

# Weeds in Ornamental Plantings: A Management Plan For Tennessee Homeowners

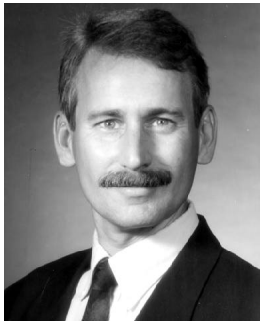


# Weeds in Ornamental Plantings: A Management Plan For Tennessee Homeowners

'*Weeds in Ornamental Plantings: A Management Plan For Tennessee Homeowners*' is provided by The University of Tennessee Agricultural Extension Service to assist you, the homeowner, with managing weeds in your ornamental plantings. This reference provides an integrated approach to minimizing weeds in which well-planned application of herbicides is just a part of the overall approach. This manual is meant as a reference and is not intended to replace reading and understanding the directions in the actual herbicide product label. The use of example brand names or trade names in this publication is intended to aid in clarity, and does not imply approval of the product to the exclusion of others of similar or suitable composition, nor does it guarantee or warrant the standard of the product. Should the registration of a herbicide be canceled prior to revision of this manual, it would no longer be recommended by The University of Tennessee.



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This helpful information has been developed for use by Tennessee homeowners with direction on content and format from Joseph Neal, North Carolina State University, Department of Horticultural Science. Joe wrote a manual for professional landscape maintenance while at Cornell. It is published as *WeedFacts No. 5*, a Cornell Cooperative Extension publication, Cornell University, Ithaca, NY.

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# Weeds in Ornamental Plantings: A Management Plan For Tennessee Homeowners

## Weeds in Ornamentals

This publication provides helpful suggestions to assist you as a homeowner in managing weeds in your ornamental plantings. For assistance with managing weeds in your lawn, refer to The University of Tennessee Agricultural Extension Service publication, PB956, *'Managing Lawn Weeds: A Guide For Tennessee Homeowners,'* which is available at your county Agricultural Extension Service office, or via the Internet at [www.utextension.utk.edu/pubs.htm](http://www.utextension.utk.edu/pubs.htm)



## Weed Management Plan

The overall objective of a weed management program for ornamental plantings is to minimize the need for hand-weeding or physical removal of weeds. The following five-step process should assist you in minimizing weeds in your ornamental plantings:

1. **Site Assessment:** Avoid a problem where you can.
2. **Choice of Plant Type:** Dictates control options.
3. **Species Selection:** Dictates herbicide options.
4. **Site Preparation and Establishment:** Gaining control of perennial weeds.
5. **Minimizing Weeds After Establishment:** Mulches and/or herbicides.



## Site Assessment:



*Site with Purple Nutsedge (an aggressive perennial weed)*



*Purple Nutsedge, seedhead*

Site assessment for landscape plantings is usually not based on weeds but functional use and aesthetics. However, avoid a problem where you can; assess the site for presence of perennial weeds. Perennial weeds may influence your choice of plant type. In certain annual or herbaceous perennial plantings, weed control options are limited, especially for perennial weeds. Ideally, perennial weeds should be controlled prior to establishing an ornamental planting. Controlling perennial weeds after planting may be very difficult and frustrating. Hand removal may be your only option. Control of perennial weeds prior to planting is discussed in the 'Site Preparation and Establishment' phase.

## Choice of Plant Type:

Your choice of plant type will dictate or limit your options for minimizing weeds after establishment of the ornamental planting.

Types of Plantings:

- *Woody Trees and Shrubs*
- *Woody Ground Covers*
- *Annual Flower Beds*
- *Herbaceous Perennial Beds*
- *Mixed Plantings*

**Woody Trees and Shrubs** — Plantings of woody trees and shrubs have the most weed management options, including the use of non-selective herbicides to spot-treat weeds.

Control options include:

- A landscape fabric or weed barrier if the planting is going to be in place for an extended period (generally four or more years). Landscape fabric acts as a barrier to weed emergence but allows passage of water and air. Landscape fabric should be covered with mulch to prevent breakdown by exposure to sunlight and to improve attractiveness.



- Mulch, with or without landscape fabric, is essential. Without landscape fabric, the mulch layer should be 2 to 3 inches thick, with 3 inches being optimum. With landscape fabric, the thickness of the mulch layer can be 2 inches, but 3 is preferred. Mulch restricts light from reaching underlying soil and limits weed seed germination. The mulch, regardless of the type used, needs to be coarse-textured, allowing water and air to pass through freely.
- Non-selective herbicides can be used to control escaped weeds by directing the application under the ornamental foliage, not contacting young succulent stems. Planting should be uniformly mulched to prevent the herbicide from contacting exposed roots.



- Preemergence herbicides can be used with these plantings to prevent weed seedlings emergence. Preemergence herbicides do not control established weeds and have limited activity towards perennial weeds. For the control of annual weeds, preemergence herbicides should be applied prior to weed emergence or to weed-free surface after removal of established weeds.
- Control of perennial weeds prior to establishment is less critical but very beneficial in these types of plantings. Directed applications of a non-selective herbicide will aid in controlling escaped perennial weeds.

**Woody Ground Covers** — This type of planting allows limited use of non-selective herbicides. Once the planting begins to spread, access to emerged weeds under the foliage may be limited to physical removal.



Control options include:

- Landscape fabric may be used where the fabric will not restrict the spread and root growth of the woody ground cover.
- A mulch layer is the best defense towards minimizing weeds. A mulch layer, alone or in combination with landscape fabric, will minimize the germination of annual weeds.
- Selective post-emergence herbicides can be used to control grass weeds (without activity towards broadleaf weeds) with very low risk of injury to most ornamentals (that are not ornamental grasses). Application of a selective herbicide for grass weeds should be made when these weeds are small and newly emerged. For perennial grasses, repeat applications will likely be required. Control of emerged broadleaf weeds is limited to physical removal and you should freshen up or add to the mulch layer to limit further germination.
- Preemergence herbicides can be used in plantings of most species of woody ground covers.
- Pre-plant control of aggressive perennial weeds is essential, especially for perennial broadleaf weeds in this type of planting.

**Annual Flower Beds** — Options for minimizing weeds are most limited in this type of planting. Options are essentially limited to physical removal of escaped weeds, especially broadleaf weeds and an effective mulch layer (where growth of desired ornamentals is not restricted by mulch). Selective postemergence herbicides may be used to control newly emerged grasses. Preemergence herbicides cannot be used when establishing a planting from seed. Use may also be limited after seedlings have become established or after setting transplants (read the preemergence herbicide label carefully for species tolerance and timing of application).



**Herbaceous Perennial Beds** — Options for minimizing weeds in this type of planting are similar to those for annual flower beds. However, control of perennial weeds prior to establishment is essential, because the planting will be in place for a longer period of time, favoring the development of perennial weeds. Control of perennial broadleaf weeds will be limited to hand removal. Newly emerged grass weeds may be controlled with a postemergence grass herbicide that selectively controls grass weeds without injury to the desired ornamental species (read the product label for species tolerance and timing of application).



species tolerance and timing of application).

Preemergence herbicides are limited for perennial beds; thus, check the product label for tolerance prior to application.

**Mixed Plantings** — Options for minimizing weeds in mixed

plantings of woody and herbaceous annuals or perennials are the most limiting, due to the diversity of species present. Options are limited to an effective mulch layer, preemergence herbicides (where possible), postemergence herbicide selective for grass weeds and physical removal of escaped weeds (especially broadleaf weeds).



### Species Selection (based on herbicide options):

If you plan to use preemergence herbicides, choose plant species that you know are tolerant to the herbicide or herbicides you intend to use (this will require you to review the herbicide product use label prior to establishment). All too often the decision to use preemergence herbicides is made after the fact and options are very limited. Preemergence herbicides are often a new tool for many homeowners and may require some experimentation to get a system with which you are comfortable.

### Site Preparation and Establishment:

During site preparation or prior to establishing an ornamental planting is the best time to control perennial weeds. Controlling perennial weeds after planting may be very difficult and frustrating. An aggressive lawngrass now becomes a perennial weed. Prior to planting, weeds can be controlled by hand weeding, repeat cultivation, repeat applications of a non-selective (controls both broadleaf and grass weeds) systemic (controls both above and below ground growth of perennial weeds) herbicide or a combination of these procedures, such as repeat cultivation and non-selective herbicide applications.



Perennial weeds are best controlled in the fall using these methods. Spring or fall is the best time to establish ornamental plantings. However, spring is the most popular time of year. Prior to establishing a new planting, allow enough time to make two applications of a non-selective herbicide. A good approach is to make an initial application and then repeat three weeks later to control regrowth of perennial weeds. Allow a week after the second herbicide application before tilling or working up the soil.

If the planting is going to be in place for an extended period of time (generally four or more years), a landscape fabric or weed barrier may be beneficial if the planting is of woody trees and shrubs or a woody groundcover (if



the fabric will not impede rooting or spread). Landscape fabric will need to be covered with mulch (2 inches).

Do not use black plastic, as plastic impedes water and air movement to the root zone of the ornamental plants.



An effective mulch layer 2 to 3 inches thick is critical to minimizing the germination and emergence of annual weeds. Use a mulch that is coarse-textured (not fine) and does not hold water, providing conditions for weed seed germination on top of the mulch layer.



Edging of landscape beds with some sort of physical barrier, such as a small trench or landscape edging of rigid plastic, bricks or stones, may be helpful. Edging creates a physical barrier that serves to keep the mulch in the plant beds and separates the lawn from the bed, aiding in preventing the lawngrass encroachment into the landscape beds. To minimize the need for the weed trimmer, establish the edging to give you smooth lines (curves, not right angles); with stones or bricks, minimize cracks that are hard to reach with the mower.

In addition, choose plant material that is weed free. Don't bring problem weeds home with you.

### **Minimizing Weeds After Establishment:**

To minimize weeds after establishment, your key tool is maintaining an effective mulch layer (spruce up in spring and fall, as required). Escaped weeds may be controlled with a non-selective herbicide, where possible. If a non-selective herbicide cannot be used, then you are limited to hand removal of emerged broadleaf weeds, followed by additional mulching where the weeds were removed. Emerged annual and perennial grass weeds can be controlled in most non-grass ornamental plantings with an herbicide that is selective for just grass weeds. Treat when grass weeds are small. Perennial grasses will likely require repeat applications. In addition to the mulch layer, certain preemergence herbicides can be used to prevent annual weeds from developing from seed. Where landscape fabric is used in combination with mulch, a preemergence herbicide may not be needed.



## Herbicide Use in Ornamental Plantings:

Adopting the use of herbicides is a personal choice requiring the expenditure of time, getting to know the products available, understanding what they will and won't do and following directions for use in gaining the best weed control without injury to your ornamentals.

**Preemergence herbicides** act by preventing weeds from establishing or emerging from seed. Preemergence herbicides are applied after planting or to established beds prior to weed seed germination or after removal of any established weeds. Preemer-

gence herbicides do not control weeds once they have become established. Preemergence herbicides may provide control of broadleaf and grass weeds. Not all weeds will be controlled. Read the label for specific weeds controlled. For the homeowner, preemergence herbicides



are often formulated as granules to be broadcast over the surface of the ornamental bed. Rainfall or irrigation after application is required to dissolve the granules and move the herbicide throughout the mulch and the underlying soil where it contacts weed seeds or seedlings, preventing them from becoming established. Optimum weed control requires uniform application and one-half inch of rainfall or irrigation soon after application. Preemergence herbicides provide residual control, acting over an extended period of time. Over time, the herbicide breaks down or loses effectiveness, requiring timely re-treatment throughout the growing season to prevent weeds from escaping. Length of residual control or timing of re-treatment is product-dependent (refer to the product label). Generally, preemergence herbicides fail due to non-uniform application, lack of timely rainfall or irrigation and untimely re-treatment.

**Postemergence herbicides** control weeds after they have emerged or become established. These herbicides are formulated to be mixed with water and applied as liquid spray to the weed foliage using a garden sprayer (hand-held or back-pack type). Postemergence herbicides act by contacting the foliage. Systemic postemergence herbicides are absorbed into the foliage and move throughout the plant. Herbicides are available that will selectively control emerged annual and perennial grasses in most ornamental plantings (not for use around ornamental grasses). Non-selective herbicides control both grass and broadleaf weeds. Obviously, use of this type of herbicide may not be an option in certain plantings or limited to spot treatment or directed application (avoiding contact with foliage and young stems of desired ornamentals).



## Summary of Weed Management Plan

In summary, weeds in ornamental beds can be perpetual problems. Certain steps can be taken to minimize the need for frustrating physical removal of weeds from your ornamental plantings. Plan before you plant and gain control of perennial weeds prior to planting. After establishment, your best defense for minimizing weeds is to maintain an effective mulch layer that is 2 to 3 inches thick (3 inches being optimum when landscape fabric is not used); use a coarse-textured mulch that does not hold water and is from a weed-free source. Landscape fabric covered with mulch may be beneficial in plantings of woody trees and shrubs and woody ground covers (where the landscape fabric will not limit rooting and spread). Use a fabric that will provide a barrier to weed emergence and still allow water and air to move through to the underlying roots of desired ornamentals. Where possible, a non-selective herbicide may be directed for spot treatment under desired ornamentals to gain control of

established weeds. If a non-selective herbicide cannot be used, then established broadleaf weeds will have to be physically removed. Established grass weeds can be controlled with a selective herbicide in most ornamentals. Plan before you plant. Gain control of perennial weeds prior to planting.

## Weed Types and Life Cycles:

Weeds of ornamental plantings can be divided into three types: broadleaf weeds, grassy weeds and sedges. Within each type, weeds may have one of three basic life cycles: summer annual, winter annual or perennial.

### Types:

#### Broadleaf weeds —

Broadleaf weeds are generally easiest to identify. Broadleaf weeds (like dandelion and clover) have leaves that are broad, and are generally produced in pairs or multiples. Leaves are detached from the main stem by a sub-stem or petiole. Leaves may be simple (having one leaflet, like dandelion) or compound (having more than one leaflet, like clover). Veins within the leaf give a netted appearance in most cases.



**Grass weeds** — Identifying individual grasses is more difficult. All grasses are similar in appearance, especially when seed heads are not present. Leaves of grasses are not detached from the main stem. Leaves of grasses are narrow with a blade-like appearance. Leaves are produced one at a time in two vertical rows. Veins within leaves run parallel. Stems are usually round or flat.



**Sedges** — Sedges (like yellow nutsedge) are not grasses but have leaves that are similar in appearance and are thus often mistaken for grasses. Since herbicides used to control grass weeds are generally not effective on sedges, it is important to distinguish between the two types. Sedges have two key identifying characteristics: leaves arranged in three vertical rows and a triangular stem. Stems of grasses are commonly round or flat with leaves in two vertical rows.



### Life Cycles:

**Summer annuals** — Annuals complete their life cycle within 12 months. Summer annuals generally germinate in the spring, grow or develop during the summer, produce seed and die by the fall or after the first hard frost.

**Winter annuals** — Winter annuals complete their life cycle in 12 months but generally overlap two calendar years. Winter annuals germinate in late summer to early fall and begin to develop. Winter annuals are dormant or semi-dormant through the winter, and flower the following spring. Winter annuals mature and die in late spring or early summer.

Summer and winter annuals reproduce and spread by prolific seed production, serving as a ready source of infestation and establishment when conditions are favorable.

**Perennials** — Perennials live for more than two years and may regenerate indefinitely. A simple perennial, like dandelion, may germinate from seed, but produces a tap root that, when severed, can produce a new plant. A complex perennial can spread by seed in addition to creeping above- or below-ground vegetative structures (such as stolons, rhizomes or nutlets) capable of initiating a new plant. Perennial weeds are often the most difficult to control. Usually you are trying to control an established plant that has already produced considerable vegetative reproductive structures that may require repeat control measures. Removal of the above-ground shoot growth does little towards long-term control. Long-term control usually requires herbicide treatments that act on the above- and below-ground structures.

# WEED IDENTIFICATION

## Broadleaf Weeds

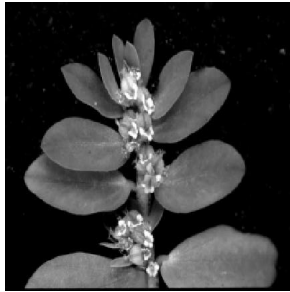
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### Summer Annuals

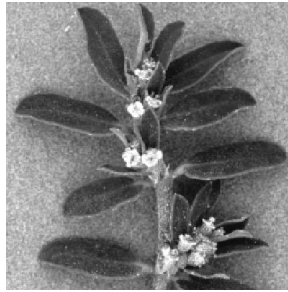
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Prostrate knotweed<sup>1</sup>



Prostrate spurge<sup>1</sup>



Spotted spurge<sup>1</sup>



Common Groundsel

### Winter Annuals

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Henbit<sup>1</sup>



Deadnettle



Common chickweed<sup>1</sup>



Mouse-ear chickweed<sup>1</sup>  
(can be perennial)



Carolina geranium  
(can be perennial)

<sup>1</sup> Photo Credit to Arlyn W. Evans



## Perennials



Wild onion/Wild garlic<sup>1</sup>



Dandelion



White clover



Hop clover



Ground ivy



Oxalis<sup>1</sup>



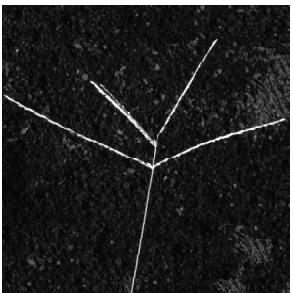
Wild strawberry



Wild violet

## Grass Weeds

### Summer Annuals



Large crabgrass<sup>1</sup>



Smooth crabgrass<sup>1</sup>



Goosegrass



Yellow foxtail<sup>1</sup>



Green foxtail<sup>1</sup>

<sup>1</sup> Photo Credit to Arlyn W. Evans

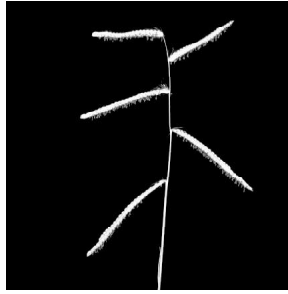


## Winter Annuals



Annual bluegrass

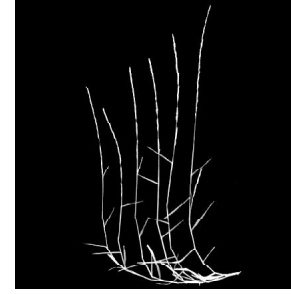
## Perennials



Dallisgrass<sup>1</sup>



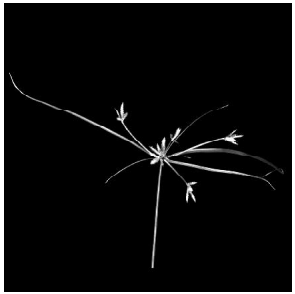
Bermudagrass



Nimblewill<sup>1</sup>

## Sedges

### Summer Annuals



Annual sedge<sup>1</sup>

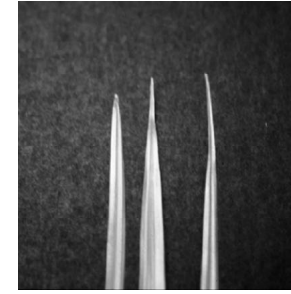
### Perennials



Yellow nutsedge<sup>2</sup>



Purple nutsedge



Leaf tips,  
Far Left - Purple Nutsedge,  
Two Right - Yellow Nutsedge

<sup>1</sup> Photo Credit to Arlyn W. Evans

<sup>2</sup> Photo Credit to Jimmy R. Summerlin

**Table 1. Summary of Weed Management Options: Dependent on Type of Ornamental Planting.**

**Tree and Shrub Beds:** Densely shaded plantings exclude weeds.

- Landscape fabrics and mulches are useful.
- Many broad-spectrum herbicides are available for preemergence and postemergence control.
- Spot or directed applications of nonselective herbicides are possible.
- Species selection is flexible and preplant weed control is not as critical as in other types of plantings.

*Recommendations:* Control perennial weeds before planting (although control may be possible after planting), use landscape fabrics with a shallow layer of mulch, use a preemergence herbicide if needed and supplement with spot applications of postemergence herbicides and/or hand weeding.

**Woody Ground Cover Beds:** The ground cover should ultimately exclude most weeds.

- Limited uses for nonselective herbicides; therefore, control perennial weeds before planting.
- Do not use landscape fabrics where ground covers are expected to root and spread.
- Control annual weeds with mulching, hand weeding and/or herbicides.
- Several preemergence herbicides are available.
- Few uses for postemergence herbicides.
- Postemergence control of annual and perennial grasses is possible.

*Recommendations:* Control perennial weeds before planting, use landscape fabrics where possible or use mulches with a preemergence herbicide and supplement with hand weeding.

**Annual Flower Beds:** A closed canopy will shade out many weeds.

- Periodic cultivations (annually or between display rotations) will suppress many weeds.
- Very limited use of nonselective herbicides; control perennial weeds before planting.
- Landscape fabrics generally are not useful (due to the short-term nature of the planting).
- Few preemergence herbicides are safe; careful species and product selection are required.
- Mulches will suppress many annual weeds.

*Recommendations:* Control perennial weeds before planting, carefully select species for weed management compatibility, use mulches and a preemergence herbicide and supplement with hand weeding.

**Herbaceous Perennial Beds:** Similar to annual flower beds except:

- Lack of periodic cultivations will encourage perennial weed encroachment.
- Fewer herbicides are labeled; check the labels carefully.
- Landscape fabrics may be useful in clump-type plantings or to restrict growth of spreading types.
- Very limited use of nonselective or postemergence herbicides.

*Recommendations:* Control perennial weeds before planting, use landscape fabrics where possible, use mulches with a preemergence herbicide and supplement with hand weeding.

**Mixed Plantings (of woody and herbaceous plants):**

- More complex due to the diversity of species.
- Different areas of the bed could receive different treatments.
- Site preparation is usually critical.
- Few herbicides are registered for a wide spectrum of ornamental plant types.
- Landscape fabrics may or may not be useful.

*Recommendations:* Maximize the number of weed control options by compatible species selection. Control perennial weeds before planting, use landscape fabrics where possible, use mulches with a preemergence herbicide where possible and supplement with hand weeding.

**Table 2. Commonly Used Mulches: Advantages and Disadvantages.**

(Adapted from Xeriscape, Georgia Cooperative Extension Service)

<b>Mulch</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Pine straw</b>	<b>An excellent mulch for water conservation.</b>	<b>Flammable when extremely dry. Fades in color with age. Decomposes rather quickly and requires annual topdressing with additional pine straw.</b>
<b>Pine bark</b>	<b>Mini-nuggets conserve moisture better than large nuggets. They stay seated better on the landscape than the large nuggets.</b>	<b>None.</b>
<b>Cypress</b>	<b>An excellent mulch material. Can be expensive.</b>	<b>None.</b>
<b>Shredded or chipped hardwood bark</b>	<b>Provides a durable, long-lasting mulch.</b>	<b>Color fades quickly.</b>
<b>Fall leaves</b>	<b>An overlooked and readily available mulch. Shredded leaves stay seated better on the landscape and conserve moisture better than unshredded leaves.</b>	<b>Not as neat and uniform in appearance as pine straw and pine bark.</b>
<b>Grass clippings</b>	<b>None.</b>	<b>Decomposes quickly, mats down and molds. Compost before using as mulch.</b>
<b>Gravel, marble chips, volcanic rock</b>	<b>Long lasting.</b>	<b>Absorb and reradiates heat. Unnatural in appearance unless in a specific landscape.</b>
<b>Newspaper</b>	<b>Place two sheets thick under organic mulch. Newspaper helps to conserve moisture while allowing water and nutrients to penetrate.</b>	<b>When placed too thick (&gt;2 layers) can prevent water and nutrients from penetrating the soil.</b>
<b>Landscape fabric</b>	<b>Allow nutrients and water to penetrate to plant roots. Prevents most weeds.</b>	<b>Does not prevent nutsedge and other large seeded weed species. Must be covered with a mulch.</b>
<b>Plastic film</b>	<b>None</b>	<b>Prevents oxygen, nutrients and water from reaching plant roots. Not recommended.</b>

**Table 3. Herbicide Options for Homeowner Use in Ornamental Plantings.**

Product	Type of Planting			
	Woody Trees and Shrubs	Woody Groundcovers	Annual Flower Beds	Herbaceous Perennial Beds
<p>Note: The symbol # next to herbicide product name indicates this product is available for homeowner use. However, it is not sold at most common retail garden centers and may require special order from a professional landscape supply retailer. In addition, these products may be sold in larger quantities and cost more than \$ 30.00 per package.</p> <p>* = Can be applied to annual flower beds only after plants are well-established (see product label).            ** = Can be used but check with supplier for product label and tolerance of specific ornamental plants.            *** = Can be used on most ornamental plantings not containing ornamental grasses.            **** = Directed application only; direct spray to emerged weeds without contacting foliage of desired plants or injury will result.</p>				
<b>Preemergence</b>				
<b>PREEN (trifluralin)</b>	Yes	Yes	Yes *	Yes
<b>Spectracide Weed Stop GARDEN WEED PREVENTER (dithiopyr)</b>	Yes	Yes	Yes *	Yes
<b>Miracle-Gro GARDEN WEED PREVENTER (trifluralin)</b>	Yes	Yes	Yes *	Yes
<b>Green Light PORTRAIT (isoxaben)</b>	Yes	Yes	No	Yes **
<b>TREFLAN # (trifluralin)</b>	Yes	Yes	Yes *	Yes
<b>SNAPSHOT # (isoxaben plus treflan)</b>	Yes	Yes	No	Yes **
<b>GALLERY # (isoxaben)</b>	Yes	Yes	No	Yes **
<b>DIMENSION # (dithopyr)</b>	Yes	Yes	Yes *	Yes



Product	Type of Planting			
	Woody Trees and Shrubs	Woody Groundcovers	Annual Flower Beds	Herbaceous Perennial Beds
<b>SURFLAN #</b> (oryzalin)	Yes	Yes	Yes	Yes
<b>PENDULUM #</b> (pendimethalin)	Yes	Yes	No	Yes **
<b>Postemergence</b>				
<b>BASAGRAN T/O #</b> (bentazon)	Directed ****	Directed ****	No	No
<b>FINALE</b> (glufosinate)	Directed ****	Directed ****	No	No
<b>FUSILADE II</b> (fluzifop)	Yes ***	Yes ***	Yes ***	Yes ***
<b>MANAGE #</b> (halosulfuron)	Directed ****	Directed ****	No	No
<b>ROUNDUP</b> (glyphosate)	Directed ****	Directed ****	No	No
<b>VANTAGE</b> (sethoxydim)	Yes ***	Yes ***	Yes ***	Yes ***

**Table 4. Herbicide Rates, Application Method and Use Directions and Precautions.**

Product	Rate	Application Method	Use Directions and Precautions
<p>Note: The symbol # next to herbicide product name indicates this product is available for homeowner use. However, it is not sold at most common retail garden centers and may require special order from a professional landscape supply retailer. In addition, these products may be sold in larger quantities and cost more than \$30 per package.</p>			
<p><b>Preemergence</b></p>			
<p><b>PREEN</b> (trifluralin)</p>	<p>10 oz. per 100 sq. ft.</p>	<p>Granular</p>	<ul style="list-style-type: none"> <li>-PREEN and Miracle-Gro GARDEN WEED PREVENTER are similar products carrying the same herbicidal active ingredient (trifluralin).</li> <li>- Can be used in most ornamental plantings (refer to Table 3).</li> <li>- Provides preemergence control of many annual grasses and certain broadleaf weeds (Table 5).</li> <li>- Apply prior to weed seed germination or after removal of established weeds.</li> <li>- Apply to soil surface or overtop of plant foliage (established or after planting).</li> <li>- Irrigate to move granules from plant foliage and dissolve the herbicide moving it into the growing media.</li> <li>- Irrigate immediately after application (ideally ½ inch of overhead irrigation should be applied).</li> <li>- Provides 30 to 60 days of residual preemergence activity.</li> <li>- Repeat applications at 30 to 60 days to extend control throughout the growing season.</li> </ul>
<p>Miracle-Gro GARDEN WEED PREVENTER (trifluralin)</p>	<p>10 oz. per 100 sq. ft.</p>		
<p>Spectracide Weed Stop GARDEN WEED PREVENTER (dithopyr)</p>	<p>7 oz. per 100 sq. ft.</p>	<p>Granular</p>	<ul style="list-style-type: none"> <li>- Can be used in most ornamental plantings (refer to Table 3).</li> <li>- Provides preemergence control of many annual grasses and certain broadleaf weeds (refer to Table 5).</li> <li>- Apply prior to weed seed germination or after removal of established weeds.</li> <li>- Apply to soil media surface or overtop of plant foliage (established or after planting).</li> <li>- Irrigate to move granules from plant foliage and dissolve the herbicide moving it into the growing media.</li> <li>- Irrigate immediately after application (ideally ½ inch of overhead irrigation should be applied).</li> <li>- Provides 90 to 120 days of residual control. Retreat 90 to 120 days after initial application to extend residual control throughout the growing season.</li> </ul>

Product	Rate	Application Method	Use Directions and Precautions
Green Light PORTRAIT (isoxaben)	8 oz. per 100 sq. ft.	Granular	<ul style="list-style-type: none"> <li>- Provides broadspectrum control of broadleaf weeds (refer to Table 5).</li> <li>- Can be used under woody trees and shrubs. Cannot be used on annuals, and has limited use on perennials (refer to Table 3).</li> <li>- Do not apply to bedding plants or area where bedding plants will be planted within one year.</li> <li>- Apply prior to weed seed germination or after removal of established weeds.</li> <li>- Apply to soil media surface or overtop of plant foliage (established or after planting).</li> <li>- Provides 90 to 120 days of residual control.</li> <li>- Retreat 90 to 120 days after application to extend residual control through the season.</li> <li>- Requires ½ inch rainfall or irrigation within 21 days after a application.</li> </ul>
TREFLAN 5G # (trifluralin)	3 oz. per 100 sq. ft.	Granular	<ul style="list-style-type: none"> <li>- Can be used in most ornamental plantings (refer to Table 3).</li> <li>- Provides preemergence control of many annual grasses and certain broadleaf weeds (Table 5).</li> <li>- Apply prior to weed seed germination or after removal of established weeds.</li> <li>- Apply to soil surface or overtop of plant foliage (established or after planting).</li> <li>- Irrigate to move granules from plant foliage and dissolve the herbicide moving it into the growing media.</li> <li>- Irrigate immediately after application (ideally ½ inch of overhead irrigation should be applied).</li> <li>- Provides 30 to 60 days of residual preemergence activity.</li> <li>- Repeat applications at 30 to 60 days to extend control throughout the growing season.</li> </ul>
SNAPSHOT # (isoxaben plus trifluralin)	4 to 7 oz. per 100 sq. ft.	Granular	<ul style="list-style-type: none"> <li>- Provides broadspectrum control of both grass and broadleaf weeds (refer to Table 5).</li> <li>- Can be used under woody trees and shrubs. Cannot be used on annuals, and has limited use on perennials (refer to Table 3).</li> <li>- Do not apply to bedding plants or area where bedding plants will be planted within one year.</li> <li>- Apply prior to weed seed germination or after removal of established weeds.</li> <li>- Apply to soil media surface or overtop of plant foliage (established or after planting).</li> <li>- Provides 60 to 90 days of residual control. Retreat 60 to 90 days after initial application to extend residual control.</li> <li>- Requires ½ inch rainfall or irrigation within 3 days after application (immediately after application is ideal).</li> </ul>

Product	Rate	Application Method	Use Directions and Precautions
<b>GALLERY #</b> (isoxaben)	<b>0.04 fl. oz.</b> <b>per 100 sq. ft.</b>	<b>Liquid</b>	<ul style="list-style-type: none"> <li>- Professional version of PORTRAIT, but in a liquid rather than a granular formulation.</li> <li>- Provides broadspectrum control of broadleaf weeds (refer to Table 5).</li> <li>- Can be mixed with DIMENSION, SURFLAN or PENDULUM for improved weedy grass control.</li> <li>- Can be used under woody trees and shrubs. Cannot be used on annuals, and has limited use on perennials (refer to Table 3).</li> <li>- Do not apply to bedding plants or area where bedding plants will be planted within one year.</li> <li>- Apply prior to weed seed germination or after removal of established weeds.</li> <li>- Apply to soil media surface or overtop of plant foliage (established or after planting).</li> <li>- Provides 90 to 120 days of residual control.</li> <li>- Retreat 90 to 120 days after initial application to extend residual through the growing season.</li> <li>- Requires ½ inch rainfall or irrigation within 21 days after application.</li> </ul>
<b>DIMENSION #</b> (dithopyr)	<b>0.1 to 0.15 fl.</b> <b>oz. per</b> <b>100 sq. ft.</b>	<b>Liquid</b>	<p>Professional version of Spectricide GARDEN WEED PREVENTER, but in a liquid rather than a granular formulation.</p> <ul style="list-style-type: none"> <li>- Provides preemergence control of many annual grasses and certain broadleaf weeds (refer to Table 5).</li> <li>- Apply prior to weed seed germination or after removal of established weeds.</li> <li>- Apply to soil media surface or overtop of plant foliage (established or after planting).</li> <li>- Requires ½ inch rainfall or irrigation within 21 days after application.</li> <li>- Provides 90 to 120 days of residual control. Retreat 90 to 120 days later to extend residual control throughout the growing season.</li> </ul>
<b>SURFLAN #</b> (oryzalin)	<b>0.2 to 0.3 fl. oz.</b> <b>per 100 sq. ft.</b>	<b>Liquid</b>	<p>Provides preemergence control of annual grasses and certain broadleaf weeds. Apply to weed free soil or prior to weed seed germination. Requires ½ inch rainfall or irrigation within 21 days after application.</p>
<b>PENDULUM #</b> (pendimethalin)	<b>0.12 to 0.24 fl.</b> <b>oz. per</b> <b>100 sq. ft.</b>	<b>Liquid</b>	<p>Provides preemergence control of annual grasses and certain broadleaf weeds. Apply to weed free soil or prior to weed seed germination. Requires ½ inch rainfall or irrigation within 21 days after application.</p>



Product	Rate	Application Method	Use Directions and Precautions
<b>Postemergence</b>			
<b>BASAGRAN T/O #</b> (bentazon)	0.75 fl. oz. per gallon of water	Directed- Foliar Spray	<ul style="list-style-type: none"> <li>- Use is primarily for control of annual or yellow nutsedge in ornamental beds.</li> <li>- Apply as a directed spray under woody trees and shrubs and woody ground covers (where possible).</li> <li>- Make first application when yellow nutsedge has produced 3 to 6 new leaves (approximately mid- May to June).</li> <li>- Repeat application when 3 to 6 new leaves have developed (approximately 3 to 4 weeks after the initial application).</li> <li>- Will require at least one repeat application for control of yellow nutsedge.</li> </ul>
<b>FINALE</b> (glufosinate)	2 to 4 fl. oz. per gallon of water	Directed- Foliar Spray	<ul style="list-style-type: none"> <li>- Can be used as a directed spray under most woody ornamental trees and shrubs and as spot treatment, where possible in other plantings (<b>Injury Note:</b> FINALE is non-selective and will cause injury to desired ornamentals when contacted by a mis-application).</li> <li>- Can be used for edging or trimming of landscape beds.</li> <li>- Provides broadspectrum control of emerged grass and broadleaf weeds.</li> </ul>
<b>FUSILADE II #</b> (fluazifop)	3/4 fl. oz. per gallon of water	Foliar Spray	<ul style="list-style-type: none"> <li>- Provides control of emerged annual and perennial weedy grasses (refer to Table 5).</li> <li>- Can be used overtop of most ornamental plantings. Except ornamental grasses (refer to Table 3).</li> </ul>
<b>MANAGE #</b> (halosulfuron)	One dose pack per gallon of water	Directed- Foliar Spray	<ul style="list-style-type: none"> <li>- Provides control of emerged sedges; annual, yellow and purple nutsedge. Make first application when 3 to 6 new leaves have been produced. May require a repeat application when 3 to 6 new leaves are produced.</li> <li>- Requires the addition of surfactant or spray additive (refer to distributor).</li> </ul>
<b>ROUNDUP</b> (glyphosate)	Product Dependent Several formulations (refer to label)	Directed- Foliar Spray	<ul style="list-style-type: none"> <li>- Can be used as a directed spray under most woody ornamental trees and shrubs and as spot treatment, where possible in other plantings (<b>Injury Note:</b> ROUNDUP is non-selective and will cause injury to desired ornamentals when contacted by a mis-application).</li> <li>- Provides non-selective activity, controlling both grass and broadleaf weeds (annuals and perennials). Perennial broadleaf weeds, bermudagrass and yellow nutsedge may require repeat application.</li> <li>- Provides systemic activity, as herbicide applied to the foliage moves within the plant to control both above and below ground growth. May take 7 to 14 days for control to symptoms to be evident.</li> <li>- Ideal for control of annual and perennial weeds prior to establishing an ornamental planting.</li> </ul>

Product	Rate	Application Method	Use Directions and Precautions
<b>VANTAGE</b> (sethoxydim)	<b>1.4 fl. oz.</b> <b>per gallon</b> <b>of water</b>	<b>Foliar Spray</b>	<ul style="list-style-type: none"> <li>- Can be used overtop of most ornamental plantings. Except ornamental grasses.</li> <li>- Provides control of emerged annual and some perennial grasses.</li> <li>- Perennial grasses may require repeat application.</li> <li>- For bermudagrass, make repeat applications when 3 to 8 inches of new growth has developed (may require more than one repeat application to gain control).</li> </ul>

**Table 5. Herbicide Activity towards Common Weeds of Ornamental Plantings.**

WEEDS	Preemergence										Postemergence					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Herbicide Key: 1 = Preen; 2 = Miracle-Gro Garden Weed Preventer; 3 = Spectracide G Garden Weed Preventer; 4 = Portrait; 5 = Treflan; 6 = Snapshot; 7 = Gallery; 8 = Dimension; 9 = Surflan; 10 = Pendulum; 11 = Basagran T/O; 12 = Finale; 13 = Fusilade II; 14 = Manage; 15 = Round up; 16 = Vantage. Key to Codes: E = Excellent Control; G = Good Control; F = Fair Control; P = Provides some activity but poor control; N = Does not provide control; - - = Activity towards this species is not known.																
<b>GRASS WEEDS: ANNUALS</b>																
Annual bluegrass	G	G	G	N	G	G	N	G	G	G	N	G	G	N	F	P
Crabgrasses	G	G	G	N	G	G	N	G	G	G	N	G	G	N	G	G
Goosegrass	G	G	G	N	G	G	N	G	G	G	N	G	G	N	G	G
Foxtails	G	G	G	N	G	G	N	G	G	G	N	G	G	N	G	G
<b>BROADLEAF WEEDS: ANNUALS</b>																
Chickweed	G	G	G	E	G	E	E	G	G	G	--	G	N	N	G	N
Groundsel	F	F	--	E	F	E	E	--	--	--	--	G	N	N	G	N
Henbit	--	--	G	E	--	E	E	G	G	G	--	G	N	N	G	N
Dead nettle	--	--	G	E	--	E	E	G	G	G	--	G	N	N	G	N
Oxalis	N	N	G	E	N	E	E	G	G	G	--	G	N	N	G	N
Spurges	N	N	G	E	N	E	E	G	G	G	--	G	N	N	G	N
<b>GRASS WEEDS: PERENNIALS (emerged)</b>																
Bermudagrass	N	N	N	N	N	N	N	N	N	N	N	P	G	N	F	F
Nimblewill	N	N	N	N	N	N	N	N	N	N	N	P	G	N	F	F
Dallisgrass	N	N	N	N	N	N	N	N	N	N	N	F	G	N	G	G
Fescue	N	N	N	N	N	N	N	N	N	N	N	P	G	N	G	G
Ryegrass	N	N	N	N	N	N	N	N	N	N	N	P	--	N	F	--

WEEDS	Preemergence										Postemergence							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
<b>Herbicide Key: 1 = Preen; 2 = Miracle-Gro Garden Weed Preventer; 3 = Spectracide Garden Weed Preventer; 4 = Portrait; 5 = Treflan; 6 = Snapshot; 7 = Gallery; 8 = Dimension; 9 = Surflan; 10 = Pendulum; 11 = Basagran T/O; 12 = Finale; 13 = Fusilade II; 14 = Manage; 15 = Round up; 16 = Vantage.</b> <b>Key to Codes: E = Excellent Control; G = Good Control; F = Fair Control; P = Provides some activity but poor control; N = Does not provide control; -- = Activity towards this species is not known.</b>																		
<b>BROADLEAF WEEDS: PERENNIALS (emerged)</b>																		
Dandelion	N	N	N	N	N	N	N	N	N	N	N	N	G	N	N	G	N	
Ground Ivy	N	N	N	N	N	N	N	N	N	N	N	N	--	N	N	G	N	
Wild Garlic	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
Wild Strawberry	N	N	N	N	N	N	N	N	N	N	N	--	P	N	N	F	N	
Wild Violet	N	N	N	N	N	N	N	N	N	N	N	--	P	N	N	F	N	
Clovers	N	N	N	N	N	N	N	N	N	N	N	N	F	N	N	P	N	
<b>SEDGES</b>																		
Annual Sedge	N	N	N	N	N	N	N	N	N	N	N	N	G	P	N	E	G	N
Yellow Nutsedge	N	N	N	N	N	N	N	N	N	N	N	N	G	P	N	E	G	N
Purple Nutsedge	N	N	N	N	N	N	N	N	N	N	N	N	N	P	N	E	G	N

**Table 6. Problem Weeds in Ornamental Plantings: Control Recommendations.**

Problem Weeds	Control Recommendations
Grass weeds: Annuals	<p><u>Prior to Weed Emergence (PRE)</u></p> <ul style="list-style-type: none"> <li>- Mulch</li> <li>- Landscape fabric (if feasible)</li> <li>- Preemergence herbicides</li> </ul> <p><u>After Weed Emergence (POST)</u></p> <ul style="list-style-type: none"> <li>- Spot treat with non-selective herbicide (where possible)</li> <li>- Herbicide selective for grass weeds</li> <li>- Physical removal</li> </ul>
Broad leaf weeds: Annuals	<p><u>Prior to Weed Emergence (PRE)</u></p> <ul style="list-style-type: none"> <li>- Mulch</li> <li>- Landscape fabric (if feasible)</li> <li>- Preemergence herbicides</li> </ul> <p><u>After Weed Emergence (POST)</u></p> <ul style="list-style-type: none"> <li>- Spot treat with non-selective herbicide (where possible)</li> <li>- Physical removal</li> </ul>
Grass weeds: Perennials	
-Bermudagrass	<p><u>Prior to Planting</u></p> <ul style="list-style-type: none"> <li>- Gain control prior to planting with repeat applications of non-selective herbicide</li> </ul> <p><u>After Weed Emergence (POST)</u></p> <ul style="list-style-type: none"> <li>- Repeat application of herbicide selective for grass weeds. Treat when 4 to 8 inches of new growth has been achieved. Will require repeat applications</li> <li>- Physical removal or hand pulling is essentially ineffective</li> </ul>
Broad leaf weeds: Perennials	
<ul style="list-style-type: none"> <li>- Ground ivy</li> <li>- Wild violet</li> <li>- Wild strawberry</li> <li>- Dandelion</li> </ul>	<p><u>Prior to Planting</u></p> <ul style="list-style-type: none"> <li>- Gain control prior to planting with repeat applications of non-selective herbicide</li> <li>- Preemergence herbicides are ineffective</li> <li>- Mulch and landscape fabric may not be effective</li> </ul> <p><u>After Weed Emergence (POST)</u></p> <ul style="list-style-type: none"> <li>- Spot treat with non-selective herbicide (where possible). Will require repeat applications</li> <li>- Hand pulling may not be very effective</li> </ul>

Problem Weeds	Control Recommendations
<p>- Wild garlic</p> <p>NOTE: what we call wild onion is technically wild garlic. Wild garlic has leaves with hollow centers and wild onion has leaves with solid centers that are flattened not completely round in appearance.</p>	<p><u>Prior to Weed Emergence (PRE)</u></p> <ul style="list-style-type: none"> <li>- Landscape fabric at planting may be effective</li> <li>- Mulch may suppress but does not control this weed</li> <li>- Preemergence herbicides are ineffective</li> </ul> <p><u>After Weed Emergence (POST)</u></p> <ul style="list-style-type: none"> <li>- No herbicide option for use in ornamental plantings</li> <li>- Cutting the tops off does not suppress or gain control</li> <li>- Only option is to physically remove</li> <li>- Will be easiest to remove in late spring to early summer when the plants are mature. Dig mature plants prior to shedding of aerial bulblets.</li> </ul>
<p>Yellow and Purple Nutsedge: Perennial</p>	<p><u>Prior to Planting</u></p> <ul style="list-style-type: none"> <li>- If present prior to planting, gain control with repeat applications of non-selective herbicide prior to planting.</li> <li>- Mulch and landscape fabric are ineffective</li> <li>- Preemergence herbicide options are ineffective</li> <li>- Avoid contaminating your planting with this weed from contaminated soil amendments or plant material.</li> </ul> <p><u>After Weed Emergence (POST)</u></p> <ul style="list-style-type: none"> <li>- Directed application of non-selective herbicide or herbicide selective for nutsedges. Make directed or spot application when yellow or purple nutsedge has produced 3 to 6 new leaves (generally, end of May to middle of June). Make second or third applications whenever 3 to 6 new leaves are produced (generally 3 to 4 weeks later). Control may require regimental repeat applications.</li> </ul>

# *a UT Extension Reminder...*

## Common Weights and Measures

### Length

Inch = 1/12 or 0.083 foot = 2.54 centimeters = 25.4 millimeters  
Foot = 12 inches = 0.3048 meters = 30.48 centimeters  
Yard = 36 inches = 3 feet = 0.9144 meters  
Rod = 16.5 feet = 5.5 yards = 5.03 meters  
Furlong = 220 yards  
Mile = 1,760 yards = 5,280 feet = 1.61 kilometers = 8 furlongs = 80 chains

### Area

Square inch = 0.007 square foot = 6.45 square centimeters  
Square foot = 144 square inches = 929.03 square centimeters  
Square yard = 9 square feet = 0.836 square meters  
Square rod = 30.25 square yards  
Acre = 4,840 square yards = 43,560 square feet = 160 square rods =  
4,047 square meters = 0.405 hectare  
Hectare = 10,000 square meters = 2.47 acres  
Square mile = 640 acres = 2.59 square kilometers = 1 section  
Section = 1 square mile = 640 acres = 2.59 square kilometers

### Liquid Measures

Teaspoon = 0.1667 fluid ounce = 80 drops = 4.93 milliliters  
Tablespoons = 3 teaspoons = 0.5 fluid ounce = 14.8 milliliters  
Fluid ounce = 2 tablespoons = 29.58 milliliters  
Cup = 8 fluid ounces = 16 tablespoons = 236.6 milliliters  
Pint = 2 cups = 16 fluid ounces = 473.2 milliliters  
Quart = 4 cups = 2 pints = 32 fluid ounces = 0.946 liters  
Liter = 2.113 pints = 1,000 milliliters = 1.057 quarts  
Gallon = 4 quarts = 8 pints = 128 fluid ounces = 3.785 liters  
Cubic foot of water = 7.5 gallons = 62.4 pounds = 28.3 liters  
Acre inch of water = 27,154 gallons = 3,630 cubic feet

### Dry Measures

Teaspoon (level) = 0.35 cubic inch = 5.74 cubic centimeters  
Tablespoon (level) = 1.05 cubic inch = 3 level teaspoons = 17.21 cubic centimeters  
Cup = 16 level tablespoons = 16.8 cubic inches = 275.3 cubic centimeters  
Pint = 2 cups = 32 level tablespoons = 33.6 cubic inches = 550.6 cubic centimeters  
Quart = 2 pints = 64 tablespoons = 67.2 cubic inches = 1.101 liters  
Peck = 8 quarts = 16 pints = 538 cubic inches = 8.8 liters  
Bushel = 4 pecks = 2,150 cubic inches = 32 quarts = 3 liters

### Volumes

Cubic inch = 0.00058 cubic foot = 16.4 cubic centimeters  
Cubic foot = 1,728 cubic inches = 0.037 cubic yard = 0.028 cubic meter  
Cubic yard = 27 cubic feet = 0.765 cubic meters

### Weights

Gram = 15.43 grains = 1,000 milligrams  
Ounce = 28.35 grams = 437.5 grains  
Pound = 16 ounces = 7,000 grains = 454 grams  
Kilogram = 1,000 grams = 2.205 pounds  
Ton (short) = 2,000 pounds = 0.907 metric tons

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