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It's time to corral invasive oxalis

By Mark S. Brunell

It is probably safe to say that all gardeners in the bay area will at some point be confronted with the weed known as oxalis. There are two species of oxalis that are common weeds in the Bay Area: *Oxalis pes-caprae* (Bermuda Buttercup) and *Oxalis corniculata* (Creeping Woodsorrel). Both species are naturalized nonnative species that are very difficult to control.

Bermuda Buttercup is neither a buttercup nor is it from Bermuda. It is native to South Africa, where it occurs as a well-behaved native plant but also as a weed. In its native country, the plant reproduces by seeds and bulbs, but elsewhere it produces no seed and so propagates itself solely by bulbs. Bermuda Buttercup has long been grown as an ornamental species because of its beautiful yellow flowers which are usually present from February to May, and attractive leaves, which bear three clover-like leaftlets, each shaped like an upside-down heart. Many people mistake this species for a clover, however they are not related. Another name for this species is Sour Grass, named for its sour taste caused by the chemical oxalic acid. More than 50 years ago, this species escaped cultivation and became naturalized. It quickly spread into new habitats, such as ditches, roadsides, fields, and planting beds, and is now invading natural areas and impacting native plants.

Bermuda Buttercup reproduces by bulbs that form underground at the base of the stem just below the leaves, and also along a horizontal stem that acts somewhat like an underground runner. The bulbs are white to light brown in color, and about the size of an unshelled peanut or smaller. The plant is often inadvertently moved from place to place by moving around bulb-contaminated soil. Removing bulbs from the soil is extremely time-consuming, requiring either hand-picking or sieving. A single bulb, after sprouting and growing, can produce ten times its weight in bulbs, and a single plant can spread those bulbs over a foot away from the mother bulb. Therefore, any successful control method must aim to reduce bulb production. Research from Australia has shown that cultivating the ground at the "old bulb exhaustion stage" is somewhat effective. In this stage, the mother bulb has sprouted and grown a short stem and a set of leaves, but has not yet flowered. The old bulb is depleted of nutrients, and its formerly white swollen scales have become thin and flaky. At this stage, tiny new bulbs are present but are too young to survive soil cultivation. Based on this research, bulb populations can be reduced by waiting until the plants have grown a set of leaves in the fall/winter, but are not yet flowering, and then tilling the soil to bring the plant fragments to the surface. Another tilling should be performed two weeks later to reduce any fragments that have regrown. Another common method is to sheet-mulch over the plants with cardboard, and cover with a thick layer of woodchip mulch; eventually the remaining plants will be weakened from the reduction in light. Avoid watering the weed by using drip irrigation

for the desired landscape plants. If desired, broad-leaf or nonselective herbicides can be used, and are also best applied at the bulb exhaustion stage. The efficacy of herbicide control depends on the timing of application and the type of herbicide used. No matter what control measure is used, diligence and labor are necessary to reduce population levels. If an infestation is large, complete control is probably not possible, but reductions to acceptable levels are achievable.

Creeping Woodsorrel in many ways resembles a smaller version of the Bermuda Buttercup, however there are important differences. Creeping Woodsorrel is probably native to the Old World, and has a creeping stem that roots at the nodes, has no bulbs, flowers most of the year and reproduces abundantly by seed that are ejected explosively from the fruits, which resemble tiny okra fruits. The seeds are rough and stick to most surfaces, and they can be thrown 10 feet from the mother plant. This weed is very often found in lawns, where it intermingles with turf grasses, and it also contaminates plant containers and beds. The seed require light to germinate, so a simple control method is to heavily mulch over them, depriving them of light. Pulling this weed out whole from the soil is made difficult by the fragile creeping stems that are well-rooted along their length. In containers, a useful control method is to invert the pot and pop out the plant and soil. The weed stems generally circle around the root ball of the desired plant, and can be unwrapped and removed. As with Bermuda Buttercup, complete control is often not possible, but diligence will be rewarded with fewer weeds.

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The Creeping Woodsorrel seedling has oval cotyledons and true leaves bearing three leaflets.