

Pasadena, CA, in 1904 was the first person to design and sell sprinklers for lawn and garden use. He was followed in 1907 by W. Van Thompson, founder of Thompson Mfg. Co., now located in Ohio. A big name in early irrigation was Charles Skinner, who designed a simple, multi-nozzled, above-ground system in 1908. Lewn Nelson, George Moody, Max Snoddy, W.A. Buckner, Edwin Hunter and Karl Kah were among the inventors who pioneered the permanent subsurface irrigation systems of today.

John R. Brooks was the first recognized landscape irrigation contractor in the country. From an office in Detroit, he designed, constructed and installed irrigation systems for Henry Ford, the Chicago Parks Department and other wealthy industrial barons of the 1920s. Thirty years later, Burt Sperber's Valley Crest Landscape Company installed irrigation for the film industry and the California Transportation Agency.

Every region has its tales and early irrigation stories. Irrigation grew up largely on a regional basis. Some manufacturers remain regional to a large extent, choosing to serve the customers they know best.

From a national perspective, irrigation seemed to gel in the 1950s when Rain Bird, Toro, Hunter, L.R. Nelson, Weathermatic, Buckner and others gained momentum. On the West Coast, manufacturers had to install their own products at first. Irrigation distributors didn't exist until after World War II, but they are the ones who built the foundation that enabled the market to nationalize and take off — people such as Ewing, Hodas, Moffet and Tiglio.

Irrigation in a Nutshell

Today, four United States manufacturers represent more than \$600 million in irrigation sales — Rain Bird, Toro/Irritrol, Hunter and Orbit. This is approximately half of turf and landscape irrigation sales by manufacturers in the United States. There are midsized manufacturers on the move

as well, including Weathermatic, Storm and K-Rain. In addition, some manufacturers do considerable international business.

Three distributors have built substantial chains, doing in excess of \$300 million per year in sales — Century Rain Aid, Ewing Irrigation and United Green Mark. Like manufacturing, acquisition and consolidation in the middle ranks of distribution are also taking place. Meanwhile, retail hardware outlets are selling irrigation components wholesale to contractors in some areas. Service to contractors by distributors and manufacturers selling direct to large contractors are concerns that threaten conventional distribution.

Finally, we have large, multiple-branch landscape firms installing irrigation across the country — Environmental Care/Valley Crest, Brickman Industries and Service-Master's TruGreen-ChemLawn group. So, in a sense, irrigation has caught up with the landscape industries in the past decade.

Yet, most of us know little about irrigation.

Catching Contractors' Attention

Contractors have a sixth sense that alerts them to peculiar things normal people miss, such as lines on a mowing pattern that aren't straight, trees that were pruned improperly, fading color in an annual bed, a lawn suffering from a high grub population or mulch that needs to be refreshed. Contractors are now becoming sensitized to irrigation symptoms, such as dry spots caused by poor uniformity, overspray, wetness resulting from poor scheduling and sprinklers that operate during rainstorms. The fact that irrigation is becoming part of the consciousness of contractors is a significant matter.

Although water shortages should be worrisome enough to generate interest in efficient irrigation to defend our valuable landscapes, they are not the main reason people invest in irrigation. More often, the justification for irrigation is better control and reliability of performance by the land-



The main reason people invest in an irrigation system is to protect and improve their landscapes. Photos courtesy: Rain Bird



Contractors will need to strengthen their understanding of hydraulics and system design as they compete for irrigation business.



Expect the demand for certified irrigation designers to jump in the coming decade. Check with your local distributor about setting up training in your area.

scape as an investment and source of enjoyment, explains Kurt Maloney, director of landscape marketing for Netafim Irrigation Inc.

It's not hard to get our attention when the value of irrigation in a landscape project exceeds 25 percent, according to Jon Ewing, president of LandTrends in San Diego, CA. "You have to take it seriously." LandTrends has an irrigation division for minor design work, installation and maintenance.

Segments of the industry

Contractors — As large contracting firms acquire landscape companies with irrigation divisions, they assume a greater involvement in irrigation. To compete with large national chains, smaller contractors will need to increase their level of involvement in irrigation.

Suppliers — In turn, more contractors will seek services such as technician training and rudimentary design from distributors. Retail outlets mimicking wholesale suppliers won't be able to provide these services.

Experts — Meanwhile, irrigation consultants, the engineers who design complicated irrigation systems, are tempted to focus on the big jobs of large chain contractors. This could leave the midsized and small contractor without the design assistance he or she needs as irrigation grows in popularity. You can expect the demand for certified irrigation designers to jump in the coming decade.

Certification for irrigation contractors can moderate some of the demand for design at the lower levels. Learning how to use AutoCAD isn't enough. Contractors should understand hydraulics and the physical limitations of irrigation compo-

Cover the world

Irrigated Acres in the World:

- ▶ World — 600 million acres
- ▶ China — 123 million acres
- ▶ United States — 70 million acres
- ▶ United Kingdom — 267,000 acres
- ▶ Europe — 62 million acres
- ▶ South America — 24 million acres
- ▶ Japan — 7 million acres
- ▶ Australia — 6 million acres

nents. This will become increasingly important as more irrigation systems mix low-volume irrigation, sprinklers and weather-reactive sensors and controllers. You won't be able to figure it out in the aisle of a mega-hardware store.

Only a handful of states currently license irrigation contractors. Most of these states have used the help of the Irrigation Association when building their tests and requirements. But you don't have to depend upon state licensing to become certified. The classes are taught by the best in the business, and your local distributor can ask the IA to help set up training in your area.

Those who fail to study history are doomed to repeat it is a famous phrase that applies to any business. Many painful lessons can be avoided by talking with those in your area with irrigation experience. Do surveys of your existing customers about irrigation. Hire trained individuals and reward them for performance. Be inventive when necessary. One size fits all doesn't work in irrigation.

There is a rich history to the irrigation industry. It belongs as part of the history of the landscape industry. It's time to make irrigation a valued member of the landscape family.

Next month: Thinking of entering the irrigation business or expanding into larger, more comprehensive accounts? LM will look at two models for success. LM

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A staff of about 22 at Illinois State University handles turf maintenance, tree and shrub care, snow and litter removal, brick and retaining wall installation, athletic field maintenance, annual and perennial gardens and others tasks on a college campus that is busy year-round.

Illinois State's Central Quadrangle

This complex campus was a 1998 Grand Award Winner for the Professional Grounds Management Society

Visitors and students know the Central Quadrangle of Illinois State University in Normal, IL, an eight-acre area of turf, harboring more than 400 trees of 80 different species. About 300 shrubs and more than 6,000 annuals (totaling 5,600 sq. ft. in the Quadrangle alone) also challenge the grounds crew. The Quadrangle itself includes several perennial beds and a native Illinois prairie garden.

Each tree receives annual fertilization, aeration, pruning and shaping, plus scouting for insects. Several varieties of annuals are grown in the Grounds Services' greenhouses. Plant varieties are labeled; watering and weeding is done by hand.

The staff keeps turf at a three-inch height throughout the season and IPM is used to control grubs and other pests. Turf is fertilized twice a year, with supplemental applications as needed.

A major element of this project was the redesign of campus walkways to replace existing asphalt ones with concrete, installed in a 5-ft. x 5-ft. pattern. Other renovations include landscaping to enhance pedestrian gateways, add attractive seating and encourage visitors to study and explore the trees and plantings.

Trees have been inventoried, cataloged and tagged by species and new species have been added. A tree map of the Quadrangle was developed for those taking a walking tour of the area.

Upcoming projects include "In Exchange," an 80,000-sq. ft. area nearby, combining sculpture, colored concrete and plant material on a seasonal theme.

For more information about this project, contact the Professional Grounds Management Society, 120 Cockeysville Rd., Suite 104, Hunt Valley, MD 21030, 410/584-9754. Or contact ISU Dept. of Facilities Management, Box 9100, Normal, IL 61790, 309/438-2032.

Property at a glance:

Location: Illinois State University Central Quadrangle, Normal, IL

Staff: ISU Grounds Services

Category: Urban University

Year site built: 1857

Total acres maintained: 125 (total campus)

Acres of woody ornamentals: 20 (total campus)

Acres of display beds: 25,000 sq. ft. (total campus)

Total man-hours/week: 788



Recent major projects include replacing 128,000 sq. ft. of concrete surface, as well as walls and seating.

Maintenance Challenges

- Busiest spot for pedestrian flow on campus
- High-use area for public events
- Deteriorating infrastructure: How to preserve or repair existing structures without damaging 100-year-old trees?

Winter is good for hort oil

(Smite mites before they strike)

Dormant-season applications of horticultural oil only work for certain mites and scale species

By DOUG CALDWELL, Ph.D.

Applications of 2% horticultural oil (two gallons of oil in 98 gallons of water) are used from late fall through early spring to control certain pests. This is an "offensive strike" opportunity on overwintering stages of pests that takes them out before they become active next spring and damage plants during the growing season.

Oil applications work by suffocating, rather than poisoning, the pest. The oil plugs up the breathing pores and soft tissues of targeted mites and scale insects.

What you hit is what you get!

It is important to remember that horticultural oils are a contact treatment. But, while thorough coverage is important, soaking or saturating plant tissue can cause phytotoxicity. These applications may not be as effective on certain pest species as you may think and **should not** be used as a general dormant "cover spray."

Know your mites

If you believe you can control *two-spotted spider mites* with winter oil applications, guess again. The two-spotted spider mite overwinters as a female in litter, mulch or other protected areas and is not normally found on the plant. Therefore, this pest is not controlled with the dormant oil strategy. However, the *spruce spider mite* overwinters on its evergreen hosts (arborvitae, juniper, hemlock, pines, etc.) in the egg stage, which makes it quite vulnerable to oil sprays. Be aware, and notify clients, that the oil will temporarily turn those prized Colorado blue and specimen blue Moerheim spruces green, but that new growth will not be affected.

The *honeylocust spider mite* overwinters on its host as a mature female in bark and bud crevices. Again, it is another prime target for dormant applications.

PLANT SPECIES PRONE TO DAMAGE BY FALL AND WINTER OIL APPLICATIONS

Species	Type of Injury
Deciduous	
Beech*	Branch dieback (dead cambium)
Butternut*	Branch dieback (dead cambium)
Citrus	Occasional leaf and flower drop and "water spot" of rind
Hickories*	Branch dieback (dead cambium)
Maples*, sugar and silver	Stunted and reddened leaves to branch dieback (dead cambium)
Oaks, red and black	Occasional branch dieback (dead cambium)
Redbud	Late leaf emergence and branch dieback (dead cambium)
Walnut*	Branch dieback (dead cambium)
Coniferous	
Arborvitae	Needle browning, defoliation and branch dieback
Chamaecyparis	Needle browning and defoliation
Cryptomeria	Needle browning, defoliation and branch dieback
Hemlock	Needle browning and defoliation
Junipers	Turns blue cultivars to green (alters wax layers that create the blue color); occasional needle drop and branch dieback
Spruces (blue, white, 'Dwarf Alberta')	Alters wax layers that create the blue color; needles turn purple brown then brown, defoliation and branch dieback
Taxus	Occasional marginal browning of leaves

*High risk plants are noted. Fall-winter oil applications are NOT recommended for these species.

NOTE: Injury is not always going to happen. Occurrence of injury tends to vary depending on plant dormancy stage, degree of plant stress (vigor), moisture stress, sudden temperature drops and high humidity following application. But most often it is due to an application procedural-related error or an overdose mistake.

Other species that are vulnerable to dormant season sprays are the *southern red mite* and the *boxwood mite*. Both species overwinter on their respective hosts in the egg stage. The southern red mite can be targeted on its broadleaf evergreen hosts, Japanese holly, azalea, *Pieris*, certain *Viburnum* spp., etc., on the underside of leaves.

Soft and armored scales

Oil is an excellent product to reduce overwintering stages of scales; primarily, the first and second instar nymphs of *soft scale* species (magnolia, lecanium and cottony maple scales, etc.). A follow-up spray of 2% oil in late August or September is needed to reduce surviving populations.

Overwintering *armored scales* can be more difficult to control, especially those species that overwinter in the egg stage beneath the scale covering. This group includes oystershell, elm scurfy, elongate hemlock and pine needle scale. Achieving acceptable control of these species is difficult because the eggs are often stacked on top of one another and the oil may only contact the bottom layer of eggs. Target these species during the growing season to get acceptable results.



Pine needle scale overwinters as eggs pile under the "shell" of the female. Oils are not effective for this scale during the late fall to winter.

Other armored scale species overwinter as 2nd instar or mature females and are more readily controlled with November through March applications of oil. These scale species include euonymus, juniper, white peach and obscure scale.

Beware of phytotoxicity

Remember, winter identification of plants is critical because phytotoxicity can occur when oil is applied to a sensitive species. Species that should be avoided include arborvitae, beech, *Cryptomeria*, hickory, maple (especially sugar), spruce and taxus. For maple and spruce, sensitivity varies with location; more problems seem to occur in the Midwest than further north. Branch dieback or death of these species has been reported.

Usually phytotoxicity occurs with higher rates of oil (three gallons of oil per 97 gallons) and early fall (before dormancy) or late spring (at budbreak) applications. There are fewer problems when

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applications are made in late October through February, when the plants are "completely" dormant. A good guideline is to wait until 24 to 48 hours of below-freezing temperatures have passed during Octo-

ber before spraying, and start the applications, usually in mid- to late-November.

Use agitation and a clean tank

Avoid phytotoxic effects with agitation. Recirculate the oil solution in the hose before spraying each property. These oils are quick-breaking emulsions, which means the oil separates, or "floats" to the surface in three to four minutes. Otherwise, you might spray concentrated blobs of oil solutions, which could injure the plants.

Tests have shown that fertilizer residue in the tank, when combined with the oil solution, can cause a synergism that increases the chances for plant injury. Make sure that the fertilizer residue is completely rinsed out of the tank before adding the oil solution.

When applied properly and for the appropriate pests, horticultural oil offers an opportunity to use a "soft" pesticide when we have time to make applications, as well as increase revenues during a slower time of the year.

Doug Caldwell is the Landscape Entomologist for the Davey Institute, a division of The Davey Tree Expert Company.



This overwintering Euonymus scale has been flipped out of her teste or "shell." This stage is vulnerable to winter oil applications.

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