     |     |  |
|---------------------------|-------------------|-------|-----|---|--------------------------------------|---------------------------|-----|-----|--|
| <i>globosa</i>            | amaranth          |       |     |   | purple, white, red, or orange bracts | to early fall             |     |     | dried flower   |
| <i>Impatiens capensis</i> | Spotted jewelweed | 2-5   | Yes | 0 | Orange                               | Late spring to frost      | P-S | A-W | Attracts hummingbirds; also called touch-me-not because seed capsules burst when ripe                              |
| <i>Lantana camara</i>     | Common lantana    | 1.5-6 | No  | 0 | Yellow, orange, or red               | Late spring to early fall | F   | A   | Invasive perennial in tropical areas but not in cold winter climates   |
| <i>Rudbeckia hirta</i>    | Black-eyed Susan  | 1-3   | Yes | 0 | Yellow with brown center             | Summer to early autumn    | F-P | D-A | Short-lived perennial or biennial that is usually grown as an annual; also known as gloriosa daisy; reseeds freely |
| <i>Salvia farinacea</i>   | Mealycup sage     | 2-3   | No  | 0 | Lavender-blue, white                 | Mid summer to frost       | F   | A   | Perennial in hot climates; best when massed; good cut flower   |
| <i>Tagetes erecta</i>     | Common marigold   | 0.5-3 | No  | 0 | Orange, yellow                       | Late spring to frost      | F   | A   | Tolerates dry soil; deadhead to prolong flowering; also known as French marigold                                   |

## Bulbs

### *Camassia leichtlinii* — Camassia

With 3-4' high terminal spikes of white, cream, blue or purple flowers, camassia is a beautiful choice for the wet areas of the garden. While tolerating drier soil after the blooming period, its grass-like leaves may decline somewhat and this should be considered when choosing a site for this plant.

### *Ipheion uniflorum* — Spring starflower

Each bulb of spring starflower produces sweetly fragrant star-shaped flowers for several weeks. The leaves are grass-like and have an onion or garlic scent when bruised. Most attractive when massed, these bulbs may be planted in drifts in rock gardens, borders, under trees or shrubs or naturalized in lawns.

| Scientific name             | Common name       | Height (ft) | MO native | Zone | Bloom color                                      | Bloom time            | Sun | Water | Notes   |
|-----------------------------|-------------------|-------------|-----------|------|--|-----------------------|-----|-------|---|
| <i>Camassia leichtlinii</i> | Camassia          | 3-4         | No        | 5-9  | White, cream, blue or purple with yellow anthers | Late spring to summer | F-P | A-W   | Tolerates drier soil after blooming; good cut flower  |
| <i>Crocus vernus</i>        | Crocus            | 0.25-0.5    | No        | 3-8  | Purple, white                                    | Early spring          | F-P | A     | Best when massed or in groups; if planted in lawn, postpone mowing until foliage has yellowed |
| <i>Galanthus nivalis</i>    | Snowdrop          | 0.5-0.75    | No        | 3-7  | White  | Late winter to spring | F-P | A     | Good for slopes   |
| <i>Ipheion uniflorum</i>    | Spring starflower | 0.25-0.5    | No        | 5-9  | Pale to dark blue                                | Early spring          | F-P | A     | Fragrant flowers; spreads rapidly   |
| <i>Leucojum</i>             | Summer            | 1-1.5       | No        | 4-10 | White  | Spring                | P   | A     | Good for planting under   |

|                                      |                     |          |    |     |   |                     |     |   |  |  |
|--------------------------------------|---------------------|----------|----|-----|---|---------------------|-----|---|--|--|
| <i>aestivum</i>                      | snowflake           |          |    |     |   |                     |     |   |  | deciduous trees; tolerates wet soil  |
| <i>Muscari armeniacum</i>            | Grape hyacinth      | 0.5-0.75 | No | 4-8 | Blue with white rim                     | Early spring        | F-P | A |  | Best when massed; good cut flower  |
| <i>Narcissus</i> species and hybrids | Daffodil, Narcissus | 0.5-2    | No | 4-8 | Yellow, orange, white, orange-red, pink | Early to mid spring | F-P | A |  | Lighten heavy clay to reduce chances of bulb rot; <i>Narcissus poeticus</i> 'Actaea' better for wet poorly drained areas |

## Ferns

*Matteuccia struthiopteris* — Ostrich fern

Best in consistently moist soil, the finely dissected feathery fronds of ostrich fern decline and may go dormant early if conditions are too dry. The fertile fronds are up to 2' tall, dark brown, and are attractive in dried flower arrangements. Ostrich fern will spread rapidly by underground rhizomes to form large colonies, making it a good choice for massing in woodland areas, wild gardens, or near streams or ponds.

| Scientific name                  | Common name    | Height (ft) | MO native | Zone | Bloom color   | Bloom time | Sun | Water | Notes  |
|----------------------------------|----------------|-------------|-----------|------|---------------|------------|-----|-------|--|
| <i>Dryopteris filix-mas</i>      | Male fern      | 3-4         | No        | 4-8  | Non-flowering |            | P   | A     | Arching leaves arise from brown scaly crown; tolerates dry shade       |
| <i>Matteuccia struthiopteris</i> | Ostrich fern   | 3-6         | Yes       | 3-7  | Non-flowering |            | P-S | A-W   | Soil should not dry out; good for moist shady area                     |
| <i>Onoclea sensibilis</i>        | Sensitive fern | 3-4         | Yes       | 4-8  | Non-flowering |            | P-S | A-W   | Thrives at edge of water or damp shady border; needs constant moisture |

## Needled Evergreens

| Scientific name            | Common name         | Height (ft) | MO native | Zone | Bloom color   | Bloom time | Sun | Water | Notes  |
|----------------------------|---------------------|-------------|-----------|------|---------------|------------|-----|-------|--|
| <i>Juniperus chinensis</i> | Chinese juniper     | 1.5-60      | No        | 4-9  | Non-flowering |            | F   | A     | Tolerates some drought and urban pollution; not for wet soils                |
| <i>Juniperus communis</i>  | Common juniper      | 1.5-20      | No        | 2-6  | Non-flowering |            | F   | A     | Spreading shrub to small tree; less tolerant of dry soil than other junipers |
| <i>Pinus flexilis</i>      | Limber pine         | 30-50       | No        | 4-7  | Non-flowering |            | F-P | A     | Dark bluish green needles are densely crowded on ends of branchlets          |
| <i>Pinus mugo</i> 'Mops'   | Mugo pine           | 3-5         | No        | 2-7  | Non-flowering |            | F-P | A     | Good for foundation plantings or groupings                                   |
| <i>Taxus x media</i>       | Yew                 | 2-20        | No        | 4-7  | Non-flowering |            | F-P | A     | Tolerates full shade; needs excellent drainage                               |
| <i>Thuja occidentalis</i>  | American arborvitae | 40-60       | No        | 2-8  | Non-flowering |            | F-P | A     | Needs regular deep watering in hot dry weather; foliage less dense in shade  |

## Ornamental Grasses

### *Bouteloua curtipendula* — Sideoats grama

Side-oats grama features flowers and seed heads that hang down from one side of each flowering stem. The flowers have showy orange-red stamens when in full bloom. Forming a dense clump, its narrow bluish-gray leaf blades turn golden brown in fall. Best when massed in meadows, prairies, native plant gardens, or naturalized areas, this grass may also be grown as a tall turfgrass.

### *Chasmanthium latifolium* — Inland sea oats

Attractive almost year-round, the most striking feature of inland sea oats is the oat-like seed heads that hang down from arching stems. These are excellent for dried flower arrangements. This plant prefers light shade, but will do well in full sun if given sufficient moisture. The tendency to self-sow makes it a good choice for a tall ground cover or for naturalizing. If used as a specimen plant or in a border, it may be preferable to remove the seed stalks to avoid seed dispersal.

### *Sporobolus heterolepis* — Prairie dropseed

The delicate flower heads of this native grass have the warm toasty scent of popcorn or coriander and rise 1-3' above the tufted clumps of 2' tall foliage. Prairie dropseed has a fountain-like growth habit and is useful as a groundcover, as a specimen plant or for native plant gardens. Birds and small mammals are attracted by the seeds and arching growth form. The foliage turns red, orange, and yellow in fall and creamy brown in winter.

| Scientific name                   | Common name        | Height (ft) | MO native | Zone | Bloom color                         | Bloom time                | Sun | Water | Notes  |
|-----------------------------------|--------------------|-------------|-----------|------|-------------------------------------|---------------------------|-----|-------|--|
| <i>Andropogon gerardii</i>        | Big bluestem       | 4-6         | Yes       | 4-9  | Pale purplish white to purplish red | Summer to early fall      | F   | D-A   | Beautiful fall color: good for native planting or mixed border                     |
| <i>Bouteloua curtipendula</i>     | Sideoats grama     | 1.5-2.5     | Yes       | 4-9  | Purplish                            | Mid summer to fall        | F   | D-A   | Oat-like seeds hang down from one side of stem                                     |
| <i>Calamagrostis x acutiflora</i> | Feather reed grass | 3-5         | No        | 5-9  | Pinkish purple                      | Late spring to fall       | F-P | A-W   | Part shade better for hot climates; healthier if soil does not dry out             |
| <i>Chasmanthium latifolium</i>    | Inland sea oats    | 2-5         | Yes       | 3-8  | Green                               | Mid summer to mid fall    | F-P | A-W   | Good for dried flower arrangements; attractive almost year-round                   |
| <i>Hystrix patula</i>             | Bottle brush grass | 2.5-3       | Yes       | 5-9  | Green                               | Late summer to early fall | F-P | D-A   | Grown easily from seed; flower heads resemble bottle brushes                       |
| <i>Miscanthus sinensis</i>        | Eulalia            | 5-8         | No        | 5-9  | Pale pink to reddish                | Late summer to frost      | F-P | A     | Best in full sun; seed plumes provide winter interest; tolerates heat and humidity |
| <i>Panicum virgatum</i>           | Switch grass       | 3-6         | Yes       | 5-9  | Pink-tinged                         | Mid summer to fall        | F-P | A-W   | May spread but easily controlled   |

|                                |                    |     |     |     |                                 |                           |     |     |  |
|--------------------------------|--------------------|-----|-----|-----|---------------------------------|---------------------------|-----|-----|--|
| <i>Schizachyrium scoparium</i> | Little bluestem    | 2-4 | Yes | 3-9 | Purplish bronze                 | Late summer to mid fall   | F   | D-A | Has bronze-orange foliage in fall; fluffy white seed heads may persist into winter |
| <i>Sorghastrum nutans</i>      | Indian grass       | 3-5 | Yes | 4-9 | Light brown with yellow stamens | Late summer               | F   | D-A | Good for poor dry soil; has orange- yellow foliage in fall                         |
| <i>Spartina pectinata</i>      | Prairie cord grass | 4-6 | Yes | 4-9 | Green with purple anthers       | Late summer to early fall | F-P | A-W | Leaves are sharp-edged; turn bright yellow in fall; good for edge of pond/stream   |
| <i>Sporobolus heterolepis</i>  | Prairie dropseed   | 2-3 | Yes | 3-9 | Pink and brown-tinted           | Mid summer to fall        | F   | D-A | Tolerates drought and heat; fragrant flowers                                       |