

Nutsedge Management in Trees and Vines

*Kurt J. Hembree, Farm Advisor
UC Cooperative Extension, Fresno County*

Introduction

Yellow and purple nutsedge (*Cyperus esculentus* and *C. rotundus*) are troublesome perennial weeds in orchards and vineyards. Yellow nutsedge is found throughout California, while purple nutsedge is found generally south of Fresno County, particularly in Tulare County and the southern desert regions. Nutsedge does not normally affect production directly, but does highly compete for water and nutrients, especially in new plantings when root systems are not fully developed. It thrives in moist, light textured soils and impedes with the distribution of water, particularly in low-volume irrigation systems. Although seed are produced, it spreads primarily through the production of underground rhizomes and tubers. Nutsedge is moved into and spread throughout fields mainly by cultivation equipment.

There is no easy way to control nutsedge in tree and vine crops. Even diligent management efforts often go unnoticed. Several options are available, however, that can help provide some level of control, including field selection, preplant control, prevention, and pre- and post-emergence herbicides after planting. Since no one option or program will work in all situations, the combined use of available tools is usually required for adequate control.

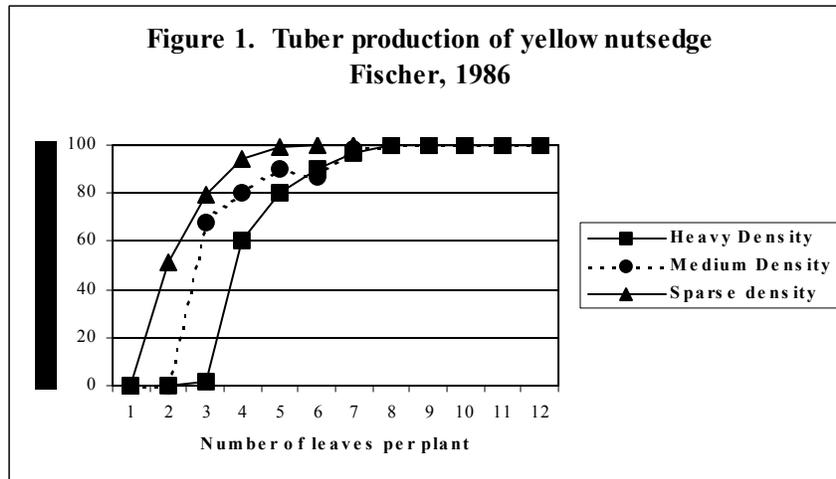
Field selection

Planting in fields that do not have a history of nutsedge is the best method of control. Conduct routine weed surveys well before planting to help determine if nutsedge is present and at what population levels. Knowing the history of the field ahead of time will make it easier to develop a plan of attack in the advent you plant into a field that is infested.

Preplant control

Repeated applications of post-emergence herbicides (like glyphosate) can help to reduce nutsedge levels, especially in fields where the initial population is low. This method requires irrigating the field and allowing the nutsedge to emerge. Once growing, apply the herbicide directly to the plants when they have fewer than 4 to 5 leaves. This will help prevent the formation of new tubers and plants (see figure 1). It is important to repeat applications as often as needed (usually every 2 to 3 weeks) to prevent nutsedge from reinvading the area.

Repeated tillage operations, while the field is fallow or idle, can be used to bring tubers to the surface so they can dehydrate during the hot summer months. The soil should be dry and free of large clods to be effective. Purple nutsedge tubers are sensitive to drying under these conditions and can dehydrate in as few as three weeks. A spring-tooth harrow is usually the best tillage tool for this method, while disking is often ineffective. Studies conducted by Paul Keeley at the University of California Shafter Field Station showed 95% control using this method by listing and splitting the beds during the summer. Yellow nutsedge tubers will not be controlled in this manner, since they can survive in warm, dry soils for up to four years. It is, therefore, important that you determine which type of nutsedge you have before attempting this technique.



Nutsedge tubers buried for more than a year can result in high tuber mortality (80% or more) through decomposition, but it is difficult to bury them with most conventional equipment. Modified flip-over plows (like the Kverneland or Wilcox plow) can invert the upper soil profile to a plowing depth, effectively burying tubers. These plows have been used successfully to bury weeds like nightshade and others as well as disease pathogens (sclerotinia in lettuce). Studies by Tim Prather and others have shown significant reductions in purple and yellow nutsedge emergence and increased tuber mortality when buried more than 12" deep before planting annual crops like cotton. This procedure can also be effective prior to planting an orchard or vineyard. It works best when the majority of the tubers are distributed in the upper four to eight inches of the soil profile prior to turning the soil. Tubers spread evenly throughout the profile will not be buried effectively.

Prevention

Closely monitoring fields for new nutsedge outbreaks is the cheapest and easiest way to prevent its spread. New nutsedge infestations typically appear as small patches, limited in size and distribution. Studies by Dr. Theodore Webster in Tifton, GA have shown that a single nutsedge tuber can give rise to significantly large areas of new nutsedge plants in a short period of time. A single yellow nutsedge tuber may yield an infestation patch of up to 1 m² within six months, while a purple nutsedge tuber can spread to an area of more than 7 m² in the same period of time. To help prevent its spread, inspect cultivation equipment entering the field from infested fields and control nutsedge growing along field edges and other nearby locations. Once identified in the field, pay special attention to those areas and dedicate labor and resources to eradicating it. Use timely post-emergence herbicide sprays to control them and prevent new tubers from forming. Do not skip treatments or use cultivation as the sole means of control, since this can lead to an increase in the size and distribution of the infested patches. Be diligent in your efforts.

Pre- and post-emergence herbicides

There are several pre- and post-emergence herbicides registered in a number of tree and vine crops that can provide control of nutsedge (see table 1). While none of these herbicides will completely eradicate nutsedge with a single application, they can significantly reduce populations over time if applied accordingly. In fact, it may take several years to get nutsedge

under control if the initial population is high and distributed throughout the field. No one approach will work for every field, so select the herbicide or combination of herbicides that best suits your situation. Factors like tree or vine age, soil texture, irrigation type, scope of infestation, equipment availability, field access, and others will influence the approach you take. Prior to using herbicides, read the label carefully and follow all recommendations.

Table 1. Herbicides registered in trees and vines for nutsedge control

<u>Pre-emergence</u>	<u>Purple</u>	<u>Yellow</u>	<u>Post-emergence</u>	<u>Purple</u>	<u>Yellow</u>
Casoron®	C	C	DSMA®	P	C
Eptam®	P	C	Gramoxone®	C	C
Hyvar X®	C	C	MSMA®	P	C
Krovar®	C	C	Reglone®	P	P
Solicam®	N	P	Rely®	P	P
Visor®	P	C	Roundup®	C	C
			Sempre CA®	C	C
			Touchdown®	C	C

C = control P = partial control or suppression N = no control

Refer to the appropriate label for the herbicide registration on specific crops. Control assumes proper rate, application, and timing according to label recommendations.

Pre-emergence herbicides need to be applied prior to the tubers sprouting or emerging. In California, the majority of nutsedge grows from March to September, but can differ, depending on each growing region in the state. Pre-emergent sprays should be timed to meet periods of nutsedge emergence and receive adequate rainfall or irrigation to incorporate and activate the chemical. In some cases, it may mean making more than one application to achieve adequate residual control. Some of the common pre-emergence herbicides are listed on the following page, along with factors that can influence their performance and crop safety.

Solicam®: Crop is 1.5 to 2+ years old • the population is low • symptoms first appear after emergence as leaf bleaching, followed by death • it can leach and cause crop injury in sandy soils with low-volume irrigation.

Hyvar X®: Used in citrus >4 years old • runoff water containing the herbicide can cause injury to nearby trees and vines.

Krovar®: Used in citrus >4 years old • runoff water containing the herbicide can cause injury to nearby trees and vines.

Visor®: Used in bearing and non-bearing citrus and non-bearing tree nuts • applied at 2 pt/A in the fall and again in the spring • mixed with Goal® for broader weed spectrum.

Post-emergence herbicides should be applied after nutsedge plants have emerged. These herbicides must be applied before nutsedge has more than four to five leaves. Applications are generally made every two to three weeks, or as often as necessary to meet new periods of

emergence. Since nutsedge is nearly impossible to fully eradicate once it is distributed throughout the field, and will quickly reinvade the field if control measures are relaxed, a vigorous control program must be maintained indefinitely. Some of the common post-emergence herbicides are listed below, along with factors that can influence their performance.

Roundup[®]: Plants have <4-5 leaves • treated every 2-3 weeks • don't skip treatments if needed • generics give similar control • ammonium sulfate improves control slightly.

Touchdown[®]: Plants have <4-5 leaves • treated every 2-3 weeks • don't skip treatments if needed • ammonium sulfate improves control slightly.

Sempre CA[®]: Tree nuts are >1 year old • plants have <4-5 leaves • used at 2/3 to 1 2/3 oz/A • add a crop oil concentrate, non-ionic surfactant, or ammonium sulfate • also controls pigweed, cocklebur, mustard, and lambsquarters • it has many cautions on the label regarding its use.

MSMA[®] or DSMA[®]: Primarily used in non-bearing crops • better yellow nutsedge control • air temperature is warm during and following treatment • burn-down control only.

Gramoxone[®]: Plants have <4-5 leaves • burn-down control only • Category I, restricted use.

Conclusion

Persistence is the key to nutsedge management in orchard and vineyard settings. While no one measure will provide complete nutsedge control, the proper selection of combinations of options can help to significantly reduce its presence in the field.

Literature cited

Day, B. and R. Russell. 1955. The effect of drying on survival of nutgrass tubers. University of California. Bulletin 751.

Fischer, B. and K. Hembree. 1990. Nutsedge control in orchards and vineyards. Runcina. Vol. 32. University of California Cooperative Extension, Fresno County.

Glaze, N. 1987. Cultural and mechanical manipulation of *Cyperus* spp. *Weed Technology*. 1:82-83.

Prather, T., K. Hembree, and M. LeStrange. 1995. Deep plowing for yellow and purple nutsedge control. University of California Cooperative Extension Report.

Webster, T.M. 2002. Nutsedge biology: implications for management. In a slide show presentation (www.cropsoil.uga/slides/NutsedgeBiology/). USDA-ARS. Tifton, GA.

William, R. and L. Bendixen. 1987. Year-round management of yellow nutsedge (*Cyperus esculentus*). An Extension Worker's Survey. *Weed Technology*. 1:99-100.