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a good 2 to 3-inch mulch which can be of almost any organic material, pure sphagnum peat moss being the most obvious exception. If redwood is available, it is about the best mulch as it practically repels insects; cedar is also good. Other good and easily accessible mulches are shredded oak leaves or chopped evergreen branches that may be available from your own prunings. With the combination of a deep mulch and a pre-emergent herbicide such as Dacthal (if you can find it this year), Ronstar-G or Betasan, weeds can all but be eliminated in the planting bed, making life and rose growing easier.

Where space is limited or low plantings are desired, miniature roses are an answer. If you normally set out bedding plants, try minis instead. They'll give you more months of bloom each year along with eliminating the need to use your maintenance crew to replant marigolds or petunias every year. Miniatures require little attention. They can be pruned with hedge shears to 3-6 inches in early spring and can be trimmed back 6-8 inches in summer if they need it. Where dichondra can be grown, add it as a ground cover under minis and you'll have no problems with mites.

The popularity of container plantings continues to rise and roses make a good choice here. The World Trade Center in New York City has used container roses in its seasonal displays. Select a floribunda or miniature for largest flowering effect and be extra careful to prune as symmetrically as possible. Use a peat-lite planting media for best growth and be aware that the rose planted in the container will need more water than the same plant in the ground.

Care tips

Although roses can be grown under less than ideal conditions if attention is high, to keep your maintenance to a minimum provide them with the ideal of at least six hours of sun a day and a well drained, improved soil with a pH in the range of 6.0-7.0.

Watering can be done as needed by a manual method or tied into the

automatic irrigation system. Harold Goldstein, Director of the American Rose Center in Shreveport, LA, prefers drip irrigation under the mulch as it uses less water and fertilizer can be added as watering is carried out. On the opposite extreme, Jim Kirk at Rose Hills waters as needed with overhead sprinklers set at 36" high between the plants. Watering frequency depends on the heat and is somewhere between twice a week and once every two weeks. He feels the overhead watering is an advantage to keep the plants clean of smog residue, which aids growth and reduces disease. If you follow overhead watering, do it in the morning if possible to further reduce the chances of spreading disease.

Most people turn up their noses at roses because of the stories of insect and disease problems that plague them, yet the men who tend to them on their grounds do not report problems provided a few basics are followed: 1) plant in at least six hours of full sun; 2) select a site where there is good air circulation; 3) prune to keep the center of the plant open; and 4) spray as necessary.

The major insect pest of roses, the Japanese beetle, is no problem where grubs are properly controlled. Aphids are easily controlled with a number of chemicals and spider mites with Kelthane or Plictran. Mildew responds to Tersan 1991 and blackspot to Thiram or Captan. West of the Rockies, blackspot is rarely a problem. Most grounds managers seem to spray the roses when they're spraying the surrounding turf as long as the material is safe and useful, and not make a big thing of spraying. As an added incentive to planting roses, disease resistance is on the increase in new rose varieties.

Wintering the cold

Another headache can be winter kill, yet The Toro Co. in Minneapolis and the Bayview Country Club in Toronto, both certainly in two of our colder spots, report no loss over the winter as long as a simple protection method is used. Both pile up mulching material around the roses in winter, and evergreen boughs are added to this in Minnesota. In

spring the mulch is not removed but instead spread over the bed as summer mulch. If you are located in a frosty area, stay away from most yellows, whites, and pale pinks as they tend to be more prone to cold damage. In other words, stick to red and dark orange roses.

Fertilizing is something that unfortunately can't be done when the turf is being fertilized, as the high nitrogen is the turf fertilizer will cause the roses to bloom poorly or not at all. Instead, use a balanced 5-10-5, 5-10-10, 7-7-7 or similar formulation spread on top of the mulch and watered in. Do this anywhere from once a season to once a month depending on your available time. The more, the better.


Except for minis and the self-cleaning floribundas spoken of earlier, roses should have the spent blooms removed as soon as possible to encourage them to re-bloom quickly. Instead of waiting for the blooms to fade, why not cut them at their peak and use them in the office, lobby or clubhouse? Having roses to cut for this purpose is one reason why James Wylie at the Bayview Country Club in Toronto grows the "Queen of Flowers".

What's the bottom line here? Are roses more work? The question must include "as compared to what?" Compared to no ornamentals at all, surely they're more work. Compared to other ornamentals, they are slightly more work, but isn't maintaining a perfect bent-grass green, a tough athletic field or a velvet lawn more work? And isn't it worth it? **WTT**



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Howard Kaerwer, Director of Turf Research at Northrup King's Research Center, stands in a laboratory. He is wearing a dark jacket over a light turtleneck and glasses. Behind him is a large window or open door looking out onto a vast field of young, green grass plants arranged in neat rows. To his left is a laboratory bench with various glassware and equipment. In the foreground, a large bag of Northrup King Medalist turf product is visible.

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—Howard Kaerwer, Director of Turf Research at Northrup King’s Research Center

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IRRIGATION RENOVATION AT TIGER STADIUM ADDS TO EFFICIENCY



Padded heads are checked by Century's Ben Taliaferro (left) and director of stadium operations, Ralph Snyder.

The recent renovation of Tiger Stadium in Detroit, gave Assistant Director of Stadium Operations Frank Feneck an opportunity to improve the stadium's old irrigation system. The stadium and irrigation system were plagued with old designs and worsening repair records. The renovation also gave Century Rain Aid of Detroit a chance to evaluate the basic needs of a baseball field more precisely and come up with a modern efficient design.

Feneck indicated the old system was plagued with freezing problems despite the park's efforts to flush the system in preparation for Detroit's often harsh winter season. Designed like a diamond with heads placed randomly throughout the field, it would often interfere with the game.

"It seemed like line drives were forever hitting one of the heads,

sending the baseball flying past fielders often for a double or triple," Feneck said. "Repair costs were starting to bog us down."

The job was put out to bid and

Fewer heads, but more zones make Tiger Stadium's new system more efficient, less hazardous.

Century came in lowest with a bid of less than \$12,000 for a Rain Bird system. The plan was designed by Century's Ken Hodas and Ben Taliaferro to incorporate a scientific application to irrigation of the playing field. It contained 11 zones to provide different levels of irrigation to each area. For example, the

wings (outside the foul lines) did not need the same water as the infield or outfield. Also, to assure uniform distribution during frequent gusty winds, low trajectory heads were specified.

Century subcontracted installation to Bob Quigley, Sprinkler Services Co., a firm with 12 years experience in Detroit and in athletic fields. "We had to be extremely careful not to damage the turf when we installed the system," Quigley said. "Head heights were held down to minimums in order to avoid player injury." As an added precaution, the heads are covered with a soft, astroturf-like material which provides protection and conceals them when not in use.

Installation of the system, designed to irrigate roughly 18,000 sq. yards of turf, took ten days using a

Continues on page 66



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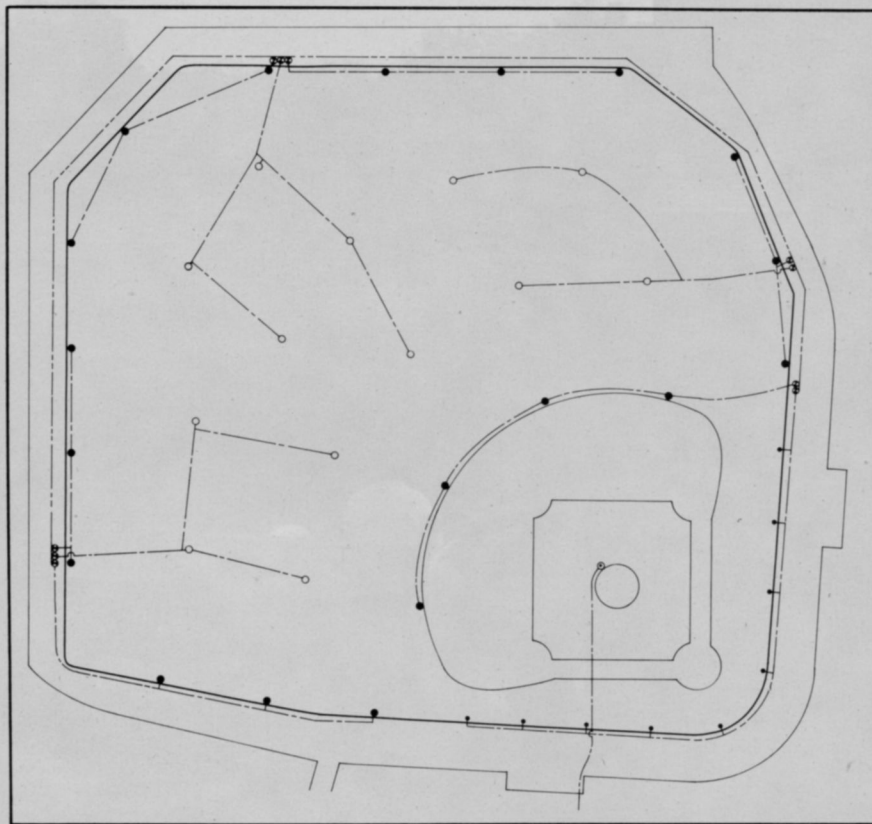
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Head layout for Tiger Stadium's new irrigation system.

crew of six men in early October. Pipe, ranging in size from one and one-half to two and one-half inches in diameter, was pulled into place. Heads were removed from the old system but the old pipe was not removed. The controller (Rain Bird RC-1260AB) was concealed behind the outfield padding.

The outfield heads were reduced from 30 to 17, and the infield has a single head directly behind the pitcher's mound. The system gets its water from the city and uses a 25 horsepower pump.

Feneck irrigates from early April through mid-October, despite the region's 32-inch annual rainfall. Only six or seven inches fall during the summer months, requiring 12 to 14 inches of compensating moisture.

"Because the system is automatic, we don't have to hold off watering until Saturday after a game because we couldn't get the field wet Friday night," said Feneck. "We set the controller and let the workman stay home." **WTT**

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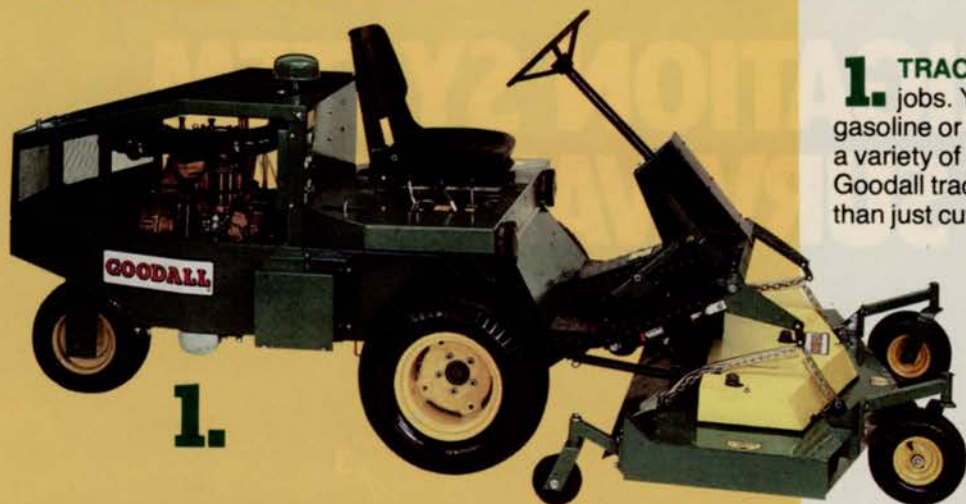
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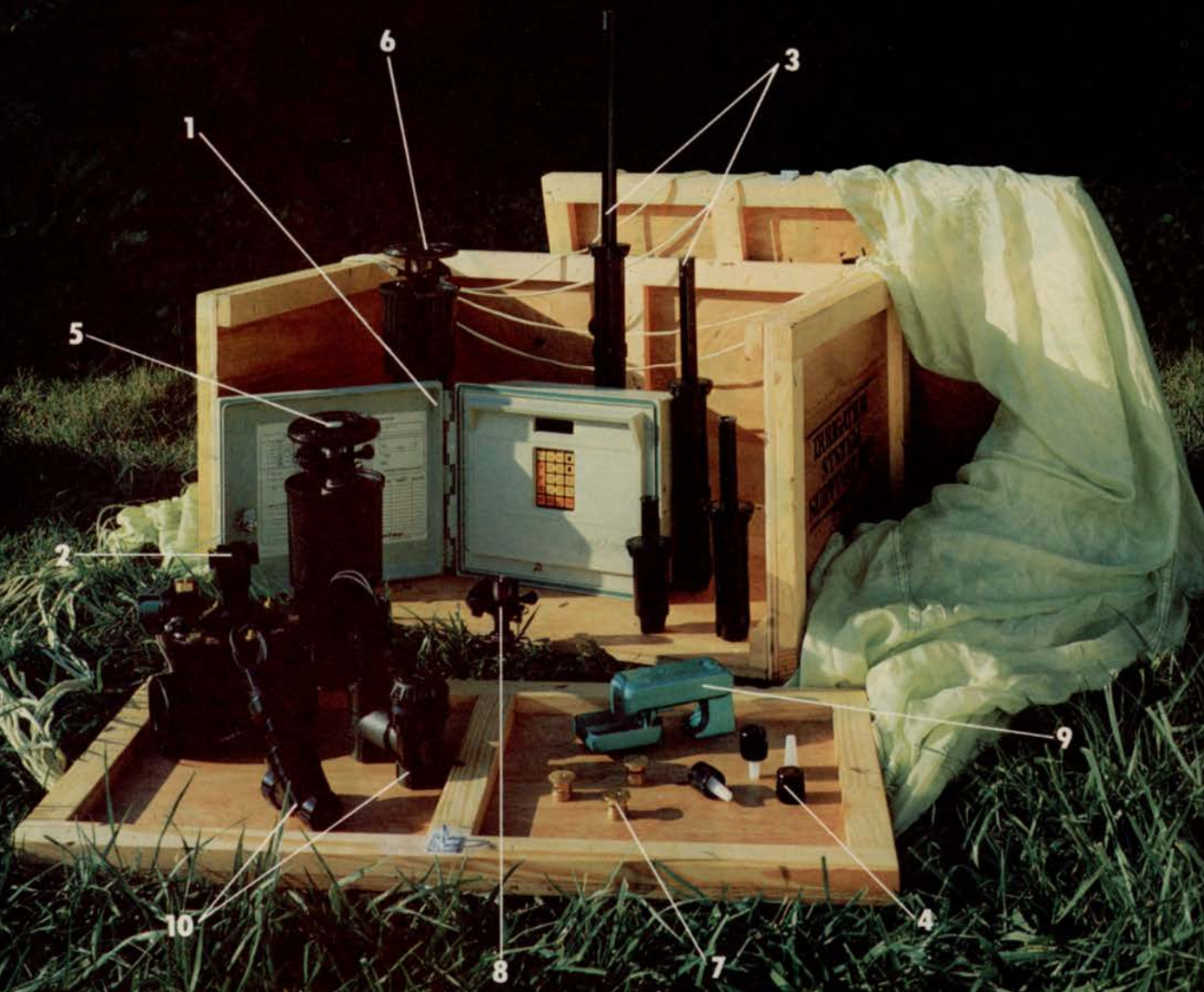
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IRRIGATION SYSTEM SURVIVAL KIT.



Today the ability to manage water more wisely is a matter of survival for irrigation professionals. A predicted water shortage will severely limit the amount of water available for irrigation. In turn, causing forced restrictions on water usage that may threaten the lifeblood of your business. Don't take any chances. Meet this challenge with ten new water-saving products from the world's leading manufacturer of irrigation equipment. The Rain Bird irrigation system survival kit. We're committed to helping your business survive any water shortage.

1. The ISC "Independent Station Controller."

Save water with the precision that comes from having a separate program for each station on the clock. Rain Bird is pleased to introduce the ISC "Independent Station Controller" available soon in 16, 24 and 32 station units. Owning an ISC is like having a separate controller for each valve. And should watering times need to be cut back, just depress the water budgeting button for instant adjustments in 25 percent increments.

2. Pressure Regulating PRS Modules.

Stop wasteful misting from over-pressurized sprinklers. The new PRS Pressure Regulating modules with Schrader valves take pressures as high as 200 psi and effectively regulate from 100 psi down to 15 psi (± 5 psi). And they are suitable for all Rain Bird EFA, EP, or PVE series electric control valves.

3. 1800 Series high-pop spray heads.

Reach above taller drought-tolerant turf cuts and ground covers for uniform water distribution with the new Rain Bird 1800 Series high-pop spray heads. The new patented multi-function, co-molded wiper seal assures positive pop-up and pop-down for the full line of two, four, six and twelve inch models. While a special ratchet device on the six and twelve inch models resists tampering and makes adjustment of the spray a snap.

4. 1400 Series pressure compensating bubblers.

Stop water waste caused by changes in water pressure from rolling terrains and friction loss with the new 1400 Series pressure compensating bubblers. Available in one-quarter, one-half and one gpm flow rates, the 1400 Series fills the gap between drip emitter flow rates in gallons per hour and sprinkler rates in gallons per minute.

5. New MINI-PAW "Seal-a-Matic" Sprinkler

Rain Bird introduces a new water-saving 15103 SAM model. The "Seal-a-Matic" option on this new MINI-PAW ends water wasted by low head drainage caused by changes in elevation as great as 10 feet.

6. New "Short Range" MINI-PAW Sprinkler

The new "Short Range" 15103 SR model eliminates water waste associated with overspraying. Filling the performance gap where spray head coverage ends and small rotors begin, the 15103 SR offers low trajectory throw, low gallonage operation and an adjustable radius from 15 to 25 feet.

7. New matched precipitation rate spray nozzles.

End overwatering expenses with the new matched precipitation rate spray nozzles. Available in plastic or brass, the nozzles fit all Rain Bird 2800, 1800 and 171G series pop-ups and plastic PA-8 and brass A-7G shrub adapters.

8. P3-PJ short range impact sprinkler.

The new Rain Bird P3-PJ sprinklers minimize problems caused by wind interference by throwing a single stream at a slope-hugging 15 degree angle. And with gallonage as low as 1.6 gpm, the precipitation rate resists slope run-off and puddling.

9. Adjustable rain shut-off device.

Avoid the high cost and embarrassment of wasting water in a downpour with the new rain shut-off device from Rain Bird. When rain water reaches the adjustable sensing probes at a pre-set level, the shut-off device interrupts all power to the electric valves on the controller's next cycle. When the water evaporates, the system returns to normal operation.

10. Low cost automatic residential control valves.

Conversion from manual to water-saving automatic irrigation system control is simpler and more cost-effective with the new line of Rain Bird low cost residential valves. Highlighting the line is the AVA "Automatic Valve Actuator" available in three-quarter and one-inch models for conversion of many Rain Bird and competitive manual valves.

Together with the PAS anti-siphon valves and the AGV automatic globe valves, Rain Bird provides the best in low cost residential controls.

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RAIN BIRD

VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: How do you treat St. Augustine decline (SAD)? (Texas)

A: St. Augustine decline (SAD) is the only major viral disease infecting turfgrasses and cannot be cured with chemicals. Although the best solution is to plant resistant cultivars, susceptible turfgrass can be improved through proper maintenance. Apply fertilizer high in potassium and iron and low in nitrogen. Do not overapply pesticides, particularly phenoxy herbicides. If the turf is grown in shade, do not apply phenoxy herbicides and mow slightly higher.

Q: I would like to add variety to the landscape plantings at one of our state mental institutions. The goldenchain tree is being considered but I have heard that its parts are poisonous. Is this true? (Indiana)

A: A number of sources, including a publication from the Arnold Arboretum of Harvard University, state that all parts of the goldenchain tree (*Laburnum anagyroides*) are poisonous, particularly the flowers and seeds which contain a substance called cystine. If eaten, the person may experience vomiting, convulsions, and even death.

Two references to examine prior to purchasing trees for this specific purpose are *Poisonous Plants of the United States* by W. C. Muenscher (1947) and *Poisonous Plants of the United States and Canada* by J. M. Kingsbury (1964).

Q: What is the latest information on maple decline? Has any specific disease been identified as the cause and can it be controlled? (Michigan)

A: As with many disorders, we do not as yet, have the final answer(s) and research continues. At present, a number of factors have been associated with maple decline either as an inciting agent or as a contributing factor. These include deicing salts, soil compaction,

nutrient deficiencies, drought or prolonged wet soils, high soil temperature, girdling roots, insect defoliation, pollution, mechanical injury, root disorders and basal cankers. Maple decline is usually a "complex" of many of these factors.

Identification and correction of the causal agents in conjunction with high nitrogen fertilizer and proper watering has given the most consistent results. Of course, proper tree selection, soil preparation, and planting practices will minimize the potential for stress conditions that weaken maple trees and trigger maple decline.

Q: I have been told that fungicides increase the amount of thatch. How is this possible and is it really a problem? (Georgia)

A: Most fungicides cause thatch accumulation by inhibiting microorganisms that decompose thatch and by increasing the shoot tissue that must be decomposed. However, I am not aware of any research that shows that the increase in thatch is significant.

Q: Can you tell me a reference for the relative sensitivity to salts of trees commonly grown in central and northeastern United States? (New York)

A: In the November 1976 Journal of Arboriculture, an article by Michael Dirr entitled "Selection of Trees for Tolerance to Salt Injury," provides a rather comprehensive list of trees ranked according to their relative salt tolerance. More recent information can be obtained from Dr. George Hudler, assistant professor of plant pathology at Cornell University, Ithaca, New York.

I have included a list of the relative salt tolerance of trees and ornamentals which I compiled from various sources. Since investigators often place a tree species in different categories, contact your local extension service to determine if any information is available for your particular area.

Relative salt tolerances of trees and ornamentals

Good Salt Tolerance		Moderate Salt Tolerance		Poor Salt Tolerance	
Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name	Common Name
<i>Quercus robur</i>	English oak	<i>Thuja spp.</i>	arborvitae	<i>Fagus spp.</i>	beech
<i>Populus alba</i>	white poplar	<i>Juniper spp.</i>	juniper	<i>Juglans nigra L.</i>	black walnut
<i>Robinia pseudoacacia L.</i>	black locust	<i>Salix alba tristis</i>	weepinggold willow	<i>Tilia spp.</i>	linden
<i>Gleditsia triacanthos L.</i>	honeylocust	<i>Pinus ponderosa</i>	Ponderosa pine	<i>Euonymus alatus</i>	winged euonymus
<i>Elaeagnus angustifolia L.</i>	Russian olive	<i>Fraxinus pennsylvanica</i>	green ash	<i>Spiraea spp.</i>	spiraea
<i>Crataegus spp.</i>	hawthorn	<i>Juniperus virginiana</i>	Eastern red cedar	<i>Viburnum spp.</i>	viburnum
<i>Quercus rubra</i>	red oak	<i>Gleditsia japonica</i>	Japanese honeylocust	<i>Alnus incana</i>	speckled alder
<i>Quercus alba</i>	white oak	<i>Acer negundo L.</i>	boxelder	<i>Rosa spp.</i>	rose
<i>Morus spp.</i>	mulberry	<i>Malus baccata</i>	Siberian crab	<i>Acer pseudoplatanus</i>	sycamore maple
<i>Pinus nigra Arnold</i>	Austrian pine	<i>Ribes nigrum</i>	cutleaf European black currant	<i>Populus nigra italica</i>	lombardy poplar
<i>Prunus serotina</i>	black cherry	<i>heterophyllum</i>		<i>Acer rubrum L.</i>	red maple
<i>Populus grandidentata Michx.</i>	large-toothed aspen	<i>Pyracantha spp.</i>	pyracantha	<i>Acer saccharum</i>	sugar maple
<i>Pinus thunbergi</i>	Japanese black pine	<i>Ligustrum spp.</i>	privet	<i>Buxus sempervirens</i>	common boxwood
<i>Pinus rigida</i>	pitch pine	<i>Populus deltoides</i>	Eastern cottonwood	<i>Ulmus americana L.</i>	American elm
<i>Lycium halimifolium</i>	matrimonyvine	<i>Populus spp.</i>	poplar	<i>Pinus strobus</i>	white pine
<i>Fraxinus americana L.</i>	white ash	<i>Salix nigra</i>	black willow	<i>Tsuga canadensis</i>	Canadian hemlock
<i>Ulmus procera (campestre)</i>	English elm	<i>Catalpa speciosa</i>	Northern catalpa	<i>Ostrya virginiana</i>	American hophornbean
<i>Acer platanoides L.</i>	Norway maple	<i>Cydonia oblonga</i>	quince	<i>Taxus spp.</i>	yew
<i>Acer saccharinum L.</i>	silver maple	<i>Quercus macrocarpa</i>	bur oak	<i>Pinus resinosa</i>	red pine
<i>Prunus virginiana L.</i>	chokecherry	<i>Shepherdia argentea</i>	silver buffaloberry	<i>Carya ovata</i>	shagbark hickory
<i>Aesculus hippocastanum</i>	horsechestnut	<i>Populus tremuloides</i>	trembling aspen	<i>Malus spp.</i>	apple
<i>Ailanthus altissima</i>	ailanthus	<i>Betula lenta</i>	sweet birch	<i>Pinus sylvestris</i>	Scotch pine
		<i>Betula papyrifera</i>	paper birch	<i>Abies balsamea</i>	balsam fir
		<i>Betula populifolia</i>	gray birch	<i>Picea pungens</i>	Colorado spruce