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# GREEN KYLLINGA

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*Integrated Pest Management for Home Gardeners and Landscape Professionals*

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Green kyllinga, *Kyllinga brevifolia*, is a weedy sedge that is becoming a major problem in turf and ornamental plantings in California. The genus *Kyllinga* consists of about 40 species that are distributed worldwide in subtropical and warm temperate regions. Green kyllinga has been reported as a weed problem from Florida across the Southeastern United States into Arizona, California, and Hawaii. In California it occurs from San Diego to the Sacramento Valley. Green kyllinga is believed to have originated in Asia and was reported as a weed in California more than 50 years ago. However, it has developed into a major problem for turfgrass and landscape managers during the last 10 to 15 years. Green kyllinga is sometimes confused with purple or yellow nutsedge, but its growth habits, reproduction, and morphology are different.

## IDENTIFICATION AND LIFE CYCLE

Green kyllinga (Figure 1) is a perennial plant that grows best in moist or wet areas that receive full sun, but it can survive some shade and drying once established. Green kyllinga grows well in warm weather from April through October. It is dormant in winter but remains green in warm climates where freezing doesn't occur. It can yellow in the winter but doesn't turn brown when it goes dormant. When left unmowed, green kyllinga can reach a height of about 15 inches but will adapt and grow in a prostrate manner if mowed. The plant produces a network of numerous underground stems (rhizomes) and can root and send out new leaves at each stem node. If green kyllinga rhizomes are removed and chopped into pieces, new plants can be produced from each node or stem

section. Rhizomes in soil will begin to produce long, narrow leaves that are 1 to more than 5 inches long as temperatures rise in the spring.

Green kyllinga stands out in turf due to its different texture and growth rate and is easily identified by its flower stalk. Flowering usually occurs from May to October, but it can occur earlier in warm locations. Flower stalks are triangular in cross section and 2 to 8 inches long. The stalks terminate in a globular inflorescence (flower head) that is green and about  $\frac{3}{8}$  inch in diameter. Directly below the flower is a group of three leaves that radiates out from the stalk. There are 30 to 75 spikelets within each flower, and each of these is capable of producing one seed. A mature plant can produce more than 100 flowers within a growing season and up to 5,000 seeds.

The seed of the green kyllinga plant is highly viable and contributes significantly to the spread of this plant. It has an oval shape, is flat in cross section, and is about  $\frac{1}{8}$  inch long and  $\frac{1}{16}$  inch wide. Seed germination occurs at or very near the soil surface. Burying seed as little as  $\frac{1}{3}$  inch below the soil surface reduced germination twelvefold in one Arizona study. The tan-colored seeds germinate when soil moisture is adequate and soil temperatures reach about 65°F. Germination continues throughout the summer. Seedling growth is slow initially, and plants might require several weeks to become established. Once established, green kyllinga forms a vigorous system of rhizomes that allows lateral spread and production of new plants. It can survive and even flower and produce seed at mowing heights of  $\frac{3}{4}$  inch.



Figure 1. Mature green kyllinga plant.

Green kyllinga can be confused with yellow or purple nutsedge because they grow in similar locations. Often green kyllinga can be recognized by its habit of growing in continuously enlarging patches similar to rhizomous turfgrasses. Yellow and purple nutsedge appear more commonly as individual plants and have much wider leaves than the finer-bladed green kyllinga. Also, green kyllinga has a small, round seed head whereas nutsedges have an open spikelet. The flower and rhizomes of the green kyllinga plant and the absence of underground tubers make it easy to distinguish from nutsedges (Table 1).

## IMPACT

Green kyllinga can be a major weed problem for turfgrass and landscape managers. In turf it forms a weak sod that gives poor footing for athletic fields and golf courses. Although green kyllinga is most often a problem in bermudagrass, it has been found in cool-season turf species as well. Green kyllinga has a texture and color that varies from normal turfgrass species and reduces the aesthetic quality of the turf. Also, green kyllinga grows faster than most turfgrass species, which gives infested turfgrass an undulating or irregular surface in as little as two days after mowing.

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# PEST NOTES

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Once a few plants become established in turfgrass or ornamental areas, spread can be rapid. In warm weather, rhizomes can grow by more than 1 inch per day, forming thick mats in just a few weeks. Mowing, foot traffic, and cultivation spread both seed and rhizomes. This allows the production of new plants and hastens spread.

**MANAGEMENT**

The best management approach is to prevent new infestations by excluding and monitoring for the weed. Thoroughly clean mowers and cultivation equipment before moving from infested to weed-free areas. If solitary plants of green kyllinga are found, they should be grubbed out (i.e., remove the entire plant, roots and all) and the area monitored for several months to ensure removal was complete.

When green kyllinga infests ornamental plantings, it forms a dense mat that crowds out desirable species and reduces the vigor of those plants that survive. Because of the extensive rhizome system in established stands, hand pulling or hoeing to remove green kyllinga usually is futile unless done repeatedly over a long period of time. Digging out plants and surrounding soil with a shovel is likely the best approach for removing rhizomes, although plant removal can be very expensive and not always successful. Once established green kyllinga will continue to spread unless control measures are taken.

Turfgrass and ornamental areas should be well maintained to promote maximum vigor and make these plantings as competitive as possible to hinder invasion by the weed. Dense turfgrass and ornamentals will shade the soil surface, making establishment of green kyllinga seedlings difficult. Irrigation systems should be adjusted and managed to eliminate wet conditions that favor green kyllinga.

**Turfgrass**





Controlling green kyllinga in turfgrass requires a combination of control procedures. Wet or overwatered areas in turfgrass provide ideal habitat for a green kyllinga invasion. To reduce the chance of invasion or slow the invasion into turfgrass, don't overwater the turf. If low areas stay wet, improve drainage or reduce water applications in that area.

Early grubbing of solitary infestations has been successful when practiced diligently. Spot spraying isolated plants with glyphosate can be helpful,

but the turfgrass also is killed, leaving open areas that allow reestablishment of kyllinga or invasion of other weed species. The open spots should be overseeded or patched with sod to establish a vigorous turf.

Mowing and nitrogen fertilization also affect the growth of green kyllinga. In one study on hybrid bermudagrass, low mowing (i.e., 1 inch compared to 2 inches) resulted in increased green kyllinga seed germination and growth in established turf provided with adequate nitrogen. However, in newly established turf where there was significantly more green kyllinga

**Table 1. Distinguishing Characteristics of Green Kyllinga and Yellow Nutsedge.**

Green kyllinga	Yellow nutsedge
<b>Growth habit</b>	
continuously enlarging patches, almost as a turf	usually individual plants or, when young, connected widely by rhizomes
 <p style="text-align: right; font-size: small;">J. K. Clark</p>	 <p style="text-align: right; font-size: small;">J. K. Clark</p>
<b>Seed head/flower</b>	
small, round	open spikelet
<p style="text-align: right; font-size: small;">J. M. DiTomaso</p>	<p style="text-align: right; font-size: small;">J. K. Clark</p>
<b>Below-ground propagation method</b>	
rhizomes; no tubers	tubers
 <p style="text-align: right; font-size: small;">J. K. Clark</p>	 <p style="text-align: right; font-size: small;">J. K. Clark</p>

present, the mowing height didn't have as great an effect, and additions of nitrogen resulted in increased turf cover and less spread of green kyllinga. Unfortunately, eradication wasn't possible with any mowing height or nitrogen rate.

Chemical control of green kyllinga may be achieved with preemergent herbicides applied before the seeds germinate, with selective postemergent herbicides for established plants or with a combination of preemergent and postemergent herbicide treatments. The use of herbicides can be very effective if combined with cultural methods such as water management and exclusion of green kyllinga from turf and landscape areas.

Preemergent herbicides have been successful in limiting germination of green kyllinga seeds. These herbicides should be applied in spring before soil temperatures reach 60°F to limit germination in late spring and early summer. Preemergent materials that are effective include benefin, bensulide, dithiopyr, pendimethalin, and prodiamine.

Postemergent herbicides can limit growth of green kyllinga. Herbicide products available for green kyllinga and plants in the sedge family contain halosulfuron, imazosulfuron, MSMA, or trifloxysulfuron. Be sure to select a product that is safe for your existing turfgrass species. The best control has been obtained when halosulfuron is applied in two sequential applications. Make the second halosulfuron application when kyllinga plants show signs of recovering.

Even when herbicides are used for control, be sure the turfgrass has adequate drainage to reduce the potential for proliferation by this weed. If turfgrass areas are to be completely renovated with new turf from seed, sod,

or stolons, the existing plant material—including green kyllinga—can be treated with a nonselective herbicide such as glyphosate prior to planting.

### Ornamental Landscapes

There are few options for the control of green kyllinga in ornamental landscape plantings. Prevention is very important. Hand removal or spot spraying of solitary plants as soon as they are found will save time and money in the long run. Cultivation or hand hoeing must be done carefully, because hoeing can break rhizomes into smaller pieces and "transplant" them to new areas. This is particularly true if irrigation follows hoeing.

Mulching with landscape fabrics (e.g., geotextile mulches) can be effective if fabrics are overlapped and no light is allowed to penetrate to the soil. Geotextile mulches combined with hand removal should provide adequate control of green kyllinga in perennial planting beds. Use a polypropylene or polyester fabric or black polyethylene (plastic tarp) to block all plant growth. Wood chips or bark should be placed on top to inhibit breakdown by UV light. Plant-derived mulches (i.e., organic mulches) alone might not effectively control kyllinga, because it will probably grow through the mulch.

Preemergent herbicides such as oryzalin and pendimethalin can be used to limit seedling germination in sites where their use is permitted. Make applications in April before soil temperatures reach 60°F. Preemergent herbicides will be of little benefit if established kyllinga plants are present. Postemergent herbicides containing halosulfuron are registered for use in established ornamental plantings. Spot treatment with glyphosate can reduce green kyllinga's growth, but don't let the spray come in contact with desirable plants or injury will result.

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Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. 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 or pour pesticides down the 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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