

# 2000 Herbaceous Perennial Trial Results

<http://www.florifacts.umn.edu/>

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## **Introduction.**

As herbaceous perennials become increasingly popular with the gardening public, the rush to provide such plant material for the market often perpetuates the misnomer of winter hardiness. Many, but not all, perennial breeder/producer/distributor companies initiate trialing in northern zones. Frequently these only include Z5-Z6 in their scope. Other new releases from herbaceous perennial breeders are listed with zone-specific hardiness that was derived from published information for the original species. Usually the hardiness of these new releases is never scientifically validated, over years, prior to release due to the rapid pace and competitiveness of the annual bedding and perennial plant markets.

Unlike annuals that complete their life cycle without the need to over-winter, winter hardiness of herbaceous perennials is of particular importance to home gardeners and other consumers. The name perennial denotes the assumption that the product will be winter-hardy and flower year-after-year. Consumers have become wary after disappointing performance of products that did not meet the minimum expectations. For instance, *Gaura lindheimeri* 'Siskiyou Pink', 'Whirling Butterflies' are hardy to Z6 yet every year consumers find these being retailed as "hardy" plants in Z3-4 regions; most "hardy mums" sold on the market are also not hardy north of Z5, with the notable exception of select releases from the University of Minnesota breeding program.

The annual bedding plant industry companies test material at their secure trial sites, as well as in the national network of All America Selections (AAS) testing locations. Such national testing provides breeder, producer, distributor, grower, and retailer companies with data to select plant material with wide adaptation across the nation or specific regions, e.g. the south (heat/drought tolerant plants) or north (cool crops for fall/spring sales). An organized, national test system for herbaceous perennial plants does not exist. AAS does not have specified categories for herbaceous perennials. If they are trialed in AAS, they are evaluated as "annualized" perennials only, i.e. their ability to flower in the first year from seed/cuttings with at least equal performance against varietal standards or comparisons. Since AAS trial sites are replanted each year, no winter survival over years is possible. Individual companies may have organized public and/or private trialing of perennials. For instance, Blooms of Bressingham Perennials™ N.A. (Lapeer, MI) conducts performance evaluations and hardiness tests for each year's new releases. This provides a gauge of performance/hardiness across various regions.

In 1998 John Erwin, Mary Lerman, and Steve Poppe initiated a new research direction for herbaceous perennial testing—combining breeding and crop physiology. The trial sites were chosen and initial plantings were done that year. In 1999, Neil Anderson joined the team as an herbaceous perennial breeder. The program focuses on improving perennials through research in plant breeding, production, use, and testing in replicated trials at multiple locations. Critical information on winter hardiness in Z3/Z4 is an additional criteria in the research. Such will provide this rapidly growing sector of the ornamental industry with a strong base of plant materials and information to maintain the strength and growth of the garden perennial market.

### **Plant Evaluation Sites.**

Three sites have been established with high public visibility for exposure to consumers and Minnesota/national commercial floricultural and nursery growers/researchers. All sites have sun and shade conditions. Signage identifies the plant materials and the companies donating the new cultivars. Grower and home-gardener field days during the peak flowering season exposes the local industry and consumers to the new introductions for on-site evaluation. The gardening public and growers can also rate the various plant materials on a yearly basis.

The three testing sites are as follows:

1. [Department of Horticultural Science, University of Minnesota](#), St. Paul, MN. USDA Z4 (Winter Hardiness Zone); Z5 (Heat Zone). At this site plant material is planted in full sun.
2. [Lake Harriet Gardens, Minneapolis Park and Recreation Board](#), Minneapolis, MN. USDA Z4 (Winter Hardiness Zone); Z5 (Heat Zone). This site includes both full sun and partial shade plantings.
3. [West Central Research and Outreach Center, University of Minnesota](#), Morris, MN. USDA Z3/4 (borderline between Z3 and Z4 for Winter Hardiness); Z4 (Heat Zone).

This site includes both full sun and partial shade plantings.

It is anticipated that a fourth site (Z3) will be added in 2001 to complete the trialing throughout Minnesota.

### **Plant Material.**

Select genera have been designated for testing at all three sites, based on input from northern consumers, growers, and other horticultural professionals. Additional genera are included as new releases surface with market potential that may not have been scientifically trialed for winter hardiness.

The Perennial Plant of the Year, as determined by the Perennial Plant Association, is included in the trials, beginning with the year 2000. The Perennial Plant of the Year for 2000 is *Scabiosa columbaria* 'Butterfly Blue'.

Plant material of particular interest are new cultivars/varieties for which winter hardiness is unknown or that will be of interest to consumers and the ornamental industry. When available, four plants per accession (replications) are planted at each site.

Plant material trialed in the sites is not propagated nor distributed to interested parties. Rather, all parties are directed to contact their distributors or the original source company (breeder/producer) directly to obtain the plant material.

### **Weather Conditions.**

Data on monthly high, low, and average temperatures, as well as precipitation totals are included for each site. This data is generated by the University of Minnesota, Department of Soil, Water, and Climate and is available on their website:

<http://climate.umn.edu/climatology.htm>

### Evaluation Criteria.

All plants remain at each site for three years. During each growing season, the herbaceous perennials are evaluated for various criteria. Of particular importance is winter hardiness and overall performance during and after establishment at the trial sites. The following criteria are used for evaluating the germplasm:

1. Winter hardiness
2. Disease and/or pest susceptibility, tolerance, or resistance.
3. Cultural responses to cutback, growback.
4. Plant morphology: height x width measurements, stem strength.
5. Flowering: time of 100% flowering, duration.
6. Reseeding or invasiveness: tendency to form asexual and/or sexual propagules, their dissemination, and competition with the parental source.
7. Floriculture and Nursery Industry ratings: Used to make the top three Minnesota Select Perennial Winners.

### Year Planted.

Material is received and planted from plugs, liners, or nursery containers in the spring (May-June) of each year. All plots are irrigated to promote establishment. No fall plantings occur.

98=Plants were planted in 1998. Thus, data included in this report is the third year of evaluation for this material; data for winter hardiness is the second year recorded. Data is pooled over replications. In some instances, more than n=4 replications were included at one site. Data from Z4 (St. Paul, Minneapolis) sites are pooled.

99=Plants were planted in 1999. Thus, data included in this report is the second year of evaluation for this material.

2000=Plants were planted during 2000. Any data included is not indicative of the accessions full potential after establishment and over-wintering. Many did not flower during the first year.

### % Winter Survival.

% winter survival = [number of reps. surviving] / [total number of reps. per site] x 100.  
Calculated only for those plants that have over-wintered through  $\geq 1$  winter period.

### Date of 100% Flowering.

Date when 100% of the replications at each site were in flower. If material reflowers, that is noted in the comments section.

### Flower Stalk Strength.

Measured on a scale of 1-5, with 1-2 meaning weak/lodging; 3-5 denoting increasingly stronger stems.

### Floral Display.

An indication of floral coverage over the plant surface area.

Exc=Excellent, 75-100% coverage

Gd=Good, 50-75% coverage

Fr=Fair, 25-50% coverage

Pr=Poor, <25% coverage

### Height x Width.

Measured in centimeters (cm) at flowering.

### Reseed or Invasive.

In second-year plantings, indicates seedlings or vegetative propagules surrounding original plants and tendency to become invasive (spreading in the trial gardens). If the cultivars were very invasive, the seedlings/veg. propagules had achieved 100% cover in the plot and the original clones were difficult, if not impossible, to identify.

### Comments.

Additional notes recorded during the observational year.

## **2000 Results.**

Herbaceous perennial trial reports for 1999- are available on the web at: <http://www.florifacts.umn.edu/> This is the second year of reporting winter hardiness and performance evaluations of herbaceous perennials in replicated trials ( $\geq 4$  plants/site) in USDA Z3/4 and Z4. Before 1999 and the arrival of the herbaceous perennial breeder, the first trialing year had several difficulties. In some instances, insufficient numbers of perennials were received for planting at all three sites. As a result, some plantings at Morris (Z3/4) did not occur and data may be missing for this site for various accessions.

The weather conditions during the winters of 1998 and 1999 were extremely mild and snow cover was minimal. During the 1998 evaluation season (1998 calendar year), St. Paul & Minneapolis (Z4) had a high of 88.4F and a low of 10.7F, with a maximum precipitation of 4.6" (per month). Morris (Z3/4) had a high of 82F and a low of 4.3F with a maximum of 5.7"/month precipitation. During the 1999 evaluation period, St. Paul & Minneapolis (Z4) had a high of 96F and a low of -17F, with a high of 10.3"/month. Morris (Z3/4) had a high temperature of 94F and a low of -21F, with a maximum precipitation of 4.9"/month. During the year 2000, St. Paul & Minneapolis (Z4) experienced a high of 94F and a low of -13F with a maximal precipitation of 6.3"/month. Morris (Z3/4) had a high of 97F and a low of -20F, while the maximum precipitation was 4.5"/month. The winter season of 2000-2001 has commenced as a more typical season with snow cover and colder temperatures.

As a consequence of the recent winters, the sites had less than adequate snow cover. In Morris, with windier conditions, many of the trial gardens were completely windswept of snow when the colder temperatures occurred. This may have exposed the crowns to lower soil temperatures than would occur with adequate snow cover or the crowns may have severely desiccated. This was particularly problematic in the shade garden area, potentially causing higher winter kill in *Heuchera*, *x Heucherella*, and *Tiarella*.

### **2000 Minnesota Select Top Three Perennials.**

Several perennials had superior performance during the 2000 season. The most popular perennials with  $\geq 62\%$  winter hardiness and superior performance throughout the season are listed below. To obtain these cultivars, contact your local retailer or wholesale distributor.

1. *Agastache rupestris* '**Blue Fortune**'. This is the hardiest (70-100%) *Agastache* or Mexican Mint trialed at all three sites. The plant shape, flower stalk strength, floral display, vigor, lack of disease, and flowering make this a stunning backdrop in any perennial bed. Best to keep this back from major garden pathways to avoid the hordes of bees that are attracted by its flowers.
2. *Dianthus chinensis* '**Bouquet Purple**'. This seed-propagated *Dianthus* is useful as either a perennial or annual. The long stem lengths make it ideal for floral arrangements and it is preferable to cut the stems, else deadheading becomes a necessity. It will tend to stop flowering briefly if it is not deadheaded. Since 'Bouquet Purple' tolerates cooler weather, we had flowering stems up until a the first freeze. This cultivar achieved 75% winter hardiness at all three sites. It does well in mass plantings and the purple flowers are attractive cut flowers. Despite the long stems, no lodging occurred and it reflowered continuously.
3. *Monarda didyma* '**Petite Delight**'. This dwarf cultivar is a delightful trend in bee balms and can be placed in the garden as border plantings. The mid-season flowering and superior flower stalk strength & floral display removed the occasional lodging frequently seen with the taller types. 'Petite Delight' has 100% winter hardiness, thanks to the breeding efforts of the Morden Experiment Station (Morden, Canada).

### **Hardy perennials with superior performance.**

For those accessions planted **during 1998-1999 only**, the following herbaceous perennials were found to have an average of  $\geq 62\%$  winter hardiness, high rankings in floral display, stem strength, and minimal invasiveness. These are highlighted with a dark background on the attached 2000 Trial Data Tables.

1. *Agastache rupestris* 'Blue Fortune' **2000 Minnesota Select Perennial.**
2. *A. rupestris* 'Snow Spike'
3. *Aquilegia x hybrida* 'Songbird Mix'
4. *Artemisia dracunculus*
5. *A. lactiflora*
6. *A. ludoviciana* 'Silver Queen'
7. *A. ludoviciana* 'Valerie Finnis'
8. *A. schmidtiana* 'Silver Mound'
9. *A. sp.* 'Huntington'
10. *Asclepias incarnata* 'Ice Ballet' **1999 Minnesota Select Perennial.** Note: While it had only 62% winter survival, it's tendency to reseed filled in the areas where the original clones had been lost.
11. *Baptisia australis*
12. *Bergenia cordifolia*
13. *Coreopsis grandiflora* 'Early Sunrise'
14. *Dianthus chinensis* 'Bouquet Purple' **2000 Minnesota Select Perennial.**

15. *Echinacea purpurea* 'Bravado'
16. *Filipendula vulgaris*
17. *Fragaria* sp. 'Pink Panda'
18. *Fragaria* sp. 'Red Ruby'
19. *G. macrorrhizum* 'Spessart'
20. *G. macrorrhizum* 'Ingwersen's Variety'
21. *Heliopsis helianthoides* 'Bressingham Double'
22. *Heliopsis helianthoides* 'Lorraine Sunshine'
23. *Hemerocallis x hybridus* 'Lady Emily'
24. *Hemerocallis x hybridus* 'Lady Eva'
25. *Hemerocallis x hybridus* 'Lady Scarlett'
26. *Hemerocallis x hybridus* 'Miss Amelia'
27. *Hemerocallis x hybridus* 'Miss Mary'
28. *Hemerocallis x hybridus* 'Miss Mary Mary'
29. *Hemerocallis x hybridus* 'Miss Tinkerbell'
30. *Hylotelephium x hybridum* 'Autumn Joy' (formerly *Sedum*)
31. *Hylotelephium x hybridum* 'Frosty Morn' (formerly *Sedum*)
32. *Hylotelephium x hybridum* 'Vera Jameson' (formerly *Sedum*)
33. *Hylotelephium spectabile* 'Brilliant' (formerly *Sedum*) **1999 Minnesota Select Perennial.**
34. *Monarda didyma* 'Marshall's Delight'
35. *Monarda didyma* 'Petite Delight' **2000 Minnesota Select Perennial**
36. *Nepeta x faassenii* 'Blue Wonder'
37. *N. x faassenii* 'Dropmore'
38. *N. x faassenii* 'Walker's Low'
39. *N. sibirica* 'Souvenir d'Andre Chaudron'
40. *Perovskia abrotanoides* 'Filigran'
41. *Phlox maculata* 'David'
42. *Phlox maculata* 'Eva Cullum'
43. *Salvia pratensis* 'Indigo'
44. *Stachys byzantina* 'Helene von Stein'
45. *Verbascum x hybridum* 'Southern Charm'

**Hardy perennials with inferior performance.**

For those accessions planted **during 1998-1999 only**, the following herbaceous perennials were found to have an average of  $\geq 62\%$  winter hardiness, but low rankings in floral display, stem strength, or other characters.

1. *Centaurea montana*
2. *Echinacea* sp. 'Cygnet White'
3. *E. pallida*
4. *Geranium x cantabrigiense* 'Biokovo'
5. *G. x cantabrigiense* 'Cambridge'
6. *G. x cantabrigiense* 'Karmina'
7. *Hosta x hybrida* 'Francee'
8. *Hylotelephium x hybridum* 'Robustrum' (formerly *Sedum*)
9. *H. x hybridum* 'Rosy Glow' (formerly *Sedum*)

10. *H. spectabile* 'Indian Chief' (formerly *Sedum*)
11. *Lilium x hybridum* 'Salmon'
12. *Nepeta x faassenii* 'Six Hills Giant'
13. *N. subsessilis* 'Blue Whisper'
14. *Perovskia abrotanoides* 'Longin'
15. *Phlox carolina* 'Miss Lingard'

### **Border-line Hardy Perennials.**

Based on the data collected from plantings during 1998-1999 only, the following perennials were found to have minimal survival, i.e.  $\leq 50\%$  survival in both Z3/4 and Z4 (unless otherwise noted). As such, we are classifying these as border-line winter hardy perennials. With this low winter survival rating, gardeners would be advised that mulching may be necessary to ensure minimal survival and, **more likely**, these should be treated as annuals.

1. *Achillea millefolium*
2. *Agastache mexicana* 'Mauve Beauty' Z4
1. *A. rugosa* 'Honey Bee Blue'
3. *A. rupestris* 'Pink Panther' Z4
4. *Artemisia stelleriana* 'Silver Brocade' Z3/4
5. *Asclepias curassavica*
6. *A. incarnata*
7. *A. tuberosa* 'Hello Yellow'
8. *Aster nova-angliae* 'Alma Potchke'
9. *Baptisia lactea*
10. *Campanula car[at]oca* 'Chettle Charm'
11. *Digitalis lantana*
12. *Echinacea sp.* (white)
13. *Erigeron sp.* 'Prosperity'
14. *Eryngium sp.* 'Sapphire Blue'
15. *Euphorbia x martinii*
16. *Geranium sp.* 'Bressingham's Delight'
17. *Helenium autumnale* 'Coppelia'
18. *Helianthemum x hybridum* 'Henfield Brilliant'
19. *Hemerocallis x hybridus* 'Lady Lucille'
20. *H. x hybridus* 'Miss Victoria'
21. *Heuchera x hybrida* 'Champagne Bubbles'
22. *H. x hybrida* 'Crimson Curls'
23. *H. x hybrida* 'Harmonic Convergence'
24. *H. x hybrida* 'Rosemary Bloom'
25. *x Heucherella sp.* 'Quicksilver'
26. *x Heucherella sp.* 'Viking Ship'
27. *Hylotelephium x hybridum* 'Larinem Park' (formerly *Sedum*)
28. *H. x hybridum* 'Mohrchen' (formerly *Sedum*)
29. *Kniphofia sp.* 'Cobra'
30. *Lavandula angustifolia* 'Lavender Lady'
31. *Lilium x hybridum* 'Spotted Yellow'

32. *L. x hybridum* 'Orange'
33. *Perovskia abrotanoides* 'Filigran'
34. *Persicaria amplexicaule* 'Taurus'
35. *Phlox maculata* 'Franz Schubert'
36. *P. maculata* 'Miss Wilma'
37. *P. maculata* 'Natasha'
38. *P. maculata* 'Shortwood'
39. *Polemonium caeruleum* 'Brise d'Anjou'
40. *Salvia greggii* 'Desert Blaze'
41. *Stachys byzantina* 'Cotton Ball'
42. *S. byzantina* 'Silver Carpet'
43. *Tiarella x hybrida* 'Mint Chocolate'
44. *T. x hybrida* 'Ninja'
45. *Veronica x hybrida* 'Blue Bouquet'

### **Non-hardy Herbaceous Perennials.**

The following perennials (**planted during 1998-1999 only**) were found to be non-hardy in Z3/4 and Z4 trial sites (unless noted otherwise below), i.e. 0% winter hardiness. These should be treated as annuals in northern gardens and not as perennials that can be expected to survive the winter.

1. *Agastache barberi* 'Firebird'
2. *A. barberi* 'Tuti-Fruti'
3. *A. rupestris* 'Apricot Surprise'
4. *Artemisia lactiflora* 'Guizho'
5. *Digitalis x mertonensis*
6. *D. purpurea* 'Alba'
7. *Echinacea sp.* (purple)
8. *Geranium x cantabrigiense* 'Patricia'
9. *G. x oxonianum* 'Claridge Druce'
10. *G. x oxonianum* 'A.T. Johnson'
11. *G. sp.* 'Bressingham Purple'
12. *G. sp.* 'Bressingham's Delight'
13. *Helleborus niger*
14. *H. odoratus*
15. *Heuchera x hybrida* 'Autumn Haze'
16. *H. x hybrida* 'Green Spice'
17. *H. x hybrida* 'Strawberry Candy'
18. *H. x hybrida* 'Veil of Passion'
19. *H. x hybrida* 'Velvet Night'
20. *H. sanguinea* 'Bressingham Hybrid'
21. *x Heucherella hybrida* 'Burnished Bronze'
22. *x Heucherella hybrida* 'Cinnamon Bear'
23. *x Heucherella hybrida* 'Kimono'
24. *Kniphofia sp.* 'Bressingham Comet'
25. *K. sp.* 'Shining Sceptre'
26. *Persicaria bistorta*

27. *Phlox maculata* 'Miss Karen'
28. *P. pilosa* 'Eco Happy Traveler'
29. *Tiarella x hybrida* 'Crow Feather'
30. *T. x hybrida* 'Tiger Stripe'

Consult the following [summary table](#) to determine the performance of the herbaceous perennials of interest to you. Data from 2001 will either further substantiate or modify the recommendations made above.

Please feel free to visit any or all of the testing sites during the 2001 growing season!

### **The Summary Table for 2000 is Available at:**

<http://www.florifacts.umn.edu/2000perennialtable.pdf>

### **Legend for Tables.**

#### **Sources of Perennials.**

AOP=American Ornamental Perennials  
BB=Blooms of Bressingham  
BIB=Blue Bird Nursery  
BLN=Blooming Nursery  
BN=Bailey Nursery  
BP=Bluestone Perennials  
BSC=Ball Seed Co.  
GL=Green Leaf Enterprises  
H=Heronwood Nursery  
HC=Horticulture Club, University of Minnesota  
NC=North Creek Nurseries  
NG=Niche Gardens  
PAS=PanAmerican Seed Co.  
PPP=Pride of Place Plants  
SG=Skagit Gardens  
SN=Siskiyou Nursery  
SO=Shady Oaks Nursery  
TN=Terra Nova  
UCT=University of Connecticut  
VB=van Bourgondien  
WFF=White Flower Farm  
WG=Walters Garden