



Nutgrass Control in the Lawn, Landscape, and Garden

Purple nutsedge (*Cyperus rotundus*), commonly known as nutgrass in Hawaii, is one of the world's most serious weeds. In addition to being unsightly in gardens, lawns, and landscapes, nutgrass can compete with garden crops or landscape plants and restrict their establishment and growth.

Because its growth is severely restricted by shade, most other weeds and many larger crop or landscape plants can eventually dominate nutgrass, but they seldom can completely suppress it, and it will almost always persist if not controlled. Nutgrass grows most rapidly in full sunlight when adequate water and nutrients are available. It becomes more serious when allowed to grow without competition from other plants for light, water, and nutrients. This can occur when annual weeds are removed, crops are harvested, or the soil is cultivated for new plantings.

Nutgrass' slender leaves are connected to a network of underground stems (rhizomes), roots, and tubers. Although nutgrass flowers profusely, very few seeds are formed, and few of them can reproduce. Thus, seeds are not often the source of new nutgrass plants. The underground tubers and corms (nuts or nutlets) are the primary source of nutgrass infestations. Some tubers are linked to above-ground growth, but other tubers may not be connected to leaves above ground (see drawing, p. 3). Left undisturbed, nutgrass will spread by growing laterally underground, several yards each year.

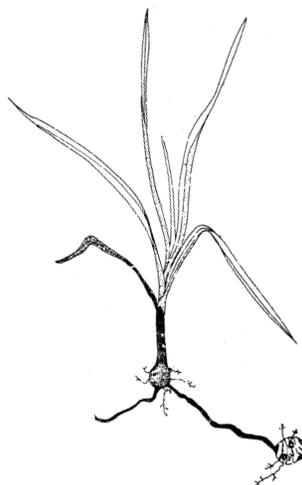
Some other weedy plants can be mistaken for nutgrass, including yellow nutsedge, green kyllinga, and white kyllinga, which have leaves resembling those of purple nutsedge. Nutgrass has brownish flowers, and its tubers occur in chains. Yellow nutsedge, which is primarily found in the Hamakua coast region of the island of Hawaii, has straw-yellow flowers, and

its tubers occur at the end of rhizomes. The kyllingas have no tubers, and their round flower heads have a green or white globe-shaped structure.

New infestations of nutgrass occur when tubers are moved from one area to another on equipment or in soil, plant containers, or among roots of transplants. Under optimum conditions, a network of nutgrass plants arising from one tuber can produce 100 or more tubers in about 100 days. About 80–95 percent of the tubers are located within the top 6 inches of soil. However, tubers have been reported to be present as deep as 18 inches.

Once tubers form, they can remain viable in soils for at least two years if they retain moisture. They can survive even when soils are very dry for short periods. However, if tubers are brought to the soil surface for about one week under sunny conditions, they dry out and die. Populations of viable nutgrass tubers can be dramatically reduced by repeatedly turning the soil at one- to two-week intervals to expose the tubers to the sun.

Tuber dormancy is perhaps the most important of the adaptations that enable nutgrass to persist. Dormancy prevents tubers in the soil from sprouting all at once, so a potential reservoir for new plants is maintained. This is the reason you will find nutgrass emerging after you thought you controlled it with herbicide or by weeding.



Weeding

When hand-weeding, the wiry connections between tubers make them easier to remove than if the connections have been severed by soil cultivation. The tuber or basal bulb of an emerged shoot must be removed to control nutgrass. Clipping the topgrowth is ineffective, and an inch or so of new growth will emerge the following day. Patient gardeners can dig up and remove tubers from the soil and greatly reduce the nutgrass population.

Mulching

Nutgrass is difficult to control with mulch. Most of the materials commonly used as mulch for general weed control around the home and landscape are ineffective against nutgrass.

A thick layer of organic mulch can be partially effective by reducing nutgrass emergence, but it usually will not provide complete control, and it must be renewed frequently.

Black plastic sheet mulch is not effective because the sharp, pointed shoot tip of nutgrass can easily penetrate it. The thin mulch used in pineapple fields is a barrier to water evaporation, but not to nutgrass. Even thicker sheet plastic mulch materials are readily penetrated, particularly when the mulch is spread tightly over the soil or is settled against the soil surface by rain puddles. One variation of the thin film mulch is made from much thicker material with many fine holes punched in it; this is not an effective barrier to nutgrass. Another type of weed barrier is made from gray or black spun-bound polyester and has the texture of a wool blanket; it also is not effective with nutgrass.

Weed cloth, or woven black polypropylene weed mat, can be effective in suppressing nutgrass when used properly. It is porous to air and water and can be an effective tool for reducing nutgrass underground tubers without the use of chemicals or tedious hand-weeding. It is a very durable material that can be re-used many times if handled carefully to avoid making larger holes. Using weed cloth against nutgrass requires that the garden area be fallow (not planted or tilled) for a period of 2–4 months. After the last crop is harvested, remove all plant residues by mowing or rototilling, and cover the planting area with the weed cloth. The method of securing the cloth to the soil is crucial in preventing nutgrass emergence. The preferred securing method is to use long (10–12 inch) spikes fitted with a large flat washer. These spikes secure the weed mat to the ground but should not be used to pull the weed mat too tight. There should be enough slack to allow some air space between the soil and the weed mat. The worst way to secure the weed mat is to use rocks, soil, or other heavy objects. When the weed mat is held tightly to the ground, nutgrass shoots can push through the fabric.

With the weed mat properly in place, nutgrass is induced to sprout by generous and frequent watering. A

new weed mat tends to repel water, but after a 2–3-week exposure to full sunlight, shrinkage occurs and water can pass through the material. As the nutgrass germinates, it pushes the weed mat upward, as if it was inflating it. The nutgrass grows so fast that when the pointed tip of the leaf blade gets caught in the weave of fabric, the rapidly elongating leaf blade starts to crinkle up behind it, and penetration of the cloth is thus prevented.

The weed mat must remain in place long enough for weeds to germinate below it and die from lack of sunlight. After several cycles of weed growth and die-back during the 2–4-month period, the weed mat can be removed and the garden replanted. Most of the weed propagules (including nutgrass tubers) will have tried to emerge and died.

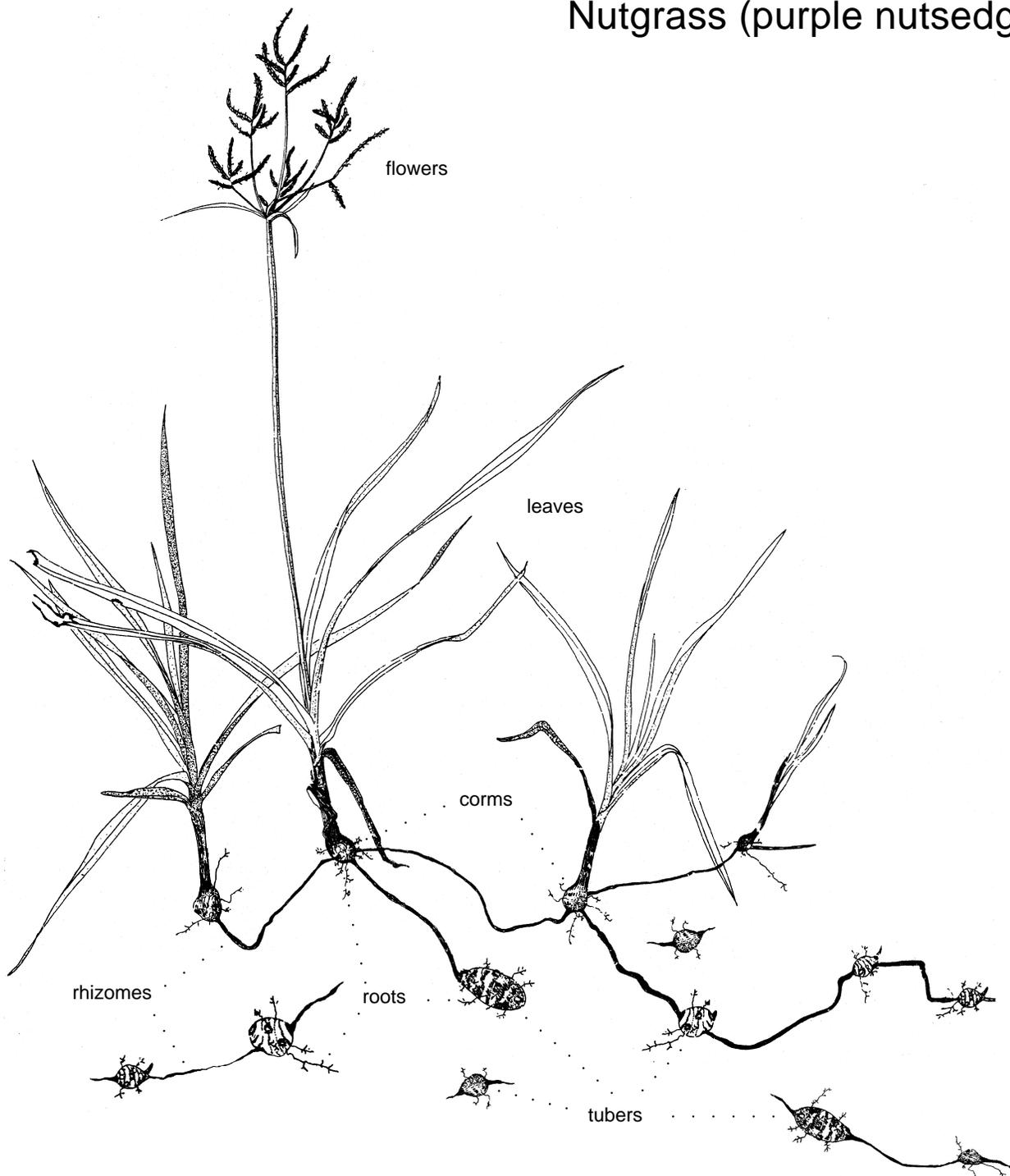
When the plastic is removed, it is important not to disturb the soil unnecessarily. Cultivation brings up lower layers of soils that will likely contain viable weed seeds and nutgrass tubers.

Herbicides

There are effective herbicides for nutgrass control. One of the most effective is glyphosate (Roundup®), because it will kill the underground tubers connected to the leaves. Timing of the Roundup application, however, is crucial for effective control. Spraying newly emerged nutgrass plants is not the most effective method. It is best to apply Roundup 2–3 months *after* the initial emergence of nutgrass. One way to do this is to allow nutgrass to grow while raising a crop that takes 2–3 months to mature. During this time, weed once or twice to remove annual weeds that may outgrow nutgrass and the crop. After harvesting the crop, and while the nutgrass is still growing well, apply Roundup following the label directions, then wait 1 or 2 weeks (or longer) before preparing the soil for the next planting. Many crops can be planted into the treated area, but be sure to read and follow directions on the Roundup label.

This procedure kills nearly all new tubers connected to the emerged nutgrass shoots, as well as the original tubers that sprouted. The nutgrass population in the next crop will be greatly reduced, but it is unlikely that this procedure will kill all the nutgrass, because tubers that are dormant or are not connected to above-ground leaves are not affected by the herbicide application. When nutgrass again becomes a serious problem, this

Nutgrass (purple nutsedge)



Nutgrass is an interconnected network of shoots arising from corms that are connected by rhizomes (underground stems) to other corms and tubers. Tubers that have become disconnected from this network are not susceptible to control with systemic herbicides. After separation from the plant, tubers can remain viable for at least two years and serve as a reservoir of new nutgrass plants.

procedure can be repeated.

Roundup can also be used as a spot treatment or directed spray to nutgrass growing beneath trees, including many fruit trees and landscape plants that are listed on its label. Special care must be taken to avoid getting Roundup spray or drift on green bark or foliage of any desirable trees, shrubs, or groundcovers.

In turfgrass, Manage[®] and Image[®] or a combination of Image and MSMA can provide effective control of nutgrass. Do not apply MSMA to St. Augustinegrass or centipedegrass. A single application of Manage, Image, or Image and MSMA usually controls an existing stand of nutgrass growing in turf. However, a few weeks later, new nutgrass shoots will emerge, arising from dormant tubers that were not connected to nutgrass shoots when the herbicide application was made. The new stand of nutgrass must be treated to prevent new tubers from repopulating the soil. However, it is best to wait 2½–3 months between herbicide applications to allow more nutgrass shoots to emerge before reapplication.

In any herbicide control program for nutgrass, it is important not to allow the weed to grow untreated for longer than three months, because most nutgrass shoots die naturally after three months. Once the nutgrass shoot dies, there is no living connection to the tubers, and many of them escape the herbicide treatment to serve as a source of re-infestation. This reserve can last for two years or longer. Thus, in order to effectively reduce the nutgrass tuber population in the soil, herbicides must be reapplied about every three months for about two years. Some herbicides have use limitations, and application directions on the label must be followed.

“In a nutshell . . .”

Nutgrass control requires an understanding of the plant’s growth habits and weaknesses. With this understanding, control measures including hand weeding, use of mulch, and herbicide applications can be effective in reducing a nutgrass infestation from a serious problem to a minor nuisance.

*Roy K. Nishimoto, Joseph DeFrank,
and David L. Hensley
Department of Horticulture*

Mention of a trademark, company, or proprietary name does not constitute an endorsement, guarantee, or warranty by the University of Hawaii Cooperative Extension Service or its employees and does not imply recommendation to the exclusion of other suitable products or companies.

This and other CTAHR publications can be viewed on the CTAHR website at <www.ctahr.hawaii.edu>.