

# MARKET WATCH

LAWN/TREE CARE

## Bee-friendly lawn care

How turf managers can help protect pollinators while using insecticides.

By JONATHAN LARSON AND DANIEL POTTER, PH.D.

**P**opulations of cultivated honeybees, native bumblebees and other pollinators have declined alarmingly in recent years. Scientists are scrutinizing the possible causes of bee die-offs and what to do about them. Much of the debate centers on whether or not exposure to insecticides, especially neonicotinoids, contributes to the problem. Because lawn care providers use these insecticides to control grubs and other turfgrass pests, they should understand the issue and be able to reassure customers their services don't contribute to the problem.

### WHY POLLINATING INSECTS ARE IMPORTANT

Many orchard and garden crops, including apples, cantaloupes, almonds, cherries, soybeans, blueberries and a host of others, will not produce fruits without first being pollinated by bees. European honeybees get much of the credit, but in the U.S. alone some 4,000 species of native bees, including bumblebees, orchard mason bees, squash bees and leafcutter bees, also provide important pollination services.

According to a 2012 scientific study published in the journal *Public Library of Science One (PLOS One)*, crops pollinated by bees and other insects contributed \$29 billion to U.S. farm income in 2010. If bees continue to die off, those pollination needs may not be met, resulting in shortages of fruits, vegetables and seeds. These shortages lead to higher costs to consumers. Insect pollination also is essential to the preservation of wild plants, most of which would not otherwise produce fruits and seeds.



University of Kentucky researchers studied how to reduce insecticide hazards to bees. Above: A bee hive at a safe foraging site. Right: A hive in a treatment tent.



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Bees in suburban areas commonly forage on flowering lawn weeds. Indeed, we've surveyed and collected dozens of species of native bees visiting dandelions and white clover in central Kentucky lawns. Many of the species we caught are also pollinators of garden crops, fruits and berries, and of ornamentals such as flowering crabapples and hollies. Bumblebees, for example, are especially good pollinators of tomatoes, eggplant and peppers in home gardens.

### WHY ARE BEE NUMBERS DECLINING?

Experts agree there's no single reason why bee numbers are declining. Rather, bee populations face a number of stresses that include parasitic mites, disease-causing pathogens, land development, habitat fragmentation, changes in beekeeping practices and, in some cases, exposure to pesticides.

**Parasites, diseases and changes in beekeeping practices.** Honeybees are parasitized by varroa mites that suck their blood and by tracheal mites that clog the breathing ducts of adult bees. They are susceptible to diseases caused by bacteria and fungi as well and to a virus that targets their immune systems. Shipping bee colonies around the country for commercial pollination can weaken them, increasing vulnerability to these agents. Plus, they may bring diseases with them that will infect local bee populations. Beekeepers provide colonies with supplemental food—often sugar or corn syrup—to compensate for the lack of wild forage in agricultural monocultures and as a substitute for “raiding” the bees’ stores of honey, which is harvested for sale. Artificial bee foods, however, lack some of the nutrients in real honey that bees need to develop a strong immune system.

**Loss and fragmentation of natural habitat.** Replacement of natural habitat by agricultural or urban expansion results in shortages of plants that bees depend on for food. Monocultures of crops like corn and wheat offer relatively little in the way of pollen and nectar that bees need to survive. In addition, native wild bees typically have specific nesting requirements; bumble bees, for example, often construct their underground nest in abandoned rodent burrows. Because of habitat loss, nesting sites are limited and worker bees must forage greater distances to bring food back to the nest.

**Insecticides.** Bees may encounter insecticide residues on the crops they pollinate or on wildflowers or flowering weeds that are inadvertently sprayed. Many chemical insecticides used to control insect pests of lawns, landscapes and gardens are acutely toxic to bees, which is why they have label precautions not to apply them to plants that are in bloom when bees may be present. This potential hazard was punctuated by an incident in Oregon this past June that led to the deaths of some 50,000



An inside look at a bumblebee hive tested by UK researchers.

bumblebees when linden trees in bloom were sprayed with an insecticide, a violation of the pesticide label.

Because neonicotinoids are systemic, there also is potential for translocation of their residues into pollen and nectar. Even low-level exposures can adversely affect bees. For example, research has shown worker bees that ingest sublethal amounts of imidacloprid become intoxicated and neglect their duties in the hive. Such bees are less likely to learn essential tasks like locating patches of food plants, which can lead to food shortages and decreased colony success. Additionally, sublethal exposure to insecticides can weaken bees’ immune systems, making them more vulnerable to infection by parasites and pathogens.

**A perfect storm of stresses.** Most likely, bee declines are due to a combination of the aforementioned menaces acting together. In the case of honeybees, a one-two punch of varroa mites and viruses has been implicated in collapsing colonies, although lack of food and pesticide exposures can weaken colonies and make it easier for the mites and pathogens to finish them off. In the case of bumblebees, stresses from habitat loss and disease could be compounded by

pesticide exposures. Ongoing research does not point to a single causal agent for global bee declines; rather, the causes are multiple and complex.

## LAWN INSECTICIDES AND BEES

We conducted a study to determine how turf care providers can reduce insecticide hazards to bees when treating lawns for grub control. The research, published last spring in *PLOS One*, showed when turf intermixed with flowering white clover is sprayed with a neonicotinoid insecticide, bumblebee workers foraging on the contaminated flowers were intoxicated or killed, reducing colony growth. Only the largest, most vigorous bumblebee colonies will produce queens by late summer, and those failing to do so are doomed because only the new queens survive the winter to start the next generation. We found even when they were moved to a “safe site” with no pesticide exposure, colonies that had foraged on treated flowers for just six days failed to produce new queens.

Notably, though, once the clover flowers present at the time of treatment were removed by mowing and new flowers grew to replace them, bees subsequently foraging on the site were not harmed. Indeed, residues in the nectar dropped from toxic to essentially nontoxic levels

### » WEB EXTRA

Read Larson’s, Potter’s and Carl Redmond’s complete study, “Assessing Insecticide Hazard to Bumble Bees Foraging on Flowering Weeds in Treated Lawns,” at [bit.ly/15S6oja](http://bit.ly/15S6oja).



once the turf was mowed. Thus, while the research validates EPA label precautionary statements not to apply neonicotinoids to blooming nectar-producing plants if bees may visit the treatment area, it also indicates that such applications don't pose a prolonged systemic hazard to bees. Another key finding was chlorantraniliprole (Acelepryn), representing a relatively new class of insecticides called anthranilic diamides, did not adversely affect bee colonies even when the workers foraged on flowering clover that had been directly sprayed.

UK research shows LCOs taking precautions can use neonicotinoids on turf without harming bees.

### FIRST DO NO HARM

What can lawn care providers do to avoid harming resident bees? Clearly, direct contamination of flowers by neonicotinoids is a bee hazard, so applicators should follow label directions to not spray those products on turf when blooming weeds are present. But with a few sensible precautions—e.g., controlling flowering weeds with herbicides before application, delaying grub treatments until after peak bloom of spring-flowering weeds, using granular formulations, and/or notifying homeowners to mow off any flower heads before or soon after liquid applications have been watered-in—it should be possible to use neonicotinoid insecticides for grub and billbug control



without harming bees. Chlorantraniliprole, a relatively new chemistry, appears non-hazardous to bees.

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PHOTO: DANIEL POTTER, PH.D.



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MAINTENANCE

# Fuel savings inside the box (truck)

John Shorb Landscaping backs its sustainable mission with diesel-electric hybrid vehicles. *By JONATHAN KATZ*



**S**ome of the latest blog entries on John Shorb Landscaping’s website focus on sustainable landscaping practices, such as beneficial insects, rooftop gardens, conservation and stormwater management. The company, based in Kensington, Md., also promotes its sustainability message on its Facebook page.

The efforts all are part of an overall commitment to resource conservation. John Shorb Landscaping has built a sizable portfolio of services that appeal to eco-conscious customers. To build on its sustainability message, the company ordered two diesel-electric hybrid box trucks in 2012 and began driving them in the spring of 2013.

“We thought this played into our image of trying to do the right thing environmentally,” says John Shorb, president of the company.

In addition to the environmental benefits, Shorb expects the trucks to provide fuel savings. As of September, the company was still evaluating how much it has cut fuel use.

“We are noticing fuel savings,” Shorb says. “We don’t have empirical data proving it. It’s mainly based on the fact that we’re not fueling up as often.”

John Shorb Landscaping added two diesel-electric hybrid box trucks during the 2013 season.

### WHY HYBRIDS?

The trucks Shorb purchased were 2014 Hino 195h diesel-electric hybrid box trucks. The company drove Isuzu box vans for several years until Isuzu stopped making the model the company preferred. Shorb purchased two Hino vans and liked them enough to purchase two more. Upon visiting the Hino website to view his options, he noticed the company, a Toyota Motor Group company, offered hybrid vehicles. One of Shorb’s managers drove a Toyota Prius and spoke highly of its performance, further convincing Shorb to make the purchase.

“Hino is Toyota’s truck version (of the Prius), so we knew the brand and liked it,” Shorb recalls. “Also, we knew fuel prices weren’t going down, so we thought it would be worth a try.”

Shorb says his company plans to continue replacing its fleet with more hybrid box trucks as long as the cost remains competitive. The hybrid trucks cost about \$11,000 more than a traditional diesel box truck, says Ed Ervin, a commercial fleet sales manager at K. Neal International Trucks in Hyattsville, Md.



In addition to improving fuel efficiency, John Shorb Landscaping hopes to better maintenance crew productivity with the addition of bathrooms and laptop computers to its box trucks.

PHOTOS: JOHN SHORB LANDSCAPING



But the hybrids are about 30 percent more fuel efficient than the standard diesel engine, says Ervin, who sold the Hino trucks to John Shorb Landscaping. The payback period on these hybrid vehicles is nearly seven years. The return on investment can fluctuate depending on the price of diesel fuel, Ervin says.

Hybrid trucks, Ervin cautions, are not suited for every industry because the trucks need to idle for the batteries to recharge. They are ideal for landscaping businesses that have many clients in the suburbs, where stoplights every few miles offer an opportunity to recharge, he says.

### HOW IT WORKS

When the clutch engages in the hybrid system, the motor uses electric power stored in the battery to start the engine, eliminating the need for a starter motor. The hybrid system is active until the truck reaches a cruising speed, the most efficient operating mode for an engine. The truck then automatically switches to engine-only driving.

During braking, vehicle acceleration energy is converted to electricity, which is stored in battery. In this mode, the clutch automatically disengages to enable energy recovery and regeneration. Another potential fuel-saving feature is the "idle stop mode." When the vehicle stops, the engine shuts off to reduce unnecessary fuel consumption. When the driver takes his or her foot off the brake pedal, the engine restarts.

### MOVING FORWARD WITH HYBRIDS

As of late July, Hino had sold about 450 195h hybrids in the U.S. since introducing them in November. Most of the sales were in California, due to the state's Hybrid Vehicle Incentive Program.

And while adoption has been slow, more landscaping companies are showing interest in hybrid vehicles.

"I've quoted two or three other landscaping companies on hybrid trucks," Ervin says. "The landscaping companies I've dealt with are very environmentally sensitive—a lot more than any other industry that I deal with. They're dealing with the environment day in and day out so they seem to be more in tune with it."

So far, Shorb says he's pleased with the performance of the hybrid vehicles. The "idle stop mode" feature was a little frustrating at first because Shorb thought the van wasn't working properly. "It's a little disconcerting the first few days you're driving it in stop-and-go traffic," he says.

Looking ahead, though, Shorb expects the hybrid trucks will pay off.

"We hope we're able to confirm the extra price will be offset by the fuel savings," Shorb says. "We also believe that eventually customers will appreciate the fact that we're doing this."

*Katz is a Cleveland-based freelance writer.*



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## IRRIGATION

# Three keys to a 'smarter' business model

EPA WaterSense Partner of the Year shares tips on how to successfully sell efficient irrigation systems. *By JONATHAN KATZ*

In October, Taylor Irrigation Service became the first Texas-based irrigation designer/contractor to win the Environmental Protection Agency's (EPA) WaterSense Partner of the Year Award. The EPA recognized the company for changing its business model by designing and installing irrigation systems that consume as much as 50 percent less water than traditional systems.

John Taylor, director of operations and president of the Houston-based company, decided in 2011 to transition his business from general irrigation services to water-conservation technologies. The change has helped the company differentiate itself from competitors and expand the business.

The process didn't come without challenges, though. Here, Taylor shares three principles to establishing a profitable irrigation business model focused on conservation.

## 1 Sell the ROI.

It seems every business today in just about any industry is marketing some type of "green" product or service. But actually convincing customers they need sustainable solutions can be a tough sell. Irrigation contractors must demonstrate to customers efficient irrigation can provide a measurable return on investment, Taylor says.

The company performs audits to show customers how much money they can save by adopting smart-irrigation systems, including evapotranspiration

rate-based (ET) controllers and drip irrigation. The company backs its auditing services with certifications from the state of Texas and the EPA. Taylor sells systems that cost 40 to 50 percent more than standard technologies, but with the audits he can show customers more efficient irrigation technologies use up to 50 percent less water.

Taylor cautions, however, contractors should not oversell the potential savings. In addition to the property audits, he suggests contractors interview their clients about how they use their irrigation systems because some customers may manage their irrigation schedules better than others.

"How the client interacts with the system is very important because with an ET-based system the controller is making the decisions on its own," Taylor says. "So if we're going to forecast the ROI for the client, then we need to have a pretty accurate idea of what the client does with their current system."

## 2 Don't be afraid to refocus your client base.

Taylor Irrigation previously sold standard and "Cadillac" smart-irrigation systems. Before the company shifted its focus to water conservation, it regarded the higher-priced, more efficient systems as a luxury for its clients. Now, it's the only option for customers.

After making the move, the company lost the bottom 25 percent of its client base, Taylor says. But the move opened the door to a new client base that's capitalizing on the company's high-efficiency technology.



John Taylor, director of operations and president of Taylor Irrigation Service, accepts the company's EPA WaterSense Partner of the Year Award.

In addition, the company has gained an advantage over many competitors in the Houston area because it's positioned itself as an expert in efficient irrigation, Taylor says.

## 3 Ask your peers for advice.

One of Taylor's most difficult challenges in the beginning was learning how to install and price the new technology. Taylor tried to hasten the learning curve by reading market reports on the best technologies available and providing his staff with training courses.

The company, Taylor admits, learned mostly by trial and error in those first three to six months. He now suggests contractors take advantage of industry resources such as conferences and industry trade magazines to overcome some of the early hurdles.

"One of the best things irrigation contractors can do is go to the industry shows to network and ask other irrigators what they think works," Taylor says. "You'd be surprised how many great irrigation contractors are out there and available and willing to share information with guys ready to make the same choices. I think if irrigators weren't so afraid to flat-out ask, they'll be much better off."

*Katz is a Cleveland-based freelance writer.*

DESIGN/BUILD

# Tracking time vs. measuring value

Design/build pros weigh in on the art of charging design fees. *By SARAH PFLEDDERER*

There's a tale about Pablo Picasso that begins with the artist sitting in a cafe, sketching a woman in his view. The picture took all but five minutes to craft, but he alleged to the woman it would cost her \$2,000 to own.

While not charging for the minutes to do the drawing, he was charging for the years it took him to attain the knowledge to put the sketch to paper.

"It is a wonderful way to say what we do has so much more value than the time we put in it," Diana Grunden says.

The owner of Trio Landscaping, in Minneapolis, shares the Picasso scenario to support why she charges

flat-rate design fees instead of hourly rates.

Charging design fees is a choice of yes or no. But choosing how to charge them—hourly or flat—is complex and approaches differ per company, depending on clients, individual projects and design processes.

Grunden starts off with a \$300 base rate, an amount she figures is worth six hours of her time. The cost goes up contingent on the intricacy of the project and size of space. (She's charged up to \$1,500 for a single project.)

And, to the client's benefit, Grunden uses her design fees as a deposit instead of a source of income, reimbursing the prorated payment to clients for whatever part of the design they choose to move forward with.

For this reason, she rarely banks on her design fees.

On the flip side, Chad Wheeler makes around \$12,000 in design fees annually.

The president of Dream Landscapes in Lynchburg, Va., which is 70 percent design/build, isn't loyal to hourly or flat rates, though. His means of pricing vary per customers and projects.

"I like to take more a consultative approach, consulting with the clients, giving them their options," he says.

Typically, his "rule of thumb" is to charge an hourly rate at \$100 per hour for projects that will cost \$10,000 to \$15,000. He will charge a flat rate on projects costing more than that, factoring in some revision times for those larger projects.

Wheeler isn't set on his hourly rate either. He sometimes lowers the price to \$75 per hour to have an advantage over competitors and, on very rare occasions, also will reimburse fees like Grunden.

The biggest advantage to a flat rate, he says, is the commitment from his clients to see through an entire project. Whereas with an hourly fee, they can back out at anytime, but he still will be paid for the hours he's already put in.

For David Marciniak, a flat rate is a greater reassurance to clients because they're able to see what they're charged for every step of the way before they choose to move forward with a proposal.

"You tend to get a lot of pushback from homeowners on the idea of design fees anyhow," says the owner of

design firm Revolutionary Gardens in McLean, Va., which does not offer reimbursements on design fees. "So when (clients) get the perception, 'You're just charging us hourly so we have no idea what's going on,' they just have an extra level of fear and discomfort."



Dave Marciniak

Revolutionary Gardens, however, does offer hourly fees to landscape contractors, with the assumption they have an understanding of design processes and procedures.

For traditional clients, Marciniak details to them the time it takes to design a project and instills there's two processes to a landscaping project: the design process and the construction process.

"I find when it's presented to clients that way, they understand it and they see the value in it," he says. "It ends up being a very transparent way of seeing what your costs are throughout the process."

In figuring estimates, Marciniak investigates the complexity of projects, factoring in the time to measure, base map, draft conceptual designs, put together supporting materials, etc.

He educates clients on these components and accounts for some revision time in his proposals, plus offers additional revision time at an hourly rate.

"Part of the value in that is it lets people know 'I need you to really think through what you're asking me for. Because if you neglect to tell me something important, I'm not going to go over and start at zero again,'" he says. "From a sales standpoint, it's just neater and cleaner to do flat rate."

Grunden adds a flat rate is fairer to clients because her design processes vary.

"How in the world do I track and budget people appropriately for back-end time?" she says, adding she brainstorms about projects in her daily tasks and jokes she even landscapes in her sleep.

"We're all artists," she says. "Our brains are all going to work in different ways. You have to do what is best for you." LM



Diana Grunden



Chad Wheeler