Plant Evaluation Notes

Rudbeckia for Cultivated Landscapes

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Coneflower or black-eyed Susan are common names associated with *Rudbeckia,* and refer to the shape and color of the conical head of disc flowers. Often considered a common wildflower, many coneflowers have been overlooked for the garden. But with the growing interest in water conservation and plant hardiness, these native plants are increasingly becoming the choice of gardeners. With a greater variety of coneflowers in cultivation, gardeners and landscape professionals are discovering the merits of this choice plant group.

Rudbeckia consists of about 25 species of annual, biennial and perennial herbs native throughout most of the continental United States, some concentrated in the moist woodlands of the southeast and others in the drier prairies of the Midwest and Great Plains. *Rudbeckia,* a member of the Sunflower family (Asteraceae), has daisy-like flowers with usually drooping, yellow to orange ray florets and green to black disc florets.

Familiarity with one common species or cultivar belies the contrasts in flowers, foliage and habits within the genus. Flowers can be large or small, single or double, from clear, bright yellow to brassy, orange-yellow. The flowers emerge in mid summer and continue into October, providing a significant impact in the late season landscape. Whether held high atop seven foot stems, or in a low, profusion of golden blossoms, the coneflower's floral display is extraordinary. Foliage varies greatly, ranging from the coarsely rough, dark green leaves of *Rudbeckia fulgida* to the glaucous, cabbage-like leaves of the great coneflower, *Rudbeckia maxima.*

Rudbeckias are easy to grow and well-adapted to a variety of cultural situations. Coneflowers prefer full sun and moist, well-drained soils, but are adaptable to light shade and drier sites. Species native to moist sites, like *Rudbeckia maxima* and *R. laciniata,* are especially useful near water. Coneflowers endure and provide flowering enjoyment for over two months during summer and autumn.

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Perennial border of *Rudbeckia fulgida* var. *sullivantii* 'Goldsturm' at Cantigny Gardens, Wheaton, IL

The diversity within the genus allows for many landscape applications. Designers and landscape contractors alike are using coneflowers to bring color to small suburban backyards and large corporate campuses. Rudbeckias are excellent choices for summer borders, meadow gardens or urban landscapes, and make fine cut flowers. The long-lasting flowers add color and beauty to any landscape.

Project Objectives

While gardeners have been using some rudbeckias in their landscapes, horticultural information on lesser used species and cultivars was not readily available. A four-year project was initiated in 1989 to compare ornamental characteristics and to determine the landscape potential of specific *Rudbeckia* taxa. Plant traits and cultural requirements were observed during the project term in order to recommend the best coneflowers for cultivation in the Midwest. Eleven perennial *Rudbeckia* taxa (Table 1) were acquired from various commercial sources in the United States, and grown at the Chicago Botanic Garden (USDA Hardiness Zone 5b). Plants were obtained based on nursery availability regardless of suspected problems with identification or nomenclature. The issues of nomenclature and identification were addressed during the evaluation process. Nomenclature in this report follows The New Royal Horticultural Society Dictionary of Gardening[2].

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[2] 'Herbstsonne' is spelled 'Herbsonne' in The New Royal Horticultural Society Dictionary of Gardening but verified in all other cited references.

The trial plots were located in the Herbaceous Test Garden, which provides a uniform site for the evaluation of herbaceous perennial plants. Trial plots received similar exposure to wind and approximately 8 to 10 hours of full sun daily during the growing season. Planting beds were excavated to a depth of 30.5 cm (12 in.) and raised 15.2 cm (6 in.) above ground level to improve drainage. The soil consisted of one part composted leaves to four parts soil. An average soil pH of 7.4 was recorded during the evaluation term. Plots of 15 plants each were bounded on two sides by turf grass paths and separated by mulched strips.

Maintenance practices were kept to a minimum to simulate home garden culture. The test plants received moisture when the surrounding turf grass was regularly irrigated. This irrigation was supplemented only when necessary. Each spring the plants received an application of slow-release granular fertilizer (Woodace® 12-5-9) at a rate of one pound per 100 square feet. A mulch of shredded leaves and wood chips was maintained throughout the year for aesthetic purposes and water conservation.

Observations

Each taxon was observed for flower color, flower size, bloom period, flower coverage, plant height and plant width (Table 2). Plant widths for *Rudbeckia laciniata* 'Golden Glow' and *R. laciniata* 'Goldquelle' were not recorded following the first season because of the spreading nature of these plants. Data were also collected on insect and disease resistance, winter hardiness and culture.

The long flowering period was the most notable trait of *Rudbeckia.* On average, plants bloomed continuously for two to three months, from mid summer to October frosts. Flowering began almost a month earlier in 1991 due to unusually warm temperatures in early May. Floral character and size ranged from the small boxy inflorescence of *Rudbeckia triloba* to the fully double flower of *R. laciniata* 'Goldquelle' to the long drooping ray florets of *R. maxima.*

Rudbeckia fulgida and its botanical varieties resembled the black-eyed Susans of roadsides and most gardens. Minor differences were observed in flower size, flower coverage and bloom period among this group. *Rudbeckia fulgida* var. *sullivantii* 'Goldsturm' ranked superior because of its greater flower coverage and larger flower size. Precocious flowers were commonly produced on *Rudbeckia fulgida* var. *sullivantii* in late June, several weeks before the standard bloom period began. *Rudbeckia fulgida* varieties were usually the first of the coneflowers to bloom and had the longest flowering period.

The tight, compact habit of 'Goldsturm' was also superior to *Rudbeckia fulgida* and its varieties. *Rudbeckia fulgida* var. *sullivantii* most closely resembled 'Goldsturm' in general appearance but was not as uniform in height or habit. The other varieties had looser habits yet still provided effective floral displays. These plants spread slowly by rhizomes. The basal leaves of this group were bold textured, and oval to broad lance-shaped. The basal foliage of *R. fulgida* var. *speciosa* was not as coarse as 'Goldsturm'.

Table 1: Evaluation Group

Rudbeckia fulgida
Rudbeckia fulgida var. *speciosa*
Rudbeckia fulgida var. *sullivantii*
Rudbeckia fulgida var. *sullivantii* 'Goldsturm'
Rudbeckia laciniata 'Goldquelle' (Gold Fountain)
Rudbeckia laciniata 'Golden Glow' (Hortensia)
Rudbeckia maxima
Rudbeckia newmanii
Rudbeckia nitida 'Herbstsonne' (Autumn Sun)
Rudbeckia subtomentosa
Rudbeckia triloba

The *Rudbeckia laciniata* cultivars, 'Goldquelle' and 'Golden Glow' had similar bright yellow, double pom pon-like flowers. The flowers of 'Goldquelle' seemed overly large for the small stature of the plant, and conversely, the flowers of 'Golden Glow' appeared diminutive for its large size. These cultivars resembled one another in most characteristics except height, but 'Goldquelle' had a less aggressive spreading nature. *Rudbeckia laciniata* 'Golden Glow' spread rapidly and had completely filled in its test plot by the third growing season.

The shorter stems of 'Goldquelle' were not weighted down by the heavy, double flowers, as were the tall stems of 'Golden Glow'. Falling stems created an open habit on 'Golden Glow' that was inferior to both 'Goldquelle' and the taller, erect *Rudbeckia nitida* 'Herbstsonne'. Foliage of 'Goldquelle' appeared exceptionally bold due to its short plant size. The lower foliage on both cultivars turned yellow in the summer, sometimes as early as June. 'Goldquelle' typically held the yellow leaves throughout the summer, whereas the lower stems of 'Golden Glow' were denuded by mid summer. Healthy, green basal leaves quickly emerged after the yellow leaves had dropped.

Rudbeckia nitida 'Herbstsonne', a tall, clump-forming cultivar, had sturdy stems that were mostly erect through the season. Bright yellow flowers perched atop tall leafy stems provided a beautiful display in late summer. The columnar, green disc heads of 'Herbstsonne' were ornamental late into autumn after the ray florets had dropped. Its lower foliage remained green throughout the summer months. Copious flowers, an erect habit and the retention of green leaves made 'Herbstsonne' a better performer than *R. laciniata* 'Golden Glow'.

The clump-forming *Rudbeckia maxima* with its large, glaucous leaves was perhaps the most unusual coneflower. Upstanding basal leaves, to 16 inches, were a striking contrast to the other coneflowers, and had a cabbage-like appearance before the flower stalks elongated. Its flowers were the largest of all, with a prominent 3-inch elongated black cone of disc florets. The great coneflower's distinctive appearance offset the lower flower production, usually at about 60% open flowers at peak. Flower production was dramatically reduced following peak bloom, with only a few flowers sporadically produced into October.

Rudbeckia subtomentosa, perhaps not as showy as *Rudbeckia fulgida,* was taller, with softer, grey-green leaves and paler, yellow ray florets; a good alternative to the brassy yellow-orange flowers of *R. fulgida.* The variable plant heights within the test plot created a less uniform display, but flower coverage was consistently high. Another shortcoming of *R. subtomentosa* was that plants opened in the centers as the season progressed.

The best floral display of 1990 was *Rudbeckia triloba,* a biennial or short-lived perennial species. Small, boxy yellow-orange flowers created a distinctive display from the top to the bottom of the plant. The original plants lived for three years before dying out during the winter of 1990-91. Seedlings began growing in mid May of 1991, eventually filling the test plot. Much variation in plant height and habit was observed in 1991 and 1992 due to the seedling nature of the plants. Floral displays in subsequent years were good but never again as profuse or uniform as in 1990.

The test plants were not generally susceptible to insect or disease problems; however, a few instances of powdery mildew and damage from chewing insects were recorded. Minor injury from an unidentified chewing insect was noted in 1991 and 1992 on *Rudbeckia fulgida* var. *sullivantii* 'Goldsturm', *R. fulgida* var. *sullivantii* and *R. maxima.* Damage was noted for a short period only and no long term adverse effects to either ornamental display or health were observed. Powdery mildew was commonly observed on 'Golden Glow' and 'Goldquelle'; approximately 30% to 40% of the foliage was infected each year. Mildew covered 100% of the leaves of 'Golden Glow' in 1991. No measures were taken to control or prevent powdery mildew.

There were no plant losses due to lack of winter hardiness. *Rudbeckia maxima,*

Table 2: Characteristic Summary of Rudbeckia

Rudbeckia	Flower Color	Flower Size	Bloom Period	Coverage[1]	Height	Width
fulgida	orange-yellow rays brownish-purple discs	5.1–7.6 cm (2–3 in.)	late July–Oct	80–100%	71.1–88.9 cm (28–35 in.)	63.5 cm (25 in.)
fulgida var. *speciosa*	orange-yellow rays brownish-purple discs	5.1–6.4 cm (2–2½ in.)	late July–Oct	90–100%	83.8–96.5 cm (33–38 in.)	76.2 cm (30 in.)
fulgida var. *sullivantii*	orange-yellow rays brownish-purple discs	7.6 cm (3 in.)	mid July–Oct	100%	91.4–99.1 cm (36–39 in.)	76.2 cm (30 in.)
fulgida var. *sullivantii* 'Goldsturm'	orange-yellow rays brownish-purple discs	7.6–10.2 cm (3–4 in.)	mid July–Oct	100%	86.4–91.4 cm (34–36 in.)	76.2 cm (30 in.)
laciniata 'Golden Glow'	bright yellow rays green discs	6.4–7.6 cm (2½–3 in.)	late July–Sept	90–100%	188.0–203.2 cm (74–80 in.)	Not available
laciniata 'Goldquelle'	bright yellow rays green discs	7.6–8.9 cm (3–3½ in.)	late July–Sept	80%	63.5–76.2 cm (25–30 in.)	Not available
maxima	bright yellow rays black discs	12.7 cm (5 in.)	early July–mid Oct	60%	127.0–170.2 cm (50–67 in.)	81.3 cm (32 in.)
nitida 'Herbstsonne'	bright yellow rays green discs	6.4–10.7 cm (2½–4 in.)	early Aug–Oct	100%	182.8-203.2 cm (72-80 in.)	Not available
subtomentosa	yellow rays purple-brown discs	6.4 cm (2½ in.)	late July-Oct	80–100%	119.4–149.8 cm (47–59 in.)	94.0 cm (37 in.)
triloba	yellow-orange rays black discs	2.5–5.1 cm (1–2 in.)	late July-Oct	80–100%	91.4–132.1 cm (36–52 in.)	76.2 cm (30 in.)

[1] Flower coverage is measured as percentage of plot with blossoms at peak, approximately one month after the first flowers opened.

though listed variably as hardy in zones 6-9 (Clausen and Ekstrom 1989), zone 7 (Huxley 1992) and zones 3-9 (Phillips and Burrell 1993), had no difficulties with hardiness. One-third of the *R. maxima* group died during the first winter; a broken irrigation line under the test plot may have played a role in these deaths. No additional deaths were recorded in subsequent years, and the remaining plants were robust and vigorous.

All rudbeckias were easy to grow, essentially maintenance-free and adapted to the cultural environment of the test site. Several instances of drought stress were noted during 1991, but supplemental irrigation quickly relieved the problem. No plant losses were attributed to cultural conditions, aside from the *Rudbeckia maxima* deaths. The stoloniferous *Rudbeckia laciniata* cultivars were easily controlled, by spade, from spreading into other test plots.

Comparisons made between each taxon during the evaluation term revealed that the plants received as *Rudbeckia newmanii* were identical in all aspects to *R. fulgida* var. *speciosa. Rudbeckia newmanii* is listed as a synonym of *R. fulgida* var. *speciosa* (Huxley 1992). Consequently, *Rudbeckia newmanii* was removed from the evaluation project in 1991. In horticultural literature, 'Goldquelle' is assigned to either *R. nitida* or *R. laciniata.* Its characteristics, except for height, match *R. laciniata* 'Golden Glow', and therefore this specific epithet was used in the project. In addition, Clausen and Ekstrom note that the shorter 'Goldquelle' is probably a hybrid between *R. laciniata* 'Golden Glow' and *R. nitida* 'Herbstsonne'. This might explain the less aggressive habit of 'Goldquelle', since 'Herbstsonne' is a clump-forming plant. All other taxa matched botanical or horticultural descriptions.

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Rudbeckia laciniata 'Goldquelle'

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Rudbeckia nitida 'Herbstsonne'

Conclusions

Whether in a naturalized meadow or a traditional perennial border, rudbeckias merit use in the cultivated landscape. These hardy native plants come in sizes and habits for many garden settings, and the brilliant, long-lasting flowers are welcome components of the summer garden. Of the many species available, only a handful have been widely promoted for homeowner use, and some can be found only from nurseries specializing in native plants. In an effort to increase plant diversity within local nurseries, all taxa were distributed upon completion of the project.

The ten *Rudbeckia* taxa that completed the project are highly recommended based on ornamental characteristics and cultural data collected throughout the four-year evaluation period. It was easy to compare and contrast the merits and shortcomings of each coneflower in this side-by-side evaluation. On the whole, the plants adapted to the test site and thrived with minimal care. All plants proved to be winter hardy, including *Rudbeckia maxima.* The ornamental characteristics of the plants were generally outstanding with several of the cultivars displaying exceptional traits. Of particular note were: *R. fulgida* var. *sullivantii* 'Goldsturm', *R. laciniata* 'Goldquelle' and *R. nitida* 'Herbstsonne'. The popularity and general availability of 'Goldsturm' seems justified by its superior characteristics and performance in these trials.

In a prairie, parking lot or backyard, rudbeckias enhance the landscape with bright yellow blossoms from summer to autumn. The diversity of height and flower allow these plants to be used in a wide variety of landscape settings. As development continues to encroach on our natural spaces, these plants offer a bit of "nature" to our personal environments.

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