



## Controlling Weedy Grasses

“I hate crabgrass!” is a common lament I’ve heard from residents during my 35 years as a UCCE Weed Science Farm Advisor. As a landscape professional, you probably hear the same and your clients want it dealt with. Most of the time however, the weed people are actually referring to is not crabgrass, but bermudagrass or dallisgrass. So why does knowing the name of the weed matter? It doesn’t—unless you are trying to control it!

### Crabgrass

There are two annual weed species of crabgrass: large crabgrass and smooth crabgrass. Large crabgrass, sometimes called hairy crabgrass (*Digitaria sanguinalis*), has leaves that usually appear gray with a hairy upper surface (Figure 1). If unmowed, the leaf sheath can grow upright to a height of 2 feet. Large crabgrass is commonly found in gardens and landscape areas.

Smooth crabgrass (*D. ischaemum*), is usually light green in color (Figure 2) and as the name indicates, it appears smooth. The leaves do have some hairs, but they are not as prominent as those found on large crabgrass. Left unmowed, smooth crabgrass can grow

to a height of 6 inches tall. It first appears in open areas in the lawn such as the edges or areas cut around sprinklers. Each winter (as early as January in Southern California and late February in the North), very small, light green single leaves begin growing flat on the ground, often in turf areas.

While annual crabgrasses can be a problem, they pale in comparison to the perennial weeds bermudagrass and dallisgrass. Learn more about crabgrasses in the *UC IPM Pest Notes: Crabgrass*. See the resource box at the end of the article on page 3.

### Bermudagrass

Bermudagrass (*Cynodon dactylon*), is a low-growing, wiry perennial that has two types of shoots: stolons that grow above ground (Figure 3), and rhizomes that grow below ground. Stolons and rhizomes are capable of rooting in soil and creating new plants as they grow out from the original plant. They can also grow when they are cut and left on moist soil. Although bermudagrass can spread by seed, it usually spreads by stolon. Common bermudagrass and hybrid varieties can be used as a lawn in some areas of the state. In this article, we are talking strictly about bermudagrass as a weed.

Bermudagrass is hard to pull out and is very tolerant of both drought and mowing. The seed heads look very similar to those of crabgrass (Figure 4). Unlike the other two weeds discussed, bermudagrass can be very



Figure 1. Large crabgrass.

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Figure 2. Smooth crabgrass.

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Figure 3. The creeping stolons of bermudagrass.

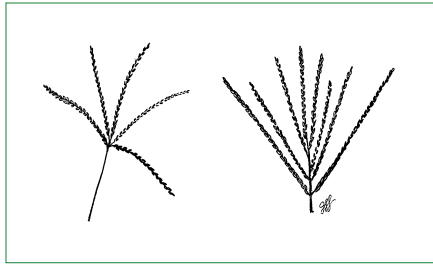
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JL LOCKWOOD, UCIPM

Figure 4. Flower heads of bermudagrass (left) and crabgrass (right).



JACK KELLY CLARK, UCIPM

Figure 5. Mature dallisgrass plant.



JACK KELLY CLARK, UCIPM

Figure 6. Dallisgrass rhizomes.

invasive in lawns and gardens. Learn more about bermudagrass in the *UC IPM Pest Notes: Bermudagrass* mentioned at the end of the article.

## Dallisgrass

Dallisgrass (*Paspalum dilatatum*) is a coarse-textured perennial that grows in a clump (Figure 5). It slowly increases in diameter as its shallow, underground rhizomes grow outward. The rhizomes have short internodes (the length of stem between the joints) that look like concentric rings on its surface and resemble grubs or worms (Figure 6).

Dallisgrass is a problem in many areas because it is adapted to inconsistent irrigation and fairly close mowing; the seed heads grow almost parallel to the ground and are often missed by lawn mowers. Learn more about dallisgrass in the *UC IPM Pest Notes: Dallisgrass*.

### How do you tell them apart?

Dallisgrass is easy to distinguish from crabgrass and bermudagrass because it grows in clumps, is green year-round, the stems are flat, and the flower heads droop rather than appearing as upright fingerlike spikes. As mentioned

already, crabgrass and bermudagrass have similar fingerlike flower heads (Figure 4) but crabgrass has wider leaves than bermudagrass. The stems of large crabgrass are often purple. Bermudagrass grows in long, wiry, trailing stems with leaves that are generally smooth and pointed, and has a conspicuous ring of white hairs at the junction of the blade and sheath.

### How are these weeds controlled?

Because crabgrasses are annual plants, reducing the amount of shallow

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**Table 1. Susceptibility of weed species to preemergence herbicides. Susceptibility tables are based on limited UC research and information from labels.**

	ATR	BEN	DCP	DIT	IND	ISO	MES	NAP	ORY	OXA	PEN	PRD	PRO*	SID	SUF
ANNUAL WEEDS															
Crabgrass, large	P	C	C	C	C	N	C	C	C	C	C	C	C	C	C
Crabgrass, smooth	P	C	C	C	C	N	C	C	C	C	C	C	C	C	C
PERENNIAL WEEDS															
Bermudagrass (Seedling)	C	C	C	C	—	N	—	C	C	C	C	C	C	C	C
Bermudagrass (Perennial)	N	N	N	N	N	N	N	N	N	—	N	N	N	N	N
Dallisgrass (Seedling)	C	C	C	C	—	N	—	C	C	C	C	C	C	N	C
Dallisgrass (Perennial)	N	N	N	N	N	N	—	N	N	N	N	N	N	N	N

Ratings legend: **C** = Control **P** = Partial Control **N** = No control **—** = no information

ATR = atrazine (Atrazine)      IND = indaziflam (Specticle)      ORY = oryzalin (Surflan)      PRO\* = pronamide (Kerb)  
 BEN = bensulide (Bensumec)      ISO = isoxaben (Gallery)      OXA = oxadiazon (Ronstar)      SID = siduron (Tupersan)  
 DCP = DCPA (Dacthal Flowable)      MES = mesotrione (Tenacity)      PEN = pendimethalin (Pre-M, Pendulum)      SUF = sulfentrazone (Dismiss CA)  
 DIT = dithiopyr (Dimension)      NAP = napropamide (Devrinol)      PRD = prodiamine (Barricade)

\*Permit required from county agricultural commissioner for purchase or use.

# Weedy Grasses ...continued from page 2

irrigation helps reduce their germination and growth. In landscape areas, use drip irrigation, which works best when buried. In lawns, replace short, daily watering with fewer but longer (deep) irrigations. This allows the top to dry out, and encourages the deep-rooted perennial lawn species growth. To manage crabgrass, raise the height of your mower; this has been shown to make lawn more competitive.

Although raising the mowing height helps slow bermudagrass growth, changing irrigation practices will not discourage, and may in fact encourage both dallisgrass and bermudagrass once they are established. Because of their perennial structures, these plants must be removed either physically or chemically. Bermudagrass can also be controlled in the garden by drying it

out for an extended period or by using soil solarization.

Many people use “crabgrass weed and feed” for weed control. This product is a combination of lawn fertilizer and preemergence herbicide. If applied before crabgrass emerges in your lawn, it can be very effective. However, if the weeds are bermudagrass or dallisgrass, the preemergence herbicide may control some of the emerging seedlings but will not control (and may actually increase) the infestation of these two weeds.

Not all herbicides effectively control crabgrass, bermudagrass, and dallisgrass. Table 1 shows the

Visit the UC IPM Weed Gallery at [ipm.ucanr.edu/PMG/weeds\\_intro.html](http://ipm.ucanr.edu/PMG/weeds_intro.html) for help identifying weeds. See each of the *Pest Notes* entitled *Bermudagrass*, *Crabgrass*, and *Dallisgrass* on the UC IPM website at [ipm.ucanr.edu](http://ipm.ucanr.edu) for specific management information.

susceptibility of these weeds to specific preemergence herbicides and Table 2 shows susceptibility to specific postemergence weeds.

Proper identification and knowledge of weed biology, such as germination time and life cycle, is the first step in any effective weed management attempts.

—John Roncoroni, UCCE Weed Science Advisor, Napa County, [jaroncoroni@ucanr.edu](mailto:jaroncoroni@ucanr.edu)

**Table 2. Susceptibility of weed species to postemergence herbicides. Susceptibility tables are based on limited UC research and information from labels.**

	BRO	BTZ	CAR	CLO	DIC*	ETH	FLU	FLX	FOR	GLY	HAL	MEC	MES	MSM	PRO*	QUI	SUF	SUL	TRS	TRY	24A*	24E*
<b>ANNUAL WEEDS</b>																						
Crabgrass, large	N	N	N	N	N	P	C	N	N	C	N	N	C	C	C	P	N	—	P	N	N	N
Crabgrass, smooth	N	N	N	N	N	P	C	N	N	C	N	N	C	C	C	P	N	—	P	N	N	N
<b>PERENNIAL WEEDS</b>																						
Bermudagrass (Seedling)	N	N	N	N	N	—	C	N	N	C	N	N	—	N	C	—	N	—	—	C	—	—
Bermudagrass (Perennial)	N	N	N	N	N	N	P	N	N	C	N	N	—	N	N	—	N	—	—	N	—	—
Dallisgrass (Seedling)	N	N	N	N	P	—	—	N	N	C	N	N	—	C	C	—	N	P	P	C	—	—
Dallisgrass (Perennial)	N	N	N	N	N	N	N	N	N	C	N	N	—	C	N	—	N	P	P	N	—	—

Ratings legend: **C** = Control **P** = Partial Control **N** = No control **—** = no information

- |                                               |                                  |                                  |                                   |
|-----------------------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| BRO = bromoxynil (Buctril)                    | FLU = fluzifop (Fusilade II)     | MES = mesotrione (Tenacity)      | SUL = sulfosulfuron (Certainty)   |
| BTZ = bentazon (Bentazon, Broadloom)          | FLX = fluroxypyr (Vista)         | MSM = MSMA                       | TRS = trifloxysulfuron (Monument) |
| CAR = carfentrazone (QuickSilver)             | FOR = foramsulfuron (Revolver)   | PRO* = pronamide (Kerb)          | TRY = triclopyr (Turflon)         |
| CLO = clopyralid (Lontrel)                    | GLY = glyphosate (Roundup)       | QUI = quinclorac (Drive)         | 24A* = 2,4-D amine                |
| DIC* = dicamba (Banvel)                       | HAL = halosulfuron (Sedgehammer) | SUF = sulfentrazone (Dismiss CA) | 24E* = 2,4-D ester                |
| ETH = ethofumesate (PoaConstrictor, Prograss) | MEC = mecoprop (MCP)             |                                  |                                   |

\*Permit required from county agricultural commissioner for purchase or use.

# Calibrating Spray Application Equipment

Applying the wrong amount of pesticide can result in poor control if not enough is used; too much being applied can lead to waste and possibly illegal usage. If pest control is insufficient, the end result might be a second application that will be more expensive due to the cost of labor involved. If the pesticide is overused, the cost of the extra material is one consideration, but there might also be plant damage and a higher risk of pesticide moving off-site in runoff or leaching into groundwater.

## Supplies for Calibration

- Buckets and a measuring container with markings in ounces
- A stopwatch
- A tape measure and stakes to mark out the test area
- A calculator

In addition to reading the label carefully and making sure that pesticides are not washed off into storm drains, the applicator must be sure equipment is properly calibrated so that the proper amount of pesticide is applied. Poor calibration also can result in a lot of leftover pesticide in the sprayer. The less that is leftover, the less there is that must be disposed.

For liquid applications, one needs to know the area to be sprayed, how much pesticide product is needed to treat the area, and how much water to use so the solution will cover the treatment area. Because people walk at different speeds or otherwise may operate spray equipment differently, it is important that each individual applicator perform calibration steps, especially if the equipment is shared. Similarly, individual pieces of equipment may vary in performance, so it's

important to calibrate each piece of equipment with the applicator, even if you have several of the same make and model.

Liquid applications are usually made using backpack sprayers (Figure 1) or hand cans with single nozzles and hand-operated pumps, vehicle-mounted tanks with gun-type nozzles and electric or gas pumps, or agricultural equipment with tank and boom supporting multiple nozzles.

Here we provide several methods you can use to calibrate equipment for specific broadcast spray situations. Follow the steps below to calibrate small sprayers for small treatment areas. Another method that can be used for larger sprayers and larger treatment areas is called the 128<sup>th</sup> acre method and is illustrated in Table 1. For estimating how much pesticide may be needed when spraying trees and shrubs, see the *Ask the Expert!* section on Page 6 of this newsletter.

## Backpack and Hand Can Sprayers

- Measure out a representative area of 1,000 square feet (20 by 50 feet works well, or 5 by 200 feet is good if you are going to be spraying medians).
- Put clean water into the tank without any pesticide.
- Walking at your normal pace and using your normal method of spraying, record the time it takes for you to spray the area you measured. It is best to do this two or three times to calculate an average time.
- Get a bucket or other container that has markings in ounces and spray water into it for the same amount of time it took you to spray 1,000 square feet. This amount is how much water you need to put in the tank for 1,000 square feet.



Figure 1. Backpack sprayer pesticide calibration.

- Where will you be spraying? Measure the area to be treated. If you plan to make several small applications to a number of locations, you can combine the measured areas.
- How much pesticide product do you need? Many pesticide labels provide application rates as ounces per 1,000 square feet. If you have 2,000 square feet and the label says 5 ounces per 1,000 square feet, then you need 10 ounces of the pesticide product. If you have 500 square feet and the label says 5 ounces per 1,000 square feet, then you need 2.5 ounces.
- How much water do you need? In a previous step (above), you determined how much water is needed for you to cover 1,000 square feet. If you need to spray 2,000 square feet, you will need two times more water (2,000 divided by 1,000 equals 2); if you need to spray 500 square feet, you would need half as much water (500 divided by 1,000 equals 0.5).

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# Calibrating ...continued from page 4

## Let's Try an Example

**Output:** You find it takes 130 seconds for you to treat 1,000 square feet with a specific sprayer. When you spray water with this sprayer into a bucket for that same amount of time, you find that you applied 22 ounces.

**Area:** You need to treat three locations; one is 600 square feet, one is 900 square feet, and the third is 200 square feet. So you will be spraying a total of 1,700 square feet (600 plus 900 plus 200).

**Pesticide:** The pesticide product label calls for a rate of 2 ounces per 1,000 square feet. Since you need to treat 1,700 square feet, you will need 1.7 times more pesticide (1,700 square feet divided by 1,000 square feet equals 1.7). Multiply 1.7 by 2 ounces, and the result is 3.4 ounces.

**Consider pesticide product formulations:** In this example, treatment of 1,000 square feet used 22 ounces of water, but you are going to spray 1,700 square feet. Take 1,700 and divide it by 1,000, and the result is 1.7, so you need to add 1.7 times more water. For 1,700 square feet, we multiply 1.7 by 22 ounces of water, resulting in 37 ounces of water needed.

If the pesticide product is a liquid formulation, then you will need to subtract the amount of liquid pesticide product added from the total amount of water needed. Therefore, to get 37 ounces of solution, you will need to subtract the 3.4 ounces of pesticide product added to determine the amount of water you must add (37 ounces total solution minus 3.4 ounces of pesticide equals 33.6 ounces of water).

If the product is a dry formulation like a wettable powder, you will mix 37 ounces water and 3.4 ounces of dry pesticide product.

In both cases, you would use the final solution to spray 1,700 square feet.

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## Conversions

1 acre=43,560 square feet	1,000 square feet=0.023 acre
8 ounces=1 cup	16 ounces=1 pint
32 ounces=1 quart	128 ounces=1 gallon

**Table 1. Easy 128<sup>th</sup> Acre Broadcast Sprayer Calibration for Backpack and Larger Tank Sprayers.\***

If the label rate is ounces or pounds per acre:	
Step 1	Measure out 128 <sup>th</sup> of an acre (340 square feet) for the calibration area. This is equal to an area of 10 feet by 34 feet or about 18.5 feet by 18.5 feet.
Step 2	Spray the calibration area evenly while recording the amount of time to complete the spray. Time: _____
Step 3	Spray water into a bucket for the same amount of time. For booms with more than one nozzle, put buckets under all the nozzles. Measure the amount of water in the bucket(s) in <b>ounces</b> ; this will equal the gallons per acre (GPA) that the sprayer is applying. Put this value in the Step 3 section of the box below.
Rate calculation:	
Step 4	Look up the total volume of your spray tank, in <b>gallons</b> . Put this value in the Step 4 section of the box below.
Step 5	From the pesticide label, determine the amount of product to be applied <b>per acre in ounces</b> . Put this value in the Step 5 section of the box below.
Step 6	Divide Step 4 by Step 3; this will determine the number of acres sprayed per tank load. Put this value in the Step 6 section of the box below.
Step 7	Multiply Step 5 times Step 6; this will determine the amount of product to be added to each tank load.
Step 4 _____	÷ Step 3 _____ = Step 6 _____
spray tank volume	GPA acres per tank load
Step 5 _____	x Step 6 _____ = Step 7 _____
ounces of herbicide per acre	acres per tank load herbicide per tank load in ounces

Notes: If the area to be sprayed is less than the area that a full tank load will spray, reduce the amount of water and pesticide by the same proportion as the reduction in acres to be sprayed, therefore reducing the amount of leftover solution. For example, you calculate that a full tank that holds 3 gallons will spray 2,000 square feet and you will need 1 ounce of pesticide for that size area but you are going to spray only 1,000 square feet; then you need to reduce the amount of water and pesticide by half. To do so, put 1.5 gallons of water plus 0.5 ounce of pesticide in the tank.

\*Adapted from Bell CE, Wilen CA, McGiffen Jr ME. Easy, No Math, 128<sup>th</sup> Acre Herbicide Broadcast Sprayer Calibration.

For more examples and ways to calibrate granular equipment, see:

Dill J, Koehler G, eds. 2005. Agricultural pocket pesticide calibration guide. Orono: Univ. of Maine Coop. Exten. Available online at [pronewengland.org/INFO/PROpubs/CalibrationGuide-small.pdf](http://pronewengland.org/INFO/PROpubs/CalibrationGuide-small.pdf).

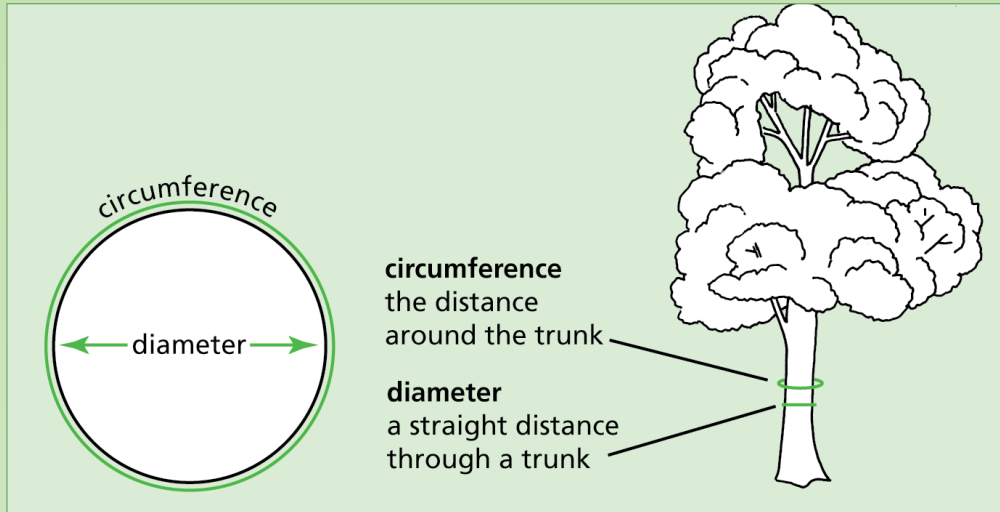
Whithaus S, Blecker L. 2016. *The Safe and Effective Use of Pesticides (Pesticide Application Compendium 1)*, 2nd ed. UC ANR Publication 3324. Oakland, CA.

O'Connor-Marer PJ. 2006. *Landscape Maintenance Pest Control*. UC ANR Publication 3493. Oakland, CA.

# Ask the Expert!

**Q:** I am applying imidacloprid (Merit) to control aphids on hackberry trees. The label says to apply 0.7 to 1.4 level teaspoons per inch of trunk diameter. How do I determine how much pesticide to use?

**A:** CALCULATING TRUNK DIAMETER AND APPLICATION RATES



1. **Read the label to find the rate of application.** For instance, the label might say to apply 1.2 teaspoons (tsp) of a systemic pesticide for every inch of the diameter of the trunk.
2. **Measure the tree.** If you know the circumference of the tree, you can easily calculate the diameter. To measure the circumference of the trunk (the distance around it at chest height), use a tape measure or string. Find the diameter by multiplying the circumference by 0.32.  
For example, a trunk that has a circumference of 47 inches would have a diameter of about 15 inches (47 inches x 0.32 = 15.04 inches).
3. **To determine the total pesticide you will need,** multiply the tree size by the application rate. For instance, if the stated rate on the label is 1.2 teaspoons per inch of diameter and your diameter is 15 inches:  
 $15 \text{ inches} \times 1.2 \text{ tsp/inch} = 18 \text{ tsp}$
4. **Convert the teaspoons to liquid ounces (oz)** (6 teaspoons = 1 liquid ounce):  
 $18 \text{ tsp} \div 6 \text{ tsp/oz} = 3 \text{ oz}$
5. **Multiply by the number of trees to be treated.** If you have two trees of the same size:  
 $3 \text{ oz} \times 2 = 6 \text{ oz}$   
A total of 6 ounces of the pesticide product will need to be applied to the soil surrounding the two trees.
6. **Next, determine how much water to mix with the product by reading the label.** Some labels specify mixing the pesticide with 1 gallon of water for trees less than 40 inches in diameter and 2 gallons of water for trees more than 40 inches in diameter.  
For applications to multiple trees, calculate the amount of pesticide to use based on the combined sizes of the trees. Mix the pesticides, following the label rate instructions, in a bucket or other applicator containing the measured amount of water.

**WHAT IS IPM?** Integrated Pest Management (IPM) programs focus on long-term prevention of pests or their damage through a combination of techniques including resistant plant varieties, biological control, physical or mechanical control, and modification of gardening and home maintenance practices to reduce conditions favorable for pests. Pesticides are part of IPM programs but are used only when needed. Products are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.

# Calibration ...continued from page 5

Want to make your backpack sprayer calibration more accurate? Use the retrofit in Table 2 (provided by Danny Hirschag, Urban Forest Superintendent at UC Irvine) to improve calibration and ensure you are evenly applying the correct amount of pesticide product.

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No endorsement is implied for products and manufacturers listed here. Resources are listed for informational purposes only.

## Subscribe to the UC IPM urban pest management blog!

UC IPM's blog provides readers with timely information about pests in and around homes, gardens, landscapes, and structures in California. We post articles about common seasonal pests, invasive pests, beneficials, and new UC IPM resources, including new and revised Pest Notes, training events, and other educational materials for residential audiences and pest management professionals.

View or subscribe to the blog at [ucanr.edu/blogs/ucipmurbanpests](http://ucanr.edu/blogs/ucipmurbanpests)



**Table 2. Materials List for Spraywand Conversion to TeeJet System.**

Part Description: Catalog No.	Supplier Sources
3/8" rubber chemical resistant spray hose	Multiple
**CF pressure regulating valve 11/16" thread, 15psi: 98661	Pbmsprayers.com, hdhudson.com
TeeJet strainer 6051-SS-50 Mesh	#TeeJet Spraying Systems
4" barbed swivel: 119990	TeeJet Spraying Systems
Valve handle: 4727	TeeJet Spraying Systems
##Trigger valve, brass: 6466	TeeJet Spraying Systems
24" brass curved extension: 6671-24"	TeeJet Spraying Systems
Quick TeeJet 11/16" nozzle body: OJT-NYB	TeeJet Spraying Systems
TeeJet spray tip: TP8002EVS	TeeJet Spraying Systems
Gasket, nylon: CP8935-NY	TeeJet Spraying Systems
Rubber seal gasket: CP18999-EPR	TeeJet Spraying Systems
Quick TeeJet caps: 25612-1-NYR	TeeJet Spraying Systems
Shindaiwa 3 gal backpack #SP30BPE	Multiple

\*replace hose only if existing OEM hose inadequate.

\*\*G.A.T.E. LLC (Global Agricultural Technology and Engineering, LLC), 6245 105th Place, Sebastian, FL. 32958-4706. 800-303-2099. [gate-llc.com](http://gate-llc.com).

# TeeJet Spraying Systems, 124A West Harrisburg St., Dillsburg, PA. 17019. 717-432-7222. [teejet.com](http://teejet.com).

## brass trigger valve can be substituted with plastic to save money for light duty use.

## Vertebrate Pest Council Seminar Series

The Vertebrate Pest Council is hosting their seminar series this year in conjunction with new partner Target Specialty Products.

Don't miss this unique opportunity to learn about wildlife management of a number of bird and mammalian species from staff at the University of California, California Department of Fish and Wildlife, California Department of Food and Agriculture, California Department of Pesticide Regulation and more!

Both structural and DPR Ag CEUs are available and Vector CEUs have been approved for some venues.



M. DIMSON, UCCE

For more information on these workshops, hosted in Oxnard and Anaheim this year, please check out [vpconference.org](http://vpconference.org).

# UC IPM Resources for Landscape Pest Management Professionals

This season's issue of the UC IPM *Green Bulletin* focuses on topics relevant to landscape pest management professionals, so we thought we'd showcase some useful resources developed and maintained by the University of California Statewide Integrated Pest Management Program (UC IPM) aimed at landscape professionals.

## What is UC IPM?

UC IPM is a statewide program within the University of California Division of Agriculture and Natural Resources. We are dedicated to helping all Californians manage pests around the home, in the landscape, on the farm, in schools, and even on the pet. Our philosophy focuses on long-term prevention of pests or their damage through using a combination of techniques such as building out pests, modifying maintenance practices, excluding pests, using biological control, and planting pest resistant plant varieties.

Pesticides can be a part of IPM but should be used only when needed. Pesticides should be selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.

## Landscape-specific resources

UC IPM has many resources for professionals seeking to carry out IPM programs. These include books, co-sponsored workshops, and many online tools.

Explore the UC IPM website's Home, Garden, Turf & Landscape Pests page, [ipm.ucanr.edu/homegarden](http://ipm.ucanr.edu/homegarden), for numerous sources on identifying and managing pests in landscapes.

See the box for a list of some online features for landscape pest management professionals.

## Key online features:

- **Pest Notes**, a peer-reviewed series covering 170 pests, are a key resource for landscape pest management professionals and include both nonchemical and pesticide suggestions.
- **Plant lists** under "Pests in gardens and landscapes" will help you diagnose problems. More than 200 different plant species are available on the trees and shrubs page with a list of common pests of each one.
- **Weed photo gallery** can help you identify weeds and recommends how to control them.
- **Plant Problem Diagnostic Tool** will assist you in determining the pest or problem based on the plant type and damage symptoms.
- **Seasonal Landscape IPM Checklist**, a monthly guide to help you plan your IPM activities.
- **The UC Guide to Healthy Lawns** provides all the information you need to manage residential or park turf with minimal pesticides.
- **Short videos** about pests and their management can be found in our video library or by searching YouTube for "UCIPM."

## Training and online courses

The training and events web page, [ipm.ucanr.edu/training](http://ipm.ucanr.edu/training), lists online training courses as well as in-person training opportunities. Currently we offer online courses for pesticide applicators on urban pesticide runoff, pesticide application equipment and calibration, and practicing IPM in schools and child care settings. Additional online and in-person courses are being developed and will be added over time.

You can also find pesticide safety training resources to help you prepare for licensing exams including materials for maintenance gardeners preparing for the QAC exam.

Remember, using integrated pest management practices will reduce environmental and health problems associated with pesticides. In future issues of this newsletter, we will feature additional UC IPM resources that we hope will help you in your job.



BM SIKES, UCIPM

For more IPM resources for landscape professionals, see the [Resources for Landscape Professionals](#) page on the UC IPM website. You can also visit your local county [University of California Cooperative Extension](#) website or office for assistance with solving plant problems.

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# Recently Revised *Pest Notes*



## Brown Recluse and Other Recluse Spiders

The brown recluse spider, despite not being a California resident, is a pest that worries many people. UC arachnologist Richard Vetter is a world expert on this spider and has recently updated the *Pest Notes: Brown Recluse and Other Recluse Spiders*. This revision includes new photographs to help distinguish common spiders from the brown recluse and new information about misdiagnosis of spider bites.

Online at [ipm.ucanr.edu/PMG/PESTNOTES/pn7468.html](http://ipm.ucanr.edu/PMG/PESTNOTES/pn7468.html)



## Asian Citrus Psyllid and Huanglongbing Disease

In order to bring the latest information about the Asian citrus psyllid's spread through the state which brings with it the threat of the fatal citrus disease, huanglongbing disease, UC entomologists Elizabeth Grafton-Cardwell and Matthew Daugherty have updated the *Pest Notes: Asian Citrus Psyllid and Huanglongbing Disease*. Recent research on biological control of the psyllid is included, as well as an expanded section on what home gardeners can do to help stop the spread of the pest and its associated disease.

Online at [ipm.ucanr.edu/PMG/PESTNOTES/pn74155.html](http://ipm.ucanr.edu/PMG/PESTNOTES/pn74155.html)



## Ground Squirrel

The newly updated *Pest Notes: Ground Squirrel* includes more information about identification and management. UC scientists Niamh Quinn, Roger Baldwin, and Monica Dimson revised this document with an updated range map and the latest research on management of the California ground squirrel such as methods that are most efficacious at different times of the year.

Online at [ipm.ucanr.edu/PMG/PESTNOTES/pn7438.html](http://ipm.ucanr.edu/PMG/PESTNOTES/pn7438.html)

Visit UC IPM's *Pest Notes* web page for these and many more titles  
[ipm.ucanr.edu/PMG/PESTNOTES](http://ipm.ucanr.edu/PMG/PESTNOTES)

**Always read and carefully follow all precautions and safety instructions provided on the pesticide container label, as well as any other regulations regarding the use of pesticides. Not following label directions, even if they conflict with information provided herein, is a violation of state and federal law. No endorsements of named products are intended, nor is criticism implied of products not mentioned.**

### University of California Statewide Integrated Pest Management Program



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