

Did I mention that plug-grown seedlings transplant well in the fall — no transplant shock the roots grow naturally until soil temperatures drop and the tops take off the following season. Picture that idea — spring vacations.

Scandinavian foresters have discovered that by taking a tiny 18-mm Jiffy seedling directly to the out-planting site, they get better regeneration than with bigger seedlings. It is all about below ground management! There is a take home-message here — buy liners with the root systems you need for the date you need them and always prune them.

### LITERATURE CITED

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## Hardy Shrub Rose Research Trials®

**Laura G. Jull**

Department of Horticulture, 1575 Linden Dr., University of Wisconsin-Madison,  
Madison, Wisconsin 53706-1590

### BACKGROUND AND RATIONALE

Roses are among the most popular plants in the United States among amateur and professional gardeners. Traditionally garden roses (floribunda, grandiflora, and hybrid tea) have attracted the majority of market attention, however, the care and attention required to grow them successfully has spawned a demand for rose taxa that require less intensive management, i.e., hardy shrub roses. The climatic conditions of the upper Midwest can make garden rose culture a challenge. High summer humidity and sub-zero winter temperatures can cause numerous disease problems and lack of winter hardiness. In addition, homeowners and green industry professionals would like roses that have a reduced reliance upon pesticides without sacrificing plant vigor, health, and flowering.

Characteristics of hardy shrub roses such as cold hardiness, repeat flowering, and pest resistance make them attractive choices for modern landscapes, yet not all cultivars exhibit these desirable traits. In a review of 30 common rugosa rose (*Rosa rugosa*) cultivars, Epping and Hasselkus (1989) found that only 10 of the selections could be recommended for Midwestern landscapes with the remaining cultivars considered inferior due to inadequate pest resistance, lack of cold hardiness, or poor flowering characteristics. Similarly, Hawke (1997) evaluated 51 English and Canadian (Explorer and Parkland Series) roses and found only three of the English and seven Canadian cultivars to be acceptable for the Midwest. With new cultivars

making their way to the market each year, independent rose evaluations need to be conducted in order to help Midwestern nurserymen and landscapers increase their profitability by providing high quality, low maintenance roses to consumers. A 3-year hardy shrub-rose research trial was conducted in Wisconsin to evaluate 20 cultivars of hardy shrub roses. The roses selected for the study have not been completely evaluated in the Upper Midwest for pest resistance, ornamental value, and cold hardiness.

## MATERIALS AND METHODS

The hardy shrub rose evaluation trials were planted at three locations in Wisconsin (U.S.D.A. cold hardiness Zones 3, 4, and 5) in Spring 2000. The locations include the West Madison Agricultural Research Station, Middleton, Wisconsin (cold hardiness Zone 4b-5a, clay loam soil); Brown County Extension Office, Green Bay, Wisconsin (Zone 4b, silt loam soil); and Spooner Agricultural Research Station, Spooner, Wisconsin (Zone 3b, sandy loam soil). The three locations were chosen to represent three hardiness zones, each with its own representative soil type. There were nine replications (plants) of each of the 20 cultivars located at each location for a total of 180 roses at each research station/office. However, due to a number of factors including vole and deer damage, winterkill, and heavy disease pressure, a number of the original 180 plants at each location died. These rose plants were not replaced in the trial, as hardiness and vigor are part of the 3-year evaluation trials' data collection. Three years worth of data is considered a sufficient amount of time to successfully evaluate hardy shrub roses, considering yearly temperature fluctuations and amount of insect and disease pressure.

Nineteen of the twenty shrub rose cultivars were obtained mainly as a donation from three large-scale rose growers in the U.S.A. (Bailey Nurseries, St. Paul, Minnesota; Weeks Roses, Upland, California; and Star Roses, West Grove, Pennsylvania). The dwarf shrub rose 'Scrivluv' (Baby Love™ miniature rose) was generously donated by Schroeder's Flowers, Green Bay, Wisconsin. These shrub rose cultivars were selected because most were either new cultivars just introduced to the market, have been on the market for less than 3 years, or are underused in the landscape, or the roses are still in evaluation by the nurseries in hopes for future release. Two cultivars 'Buchi' (Carefree Beauty™ rose) and 'Meipotal' (Carefree Delight™ rose) are used as "industry standards" in the trial to compare the other rose cultivars. These two cultivars are commonly used by the landscape industry in the Midwest. The roses used in the trial are #1 to 1½ grade, bareroot roses, each on their own root systems (nonbudded). There were some obvious differences between various roses within a cultivar, however, the roses were randomly selected at each research location to ensure proper experimental randomization. The cultivars evaluated in this study for 3 years are shown in Table 1.

The roses were received bareroot during the second week in March 2000. The roses were potted into 2-gal, black plastic containers using a soilless mix [5 pine bark : 1 peat : 1 sand (by volume)] and a slow-release fertilizer (Osmocote 16-16-16) was applied to the top of the media after the roses were potted. Plants were potted up at McKay's Nursery (Waterloo, Wisconsin) and placed into miniature poly houses with no heat (temperatures maintained at around 40–45 °F to enhance root development). The plants were watered as needed and allowed to break bud slowly. The plants were then transported to the three locations for planting during early to

**Table 1.** Rose cultivars evaluated in the 3-year study.

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**Rosa ‘Korgosa’, Robusta™ rugosa hybrid rose:** Single, medium-red flowers, 6 ft tall, everblooming\*, robust, thorny stems.

**Rosa ‘Bucbi’, Carefree Beauty™ rose:** Buck rose with semi-double, coral-pink flowers, 3 ft tall, everblooming.

**Rosa ‘Meipotal’, Carefree Delight™ rose:** Single, pink flowers, 2.5–5 ft tall, everblooming.

**Rosa ‘Wisconsin Cheese’:** New, experimental rose from Bailey’s, not on the market, light yellow, fragrant flowers, long stems, recurrent.\*\*

**Rosa ‘Serendipity’:** Buck rose with double, orange-blend flowers, 4 ft tall, everblooming.

**Rosa ‘Marie-Victorin’:** New Explorer series rose with double, pale peach flowers fading to pink, recurrent.

**Rosa ‘Harwelcome’, Livin Easy™ floribunda rose:** Floribunda rose with double, apricot/orange flowers, 3 ft tall.

**Rosa ‘Meibonrib’, Magic Meidiland® rose:** Semi-double, medium pink flowers, 2 ft tall, everblooming.

**Rosa ‘JACbow’, Kaleidoscope™ rose:** Shrublet with double, tan to mauve blend flowers, 3 ft tall, recurrent.

**Rosa ‘Poulrust’, Cambridge™ rose:** Town and Country Series with double, lavender flowers, 2 ft tall, everblooming.

**Rosa ‘Poulijik’, Madison™ rose:** Town and Country Series with double, pink flowers, 2 ft tall, everblooming.

**Rosa ‘Paloma Blanca’:** Buck rose with double, white fragrant flowers, 3 ft tall, everblooming.

**Rosa ‘Fryeoman’, Flower Girl™ rose:** Small, soft pink flowers in large clusters, recurrent.

**Rosa ‘Moredfar’, Red Fairy™ polyantha rose:** Polyantha rose with small, cherry-red flowers, recurrent.

**Rosa ‘WEKplapic’, Betty Boop™ floribunda rose:** Floribunda, semi-double, ivory flowers w/ bright red edges, everblooming.

**Rosa ‘CHEwily’, Mix ‘n’ Match™ rose:** Semi-double, pastel pink flowers, reddish new growth, recurrent.

**Rosa ‘Scrivluv’, Baby Love™ miniature rose:** Shrublet with single, bright yellow, slightly fragrant flowers, recurrent.

**Rosa ‘RADrazz’, Knockout™ rose:** Single, deep cerise-red flowers, 3 ft tall, everblooming.

**Rosa ‘Meipsidue’, Fire Meidiland™ rose:** Double, deep red flowers in large terminal clusters, everblooming.

**Rosa ‘Meialate’, Mystic Meidiland™ rose:** Single, light copper with yellow flowers fading to pink, everblooming.

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\*Everblooming: continuous, or repeat flowering habit, rarely not in bloom

\*\*Recurrent: flowers produced in succeeding cycles throughout a flowering season, bloom, rest, then rebloom at a later date

late May 2000 (date is location dependent). Roses were planted into the soil at each location and shredded bark mulch was applied at a 3-inch thickness to the entire soil surface to control weeds and retain moisture. Hand weeding was performed weekly at all three locations throughout the growing season.

To allow for proper evaluation for insect and disease resistance, no insecticides or fungicides were applied during the duration of the experiment. A 3-month, 14-14-14, slow-release fertilizer was top dressed around each rose plant yearly in June. Watering occurred at planting time and after fertilizer application. Plants received 1 inch of additional irrigation if rain had not occurred during a 10- to 20-day period, depending on location. During the 1st and 2nd year of the trails, removal of spent flowers occurred weekly until July at which time rose hip production initiated. During the remaining growing seasons, deadheading of flowers occurred once in June. The ability of each cultivar to shed its spent flowers was evaluated. In addition, the absence of deadheading during the final seasons resulted in only a slight increase in colorful hip production, particularly in the northernmost location of Spooner, Wisconsin.

## RESULTS AND DISCUSSION

Evaluation of the roses occurs monthly at all three locations throughout the growing season and into late fall (May–Nov.) and continued for 3 years. Qualities evaluated included: height and width of the plant, overall plant habit, foliage color (especially the new growth), flowers (color, amount, size, single or double, fragrance, and duration), hips (production, size, and color), insect injury (rose sawfly, leaf cutter bee, aphids, Japanese beetle, stem girdler, spider mites, etc.), disease susceptibility (blackspot, anthracnose, powdery mildew, botrytis, canker, etc.), and winter hardiness (amount of dieback that occurred in winter). Deer fencing was installed at the Spooner location but not at the West Madison or Brown County sites as historically, deer pressure at these latter two locations are negligible. However, deer pressure, and especially vole injury, was eventually considered a problem at the Brown County location despite its urban surroundings.

No winter protection was used on the roses at any of the three locations in order to provide successful analysis of cultivar hardiness. During hardiness evaluation in early May, removal of dead wood was completed each year. After the 1st year, roses that completely died to the ground were left planted to allow for potential regrowth from their root system. Even if the tops of plants died back to the ground, the resulting new growth from the root system is the same cultivar as none of these roses were budded onto a rootstock. Rose plants that completely died back were allowed to remain in the trial until July to see if regrowth occurred from the base of the plant. If regrowth did not occur, these plants were not replaced in the trial, as hardiness and vigor are part of the 3-year evaluation trials' data collection. However, Knockout™ rose ('RADrazz') plants were purchased and replanted in each location for analysis due to vole and winter injury. Only six plants of this cultivar were replanted at West Madison and Green Bay and only three were replanted at Spooner (less winter injury). Knockout™ rose ('RADrazz') was replanted at these locations to see if winter hardiness results are the same for each year. These rose plants were not used in the final evaluation as they were not part of the original plantings, but they were evaluated separately for flowers, pests, and hardiness.

First-year winter-hardiness data proved a number of these cultivars are not particularly hardy to Wisconsin unless winter protected. For the first year's results,

many of the Knockout™ rose ('RADrazz'), Baby Love™ miniature rose ('Scrivluv'), Livin Easy™ floribunda rose ('Harwelcome'), 'Wisconsin Cheese', Betty Boop™ floribunda rose ('WEKplapic'), and Carefree Beauty™ rose ('Bucbi') were killed to the ground at the West Madison and Green Bay locations. Surprisingly, winter survival was best at the far northern location of Spooner with only a few plants from the above cultivars dying, except for Knockout™ rose ('RADrazz'), which suffered death of six out of the nine plants used at this location. The hardiness results at Spooner were greater than for some of the same cultivars at more southern locations, perhaps due to complete snow cover for most of the winter in Spooner. In addition, Fall, 2000 had unusually warm temperatures in Green Bay and Madison. This prolonged the warm fall season in the central and southern parts of Wisconsin, which may have affected the winter hardening of many of the rose cultivars. The above listed cultivars, in particular, Knockout™ rose ('RADrazz'), were still flowering in November. In contrast, plants in Spooner finished flowering in early October and experienced gradual decreases in fall temperatures, which lead to sufficient hardening off of the plants. December of that year came with a vengeance all over the state with very cold temperatures, which killed unhardened tissue in the roses, particularly in Madison and Green Bay. However, high snowfall led to protection of voles from predators in the winter, particularly at the Green Bay location, which suffered tremendous vole injury and death of 30% of the rose plants. Vole baits were then installed at this location. Two more years worth of winter hardiness data showed similar results as the 1st year's hardiness data. Unseasonably high winter temperatures, fluctuating temperatures, and low snowfall amounts provided interesting results in 2002 and 2003.

In terms of pests, the most common insect damage seen at each location during the first two years was rose sawfly (rose slug) and leaf cutter bee. Neither insect cause's death of the plant but severe enough damage can significantly reduce a rose's ornamental value. These insects commonly attack the leaves with chewing of the foliage and eventual defoliation of severely infected leaves. Other pests seen at the three locations include: aphids, gypsy moth (Green Bay only), forest tent caterpillar (Spooner only), tussock moth, and false Japanese beetle otherwise known as spring rose beetle. There was no preference to a specific cultivar for any of the insects except for aphids, which seemed to prefer the larger flowers of Robusta™ rugosa hybrid rose and 'Wisconsin Cheese'. 'Marie-Victorin' was the most severely infected rose for rose sawfly, forest tent caterpillar, and other chewing insect activity.

Diseases of the roses mainly appeared as black spot and anthracnose on the leaves. Both of these diseases can be hard to distinguish from each other. Black spot appears as black, roundish to obtuse spots on the leaves sometimes with a yellow halo surrounding the black spots. Lesions (spots) often have feathery edges. Leaf anthracnose can also have similar symptoms as black spot, however, the spots often do not have the feathery margin, instead a more distinct edge to the spot is apparent. Both diseases can cause severe defoliation. Blackspot and anthracnose were severe (> 60% of plant infected) during the first two summers on Robusta™ rugosa hybrid rose, Red Fairy™ polyantha rose ('Moredfar'), Kaleidoscope™ rose ('JACbow'), Cambridge™ rose ('Poulrust'), and Madison™ rose ('Poulrjik').

Flower amount and production varied between cultivar but was fairly consistent among locations. The cultivars that were continuously in flower for most of the growing season include: Carefree Delight™ rose ('Meipotal'), Cambridge™ rose ('Poul-

rust'), Madison™ rose ('Poulsrijk'), Knockout™ rose ('RADrazz'), Fire Meidiland™ rose ('Meipsidue'), Mystic Meidiland™ rose ('Meialate'), and Red Fairy™ polyantha rose ('Moredfar'). However, many of the above cultivars are not recommended due to their high disease susceptibility [Cambridge™ rose ('Poulsrust'), Madison™ rose ('Poulsrijk'), Red Fairy™ polyantha rose ('Moredfar'), and Robusta™ rugosa hybrid rose]. Unfortunately, the roses, which produced the best flower display with high pest resistance often, were not winter hardy. Hip production occurred on many of the cultivars, however, only Carefree Beauty™ rose, 'Marie-Victorin', and Mystic Meidiland™ rose produced colorful orange-red hips. Hip production in the northern location of Spooner was poor as many of the cultivars, including Carefree Beauty™ rose, 'Marie-Victorin', and Mystic Meidiland™ rose only produced green hips and did not have sufficient time to change colors to orange or red before a severe frost occurred thereby turning the hips black.

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## A Brief Discussion of Rooted Cutting Propagation at Mitsch Nursery With Focus on Conifers®

**Susan D. Jones**

Mitsch Nursery Inc., 6652 South Lone Elder Road, Aurora, Oregon 97002 U.S.A.

### BRIEF HISTORY

I have been asked to discuss methods of rooting "difficult-to-root" conifers at Mitsch Nursery. Let me start by explaining a few things about the nursery history and how our program has evolved, as that may give more insight into how some of our methods were developed, than any of the actual formulas.

Mitsch Nursery began as a project of a few trays of plants on the sun porch of the small Arts and Crafts-inspired house that now houses the nursery office. John left school in the 8th grade, and with his parents' help, began to sell rooted cuttings that he had propagated. Little by little his project required more space, until he eventually bought the property from his father, and ran Mitsch Nursery for over 40 years. The industry was young, and he was able to develop relationships with like-minded plant's people all over the country in order to acquire, trial, and disseminate new ornamental plants.

It is interesting and important to note here that neither John Mitsch himself, or any of his employees had any formal training in horticulture. They were deeply committed plant lovers who were willing to glean whatever information they could from other nurserymen and from extension and arboretum researchers, and to try different ideas until they found what worked most dependably for their situation. There were no preconceived ideas about what "should" work.

Although John's initial attraction was to flowering and miniature shrubs, he also pioneered work with conifers, including *Juniperus*, dwarf *Picea abies* and *P. glauca*,