CREEPING OXALIS  Oxalis corniculata
SOURSOB  Oxalis pes-caprae

Creeping oxalis, Oxalis corniculata, is a cosmopolitan weed species that occurs throughout the world. It is widely distributed in lawns, flower beds, nurseries, gardens, and greenhouses. A related species, Soursob (O. pes-caprae) originates from South Africa. Soursob has been cultivated as an ornamental, and though it is found in lawns, it usually is only a problem in gardens or shrub areas.

IDENTIFICATION AND LIFE CYCLE

Creeping Oxalis (Creeping woodsorrel). Creeping oxalis grows in both full sun and shade in areas that receive adequate moisture. It is a perennial plant (lives for several seasons) that grows in a prostrate manner (low and creeping) and forms roots along its stems where nodes contact the soil. The leaves of creeping oxalis are composed of three heart-shaped leaflets that are attached to the tip of a long stem (petiole). The green leaves often close and droop at night or under high light intensity. If creeping oxalis plants are stressed from drought or full sunlight, the leaves sometimes turn reddish and wilt. There is also a purple-leafed subspecies, O. atropurpurea.

Flowers of creeping oxalis can be found almost anytime during the year and have five small yellow petals (3 to 7mm long) that occur in clusters of one to five at the ends of slender flower stalks. Seedpods are erect, hairy, cylindrical (resembling peas), and 4mm to 25mm long. Creeping oxalis seed is rough, reddish, and about a millimetre in size. There are about 10 to 50 seeds per pod, with more than 5,000 seeds per plant. Plants can produce seeds even when kept mowed to 5mm. When seedpods mature, they burst open and forcefully expel the seeds, which may land 10 feet or more from the plant. Because seeds are rough, they adhere to surfaces of machinery or clothing.

Light is required for germination. Optimum seed germination occurs at temperatures between 15°C to 27°C, though some germination occurs at lower temperatures. The seeds can germinate any time of year, but most plant establishment takes place in autumn. It is not known how long seeds remain viable in the soil. Germination is inhibited when seeds are exposed to moist, warm conditions (4 hours of moist heat at 36°C decreased germination of creeping oxalis by 96%, and 8 hours stopped it altogether). The seedling has two round cotyledons (seed leaves), and the first true leaves are a replica of the mature, three heart-shaped leaflets. Creeping oxalis grows rapidly from a seedling, forming a fleshy taproot and an extensive rootstock that expands outward. Though flowering seems to occur almost all year, spring is a time of heavy flowering and seed formation. Extremely cold or hot temperatures reduce growth, but the plants do not die. If the plant is pulled out, the rootstock often breaks off and remains in the soil, allowing the plant to regrow.

Soursob. (Bermuda buttercup in USA) is a perennial that grows in full sun or shaded areas. It grows from bulbs in autumn and flowers in late winter or early spring. The plant forms a single, short, vertical stem that is mostly underground. The leaves, which are larger and flesher than those of creeping oxalis and are often spotted with purple, form a rosette on the surface of the soil. Small, whitish bulblis develop on the stem at the base of the rosette of leaves, and new bulbs form underground. The flowers are bright yellow and from...
20 to 35mm in diameter, and the seed pods resemble the bulbs. Soursob reproduces primarily by means of bulbs and spreads when soil contaminated with the bulbs is moved to uninfested areas.

**IMPACT**

**Creeping Oxalis.** Creeping oxalis is a major weed in turf, ornamental plantings, gardens, and nurseries. It is also a serious problem in container-grown, ornamental production. Uninfested landscapes can become contaminated if infested container stock is used in plantings. As seedpods mature and expel seeds, creeping oxalis spreads from container to container, flowerbed to flower bed, or across ornamental plantings. Hand weeding is used extensively to reduce infestations, particularly in commercial nurseries. Creeping oxalis can establish rapidly in semi-shaded areas of new or established grass or dichondra. It also spreads in turf from mowing and other cultural operations. Once established, it is very competitive because it grows all year. This makes it a particular problem in turf species that have a dormant period such as couch grass.

**Soursob.** Soursob is grown as an ornamental in the northern hemisphere. Once established it spreads throughout a garden, competing with other plants. It can spread into edges of turfgrass, but mowing reduces its invasiveness. It is a major problem in field-grown flowers and in the home garden. Hand weeding is used extensively to reduce infestations, though usually not all of the bulbs are removed and new plants appear. Soursob is not as invasive as creeping oxalis because it spreads predominantly from bulbs.

**MANAGEMENT**

**Creeping Oxalis.** The primary methods of managing creeping oxalis are to remove the established plant and to try to control the germinating seeds. Seedlings can be controlled by continual hand weeding or by the use of preemergence herbicides. Burying seeds or covering them with mulch to block their exposure to light prevents germination and is a very effective way to control seedlings in planting beds, but it is not a feasible method for lawns. **Soursob.** Soursob is mostly found in ornamental beds and in turf where control can be very difficult. Although cultivating or cutting it off can control the top of the plant, this will not kill the bulb. Since Soursob spreads mostly from the bulbs rather than the seeds, do not move soil from an infested site to one that is free of the weed. The effectiveness of control methods against creeping oxalis and Soursob depends on where the weed is growing.

**Turfgrass** The following sections outline specific controls for use in turfgrass, container-grown ornamentals, and landscape plantings.

**Cool Season Turfgrass (ryegrass, tall fescue, Kentucky bluegrass, bentgrass).** Mowing, fertilising, or irrigating to control creeping oxalis is not effective: the more vigorous the turfgrass, the more vigorous the creeping oxalis. Creeping oxalis survives and sets seed even when mowed as close as 5mm. If lawn mowers are used where creeping oxalis is growing, wash or air spray them to remove all seed and clippings before mowing a weed-free turf. Triclopyr can be applied by a professional herbicide applicator for the control of established creeping oxalis plants in cool season turf. Other herbicides currently on the market that mention the control of Oxalis in turf on their labels are mostly ineffective. They may burn the foliage of the oxalis, but regrowth is rapid. Often one application of triclopyr is adequate for control, but a follow-up application may be necessary for complete control. Once established plants are controlled, a preemergence application of pendimethalin, isoxaben, or a mixture of isoxaben plus trifluralin will control new seedlings.

**Warm Season Turfgrass (couch grass, kikuyu buffalo, zoysia and dichondra).** Currently there are no herbicides available for the control of creeping oxalis in warm season turfgrass. 3ml MCPA –Dicamba plus 4ml 2,4-D amine per litre of water will suppress creeping oxalis in turf. Follow-up treatment is usually required for this difficult weed. Products containing 2,4-D, mecoprop, or dicamba (many different labeled products) will burn the top of the plant but will not control the weed. If lawn mowers are used where creeping oxalis is growing, wash or air spray them to remove all seed or clippings before mowing a weed-free turf. Seedlings can be controlled with 2,4-D, mecoprop, or dicamba or oryzalin alone or in combination with benefin or isoxaben, but these products will not control established plants.
Container-Grown Ornamentals
When you plant new containers, use soil that is free of weed seeds. If purchasing container plants, avoid those with Oxalis in the pots. If mature oxalis plants are found, carefully pull them out so that all of the rootstock is removed. Fabric or organic mulches will prevent seed germination. Several preemergence herbicides are available to the commercial nurseryman to control germinating seeds in containers, including pendimethalin, oryzalin, oxadiazon, isoxaben, dithiopyr, and combinations of oxyfluorfen and oryzalin, or isoxaben and oryzalin. Creeping oxalis seedlings may grow at the base of plants, where they escape preemergence herbicide treatment or poke through mulches. Remove the weeds before they set seed.

Landscape
Control is difficult in areas with shrubs or ground cover, particularly if established creeping oxalis plants are not controlled in other areas of the landscape. Total control of established oxalis and seedlings is necessary in turfgrass, shrubs, ground covers, and bedding plant areas to prevent creeping oxalis from reestablishing. Carefully hand-weed established plants to remove as much of the stem sections as possible because they break easily; several weedings are usually necessary to remove old plants because new plants will grow from the stem segments that remain in the soil. After established plants are removed, apply a mulch or preemergence herbicide to control seedlings. Two types of mulching materials are effective: geotextile fabrics and organic mulches used alone or over the top of the geotextile fabrics. When using organic mulches, cover the soil with 5 to 10 centimetres of mulch. If any light reaches the soil, seeds may germinate or plant parts may regrow. If seeds drop on top of the mulch, they will usually germinate and grow.

If you are using preemergence herbicides to control creeping oxalis, two applications of the herbicide about 6 to 8 weeks apart may be necessary to control all of the seedlings. Because most seeds germinate in autumn, make applications of preemergence herbicides at this time. Oryzalin, simazine, pendimethalin, and isoxaben are available for commercial use. Do not use these materials on bedding plants or injury may result. There are no herbicides available to control creeping oxalis in ornamental plantings after the weed has emerged.

Cut Soursob before it flowers and forms new bulbils. Repeated cutting or cultivation is necessary to reduce a population. Before planting an infested area, soil solarisation can be used to reduce Soursob populations. Best results have been obtained if solarisation is done for 4 weeks during summer. (See Soil Solarisation: A Nonchemical Method for Controlling Diseases and Pests, listed in the References). Glyphosate effectively kills the top growth of this weed, but it is a nonselective herbicide that also kills ornamentals: be careful this herbicide does not drift onto desirable plants. Other herbicides are not effective on Soursob beyond the seedling stage or on plants emerging from bulbs.

REFERENCE

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