



# Yellow Nutsedge Management in Field Crops

Jerry D. Doll

YELLOW NUTSEDGE (*Cyperus esculentus* L.) is found in more than 30 countries around the world and made its way to the North Central United States long ago. Although it is commonly found in poorly drained and low areas of fields, it can also survive in upland areas. A regional survey estimated that 12.6 percent of the soybean and 10.5 percent of the corn acreage in the North Central states are infested with yellow nutsedge. Every effort should be made to prevent its spread to new areas and to reduce the seriousness in infested fields.

Yellow nutsedge is a perennial plant with an extensive underground system of rhizomes and tubers or nutlets. It is a member of the sedge family, but because of its narrow leaf, is frequently mistaken for a grass. It is easily distinguished from grasses, however, by its triangular, solid stem which is free of nodes. The base of the stem produces a basal bulb from which the rhizomes form. Nutsedge grows up to 24 inches tall, and the foliage has a light green color. Straw-colored flowers appear within 60 days after the plant emerges.

The tubers range from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in diameter. They are fleshy and white when first formed but soon turn brown or orangish brown. Their shape varies from pea-shaped to highly irregular, flattened forms. Tubers consist primarily of water, starch, oil and sugars with small amounts of fat and protein. In some parts of the world they are referred to as "chufa" or ground almonds and are used as feed and food.

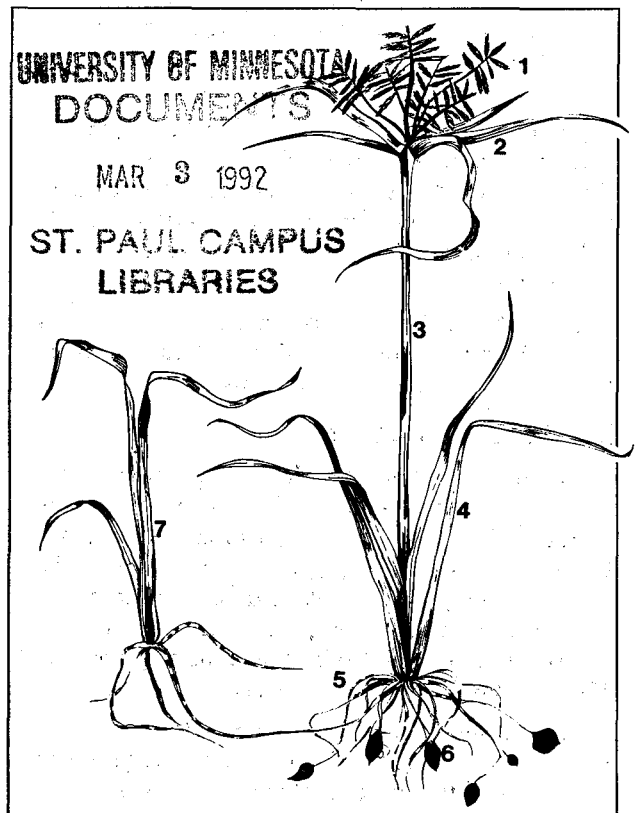
## Growth and Reproduction

The primary means of reproduction is by tubers. Each tuber has eight to ten buds or "eyes," but normally only two or three sprout in the spring. If they are damaged or killed, other buds sprout, sending up new shoots. Tubers planted as deep as 12 inches may have shoots reaching the surface, but most tubers emerge from the upper six inches of soil.

One tuber can produce more than 6,000 new tubers in a year when placed in an uninfested soil, free of crop competition. Tuber populations can reach 30,000,000 per acre in the plow layer of heavily infested fields. New tubers are dormant, but after

winter they break dormancy and sprout readily. After sprouting, a plant begins producing new tubers in approximately 60 days (normally in late July). When the canopy of crop foliage shades nutsedge, tuber production is greatly reduced.

Yellow nutsedge is also a prolific seed producer, yielding up to 200,000,000 seeds per acre. Interestingly, in thick stands of nutsedge, flowering and seed production are reduced. Studies have shown that 50 percent of these seeds are viable and could produce new plants. Nevertheless, the tubers are the most important method of reproduction and cause the most difficulty in controlling yellow nutsedge.



YELLOW NUTSEDGE (*Cyperus esculentus*) plant showing (1) inflorescence, (2) involucre leaves, (3) triangular stem, (4) basal leaves, (5) rhizomes, (6) tubers, and (7) new shoot arising from a rhizome.

## Prevention

Preventative measures must be practiced to avoid introducing nutsedge into uninfested areas. Be sure to clean field equipment upon leaving infested fields because soil adhering to tractors and tillage or harvest equipment may contain nutsedge seeds and tubers. Inspect purchased hay or straw for the presence of nutsedge. While more common in row crops, nutsedge can infest hay and small grain fields and can spread by seed. The effect of ensiling on nutsedge seeds is unknown, but they are probably killed.

## Cultural Practices

Yellow nutsedge control is difficult in most crops and nearly impossible in others. The use of crop rotations, proper fertilization, thorough soil preparation, recommended varieties, and all other good crop management practices aids in controlling yellow nutsedge.

Yellow nutsedge cannot effectively compete once the crop forms a canopy shading the soil surface. Therefore, taller crops such as corn and soybeans compete more favorably with nutsedge than navy beans, alfalfa or turf grasses. Narrow row spacing is more desirable than wide spacing because narrow rows also decrease the amount of light reaching nutsedge.

Nutsedge tubers are sensitive to drying when exposed on the soil surface. Periodic disking or cultivating of infested fields during periods of hot, dry weather reduces the population of viable tubers. However, only tubers on or near the surface are likely to be affected. It is impossible to eradicate all tubers in this manner.

Tubers are very water-tolerant and are not killed by flooding. If submerged, tubers remain dormant until favorable growing conditions return.

## Mechanical Practices

Tilling infested fields in the spring, after the yellow nutsedge has emerged but before planting, reduces its competitiveness by destroying many sprouted tubers. Because nutsedge grows best in warm soils, infested fields should be planted last in order to destroy as many plants as possible during seedbed preparation. Several diskings or similar operations at 10- to 14-day intervals are most effective.

After planting, pay close attention to nutsedge-infested fields. Frequently this weed emerges before the crop, and timely cultivations or herbicide applications are necessary to avoid serious losses. In row crops, adjust the cultivators to mix as much soil as possible between the rows and to cover as much nutsedge as possible in the rows. Cultivators work

best in dry soils; in wet soils they may simply "transplant" nutsedge from one spot to another. A rotary hoe is not an effective implement against nutsedge. The losses caused by uncontrolled nutsedge and the effectiveness of timely cultivation can be seen in the following table.

## Corn and soybean yields with various systems of yellow nutsedge control.\*

Treatment	Corn yield	Soybean yield
	----- (bu/A) -----	
Two cultivations	118	41
Herbicides	126	43
No control	67	24

\*University of Wisconsin on-farm data, 1978-80 and 1982-84.

## Chemical Suppression

Many farmers routinely apply herbicide treatments for annual weed control in field crops. This, perhaps, has spurred growth of aggressive perennial weeds like yellow nutsedge by removing the competition from annual broadleaf and grassy weeds. Perennial weeds are always more difficult to control than annuals. Acceptable suppression requires special efforts.

Often "control" is viewed as "eradication" of a weed because effective herbicide treatments often keep fields free of many annual weeds for the entire season. For perennial weeds like yellow nutsedge, the herbicidal effects are more correctly seen as "suppression" of weed growth, not complete control. Herbicide treatments, cultivation and cultural practices that suppress yellow nutsedge growth during the early weeks of crop development usually are sufficient to allow the crop to produce optimum yields. Effective control for two or more seasons greatly reduces the tuber population to more manageable levels.

The herbicides described here are applied either as preplant-incorporated or postemergence treatments. No preemergence herbicide treatments for yellow nutsedge control are recommended.

Previously we suggested using atrazine for yellow nutsedge suppression in corn. Rate reductions in the national label and even further restrictions on atrazine rates, including moratorium areas imposed in regions of several states, make its use for nutsedge suppression less effective in general and illegal in certain localities. Consult the atrazine label and your county Extension office for guidelines if you are considering using atrazine for yellow nutsedge suppression.

### ***Preplant-Incorporated Treatments***

Incorporating the herbicide into the soil places it in close contact with the sprouting tubers. Incorporation also helps destroy both sprouted and dormant tubers by placing some of them on the soil surface where they will die. The effectiveness of any soil-applied nutsedge treatment is dependent upon thorough and uniform incorporation. Yellow nutsedge control often requires higher herbicide rates than those used for annual weed control. Using less than the recommended rate results in less than optimum nutsedge suppression.

**Eradicane or Sutan+ for corn (EPTC or butylate + a safener).** Use  $4\frac{3}{4}$  to  $7\frac{1}{3}$  pt/A of either Eradicane or Sutan+. At equal rates of application, Eradicane typically provides better nutsedge suppression than Sutan+. Both provide excellent annual grass control and fair to good broadleaf control. Tank mixing atrazine or Bladex with either herbicide broadens the spectrum of control. Atrazine may also provide some activity against nutsedge.

Eradicane and Sutan+ must be incorporated into the soil immediately after application or the active ingredient will vaporize. Most rapid losses occur from warm moist soils on windy days. Incorporate to a depth of 2 to 3 inches with two passes of a disk or other suitable implement, working first in one direction and then in another. At least one incorporation pass should be done with a tandem disk. Plant corn anytime after incorporation.

Nutsedge escaping control of Eradicane or Sutan+ can be controlled with timely and thorough cultivations, or with a postemergence treatment of Basagran plus crop oil concentrate. Eradicane and Sutan+ should not be applied to peat or muck soils as they will be ineffective.

**Lasso for corn or soybeans (Alachlor).** Incorporating Lasso 2 to 3 inches deep provides good to excellent nutsedge suppression. Incorporate uniformly with a disk or other suitable implement working the field in two directions. Incorporation can be delayed 24 hours or longer if desired, but prompt incorporation is suggested. Lasso has some activity on peat and muck soils but is most effective on mineral soils. Lasso gives excellent annual grass control, and tank mixing it with other herbicides generally provides broad spectrum weed control. Nutsedge escaping after crop emergence should be controlled with timely and thorough cultivations or with postemergence treatments of Basagran plus a crop oil concentrate in either corn or soybeans or Classic plus a surfactant in soybeans.

Lasso is available in several formulations and prepackaged mixtures with other herbicides. Its

active ingredient, alachlor, is also available under other brand names. Check the label of your product to determine the appropriate rate to use for yellow nutsedge suppression. Rates will usually be higher than those used for annual weed control.

**Dual for corn or soybeans (Metolachlor).** Dual is chemically related to Lasso and also provides good to excellent nutsedge suppression in corn and soybeans. At equal rates of active ingredient, Dual often gives better late season control of nutsedge than Lasso. Apply Dual before planting and incorporate thoroughly 2 to 3 inches deep, working the field first in one direction and then in another. Do not treat peat or muck fields with Dual. Dual gives excellent annual grass control and tank mixing it with other herbicides generally gives broad spectrum weed control. Nutsedge escaping after crop emergence should be controlled with cultivations or treated with Basagran plus a crop oil concentrate postemergence in either corn or soybeans or Classic plus a surfactant in soybeans.

Dual is available in several formulations and prepackaged mixtures with other herbicides. Check the label to determine the appropriate rate to use for yellow nutsedge suppression. Rates will usually be higher than those used for annual weed control.

**Eptam for direct seeded legumes (EPTC).** To suppress nutsedge during alfalfa or birdsfoot trefoil establishment, apply  $3\frac{1}{2}$  to  $4\frac{1}{2}$  pt/A of Eptam. This product must be incorporated to a depth of 2 to 3 inches immediately after application to prevent volatilization losses. Use a disk or other suitable implement, working the field first lengthwise and then in another direction. At least one incorporation pass should be done with a tandem disk. Seed the desired legume but do not plant oats, brome grass, orchardgrass or timothy as they would be killed by Eptam. Once established, the legume usually competes effectively with yellow nutsedge.

### ***Postemergence Treatments***

Timing is one of several factors influencing the effectiveness of postemergence applications. Spraying before or after the recommended stage of weed growth results in poor nutsedge suppression. Weather conditions before and after treatment also influence the results. Rainfall soon after application may reduce the effectiveness of postemergence treatments. For best control, treat actively growing nutsedge. If nutsedge is growing only in patches or localized areas of fields, treat the infested areas with postemergence applications. Of course, use other measures to control weeds in other parts of the field.

**Basagran for corn or soybeans (Bentazon).** Basagran provides good to excellent yellow nutsedge



suppression. It has only foliar activity and is equally effective on mineral, peat and muck soils. Apply  $\frac{3}{4}$  to 1 qt/A of Basagran to actively growing nutsedge 6 to 8 inches tall. Do not spray when either the crop or nutsedge has been exposed to prolonged periods of drought or unseasonably cold weather because poor suppression will result. Follow label guidelines on the use of crop oil concentrates with Basagran. If necessary, cultivate or repeat the application 7 to 10 days later. Do not apply more than a total of 2 qt of Basagran per acre in one season. Use a minimum of 40 psi pressure and 20 gal/A water. Eight hours or more without rainfall after application are needed for best results.

Basagran also controls several annual broadleaf weeds but has no activity on any grass weeds. Basagran is very safe to corn but may cause slight leaf bronzing or burning to soybeans under certain conditions. Soybean plants usually outgrow this condition in 7 to 10 days.

**Classic for soybeans (Chlorimuron).** Classic provides good yellow nutsedge suppression. Apply  $\frac{1}{2}$  to  $\frac{3}{4}$  oz/acre to nutsedge with 4 to 6 leaves and is 3 to 4 inches tall. Use a surfactant in the spray solution and at least 10 gal/acre of spray solution. Apply Classic using flat fan or hollow cone nozzles. If necessary, cultivate 14 days after treatment. Follow all label guidelines to prevent injury to adjacent or rotational crops and crops subsequently treated with the sprayer used to apply Classic.

## Integrated Control

Perennial weeds like yellow nutsedge require the integration of all control and management methods. No single approach provides adequate suppression. Integrating preventative, cultural, mechanical and chemical measures into a control program is required to reduce the seriousness of yellow nutsedge infestations. Following the suggested cultural methods, using either soil or foliage-applied herbicides, and cultivating as necessary will normally provide acceptable nutsedge control.

Long-term studies in Wisconsin have shown that using timely cultivations or effective herbicides for three seasons reduces tuber populations by over 90%. While no system or treatment tested eradicated yellow nutsedge, the infestations were of slight importance following several seasons of efficient control.

*References to pesticide products in this publication are for your convenience and are not an endorsement of one product over other similar products. You are responsible for using pesticides according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from pesticide exposure. Failure to do so violates the law.*

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**Author:** Jerry D. Doll is professor of agronomy, College of Agricultural and Life Sciences, University of Wisconsin-Madison and University of Wisconsin-Extension, Cooperative Extension.

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