

Plant Evaluation Notes

An Evaluation Report of Meadow Rues

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The merits of meadow rues (*Thalictrum*)—their delicate flowers, handsome foliage and graceful habits—are treasured by many gardeners. From the diminutive *T. kiusianum* to the titanic *T. pubescens*, they possess a distinctive charm. Meadow rues are a diverse group of perennials well-suited to a variety of garden settings including sunny borders, woodlands and rockeries. The wealth of meadow rues available to gardeners ensures a profusion of pretty blossoms from spring into fall.

Thalictrum is a member of the buttercup family (Ranunculaceae), which includes other important garden perennials such as *Aquilegia*, *Delphinium* and *Helleborus*. Many of the 130 worldwide species of *Thalictrum* are indigenous to northern temperate zones. Meadow rues are perennial herbs with clump-forming or rhizomatous habits ranging from several inches to over 10 feet tall. Their fine-textured leaflets are arranged pinnately (featherlike) or ternately (divided one or more times into groups of three), giving

some meadow rues a decidedly fernlike appearance. Leaflet shape and color varies as well, being round, oval or linear and blue-green, gray-green or green.

Meadow rues have small flowers that feature clusters of stamens but lack true petals. In some species, colorful and persistent petaloid sepals subtend the sta-

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mens; whereas, other species have insignificant sepals that may fall off early, leaving only the stamens to provide the floral display. For example, the pendulous flowers of *Thalictrum rochebruneanum* have conspicuous lavender sepals surrounding a boss of primrose-yellow stamens, while the flowers of *T. aquilegifolium* are fuzzy pompons of lilac-colored stamens only. The yellow, pink, violet, white or greenish flowers are borne in terminal or axillary clusters in late spring and summer. Columbine meadow rue (*T. aquilegifolium*) is the first to bloom in mid-May, while 'Elin' and *T. rochebruneanum* have flowers lasting late into the summer and early autumn.

The easy-to-grow meadow rues generally prefer moist, organic soils in partial shade to full sun. In some cases, such as *Thalictrum aquilegifolium*, consistent moisture is beneficial for success in sunny gardens. Plants that become ragged after flowering can be pruned to the ground to rejuvenate plant health and encourage new growth. Meadow rues are generally trouble-free, although powdery mildew and leaf miners are occasional pest problems for some species.



Thalictrum rochebruneanum

Photographed in the garden of Linda Cochran, Bainbridge Island, WA by Richard Hawke

Meadow rues are used formally or informally in borders, meadows and woodland gardens. As a rule, tall meadow rues are best at the back of the border, but the statuesque, yet airy *Thalictrum rochebruneanum* has a see-through quality that makes it a good accent in the midborder too. Small species such as *T. kiusianum* and *T. ichangense* may be overwhelmed by neighboring plants in the perennial border but are well-suited to rock gardens. Pairing the fine-textured meadow rues with bold-leaved perennials such as rodgersias (*Rodgersia*) and ligularias (*Ligularia*) creates a dramatic contrast. In full sun, meadow rues combine nicely with daylilies (*Hemerocallis*), phloxes (*Phlox*) and ornamental grasses; while yellow waxbells (*Kirengeshoma*), turtleheads (*Chelone*) and ferns make delightful companions in shady gardens.

The Evaluation Study

The Chicago Botanic Garden (USDA Hardiness Zone 5b, AHS Plant Heat-Zone 5) evaluated 26 taxa of *Thalictrum* in two successive trials from 1995 through 2003. The first trial, from 1995 through 1999, included six species that were wild-collected in different regions of Russia. The second trial took place from 1998 through 2003 and contained 18 cultivated taxa obtained from commercial sources or botanical institu-

tions as well as two additional species collected in Russia. The goal of the comparative trials was to identify outstanding *Thalictrum* for full-sun gardens through an assessment of their ornamental traits, disease and pest resistance, cultural adaptability and winter hardiness.

Eight plants of each taxon were grown in side-by-side plots for easy comparison. The evaluation site received approximately 10 hours of full sun during the growing season and was openly exposed to wind in all directions. The well-drained, clay-loam soil was amended with composted leaves and had a pH of 7.4 throughout the evaluation term.

Maintenance practices were kept to a minimum to simulate home garden culture. Water was provided as needed and no fertilizer was applied. Plants were not routinely cut back after flowering, but occasionally stems were pruned to the ground to rejuvenate foliage and plant health. Mulch consisting of shredded leaves and wood chips was placed around the plants for water conservation and weed suppression. No winter protection was provided.

Observations

The comprehensive evaluation of *Thalictrum* included the collection of data on ornamental traits including floral

display and leaf color; cultural adaptability to the soil and environmental conditions of the test site; disease and pest problems; and winter injury. Final ratings are based on flower production, plant health, habit quality and winter hardiness. Plant traits, evaluation specifics and final ratings for 17 commercially available taxa that completed the trial are noted in Table 1. Three accessions of *Thalictrum delavayi* 'Hewitt's Double' were evaluated between 1998 and 2001 but each time all the plants died after one season in the trial; therefore, the evaluation of this taxon was considered incomplete and not included in Table 1. Performance information on wild-collected taxa is highlighted in the sidebar on page 6; these taxa were not rated because they are not recommended for garden use.

In general, the meadow rues exhibited strong habits and good flower production in the full-sun test site. The lack of any serious pest or disease problems, combined with winter hardiness, contributed to high ratings for many plants. Eleven taxa received four-star good ratings for their overall performance, including *Thalictrum flavum* ssp. *glaucum*, *T. flavum* 'Illuminator', *T. kiusianum*, *T. lucidum*, *T. minus* 'Adiantifolium', *T. pubescens*, *T. rochebruneanum*, *T. rochebruneanum* 'Lavender Mist', *T. rochebruneanum* 'Purple

Table 1: Plant Characteristics and Performance Summary Ratings

Overall Rating	<i>Thalictrum</i>	Flower Color	Flower Size	Bloom Period	Flower Coverage ¹	Leaf Color ²	Plant Height	Plant Width
★★★★	'Elin'	lavender, yellow	½ in.	late Jun-mid Aug	good	purple/blue-green	96 in.	42 in.
★★	<i>actaeifolium</i>	lavender and white•	¾ in.	Aug-Sep	poor	bronze/green	34 in.	22 in.
★★★	<i>aquilegifolium</i>	pale lavender•	¾ in.	late May-late Jun	fair	blue-green	30 in.	20 in.
★★★★	<i>aquilegifolium</i> 'Purpureum'	lavender•	1 in.	mid May-late Jun	good	blue-green	42 in.	20 in.
★★★	<i>aquilegifolium</i> var. <i>album</i>	white•	¾ in.	mid May-mid Jun	fair	blue-green	33 in.	16 in.
★★	<i>delavayi</i>	lavender, yellow	½ in.	early to late Jul	poor	green	33 in.	14 in.
★★★★	<i>flavum</i> 'Illuminator'	yellow•	½ in.	late Jun-late Jul	fair	yellow/blue-green	49 in.	28 in.
★★★★	<i>flavum</i> ssp. <i>glaucum</i>	yellow•	½ in.	mid Jun-late Jul	good	blue-green	72 in.	30 in.
★★★	<i>flavum</i> ssp. <i>glaucum</i> 'True Blue'	yellow•	½ in.	early Jul-early Aug	good	blue-green	50 in.	26 in.
★★	<i>ichangense</i>	pale lavender•	½ in.	early Jun-early Jul	poor	bronze/green	10 in.	18 in.
★★★★	<i>kiusianum</i>	pink•	½ in.	late Jun-mid Aug	excellent	purple/green	5 in.	15 in.
★★★★	<i>lucidum</i>	pale yellow•	½ in.	late Jun-early Aug	excellent	green	72 in.	30 in.
★★★★	<i>minus</i> 'Adiantifolium'	yellow•	½ in.	mid Jun-late Jul	excellent	blue-green	61 in.	24 in.
★★★★	<i>pubescens</i>	creamy white•	½ in.	late Jun-early Aug	excellent	green	120 in.	45 in.
★★★★	<i>rochebruneanum</i>	lavender, yellow	½ in.	early Jul-Sep	good	purple/blue-green	72 in.	30 in.
★★★★	<i>rochebruneanum</i> 'Lavender Mist'	lavender, yellow	½ in.	early Jul-Sep	good	purple/blue-green	75 in.	26 in.
★★★★	<i>rochebruneanum</i> 'Purple Mist'	lavender, yellow	½ in.	early Jul-Sep	good	purple/blue-green	72 in.	30 in.

Overall Ratings: ★★★★★ good, ★★★ fair, ★★ poor.

•Floral display consists of conspicuous stamens only due to absent or insignificant sepals.

¹Flower coverage ratings: excellent 80-100%; good 60-80%; fair 40-60%; poor <40%.

²Emerging or early leaf color precedes the backslash, followed by the standard leaf color.



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Thalictrum lucidum

Photographed at Olbrich Botanical Gardens, Madison, WI by Richard Hawke

Thalictrum flavum ssp. *glaucum*

Richard Hawke

Thalictrum aquilegifolium

Mist', *T.* 'Elin' and *T. aquilegifolium* 'Purpureum'.

Thalictrum flavum ssp. *glaucum* (yellow meadow rue) was a robust, rhizomatous plant with stems spreading up to 6 feet from the original plot by the fourth year of the trial. The rhizomatous stems did not grow into a thicket but instead developed satellite plantlets nearby the original plants. Emerging leaves and young stems were purple, eventually changing to dusty blue-green in June. The yellow flowers, comprised of stamens only, were held in broad, 6-inch wide terminal inflorescences in June and July. Some repeat bloom in late August was noted in the lower leaf axils. Plant health commonly declined after flowering, so stems were regularly pruned to the ground at the end of August. Stem regeneration was robust, resulting in bushy mounds several weeks after pruning. Leaf miners caused slight cosmetic damage in 2001 and 2003 only. *Thalictrum flavum* ssp. *glaucum* 'True Blue' was comparable to yellow meadow rue in floral display and flower production, but its stems were typically uneven in height among the plants and often lodged early in the season.

The leaves of *Thalictrum flavum* 'Illuminator' emerged yellow with a bronze tint, eventually changing to blue-green as flower buds swelled in June. Stems remained upright throughout the bloom period, but were occasionally cut

back after flowering to rejuvenate plant health. A small amount of leaf miner damage was observed in 2002 and 2003, but was superficial and did not have an effect on plant health.

Thalictrum kiusianum (Kyushu meadow rue) was the smallest species in the trial, only 2 inches tall without flowers. Flower production was especially strong each year, smothering the green foliage in fuzzy pink flowers at peak bloom. Kyushu meadow rue remained healthy throughout the trial and performed better than the slightly taller *Thalictrum ichangense* in the environment of the test garden. No winter injury was observed, but like *T. ichangense*, it did not compete well with weeds early in the season.

Linear leaflets differentiated *Thalictrum lucidum* from other meadow rues in the trial. The bi- to tri-ternately compound leaves emerged purple, eventually changing to lustrous green. This species put on an outstanding show in bloom, with puffs of pale yellow flowers in pyramidal clusters up to 9 inches wide. The fluffy effect was due to clusters of prominent stamens subtended by tiny, insignificant sepals. *Thalictrum lucidum* had a robust habit with stems that remained upright all summer.

Thalictrum minus 'Adiantifolium' (lesser meadow rue) featured flowers with pendulous yellow stamens held in loose clusters above the foliage; the greenish

sepals were inconspicuous and abscised early. The floral effect was more textural than colorful due to the small size of the flowers and the openness of the inflorescences. The fine-textured foliage, resembling the fronds of maidenhair fern (*Adiantum*), emerged with a bronze cast before turning blue-green. Stems stayed upright during the bloom period, but typically declined late in the summer. In some years, stems were cut back in August and quickly regenerated into healthy foliar mounds. Lesser meadow rue had a slow-growing, rhizomatous habit but plants remained discrete during the trial period.

The trial plants of *Thalictrum pubescens* (tall meadow rue) were grown from wild-collected seed received from Mt. Cuba Center, Greenville, Delaware. Consequently, variation in habit, stem height and flower production was noted among the seedlings. In general, *T. pubescens* exhibited heavy flower production and robust habits with stiff stems. The creamy white flowers, comprised of stamens only, were produced on stem terminals and in lower leaf axils. The upper portion of the stems typically defoliated after flowering, thus creating an open effect in late summer. Stems were cut back twice in the trial, followed by a speedy regeneration of basal leaves.

Flowers of *Thalictrum rochebruneanum* (lavender mist or lavender



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Thalictrum 'Elin'

Richard Hawke

Thalictrum flavum 'Illuminator'

mist meadow rue) feature prominent lavender sepals surrounding a cluster of yellow stamens. The persistent and colorful sepals set this species apart from many of the other taxa in the trial. Leaves emerged purple, eventually fading to blue-green by late May. Lavender mist typically has a sparse or see-through quality to its habit. This trait was accentuated by the fact that the lush lower leaves present in the early season gradually turned yellow and dropped throughout the summer. Stems remained upright all summer with secondary bloom noted in the lower leaf axils into September.

There was no discernible difference in the floral traits and floral displays of *Thalictrum rochebruneanum*, 'Lavender Mist' and 'Purple Mist'. In addition, the cultivars emerged with purple leaves and were comparable to the species in size. Whereas the species was pest-free during the trial, 'Lavender Mist' and 'Purple Mist' had minor powdery mildew infections in 1999, 2001 and 2003. Seedlings of *Thalictrum rochebruneanum* and/or its cultivars were commonly observed in the test plots.

Thalictrum 'Elin' is a reputed hybrid between *T. rochebruneanum* and *T. flavum* ssp. *glaucum*, although it resembles the former species more than the latter. Flower color and size was comparable to *T. rochebruneanum* but 'Elin' bloomed slightly earlier each year; secondary

bloom was noted in the lower leaf axils later in the summer too. However, the new leaves remained purple longer than on lavender mist, beginning to fade when flower buds swelled in mid-June. The plant vigor of 'Elin' surpassed either of its parents, with stems ultimately reaching 8 feet tall. 'Elin' maintained a dense, bushy habit throughout the summer, and did not drop leaves and thin out like *T. rochebruneanum*. Severe powdery mildew was observed in 2001 and 2003; slight leaf miner damage was noted in most years but did not affect the ornamental quality of the plant.

The specific epithet and common name of *Thalictrum aquilegifolium* (columbine meadow rue) refer to the foliar resemblance to columbine (*Aquilegia*). Their pomponlike flowers are made up of pale lavender stamens held in broad inflorescences up to 6 inches wide. The flower color of 'Purpureum' was variable within the test group and only slightly darker than the species. The plants of 'Purpureum' were generally more robust and floriferous than *T. aquilegifolium* and *T. aquilegifolium* var. *album*. Flowers of var. *album* were actually very pale lavender, not pure white.

The vigor of *Thalictrum aquilegifolium*, including 'Purpureum' and var. *album*, was weakened by the cultural conditions of the test site; inconsistent soil moisture and full-sun exposure



Carol Freeman

Thalictrom aquilegifolium 'Purpureum'

Jen Van Wagener

Thalictrom rochebruneanum

resulted in rapid foliar decline after flowering. On the other hand, these meadow rues were the earliest to bloom so their premature decline may have been partially due to natural senescence, which was exacerbated by the conditions of the site. In addition, powdery mildew was a minor to moderate problem following the bloom period in all years of the trial.

Thalictrom actaeifolium (baneberry-leaf meadow rue) was one of three taxa that received a poor final rating. In this instance, the poor rating was due to low flower production, lack of plant vigor and excessive winter injury. The fuzzy flowers were made up of bicolored stamens with lavender filaments and white anthers, but were sparsely produced each year. Stems remained upright during the bloom period but became floppy soon afterward. Plants were weakened by crown damage in the winter of 1999-2000 and never fully recovered their health in subsequent years. In addition, seven plants were killed in the winter of 2002-03, leaving only one plant alive in the final year of the trial.

Thalictrom delavayi (Yunnan meadow rue) was the only taxon with a general lack of plant vigor attributed to poor establishment after planting. Poor health and a weakened condition during the first summer likely contributed to the death of seven of the eight plants over the winter of 1998-99. The remaining plant survived

for two more years, ultimately dying in the winter of 2000-01. Unfortunately, this taxon was not retested to determine if healthy plants would perform differently. Conversely, *T. delavayi* 'Hewitt's Double' was replanted and evaluated three times between 1998 and 2001. In each instance, all plants died during the subsequent winter after just one summer in the trial.

Thalictrom ichangense (Korean meadow rue) was the second shortest species in the trial, only 6 inches tall without flowers. The few-flowered inflorescences were sparsely produced each year, although repeat bloom was observed periodically throughout summer and into October. Pale lavender stamens provided the floral display because the sepals fell off soon after the flowers opened. The peltate leaves were held perpendicular to the stems, thus exposing silvery glaucous undersides. Stems were late to emerge in spring, so early season weeds often crowded out young shoots if the weeds were not removed promptly. Korean meadow rue received a poor overall rating because of low flower production and excessive winter injury. Many of the plants suffered serious crown damage in the winter of 2000-01, with additional plants killed in the winters of 2001-02 and 2002-03.

Summary

Although commonly recommended for shadier sites, a majority of the meadow

ruess in the study thrived in full sun and are recommended for gardens with similar cultural conditions. Eleven different meadow ruess, from tiny *Thalictrum kuisianum* to lofty 'Elin', received top honors—a four-star good rating based on higher flower production, superior plant habits, winter hardiness and good plant health. Conversely, *Thalictrum aquilegifolium* is not recommended for full sun unless consistent soil moisture is provided. Meadow ruess are easy-care perennials for a variety of garden uses, showing exceptional diversity in their flowers, foliage and habits. They offer gardeners tempting design potential because of their versatility.

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Wild-collected *Thalictrum* Species



Thalictrum simplex

The Chicago Botanic Garden evaluated eight *Thalictrum* species collected in the wild during three plant exploration trips to Russia between 1993 and 1997. These species were collected as seed in their native habitats in the Altai Mountains of Central Siberia, the Lake Baikal region of Siberia and the Far East of Russia. *Thalictrum altaicum* (syn. *T. schischkini*), *T. minus* and *T. simplex* were collected in the Altai Mountains in 1993 and evaluated from 1995 through 1999; *Thalictrum appendiculatum* (syn. *T. minus* ssp. *minus*), *T. baicalense* and *T. foetidum* were collected in the Lake Baikal region in 1994 and evaluated from 1995 through 1999; and *Thalictrum amurense* (syn. *T. flavum* ssp. *flavum*) and *T. tuberiferum* were collected in the Russian Far East in 1997 and evaluated from 1999 through 2003. These species were grown under the same cultural conditions as the meadow ruess in the second trial; that is, full sun, well-drained soil, pH of 7.4 and protection from deer browsing.

The wild-collected species were evaluated for the same criteria as the commercially available meadow ruess, but their habits, growth rates and

reproductive characteristics were carefully observed to ascertain weediness, which could potentially lead to invasiveness. A number of the taxa were readily adaptable to garden culture but had limited ornamental appeal and/or had vigorously spreading habits. In the end, none of the wild-collected species in the trial are recommended for garden use due to weedy habits, lack of ornamental traits or poor performance. In addition, commercial sources in the United States were not found for many of these plants.

Floral displays, specifically flower color, were inferior when compared to any of the cultivated taxa in the trial. These species generally had nondescript yellow or purplish flowers. *Thalictrum amurense*, *T. appendiculatum*, *T. simplex* and *T. tuberiferum* exhibited exceptionally heavy flower production each year. On the other hand, the floral display of *T. altaicum*, *T. baicalense* and *T. foetidum* was consistently recorded as unremarkable or nonornamental due to low production and/or inferior color.

Species with rhizomatous plant habits were variably described in the trial as aggressively spreading, weedy or potentially invasive, including *Thalictrum altaicum*, *T. amurense*, *T. appendiculatum* and *T. tuberiferum*. In addition, *T. amurense*, *T. appendiculatum* and *T. tuberiferum* were observed to reseed readily in the test site. *Thalictrum foetidum* was severely injured during the winter of 1997-98 and all remaining plants died during the following winter. *Thalictrum minus* was in poor health when planted in 1995 and struggled through two growing seasons before dying during the winter of 1996-97. *Thalictrum altaicum* was healthy for two years but died out completely in the winter of 1996-97. None of the taxa was retested.

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