

Insec(tc)ure*: Are you insecure about your insect cures?

A UT Urban IPM Lab Newsletter for the Pest Management Industry

The Contribution of the Tennessee Pest Control Industry to the Tennessee Economy

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Introduction

Estimates regarding the growth and contribution of the Tennessee pest control industry to the state economy are provided in this report. An IMPLAN-based (IMPLAN Group LLC 2015) input-output model of the 2022 Tennessee economy and the most recent published data regarding the industry's size are used in arriving at model estimates. Estimation results for the industry's total (direct and multiplier-based) impact are provided followed by the summary and conclusions.

Input-Output Model Use

Input-output models "examine the market flow of products between industries, sales by industries to households and other final users, and industry use of factors of production (labor and capital). Such models can be very detailed, containing several hundred industries" (Hughes 2003). An IMPLAN-based model of the Tennessee economy in 2022 was used as the starting point of our work. IMPLAN is a so-called "ready-made I-O modeling system, where a basic knowledge of personal computers is sufficient for generating models, multipliers, and impacts" (Hughes 2003). As such I-O models provide estimates of the economic impact of a given event or industry (as contribution analysis). In contribution analysis, the impact of a given industry, such as pest control in this case, is based on the multiplier effect of the spending and re-spending in a given economic set off by that industry.

To obtain an estimate of the contribution of the pest control industry to the Tennessee economy, estimates regarding the size of the industry must first be obtained. Reported employment data were used as the starting point for estimating the economic impact of the exterminating and pest control services industry (North American Industrial Classification System number 56171) on the state economy using fourth-quarter data and annual data for 2023 as reported in the Quarterly Census of Employment and Wages (QCEW) report. Annual data indicated that covered employment was 4,582 jobs with a total payroll of \$263,136,561 (average annual pay of \$57,431) for 464 establishments. However, the number of reported establishments for the last quarter of 2023 was 481. In the IMPLAN model, the pest control industry is a major component of the Services to Building Industry (Number 476). Based on the 2022 model for Tennessee, the average value of output (revenue) per worker was \$111,820. This result is within the range of values reported by Winkles et al. (2024) of \$102,213 and \$116,482 reported for the Georgia pest control industry. We applied the reported 2023 employment of 4,582 to arrive at an estimated total revenue estimate (\$512,358,524) for QCEW reporting establishments.

But while accounting for most activity, QCEW does not account for establishments who do not have covered employees. To account for such proprietors, we used estimates for the number of pest control industry establishments (349) and revenue (\$18,207,000) from nonemployer statistics data provided by US Census Bureau for 2021. We converted these values into 2023 estimates by adjusting the per-establishment revenue estimates based on the Gross Domestic Price Deflator and by applying the growth rate from 2021 to 2023 (10.7%) in the number of establishments reporting employment (i.e., the QCEW data) to the number of nonemployer establishments. For establishments with no employees, we arrived at an estimated 386 establishments and \$21,586,040 in revenue. Adding these estimates to the QCEW-based estimates, we arrived at an estimated 867 total establishments (481 with hired workers and 386 without), 4,755 workers (including the self-employed), and an industry revenue estimate of \$531,745,440. The latter value provided our estimate of industry size used in our contribution analysis of the Tennessee pest control industry to the state economy.

Study Results

The economic contribution of the Tennessee pest control industry to the state economy is substantial as shown in Table 1 and Figure 1-4. Estimated direct employment of 4,755 leads to a total impact on state employment of 7,358 jobs while \$180,329,431 in direct labor income leads to a total impact on labor income of \$354,686,332. In terms of Gross State Product, \$253,066,261 in activity in the industry leads to a total impact on GSP of \$534,510,745 while direct output of \$531,745,440 leads to a total impact in output of \$1,029,122,359. Economic multipliers are total impacts divided by direct impacts for the variable in question. In terms of output, one dollar in direct spending or output by the Tennessee pest control industry leads to an impact of \$0.94 in the rest of the state economy (i.e., the output multiplier is \$1.94). One dollar of labor income in the industry had a total impact on labor income throughout the economy of \$1.97 while one dollar of gross state product in the industry had a total impact on gross state product throughout the economy of \$2.11. Finally, one direct job in the pest control industry led to 1.55 jobs (the job itself plus 0.55 jobs in the other parts of the state economy) throughout the Tennessee economy.

Type	Employment	Labor Income	Gross State Product	Output
direct	4,755	\$180,329,431	\$253,066,261	\$531,745,440
indirect	1,351	\$95,112,970	\$139,519,585	\$261,455,730
induced	1,252	\$79,243,932	\$141,924,899	\$235,921,190
total	7,358	\$354,686,332	\$534,510,745	\$1,029,122,359
Multiplier	1.55	\$1.97	\$2.11	\$1.94

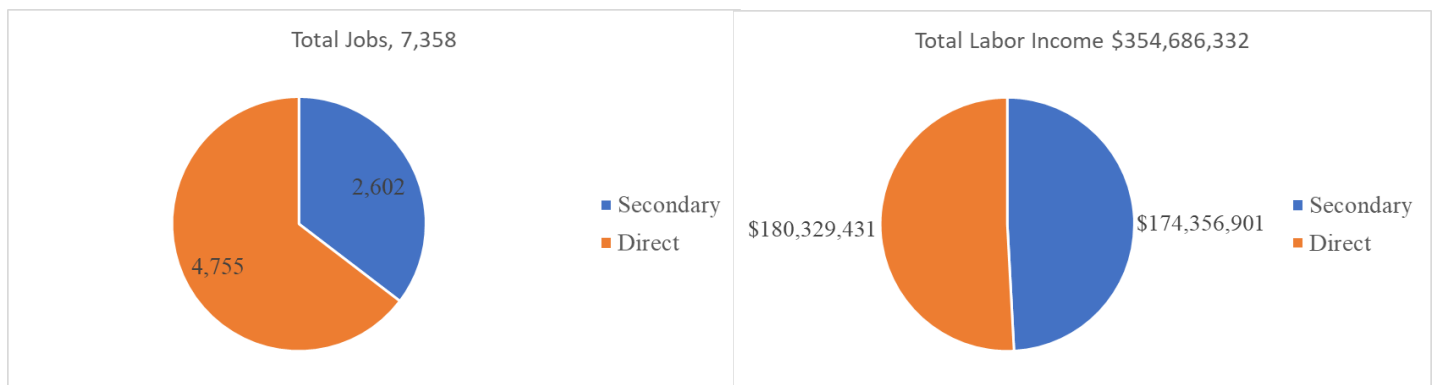


Figure 1. Impact of the Tennessee Pest Control Industry on Tennessee Employment.

Figure 2. Impact of the Tennessee Pest Control Industry on Tennessee Labor Income.

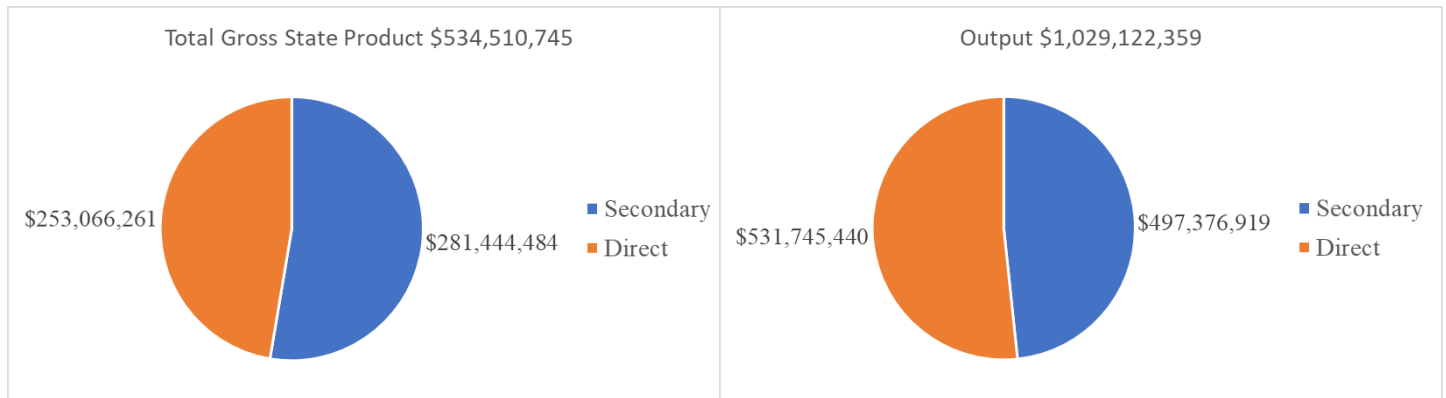


Figure 3. Impact of the Tennessee Pest Control Industry on Tennessee Gross State Product

Figure 4. Impact of the Tennessee Pest Control Industry on Tennessee Output

We compared our results to those reported by Menard (2023) regarding the contribution of agriculture to the Tennessee economy for 2021. Focusing on output, the impact of the Tennessee pest control industry, at \$1.029 billion, is comparable to that found for several important components of the agricultural economy, including beef cattle (\$0.866 billion), greenhouse, nursery, & floriculture production (\$0.576 billion), cotton farming (\$0.348 billion), and poultry and egg production (\$1.058 billion).

The economic impact on specific selected sectors of the Tennessee economy is provided in Table 2. Output impacts are concentrated in employment services (over \$34 million), other real estate (\$27.8 million), owner-occupied dwellings (over \$26.8 million), management of companies and enterprises (\$22.9 million), and full (\$10.1 million) and limited-service (\$8.8 million) restaurants. Likewise, employment impacts were concentrated in employment services (313.6 jobs), other real estate (126.7 jobs), full-service restaurants (100.7 jobs), management of companies and enterprises (98.4 jobs), and limited-service restaurants (82.9 jobs). Major labor income impacts were found in the management of companies and enterprises (\$15.8 million), employment services (\$14.1 million), hospitals (\$8 million), and offices of physicians (\$6.8 million). Impacts on Gross State Product were concentrated in owner-occupied dwellings (over \$22.2 million), employment services (\$19.3 million), management of companies and enterprises (over \$13.6 million), other real estate (\$11.9 million), and hospitals (\$8.4 million). Impacts in sectors such as restaurants and health care reflected spending by households supported by working in the pest control industry, while impacts in sectors such as employment services and management of companies and enterprises were due to purchases by the industry.

We compared our results to those recently reported by Winkles et al. (2024) for the pest control contribution study conducted for Georgia. Averaging the two industry contribution analysis results that they reported, (14,308 jobs, \$618.2 million labor income, \$935.4 million Gross State Product, and \$1.874 million in output), our results for Tennessee were 53.9% of their employment impact, 57.4% of their labor income impact, 57.2% of their Gross State Product impacts, and 54.9% of their output impact. Given that the Tennessee economy is less than two-thirds the size of the Georgia economy and given that much of Georgia has hotter and more humid weather than Tennessee allowing for more pest species, faster growth of pest populations and thus higher abundance of pests, the results are not surprising.

Summary and Conclusions

Provided here are estimates regarding the economic impact of the pest control industry on the Tennessee economy through the spending that the industry engenders. The impact is substantial including the over \$1 billion in impact in terms of output. While smaller than the impact found for the industry in Georgia, the values reported here are comparable, especially given the smaller size of the Tennessee economy and the greater need for pest control in Georgia given its warmer climate.

Industry Number and Title	Output	Total Employment	Labor Income	Gross State Product
476 Services to buildings	\$531,745,440	4,755.4	\$180,329,431	\$253,066,261
472 Employment services	\$34,407,032	313.6	\$14,118,240	\$19,303,485
447 Other real estate	\$27,759,131	126.7	\$4,288,358	\$11,897,558
509 Full-service restaurants	\$10,091,271	100.7	\$3,775,365	\$5,591,606
469 Management of companies and enterprises	\$22,861,035	98.4	\$15,792,342	\$13,649,725
510 Limited-service restaurants	\$8,813,088	82.9	\$2,597,434	\$4,047,023
462 Management consulting services	\$9,878,068	63.3	\$5,659,582	\$5,896,774
483 Offices of physicians	\$9,525,521	55.0	\$6,761,612	\$6,806,930
490 Hospitals	\$13,369,263	53.1	\$8,026,207	\$8,412,923
512 Automotive repair and maintenance, except car washes	\$5,985,185	49.9	\$3,495,008	\$4,392,752
515 Commercial-industrial machinery, equipment repair, maintenance	\$7,037,509	48.7	\$4,015,445	\$4,705,159
411 Retail - General merchandise stores	\$4,826,073	44.3	\$1,678,432	\$3,019,959
470 Office administrative services	\$3,734,159	44.0	\$3,479,871	\$1,519,356
456 Accounting, tax preparation, bookkeeping, and payroll services	\$8,407,225	43.1	\$4,518,967	\$5,764,868
511 All other food and drinking places	\$3,689,826	41.1	\$1,572,661	\$2,418,740
406 Retail - Food and beverage stores	\$3,831,359	38.9	\$1,660,389	\$2,439,189
449 Owner-occupied dwellings	\$26,826,756	0.0	\$0	\$22,229,028
413 Retail - Nonstore retailers	\$8,977,859	37.3	\$1,062,225	\$5,648,762
441 Monetary authorities and depository credit intermediation	\$12,347,217	30.1	\$3,005,145	\$7,545,353

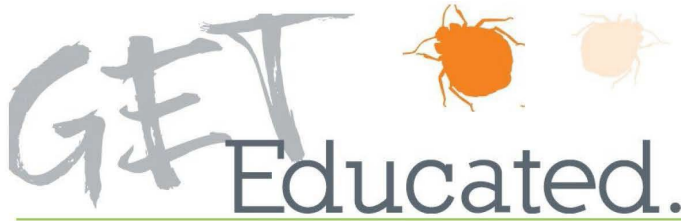
Note: This article is an abbreviated version of a UT Extension publication expected to be released in late 2024.

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Upcoming Educational Events Offered by the UT Urban IPM Program

Come experience the best-tasting food you'll find at any conference in the area – it's prepared by the UT Culinary Program's students.



10TH ANNUAL TENNESSEE

BED BUG, COCKROACH & RODENT MANAGEMENT

MEETING WEDNESDAY | AUGUST 7, 2024

UNIVERSITY OF TENNESSEE CONFERENCE CENTER | 600 HENLEY STREET |
KNOXVILLE, TENNESSEE 37902

Check-in starts at 7:00 AM | Meeting 8:00 – 4:00 EDT



- > 8:00 – 9:00 **Exploring Bed Bug Biology and Recent Innovations in Management Strategies**
Simona Principato, University of Kentucky
- > 9:00 – 10:00 **What Do You Mean We Have Smokybrown and Turkestan Cockroaches in Tennessee?** Dr. Art Appel, Auburn University
- 10:00 – 10:30 Break with Vendors
- > 10:30 – 11:30 **Mosquitoes: Insect Vector and Vector-Borne Diseases** Dr. Angela Tucker, University of Tennessee
- 11:30 – 12:30 Lunch provided
- > 12:30 – 1:30 **Norways, Roof Rats and House Mice, Oh My!** Tim Madere, New Orleans Mosquito, Termite & Rodent Control Board
- > 1:30 – 2:30 **Working with Suspected Delusional Infestations** Dr. Karen Vail, University of Tennessee
- 2:30 – 3:00 Break with Vendors
- > 3:00 – 4:00 **Solving Pest Problems and Q & A**
Dr. Karen Vail, University of Tennessee, and all speakers

Drum roll please.... Announcing the exciting lineup of the 10th Annual Bed Bug, Cockroach and Rodent Management Meeting to be held in Knoxville on August 7th at the UT Conference Center. Thanks to your responses on program evaluations, we've expanded beyond the previous subjects presented. This year, Simona Principato, of the University of Kentucky's DeVries Lab, will present innovations in bed bug management. When the folks in Chattanooga grabbed me after a meeting to complain about the increase in smokybrown cockroaches in the area, I sought Dr. Art Appel of Auburn University, one of the few researchers in the country that have addressed this pest, to honor us at this meeting. Our last out-of-state speaker, Tim Madere, comes to us from NOMTRCB, the New Orleans Mosquito, Termite & Rodent Control Board. Tim will share his practical, hands-on experience managing rodents in a large southern city. Dr. Angela Tucker is new to UT and will deploy her years of industry training experience to update us on mosquitoes and the diseases they vector in East Tennessee. And, I'll round things out by discussing delusional infestation (DI), a condition in which individuals falsely believe they are infested with insects, mites and other parasites, and the latest materials we have developed to work with these suspected DI individuals. Stick around for the problem-solving session at the end of the conference when manufacturer reps, distributors, pest management professionals, social workers, housing personnel and presenters work together to solve scenarios about these pests. Registration deadline is July 31, 2024.

For more information, see <https://tiny.utk.edu/2024BBEvent>.

ACE (Associate Certified Entomologist) Prep Course

Fall 2024

Are you certified in pesticide applicator category 7 with a minimum of 5 years of verifiable pest management experience in the United States? Then you may be ready to become an ACE, an associate certified entomologist. Before you can become an ACE, you will need to provide two letters of professional reference, be willing to adhere to the [ACE Code of Ethics](#), [complete the application](#) and [pay the application fee to the Entomological Society of America](#) and pass an online test of your knowledge of structural pest control. The program and its benefits are explained in its entirety at <https://entocert.org/ace>. The application process is separate from the training offered below.

To help you prepare for the exam, Dr. Karen Vail, Extension Urban Entomologist of the UT Department of Entomology & Plant Pathology will provide an ACE Prep Course this fall. All training sessions will be virtual and held from 5 pm to at least 6 pm on select Mondays via Zoom. A new Zoom link will be sent each week. By offering online training, we no longer limit participants to be within a few hours' drive of campus!

2024 Training Date	Subject
September 16	Integrated Pest Management and Tools
September 23	Insecticides and Modes of Actions
September 30	Pesticide Safety, Laws & Labels
October 7	Insect Biology and Morphology
October 14	Ants
October 21	Cockroaches
October 28	Flies
November 4	Stinging and Biting Arthropods
November 18	Stored Products Pests
November 25	Occasional Invaders
December 2	Wood-destroying Organisms
December 9	Common Commensal Pests/Review
December 15	Extended review in the afternoon
December 16* 5 pm – 8 pm	Exam (limited to 15)*

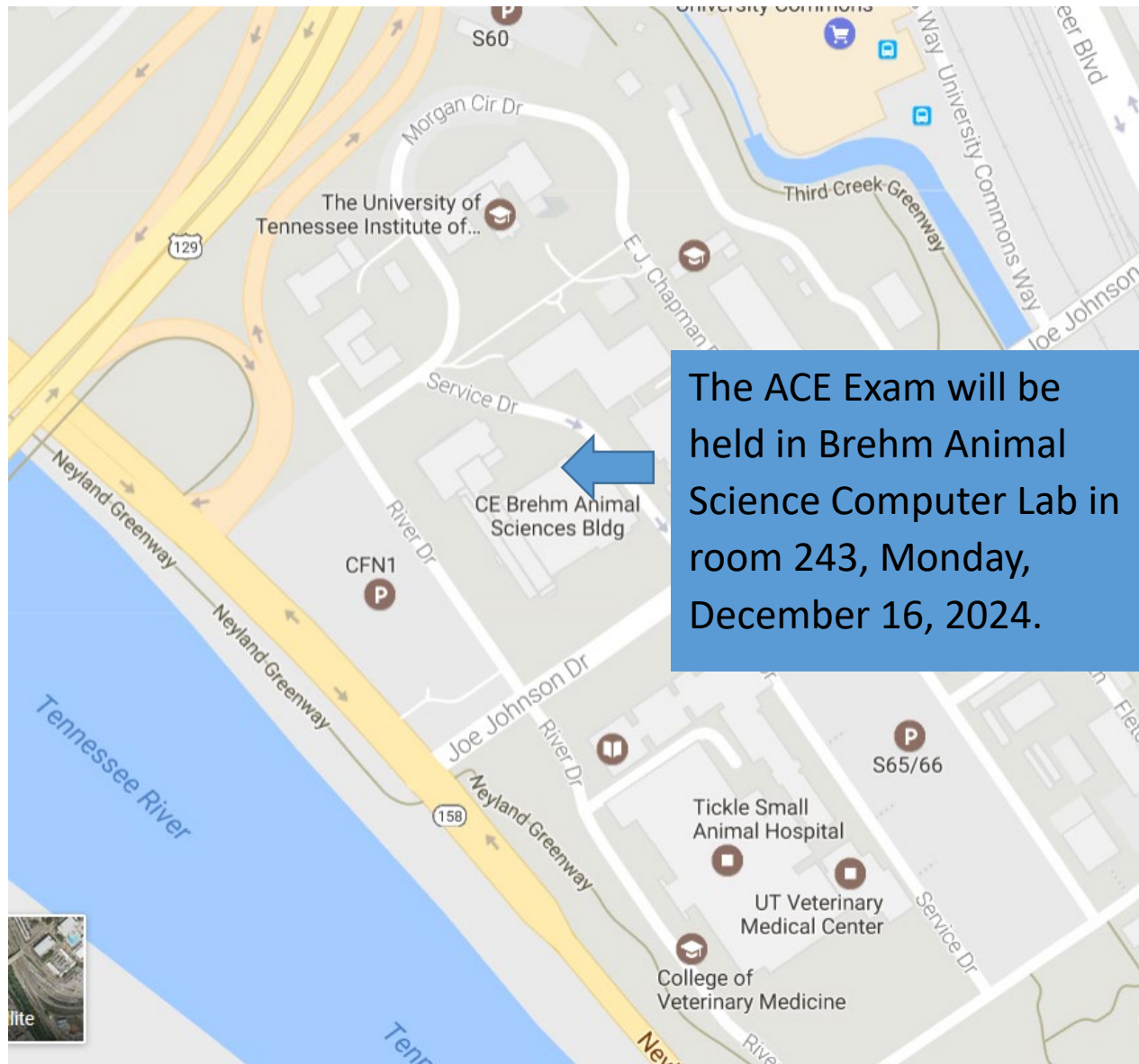
*The ACE exam will be given in room 243 Computer Lab of the Brehm Animal Science Building.

You can register for all classes of the ACE Prep Course at one time for a discounted price of \$300 or pay \$30 for each class as long as you register at least one week before the training date. Enrollment is limited to 25 per training date. One Tennessee pesticide applicator recertification unit earned in categories 7, 8, 10 and 12 per session. The course will only be held if at least 5 register before August 31st. **The course has met its registration requirements!!!!**

Register for the UT ACE Prep Course online at

<https://tiny.utk.edu/ACEPrepFall2024>

ACE Exam Location - UT Institute of Ag Campus Map



As long as it's after 5pm, you can park in lot CFN1.

We suggest you purchase the *IPM for the Urban Professional: A Study Guide for the Associate Certified Entomologist* from ESA (<https://entocert.org/ace/resources>) and the *NPMA Field Guide to Structural Pests* (<https://ebiz6personal.npmapestworld.org/UI/ProductDetails.html?productId=703>) prior to taking the training. The NPMA manual is also available as a downloadable phone app (available for [Apple iOS](#) or [Google](#)) and comes with an annual fee. The ESA study guide is discounted when you purchase it with your ACE application. In the past, shipping of the manuals has been greatly delayed, so order the manuals as soon as you sign up for the class!

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Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label and registered for use in your state.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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