

Plant Evaluation Notes

An Appraisal of Pulmonaria for the Garden

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Pulmonaria, or lungwort, is an old-fashioned perennial grown for its early spring blooms of blue and pink and its silvery-spotted leaves that brighten the shady summer garden. Many of the oldest cultivars came to American gardens from England more than 200 years ago. Current developments in hybridization are creating cultivars with unique flower colors and enhanced foliar variegation.

Of the 14 herbaceous species of *Pulmonaria* native to Europe and Asia, only five species are commonly cultivated. Lungwort is the common name most often applied, but Bethlehem sage, Jerusalem cowslip and soldiers and sailors are also used. The spotted leaves of some species point to the origin of both the scientific and common names. The genus comes from the Latin word for lung, *pulmo*, and originated with the Doctrine of Signatures in the 16th century, which held that the outward appearance of a plant determined its curative value. In this case, the spotted leaves resemble a diseased lung and, therefore, the leaves (and roots) were used to treat bronchial infections and pulmonary diseases.

Lungworts are among the first perennials to bloom in spring, sometimes starting in late March in northern gardens but earlier in warmer climates. Flower buds are usually pink while the funnel-shaped blossoms can be blue,

purple, pink, red or white when mature. The two-tone color effect of the buds and flowers enhances the display during the long bloom period. Clusters of nodding flowers are borne at the terminals of leafy stems before the basal leaves develop. The large summer leaves emerge from the crown of the plant as the flowers begin to fade. The basal leaves are spotted, speckled or blotched with silver, without spots or almost completely silver. Leaves are softly hairy to bristly and ovate to linear-lanceolate in shape, and can grow to more than 12 inches long. The distinction among species is based mainly on the shape of the basal leaves, the type of hairs on the leaves and stems, and the presence or absence of foliar spots.

Lungworts are clump-forming perennials that can be wide-spreading over time, but grow slowly and are not invasive or aggressive. The low-growing, rhizomatous nature of lungworts makes them good ground cover plants under small trees and shrubs. They are also first-rate plants for the front of the perennial border, brightening shady beds and serving as companions for spring bulbs and shade perennials such as hostas, coral bells and ferns.

Lungworts grow best in light to medium shade, in a moist, well-drained, humus-rich soil. Amending the soil with compost, rotted manure or peat moss will help with moisture retention and improve plant growth. Consistent

soil moisture throughout the growing season will keep the foliage healthy, but plants may succumb if soils are too wet, particularly in the winter. Lungworts can be grown in full sun if enough moisture is provided, but dry, sunny conditions will result in brown, withered leaves. Plants may also go dormant in summer if conditions are too dry. Pests and diseases are uncommon, but powdery mildew and slugs are occasional problems.

A plethora of new cultivars and hybrids, such as Berries and Cream, Apple Frost and Raspberry Splash, have been tempting gardeners over the past few years, and many older cultivars are being replaced by new selections. Hardiness and shade adaptability already make lungwort an important perennial, but new colors and variegations are increasing the popularity of this garden standard.

The Evaluation Project

The Chicago Botanic Garden (USDA Hardiness Zone 5b, AHS Plant Heat-Zone 5) conducted an evaluation study of 51 taxa of *Pulmonaria* from 1994 to 1999, although not all taxa were grown for the full six years. The initial evaluation group contained plants that were readily available in 1994, with additional taxa incorporated periodically during the term of the project. The goal was to determine the best lungworts for the Midwest based upon ornamental traits, disease and pest resistance and cultural adaptability.

Three plants of each taxon were grown in a site that featured the natural shade provided by mature trees in and around the planting bed. Several areas within the bed received full sun at midday, but most plants received medium dappled shade for the entire day. All plants were sheltered from wind by the wooden fences that surrounded the garden. The clay-loam soil was well-drained, with an average pH of 7.5 throughout the evaluation term.

Maintenance practices were kept to a minimum to simulate home garden culture. Overhead sprinklers provided water as needed, and no fertilizer was applied. A mulch consisting of shredded leaves and wood chips



Pulmonaria saccharata

Photographed by Richard Hawke at Boerner Botanical Gardens.

was placed on the soil around the plants for aesthetic purposes, water conservation and weed suppression. Pine boughs were laid over the plants once the ground had frozen to provide winter protection against frost heaving.

Nomenclature follows the RHS Plant Finder. The taxa that were acquired under one name but were synonymous with another species or cultivar include: *Pulmonaria longifolia* 'Bertram Anderson' ('E.B. Anderson'), *P. mollis* (*P. mollissima*), *P. officinalis* 'Cambridge' ('Cambridge Blue'), 'Lewis Palmer' ('Highdown') and 'Mawson's Blue' ('Mawson's Variety'). Plants received as *P. officinalis* 'Rubra' were determined to be *P. rubra*, although some light spotting was observed on the basal leaves.

Observations

A comprehensive evaluation of the lungworts was undertaken from spring of 1994 through autumn of 1999. Each taxon was

evaluated on five criteria: 1) floral display, including flower color, flower production and bloom period; 2) habit display, including height and width measurements, foliage and habit quality; 3) cultural adaptability to the local environment; 4) disease and pest resistance; and 5) winter hardiness. A summary rating was assigned to each taxon based on flower production, habit quality, plant health, winter injury and disease or pest problems. Plant traits and evaluation specifics for the 38 taxa that successfully completed at least four years of the trial are shown in Table 1. The 13 taxa that received poor ratings due to disease, pest and winter damage are listed in Table 2.

Unlike many other perennials, lungworts generally do not produce large quantities of flowers; therefore, plants with lower flower production may have received good overall ratings based on higher ratings for the other criteria. Taxa with the highest flower production of greater than 60% coverage

included *Pulmonaria* 'Roy Davidson', *P. mollis* and *P. saccharata*. Nineteen taxa, or half the plants receiving fair or good ratings, produced flowers in the moderate range of 40% to 60%. The remaining 16 taxa had less than 40% flower coverage. All taxa that received poor ratings also had low flower production.

Pulmonaria rubra and its cultivars were the first flowers to open, beginning in late March and continuing into the first week of April. Also opening in early April were 'Esther', 'Glacier', 'Saint Ann's', *P. officinalis* 'Cambridge' and *P. saccharata* 'Mrs. Moon'. Flowers on the majority of taxa continued to open from mid-April to early May, with 'Leopard' being the last to begin blooming in mid-May. Bloom periods of one month or more were not uncommon for the lungworts, but the heaviest flower production usually occurred in the first two weeks of the bloom period.

Flower colors were mostly variations of

Table 1: Plant Characteristics and Performance Summary for *Pulmonaria* with Good or Fair Ratings

Overall Rating	<i>Pulmonaria</i>	Foliage Color	Flower Color ¹	Flower Coverage ²	Bloom Period	Height	Width
★★★★	'Benediction'	dark green, silver-speckled	deep blue	moderate	late April-early June	12 in.	27 in.
★★★★	'Blue Crown'	green, silver spots	violet-blue	low	late April-early June	12 in.	18 in.
★★★★	'Blue Mound'	pale green, large silver patches	blue	low	mid April-mid May	15 in.	29 in.
★★★★	'Esther'	dark green, pale silver spots	dark pink	low	early April-early June	12 in.	27 in.
★★★★	'Excalibur'	silver, green margins	blue (rosy pink buds)	low	early May-early June	8 in.	24 in.
★★★★	'Glacier'	dark green, small silver spots	white (pale pink buds)	moderate	early April-late May	13 in.	26 in.
★★★★	'Little Star'	medium green, small silver spots	cobalt blue	moderate	late April-mid June	13 in.	24 in.
★★★★	'Merlin'	green, medium sized silver spots	pale blue and pink	moderate	late April-early June	7 in.	21 in.
★★★★	'Milchstrasse' (Milky Way)	green, silver-green spots	deep blue (fades to pink)	low	late April-late May	6 in.	19 in.
★★★★	'Mrs. Kittle'	dark green, heavy silver mottling	pale pink to pale blue	low	mid April-late May	12 in.	20 in.
★★★★	'Paul Aden'	green, heavy silver mottling	violet to pink	low	mid April-early June	12 in.	30 in.
★★★★	'Pierre's Pure Pink'	green, silver mottling	pale pink	low	early May-mid June	12 in.	21 in.
★★★★	'Roy Davidson'	green, white spots	pale blue (opens pink)	high	late April-mid June	10 in.	27 in.
★★★★	'Saint Ann's'	green	blue (opens magenta)	low	early April-early May	8 in.	20 in.
★★★★	'Sissinghurst White'	green, silver spots	white (pale pink buds)	moderate	mid April-late May	12 in.	28 in.
★★★★	'Smoky Blue'	green, pale silver spots	soft blue (opens pink)	moderate	late April-mid June	9 in.	21 in.
★★★★	'Snowy Owl'	silver, irregular pattern	pink and blue	low	early May-early June	10 in.	27 in.
★★★★	'Tim's Silver'	silver, green-speckled	blue (opens pink)	moderate	mid April-late May	10 in.	26 in.
★★★★	<i>P. angustifolia</i>	green	deep blue	moderate	mid April-late May	6 in.	19 in.
★★★★	<i>P. angustifolia</i> ssp. <i>azurea</i>	green	bright blue	moderate	mid April-early June	12 in.	26 in.
★★★★	<i>P. angustifolia</i> 'Blaues Meer'	green	gentian blue	moderate	late April-early June	12 in.	24 in.
★★★★	<i>P. longifolia</i> 'Bertram Anderson'	dark green, silver mottling	bright blue	moderate	early May-mid June	8 in.	24 in.
★★★★	<i>P. longifolia</i> ssp. <i>cevenensis</i>	green, large silver-green spots	dark blue	low	late April-late May	14 in.	29 in.
★★★★	<i>P. longifolia</i> 'Dordogne'	dark green, white spots	violet	low	early May-mid June	10 in.	24 in.
★★★★	<i>P. mollis</i>	green	blue (dusky pink buds)	high	mid April-late May	18 in.	45 in.
★★★★	<i>P. montana</i>	green	violet-blue	moderate	mid April-late May	16 in.	36 in.
★★★★	<i>P. officinalis</i> 'Cambridge'	green, pale silver-green spots	sky blue	moderate	early April-mid May	11 in.	22 in.
★★★★	<i>P. officinalis</i> 'White Wings'	dark green, pale green spots	white (pale pink buds)	moderate	mid April-late May	12 in.	24 in.
★★★★	<i>P. rubra</i>	green, lightly spotted	dark pink	low	late March-early June	14 in.	40 in.
★★★★	<i>P. rubra</i> var. <i>albocorollata</i>	green	white	low	late April-mid June	15 in.	36 in.
★★★★	<i>P. rubra</i> 'Bowles' Red'	green	dark salmon-pink	moderate	late March-late May	16 in.	40 in.
★★★★	<i>P. rubra</i> 'Redstart'	green	pinkish-red	low	late March-late May	14 in.	36 in.
★★★★	<i>P. rubra</i> 'Salmon Glow'	green	salmon-pink	moderate	early April-early June	13 in.	32 in.
★★★★	<i>P. saccharata</i>	medium green, regular silver spots	blue (opens rosy pink)	high	mid April-late May	10 in.	22 in.
★★★★	<i>P. saccharata</i> 'Bielefeld Pink'	medium green, pale green spots	pink (opens blue)	moderate	mid April-late May	16 in.	34 in.
★★★★	<i>P. saccharata</i> 'Dora Bielefeld'	medium green, pale green spots	pink	moderate	mid April-early June	15 in.	28 in.
★★★★	<i>P. saccharata</i> 'Leopard'	green, large silver spots	red-purple	low	mid May-early June	8 in.	16 in.
★★★★	<i>P. saccharata</i> 'Mrs. Moon'	medium green, pale green spots	violet (opens pink)	moderate	early April-late May	10 in.	34 in.

Overall ratings: ★★★★★ good; ★★★★ fair; see Table 2 for *Pulmonaria* with poor ratings.

¹Peak flower color noted first; color of flower buds or color as flowers open before peak noted in parentheses.

²Flower coverage at peak bloom: low=<40%, moderate=40-60%, high=>60%.



Cathy Jones

Pulmonaria 'Tim's Silver'

pink and blue—and rarely white—often with buds of a different color. For example, the rosy-pink buds of 'Excalibur' opened to blue flowers, and the white blossoms of *Pulmonaria officinalis* 'White Wings' opened from pale pink buds. Flowers typically opened one color but matured to another color before falling off; for example, the flowers of 'Saint Ann's' opened magenta and then turned to blue, and the flowers of *P. saccharata* 'Bielefeld Pink' opened blue but changed to pink. The flowers of *P. rubra* did not change colors but remained pinkish-red throughout the flowering period.

The lungworts began as low-growing, tight clumps, but eventually formed loose masses as the plants spread. The average plant size after four years in the garden was 10 inches tall and 24 inches wide. The largest plant was *Pulmonaria mollis* at 18 inches tall and 45 inches wide. None of the lungworts spread aggressively or were invasive in the test site. The lungworts occasionally reseeded in the evaluation plots. Seedlings observed growing within or nearby the parent plants were typically of hybrid origin and not similar in appearance to the parent plants.

Taxa with dense to slightly loose clumps for most of the growing season were considered to have good habit quality. They included 'Benediction', 'Blue Mound', 'Excalibur', 'Glacier', 'Little Star', 'Merlin', 'Paul Aden', 'Pierre's Pure Pink', 'Roy Davidson', 'Saint Ann's', 'Sissinghurst White', 'Smoky Blue', 'Tim's Silver', *Pulmonaria mollis*, *P. officinalis* 'White Wings', *P. saccharata* 'Bielefeld Pink', *P. saccharata* 'Dora Bielefeld' and *P. saccharata* 'Mrs. Moon'. Plants of *P. saccharata* 'Bielefeld Pink' were the most consistently robust and vigorous throughout the season.

Loose to open habits were observed on 'Blue Crown', 'Esther', 'Milchstrasse', 'Mrs. Kittle', 'Snowy Owl', *Pulmonaria angustifolia*, *P. angustifolia* ssp. *azurea*, *P. angustifolia* 'Blaues Meer', *P. longifolia*, *P. longifolia* 'Bertram Anderson', *P. longifolia* ssp. *cevennensis*, *P. longifolia* 'Dordogne', *P. officinalis* 'Cambridge', *P. rubra*, *P. rubra* var. *albicorollata*, *P. rubra* 'Bowles' Red', *P. rubra* 'Redstart', *P. rubra* 'Salmon Glow', *P. saccharata* and *P. saccharata* 'Leopard'.

Soil pH, soil moisture, seasonal temperatures, and insect and disease problems affected the foliage and habit quality. Cutting back the spent flowers and stems after flowering or as leaves began to decline reinvigorated the plants by encouraging new leaves to develop. The lungworts were generally adapted to the moist to occasionally droughty conditions of the test site. Plants periodically suffered or declined during periods of drought, resulting in inferior habits and poor foliage quality. Plant health rebounded after water was supplied, but summer dormancy was occasionally observed in cases of prolonged droughty periods.

The majority of lungworts were grown in partial shade all day. A small group of plants received midday sun between 1 p.m. and 3 p.m., often resulting in flagged leaves, and in some cases, necrotic margins. The plants that regularly received midday sun included *Pulmonaria angustifolia* 'Blaues Meer', *P. angustifolia* 'Munstead Blue'*, *P. rubra*, *P. rubra* 'Barfield Pink'*, *P. rubra* 'Bowles' Red', *P. rubra* 'Salmon Glow' and *P. saccharata* 'Mrs. Moon'. Repeated wilting from full sun exposure did not weaken all the plants; taxa with moderate to severe marginal necrosis following repeated wilting are noted with an asterisk. *Pulmonaria saccharata* 'Pink Dawn' was the only lungwort to die during the

growing season due to a gradual decline in health after planting.

The lungworts with unspotted or lightly spotted leaves were most affected by pH-induced chlorosis, and the plants with heavily mottled to fully silver leaves were least affected. Lungworts with minor chlorosis by mid-summer in one or more years included 'Benediction', *Pulmonaria angustifolia*, *P. angustifolia* ssp. *azurea*, *P. longifolia* 'Dordogne', *P. rubra* and *P. rubra* 'Redstart'. Severe chlorosis was observed on 'Blue Ensign' and *P. rubra* 'Barfield Pink' only.

Powdery mildew was neither a serious nor a consistent problem for most lungworts and was observed in all evaluation years except 1995. Most lungworts were not infected in multiple years, except for 'Blue Ensign' (severe 1996-98), 'Lewis Palmer' (moderate to severe 1996-98), 'Margery Fish' (minor 1994 and 1996), *Pulmonaria angustifolia* ssp. *azurea* (minor 1994, 1996 and 1998), *P. longifolia* (severe 1994 and 1996), *P. officinalis* 'White Wings' (minor 1996-97) and *P. saccharata* 'Bielefeld Pink' (minor 1994 and 1996). The plants with minor levels of powdery mildew in one year only were 'Little Star', 'Merlin', 'Smoky Blue', *P. angustifolia* 'Blaues Meer', *P. angustifolia* 'Mawson's Blue', *P. longifolia* 'Bertram Anderson', *P. mollis* and *P. obscura*.

Varying levels of slug damage were observed in one or more years. Plants with more than occasional slug damage included 'Janet Fisk' (severe 1994-95), 'Margery Fish' (severe 1994-96), 'Snowy Owl' (moderate 1995-96 and 1998), *Pulmonaria angustifolia* 'Munstead Blue' (moderate 1994-95), *P. obscura* (severe 1994 and 1996), *P. rubra* 'Salmon Glow' (minor 1995-98), *P. saccharata* (minor 1994-96) and *P. saccharata* 'Mrs. Moon' (minor 1994-96). The lungworts without slug damage included 'Blue

Table 2: *Pulmonaria* with Poor Ratings and Less Than Four Years of Evaluation

Low-Rated <i>Pulmonaria</i>	
★★	'Blue Ensign'
★	'British Sterling'
★★	'Janet Fisk'
★	'Lewis Palmer'
★★	'Margery Fish'
★★	'Mawson's Blue'
★	'Nürnberg'
★	'Spilled Milk'
★★	<i>P. angustifolia</i> 'Munstead Blue'
★	<i>P. longifolia</i>
★★	<i>P. obscura</i>
★★	<i>P. rubra</i> 'Barfield Pink'
★★	<i>P. saccharata</i> 'Pink Dawn' ¹

Overall ratings: ★★ poor; ★ very poor.

¹Died in first season before winter.



Pulmonaria rubra 'Bowles' Red'



Pulmonaria 'Sissinghurst White'



Pulmonaria 'Little Star'

Mound', 'Glacier', 'Milchstrasse', 'Mrs. Kittle', 'Paul Aden', 'Pierre's Pure Pink', 'Smoky Blue', *P. angustifolia*, *P. angustifolia* ssp. *azurea*, *P. angustifolia* 'Blaues Meer', *P. longifolia* 'Bertram Anderson', *P. longifolia* ssp. *cevennensis*, *P. longifolia* 'Dordogne', *P. rubra* var. *albocorollata*, *P. saccharata* 'Bielefeld Pink', *P. saccharata* 'Dora Bielefeld', *P. saccharata* 'Leopard' and *P. saccharata* 'Mrs. Moon'.

The lungworts overall were winter-hardy. Winter injury was periodic, and no taxa exhibited repetitive or predictable damage. Crown injury or plant loss was attributed to incorrect cultural conditions that diminished plant health and gradually weakened the plants. Taxa with crown injury in one or more years included 'Excalibur', 'Little Star', 'Margery Fish', 'Pierre's Pure Pink', *Pulmonaria angustifolia* 'Blaues Meer', *P. officinalis* 'Cambridge', *P. rubra* 'Salmon Glow' and *P. saccharata* 'Dora Bielefeld'. The crowns of all *P. longifolia* cultivars were seriously injured in the winter of 1994-95 and were slow to regenerate the following year, but recovered in 1997. The taxa with one or more plants killed during the evaluation period were 'Leopard' (one plant killed), 'Milchstrasse' (one plant killed), 'Snowy Owl' (one plant killed) and *P. rubra* var. *albocorollata* (two plants killed). Declining plant health from poor culture contributed to the complete loss during the first or second winter of some taxa, including 'British Sterling', 'Lewis Palmer', 'Janet Fisk', 'Nürnberg', 'Spilled Milk', *P. angustifolia* 'Munstead Blue', *P. obscura*, *P. rubra* and *P. rubra* 'Barfield Pink'. Only *P. rubra* and *P. obscura* were retested. Nine of

the 13 taxa that received poor ratings had serious winter injury or were killed during the evaluation term.

Summary

Almost half the lungworts received good ratings based on flower production, habit quality, plant health, winter hardiness and disease or pest resistance. Unfortunately, about one-quarter of the total taxa received poor ratings due to low flower production, inferior habit and/or health, significant winter injury or problems with powdery mildew or slugs.

Although flower production was typically low, *Pulmonaria* 'Roy Davidson', *P. mollis* and *P. saccharata* had the highest flower production with more than 60% coverage at peak bloom. The health and ornamental attributes of the foliage and plant habits were more important considerations than flower production in the final rating. Most plants had dense to somewhat open growth habits and remained ornamental into midsummer.

Soil pH, soil moisture, and insect and disease problems affected foliar quality. The foliage of most plants declined to some degree after flowering and was unsightly by mid- to late summer if not cut back. Chlorosis, slugs and droughty conditions also periodically contributed to the early decline of the foliage. Cutting back the spent flowers and declining foliage and providing appropriate water reinvigorated the plants for the remainder of the summer. The lack of organic matter in the soil and the reduced moisture retention contributed to the poor performance of some plants.

Powdery mildew and slugs were the only

pest problems observed. Fifteen taxa were periodically affected by powdery mildew, but only 'Blue Ensign', 'Lewis Palmer' and *Pulmonaria longifolia* had severe infections in more than one year. Slugs damaged the foliage of most lungworts in one or more years, but a few plants were severely damaged in multiple years. Low winter temperatures generally did not affect the lungworts. Cultural stress in the growing season often resulted in weakened plants that died during the winter. Approximately half the taxa did not suffer any injury or plant losses during winter.

Lungworts are enjoying a resurgence of popularity due to the many new selections available today. There are many more cultivars to choose from than were available when the evaluation study began in 1994, and many of those are new introductions since 1999. It's an exciting time for gardeners who already enjoy the fine qualities of lungworts and for those who want to try lungworts for the first time. With names like 'Bubble Gum', 'Silver Shimmers' and 'Victorian Brooch', the next generation of lungworts promises a bright future for an old-fashioned plant.

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The Plant Evaluation Program is supported by the Searle Research Endowment, the Woman's Board of the Chicago Horticultural Society and the Stanley Smith Horticultural Trust. Special thanks to Andra Windorf Nus, Cathy Jones and Jenny Lee for their assistance in 1994, 1996 and 1998, respectively.

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