

Wednesday, January 22, 2003
Session A: Insect Weed of the Year: Nutsedge
Moderator: Kurt Hembree, Farm Advisor
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History and Biology of Yellow and Purple Nutsedge

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The nutsedges are members of the genus *Cyperus*. *Cyperus* is the “type genus” for the sedge or Cyperaceae family. Sedge family members are annuals or perennials, often found in wet habitats. They have three-sided stems and leaves that come off the stem on each of the three sides (three ranked). There are about 110 genera in the family and about 3600 species. Although there are 16 members of the genus in California which are known to be weedy, purple nutsedge (*C. rotundus*) and yellow nutsedge (*C. esculentus*) are by far the most troublesome. The genus name *Cyperus* is from *Cypeiros* which was the ancient Greek name for the genus. *Rotundus* is Latin for round and refers to the tuber and *esculentus* is from the Latin referring to the tuber as “edible”. Yellow nutsedge is also known as Chufa, ground almond, earth almond or rush nut. Purple nutsedge is known as coco-sedge or coco-grass. Both species are often incorrectly referred to as “nutgrass”

Purple nutsedge has bracts or leaves which subtend the inflorescence and are shorter than the inflorescence. The bracts of yellow nutsedge are longer than the inflorescence.

Purple nutsedge is found in the warmer parts of southern California, Arizona, and 11 southeastern states. In the northern hemisphere it is seldom found above the 35th parallel or where the average mid-winter air temperatures drop below 28 F. Purple nutsedge is favored by high light, warm temperature, sandy soils and moist soil conditions. Worldwide it is rated as the world’s worst weed. Purple nutsedge is thought to have originated in India and now can be found as a serious or problem weed in more than 70 countries. It is a severe problem in most irrigated summer crops throughout the tropical and semitropical regions. It has been reported to infest cotton, rice, cowpea, beans, soybeans, tomatoes, melons, carrots, tree and vine crops, turf and ornamentals. The tubers of purple nutsedge have a very strong and unpleasant taste and are not usually used for food, as are the tubers of yellow nutsedge. One reference did tout a medicinal use for the tuber.

Yellow nutsedge is found throughout most of California and in all fifty states except North Dakota and Alaska. In the northern hemisphere it is found up to about the 50th parallel. World-wide yellow nutsedge has been listed as a serious or problem weed in over 18 countries and is found many places where the average mid-winter air temperature does not drop below 0 F. Yellow nutsedge’s favored habitats include sites with high light, sandy soils, and high soil moisture. Worldwide, it is rated in the top 20 of the world’s worst weeds, most often as number 16 or 12. It is most commonly found in subtropical regions. In California it probably ranks above purple nutsedge as a serious weed due to its wider distribution in the state and would easily be in the top ten of our worst weeds. Yellow nutsedge is also a problem in cotton, rice, beans, soybeans, tomatoes, melons, carrots, tree and vine crops, turf and ornamentals.

Yellow nutsedge has been cultivated as a food crop. It has been grown for hog pastures in southeast U.S. and in the Mediterranean Region as “chufa”, a food and beverage crop. The tubers are often eaten raw, cooked, ground to make a beverage after soaking, or scorched and ground to make an “instant coffee”. One recipe calls for roasting until dark brown, grinding, and brewing with a tablespoon per cup. Toasted tubers are eaten as “earth almonds”. Many people consider them to be quite good. The tubers are also touted to have some medicinal uses in the treatment of boils, colds, colic, stomachache, ulcers, bladder ailments, etc.

The nutsedges cause serious economic losses. In crops that they infest it is common to have reports of up to 50% yield losses. Most of the damage that nutsedges do to annual crops is done early in the growing season, where heavy infestations, sometimes exceeding 2,000 plants per square meter, compete with crop seedlings for light, moisture and nutrients. If nutsedge can be reduced early with herbicides, cultivation or hand weeding, the crop gains a height advantage then crop shading reduces the competition effects of nutsedge. Heavy infestations of nutsedge often prohibit the production of summer crops. This necessitates summer fallow and rotation to other less profitable crops. Where practical in high value vegetable production, nutsedge infested land has been fumigated. Fumigation is often used for disease and nematode infestation as well as nutsedge control. Fumigation is very expensive, sometimes exceeding \$1000 per acre. Fumigation, reduces nutsedge, but may not eradicate it from the site. Nutsedge is an example of a weed that can reduce land values. If heavy infestations are present on agricultural land, value can be reduced by as much as \$200. per acre.

In turf nutsedge has a different and unsightly texture than desirable turf species. Nutsedge grows more rapidly than turf, extending its shiny leaves above the turf canopy. It is readily apparent two to three days after mowing. In addition the sod strength of nutsedge is much weaker than normal turf species; providing poorer footing for athletic events. Ornamental areas that become overgrown with nutsedge grow poorly and are of inferior quality. Hand removal of nutsedge from these areas is extremely expensive; and due to the regrowth of buried tubers, is usually unsuccessful. Often the only solution for nutsedge is to remove infested soil down to a depth of three feet and replace the soil with tuber-free soil. This operation can cost thousands of dollars per acre. The nutsedges are examples of weeds where the economic damage that they do is not only due to the cost in lost production of crops and ornamentals but also in costs of waging and ongoing war on this serious pest.

Few weeds have had as much research as the nutsedges. Many researchers have spent significant portions of their careers studying these pests. Bendixen in Ohio spent years studying the anatomy and sprouting of tubers. Dave Bayer at UC Davis studied germination, apical dominance, and translocation of herbicides in yellow and purple nutsedge. Day at UC Riverside studied the effects of drying on tuber survival. UC Farm Advisors Bill Fisher, Harold Kempen, Harry Agamalian, Tim Prather, Carl Bell, Cheryl Wilen, Ron Vargas, Steve Wright, Kurt Hembree, and Robert Kasllenbach have dealt with the biology, cultural and chemical control of these pests. UC Specialists including Clyde Elmore, Milt McGiffen and Art Lange have worked extensively with nutsedges and their management.

Many herbicides have been studied for their effects on the nutsedges. Early reports were published in the 1950's about control with a new miracle herbicide, 2,4-D. Later reports dealt

with the use of MSMA, bentazon, thiocarbamates (EPTC, cycloate, etc.) the acid amides (alachlor, metolchlor, etc.), traizines (atrazine, metribuzin, etc.) uracils (bromacil) and fumigants (methyl bromide and metham), glyphosate, and finally the imidazolinone (imazaquin and imazethapyr) and the sulfonyleurea (halosulfuron) herbicides. We have come a long way in the last 50 years. I can remember crawling around on my hands and knees to place a drop of 2,4-D from an eyedropper into the central whorl of nutsedge plants in my lawn (with little success). Now with one or two applications of halosulfuron either yellow or purple nutsedge can be controlled in turf for a whole season. It is true that we now have many chemical tools that can be useful in a nutsedge management program, yet no one herbicide can completely control nutsedge. It requires a combination of chemical and cultural methods and a lot of patience.

Nutsedge management continues to be an elusive goal, one that may take several more research careers and years to solve.