

## Plant Evaluation Notes

# A Comparative Study of Cultivated *Stachys*

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Soft silvery leaves and a low, spreading habit are desirable traits of lamb's ears (*Stachys byzantina*) that contribute to its popularity in gardens everywhere. Perhaps less common, but equally wonderful, are its green-leaved cousins, big betony (*S. macrantha*) and wood betony (*S. officinalis*). Betony is a name commonly applied to *Stachys* species with green leaves and showy flowers, although lamb's ears are sometimes called woolly betony. These two types of *Stachys* are so unlike in floral display and foliar character that, at casual glance, it is easy to miss their relationship.

*Stachys* is in the mint family (Lamiaceae) and features the distinctive familial traits of bilabiate (two-lipped) flowers, opposite leaves and square stems. The arrangement of its flowers in verticillasters (false whorls) is a trait that *Stachys* shares with a number of its kin

including *Nepeta*, *Phlomis* and *Salvia*. *Stachys* bears its pink, purple, red, yellow or white blossoms in many-flowered verticillasters on spikes above the foliage. Cultivated *Stachys* are informally divided into two groups based on floral display, foliage and plant habit. One group includes *S. byzantina* and *S. thirkei*, which have silvery to gray-green, woolly leaves in a sprawling mat of rosettes. Their small flowers are mostly hidden by the fuzzy calyces or the cultivars rarely bloom at all. In contrast, *S. macrantha*, *S. officinalis* and *S. monieri* produce showy spikes of flowers above bushy mounds of rugose (wrinkled) green leaves. Many *Stachys* commonly have crenate (scalloped) leaf margins.

*Stachys* are generally easy-to-grow perennials for moist, well-drained soils in full sun to light shade. Good drainage in summer and winter is essential for the

health and longevity of *S. byzantina* and other woolly-leaved species. Their pubescent leaves can trap moisture from high humidity, excessive rain or overhead irrigation causing foliar rot or meltout. The health of lamb's ears tends to decline during flowering, but deadheading regenerates leaves and improves plant vigor.

Lamb's ears is a great plant for edging beds and softening walks, or massed as a ground cover, or as an accent in the border

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*Stachys macrantha* 'Superba'

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and rock garden. Its silvery leaves are perfect foils for plants with hot- or cool-colored blossoms. Conversely, betonies bring a casual formality to the border, herb garden, cottage garden or meadow. Their glowing purple spikes stand like sentinels in the midsummer garden.

### The Evaluation Study

The Chicago Botanic Garden (USDA Hardiness Zone 5b, AHS Plant Heat-Zone 5) evaluated 22 taxa of *Stachys* from 1998 through 2004. The goal of the comparative trial was to identify outstanding *Stachys* through an assessment of their ornamental traits, disease and pest resistance, cultural adaptability and winter hardiness.

All plants 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. The spent flowers of *Stachys byzantina* were regularly removed; whereas, other taxa were deadheaded in alternate years to observe their repeat flowering capacity. 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 *Stachys* included the collection of data on ornamental traits, including floral display, leaf color, habit and plant size; cultural adaptability to soil and environmental conditions; disease and pest problems; and winter hardiness. Final ratings are based on flower production, plant health, habit quality and winter injury; however, flower production was not factored into the final ratings for the *S. byzantina* group because of the sporadic to nonflowering aspect of some cultivars. Two taxa were eliminated before the trial ended. *Stachys byzantina* 'Helen von Stein' is a synonym of 'Big Ears'; thus, redundant in the study. *Stachys palustris* was planted in May 2000 but was removed the following year when shoots were observed sprouting all over the test plot and spreading into the surrounding

turf. Plant traits and evaluation specifics for the 20 taxa that completed the trial are shown in Table 1.

*Stachys byzantina* and cultivars featured thick woolly leaves with some variation in color, size and degree of pubescence noted. The pale silvery green leaves of 'Big Ears' and 'Wave Hill' were less pubescent and typically one inch longer and wider than the species. 'Cotton Boll', 'Primrose Heron' and the species had similar-sized leaves; however, 'Primrose Heron' had lime-yellow leaves that eventually faded to gray-green. The leaves of 'Silver Carpet' were shorter and narrower than the species but the same silvery color. The cultivars generally had dense mat-forming habits, but 'Primrose Heron' was more clumping than spreading. Repeated winter injury and slow regeneration of stems each spring contributed to the less vigorous habit of 'Primrose Heron'.

Flower production and floral display varied widely among the *Stachys byzantina* cultivars. In general, the flowers were small and partially hidden by the fuzzy calyces; however, 'Cotton Boll' is a sterile form, with the flower clusters modified into fuzzy balls along the spike. 'Big Ears' and 'Silver Carpet' are often listed as nonflowering, but both produced a few floral stems in one year

only. Despite the fact that 'Wave Hill' produced some flowering stems in each year of the trial, it was essentially the same plant as 'Big Ears' in all other traits. The heavy flower production exhibited by *S. byzantina* caused a severe decline in plant health resulting in stem dieback. Beginning in the third year of the trial, floral stems were routinely removed before flowering ended in an effort to maintain plant health.

*Stachys thirkei* looks like a miniature lamb's ears, with small, felted gray-green leaves. Unfortunately, it did not perform as well as *S. byzantina*. The plants thrived in the early trial years despite significant crown injury during the first winter of 1998-1999. Plants quickly recovered in 1999 but suffered additional damage in the winter of 1999-2000. Wet weather in the summer of 2000 further weakened the remaining plants, which eventually died during the winter of 2000-2001.

The small, green leaves of *Stachys discolor* were somewhat intermediate between lamb's ears and betony, being rugose above and woolly gray beneath. It had the largest flowers and was the only betony in the trial with yellow flowers. *Stachys discolor* had a similar habit to lamb's ears but was not a vigorously spreading plant. Plants were healthy and floriferous

**Table 1:** Plant Characteristics and Performance Summary Ratings

Overall Rating	<i>Stachys</i>	Flower Color	Flower Length	Bloom Period	Flower Coverage <sup>1</sup>	Foliage Color	Plant Height <sup>2</sup>	Plant Width
★★★★★	<i>byzantina</i>	purple	½ in.	mid Jun-mid Aug	60-80%	silvery green	9 in./30 in.	26 in.
★★★★★	<i>byzantina</i> 'Big Ears'	does not flower▲				silvery green	14 in.	30 in.
★★★★★	<i>byzantina</i> 'Cotton Boll'	silvery, fuzzy	n/a	early Jul-mid Aug	80-100%	silvery green	10 in./18 in.	30 in.
★★★★	<i>byzantina</i> 'Primrose Heron'	purple	¼ in.	early Jul-mid Aug	<20%	lime-yellow	9 in./16 in.	20 in.
★★★★★	<i>byzantina</i> 'Silver Carpet'	does not flower▲				silvery green	8 in.	30 in.
★★★★★	<i>byzantina</i> 'Wave Hill'	purple	½ in.	early Jul-late Aug	<20%	silvery green	12 in./32 in.	30 in.
★★★★★	<i>discolor</i>	pale yellow	1½ in.	early Jun-late Jul	60-80%	green	6 in./10 in.	18 in.
★★★★	<i>macrantha</i>	purple-pink	1 in.	early Jun-early Aug*	20-40%	green	12 in./18 in.	24 in.
★★★★★	<i>macrantha</i> 'Robusta'	purple	1 in.	early Jun-early Aug*	80-100%	green	18 in./24 in.	26 in.
★★★★★	<i>macrantha</i> 'Superba'	purple	1 in.	mid Jun-early Aug*	80-100%	green	24 in./27 in.	28 in.
★★★★★	<i>maxima</i>	purple	½ in.	late Jun-late Aug*	80-100%	green	9 in./18 in.	18 in.
★★★★★	<i>minor</i>	purple	½ in.	late Jun-late Aug*	80-100%	green	9 in./16 in.	20 in.
★★★★	<i>monieri</i>	pink	½ in.	early Jul-mid Aug*	40-60%	green	6 in./12 in.	20 in.
★★★★★	<i>monieri</i> 'Hummelo'	violet	½ in.	mid Jun-early Aug*	80-100%	green	12 in./24 in.	20 in.
★★★★	<i>monieri</i> 'Saharan Pink'	pink two-tone	½ in.	early Jul-late Aug	40-60%	green	8 in./14 in.	18 in.
★★★★★	<i>officinalis</i>	purple	½ in.	mid Jun-mid Aug*	80-100%	green	12 in./30 in.	30 in.
★★★★★	<i>officinalis</i> 'Alba'	white	½ in.	mid Jun-early Aug*	80-100%	green	12 in./24 in.	26 in.
★★★★	<i>officinalis</i> 'Dwarf White'	white	½ in.	late Jun-late Aug*	40-60%	green	3 in./7 in.	14 in.
★★★★★	<i>officinalis</i> 'Rosea'	pink	½ in.	mid Jun-early Aug*	60-80%	green	12 in./28 in.	27 in.
★★	<i>thirkei</i>	magenta	¾ in.	early Jun-mid Jul	20-40%	gray-green	3 in./14 in.	24 in.

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

<sup>1</sup>Flower coverage ratings: excellent 80-100%; good 60-80%; fair 40-60%; poor <20%.

<sup>2</sup>First measurement is height to top of foliar mound; second measurement is full height including flowering stems.

▲Plants produced flowering stems in one out of seven evaluation years.

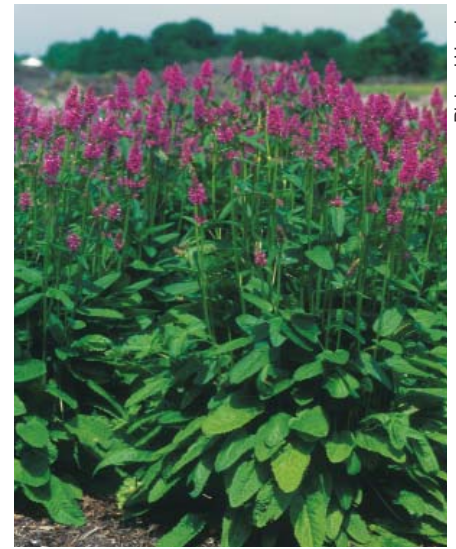
\*Repeat flowering was observed in each year of the trial regardless of whether or not plants were deadheaded.



Photographed at Olbrich Botanical Gardens by Richard Hawke

*Stachys byzantina* 'Big Ears'

Photographed at Heronswood Nursery by Richard Hawke

*Stachys byzantina* 'Cotton Boll'

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*Stachys monieri* 'Hummelo'

each year of the trial but did not thrive in the test garden.

Overall, the green-leaved betonies got high marks for floral display, plant health and robust habits, with *Stachys monieri* 'Hummelo' receiving the top rating. Unlike *S. byzantina*, flower production was an important trait in determining final ratings for this group. *Stachys macrantha* 'Robusta' and 'Superba' had darker purple flowers and were more robust than the species. These cultivars were similar in appearance but 'Superba' was 6 inches taller and bloomed a week later than 'Robusta'. Their dark green leaves remained healthy and ornamental throughout the summer. *Stachys macrantha* received a fair rating because of low flower production and a weak habit. *Stachys macrantha* is similar to *S. officinalis* and *S. monieri* in general appearance but is bolder-textured due to larger leaves and flowers.

Consistently heavy flower production, healthy foliage and a uniform habit contributed to the excellent rating for *Stachys monieri* 'Hummelo'. 'Hummelo' looked much like *S. officinalis* in leaf and habit but had a different flower color and a slightly more compact flower head. *Stachys monieri* 'Saharan Pink' was grown from seed, so variations in flower color and habit were observed among the plants. *Stachys monieri* and 'Saharan Pink' were inferior to 'Hummelo' due to low flower production and variable habits and plant sizes.

*Stachys officinalis* is reminiscent of *S. macrantha* but has narrower leaves and smaller flowers in dense clusters. 'Alba' and 'Rosea' were comparable in habit, plant size and flower production to the species, although 'Rosea' typically produced fewer

flowers. 'Dwarf White' received good ratings in the first few years of the trial, but diminishing plant vigor over the course of the trial eventually resulted in a lower rating. *Stachys minor* and *S. maxima* were the same plant in the trial and are likely only compact selections of *S. officinalis*. *Stachys minor* is listed as a variety of *S. monieri* in the RHS Plant Finder but no reference was found for *S. maxima*. Despite their uncertain identity, both species were exceptionally floriferous plants with compact habits.

There was no consistent pattern of winter injury noted in the trial, except for *Stachys byzantina* 'Primrose Heron', which suffered crown damage each winter between 1999 and 2004. The other lamb's ears with crown damage in more than one year were 'Big Ears' (1999, 2003), 'Cotton Boll' (1999, 2003) and 'Silver Carpet' (1999-2001, 2003). Even with minor losses from excessive winter soil moisture, all of the cultivars of *S. byzantina* grew well, including 'Primrose Heron'. Each spring 'Big Ears' recovered quickly from winter injury to make a full ground cover; whereas, the other cultivars were slower to regenerate, sometimes resulting in open plots into midsummer.

Plant health was generally good for all taxa, but occasional health issues included minor chlorosis in one or more years on *Stachys macrantha* and *S. macrantha* 'Robusta'; and crown meltout caused by excessive moisture in the plots of *S. byzantina*, *S. byzantina* 'Cotton Boll' and *S. thirkei* during the summers of 1999 and 2000.

*Stachys byzantina* was regularly deadheaded during its bloom period because the heavy flower production caused a

moderate to severe decline in plant health. Deadheading improved health and encouraged foliar regeneration. The green-leaved taxa were deadheaded every other year to determine their repeat flowering capacity; that is, whether removing spent flowers played a role in generating a second bloom. The degree of repeat flowering was shown to be unaffected by whether or not plants were deadheaded. Repeat-flowering taxa are noted in Table 1.

A proliferation of seedlings was observed in the test plots of the following taxa in one or more years: *S. officinalis*, *S. officinalis* 'Alba', *S. officinalis* 'Dwarf White', *S. officinalis* 'Rosea', *S. maxima*, *S. minor*, *S. monieri* and *S. monieri* 'Saharan Pink'. Excessive seedling production affected the plots of *S. monieri*, *S. monieri* 'Saharan Pink' and *S. officinalis* 'Dwarf White', causing crowding and competition. Seedlings were usually variable in habit and flower color from the original test plants.

### Summary

In general, *Stachys* proved to be exceptional perennials for Northern gardens. The majority of taxa received four-star good ratings, with only one taxon receiving poor marks. *Stachys monieri* 'Hummelo' received the highest rating in the trial based on strong flower production, plant health, habit quality and winter hardiness. *Stachys thirkei* is not as adaptable to average garden conditions as *S. byzantina*, but has potential in Northern gardens when sharp winter drainage is provided.

The impressive floral displays and strong habits of the green-leaved betonies compare favorably to other popular garden perennials such as speedwells (*Veronica*),



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*Stachys officinalis*

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*Phlomis russeliana*

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*Phlomis tuberosa* 'Amazone'

sages (*Salvia*) and hyssops (*Agastache*). The fuzzy flowers of lamb's ears add textural interest, but deadheading is recommended to maintain plant health and regenerate leaves. Selecting a nonflowering cultivar such as 'Big Ears' or 'Silver Carpet' will reduce maintenance too. Deadheading betonies eliminates self-seeding, which may ultimately crowd out the original plants.

Lamb's ears and betonies are stalwart perennials with outstanding ornamental features for a variety of gardens. Silvery lamb's ears complement an array of other colorful perennials as well as small roses such as 'The Fairy' or Carefree Wonder ('Meipitac') while its rambling habit softens the hard edges of patios and walks. The purple spikes of betony rise above handsome foliage and draw attention to their distinctive charm in perennial borders, meadows and herb gardens alike.

## References

Armitage, A.M. 1997. *Herbaceous Perennial Plants, Second Edition*. Champaign, IL: Stipes Publishing.

Lord, T., principal editor. 2003. *RHS Plant Finder 2003-2004, Sixteenth Edition*. London, UK: Dorling Kindersley Limited.

## Hardy Phlomis

*Phlomis* (phlomis) is closely related to *Stachys* but is an uncommon plant in Midwestern gardens. *Phlomis* is rarely listed as winter hardy in Zone 5, but three *Phlomis* taxa were successfully grown in full-sun trials at the Chicago Botanic Garden from 1997 through 2001. The trial included *Phlomis russeliana*, *P. tuberosa* and *P. tuberosa* 'Amazone', and a group of *P. tuberosa* grown from seed wild-collected in central Siberia. All taxa received four-star good ratings for heavy flower production, good health, robust habits and winter hardiness.

*Phlomis russeliana* (Jerusalem sage) featured 1-inch long, hooded, butter yellow flowers and heavy flower production throughout June. Like *Stachys*, its flowers are borne in verticillasters, typically three-tiered, on leafy stems above a basal clump of boldly textured, pubescent leaves. Plants reached 36 inches tall (16 inches tall without flowers) and 24-36 inches wide. Despite crown damage in two of the four winters of the trial, *P. russeliana* received a good overall rating due to the quick regeneration of stems each spring. Plants were pest-free during the trial, and were deadheaded to maintain plant health after flowering.

*Phlomis tuberosa* is similar to Jerusalem sage in basic habit but has rugose green leaves and lavender-pink flowers. The ½-inch long flowers were borne in densely whorled clusters with up to eight tiers per spike. *Phlomis tuberosa* flowered heavily from late May to late June. Stem leaves are similar in shape but smaller than the bold

basal leaves. Plant health typically declined during flowering but recovered after deadheading. Plants were larger than Jerusalem sage at 48 inches tall (14 inches tall without flowers) and 24-30 inches wide. No winter injury was noted. The wild-collected plants performed similarly to the cultivated plants, but produced more seedlings. *Phlomis tuberosa* 'Amazone' is reportedly a taller, more robust selection; however, the plants in the trial were only 4 inches taller than the species but identical in all other traits.

*Phlomis* are best grown in full sun to light shade in well-drained soils. Although *Phlomis russeliana* grew well in the open test plots, it should be sited in a warm, protected site for optimum growth. It is drought-tolerant once established, but intolerant of wet or poorly drained soils. Conversely, *P. tuberosa* is more adaptable to average garden conditions.

*Phlomis russeliana* is a good choice for the perennial border, rock garden or as a ground cover. The delightful yellow flowers combine nicely with blue-flowered perennials such as *Geranium* 'Brookside' and Rozanne ('Gerwat') and *Nepeta* 'Walker's Low' and 'Six Hills Giant'. Robust *P. tuberosa* is ideal for the perennial border, meadow garden and woodland edge. It complements a variety of perennials including yarrow (*Achillea*), catmint (*Nepeta*) and ornamental grasses. The tiered inflorescence and lush foliage of phlomis add an exotic air to Northern gardens.

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