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# SPOTTED SPURGE

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*Integrated Pest Management for Landscape Professionals, Citrus Growers,  
the Container-grown Ornamental Industry, and Home Gardeners*

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Spotted spurge, *Euphorbia* (= *Chamaesyce*) *maculata*, is an annual species that is native to the eastern United States. It is common throughout California and has become a serious weed in many crops including citrus, turf, ornamental beds, and container ornamentals.

## IDENTIFICATION

Spotted spurge is a low-growing annual plant that often forms a dense mat (Fig. 1). It has dark green, opposite leaves that are  $\frac{1}{8}$  to  $\frac{1}{2}$  inch long and about  $\frac{1}{8}$  inch wide. Leaves are usually marked with a red spot midway down the center leaf vein. Each leaf has a short stem (petiole) with a separate stipule, or little scalelike appendage at its base; you may need a 10X hand lens to see the stipule. The stem, when broken, exudes a milky latex juice. The plant has a central taproot system that is capable of extending more than 2 feet into the soil. The tiny, pinkish flowers consist of only stamens and pistils and are grouped in small flowerlike cups (cyathia) in the leaf axils. The fruit is a three-celled seed capsule that is  $\frac{1}{16}$  inch long or less. Each cell contains one seed that is about  $\frac{1}{25}$  inch long.

Although spotted spurge is the major spurge weed in California, there are six other species of spurges that appear regularly as weeds in the state: garden spurge (*E. hirta*); nodding spurge (*E. nutans*); ground spurge (*E. prostrata*); creeping spurge (*E. serpens*); petty spurge (*E. peplus*); and thyme-leaved spurge (*E. serpyllifolia*). Ground spurge and creeping spurge are both widespread and troublesome weeds in California; petty spurge is a problem in southern California landscapes; and

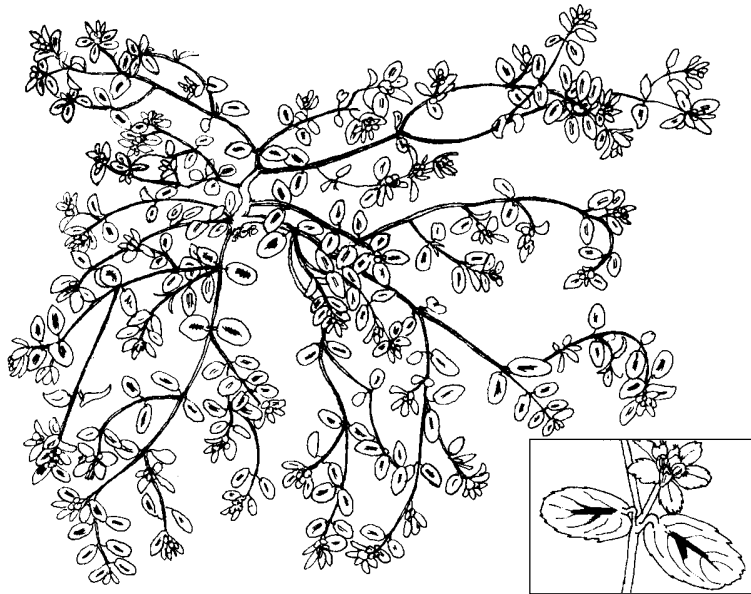


Figure 1. Top view of spotted spurge (inset: closeup of leaves and flower).

garden spurge, nodding spurge, and thyme-leaved spurge are much less frequently the source of problems. In addition to these weed species there are 17 native species of spurge that occur in arid plant communities. A few individuals of some of these native species may appear at the margins of cultivated areas adjacent to wildlands, but they are poorly adapted to cultivated conditions and rarely occur as weeds.



The plant key in this *Pest Note* (Table 1) is provided to identify all the spurges commonly encountered as weeds in California. Any weedy spurge that does not appear to fit the characteristics described in this key may be keyed using *The Jepson Manual*, listed in

“References,” or may be pressed and sent to the third author (address on last page) for identification. Unidentifiable plants may be either native species not treated here or newly introduced weeds such as garden spurge, which has only very recently been detected in the state.

## IMPACT

Spotted spurge can become established in horticultural, agricultural, and noncrop sites. It overgrows turf and low-growing ground covers; invades open areas in gardens and landscapes; and can grow in sidewalk cracks. Spotted spurge is often found in citrus groves where it is tolerant of the herbicides commonly used for weed control in citrus. In addition to reducing the

**Table 1. A Key to the Weedy Spurges of California.**

- ◆ flowers (cyathia) in dense axillary or terminal clusters (gen. > 10 cyathia per cluster)
  - stems erect, to 3 ft tall, sparsely hairy ..... NODDING SPURGE (*Euphorbia nutans* Lagasca)
  - stems prostrate, with numerous spreading hairs ..... GARDEN SPURGE (*E. hirta* L.)
- ◆ flowers (cyathia) solitary or paired in leaf axils (note: since leaves are opposite there will be a 2 to 4 cyathia in close proximity)
  - cyathia, fruit, stem and leaves hairy
    - fruit very sparsely hairy, 1.5–2 mm long; seeds 1–1.25 mm long, wrinkled with low rounded ridges; leaves lacking reddish central spot (rare form) ..... THYME-LEAFED SPURGE (*E. serpyllifolia* Persoon)
    - fruit distinctly hairy; < 1.5 mm long; seed generally < 1 mm, cross-ridge with narrow sharp ridges, or wrinkled; if wrinkled, leaves usually with reddish central spot (very common species)
      -  seeds cross-wrinkled; fruit with appressed hairs over whole surface; leaves generally (> 95% of plants) with a reddish central spot ..... SPOTTED SPURGE (*E. maculata* L.)
      -  seeds cross-ridged; fruit spreading hairy, mostly on edges only; leaves never with reddish central spot ..... GROUND SPURGE (*E. prostrata* Aiton)
  - cyathia, fruit, stem and leaves hairless
    - stipules (appendages at leaf base) united into a whitish scale between the leaves; stems almost always rooting at the nodes; leaf margins smooth-edged or faintly toothed ..... CREEPING SPURGE (*E. serpens* Kunth)
    - stipules separate and hairlike; stems rarely or never rooting at the nodes; leaf margins distinctly toothed, at least near the tip ..... THYME-LEAFED SPURGE (*E. serpyllifolia* Persoon)

growth of desirable species, spotted spurge reduces uniformity and quality of turf, provides habitat for undesirable insects in citrus, serves as an intermediate host for fungal diseases of cultivated crops, and attracts ants with its seed.

Spotted spurge is poisonous and has been known to cause death when sheep graze pastures where it is the predominant weed. Sheep that consumed as little as 0.62% of their body weight of spotted spurge have died within a few hours.

**BIOLOGY**

Spotted spurge is a summer annual that does not like competition and depends on its prolific seed production for survival. A single plant is capable of producing several thousand seeds. Seeds are small and can remain dormant in the soil until conditions are suitable for germination. Seeds that are produced in summer germinate readily whereas those produced in late fall are mostly dormant and won't germinate until spring. Spotted spurge germinates best when temperatures are be-

tween 75° and 85°F, but germination can occur at temperatures as low as 60°F and as high as 100°F. Thus, when moisture is available, germination can occur from February through September in most areas of California. Light is also required for maximum germination; seeds buried deeper than ½ inch will not germinate well. Plants that germinate early in spring under cool conditions may remain as small seedlings until temperatures are more desirable for growth. Once the seed germinates, a small rosette of leaves develops. As growth continues, the leaves form a dense mat that can grow up to 3 feet in diameter. Reproductive growth is rapid and seeds can be produced as soon as 5 weeks after germination.

**MANAGEMENT**

The primary method of managing spotted spurge should be prevention—it is very difficult to control this weed once it is established. Avoid bringing spotted spurge seeds into uninfested areas: use weed-free planting seed and uncontaminated planting stock. Clean machinery (lawn mowers) and work-

ers' clothing to remove any weed seeds that might be present. Infested areas must be constantly monitored to cultivate or hand-pull new plants before they produce seed. Plants that are hand-pulled often break at the stem, leaving the root and several buds or a single stem from which regrowth is possible. Germination can be reduced if it is possible to bury the seeds or add a layer of mulch to cover them. When mulching, put at least 1 inch of a fine mulch or 3 inches of a coarse mulch (bark, etc.) on the soil surface. Be careful that seeds do not get on top of the mulch or they will germinate and grow there. Before planting areas to turf or ornamentals, soil solarization (covering the soil with sheets of clear plastic for 5 to 6 weeks during the summer) may be an effective method of reducing the viable seed population in areas where summer temperatures are hot (90°F or higher).

**Turf**

One of the best control measures for spotted spurge in turf is to maintain a competitive stand of grass. Where open areas develop in the turf either

from stress, disease, insects, or abuse, light is able to penetrate to the soil surface, allowing spotted spurge to germinate. Once spotted spurge is established, altering cultural practices (mowing height, fertilization or irrigation) will not control it, but raising the mowing height in tall fescue or perennial ryegrass to 2 inches or more may reduce initial invasions.

Preemergent herbicides are helpful in reducing establishment of spotted spurge if they are applied in late winter before weed seeds germinate. Check the soil temperature to make sure the herbicides are applied before soil temperature at 1 inch exceeds 55° to 60°F. Preemergent herbicides for spurge in turf include pendimethalin (Pendulum), isoxaben (Gallery), DCPA (Dacthal), oxadiazon (Ronstar), and dithiopyr (Dimension); of these herbicides, only pendimethalin, dithiopyr, and isoxaben are available for use by the home gardener. Combination products are also available for both the home gardener and professional landscaper; examples include trifluralin plus benefin and oryzalin plus benefin.

Two postemergent contact herbicides, bromoxynil (available for commercial use only) and glufosinate (available for both commercial and home landscape use), can be applied to spotted spurge plants to reduce populations.

### **Container-grown Ornamentals and Ornamental Beds**

Hand-pull spotted spurge plants from containers or ornamental beds. There

are no selective herbicides that will control spurge once it is established. If planting new containers, be sure to use sterilized or weed-free planting mix. When purchasing container plants or stock for ornamental beds, avoid those with spotted spurge infestations. Preemergent herbicides will control spotted spurge if applied before emergence of the weed. These herbicides include pendimethalin, oryzalin, oxadiazon, prodiamine, and isoxaben (only oryzalin is available for home garden use). Combinations of herbicides are also available: oryzalin plus benefin, which can be used on ornamental beds but not for container-grown plants by both the home gardener and professional landscaper, and isoxaben plus trifluralin, which is available for professional use only. Mulches can effectively limit spotted spurge if they prevent light from reaching the seed. Hand-pull seedlings that escape preemergent herbicide treatment or germinate on the surface of mulches before they mature and produce seed.

### **Citrus**

Spotted spurge is not controlled by the preemergent herbicides commonly used in commercial citrus orchards. It grows around drip emitters and low volume emitters and provides a habitat for insects that clog the emitters. Cultivation is not a viable option for control in citrus as it disturbs the shallow root system of the citrus, but a shallow scraping of the soil with a shuffle hoe may provide control. Spot treatments with the postemergent herbicide gly-

phosate can remove infestations, but retreatment is usually necessary every 6 to 8 weeks during the growing season. Preemergent treatment with oryzalin is helpful if it is applied in late winter before spotted spurge seeds germinate.

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For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

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#### WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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