

Pelargoniums

An Herb Society of America Guide



The Herb Society of America
9019 Kirtland Chardon Rd.
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Table of Contents

Introduction	3
Contributors & Acknowledgements	3
Description & Taxonomy	8
Chemistry	10
Nutrition	10
History & Folklore	10
Literature & Art	12
Cultivation	13
Pests & Diseases	19
Pruning & Harvesting	20
Preserving & Storing	21
Uses	21
- Culinary Uses	21
- Recipes	23
- Craft Uses	40
- Cosmetic Uses	41
- Recipes	42
- Medicinal & Ethnobotanical Uses & Aromatherapy	43
- Garden Uses	47
- Other Uses	48
Species Highlights	49
Cultivar Examples	57
Literature Citations & References	62
HSA Library <i>Pelargonium</i> Resources	68

Introduction

Mission:

The Herb Society of America is dedicated to promoting the knowledge, use and delight of herbs through educational programs, research, and sharing the experience of its members with the community.

Environmental Statement:

The Society is committed to protecting our global environment for the health and well-being of humankind and all growing things. We encourage gardeners to practice environmentally sound horticulture.

Purpose, Scope and Intended Audience:

This guide was designed to provide an overview of the cultivation, chemistry, description, history, folklore and uses of herbal plants in the genus *Pelargonium*. It was written to accommodate a variety of audiences, providing basic information appropriate for beginners to herbs and herb gardening as well as supplemental information for more experienced herb enthusiasts. It can be used in conjunction with HSA's *Herb Study Groups Resource Kit* or as a starting point for those interested in pursuing individual research or developing an herbal presentation/program.

Disclaimer: Information is provided as an educational service. Mention of commercial products does not indicate an endorsement by The Herb Society of America. The Herb Society of America cannot advise, recommend, or prescribe herbs for medicinal use. Please consult a health care provider before pursuing any herbal treatments.

Contributors & Acknowledgements

Text by Michele Meyers, HSA Director of Education, except where otherwise noted
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Horticultural advisor: Robin Siktberg, HSA Editor/Horticulturist

Contributors

The Herb Society of America would like to thank the following contributors, without whose expertise and input this guide would not have been possible:

James Adams

Jim Adams has been gardening and growing herbs since childhood. He earned his horticulture degree from Michigan State University. He completed numerous internships at some of the country's premier horticultural institutions before becoming the Assistant Curator of the Fern Valley Native Plant Collection at the U.S. National Arboretum. In 1997, he changed posts and became Curator of the National Herb Garden, also at the arboretum. Jim is a member of the Potomac Unit of The Herb Society of America, as well as various other horticulture-related organizations and was awarded HSA's Nancy Putnam Howard Award for Excellence in Horticulture in 2004. He is currently Horticulturist at

the British Embassy in Washington, D.C.

Caroline Amidon

Caroline Amidon has been studying and growing pelargoniums for years, and she and Joyce Brobst maintain an HSA-registered *Pelargonium* collection in Pennsylvania. Caroline served as president of HSA from 1996-1998 and is a member of the Philadelphia Unit and Rosemary Circle. She received HSA's Helen de Conway Little Medal of Honor and the Nancy Putnam Howard Award for Excellence in Horticulture. She has co-authored articles on pelargoniums in *The Herbarist* and *Green Scene* as well as the book, *Pelargonium: 2006 Herb of the Year*, written with Pat Crocker and Joyce Brobst. In addition to her HSA membership, Caroline is a member of the Hardy Plant Society, the International Geranium Society and the Pennsylvania Horticultural Society, and has served as herb judge at the Philadelphia Flower Show.

Gwen Barclay

Gwen is Director of Food Services at The International Festival-Institute at Round Top, Texas. A member of both the Pioneer Unit and the South Texas Unit of HSA, she is a nationally recognized expert on herbs and herbal cuisine. Gwen and her mother, Madalene Hill, are co-authors of *Southern Herb Growing*, and were awarded HSA's Gertrude B. Foster Award for Excellence in Herbal Literature in 2005.

James H. Barrow, Ph.D.

A biology professor and long-time gardening enthusiast, James Barrow received his Ph.D. from Yale University in 1951. His academic posts included serving as Professor and Chairman of the Biology Department at Huntingdon College in Montgomery, Alabama, and Chairman of the Biology Department at Hiram College in Ohio. In 1967, he founded the Hiram College Biological Field Station, a 126-acre site dedicated to undergraduate research, which was later renamed the Hiram College James H. Barrow Field Station. A Master Gardener, Dr. Barrow started and directed a mentor program to involve children ages 13- to 15-years old with plants and gardening. Along with his wife, HSA Past President Jamie Barrow, he helped create and maintain the Hiram Public Gardens, one of which is named in his honor. Dr. Barrow was a member of The Herb Society of America for over 10 years and maintained an HSA-registered *Pelargonium* collection in Cincinnati, Ohio.

Susan Belsinger

Susan Belsinger is a culinary educator, food writer and photographer whose articles have been published in *Woman's Day*, *Organic Gardening*, *Victoria Magazine* and *The Herb Companion*. She is the author of *Not Just Desserts—Sweet Herbal Recipes*, *Flowers in the Kitchen*, co-author, with Carolyn Dille, of *The Garlic Book*, *Herbs in the Kitchen*, and *The Greens Book*, and co-author of *Basil: An Herb Lover's Guide* with Thomas DeBaggio. Susan is a member of the Potomac Unit of The Herb Society of America and the 2006 recipient of the Joanna McQuail Reed Award for the Artistic Use of Herbs.

Joyce Brobst

Joyce Brobst is a longtime *Pelargonium* grower and enthusiast. She is a member of HSA's Pennsylvania Heartland Unit and was president of The Herb Society of America from 1998-2000. She is also a member of the International Geranium Society, the Hardy Plant Society and the Pennsylvania Horticultural Society, and serves as a horticultural judge at the Philadelphia Flower Show. Joyce holds B.S. and M.Ed. degrees in biology, an M.S. in education, and taught high school biology for 25 years. She currently teaches botany, biology and environmental science at the Reading Area Community College.

Pelargoniums: An Herb Society of America Guide

Joyce has co-authored articles on pelargoniums appearing in *The Herbarist* and *Green Scene* as well as the book, *Pelargonium: 2006 Herb of the Year*. Joyce and fellow *Pelargonium* enthusiast, Caroline Amidon, maintain a collection of over 75 *Pelargonium* species, hybrids and cultivars. Joyce received the Helen de Conway Little Medal of Honor in 2006.

Jane Cole

Jane Cole started growing herbs because she was fascinated with their many scents and has been a member of HSA for 21 years. She owned and operated a herb and aromatherapy business for 12 years, has taught classes at Boerner Botanic Gardens and Green Bay Botanical Garden and has presented programs for many garden clubs and organizations. Jane helped design and plant herb gardens at Fort Howard Hospital, Hazelwood House and the Green Bay Botanical Garden. She lives in DePere, Wisconsin, and is a member of the Wisconsin Unit of The Herb Society of America.

Karen England

Edgehill Herb Farm in Vista, California, is the home-based business of herb enthusiast Karen England. In addition to being a member at large of The Herb Society of America, Karen is the President of the Vista Garden Club and on the board of The International Herb Association. She is a popular garden speaker and teacher of cooking with herbs and edible flowers in the San Diego, CA area, specializing in the art of cooking with lavender, roses and scented geraniums.

Madalene Hill

Madalene was president of The Herb Society of America from 1986-1988 and has been a member since 1957. She organized the South Texas Unit and was a charter member of the Pioneer Unit. Madalene was awarded HSA's Helen de Conway Little Medal of Honor in 1978 and the Gertrude B. Foster Award for Excellence in Herbal Literature in 2005. She is an accomplished plantswoman, and her garden at The International Festival-Institute at Round Top, Texas, attracts visitors from all over the world. She is curator of the Pioneer Unit's HSA-registered *Pelargonium* collection at Festival Hill in Round Top, Texas.

Lorraine Kiefer

Lorraine Kiefer is the founder of the South Jersey Unit of The Herb Society of America and has been a member of HSA for over 20 years. With her husband, Ted, she owns and operates Triple Oaks Nursery & Herb Garden, a retail garden center and gift shop in Franklinville, New Jersey. Lorraine is a regular garden columnist for several local newspapers and has contributed articles to *Green Scene* and the Brooklyn Botanic Garden's *Gardening for Fragrance*. She lectures regularly at the Philadelphia Flower Show on topics ranging from flower arranging and kitchen gardening to herbal history and fragrant plants.

Mark Langan

Mark has a degree in Ornamental Horticulture from Washington State University and has been working in the horticulture field since he was a teenager. He and his wife, Karen, run Mulberry Creek Herb Farm, an organic herb nursery in Huron, Ohio; lecture; and offer workshops on herbs and gardening. Mark is a member at large of The Herb Society of America.

Sandy Manteuffel

Sandy Manteuffel is a member at large of The Herb Society of America and member of the Herb Society of Greater Cincinnati. She received an HSA Certificate of Achievement in 2004, has an

Pelargoniums: An Herb Society of America Guide

extensive garden and has been growing herbs and scented pelargoniums for over 20 years. She has presented many programs on herb gardening and scented pelargoniums for the Herb Society of Greater Cincinnati, HSA, garden clubs, and the general public. A former registered nurse, Sandy enjoys decorating her hand-made pottery with herbs and *Pelargonium* leaves. Her article, "Pelargoniums in Pottery" was published in *The Herbarist* in 2005.

Rexford Talbert

Rexford Talbert has been a member of The Herb Society of America since 1968 and is the recipient of the Nancy Putnam Howard Award for Horticultural Excellence. He is the co-founder and former chairman of the South Texas Unit and has served on the HSA Board of Directors. Rex served on the National Advisory Committee for Aeronautics and The National Aeronautics and Space Administration as Senior Information Research Scientist and is now retired. He has written and lectured on herbs for over 40 years and has been published in *The Herb Companion*, *Kitchen Gardens*, *The Gilded Herb* and *The Herbarist*, among others.

Arthur O. Tucker, Ph.D.

Dr. Tucker is a research professor at Delaware State University specializing in the chemistry and identification of herbs. He is a member of the Rosemary Circle and the Northern New Jersey Unit of HSA and has received HSA's Nancy Putnam Howard Award for Excellence in Horticulture, the Helen de Conway Little Medal of Honor, and the Gertrude B. Foster Award for Excellence in Herbal Literature. Art has a B.S. from Kutztown State College and M.S. and doctoral degrees from Rutgers University. He is a nationally recognized expert on flavor, fragrance and medicinal plants and has been published many times in scholarly and popular publications. Dr. Tucker is co-author of *The Big Book of Herbs* with Thomas DeBaggio.

Ann Wilson

Ann is a pharmacist with a passion for plants. Growing up in rural Iowa, she began gardening at a very early age, but her interest in herbs began when she moved from Indiana to Texas in 1986 and began landscaping with herbs. She is a regular volunteer in the Festival Institute Gardens located in Round Top, Texas. Her special interests are the pelargoniums and the pharmacy garden. Ann lives in Austin, Texas and is a member at large of The Herb Society of America.

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Pelargoniums: An Herb Society of America Guide

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In Memory of Dr. James H. Barrow

Description & Taxonomy

Description

Pelargoniums are a diverse group of plants with a wide variety of growth habits and habitats. Members of the family Geraniaceae, estimates of the total number of species and subspecies in the genus range from 230-300 (10, 63, 64, 83, 90, 94). Most are native to southern Africa (14, 90), but a few species occur naturally in Australia, eastern Africa, New Zealand, the Middle East and the islands of Madagascar, St. Helena, and Tristan de Cuhna (63, 64). *Pelargonium* height typically ranges from 1 to 6 feet (90) depending on species, hybrid or cultivar, but some species may grow even taller in their native habitats.

The genus *Pelargonium* includes annuals and herbaceous perennials, shrubs and subshrubs, and both evergreen and deciduous plants (63, 64), but most of the scented-leaved species or “scenteds” are succulent perennial shrubs in their native habitats (87). One notable exception is *P. grossularioides*, the coconut-scented *Pelargonium*, which is an annual (90). Some species have spiny stems (63), and many have stems that are initially herbaceous but become woody with age (90). Some grow erect while others have a trailing habit, and some have tuberous roots (4, 90). Pelargoniums grow in areas with low rainfall and low humidity (10, 63) in a variety of habitats, from rocky slopes to grasslands, forests and along streams (10, 63, 90).

Most herb enthusiasts value pelargoniums for their fragrant leaves, but not all plants in the genus are scented, and not all of the scents are pleasant. Pelargoniums are informally classified as zonals (which are named for the dark markings on the leaf surface (85, 103) and are primarily ornamental, bedding plants), fancy-leaf cultivars (some of which are scented), regals, angels, ivy-leaf, and scented-leaf (15). (See Taxonomy section for formal classification.) The scented-leaved pelargoniums can have aromas of rose, peppermint, lemon, lime, orange, strawberry, camphor, nutmeg, spice, apricot, apple, filbert, ginger, and coconut (90). Plants are often categorized by enthusiasts according to the following scent groups: citrus, fruit and nut, mint, rose, and pungent (10, 15). Sensitive noses may detect a hint of pungency in all of the scent groups (12). Although fragrant-leaved pelargoniums are commonly called scented geraniums, true geraniums are actually in a separate genus in the Geraniaceae family that is native to Europe, North America and Asia (64).

Pelargonium leaves come in a variety of shapes and sizes and may resemble ferns, grape leaves or oak leaves and may be deeply divided or nearly round. They may be small or large, may be covered with fine hairs and may be rough, sticky or have a velvety texture (10). Leaf edges may appear “curly” or “crisped” in some species (4). Leaves include scent glands that release pelargoniums’ renowned scents when brushed (15), may be variegated, and may include dark patches of color in the center (10) or along the veins (5).



Assorted *Pelargonium* leaves
Photo by Susan Belsinger

Although some hybrids have 8-10 petals and are known as “double-flowered,” most scented *Pelargonium* flowers have 5 petals (2 upper and 3 lower), and these pelargoniums are considered “single-flowered” (10). The arrangement of the petals distinguishes pelargoniums from other members of the family Geraniaceae (6). Flowers occur in a pseudo-umbel consisting of 1-50 individual flowers (64), but most have 5-10 florets (10). Flowers may be white, pink, mauve (4), lavender, pale yellow or burgundy, and upper petals may have purple, pink (4) or red markings (10). Although the flowers of most pelargoniums are not scented, a few species, like *P. triste*, have flowers that emit a scent, but only at night. Most of the scented-leaf species have small, delicate blooms, but some pelargoniums have flowers that resemble tulips, carnations, cactus flowers or pansies (15).

The genus name derives from the Greek word for stork, “pelargos,” due to the resemblance of the seed pod/fruit to the head and bill of a stork (14, 64, 90). Plants in the genus are often given the common name storksbill for this reason (90).

Taxonomy

Confusion has surrounded *Pelargonium* nomenclature since the dawn of taxonomic classification and continues to this day. The common name geranium is associated with hardy North American and European plants from the genus *Geranium* as well as tender South African plants from the genus *Pelargonium* due to a very early misclassification of the genus. The plants were originally classed in the genus *Geranium* by Linnaeus in 1753 (15), along with plants that are now known to be in the genera *Geranium* and *Erodium*, both members of the family Geraniaceae. Although the French botanist Charles L'Heritier first classified pelargoniums as a separate genus in the late 1700s, this nomenclature was not widely accepted until many years later (15), long after the common name geranium had become irrevocably associated with pelargoniums.

Pelargonium nomenclature confusion doesn't end here. To complicate matters further, the parentage of many *Pelargonium* cultivars is uncertain (90), and there are many identical plants that may appear under several different names in the trade (6, 90).

Conversely, some plants bearing the name of historic cultivars are actually different plants (15). Genetic testing has shed new light on *Pelargonium* classification, and will probably continue to do so. For example, most plants sold in the U.S. and Europe as *P. graveolens*, are now believed to actually be a group of hybrid cultivars due to differences in chromosome numbers and pollen fertility (88).

The genus *Pelargonium* is divided into 14 sections, which are used to organize the various species. The majority of the scented-leafed species belong to sections *Pelargonium* and *Reniformia*, with some scented-leaf species occurring in *Cortusina*, *Jenkinsonia*, *Ligularia*, *Peristera* (63) and *Ciconium* (5).



Illustration of *Pelargonium graveolens* from L'Heritier's *Geraniologia* (1787-1788)

Chemistry

Pelargoniums are renowned for their scents and have a history of medicinal use in their native Africa. These properties result from the chemical composition of the volatile/essential oil found in glandular hairs in the leaves (100). Over 120 different chemical constituents have been isolated in *Pelargonium* oil (100). The composition varies by species (100) and growing conditions (90), and may include citronellol, geraniol, linalool, menthone, isomenthone, limonene, pinene and methyl eugenol (49, 50, 90, 100). The peppermint flavor/scent of *P. tomentosum* is due to large amounts of isomenthone and menthone (90, 100). The old-fashioned rose geranium, *P. 'Rosé'* owes its scent to a combination of citronellol, citronellyl formate, geraniol, beta-caryophyllene, linalool and geranyl butyrate (90). The lemon scent of *Pelargonium citronellum* comes from geraniol and neral (90). Pelargoniums also contain flavonoids, tannins and alkaloids (100). The presence of phenols, coumarins, proanthocyanidins, phenolic compounds and tannins may account for some of the medicinal uses of pelargoniums in their native lands (45), and the reported antibacterial activity of some *Pelargonium* oil may be due to the presence of monoterpenes (26). See the Medicinal & Ethnobotanical Uses and Other Uses sections for additional information. For a detailed chemical analysis of additional *Pelargonium* species, hybrids and cultivars, see *The Big Book of Herbs* by Arthur O. Tucker and Thomas DeBaggio.

Nutrition

There is relatively little information available about the nutritional composition of pelargoniums. Unlike many other more widely used herbs and spices, pelargoniums have not been analyzed by the USDA and do not appear in the USDA's Nutrient Database, which lists vitamin, mineral and general nutrient composition for many common herbs and spices. Because very small amounts of scented pelargoniums are used for flavoring, they are unlikely to be a significant source of nutrients (83).

Both *Pelargonium* spp. and *Pelargonium graveolens* are included in the FDA's official GRAS (Generally Recognized as Safe) lists (92, 93), and rose geranium oil (*P. graveolens*/*P. 'Graveolens'* group) is considered GRAS at 1.6 to 200ppm (90, 93). Most individual species, hybrids and cultivars do not have GRAS status, however (90), and the coconut-scented *Pelargonium*, *P. grossularioides*, should not be used for culinary purposes, especially during pregnancy, due to reported abortifacient properties (4).

History & Folklore

History

Originating primarily in South Africa, pelargoniums were introduced to the western world when naturalists, plant collectors and ship surgeons sailing trade routes around the Cape of Good Hope brought plants back from their voyages in the early seventeenth century (6, 15, 63). The first *Pelargonium* cultivated in Europe is believed to be *P. triste*, brought to the botanic garden in Leiden around 1631 (64), and possibly earlier (55, 64).

Once described as plants best used "for enchantment" (20), pelargoniums have been captivating gardeners for centuries. The 1800s marked the height of *Pelargonium* popularity (15, 46, 102). In

Pelargoniums: An Herb Society of America Guide

England, scented pelargoniums were grown in greenhouses, manor halls and cottage windows (102), and rose geranium oil became an inexpensive substitute for Attar of Rose (rose oil) in the French perfume industry (46, 102). Today, China produces most of the world's supply of rose geranium oil, followed by Egypt, and the U.S. imports 60-65 tons annually (27).

In the Victorian language of flowers, a means of communicating with tussie-mussies or floral bouquets, distinct meanings were associated with different pelargoniums. The oak-leaf *Pelargonium* signified “true friendship” (35, 102), the rose-scented *Pelargonium* “preference” (35, 102), nutmeg-scented designated an “expected meeting” (35, 102), the lemon-scented an “unexpected meeting” (35, 102), the apple-scented “present preference” (35), and the unpleasantly scented “fish” (zonal) geranium “disappointed expectation” (35). The use of pelargoniums in potpourris, ointments and cooking became popular at this time (46), and pots of scented pelargoniums were strategically placed in homes so that their scents would be released when brushed by the long skirts of passing ladies (16). During the Victorian era, the leaves of *P. crispum* became a fashionable addition to finger bowls, and the plant subsequently came to be known as the “finger bowl *Pelargonium*” (4). By 1870, pelargoniums were so popular and widespread that according to Adelpa Simmons, “even those who lived in remote farmhouses had access to several kinds” (81).

Pelargoniums arrived in the U.S. with the early colonists. With “little access to spices,” scented pelargoniums were used by colonists as a flavoring for foods as early as 1818 (6, 7). Thomas Jefferson is said to have maintained a small collection at the President's House, including *P. inquinans* (24, 46). Scented geraniums were reportedly among the first houseplants “suggested as benefiting” from indoor lighting following Edison's invention of the electric lamp in the late 1800s (70 in 83). Pelargoniums gained renewed popularity in recent years with nostalgic interest in the Victorian era (102).

Folklore

Although pelargoniums aren't as rich in folklore as some other herbs, they are associated with a few legends, superstitions and at least one hoax. In Poland, pelargoniums have special significance and are considered a “symbol of hope” and “protector of the home” (65). The ability of a *Pelargonium* plant to add fragrance to a room is especially valued in Poland's industrial areas marred by air pollution (65).

According to a Muslim legend, the rose geranium was created when the prophet Mohammed hung his shirt on a mallow branch after bathing in a river. The mallow plant was so honored and happy that “she slowly transformed herself into a lovely flower with leaves that were richly perfumed” – the rose geranium (41).

P. luridum, a *Pelargonium* with night-scented flowers, has reportedly been used during Zulu courtship rituals in South Africa (63, 84, 95). According to van der Walt, “During courtship, the young [Zulu] men rub a mixture of this root powder and fat of hippopotamus or python on their faces to charm the opposite sex.” (95)

At least one *Pelargonium* species has a somewhat magical reputation. During the wars of 1850-1853, the roots of *P. pulverulentum* were believed by Xhosa warriors to “ward off the bullets” of their enemies and/or dampen gunpowder (95).

Some relatively recent *Pelargonium* folklore involves the notorious “citrosa mosquito-fighter,”

Pelargoniums: An Herb Society of America Guide

Pelargonium 'Citrosa.' In the 1990s, the plant (which was also marketed as *Pelargonium citrosum* 'Van Leenni') sold for \$7.99-\$18.95 in Ontario, and was alleged to be a genetically engineered cross of a *Pelargonium* and *Cymbopogon nardus*, a Chinese grass containing citronella oil, but analysis of the plant and field trials proved it to be a hoax (60, 91). The plant's oil composition was very similar to rose geranium, including only .09% citronellal (one of the active components in citronella oil) (60, 91). The citrosa plant did not protect human subjects from mosquito bites more than controls, and in one field trial mosquitoes actually landed on the plant (60). Interestingly, there are pelargoniums with documented insect-repellent activity. See the Other Uses section for additional information.

See the Medicinal & Ethnobotanical Uses section of this guide for folkloric and traditional medicinal uses.

Literature & Art

Literature

Most references to pelargoniums in literature appear under the term "geranium." Not surprisingly, a large number of literary geranium references appear in the literature of the 1800s, the zenith of *Pelargonium* popularity. In many cases, it is difficult to determine whether the authors are referring to plants from the genus *Pelargonium* or *Geranium*, since both genera bear the common name "geranium." Mention of fragrant leaves nearly guarantees that the plant in question is indeed a scented *Pelargonium*.

Pelargoniums appear several times in Augusta J. Evans's 1869 novel *Vashti; or, "Until Death Us Do Part"*: "The air was fragrant with the breath of flowers that nodded to each other from costly vases scattered through both apartments; and, before one of the windows, rose a bronze stand containing china jars filled with pelargoniums, in brilliant bloom." (33)

George Eliot's *Scenes of Clerical Life* (1858) features this simile: "But the sweet spring came to Milby notwithstanding... And so it was with the human life there, which at first seemed a dismal mixture of griping worldliness, vanity, ostrich feathers, and the fumes of brandy: looking closer, you found some purity, gentleness, and unselfishness, as you may have observed a scented geranium giving forth its wholesome odours amidst blasphemy and gin in a noisy pothouse." (31)

Other 19th century authors that mention scented geraniums in their works include Mark Twain (*Sketches*, 1874), Mary Jane Holmes (*Tempest and Sunshine or, Life in Kentucky*, 1854), J.H. Ingram (*The South-West, by a Yankee, Vol. 2*, 1835), Robert Lowell (*Antony Brade*, 1874) and Mary Wollstonecraft Shelley (*The Fortunes of Perkin Warbeck*, 1830). Although not describing their scents, Charles Dickens writes of geraniums as conservatory and parlor-window plants in *Little Dorrit* (1857) and *The Personal History of David Copperfield* (1850). William Makepeace Thackeray, likewise, includes potted geraniums in a description of a lady's drawing room window in *Vanity Fair* (1848).

At least one poem is named for a *Pelargonium* – *Preference. Rose Scented Geranium* by Frances Sargent Locke Osgood (in *The Poetry of Flowers and Flowers of Poetry*, 1864). The scented also appear briefly in Rainer Maria Rilke's *Les Roses* (in *My Life Asleep* translated by Jo Shapcott, 1998) and in May Sarton's *A Winter Notebook* (in *Halfway to Silence*, 1980). Pelargoniums are mentioned explicitly in Gillian Allnutt's

Pelargoniums: An Herb Society of America Guide

poem *Pistachio* (from *Nantucket and the Angel*, Bloodaxe Books, 1997) and Sandra M. Gilbert's *9. Rain* (from *Ghost Volcano*, Norton, 1995).

Art

There are many art works depicting pelargoniums, including botanical illustrations, watercolors, etchings, and pen and ink drawings. Robert Sweet published *Geraniaceae*, his collection of hand-painted illustrations, between 1820-1830, and many of the pelargoniums depicted in this work are now believed to be extinct (15). *Mrs. Clark Gayton* (1779), a painting by John Singleton Copley, includes a potted specimen of *Pelargonium zonale* (89). The most famous *Pelargonium* artwork is probably *Rubens Peale with a Geranium*, an oil on canvas painting by the 18th-19th century American artist Rembrandt Peale. The painting depicts the artist's brother, a botanist, with a potted *Pelargonium inquinans* (24, 66).



Rubens Peale with a Geranium by Rembrandt Peale. Patron's Permanent Fund. Image © Board of Trustees, National Gallery of Art, Washington

Cultivation

Propagation

Pelargoniums can be propagated from stem cuttings, root divisions, leaf cuttings or seed. Propagating from seed can be tricky for several reasons. Only true species can be cultivated successfully from seed, but due to cross-pollination and labeling errors it may be difficult to know if your seed is true (3). Lengthy seed germination time can also be an issue for some *Pelargonium* species (3). If you decide to take your chances and propagate from seed, HSA *Pelargonium* experts Caroline Amidon and Joyce Brobst have the following recommendations: Bury seed about ¼ inch under soil, a little more or less depending on the size of the seed. Lightly cover with a piece of glass or plastic or use a growing tray with a plastic top. Soil should be kept moist, and seeds should remain covered until germination, after which the cover can be removed. Caroline and Joyce don't suggest planting seeds directly in the garden. True species seeds are "too difficult to get" for the uncertainties of a garden planting, and as Joyce points out, "If you acquire seeds you want to know exactly where they are." (3) If collecting seed from existing plants, seeds can be harvested after flower carpels brown by drying the carpels in a paper bag for a few days (10).

Cuttings are the preferred propagation method for many of HSA's *Pelargonium* aficionados. Caroline and Joyce root cuttings in a mixture of 5 parts sterile potting soil to 1 part perlite, pigeon grit or granular baked clay, watering the pots before inserting the cutting. The plant should be cut 3 or 4 nodes from the tip. Stipules, flower buds and lower leaves should be removed, but 1 or 2 leaves should remain on the cutting. The cutting is then inserted into the soil with 2 or more nodes below the soil's surface, and the soil should be tamped gently and watered. The pot can then be set on top of a heat tape set at 70°F. The cutting should not be fertilized until rooted (6). After rooting, the cuttings can be transferred to 4-inch pots and moved to a greenhouse or placed on a windowsill where they will be exposed to lots of light. They can later be moved to even larger pots or the garden (3).

Sandy Manteuffel roots her cuttings in seed-starting trays placed on a piece of felt that wicks water into the soil from a reservoir below and, when rooted, moves her cuttings to 3-inch pots (58). Susan Belsinger places her cuttings directly into the base of her source plants. She finds that this method is an easy way to remember what the cutting is and has a 50-60% success rate (12).

According to Mark Langan, owner of Mulberry Creek Herb Farm, an organic herb nursery in Huron, Ohio, extra care should be taken when propagating the small-leaved lemon-scented varieties like *P. crispum*. For these plants, Mark recommends taking longer shoots, making a $\frac{3}{4}$ -inch scar on the side of the stem with a razorblade, placing the cutting in an extra sandy mix, giving the cuttings a lot of light and keeping them slightly moister than other *Pelargonium* cuttings. Mark has found that although using a heat mat speeds up rooting, fewer plants survive. Mark propagates other *Pelargonium* cuttings “on the dry side.” He generally propagates in fall with well-drained potting mix in a sunny area and waters only when the soil becomes dry. He has tried refrigerating cuttings overnight in trays but hasn’t had as much success with this method and doesn’t recommend it. Depending on the variety, Mark finds that *Pelargonium* cuttings will be ready to pot up or move out in 3-6 weeks (47). Although Dr. Arthur O. Tucker of Delaware State University has found that rooting some of the species, such as *P. citronellum*/*P. ‘Mabel Grey’* is the most challenging aspect of *Pelargonium* cultivation (87), Mark hasn’t found ‘Mabel Grey’ to be difficult to root (47). Mark points out that for commercial growers, *Pelargonium* cuttings are more costly to produce because they require more heat, time and space than many other types of cuttings. *Pelargonium* cuttings must be taken when the plant is actively growing (5), have a longer rooting time than many other herbs, and must be overwintered warm (47).

Depending on where you live, however, you may not be restricted to fall cuttings. Karen England, an HSA member living in California in Zone 10b, prepares cuttings in both spring (April/May) and fall (October/November) and sometimes starts cuttings directly in the ground (32). At the National Herb Garden in Washington, D.C., the *Pelargonium* collection is re-propagated every 3 years with late-summer cuttings, although former curator Jim Adams admits that this is “not the best time of year.” Plants are started with rooting hormone, positioned in a mixture of perlite and a small amount of potting media, and placed under mist (1). Lorraine Kiefer, owner of Tripleoaks Nursery and Herb Farm in Franklinville, New Jersey, roots her cuttings in summer or in the greenhouse in winter (44).

In the South, cuttings can be taken from October to February (38). For her personal collection, Ann Wilson roots cuttings in regular potting soil in October and keeps plants outdoors in a shady area as long as night temperatures remain above 40°F. For the Pioneer Unit’s HSA-registered *Pelargonium* collection at Round Top, cuttings are taken in November and December and are placed in a greenhouse on open benches to promote air circulation. Although it’s common advice for zonal geraniums, Ann doesn’t recommend drying cuttings before rooting, especially for plants with delicate stems like the lemon-scented *P. crispum* (101).

Although this method is little-known, pelargoniums can also be propagated by leaf cuttings (38, 62). To prepare a leaf cutting, snip the leaf stem diagonally, far enough down the stem so that when it is inserted into the soil, 1 inch of leaf stem is below the soil but the leaf isn’t touching the soil. Dip in rooting hormone and insert into moist soil in a terrarium in indirect light. The cutting should root in about 10 days. Pelargoniums that have been successfully rooted using this method include *P. ‘Old Fashioned Rose,’ P. tomentosum, P. ‘Rober’s Lemon Rose,’ P. odoratissimum* and *P. ‘Nutmeg’* (62). Perhaps Mark Langan summed it up best when he said, “There are as many ways to propagate the

scenteds as there are varieties.” (47)

OUTDOOR CULTIVATION

Pelargonium cultivation may seem complicated to the beginner since different species and cultivars have different growth requirements, but if a few simple guidelines are followed, even novice growers can successfully propagate and grow these diverse and wonderful plants.

Hardiness

All pelargoniums are hardy in Zone 10 (4, 6, 90), but some are hardy to Zones 7-8 (4, 6). According to Dr. Arthur O. Tucker and Thomas DeBaggio, “well-mulched plants snuggled next to the house may be root-hardy to Zone 6” (90).

Soil

All pelargoniums require well-drained soil with good air circulation (4, 7, 63). Some, like *P. graveolens*, prefer moist soil, and others, like *P. scabrum*, grow in dry, sandy areas (4). Soil should be slightly acid with a pH of 6.0-6.8 (10, 63). Sterilized potting soil amended with perlite, pigeon grit, granular baked clay (3), sand or greensand (12) will provide adequate drainage. Ann Wilson likes to use pea gravel as a mulch for the smaller-leaved types (101). If planting in-ground, raised beds can aid drainage (38), and soil can be mulched yearly (32).

Planting

Pelargoniums can be planted in-ground or in containers, or a combination of both. If planting in-ground, remember that due to their temperature requirements, pelargoniums are generally grown as annuals in areas of North America that experience frost (10). One way to get around this is to plant pelargoniums in pots sunk into the ground. The late Dr. James Barrow, longtime curator of a HSA-registered *Pelargonium* collection in Cincinnati, Ohio, used this method for all of his plants (9). Planting in sunken pots allows plants to be easily moved indoors or to the greenhouse in fall (9).

In Texas, Madalene Hill and Gwen Barclay grow *P. graveolens*, *P.* ‘Round-Leaf Rose,’ *P.* ‘Rober’s Lemon Rose,’ *P.* ‘Attar of Roses’ and *P. quercifolium* in the ground in raised beds positioned between large shrubs that help remove excess moisture from the soil (38). They also like *P.* ‘Nutmeg’ and *P. odoratissimum* for ground plantings (38). Ann Wilson prefers *P. grossularioides* for ground plantings since it is hardy in Central Texas (101). Ann also uses *P.* ‘Peacock’ and *P.* ‘Snowflake’ (syn. *P.* ‘Logee’s Snowflake’) as bedding plants in summer and finds that they are “especially showy but revert to green forms after freezing to the ground” (101). Mark Langan, who gardens in Ohio, recommends large-leaf pelargoniums for ground plantings, pointing out that they are “so dramatic in the landscape and can get so huge and beautiful” (47). Karen England (Zone 10b) has found that all of her pelargoniums “thrive” both in the ground and in pots (32). She usually plants in October or November but points out that in her climate, pelargoniums can be planted year-round (32). Lorraine Kiefer grows many of her pelargoniums as annuals in-ground where they become “big and lush” (44). *P. capitatum* and *P. radens* can also work well for ground plantings (4).

If you will be planting directly in the ground, spacing should be based on the size and habit of the plant,

which may be large or small, spreading or upright with large or small leaves (3). Sandy Manteuffel plants her large in-ground pelargoniums 18-24 inches apart (58).

Containers

Pelargoniums are well-suited to container growing, whether in whiskey barrels, pots or hanging baskets. Clay pots are recommended because they promote water evaporation (1, 63) and prevent accumulation of excess moisture. Plastic and ceramic pots can retain too much water and prevent soil from drying out between waterings (1). The trailing habit of *P. 'Burgundy'* (a cultivar of *P. sidoides* and *P. reniforme*) is perfect for hanging baskets (4). Sprawling plants like *P. 'Fair Ellen,' P. tomentosum,* and *P. 'Attar of Roses'* work well for hanging baskets and window boxes (58). Combinations can be planted in 18-24-inch pots. Sandy Manteuffel likes a mix of *P. 'Fair Ellen,' P. 'Peppermint Rose' or P. 'Cinnamon Rose,' P. 'Grey Lady Plymouth,' and P. 'Ocean Wave' or P. 'Snowflake' (syn. P. 'Logee's Snowflake')* (58). According to Sandy, "Plants with upright growth habits can be trained into standards and are really beautiful. Some good choices are *P. crispum, P. 'Mabel Grey,' P. 'Old Fashioned Rose' and P. 'Frensham.'*" (58)



Pot of *P. 'Concolor Lace'* on the back porch steps at HSA Headquarters in Kirtland, OH
Photo by Michele Meyers

Caroline Amidon and Joyce Brobst keep many of their "show" plants in 6- or 8-inch pots, but Caroline also grows pelargoniums in larger pots on her terrace. She recommends placing tall types like *P. cucullatum* in the back, shorter ones in the front, and letting drooping types cascade over the edges. Variegated cultivars like 'Snowflake,' *P. 'Charmay Snow Flurry'* and *P. 'Atomic Snowflake'* add contrast and interest to a *Pelargonium* mix, and *P. 'Rober's Lemon Rose'* is great for combinations. Pelargoniums can even be planted in a strawberry jar; Joyce has had success planting *P. 'Golden Nutmeg,' P. grossularioides* and 'Fair Ellen' in the sides and *P. tomentosum* or *P. capitatum* on top (3).

When selecting a container, Mark Langan suggests matching the size of the container with the size of the leaf; large-leafed plants require large pots, and small-leafed plants do best in small ones. *P. 'Staghorn Oak,' P. 'Chocolate Peppermint' and P. 'Clorinda'* have large leaves that are 4-5 inches wide. These plants are great for whiskey barrels where they may reach 5-7 feet wide. For smaller types like *P. crispum,* a 6-inch pot is more appropriate (47).

Light & Temperature

Although most pelargoniums can be grown in full sun (63, 90), some species, including *P. odoratissimum, P. graveolens, P. grossularioides* and *P. tomentosum* require some shade (4, 6). The amount of shade required depends on the temperature, and partial afternoon shade is especially necessary if temperatures are high (10). Most pelargoniums prefer temperatures of 50-60°F at night and 65-75°F during the day (10), but the gray-green-leafed pelargoniums are most tolerant of high heat (4). Caroline Amidon has found *P. grossularioides* to be very tolerant of extreme conditions. This species has survived temperatures over 120°F in her greenhouse growing in gravel with no water (3). Madalene Hill cautions, however, that for some pelargoniums, extreme heat triggers dormancy, usually in mid-July in

the South (38). For most pelargoniums, growth stops when temperatures reach over 90°F (10). Southern growers should also know that the small-leafed citrus types can be difficult to grow in hot, humid climates (101).

Water

If there is a cardinal rule for watering pelargoniums, it is “less is more.” Although some grow near streams or in areas with winter rainfall in their native lands (4), most plants in this genus are native to low-rainfall areas (63), and they dislike excess water and humidity. Container-grown plants require more water than in-ground plantings, however (6), and the shade-loving *P. tomentosum* requires a heavily watered but well-drained container (4). To prevent fungal infections, the soil should be watered but leaves should not get wet (6, 7). Pelargoniums should be allowed to dry out completely between waterings (58). Rain will often suffice for in-ground plants. Susan Belsinger waters her full sun potted plants daily in the summer but only waters once or twice a week in her winter greenhouse (12). It is important to remember not to water during dormant periods, including periods of high temperature, which can be a particular challenge in the South (38). Madalene Hill and Gwen Barclay of Round Top, Texas, water their potted plants three times a week during the regular growing season. In the South, Ann Wilson has found that the small-leafed types such as *P. crispum*, *P.* ‘Countess of Scarborough,’ and *P.* ‘Gooseberry Leaf’ are particularly susceptible to overwatering (101). Madalene and Gwen suggest watering the tiny *P. crispum* group with a teaspoon or tablespoon. To make sure soil is dry, they recommend picking up the pot to assess its weight, or sticking a pencil in the soil. If soil sticks to the pencil, the plant doesn’t need water (38). Karen England drip irrigates her in-ground plants (32). If a plant has been overwatered, the leaves may turn brown. One way to remedy an accidental overwatering is to remove the plant from its pot overnight (12).

Fertilizer

Container-grown pelargoniums generally need more fertilizer than in-ground plants (6). *Pelargonium* cuttings can be fertilized with a balanced 20-20-20 fertilizer after they are rooted (7). For in-ground plants, compost and balanced organic fertilizer can be added to the soil before planting (10). Mark Langan doesn’t fertilize his in-ground plants, believing that healthy soil will provide enough nutrients, but for his potted stock plants he uses slow-release organic fertilizer added once halfway through the summer (47).

Caroline Amidon uses a Dositron to fertilize her large collection of plants, but for the average grower with a few plants, a tablespoon of fertilizer can be diluted in a gallon of water every 2 weeks (3). Susan Belsinger uses fish emulsion/kelp about once a month (12). For the Pioneer Unit’s *Pelargonium* collection in Round Top, Texas, granular fertilizer is used every 6 weeks during periods of high growth (101). Karen England prefers the fragrance of “slightly stressed” plants and uses very little fertilizer (32).

Scented pelargoniums are “heavy magnesium feeders” (47), and Epsom salts can be added to supplement magnesium (3, 10). If magnesium isn’t included in your mix, try adding a tablespoon of Epsom salts to a gallon of water once a month (3, 47). The calcium to magnesium ratio should be no more than 3:1 (47).

For commercial plantings of rose geranium for essential oil production, Dr. Arthur O. Tucker and

Thomas DeBaggio recommend 53-71 lbs/acre of nitrogen (90). Garden grown pelargoniums should not be given too much nitrogen because they may grow excessively (3). Mark Langan cautions that although some commercial bedding plant growers use the growth regulators Cycocel and Bonzi on pelargoniums, these should not be used on scented and culinary plants (47). Whichever fertilization method you choose, plants should not be fertilized during dormant periods, including the winter (3, 58) and episodes of very high heat (38).

Recommended Plants for Beginners

Beginners may be overwhelmed with the sheer number of *Pelargonium* cultivars available. For beginners, Sandy Manteuffel, who gardens in Cincinnati, Ohio, recommends the cultivar *P.* 'Fair Ellen,' which is easy to grow, does well in the ground, in pots and hanging baskets, and blooms more than some other pelargoniums (58). Caroline Amidon and Joyce Brobst recommend the species *P. odoratissimum*, *P. citronellum*, *P. tomentosum* and *P. capitatum* for beginners (3). Susan Belsinger recommends *P. tomentosum* and rose-scented geraniums since they are difficult to kill and "grow with reckless abandon" (12). Madalene Hill and Gwen Barclay suggest starting with larger-leaved types like *P. graveolens* and *P.* 'Rober's Lemon Rose' which won't have as much of a problem with over- and underwatering and "like a little neglect" (38). Smaller-leaved cultivars can be difficult in hot, humid climates (101). For Madalene and Gwen, woolly/velvety *P. tomentosum* "can be a challenge," and they recommend plants in the *P.* 'Graveolens' group (38). Other recommended cultivars included *P.* 'Rober's Lemon Rose' (32), *P.* 'Attar of Roses,' *P.* 'Frensham' (44), *P.* 'Round Leaf Rose,' *P.* 'Snowflake' (syn. *P.* 'Logee's Snowflake'), *P.* 'Candy Dancer' (101) and the old-fashioned rose geranium, *P.* 'Rosé' (87, 101).

INDOOR CULTIVATION/ OVERWINTERING

Unless they are treated as annuals, in many parts of North America, pelargoniums must be grown indoors during the colder months of the year. If plants can not be moved indoors, cuttings can be taken (58). For indoor growing and overwintering, plants should be brought indoors before nighttime temperatures fall below 45°F (10). Indoor plants will require at least 4 hours of direct sunlight or growlights, and are best placed in a south facing window or greenhouse (10). Joyce Brobst has grown plants under lights with a timer set for 10 hours on but has found that plants will get leggy and need to be pruned every 8 weeks (3). In parts of the South, a screened porch can be sufficient winter residence for potted pelargoniums (38). If plants are grown on windowsills, pots should be positioned on pebbles to aid drainage (6). Like their outdoor-grown counterparts, indoor plants also need proper air circulation, which will help prevent infestation by whiteflies, but overwintered plants require less water than during their primary growth periods in spring and summer (58). Remember that plants will need to be repotted, pruned and hardened off before moving back outside in the spring (10).

According to Mark Langan, rose-scented pelargoniums can be overwintered cold and dry, by uprooting and hanging them in the rafters of a dry basement. Although this method can also be used with some pungent and fruit-scented pelargoniums, it will not work for all pelargoniums, and Mark has found that it is most effective with the rose-scented types (47).

Pests & Diseases

Aphids, whiteflies, spider mites and mealy bugs may afflict indoor and greenhouse-grown plants (58). Root mealy bug is reportedly a problem for West coast growers (2), although Karen England, who gardens in Vista, California, has never experienced an infestation of this pest (32). For above-ground mealy bug infestations, Madalene Hill and Gwen Barclay simply prune plants aggressively, or “wack ‘em back” (38). A soil drench is the usual remedy for root mealy bug (2), but be wary of synthetic pesticides, particularly for culinary plants, and opt for organic alternatives.

Probably the most common *Pelargonium* pests are whiteflies (58) and aphids (4, 47). Adult whiteflies lay eggs on the undersides of leaves (79) and can transmit viruses that may infect pelargoniums (63). To combat these two pests, Caroline Amidon and Joyce Brobst suggest spraying plants with insecticidal soap once every 3 or 4 days (4, 6, 7). Garlic–chile spray can also be used to deter aphids, whiteflies and spider mites (12, 47), and horticultural oil spray can be used to kill eggs and nymphs (58). Dr. James Barrow had a simple solution for the occasional aphid, washing them off with a strong stream of water (9).

Japanese beetles can be a problem for outdoor plants since they eat *Pelargonium* leaves. Susan Belsinger has found that although they will attack all of her scented, Japanese beetles are particularly fond of the rose-scented. To combat these pests, Susan simply flicks them off daily (13).

Nematodes may attack in-ground plants if soil is not properly drained (47). Nematophagous fungus is a possible biological control, and companion planting with nematocidal plants like periwinkle and marigold may also help combat nematodes (27). Caterpillars may eat leaves and flower buds but can usually be removed manually (63).

Other pests that have been reported include slugs/snails, western flower thrips (*Frankliniella occidentalis*), vine weevil (*Otiorhynchus sulcatus*), and cyclamen mite (*Phytonemus pallidus*) which causes brittle, curling leaves, stunts growth and is primarily a problem in glasshouses (79).

Diseases that may attack pelargoniums include viruses that interfere with rooting cuttings (90), and bacterial blight (*Xanthomonas campestris pelargonii*), which causes yellowing, wilting and stem rot (10). According to Jim Adams, bacterial blight is the primary problem faced at the National Herb Garden. For this reason, pruners are sterilized before grooming each plant (1).

High humidity and excessive or improper watering can lead to fungal infections (7, 12, 90). Geranium rust (*Puccinia Pelargonii-zoralis*) can cause yellowish rings on leaves (10). The fungi *Fusarium*, *Pythium*, *Botrytis*, *Verticillium* and *Lasiodiplodia* can cause root rot and wilt (27, 90). *Botrytis* (*Botrytis cinerea*) causes gray mold and stem/leaf/flower blight and is common in winter greenhouses (10). Black leg/stem may affect cuttings or weak plants, especially if overwatered or given inadequate air circulation (3, 38, 63).

Susan Belsinger recommends using an oscillating fan in the greenhouse to improve air circulation and compensate for humidity (12). If your plant does succumb, affected areas should be removed and discarded or burned, but not composted (6, 12) since fungal spores may survive in compost and infect other plants (7).

Galls, or fasciated growths at the stem’s base, may appear on older possibly pot bound plants. The

cause of this growth is *Rhodococcus fascians*, a pathogenic bacterium. Cuttings may be taken, but the plant should then be destroyed (5).

Despite this long list of potential threats, with proper care, pelargoniums can be relatively pest and disease free. Good air circulation, sterilized pots and potting soil, avoidance of excessive/overhead watering, and prompt pruning of yellowing leaves can help ensure healthy plants (10, 58).

Pruning & Harvesting

Pruning is essential to keep pelargoniums healthy and attractive and to prevent upright plants from becoming “leggy.” Indoor grown plants have a particular tendency toward legginess, if not diligently pruned (44). Pinching/pruning plants will encourage branching, producing a sturdy and well-shaped plant. The plants Joyce Brobst grows under lights at the community college where she teaches are pruned about every 8 weeks (3).

When they have 3-4 sets of leaves, plants should be pinched in the tip to promote branching (3, 5). Two branches or stems will grow at the pinched node (3) which can then also be pinched when each has 5 nodes (10), creating a compact and shapely plant (12). If properly pinched, *P. tomentosum* will grow into a “magnificent” mound in the garden (3). The amount of pinching required depends on the growth rate of the plant (3). Madalene Hill and Gwen Barclay cut most of their pelargoniums back to 5-6 inches high regularly and find that although the smaller-leaved cultivars need more conservative pruning since they don’t grow as fast or get as leggy, rose and oakleaf types require especially aggressive pruning. Madalene and Gwen prune their pelargoniums hard 2-3 times per year, once in their Texas greenhouse in January, once in late spring (April) and in August. Major prunings are harvest time for Madalene and Gwen. Any dead branches or brown leaves should be removed as needed, and ends should be nipped throughout the summer if plants start to become leggy (38). Mark Langan cuts back his 4-foot pelargoniums to 1-foot stumps every fall. Even though growers can be hesitant to prune this dramatically, in a month the plant will grow back looking “tall and gorgeous and beautiful” (47).

Plants should also be cut back in fall before bringing in for the winter (58). Leaves can be harvested as needed, but fall pruning is a good time for a major harvest to make syrups for the freezer and sugars (12). Although some growers prefer to harvest on cloudy days, a study conducted during the rainy, autumn and spring seasons on the plains of south India found that essential oil yield for rose-scented *Pelargonium* was highest between 12:00 p.m. and 4:00 p.m., during periods of peak sun and heat (72). Plants grown for geranium oil are usually harvested “about 4 months after planting” (90). If harvesting for fresh bouquets or cooking, Madalene Hill and Gwen Barclay prefer to harvest early in the morning or the night before usage so cuttings don’t wilt. Leaves should be removed by snipping rather than pulling (38).

Sandy Manteuffel likes to make instant natural potpourri while pruning. Simply toss fragrant leaves in a basket and stir periodically until dry (58).

Preserving & Storing

Drying

Drying can be an easy and effective method for preserving *Pelargonium* leaves, and dried leaves of the scented types will retain their fragrance as well as when fresh (3). In Susan Belsinger's experience, the rose-scented types hold their fragrance the longest (12).

Pelargoniums can be dried by hanging upside down in bundles (1) or by placing on newspaper or screens (3) indoors, out of direct sun (38). They can even be dried in a paper bag kept in the car (3). If drying on newspaper or screens, Caroline Amidon suggests keeping leaves in a single layer to prevent the growth of mildew (3). Leaves should be removed from the stem and will dry in 7-10 days (38). Dried leaves can then be added to potpourri.

Frozen Oil Concentrates

The preferred preservation method for Madalene Hill and Gwen Barclay is the frozen oil concentrate. To prepare an oil concentrate, blend 2 cups hard-packed scented *Pelargonium* leaves with ½ cup vegetable oil. *P. graveolens* and *P. 'Rosé'* leaves are thick and will absorb more oil. If the mixture appears dry and crumbly, add more oil. If it is not moist enough, the oil concentrate will lose fragrance. For proper food safety and to prevent botulism, oil concentrates should be stored in the freezer but can be thawed for use in cakes and cookies (38). See the Culinary Uses section for recipes.

Other Preservation Methods

Leaves can also be preserved by pressing (44, 58), but Susan Belsinger finds that leaves pressed between the pages of a book can turn pale green and have a brownish color (12).

Uses

Culinary Uses

Best known as fragrant and flavorful additions to cakes and jellies, scented pelargoniums actually have a variety of culinary uses not limited to the dessert course. The pelargoniums most often used in food are the rose-, lemon-, and peppermint-scented species and cultivars (10). Commonly used lemon-scented culinary species include *P. crispum* and *P. citronellum* (14, 34). Rose-scented types include *P. graveolens* and members of the *P. 'Graveolens'* cultivar group. Other species and cultivars with culinary use include the lime-scented *P. 'Lime,'* the lemon balm-scented *P. 'Lemon Balm'* (34), and the strawberry-lemon-scented *P. 'Lady Scarborough'* (86). There are many rose and citrus-scented cultivars with culinary use including those with hints of peach, cinnamon and orange (34). *P. 'Rosé' / P. 'Old Fashioned Rose'* is a culinary favorite among HSA's *Pelargonium* aficionados (3, 32, 38, 101). Madalene Hill and Gwen Barclay prefer 'Old Fashioned Rose' for recipes because it retains its flavor better than other cultivars when chopped and/or cooked (39).

Leaves of the rose-, lemon- and peppermint-scented types can be added to iced tea, butter and ice cream (6, 7). Rose and lemon pelargoniums can be layered in flour or sugar to add a subtle and distinctive

flavor and aroma to baked goods (7). They can also be candied with egg white and sugar (10) and used to decorate cakes and other desserts. The traditional method for preparing scented geranium cake is to line the bottom of a cake pan with leaves before adding batter, but there are many variations on this idea. See the recipe section for details. Rex Talbert has found that lining the cake pan with leaves can produce a “scorched” taste. To infuse pound cake with rose geranium flavor, Rex bakes the cake, cools it completely, and then places it in a plastic bag with 3-4 cups rose geranium leaves, replacing the leaves daily and storing the cake at room temperature. After 2 days the cake develops a rose-geranium flavor. Rex prefers new leaves for this recipe since the tips of new leaves contain the most essential oil (85). Lemon- and rose-scenteds are most often included in cakes, but *P. tomentosum*, the peppermint-scented species, can give a minty flavor to chocolate cake (14). A traditional use for the rose-scenteds is to add a leaf to boiling apple jelly for a “subtle” rose flavor (6, 7, 81). Lemon-scenteds like *P. citronellum* make a lovely lemon liqueur (3, 7) and rose-scenteds can be used to create rose geranium wine (41). Other culinary possibilities include fruit punch, herbal vinegars (10, 14), salads, biscuits, breads (11), cream cheeses (38) and rice dishes (12). In addition to more traditional uses, fresh leaves of the lemon-scented *P. crispum* compliment soups, sauces, fish and poultry (14).

P. 'Ginger' (syn. *P. 'Toronto'*) has ginger-scented leaves that can be added to cakes, jellies, beverages, desserts and sandwiches (34). *P. 'Nutmeg'*, the nutmeg-scented geranium, can be used in cakes (12) and has even been added to pâté, stuffing, potato salad and coffee (14, 34). *P. odoratissimum*, the apple-scented *Pelargonium*, is another possible addition to fruit drinks, syrups, sauces and desserts (14). Some of the zonal cultivars can reportedly be used like spinach in cooking and taste similar to asparagus or cabbage (23). *P. acetosum* leaves are acidic tasting and can be eaten raw in salads or cooked into soups and stews (14, 34). *Pelargonium bowkeri* is believed to have been used as a salad herb in its native area of Lesotho (43).

Scented *Pelargonium* flowers are also edible, and according to Susan Belsinger “have mild, pleasing scents and sometimes taste slightly sour.” Flowers can be candied and used in many of the same ways as the leaves (11).

Pelargonium leaves and flowers make attractive garnishes for food and drink. Leaves of lemon- and mint-scenteds can be frozen into ice cubes and added to drinks (10, 102), and ice cream or fruit salad can be served in an iced geranium bowl made by freezing *Pelargonium* leaves and water in a ring mold or between two bowls (23). In addition to use in fingerbowls, *P. crispum* and other lemon- or lime-scented geraniums can add a refreshing fragrance to warm, damp napkins distributed at the end of a meal (39). When preparing medium to large leaves for garnish, Madalene Hill and Gwen Barclay recommend rinsing in cold water, removing stems and placing between one damp and one dry paper towel, then rolling in a cloth towel and refrigerating until needed (39).

When working with scented pelargoniums in the kitchen, Madalene and Gwen offer the following tips: Whether using *Pelargonium* leaves as a garnish or chopping to add to a dish, first remove stems from leaves. For optimum flavor, chop leaves just prior to using. Finely chopped leaves can be added to many types of baked goods including cookies, shortbread, shortcakes, cheesecake, baked puddings, custard pies, cakes and cobbler and fruit pie toppings. One to 2 tablespoons of chopped fresh leaves are adequate for most dishes that serve six, and Madalene and Gwen suggest starting with a conservative amount and adding more if necessary. Leaves should be “flecked” through the dish. Chopped fresh rose- or citrus-scented *Pelargonium* leaves are also wonderful additions to fresh or frozen fruit (39).

Pelargoniums: An Herb Society of America Guide

Chopped leaves can also be made into frozen oil concentrate (see Preserving & Storing section) that can be used in many recipes calling for fresh chopped *Pelargonium* leaves, especially browned baked goods like cookies. If substituting in recipes, use half as much oil concentrate as you would fresh-chopped leaves (39). Madalene and Gwen don't like using the tiny-leaved types in cooking since so many leaves would be required (38).

When preparing custard sauce, sugar syrups or fruit jellies, drop green branches of 'Old Fashioned Rose' with leaves attached into cooking liquid, and remove them promptly when liquid thickens so that leaves don't disintegrate into the mixture (39).

When cooking with the scented, remember that less is more. Susan Belsiner has noticed that beneath their primary scent/flavor, all scented have an underlying musky, pungent, earthy note. Susan cautions those new to cooking with pelargoniums that they should be used "sparingly so that they don't overwhelm" (12).

The essential oil of *P. graveolens* (and cultivars from the *P.* 'Graveolens' group) and the cultivar *P.* 'Rober's Lemon Rose' are used as a food flavoring in the commercial food industry (14, 34). *P. graveolens* oil reportedly flavors commercial baked goods, gelatin, pudding, candy, frozen dairy desserts, and alcoholic and non-alcoholic beverages (50). *P. crispum* is also used economically as a flavoring additive (99).

Not all pelargoniums are appropriate for cooking. Despite its tempting coconut fragrance, *P. grossularioides* should not be used in cooking, especially by pregnant women, due to its historic use as an abortifacient (4). For information on GRAS status, see the Nutrition section.

Recipes

PINEAPPLE ROSE FREEZE

4 cups pineapple juice
10 rose-scented geranium leaves
2 cups sugar
½ cup lime juice

Heat pineapple juice slightly. Add rose-scented geranium leaves and use a spoon to gently bruise them against the sides of the container. Cover and let steep 30 minutes. Remove leaves. Add sugar and lime juice and stir until dissolved. (Heat slightly to speed dissolution.) Cool the mixture and freeze using an ice cream freezer or the shallow pan in the freezer technique.* Garnish with pineapple sage or scented geranium leaves and flowers when serving.

*Pour liquid into a shallow baking pan. Place in the freezer. Stir with a fork every 30-45 minutes until frozen.

Recipe © Ann Wilson

ORANGE PINEAPPLE COOLER WITH SWEET HERBS

6 cups orange juice
1 large can pineapple juice (46 ounces)
¼ cup sugar (more or less as needed)
Large handful (12-20 branches) of rose geranium and other sweet herbs such as basil – especially clove variety, lemon balm, lemon verbena, mint (doublemint *Mentha xgracilis* ‘Madalene Hill,’ orange mint or spearmint) – 6 to 8" long branches with flowers, leaves and tender green stems)
2-3 tablespoons lemon juice
Sprigs of fresh herb and flower to garnish

Place juices and sugar in a large glass or plastic container, stirring to dissolve sugar. Twist and break branches of herbs to release flavor; add to juices, stirring well. Cover and let stand overnight to flavor. Lift out herbs, pressing hard to extract liquids. Serve immediately over ice or blend with crushed ice to a slushy consistency.

Yield: 12 cups liquid, without ice

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

HILLTOP MAY WINE

2 liters (approximately 8 cups) wine. Suggest Rosé, Chablis, White Zinfandel, Chardonnay, Chenin Blanc or Sauvignon Blanc – inexpensive jug wines work well
1 tablespoon (hard packed) **each** dried rose geranium, lemon verbena, and sweet woodruff leaves
2 cups fresh or frozen strawberries, puréed in blender
2 cups fresh juice or canned fruit nectar: peach, pear or apricot
Whole or sliced fresh strawberries and edible flowers for garnish

Combine herbs and wine, and refrigerate for at least 24 hours, up to several days. Strain and combine with blended fruit and juice. Stir well before serving. Garnish with whole strawberries and flower petals.

Yield: serves 12-16

Note: For a faster method, **simmer** herbs in a small amount of wine for 10 minutes. Cool and add to remaining ingredients as directed above.

Substitute 3 tablespoons **each** fresh rose geranium and lemon verbena leaves and tender stems for the dried measurement. Dry sweet woodruff slightly to develop vanilla flavor and fragrance.

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection - adapted from *Southern Herb Growing*, Hill and Barclay, Shearer Publishing.

PELARGONIUM LIQUEUR

1 quart loosely packed *Pelargonium* leaves
1½ cups sugar
¾ cup water
1 liter vodka

Place *Pelargonium* leaves in a 2 quart jar — lemon-scented or rose-scented types work well. Prepare a syrup by heating and bringing to a boil 1½ cups of sugar in ¾ cup of water, and then allow it to cool to room temperature. Mix the sugar syrup with 1 liter of vodka and pour over the *Pelargonium* leaves. Place in a dark closet for at least 6 weeks, filter and put into a bottle for use. Will last for months if stored in a cool, dark place.

Recipe © Caroline Amidon and Joyce Brobst

APPLE ROSE GERANIUM JELLY

½ cup firmly packed fresh leaves and tender stems of rose geraniums
3 cups frozen apple juice, diluted according to directions, or canned/bottled juice
6 cups sugar
1 package powdered fruit pectin
2 tablespoons lemon juice
Whole leaves to pack in finished jelly if desired

Combine fresh or dried rose geranium leaves and part of juice; bring to a boil. Remove from heat and steep at least 15 to 20 minutes. Strain and add remaining juice. If needed, add more juice to yield 3 cups. Place juice in a heavy, large saucepan over high heat; add powdered pectin and bring to a full rolling boil (cannot be stirred down). Add sugar, continue stirring and heat again to full rolling boil. Boil hard for 1 minute, stirring constantly. Remove from heat, stir and skim off foam quickly. Immediately pour jelly into sterilized containers; a whole leaf may be added, held down with a salad fork until jelly cools slightly. Seal with sterilized lids and process 5 minutes in hot water bath, according to jar manufacturer's instructions.

Use Rose Geranium Jelly as a filling for cake layers; soften and use as a glaze for cakes or sauce for fresh fruit; fill center of small cookies (*patisseries*) before baking; top cream cheese – spread sweet breads for tea sandwiches. It is excellent served as a condiment with poultry.

Yield: approximately 8 jars, ½ pint each

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

SPICY “GERANI-YUM” JELLY

This recipe was adapted from a cookbook (with a title long forgotten) that I borrowed from a cousin years ago. I have added the geraniums. It makes a great gift!

Pelargoniums: An Herb Society of America Guide

3½ cups sugar
1½ cups bottled cran-raspberry juice
1/8 teaspoon **each** ground cinnamon and cloves
1 cup firmly packed scented *Pelargonium* leaves such as 'Old Fashioned Rose,' 'Rober's Lemon Rose' or 'Limonium' or a combination (plus more leaves and flowers for the jars, if desired)
½ cup White Zinfandel or Rosé wine
3-ounce packet liquid fruit pectin

In a large saucepan combine the sugar, juice, spices and pelargoniums. Bring to a boil and stir to dissolve the sugar. Boil 1 minute stirring constantly. Remove from heat and stir in wine and pectin. Strain, discarding the herbs. Ladle the hot jelly into clean jelly jars each containing a scented geranium leaf and some flowers, if desired. Leave ½-inch headspace. Cool slightly, cover with tight-fitting lids. Store in the refrigerator or freezer (or process in a hot water bath according to the instructions included with the pectin). Be sure to inform any gift recipients that the jelly needs to be stored in the refrigerator if it has not been processed in a hot water bath. Makes about 6 half-pint jars.

Recipe © Karen England

LIME GERANIUM QUINCE HONEY

4 quinces, peeled, cored, and coarsely grated
1 sour apple, peeled and cored
4 cups hot water
6 cups sugar
2 tablespoon lemon juice
6 lime geranium leaves

Simmer quinces, apple, water, sugar, and lime geranium leaves for approximately 30 minutes, stirring frequently. Mixture should be the consistency of honey. Add lemon juice during the last few minutes of cooking. Remove lime geranium leaves. Pack into hot, sterilized jelly glasses and seal under boiling water using standard canning procedures.

Recipe © Arthur O. Tucker, excerpted from *Scented-Leaf Geraniums: Introduction and Recipes*. Dover, Delaware. Dept. of Agriculture and Natural Resources, Delaware State University.

LIMONCELLO CAKE MADE WITH *P. CITRONELLUM* LEAVES

1 box lemon cake mix
1 box lemon instant pudding mix
4 large eggs
½ cup vegetable oil
½ cup lemon juice
½ cup Limoncello (an Italian lemon liqueur)
Finely grated rind of 1 lemon

1 cup chopped pecans
1 tablespoon finely minced *P. citronellum* leaves

Beat for at least 3 minutes. Pour into buttered and floured bundt pan. Place in preheated oven (350°F) and bake 50-60 minutes. Remove from oven and place on rack. Make topping:

¼ pound butter
1 cup sugar
¼ cup water or lemon juice

Melt and bring to a full boil, until sugar is melted. Remove from heat and add ¼ cup Limoncello. Pour slowly over hot cake. Cool in pan. Turn out on plate and decorate with scented pelargoniums if so desired.

Recipe © Caroline Amidon and Joyce Brobst

SCENTED GERANIUM CAKE

A few simple variations can be used depending upon which type of geranium blossom you are using to prepare this cake. For instance, if using a lemon-scented blossom, use the called-for lemon zest, if it is lime-scented, substitute lime zest. If you have nutmeg or clove-scented flowers, omit the zest and add about ½ to ¾ teaspoon of freshly ground nutmeg or ground cloves. Rose geranium sugar or a few drops of rosewater can be added to a cake using rose geranium blossoms. This recipe is excerpted from Flowers in the Kitchen by Susan Belsinger, Interweave Press, 1991.

Makes a 13x9x2-inch cake

About 24 scented geranium blossoms (small to medium leaves can be used also)

6 extra large eggs
4 extra large egg yolks
2 cups sugar
2½ cups unbleached white flour
½ teaspoon salt
16 tablespoons unsalted butter, melted
Zest from 1 lemon
Rose geranium or vanilla sugar

Preheat the oven to 375°F degrees and generously butter and lightly flour a 13x9x2-inch baking pan. Place the geranium flowers and leaves in the bottom of the baking pan.

Combine the eggs, yolks, and sugar in the bowl of an electric mixer and beat until pale yellow and very thick. Sift the flour with the salt three times.

Slowly fold the flour into the egg mixture, a third at a time. Carefully fold the melted butter into the batter in thirds. Fold in the lemon zest.

Carefully pour the batter into the pan over the flowers and leaves. Bake the cake in the center of the oven until the top is a pale golden brown and a cake tester comes out clean, about 35 to 40 minutes. Do not over bake this cake.

Cool the cake completely before removing from the pan. Sprinkle the inverted cake lightly with rose geranium or vanilla sugar. Serve plain or with whipped cream if desired, garnish with a fresh geranium flower or leaf.

Recipe © Susan Belsinger

ROSE GERANIUM POUND CAKE

Originally from Southern Herb Growing, we now prepare this famous cake with chopped rose geranium and stir into the batter rather than lining the pan with whole leaves.

1 ½ cups butter, cut into small pieces
3 cups sugar (may use vanilla sugar—decrease vanilla extract)
5 eggs
3 cups sifted all-purpose flour
6 ounces lemon-lime soda (do not use diet soda)
1 tablespoon fresh lemon juice
1 ½ teaspoons pure vanilla extract
2 tablespoons finely chopped fresh rose geranium leaves or 1 tablespoon oil concentrate
Sifted powdered sugar for garnish and additional rose geranium leaves

Preheat oven to 325°F. Grease (do not use spray type coating) and flour a 10-inch bundt or tube cake pan, or 2 large loaf pans. Beat butter and sugar with electric mixer until light and fluffy. Add eggs one at a time, beating well between each addition. Add flour alternately with soda, beating well. Stir in lemon juice, vanilla extract and chopped rose geranium leaves.

Pour batter into prepared cake pan, smoothing top. Bake 1 ¼ hours or until cake tester comes out clean when inserted into middle. If necessary to prevent over-browning (ovens vary), place a piece of aluminum foil lightly over the cake toward end of baking. Remove cake from oven and let cool for 10 minutes in pan; invert carefully on serving plate. Slice and serve with vanilla custard, lemon curd or other sauce. Sprinkle with sifted powdered sugar and garnish with fresh rose geranium leaves.

Note: Cake freezes very well. Wrap tightly in aluminum foil, then in large plastic freezer bag. Let come to room temperature before serving. Cake can also be warmed in a low oven; keep tightly wrapped in foil to warm.

Yield: 16 slices

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

STRAWBERRY GERANIUM MUFFINS

½ cup tender strawberry geranium leaves
Grated peel of 1 orange
¼ cup warm water
1 package active dry yeast
½ cup boiling water
¼ cup sugar
3 tablespoons butter
1½ teaspoon salt
½ cup evaporated milk
2 eggs, beaten
3½ cups sifted all-purpose flour
18 sugar cubes
Melted butter

Chop fine the strawberry geranium leaves with the grated orange peel; set aside. Soften yeast in warm water a few minutes, then stir until dissolved. Pour boiling water over sugar, butter, and salt; allow to cool until just warm. Add milk, yeast, eggs and about half of the flour. Beat very well. Beat in remaining flour. Cover and let rise until doubled, about 1½ hours. Beat well and fill 18 greased 2¾" muffin cups two-thirds full. Make a dent in the top of each muffin. Roll the sugar cubes in the strawberry geranium-orange peel mixture and place in the muffin dents. Brush melted butter over the tops. Let rise until doubled, about 1 hour. Bake in a preheated 375°F oven for about 25 minutes.

Recipe © Arthur O. Tucker, excerpted from *Scented-Leaf Geraniums: Introduction and Recipes*. Dover, Delaware. Dept. of Agriculture and Natural Resources, Delaware State University.

BREAD MACHINE
LEMON HERB BREAD

¾ cup evaporated skim milk
3 tablespoons safflower oil (or other vegetable oil)
1 teaspoon sea salt
1 tablespoon fresh lemon juice (zest the lemon first and reserve the zest for later use before juicing)
2 large eggs, lightly beaten
3 2/3 cups unbleached all-purpose flour
3 tablespoons sugar
3-5 leaves of 'Mabel Grey' scented *Pelargonium*, chopped, or other lemony-scented geranium variety or herbs of choice, see below.*
Zest of 1 lemon
2¼ teaspoons active dry yeast (or 1 packet)

Measure the ingredients, in the order listed, into the bread machine pan that is fitted with the paddle. Select the "sweet" bread cycle if you have that option (or "basic" cycle, if you don't) and select the crust setting for "light." Because of the milk and eggs, this bread cannot be made using the delay timer. Start the machine and remove the finished bread promptly to cool before slicing. This refreshing bread

makes good toast and sandwiches; it is my bread of choice for tuna fish sandwiches! Any leftovers make tasty and different croutons for soup and salad.

*Other lemony or citrus-scented pelargoniums can be substituted for 'Mabel Grey' in this recipe such as 'Lime,' P. 'Orange,' P. 'Strawberry' ('Lady Scarborough') and 'Rober's Lemon Rose.' Also, other lemony herbs such as lemon balm, lemon mint, lemon basil and lemon thyme can all be used. Substitute 1-2 tablespoons of the chopped fresh lemon herb of choice to replace the 3-5 'Mabel Grey' leaves called for in the recipe. Dried herbs can be used, just reduce the amount by half. Lemon verbena leaves can be used, either fresh or dried, but because they do not chop well, the method for lemon verbena is different and as follows: Warm, but do not boil, the $\frac{3}{4}$ cup of evaporated milk called for in the recipe with 1-2 tablespoons crushed lemon verbena leaves and remove from the heat to steep. When cooled completely, strain out the lemon verbena and proceed with the recipe.

Recipe © Karen England, adapted from the "Lemon Bread" recipe in *Bread Machine Baking For All Seasons* by Connie Merydith, Prima Publishing ©1997.

ROSE GERANIUM ALMOND COOKIES

2½ cups all-purpose flour
1½ cups granulated sugar (can use rose geranium or vanilla flavored sugar)
1 teaspoon baking powder
½ teaspoon ground mace
1 cup butter (8 ounces)
1 whole egg
1 tablespoon water
½ teaspoon almond extract
1 tablespoon rose geranium oil concentrate (or 2 tablespoons chopped fresh leaves)
1½ cups finely ground, toasted almonds
2 teaspoons finely ground coriander seed
2 teaspoons minced orange peel

Preheat oven to 350°F. Combine dry ingredients with a wire whisk; set aside. Cream butter and sugar together in mixer bowl until fluffy. Add egg and mix well. Add dry ingredients a little at a time, then water and almond extract. Stir in rose geranium oil concentrate or chopped leaves, toasted almonds, coriander seed and orange peel. Mix thoroughly. Roll into small balls (walnut size or smaller), then roll in sugar. Press flat with the bottom of a slightly dampened glass or "pounder." Bake on ungreased cookie sheets at 350°F until lightly browned, about 20 minutes.

Yield: 75 cookies

Variation: Substitute other nuts for almonds; vary the spice and citrus peel. Toasted pecans, pistachios or walnuts are equally delicious.

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

BROWN BUTTER ALMOND TORTE
WITH ROSE GERANIUM

½ cup unsalted butter
1 teaspoon pure vanilla extract
4 ounces toasted almonds, natural sliced, slivered or whole (unsalted)
½ cup all-purpose flour
1 cup granulated sugar, divided
¾ teaspoon salt, divided
1 tablespoon firmly packed chopped fresh rose geranium leaves
6 egg whites, at room temperature
1/3 cup toasted sliced natural almonds
Fresh fruit
Rose Geranium and Vanilla Bean Custard

Preheat oven to 350°F. Butter and flour a 9-inch spring-form pan, or cake pan with removable bottom. Knock out excess flour and set aside pan.

Melt butter in a small saucepan over low heat until golden. Cool to lukewarm; add vanilla extract. Set aside. In a food processor, grind almonds until very fine, along with flour, 2/3 cup of sugar and most of salt. Beat egg whites until soft peaks form; gradually add remaining sugar and salt, and continue beating until stiff but not dry. Using a rubber spatula, fold egg whites into nut mixture. Add browned butter and chopped fresh rose geranium leaves, mixing well; spread batter evenly into prepared pan. Sprinkle with sliced almonds and bake in the middle of oven for about 25-30 minutes, or until cake begins to pull away from sides of pan. Cool for 5 minutes in pan; run a knife around sides to release cake. Unlatch side and carefully remove cake from pan by inverting onto a serving plate. Serve at room temperature with fruit and warm custard or topping of choice.

Yield: 8-12 servings

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

ROSE GERANIUM MERINGUE TORTE
A variation of the famous Austrian Schaum Torte

1/3 cup toasted sliced almonds or whole pine nuts
½ cup butter
½ cup granulated sugar
4 egg yolks, beaten lightly
1 teaspoon vanilla
3 tablespoons chopped rose geranium leaves (stems removed), measurement divided
1 cup cake flour, sifted before measuring
1 teaspoon baking powder
1/8 teaspoon salt
4 egg whites, room temperature
1 cup granulated sugar

Pelargoniums: An Herb Society of America Guide

1 teaspoon vanilla
1 cup fresh blueberries, strawberries or raspberries
Lime Curd (recipe follows)
Additional berries and whole rose geranium leaves for garnish

Preheat oven to 325°F. Lightly crumble toasted almonds; set aside. In electric mixer bowl, cream butter and ½ cup sugar until light. Add egg yolks and vanilla, beating well. Stir in 2 tablespoons chopped fresh rose geranium.

Sift cake flour, baking powder and salt together. Stir into butter mixture, beating at low speed until well combined. Batter will be thick. Grease and flour 2 cake pans, 9x2-inch. Spread batter smoothly in pans and set aside.

In a clean mixer bowl and with clean beaters, beat egg whites until stiff but not dry. Gradually add remaining 1 cup sugar, 1 tablespoon at a time, while beating continuously. When all sugar is added, continue to beat for several minutes, then fold in vanilla at low speed. Dividing evenly in half, spread meringue on top of batter in pans, carefully smoothing. Top one pan with crushed almonds. Bake in a preheated oven for about 40 minutes. If meringue browns too soon, reduce heat slightly. When done, meringue should be dry and lightly browned. Remove cakes from oven and cool in pans. Avoid damp drafts or meringue will become gummy. Prepare Lime Curd as directed below.

A short time before ready to serve, place the layer **without almonds** on a cake plate, meringue side down. Spread layer with half of Lime Curd, being careful not to let it run over the sides. Add remaining 1 tablespoon chopped rose geranium leaves to 1 cup fruit; sprinkle over cake layer that is spread with Lime Curd. Top with second layer, placing almond side **facing up**. Sprinkle with additional blueberries and drizzle with more Lime Curd in a criss-cross pattern. Garnish with whole rose geranium leaves. Keep cool until served.

Yield: 10-12 servings

Lime Curd

2 whole eggs
2 egg yolks
1 cup sugar
2/3 cup fresh lime juice
1 cup butter, cut in small pieces
2 teaspoons finely chopped rose geranium leaves
1 tablespoon lime zest (no white pith)

Mix first five ingredients in electric blender or mixer until smooth. Transfer to a heavy stainless or ceramic saucepan and cook until thickened, stirring constantly. Add chopped rose geranium leaves and lime zest.

You may also cook curd in a double boiler. Serve warm. Refrigerate leftover sauce and reheat in a double boiler to serve.

Fold whipped cream into curd to lighten for other purposes.

Yield: 2 cups

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

CHOCOLATE ROSE-SCENTED SOUFFLÉ

Originally I tried preparing this recipe with rose water, but the flavor was not strong enough. Rose syrup is good in this recipe, however cooking down fresh organic rose petals takes longer than the following simple syrup. By all means, try rose syrup if you have some on hand.

To make rose geranium syrup, combine 1 cup water with 1 cup sugar and about 10 or 12 rose geranium leaves in a small saucepan, bruising the leaves against the side of the pan with a spoon. Place over moderate heat and bring to a boil. Cover, remove from heat and let stand for at least 30 minutes. Remove the leaves and squeeze them into the syrup to extract their flavor. This syrup can be made ahead and kept in the refrigerator for up to 1 month or frozen for up to 1 year. You can make other herb-flavored syrups in the same manner. Mint-scented geranium, orange mint, peppermint, spearmint, or anise hyssop would be good in this recipe; use about five 4- or 5-inch sprigs in place of the geranium leaves.

Serves 6 to 8

½ cup half-and-half cream
4 ounces semisweet chocolate, broken into pieces
1 ounce unsweetened chocolate, broken into pieces
¼ cup sugar
2 pinches salt
5 extra-large eggs, separated
¼ cup rose or rose geranium syrup
Whipping cream
Organic rose geranium flowers, rose petals or candied rose petals

Preheat the oven to 375°F. Generously butter six 1-cup ramekins or custard cups and sprinkle lightly with sugar.

Combine the cream, chocolate, sugar, and salt in a heavy-bottomed saucepan. Place over medium low heat. Whisk the chocolate as it melts to make a smooth mixture. Remove from heat when the chocolate is completely melted.

Beat the 5 yolks, one at a time, into the chocolate mixture. Whisk the rose geranium syrup into the chocolate, 1 tablespoon at a time. In a separate bowl, beat the egg whites until stiff but not dry.

Whisk about a cup of the egg whites into the chocolate mixture. Then pour the chocolate mixture into the whites and fold until just blended. Pour the mixture into the prepared dishes and bake in the lower half of the oven for 12 minutes, until they are set.

While the soufflés are cooking, whip about ½ cup whipping cream with 1 tablespoon of sugar until almost stiff. Whisk in about 1 tablespoon rose syrup, taste; add a bit more if desired.

Remove the soufflés from the oven. Scatter a few fresh rose petals or rose geranium flowers over the soufflés if you have them, or garnish each soufflé with a candied rose petal. Serve the soufflés immediately and pass the whipping cream. (You have about 5 to 7 minutes to serve the soufflés before they start to deflate.)

If you have leftover soufflés, you can refrigerate them and eat them the next day. Their texture will be denser, but they are still tasty served at cool room temperature.

This recipe is excerpted from *Not Just Desserts – Sweet Herbal Recipes* by Susan Belsinger, © 2005.

SCENTED GERANIUM SUGAR

Scented sugars can easily be made the same way that the Europeans have been making vanilla sugar for years. Placing a vanilla bean, or a handful of herb leaves and/or flowers, in a pint jar of sugar transforms the sugar into a pleasing, fragrant addition to cakes, cookies, custards, whipping cream, and all sorts of sweets. If you do a lot of baking, make this in larger quantities—say a quart or half-gallon jar—you will find that you use it often.

Some favorite herbs for making scented sugars are: lemon balm, lemon verbena, orange or peppermint, and of course, scented geraniums—especially ‘Rober’s Lemon Rose,’ ‘Attar of Roses,’ and ‘Old Fashioned Rose.’ Edible flower choices are lavender, lilac, rose, violets, and anise hyssop.

About 2 cups sugar

1 handful of herb leaves and/or flowers

To prepare scented sugar, use a clean pint jar with a tight-fitting lid. Fill the jar about one-quarter full with sugar, place a few herb leaves and/or flowers in the sugar. Cover with sugar so that the jar is half full, add a few more herbs and add sugar until the jar is three-quarters full; add a few more leaves; cover with sugar to fill the jar, leaving about ½ inch headspace. Shake the jar and place on a shelf in a cool, dark place.

The sugar will be ready to use in 2 to 3 weeks and will become more flavorful with age. As the sugar is consumed, add more plain sugar to take its place and it will take on the fragrance in the jar.

Since herbs contain moisture, the sugar will absorb some of it and perhaps cake together, or even harden. If this happens, just use firm pressure to crumble it with your hands, or the back of a wooden spoon.

This recipe is excerpted from *Not Just Desserts – Sweet Herbal Recipes* by Susan Belsinger, © 2005.

SCENTED GERANIUM SYRUP

Herb syrups are wonderful flavor essences that are good on all kinds of fruits and used in beverages. They can be added in place of the liquid in cakes, pie filling, and sorbet. Brush the syrups on over baked fruit, in pound cakes, cupcakes, muffins, or breads just out of the oven. Some of the scented geraniums best suited for making flavored syrups are rose, lemon, nutmeg, and spice—but try any of your favorites! When in bloom, I use the flowers too.

Makes about 2 cups

1½ cups water

1½ cups sugar

About 12 to 15 scented geranium leaves and/or flowers

To make an herb syrup, combine the water and sugar in a small saucepan; add the herbs, bruising the leaves against the side of the pan with a spoon. Place over moderate heat and bring to a boil. Cover, remove from heat and let stand for at least 30 minutes.

Remove the leaves and squeeze them into the syrup to extract their flavor. Pour into a clean bottle or jar and label. This syrup can be made ahead and kept in the refrigerator for about 4 weeks.

If you want to keep the syrups for a long period of time, pour them into jars or bottles leaving at least an inch of headspace, place on the lid or cap, and label. Freeze them for up to 1 year. Remove from freezer the night before using and allow to thaw, or place the bottle in a bowl of warm (not hot) water to thaw more quickly. Use as needed and re-freeze immediately.

This recipe is excerpted from *Not Just Desserts—Sweet Herbal Recipes* by Susan Belsinger, © 2005.

SWEET HERBED CHEESE

4 ounces butter, softened

12 ounces cream cheese, softened

2 tablespoons finely chopped orange peel, orange portion only

Orange juice to thin cheese to desired consistency

2-3 tablespoons honey

¼ cup coarsely chopped toasted walnuts, pecans, pistachios, or pine nuts

2 tablespoons finely chopped fresh ginger (peeled)

3-4 tablespoons finely chopped fresh rose geranium leaves

Beat butter in a small mixer or with rubber spatula until smooth. Add cream cheese, mixing well. Combine with remaining ingredients, mixing until smooth. Serve with fruit or as a filling or accompaniment for simple cakes and sweet breads.

Yield: about 2½ cups

Note: Other sweet herbs such as spearmint, orange mint, lemon verbena or lemon balm would be excellent with the rose geranium.

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

ROSE GERANIUM AND VANILLA BEAN CUSTARD

1 cup sugar
2 tablespoons cornstarch
2 cups low fat milk, whole milk or half and half
2 whole eggs (or 1 whole egg plus 2 whites)
1 piece of vanilla bean, split (about 2 to 3 inches)
1 firmly packed cup of rose geranium leaves and tender stems

Place sugar and cornstarch in a heavy, medium saucepan; mix well with a wire whisk. Combine milk and eggs in a bowl or 4 cup measure; mix completely. Gradually add milk and egg mixture to flour and sugar in saucepan, stirring constantly. Add vanilla bean pieces and herb leaves, moistening well. Place pan on medium heat and cook until thickened; stir custard constantly in a zigzag or figure eight pattern, scraping around the edge of pan every minute or so. When thickened, remove from heat and keep stirring for a minute or two to keep custard from sticking. With a slotted spoon or a pair of tongs, remove rose geranium branches, scraping off custard. Do not let leaves cool in custard or they will disintegrate and/or change color. Keep warm in a double boiler or over hot water. Custard may be prepared ahead and reheated in a double boiler or a microwave. Use a wire whip to smooth completely.

Use as an accompaniment for pound cake; fruit desserts such as crisps and cobbler; fresh fruit combinations; and trifle with various fruit and cake or cookies.

Yield: about 2 cups, plenty for 10-12 servings

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

WHITE WINE CREAM
WITH FRESH FRUIT

1 cup white wine (suggest Chenin Blanc, Sauvignon Blanc, Gewürztraminer, Chardonnay (not too dry), White Zinfandel, White Burgundy, or white table wine)
1 cup sugar
½ cup orange juice (preferably fresh)
3 tablespoons fresh lemon juice
1 tablespoon cornstarch
1 tablespoon unflavored gelatin
6 whole eggs
2-3 sprigs rose geranium leaves, 4 inches long
2 tablespoons chopped fresh lemon balm
1 cup heavy whipping cream

Pelargoniums: An Herb Society of America Guide

Combine all ingredients, except herbs and whipping cream, in blender to mix a few seconds. Do not over blend. Place in a heavy, stainless steel, ceramic or enamel pan, add sprigs of rose geranium, and cook over medium heat until mixture begins to thicken. Stir constantly while cooking. Remove from hot pan to a bowl large enough to accommodate whipped cream; lift out geranium leaves with tongs or slotted spoon, scraping away as much of custard as possible. Stir in chopped lemon balm evenly, then refrigerate, or cool completely over a bowl of ice, but do not allow custard to become solid.

Whip cream in a cold bowl until stiff peaks form. Using a rubber spatula, gently fold cream into cooled base. Divide into individual serving dishes, allowing about 1/3 cup per serving, or serve in a large compote dish. Serve with fruit of choice and garnish with sprigs of fresh lemon balm or rose geranium.

Yield: 6-8 servings if using fruit as garnish only, 12-15 if serving more fruit

Note: Strawberries, boysenberries, blueberries, peaches, apricots, grapes or poached apples or pears would be delicious. Another way of serving is to place the fruit in dish in alternating layers with cream mixture. Dessert can be prepared several days in advance but do not combine with fruit until ready to serve. It can also be prepared in two steps, by cooking and cooling base ahead of time. When ready to serve, let base soften at room temperature, then fold in whipped cream several hours before serving.

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

FRUITED HONEY MOUSSE WITH ROSE GERANIUM

4 cups plain or vanilla low-fat yogurt
2 to 3 cups drained fresh, frozen or canned apricots, nectarines, peaches or plums
2 to 4 tablespoons honey; depends upon sweetness of fruit, particularly if canned fruit in heavy syrup is used
1 tablespoon apricot or peach brandy, or herbal liqueur
2 tablespoons chopped fresh rose geranium leaves
1 to 1½ cups blueberries, strawberries or other sliced or chopped fruit
Chopped nuts and small rose geranium leaves to garnish

Place yogurt into a large strainer lined with coffee filters or a double thickness of cheesecloth. Place strainer over a bowl to catch liquids. Cover and let stand in refrigerator 24 hours to drain.

Transfer strained yogurt (called cheese after straining) to a large bowl, discarding liquids. Place drained fruit in food processor, pulsing until smooth. Add to yogurt cheese, along with honey, liqueur and chopped rose geranium; mix well, using a rubber spatula to avoid breaking down yogurt cheese. Adjust sweetness with more honey as desired. Cover and chill at least ½ hour.

Serve cheese mixture over blueberries or strawberries in a large, clear glass bowl or individual dessert dishes. Garnish with chopped nuts and small rose geranium leaf.

Yield: 6 servings

Variation: Beat 2 egg whites* until stiff peaks form but are not dry. Fold into yogurt cheese and fruit mixture to lighten and extend. Serve over fruit as directed above. Yield 10 to 12 servings.

*Note: Pasteurized eggs can be used to reduce the risk of *Salmonella* infection that can be associated with raw eggs.

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

FRESH PEACHES GRATIN
WITH ROSE GERANIUM AND CARDAMOM

2 cups whole milk or light cream
2 whole eggs
2/3 cup sugar
2 tablespoons cornstarch
1 tablespoon chopped fresh rose geranium (do not chop until needed)
1/2 teaspoon freshly ground cardamom seed
1 teaspoon pure vanilla extract
1/2 cup whole milk ricotta cheese or softened cream cheese
4-6 fresh ripe peaches, seeded, peeled and sliced in 12-16 slices each (dip in diluted lemon juice to prevent discoloration)
1/3 cup toasted sliced natural almonds
1/4 cup plain cookie or cake crumbs

Place milk, eggs, sugar and cornstarch in blender container in order given. Blend for 1-2 seconds, starting at low speed and moving higher until completely blended. Do not overmix. Pour into a small, non-reactive, heavy saucepan or double boiler. Stirring constantly, preferably with a straight-bottomed wooden spatula (wedge shaped), cook over medium heat until sauce is thickened and smooth. Remove pan from heat immediately and pour into a medium bowl to cool slightly. Add chopped rose geranium, cardamom and vanilla.

While sauce is still hot, mix in cheese, using a wire whip if necessary to smooth. Preheat oven to 450°F. Drain peaches if any juice is present and place in a buttered oven-proof dish, about 11x7x2-inch or 13x9x2-inch or individual small gratin dishes. Sprinkle with toasted almonds. Top fruit and nuts with warm sauce; spread evenly to edges. Sprinkle crumbs on sauce. Bake in hot oven or broiler until bubbling and lightly browned. Serve hot or warm. Summer nectarines, plums, apricots, oranges, or poached apples or pears in the fall and winter are equally delicious. Dish makes a very nice addition to a brunch buffet.

Yield: 6-8 servings

Notes: Sauce may be prepared ahead and refrigerated until needed. Warm sauce in a double boiler or allow to come to room temperature. Do not cut fruit more than 1 hour ahead or too much juice will be lost. Watch carefully if browning dish under a broiler to prevent burning.

Recipe © Madalene Hill and Gwen Barclay, The Flavour Connection

LIGHTLY CARAMELIZED PEARS ALA 'ROBER'S LEMON ROSE'

Well, I must admit that this recipe converted me to actually really enjoy eating scented geraniums. These just-barely caramelized pears are sublime on their own. 'Rober's Lemon Rose' scented geranium gives the perfect herbal nuance to this dish, but any of the rose or lemon geraniums would work. Serve them warm or at room temperature. They can be adorned with whipped cream or even vanilla ice cream if desired. Choose pears that are firm and nearly ripe—about 2 days from eating out of hand—Bartlett, Bosc, or D'Anjou will do.

4 pears serve 4 or 8 depending on whether you want to serve half a pear or a whole one

1 lemon
4 firm, ripe pears
8 scented geranium leaves
8 tablespoons scented geranium sugar
¼ cup water

Remove the zest from the lemon in large strips. Cut the lemon in half and reserve one-half. Peel the pears, halve them lengthwise and remove their cores. Place them in a large non-reactive sauté pan so that they will all fit in one layer. As you peel each pear, place the halves in the pan, cut-side-down, and squeeze a little lemon juice over each pear half (use the juice of half a lemon total). When all of the pears are in the pan, scatter the lemon zest strips over the pears, place the leaves in the pan, and sprinkle the sugar over all.

Cover the sauté pan and place over medium heat. Cook, covered for about 7 or 8 minutes; the liquid in the pan will be bubbling furiously. Remove lid and carefully turn the pears over with a spatula so that the round side is down. Once turned, carefully add the water, shake the pan, and cover. Cook for 7 or 8 minutes more. Turn the pears over once again so the rounded side is up; they may have a few golden brown spots. Test for doneness with the tip of a knife—the pears should be tender—but not mushy.

Remove the pears immediately to a serving platter and scrape all of the lovely caramel, (there won't be much) lemon-zest strips and wilted geranium leaves from the pan over the pears. If you prefer, remove the wilted leaves and garnish with fresh ones. I rather like the ones with the syrup all over them. Serve immediately, slightly warm, or at room temperature.

Recipe © Susan Belsinger

COUSCOUS WITH DRIED FRUIT AND ROSE GERANIUM

This simple and very quick-to-prepare dish is as flavorful as it is colorful. If you don't prefer curry—then leave it out. You can substitute currants or dried cranberries for the sun-dried cherries; I find pistachios and pine nuts equally delicious. Oftentimes, I combine couscous (I use whole-wheat, but you can use regular) with other grains—you could add a cup or so of cooked basmati rice, quinoa, or wild rice to this recipe to give it more texture and make it even more wholesome. If you do, you might increase the seasoning just a bit.

Serves 8 to 10

Pelargoniums: An Herb Society of America Guide

1½ cups couscous
About 1 teaspoon salt
Freshly ground black pepper
1 teaspoon curry powder
1 teaspoon turmeric
½ teaspoon cinnamon
2/3 cup sun-dried cherries, chopped coarse if large
2/3 cup dried apricots, slivered
2½ cups just-boiling water or vegetable stock
About 2 tablespoons olive oil
2 cloves garlic, minced or pressed
12 rose geranium leaves, minced (about 3 to 4 tablespoons)
1/3 cup lightly toasted pistachios or pine nuts
Geranium leaves for garnish

Place the couscous in a heat-proof bowl. Sprinkle the salt, pepper, curry powder, turmeric, and cinnamon over the couscous, add the dried fruit, and toss to mix. Add the water or stock, olive oil, garlic, and chopped geranium leaves, stir to combine, and cover the bowl with a tight-fitting lid.

Let stand for about 10 minutes, remove lid and use a large fork to fluff the couscous. If you are adding cooked rice or quinoa, toss it in now, and taste for seasoning. You may want to adjust salt and pepper, a pinch more cinnamon, olive oil, or a squeeze of lemon juice. Sprinkle the toasted nuts over the couscous just before serving, so that they keep their crunch. Garnish with some whole, beautiful rose geranium leaves and/or flowers. Serve hot, or allow to cool to room temperature.

Recipe © Susan Belsinger

CRAFT USES

Due to their enticing aromas, scented pelargoniums are ideal for aromatic crafts like potpourri, herb pillows and sachets. Some of the species and cultivars used in commercial potpourri mixes include the rose-scented *P. capitatum*, *P. graveolens* (and cultivars in the *P.* 'Graveolens' group), the lemon-scented *P. citronellum*, *P. radens* and *P. crispum*, the cedar-rose scented *P.* 'Clorinda,' the fruit-scented *P. odoratissimum* and *P.* 'Sweet Mimosa' (*P.* 'Sweet Miriam') the nutmeg-scented *P.* 'Nutmeg,' the balsam-scented *P.* 'Fair Ellen' and the peppermint-scented *P. tomentosum* (14). *P. hispidum* has also reportedly been used in "scented mixtures" (68). Leaves will retain their scent in potpourris for a couple of years, and scent can be revived by re-crushing leaves (3). Susan Belsinger has found that the rose-scented types hold their fragrance the longest (12). Madalene Hill and Gwen Barclay prefer the small-leaved types for potpourri. Because leaves turn khaki-brown when dried, other colorful materials can be added for visual effect. Jane Cole prepares a rose blend potpourri mix with 2 cups rose petals and buds, 1 cup rose geranium leaves, ½ cup hibiscus blossoms, ½ cup patchouli, ¼-½ cup cut calamus root, and 15 drops each of rose geranium essential oil and rosewood essential oil (22). She also makes a holiday blend with oak-leaved pelargoniums, rose petals, rosemary, citrus peel, juniper, cloves, star anise, cinnamon sticks, nutmeg, frankincense, myrrh, calamus root or elecampane, and essential oil of fir (22).

Jane Cole also uses scented geraniums in sleep pillows. To make a sleep pillow, mix 1 cup each of

Pelargoniums: An Herb Society of America Guide

scented geranium leaves, lavender buds, sweet woodruff and hops. Fill small bags with the mixture and tuck inside a pillowcase (22). Other pelargoniums that can be used in fragrant pillows and sachets include rose-scented *P. 'Lady Plymouth,'* filbert-scented *P. 'Concolor Lace,'* almond-scented *P. 'Pretty Polly,'* *P. 'Clorinda,'* peppermint-scented *P. tomentosum,* nutmeg-scented *P. 'Nutmeg,'* coconut-scented *P. grossularioides,* apple-scented *P. odoratissimum,* and many of the lemon-scented types (21). Rose-scented pelargoniums have been used in “clutch-me sachets” to mask the odor of car exhaust while driving (73).

The leaves and flowers of pelargoniums can be pressed for a variety of crafts (23). The large, lobed leaves of *P. tomentosum* can be used as bookmarks (82). The small-leaved types can be pressed for homemade cards and stationery (38), and *Pelargonium* leaves can also be pressed under glass for a “pretty silhouette” (12). Sandy Manteuffel makes *Pelargonium* pottery with pressed leaves; the actual leaf is burned off when the pottery is fired, but the imprint remains and can be stained green (59).

Pelargoniums can also be used in paper making. The scented leaves can add fragrance and the flowers color. About 2 cups of dried leaves will scent 6-8 sheets of handmade paper, and large-leaved types with prominent veins reportedly work best for paper pulp (71).



Pelargonium pottery
Photo by W. Richard Manteuffel

Cut arrangements, bouquets, tussie-mussies, garlands and wreaths are more craft possibilities. Cut branches can be hardened off for cut arrangements (6, 7). The small white flowers of *P. odoratissimum,* *P. 'Nutmeg'* and *P. tomentosum* can be substituted for baby's breath in bouquets (17). The flowers will last for a day or two but foliage will appear fresh for weeks (6, 7). Madalene Hill and Gwen Barclay prefer small-leaved types like *P. crispum* for tussie-mussies since their stems are too short for standard bouquets (38). According to Caroline Amidon, the leaves of *P. tomentosum* “make a beautiful collar” for a tussie-mussie, and Joyce Brobst likes to add *P. 'Charity'* for its yellow-green tones (3). Garlands can be created from the flowers. Karen England made one from a variety of different *Pelargonium* flowers which dried into a “delightfully colored garland” that lasted 3 years (32). Small-leaved types also make attractive boutonnieres (8).

The craft use of pelargoniums isn't limited to aromatic projects. The flowers of at least one species, *P. peltatum,* are reportedly used to make a blue dye that has been used in painting (68, 95).

See the Cosmetic Uses section for information on soaps and related crafts.

COSMETIC USES

The use of pelargoniums in toiletries dates back centuries. The powdered leaves of *P. inquinans* were reportedly used as a deodorant by African tribesmen (100). During the Victorian era, the lemony leaves of *P. crispum* became a popular addition to finger bowls (6), tabletop water-filled bowls used for keeping hands clean and refreshed while dining.

Most often called geranium oil, the essential oil of scented pelargoniums has been used in perfumery since *P. capitatum* was identified as an inexpensive substitute for attar of roses in the 1800s (83, 102).

Oil is produced by steam distillation of the leaves and stems (50, 83). Plants that have been reported to be source plants for the oil used in commercial cosmetic preparations include *P. capitatum* and *P. graveolens* (50, 83). Other reported oil source plants are *P. radens*, *P. odoratissimum*, and *P. crispum* (49, 50, 52), although there is debate about the status of *P. odoratissimum* as an oil source plant (55). The Bourbon oil produced on Réunion Island, sourced from the cultivar *P. 'Rosé'* (53) is considered the “finest” of the rose geranium oils (14) and is most often used in perfumery (49). Geranium oil has a greenish-yellow or amber-yellow color and a scent with aspects of rose and mint (49, 53), and is included in a wide variety of commercial cosmetics, including detergents, soaps, lotions, creams and perfumes (50). Geranium oil has been used as a heart note or top note in perfumes and men’s colognes (98). Although not common, there have been “a few cases” of dermatitis from perfumes made with geranium oil (53).

Pelargoniums and their oil can also be used to make homemade face creams, bath oils (23), soaps (32), and other toiletries. Susan Belsinger makes a massage rub with rose geranium and witch hazel (12). Karen England makes cold process rose geranium and oatmeal soap with dried rose-scented *Pelargonium* leaves. Karen prefers rose geranium oil for home-soapmaking since it is the only *Pelargonium* essential oil that can be easily obtained by home soap crafters (32).

Cosmetic Recipes

INFUSED GERANIUM OIL

1 cup torn rose geranium leaves
1 cup sweet almond or apricot kernel oil

Place in glass or enamel pot over very low heat for 20 minutes. Cover; remove from heat; let stand overnight. Strain off leaves and pour into sterilized bottle or jar. A few drops of geranium essential oil can also be added to help prevent spoilage.

Recipe © Jane Cole

MOISTURIZING CREAM

½ ounce beeswax
½ ounce cocoa butter
½ ounce coconut oil
4 ounces rose geranium infused oil or apricot kernel oil
Vitamin E oil (3-4 capsules)
4 ounces warm rosewater
1 teaspoon borax
15 drops geranium essential oil
15 drops lavender or other beneficial essential oil
10 drops tincture of benzoin (preservative)

Measure waxes and oils into a glass mixing bowl set in a pan of water over low heat. When they are melted, remove from heat. Warm the rosewater; dissolve the borax in it, and slowly pour into the oils, stirring until it thickens. As it cools, pierce and squeeze in the Vitamin E capsules, add the essential oils

and benzoin. Pour into sterilized jar or jars.

Recipe © Jane Cole

ROSE GERANIUM TOILET WATER

Fill a jar with fresh crushed or torn leaves of *Pelargonium capitatum*, *P. graveolens* (or *P. 'Rosé'*). Pour enough vodka over to cover the leaves. Cover the jar; shake once or twice daily for 4 weeks. If scent is strong enough, strain into decorative bottle. If scent is not strong enough, crush more fresh leaves, place them in the jar and pour the infused vodka back over them. Cover; shake daily for another 2-4 weeks. To use, mix half rose geranium-vodka infusion and half distilled water in a spray bottle. (A few drops of the essential oil could be added if the scent isn't strong enough).

Recipe © Jane Cole

YOGURT CLEANSER

5 ounce carton plain yogurt
1/3-1/2 cup herb infusion

To make the infusion: place 1/4 cup torn rose geranium leaves (or herb of choice) in a glass or enamel pot; pour 2/3 cup pure water over; cover; heat just to a boil. Remove from heat and let stand until cool. Mix together yogurt and infusion, and store in the refrigerator. Cleanser will keep until expiration date of yogurt.

This cleanser works for any complexion and can be applied cold or at room temperature. Apply to face with washcloth or hands, and rinse off with water.

Recipe © Jane Cole

SKIN TONER

Fill a jar with torn rose or lemon-scented geranium leaves. Pour enough witch hazel over to cover the leaves. Cover the jar; place in a warm place; shake every other day for about 4 weeks. Strain out the leaves and pour into a fancy bottle or back into the witch hazel bottle.

Recipe © Jane Cole

MEDICINAL & ETHNOBOTANICAL USES & AROMATHERAPY

Pelargoniums have a long history of medicinal use in their native Africa. The primary uses have been for intestinal problems, wounds and respiratory ailments, but *Pelargonium* species have also been used to treat fevers, kidney complaints and other conditions. The following are reported medicinal/ethnobotanical uses:

A paste of the leaf of *P. alchemilloides* has been used to treat boils and wounds by the Xhosa of the Eastern Cape of S. Africa (68, 84). An infusion of the root has been administered by the Zulu of S. Africa as an enema to treat diarrhea (84). The leaf juice of this plant has been used in East Africa as an

eyewash for sore eyes (84), and natives of Lesotho have bathed in a decoction of the root to reduce fever (43, 84, 95).

As its name suggests, *P. antidysentericum* has been used to treat digestive disorders. A decoction of the tuber boiled in milk has been drunk by the Nama of the South African Cape for diarrhea (84), and a tea made with the leaves has been sipped as a remedy for nausea, diarrhea and dysentery in South Africa (43, 84). *P. bowkeri* is also reportedly used for colic and diarrhea in Lesotho (43) and for dysentery by the Boers of S. Africa (37). In the South African Cape, an infusion of the leaves of *P. capitatum* has been taken internally for bladder and kidney ailments as well as diarrhea, flatulence, nausea, stomach cramps and vomiting (84).

The leaves of *P. betulinum* have been pounded and applied to the skin to treat minor burns in South Africa (84), and a decoction of the leaves and twigs has been inhaled for colds, coughs and upper respiratory infections (63, 68, 84, 95). An infusion of the leaves has been taken internally for intestinal cramping and gas, and a decoction of the leaves and twigs inhaled to remedy sinusitis. The pounded leaves of this plant have also been applied to the skin to treat wounds (84).

The crushed, warmed leaves of *P. cucullatum* have been applied to boils, bruises, wounds and insect bites, and an infusion of the leaves has been drunk for colic/abdominal pain, diarrhea, fever, sore joints and kidney complaints (37, 84). The root of this plant has also been used by the Khoi of the South African Cape for diarrhea, and an infusion of the leaves has been employed as a wash to soothe sore muscles (84).

P. minimum (syn. *P. fumarioides*) has been used as an emmenagogue and abortifacient (29). *P. reniforme* and *P. grossularioides* have also been used to promote menstruation, and the latter was used as an emmenagogue and abortifacient by the Zulus, Boers and Cape Malays of Africa (37, 68, 95).

In South Africa, *P. graveolens* has been burned and inhaled to treat asthma, and an infusion of the leaves has been drunk for abdominal cramps, diarrhea, dysentery, nausea, vomiting, and insomnia (84). The stems and leaves of *P. inquinans* have been pounded and used for colds and headaches (84, 95).

An infusion of the root of *P. luridum* is used by the Shona of Zimbabwe to treat backache and is also considered a remedy for abdominal pain in infants. Oddly, the entire plant has reportedly been used by this same group as an abortifacient (84). Powdered root or an infusion of the leaves, stalk and root is taken by the Zulu for abdominal pain/cramps, nausea, vomiting, and to reduce fever (37, 68, 84), and an infusion of the root is used to treat diarrhea and dysentery (84). The Zulu also eat the tuber or mix the powdered root into porridge for dysentery (84, 95). A lotion made from the whole plant is considered a remedy for skin eruptions of cattle in Botswana. Also in this region, skin sores are treated with a wash made from the leaves (84).

The pounded leaves of *P. peltatum* have been applied to minor burns and in South Africa, the leaf sap has been taken for sore throats (84), and the “leaves have been used as an antiseptic” (63). A decoction of the leaves of *P. quercifolium* has been taken internally as a remedy for transient high blood pressure, heart disease and rheumatism. The leaves of *P. radens* have been included in a mixture to kill insect pests of the skin, and the leaves have been rubbed on the skin to treat leg pain (84).

The leaves of *P. pulverulentum* were used to treat hemorrhoids and the roots for diarrhea and

dysentery by the Xhosa. *P. rapaceum* also has reported medicinal use as an astringent for diarrhea (95).

A decoction of *P. reniforme* boiled in milk has been used for diarrhea and dysentery (43, 68, 84), and the root has been used to treat liver problems in calf and sheep by the Xhosa of the Eastern Cape of South Africa (84, 95). The root has been used to prevent maggots from infesting wounds (84), and the boiled leaves have been used to dress wounds (68). Other species that have been reportedly used for diarrhea and dysentery include the roots of *P. rapaceum* and *P. triste* (14).

A decoction of *P. sidoides* and other plants has been used in Africa to expel worms and other parasites from calves. The plant is considered a diarrhea remedy by the Zulu and a decoction of the root has been used to treat diarrhea in Transkei, South Africa. The Zulu have also reportedly used this plant to treat gonorrhoea. In Transkei, *P. sidoides* has been used for rectal prolapse and the root is included in a mixture for infant stomach aches (84).

In the South-West Cape of South Africa, a poultice made from the leaves of *P. tomentosum* has been applied to bruises and sprains (84). An infusion of *P. triste* has been taken internally in South Africa as an astringent for diarrhea, dysentery and nausea (63, 84, 95), and has been employed as a vermifuge (68).

P. transvaalense root was used for fever (37, 63), diarrhea, dysentery (96) and colds (68), and *P. tragacanthoides* for neuralgia (37), gout, rheumatism, colds and flu (97). In Africa, *P. inquinans* is reportedly used for colds and headaches (68).

There are a few reports of the medicinal use of pelargoniums outside of Africa. In Central America, a decoction of *P. capitatum* is used as a bath for skin problems (83), and *Pelargonium hortorum* has been used to treat sores in Guatemala (43). *P. graveolens* is employed as a healing bath in Venezuela; *P. graveolens* leaves mixed with vinegar and salt are applied topically for headache in New Mexico, and warmed leaves inserted into the ear are a remedy for earache. "In the West, geranium has been used as a folk remedy in the treatment of ulcers." (83) The essential oil of *P. graveolens* is reportedly "applied locally" to treat cervical cancer in Hangzhou, China (29), and an unspecified *Pelargonium* species is considered a cancer treatment in Ecuador (29, 43).

In the late 1800s and early 1900s the roots of *P. sidoides* and/or *P. reniforme* were reportedly used to treat tuberculosis in England and Switzerland (18, 45, 75). According to a study published in 2004 in *The International Journal of Antimicrobial Agents*, extracts and constituents of the roots of *Pelargonium reniforme* and *P. sidoides* have demonstrated antibacterial activity in vitro against mycobacteria similar to the type that cause tuberculosis (75).

Umckaloabo®, made from the roots of *P. reniforme* and *P. sidoides*, is a commercially produced European remedy for respiratory ailments (45, 54, 55). In 1995, it was reportedly prescribed 93,800 times in Germany for respiratory infections (28). There is now also an over-the-counter cold remedy called Umcka® available in the U.S. which is made from *P. sidoides*. In a study published in 2005, *P. sidoides* extract demonstrated an ability to increase ciliary beat frequency in cell cultures of human nasal epithelium in vitro (67). In clinical trials, *P. sidoides* root extract (EPs® 7630 - Umckaloabo®) has proven effective in treating acute bronchitis and tonsillopharyngitis in adults and children (18). *P. reniforme* and *P. sidoides* contain the phenols gallic acid and methyl ester which are believed to enhance immune response (45).

Tannins may account for the antidiarrheal and wound healing effects of some *Pelargonium* species (45, 55). A study published in 2004 in the *Journal of Agricultural and Food Chemistry* showed that phenolic compounds (flavonoids and hydrolyzable tannins) in *P. reniforme* have antioxidant properties, and the authors suggest that this activity supports the traditional use of *P. reniforme* for liver disorders (48). In addition, *Pelargonium* essential oils have demonstrated the ability to relax smooth muscle and relieve spasms (37). *P. grossularioides*, on the other hand, has demonstrated a spasmogenic effect (causes spasms) on smooth and uterine muscle in vitro in animal studies, which accounts for its folk use as an abortifacient in Africa (37, 55).

Pelargonium species are antioxidant, and methanolic extracts of *Pelargonium* are antibacterial (26). Studies have also demonstrated the antifungal and antibacterial activity of *Pelargonium* oil (26, 30), and *P. graveolens* essential oil has been shown to enhance the antifungal effects of the drug ketoconazole against *Trichophyton* spp. which cause tinea infections (78). According to the authors of a study published in 2004 in *The Journal of Applied Microbiology*, the essential oil of *P. graveolens* “may reduce the efficacious dose of ketoconazole and thus minimize the side-effects” of the drug (78).

Information on pelargoniums does not appear in the German *Commission E Monographs* or *The PDR for Herbal Medicines*, and aside from the commercial respiratory preparations derived from *P. sidoides* and *P. reniforme*, and aromatherapy uses for rose geranium oil, most pelargoniums are not used medicinally outside of their native regions. The *Botanical Safety Handbook* classifies *P. graveolens* leaf as a class I herb, which “can be safely consumed when used appropriately,” but the safety of most other medicinal species is not documented (61). According to one source “The extract of *P. sidoides* root (EPs 7630) is contraindicated during pregnancy and lactation as no specific data on pregnant or lactating women are available,” but “there are no other contraindications or known drug interactions with the root extract” (18). Some cases of mild gastrointestinal upset and skin rash have been reported with use of *P. sidoides* root extract (EPs 7630) (18). Information on contraindications for other *Pelargonium* species is not available, although it would appear that species with known or reported emmenagogue and abortifacient effects should be avoided during pregnancy. There have been a few reports of contact dermatitis or sensitization from external use of geranium oil (*Pelargonium* sp.) (29, 49, 50, 54) or handling *Pelargonium* plants (69, 74), but other reports indicate that oil is non-sensitizing and non-irritating (49, 50). Nevertheless, reports of adverse reactions are rare (54).

Aromatherapy

Geranium oil has a reputation as a relaxant in aromatherapy, and this effect has been confirmed by scientific studies (57). In animal studies, geranium oil and its components linalool, geraniol and citronellol reduced blood pressure in vivo (37). In research with human subjects, *Pelargonium* oil vapor affected certain brain waves, demonstrating both a sedative and stimulant effect (37, 54). Lis-Balchin suggests that due to its relaxant effect, geranium oil used in massage may be useful for “stress-related conditions like dermatitis, asthma, intestinal problems and headaches,” although this has yet to be studied (55). Topically applied *Pelargonium* oils have also reportedly improved pain relief in HIV-infected children (19).

Some scented *Pelargonium* species, like *P. tomentosum*, may be useful in therapeutic programs for stroke patients due to their soothing scents and textures (3, 6). HSA members Caroline Amidon and Joyce Brobst conducted a program at a rehabilitation center for stroke patients in Philadelphia and found that contact with the scented oils triggered pleasant memories and positive feelings for the patients involved (3).

HSA member Jane Cole uses geranium (*Pelargonium*) oil in her personal aromatherapy blends. For anxiety, she combines 10 drops geranium essential oil, 10 drops lavender essential oil and 5 drops vetiver essential oil. Her Balance Blend includes 10 drops geranium, 10 drops clary sage, 5 drops lavender and 5 drops bergamot or grapefruit essential oil (22). Susan Belsinger makes a relaxing and calming aromatherapy spritzer combining lavender and rose geranium essential oils (see recipe below).

SOOTHING AROMATHERAPY SPRITZER (relaxing and calming)

Spritzers are made with distilled water and aromatic essential oils. They are designed to lift our spirits and give pleasure, whether you need soothing, uplifting, or stimulating. Spritz your body, clothes or the air around you. Once spritzed, the essential oils dissipate rather quickly. Lavender and geranium essential oils are antibacterial so they help guard against germs, which make these spritzers great for using around the house, office, cars, airplanes, and hotel rooms.

4 ounces distilled water
About 6 drops lavender essential oil
3 to 4 drops rose or rose geranium essential oil

Drop the essential oils into the bottom of a 4-ounce (½ cup) blue cobalt bottle. Using a little funnel, carefully pour the distilled water in to almost fill the bottle. Put the cap on and shake. Label and date. Some people add 1 teaspoon of alcohol as a preservative, but it changes the aroma. I just use mine so quickly, there is no need for a preservative. I use this spritzer when I need to soothe myself or others; it balances and calms. I spritz when my nerves are tense. When I'm emotional, I use this spritz or if I'm feeling sad, mad, hurt, or anxious. It is great before presentations, on airplanes and in traffic jams. I often spritz the kids' rooms with this, especially when emotions or tempers are out of balance.

Recipe © Susan Belsinger

GARDEN USES

Pelargoniums have a variety of uses in the garden, both in-ground and in containers. They can be grown in pots on patios and decks (6, 10) as well as in window boxes and hanging baskets. Species like *P. crispum* can be trained into standards. With its intense peppermint scent, large leaves and velvety stems, *P. tomentosum* is ideal for children's gardens (4). *P. tomentosum* can also be planted in a circle around trees since its roots are shallow enough not to interfere with the tree's root system (70). Many of the scentededs can be useful in gardens for the blind due to their aromas and textures (63). Low-growing plants like *P. 'Nutmeg'* can be planted along pathways and walk edgings (10). *P. 'Mrs. Taylor,'* *P. 'Round Leaf Rose'* and *P. grossularioides* can be planted as groundcovers in shady areas, and *P. 'Nutmeg'* can be used as a groundcover in sunny areas (70). *P. 'Old Spice'* (syn. *P. 'Logee'*), *P. 'Golden Nutmeg,'* *P. abrotanifolium* (southernwood geranium) and others can be planted in rock gardens. *P. 'Nutmeg'* can be shaped into bonsai (70). Scenteds can be planted in fragrant gardens and culinary gardens, and plants like 'Nutmeg,' 'Old Spice,' *P. reniforme* and *P. abrotanifolium* are perfect additions to gardens of gray and silver plants (80).

Sandy Manteuffel likes planting pelargoniums near and among flowers for added color. Her favorites include petunias, periwinkle, blue salvia, zonal geraniums, ivy geraniums and alyssum (58). If planting with other plants, remember to choose plants with similar growth requirements (9). Susan Belsinger likes to group with pots of plants that provide a nice contrast with *Pelargonium* leaves, such as a large lemon verbena (12). If you like the look of ferns but have too much sun, Joyce Brobst suggests planting the fern-leaved *Pelargonium denticulatum*, which looks great in the summer next to blue *Salvia farinacea* (3).



Ground planting featuring *P. 'Fair Ellen'*
Photo by Sandra Manteuffel

According to Mark Langan, small types like *P. crispum* and *P. 'French Lace'* would be “lost in the landscape” but work well in small pots or the front of a mixed container. Mark plants larger scented in the landscape with grassy plants like society garlic (*Tulbaghia violacea*), *Miscanthus* sp. and New Zealand flax (*Phormium tenax*). According to Mark, New Zealand flax combined with scented creates a “bold and dramatic, tropical look in the landscape.” For non-stop blooms and a consistent flower show all summer long, Mark recommends ‘Nutmeg,’ ‘Old Spice,’ *P. 'Concolor Lace,' P. odoratissimum* and *P. grossularioides* (47).

OTHER USES

Insect Repellent

Despite the fact that the plant sold in the 1990s as “citrosa mosquito-fighter” was a hoax (see History & Folklore section), there are pelargoniums with documented insect repellent activity. In a study published in 2003 in *Bioresource Technology*, the leaf extract of a plant identified as *Pelargonium citrosa* (not an accepted taxonomic name) deterred the malaria-transmitting mosquito *Anopheles stephensi* (42). Dr. Arthur O. Tucker points out, however, that this study did not assess the whole plant or essential oil but a methanol extract of the plant that would have selectively extracted constituents of the essential oil and other classes of compounds (89). It may have even extracted any insecticides that had been sprayed on the plant (89). Alcohol extract of *Pelargonium reniforme* leaf also reportedly repels mosquitoes and provided 63.3% protection from *Anopheles arabiensis* for 3 hours in a test involving 3 human subjects (36).

Indole alkaloids in some zonal pelargoniums are reported to repel whiteflies (40, 100). Wild geranium extracts (*Pelargonium* sp.) repel the cockroach *Blatella germanica*, and rose geranium extracts allegedly repel the flies *Musca domestica* and *Culex fatigans* (79). The dried leaves of *P. radens* are used in insect-repellent sachets (14), and some of the scented (species unidentified) are planted as intercrops to prevent insect infestation (29).

Preservative

Some *Pelargonium* essential oils have potential as food and cosmetic preservatives. *Pelargonium* oil has

Pelargoniums: An Herb Society of America Guide

demonstrated antibacterial and antifungal activity against a variety of bacteria and fungi. Of bacteria, greatest effect was found for gram positive species (26). Oil of an unidentified *Pelargonium* species was effective in inhibiting the growth of *Yersinia enterocolitica* and the dairy products organism *Brevibacterium linens*, but it encouraged the growth of *E. coli* and *Klebsiella pneumoniae* (26). Pelargoniums including the cultivars *P.* 'Attar of Roses,' *P.* 'Sweet Mimosa' and *P.* 'Paton's Unique' have demonstrated antimicrobial activity against *Zygosaccharomyces bailii*, *Salmonella enteritidis* and *Listeria innocua* in a model food system of quiche filling (56). In a separate study, essential oils of 'Sweet Mimosa' (*P.* 'Sweet Miriam'), *P.* 'Mabel Grey,' *P. graveolens*, *P.* 'Atomic Snowflake,' *P.* 'Royal Oak,' 'Attar of Roses,' *P.* 'Chocolate Peppermint' and *P.* 'Clorinda' inhibited the growth of *Staphylococcus aureus* in a model food system of broccoli soup (51). According to the authors of this 2003 study, *Pelargonium* essential oils "show potential against some micro-organisms, but only in some food systems" (51).

Tobacco Substitute

In South Africa, the leaves of *P. papilionaceum* are smoked and used as a tobacco substitute (68, 95).

Nanotechnology

Believe it or not, pelargoniums even play a role in nanotechnology. Proteins and enzymes from *Pelargonium graveolens* leaf extract have been used to synthesize silver and gold nanoparticles (76, 77). Silver nanoparticles have also been synthesized using bacteria and fungi, but reduction of silver ions occurs more quickly with *P. graveolens* (77).

Species Highlights

Pelargonium abrotanifolium

Genus: *Pelargonium*

Specific Epithet: *abrotanifolium*

Common Name: southernwood-scented geranium

Form: shrublet

Flowers: white, pink, lavender or mauve

Habitat: arid, rocky areas

Leaves: grey-green, finely divided and feathery

Height: 3'

Sun: full sun

Scent: pungent; similar to southernwood (*Artemisia abrotanum*)

Use: ornamental (window boxes), aromatic



Photo by Caroline Amidon

Pelargonium capitatum

Genus: *Pelargonium*

Specific Epithet: *capitatum*

Common Name: rose geranium

Form: shrub or bush with prostrate growth habit

Flowers: pink, purple-pink, mauve-pink or lavender with darker stripes on upper petals

Habitat: sand dunes and low hillsides by the sea in South Africa

Leaves: dark green, ruffled, rounded and velvety with heart-shaped bases

Height: 10"-3'

Sun: full sun

Scent: rose

Use: medicinal/aromatherapy, cosmetic, craft (potpourri), aromatic

Pelargonium citronellum

Genus: *Pelargonium*

Specific Epithet: *citronellum*

Syn.: *P. 'Mabel Grey'*

Common Name: lemon-scented geranium

Form: evergreen shrub

Flowers: light pinkish-purple with darker purple markings on upper petals

Habitat: sandy soil near streams in South Africa

Leaves: hairy, green and sharply lobed

Height: 6-8'

Sun: full sun

Scent: lemon

Use: culinary, craft, aromatic

Note: Some taxonomists once thought that this species was a naturally occurring hybrid or mutation.



Photo by Susan Belsinger

Pelargonium crispum

Genus: *Pelargonium*

Specific Epithet: *crispum*

Common Name: lemon-scented geranium, finger bowl geranium (*P. crispum* 'Minor')

Form: erect or trailing shrub or subshrub

Flowers: white, pink or lilac with dark stripes on upper petals

Habitat: sandy areas with winter rainfall sheltered by sandstone boulders in south-western Cape Province

Leaves: green, hairy, crinkly or crisped, coarsely toothed and kidney-shaped, with 3 lobes

Height: 28"

Sun: partial shade

Scent: lemon

Use: culinary, craft, aromatic



Photo by Anne Abbott

Pelargonium cucullatum

Genus: *Pelargonium*

Specific Epithet: *cucullatum*

Common Name: hooded-leaf *Pelargonium*, tree *Pelargonium*, wilde malva

Subspecies: *P. cucullatum* subsp. *cucullatum*, *P. cucullatum* subsp. *strigifolium*, *P. cucullatum* subsp. *tabulare*

Form: erect, branched shrub

Flowers: large and pinkish-purple with darker purple markings on all petals

Habitat: *P. cucullatum* subsp. *cucullatum* grows in South African coastal flats and low mountain foothills near the sea

Leaves: green, hairy and cup- or hood-shaped; may have red margin

Height: 6.5'

Sun: full sun

Scent: leaves may be aromatic

Use: medicinal, ornamental



P. 'Spanish Lavender,' a cultivar of *P. cucullatum*
Photo by Anne Abbott

Pelargonium denticulatum

Genus: *Pelargonium*

Specific Epithet: *denticulatum*

Common Name: pine-scented geranium, fernleaf geranium

Form: erect, branched shrub

Flowers: pinkish-purple with dark red or purple veins on upper petals

Habitat: in valleys and alongside streams in the Southern Cape of South Africa

Leaves: flat, sticky, finely divided and fern-like

Height: 3-6.5'

Sun: full sun

Scent: pine, balsam or pungent

Use: craft (flower arrangements), ornamental



Photo by Anne Abbott

Pelargonium dichondrifolium

Genus: *Pelargonium*

Specific Epithet: *dichondrifolium*

Common Name: pepper-scented geranium

Form: evergreen herb

Flowers: white or pale pink

Habitat: rocky hills

Leaves: grey-green and smooth with kidney-shaped leaf blades

Height: 4-12"

Sun: full sun

Scent: black pepper

Use: ornamental, aromatic



Photo by Caroline Amidon

Pelargonium elongatum

Genus: *Pelargonium*

Specific Epithet: *elongatum*

Common Name: upright coconut geranium

Form: woody with erect or straggling stems and side branches that may die during dormant periods

Flowers: white, cream or pale yellow

Habitat: hill-slopes and disturbed areas in South-Western Cape Province

Leaves: kidney-shaped with serrated edge; may have purple or brown horseshoe or circular marking

Height: 8-12"

Sun: full sun

Scent: slightly citrus, despite common name

Use: ornamental, aromatic



Photo by Pat Kenny

Pelargonium graveolens

Genus: *Pelargonium*

Specific Epithet: *graveolens*

Common Name: rose geranium

Form: erect shrub or subshrub

Flowers: white or pinkish with red markings

Habitat: moist, semi-shaded areas in southern Africa

Leaves: soft, hairy with deeply-cut blades

Height: 4'

Sun: partial shade

Scent: rose or minty-rose

Use: cosmetic, culinary, medicinal/aromatherapy, craft, ornamental, aromatic

Note: Many plants sold in the U.S. as *P. graveolens* are actually a group of hybrid cultivars identified as the *P. 'Graveolens'* group. Members of this group were once classified as *P. xasperum*.

Pelargonium grossularioides

Genus: *Pelargonium*

Specific Epithet: *grossularioides*

Common Name: coconut-scented geranium

Form: low-spreading annual herb

Flowers: pink, beet red/purple, or sometimes whitish

Habitat: damp or shady places in South Africa

Leaves: small, deep green, round or kidney-shaped with 3 to 5 lobes

Height: 8"

Sun: shade, but will tolerate sun if well watered

Scent: coconut or rose-mint-lemon-clove

Use: medicinal, craft, ornamental, aromatic



Photo by Caroline Amidon

Pelargonium odoratissimum

Genus: *Pelargonium*

Specific Epithet: *odoratissimum*

Common Name: apple-rose-scented geranium, apple geranium

Form: perennial, prostrate shrublet with trailing flower stems

Flowers: white (or sometimes pale pink) with red markings on upper petals

Habitat: forests or shaded areas

Leaves: light green; round or egg-shaped with wavy edges

Height: 8-12"

Sun: partial shade, but will tolerate sun if well watered

Scent: apple, apple-rose, apple-mint or camphor-mint

Use: cosmetic, culinary, craft, aromatic



Photo by Barbara J. Williams

Pelargonium panduriforme

Genus: *Pelargonium*

Specific Epithet: *panduriforme*

Common Name: balsam-scented geranium,
fiddle leaf geranium

Form: erect, branched shrub

Flowers: large and pink with purple stippling

Habitat: near streams in the lower foothills
and ravines of Baviaanskloof and Kouga
mountains in S. Africa

Leaves: large, soft, hairy and fiddle-shaped with
dark brown along center rib

Height: 6.5'

Sun: full sun

Scent: balsam, pungent or balm

Use: aromatic, ornamental



Photo by Anne Abbott

Pelargonium quercifolium

Genus: *Pelargonium*

Specific Epithet: *quercifolium*

Common Name: oak-leaf geranium

Form: erect, branched shrub

Flowers: pale pink to purplish-pink with
markings on upper leaves

Habitat: hot, rocky slopes with low rainfall

Leaves: sticky, green and deeply divided;
resemble oak tree leaves

Height: 6'

Sun: full sun

Scent: pungent

Use: medicinal, ornamental, aromatic



Photo by Anne Abbott

Pelargonium radens

Genus: *Pelargonium*

Specific Epithet: *radens*

Common Name: rasp-leafed *Pelargonium*

Form: erect, branched shrub

Flowers: pale pinkish-purple with beet red/purple
streaks on upper petals

Habitat: mountainsides and ravines near streams in
Southern and Eastern Cape

Leaves: rough, grayish-green, triangular and deeply
divided

Height: 3'

Sun: full sun

Scent: rose or lemon with mint

Use: medicinal, culinary, cosmetic, craft, aromatic



Photo by Anne Abbott

Pelargonium reniforme

Genus: *Pelargonium*

Specific Epithet: *reniforme*

Form: erect or trailing subshrub with tuberous roots

Flowers: pink to magenta with darker markings on upper petals

Habitat: dry, sandy areas or grasslands in Southern and Eastern Cape Province of S. Africa

Leaves: grey-green, velvety and kidney-shaped

Height: 15"-3'

Sun: full sun

Use: medicinal

Pelargonium scabrum

Genus: *Pelargonium*

Specific Epithet: *scabrum*

Common Name: rough-leafed *Pelargonium*

Form: erect, branched shrub

Flowers: small and white, pink or mauve with purple markings on upper petals

Habitat: sandy, dry areas

Leaves: rough, stiff and hairy with 3 lobes

Height: 6.5'

Sun: full sun

Scent: lemon

Use: ornamental, aromatic

Pelargonium sidoides

Genus: *Pelargonium*

Specific Epithet: *sidoides*

Form: trailing, low mound with thick underground tubers

Flowers: very dark maroon, night-scented

Habitat: usually grasslands but adaptable to different habitats

Leaves: silvery gray-green, smooth and round

Height: 8-20"

Sun: full sun

Scent: slightly aromatic

Use: medicinal, ornamental

Note: Most plants sold in the trade as *P. sidoides* are actually the cultivar *P. 'Burgundy.'*

HSA Promising Plant



Photo by Caroline Amidon

Pelargonium tomentosum

Genus: *Pelargonium*

Specific Epithet: *tomentosum*

Common Name: peppermint-scented geranium

Form: low-growing, spreading, branched evergreen subshrub

Flowers: white with purple markings

Habitat: semi-shaded, moist but sandy areas on the edges of ravine forests near streams

Leaves: large, velvety and grey-green with 3 to 5 lobes

Height: 12-20"

Sun: partial shade

Scent: peppermint

Use: medicinal, culinary, craft, ornamental, aromatic



Photo by Caroline Amidon

Pelargonium vitifolium

Genus: *Pelargonium*

Specific Epithet: *vitifolium*

Syn: *P.* 'Grapeleaf'

Common Name: vine-leafed *Pelargonium*, balm-scented *Pelargonium*

Form: erect shrub

Flowers: light pink to pale purplish-pink with darker stripes on larger upper petals

Habitat: half-shaded areas near streams and rivulets in South-Western and Southern Cape

Leaves: hairy and rough with 3 to 5 rounded lobes

Height: 20"-3'

Sun: partial shade

Scent: rose, lemon-rose or balm

Cultivar Examples

The following is just a sampling of the many *Pelargonium* cultivars available:



Pelargonium 'Attar of Roses' (rose-scented)
Photo by Susan Belsinger



P. 'Atomic Snowflake' (rose-scented)
Photo by Michele Meyers



P. 'Big Apple' (apple-camphor-scented), HSA Promising Plant
Photo by Caroline Amidon



P. 'Burgundy'
Photo by Caroline Amidon



P. 'Candy Dancer' (rose-scented)
Photo by Sandra Manteuffel



P. 'Charity' (rose-scented), HSA Promising Plant
Photo by Sandra Manteuffel

Pelargoniums: An Herb Society of America Guide



P. 'Chocolate Peppermint' (syn. *P.* 'Chocolate Mint')
(mint-scented) Photo by Sandra Manteuffel



P. 'Clorinda' (syn. *P.* 'Eucalyptus')
(eucalyptus, cedar or pungent-scented)
Photo by Robin Siktberg



P. 'Concolor Lace' (syn. *P.* 'Shotesham's Pet,'
P. 'Filbert') (pungent/filbert-scented)
Photo by Michele Meyers



P. 'Cophorne' (cedar-scented)
Photo by Sandra Manteuffel



P. 'Dean's Delight' (pine-scented)
Photo by Caroline Amidon



P. 'Dr. Livingston' (syn. *P.* 'Dr. Livingstone,'
P. 'Skeleton Rose') (rose-scented)
Photo by Sandra Manteuffel

Pelargoniums: An Herb Society of America Guide



P. 'Fair Ellen' (pungent-scented)
Photo by Gwen Barclay



P. 'Frensham' (lemon-scented)
Photo by Gwen Barclay



P. 'Golden Nutmeg' (nutmeg-scented)
Photo by Caroline Amidon



P. 'Grey Lady Plymouth' (rose-scented)
Photo by Barbara J. Williams



P. 'Lady Plymouth' (left) and *P. 'Snowflake'*
(syn. *P. 'Logee's Snowflake'*) (rose-scented)
Photo by Robin Siktberg



P. 'Lime' (lime-scented)
Photo by Gwen Barclay

Pelargoniums: An Herb Society of America Guide



P. 'Limonium' (citrus-scented)
Photo by Sandra Manteuffel



P. 'Mabel Grey' (a synonym for *P. citronellum*)
(lemon-scented) Photo by Michele Meyers



P. 'Nutmeg' (nutmeg-scented)
Photo by Sandra Manteuffel



P. 'Orange' (sweet orange tree leaf-scented)
Photo by Caroline Amidon



P. 'Ocean Wave' (rose-scented)
Photo by Sandra Manteuffel



P. 'Pretty Polly' (syn. *P. 'Almond'*)
(almond or pungent-scented)
Photo by Susan Belsinger



P. 'Rober's Lemon Rose' (lemon-rose-scented)
Photo by Caroline Amidon



P. 'Rosé' (syn. *P.* 'Old Fashioned Rose')
(rose-scented) Photo by Sandra Manteuffel



P. 'Spanish Lavender'
(double form of *P. cucullatum*)
Photo by Gwen Barclay



P. 'Variegated Prince Rupert' (syn. *P.* 'French Lace')
(lemon-scented) Photo by Gwen Barclay

Literature Citations

1. Adams, James. 2005. Personal communication. October 12, 2005.
2. Amidon, Caroline. 2005. Personal communication. November 1 and 13.
3. Amidon, Caroline and Joyce Brobst. 2005. Personal communication. October 31.
4. Amidon, Caroline and Joyce Brobst. 2005. To grow pelargoniums is to know them. *The herbarist*. 71:4-10.
5. Amidon, Caroline and Joyce Brobst. 2006. Personal communication. May 11.
6. Amidon, Caroline W. and Joyce E. Brobst. 2001. Fun with pelargoniums. *The herbarist*. 67:26-30.
7. Amidon, Caroline W. and Joyce E. Brobst. 2005. Heaven scent: a world of fun. *Green scene*. (August):12-17.
8. Anonymous. 1947. Field notes. *The herbarist*. 13:54-55.
9. Barrow, James. 2005. Personal communication to Anne Abbott. October 10.
10. Becker, Jim and Faye Brawner. 1996. *Scented geraniums: knowing, growing and enjoying scented pelargoniums*. Loveland, CO: Interweave Press.
11. Belsinger, Susan. 1991. *Flowers in the kitchen*. Loveland, CO: Interweave Press.
12. Belsinger, Susan. 2005. Personal communication. October 20.
13. Belsinger, Susan. 2006. Personal communication. April 11.
14. Bown, Deni. 2001. *The Herb Society of America new encyclopedia of herbs & their uses*. New York: DK.
15. Brawner, Faye. 2003. *Geraniums: the complete encyclopedia*. Atglen, PA: Schiffer Publishing Ltd.
16. Bremness, Lesley. 1988. *The complete book of herbs*. New York: Dorling Kindersley.
17. Brigham, Dorcas. 1952. Old friends, refreshingly new. *The herbarist*. 18:24-26.
18. Brown, Donald J. 2004. Extract of *Pelargonium sidoides*: South African herbal remedy successfully treats acute bronchitis and tonsillopharyngitis. *Herbalgram*. (63):17-19.
19. Buckle, Jane. 2003. Aromatherapy: what is it? *Herbalgram*. 57:50-56.
20. Clarkson, Rosetta. 1940. *Green enchantment*. New York: Macmillan.
21. Clarkson, Rosetta. 1942. *Magic gardens*. New York: Macmillan.
22. Cole, Jane. 2005. *Pelargoniums and some of their uses* (unpublished handout).
23. Conder, Susan. 1992. *The complete geranium: cultivation, cooking and crafts*. New York: Clarkson N. Potter.
24. Cornett, Peggy. 2000. In the company of gardeners: the flower diaries of Jefferson, Skipwith, and Faris. *Twinleaf journal* [online]. Available from World Wide Web (<http://www.twinleaf.org/articles/company.html>).
25. Crocker, Pat, Caroline Amidon and Joyce Brobst. 2006. *Pelargonium: 2006 herb of the year*. Neustadt, Ontario: Riversong Studios Ltd.
26. Deans, Stanley G. 2002. Antimicrobial properties of *Pelargonium* extracts contrasted with that of *Geranium*, 132-146. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
27. DeMarne, Frederic-Emmanuel. 2002. 'Rose-scented geranium' a *Pelargonium* grown for the perfume industry, 193-211. In: Lis-Balchin, Maria (ed) *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
28. DeSmet, Peter A.G.M. 1999. Heavenly herbs and earthly ailments: Africa as ethnopharmacological treasury. *Herbalgram*. (47):52-62.
29. Duke, James A. and Edward S. Ayensu. 1985. *Medicinal plants of China*. Algonac, MI: Reference Publications.
30. Edwards-Jones, V., et al. 2004. The effect of essential oils on methicillin-resistant *Staphylococcus*

- aureus* using a dressing model. *Burns*. 30(8):772-777.
31. Eliot, George. 1858. *Scenes of clerical life* [online]. Edinburgh: William Blackwood and Sons. [accessed September 2005]. Available from World Wide Web (<http://lion.chadwyck.com.ezproxy2.cpl.org> (accessed via *Literature online*)).
 32. England, Karen. 2005. Personal communication. October 31; November 1,7.
 33. Evans, Augusta J. 1869. *Vashti; or "Until death do us part"* [online]. New York: Carleton. [accessed September 2005]. Available from World Wide Web (<http://lion.chadwyck.com.ezproxy2.cpl.org> (accessed via *Literature online*)).
 34. Facciola, Stephen. 1998. *Cornucopia II: a source book of edible plants*. Vista: Kampong Publications.
 35. Gips, Kathleen. 1990. *Flora's dictionary: the Victorian language of herbs and flowers*. Chagrin Falls, OH: TM Publications.
 36. Govere, J., et al. 2000. Local plants as repellents against *Anopheles arabiensis*, in Mpumalanga Province, South Africa. *Central African journal of medicine*. 46(8):213-216.
 37. Hart, Stephen and Maria Lis-Balchin. 2002. Pharmacology of *Pelargonium* essential oils and extracts in vitro and in vivo, 116-131. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: The genera Geranium and Pelargonium*. New York: Taylor & Francis.
 38. Hill, Madalene and Gwen Barclay. 2005. Personal communication. October 18.
 39. Hill, Madalene and Gwen Barclay. 2006. Personal communication. January 15.
 40. Houghton, Peter and Maria Lis-Balchin. 2002. Chemotaxonomy of *Pelargonium* based on alkaloids and essential oils, 166-173. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: The genera Geranium and Pelargonium*. New York: Taylor & Francis.
 41. Jagendorf, M.A. 1963. *Folk wines, cordials, & brandies*. New York: The Vanguard Press.
 42. Jeyabalan, D., N. Arul and P. Thangamathi 2003. Studies on effects of *Pelargonium citrosa* leaf extracts on malrial vector, *Anopheles stephensi* Liston. *Bioresource technology*. 89:185-189.
 43. Johnson, Tim. 2002. *Herbweb* CD-ROM.
 44. Kiefer, Lorraine. 2005. Personal communication. October 3, 7.
 45. Kolodziej, Herbert. 2002. *Pelargonium reniforme* and *Pelargonium sidoides*: their botany, chemistry and medicinal use, 262-290. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
 46. Kowalchik, Claire and William H. Hylton, eds. 1987. *Rodale's illustrated encyclopedia of herbs*. Emmaus, PA: Rodale Press.
 47. Langan, Mark. 2005. Personal communication. November 7.
 48. Latte, Klaus Peter and Herbert Kolodziej. 2004. Antioxidant properties of phenolic compounds from *Pelargonium reniforme*. *Journal of agricultural and food chemistry*. 52:4899-4902.
 49. Lawless, Julia. 1992. *The encyclopedia of essential oils*. Shaftesbury, Dorset: Element Books.
 50. Leung, Albert Y. and Steven Foster. 2003. *Encyclopedia of common natural ingredients used in food, drugs and cosmetics*. Hoboken, NJ: Wiley-Interscience.
 51. Lis-Balchin, M., H. Steyrl and E. Krenn. 2003. The comparative effect of novel *Pelargonium* essential oils and their corresponding hydrosols as antimicrobial agents in a model food system. *Phytotherapy research*. 17(1):60-65.
 52. Lis-Balchin, Maria. 2002. Essential oils from different *Pelargonium* species and cultivars: their chemical composition (using GC, GC/MS) and appearance of trichomes (under EM), 147-165. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
 53. Lis-Balchin, Maria. 2002. Geranium essential oil: standardisation, ISO; adulteration and its detection using GC, enantiomeric columns, toxicity and bioactivity, 184-192. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.

54. Lis-Balchin, Maria. 2002. Geranium oil and its use in aromatherapy, 234-246. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
55. Lis-Balchin, Maria. 2002. History of nomenclature, usage and cultivation of *Geranium* and *Pelargonium* species, 5-10. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
56. Lis-Balchin, Maria. 2002. New research: possible uses of various *Pelargonium* leaf oils and extracts as food preservatives, 251-261. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
57. Lis-Balchin, Maria and Stephen Hart. 2002. Correlation of the chemical profiles of the essential oil of *Pelargonium* (*Geranium* oil) and others separately and in mixes, with their relaxant or stimulant properties in man and smooth muscle preparations in vitro, 299-307. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
58. Manteuffel, Sandy. 2005. Personal communication. November 10.
59. Manteuffel, Sandy. 2005. Pelargoniums in pottery. *The herbarist*. 71:13-15.
60. Matsuda, Brent M., et al. 1996. Essential oil analysis and field evaluation of the citrosa plant "*Pelargonium citrosium*" as a repellent against populations of *Aedes* mosquitos. *Journal of the American Mosquito Control Association*. 12(1):69-74.
61. McGuffin, Michael, et al., ed. 1997. *American Herbal Products Association botanical safety handbook*. Boca Raton: CRC Press.
62. McNenny, Brenda R. 1978. It can't be done. *The herbarist*. 44:62-67.
63. Miller, Diana. 1996. *Pelargoniums: a gardener's guide to the species and their cultivars and hybrids*. Portland, OR: Timber Press.
64. Miller, Diana M. 2002. The taxonomy of *Pelargonium* species and cultivars, their origins and growth in the wild, 49-79. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: The genera Geranium and Pelargonium*. New York: Taylor & Francis.
65. Moody, Susan Taylor. 1992. The herbal traditions of Poland; a horticulturist's report. *The herbarist*. 58:72-83.
66. National Gallery of Art. 2005. *National Gallery of Art brief guide [Rembrandt Peale - Rubens Peale with a geranium, 1801]* [online]. Washington, DC: National Gallery of Art. [accessed November 22, 2005]. Available from World Wide Web (<http://www.nga.gov/cgi-bin/pinfo?Object=65073+0+none>).
67. Neugebauer, P., et al. 2005. A new approach to pharmacological effects on ciliary beat frequency in cell cultures - exemplary measurements funder *Pelargonium sidoides* extract (EPs 7630). *Phytomedicine*. 12:46-51.
68. Palmer, Eve. 1985. *The South African herbal*. Cape Town: Tafelberg.
69. Paulsen, E., P. Stahl Skov and K. E. Andersen. 1998. Immediate skin and mucosal symptoms from pot plants and vegetables in gardeners and greenhouse workers. *Contact dermatitis*. 39:166-170.
70. Peddie, Mary. 1998. Growing scented pelargoniums: delightful plants for difficult places. *The herbarist*. 64:36-38.
71. Peddie, Mary, Judy Lewis and John Lewis. 1991. *Growing & using scented geraniums*. Pownal, VT: Storey Communications.
72. Rao, B.R., et al. 2001. Yield and chemical composition of rose-scented geranium (*Pelargonium* species) oil at different times of harvesting. *Journal of essential oil research*. 13(6):456-459.
73. Richardson, Mayre B. 1957. Sachet time at tree top cottage. *The herbarist*. 23:48-50.
74. Rinzler, Carol Ann. 2001. *The new complete book of herbs, spices, and condiments*. New York:

Checkmark Books.

75. Seidel, Veronique and Peter W. Taylor. 2004. In vitro activity of extracts and constituents of *Pelargonium* against rapidly growing mycobacteria. *International journal of antimicrobial agents*. 23:613-619.
76. Shankar, S. Shiv, et al. 2004. Immobilization of biogenic gold nanoparticles in thermally evaporated fatty acid and amine thin films. *Journal of colloid and interface science*. 274:69-75.
77. Shankar, S. Shiv, Absar Ahmad and Murali Sastry. 2003. Geranium leaf assisted biosynthesis of silver nanoparticles. *Biotechnology progress*. 19:1627-1631.
78. Shin, S. and S. Lim. 2004. Antifungal effects of herbal essential oils alone and in combination with ketoconazole against *Trichophyton* spp. *Journal of applied microbiology*. 97:1289-1296.
79. Simmonds, Monique S.J. 2005. Interactions between arthropod pests and pelargoniums, 291-298. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
80. Simmons, Adelma G. 1974. *Herb gardens of delight*. New York: Hawthorn Books.
81. Simmons, Adelma Grenier. 1964. *Herb gardening in five seasons*. Princeton, NJ: D. Van Nostrand.
82. Simmons, Adelma Grenier. 1969. *Herbs to grow indoors: for flavor, for fragrance, for fun*. New York: Hawthorn.
83. Small, Ernest. 1997. *Culinary herbs*. Ottawa: NRC Research Press.
84. South African Traditional Medicines Research Unit. 2006. *SA health info traditional medicines database* [online]. Cape Town: South African Traditional Medicines Research Unit, Dept. of Pharmacology, Faculty of Health Sciences, University of Cape Town. [accessed January 17, 2006]. Available from World Wide Web (<http://www.mrc.ac.za/Tramed3/>).
85. Talbert, Rexford. 2006. Personal communication. April 7.
86. Tucker, A. O. *Scented-leaf geraniums: introduction & recipes*. Dover, Delaware: Dept. of Agriculture and Natural Resources, Delaware State University.
87. Tucker, Arthur O. 2005. Personal communication. October 27.
88. Tucker, Arthur O. 2005. What is the scientific name of the rose geranium? *The herbarist*. 71:11-12.
89. Tucker, Arthur O. 2006. Personal communication. March 22 and April 18.
90. Tucker, Arthur O. and Thomas DeBaggio. 2000. *The big book of herbs: a comprehensive illustrated reference to herbs of flavor and fragrance*. Loveland, CO: Interweave Press.
91. Tucker, Arthur O. and Michael J. Maciarelo. 1993. Is this plant a hoax? A lecture in honor of Otto Richter. In: Kestner, Arlene; James E. Simon (ed). *Herbs 93: Eighth national herb growing and marketing conference*. Bellevue, Washington: International Herb Growers & Marketers Association.
92. U.S. Food and Drug Administration. 2002. *Code of federal regulations Ch.21 Section 182.10* [online]. Office of the Federal Register and NARA. [accessed June 2005]. Available from World Wide Web (http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov/cfr_2002/aprqr/pdf/21cfr182.10.pdf).
93. U.S. Food and Drug Administration. 2002. *Code of federal regulations Ch.21 Section 182.20* [online]. Office of the Federal Register and NARA. [accessed June 2005]. Available from World Wide Web (http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov/cfr_2002/aprqr/pdf/21cfr182.20.pdf).
94. USDA, ARS, National Genetic Resources Program. *Germplasm resources information network - (GRIN)* [online]. Beltsville, Maryland: National Germplasm Resources Laboratory. [accessed December 12, 2005]. Available from World Wide Web (<http://www.ars-grin.gov/cgi-bin/npgs/html/taxgenform.pl>).
95. van der Walt, J.J.A. 1979. *Pelargoniums of southern Africa*. Hillscheid: Fisher GmbH & Co.

96. van der Walt, J.J.A. and P.J. Vorster. 1981. *Pelargoniums of southern Africa*. Cape Town: Juta.
97. van der Walt, J.J.A. and P.J. Vorster. 1988. *Pelargoniums of southern Africa including some representative species from other parts of the world*. Kirstenbosch: National Botanic Gardens.
98. Wells, Rhona and Maria Lis-Balchin. 2002. Perfumery and cosmetic products utilising Geranium oil, 247-250. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: the genera Geranium and Pelargonium*. New York: Taylor & Francis.
99. Wiersema, John H. and Blanca Leon. 1999. *World economic plants: a standard reference*. Boca Raton: CRC Press.
100. Williams, Christine A. and Jeffrey B. Harborne. 2002. Phytochemistry of the genus *Pelargonium*, 99-115. In: Lis-Balchin, Maria (ed). *Geranium and pelargonium: The genera Geranium and Pelargonium*. New York: Taylor & Francis.
101. Wilson, Ann. 2005. Personal communication. October 27.
102. Wilson, Helen Van Pelt. 1947. Scented geraniums. *The herbarist*. 13:17-27.
103. Wilson, Helen Van Pelt. 1965. *The joy of geraniums*. New York: M. Barrows and Company, Inc.

Additional References

The Columbia Encyclopedia, 6th ed. [online] New York: Columbia University Press. [accessed December 2005]. Available from World Wide Web (<http://www.bartleby.com/65/>), 2001-05.

Detroit Institute of Arts [online]. Detroit: MI, Detroit Institute of Arts. [accessed April 3, 2006] Available from World Wide Web (<http://www.dia.org>), 2005.

England, Karen. "Scented Gerani-Yums!: Cooking with Scented Pelargoniums." *Geraniums Around the World*. 51(4) (Winter 2003): 19-21.

England, Karen. "Scented Gerani-Yums!: Cooking with Scented Pelargoniums." *Geraniums Around the World*. 52(1) (Spring 2004): 19-20.

England, Karen. "Scented Gerani-Yums!: Cooking with Scented Pelargoniums." *Geraniums Around the World*. 52(2) (Summer 2004): 19-20.

England, Karen. "Scented Gerani-Yums!: Cooking with Scented Pelargoniums." *Geraniums Around the World*. 52(3) (Autumn 2004): 19-20.

England, Karen. "Scented Gerani-Yums!: Cooking with Scented Pelargoniums." *Geraniums Around the World*. 53(3) (Autumn 2005): 21-22.

Grieve, Mrs. M. *A Modern Herbal: the Medicinal, Culinary, Cosmetic and Economic Properties, Cultivation and Folk-lore of Herbs, Grasses, Fungi, Shrubs & Trees with all Their Modern Scientific Uses*. New York: Harcourt, Brace & Company, 1931.

Hunt Institute for Botanical Documentation. Catalogue of the Botanical Art Collection at the Hunt Institute [online]. Carnegie Mellon University. Pittsburgh, PA. [accessed 11/22/05]. Available from World Wide Web (<http://128.2.21.109:591/artcat/artsearch.html>), 2005.

Huxley, Anthony, ed. *The New Royal Horticultural Society Dictionary of Gardening*. New York: Stockton Press, 1992.

Literature Online database [online]. Chadwyck-Healy (Proquest Information and Learning Company). [accessed through Cleveland Public Library September 20 & 26, 2005] (<http://lion.chadwyck.com.ezproxy2.cpl.org/>), 1996-2005.

Oberliesen, Janet M. "Micropropagation of Herbs: Scented *Pelargonium* spp." *The Herbarist*. 51 (1985): 102-109.

Peddie, Mary. "Growing Scented Pelargoniums: Delightful Plants for Difficult Places." *The Herbarist*. 64 (1998): 36-38.

Publications Committee from data collected by Ron Crump. "Trail of Deception: The Useless 'Citrosa.'" *Geraniums Around the World*. (Summer 1996): 16-18.

Rasoanaivo, Philippe and Philippe De La Gorce. "Essential Oils of Economic Value in Madagascar: Present State of Knowledge." *Herbalgram*. 43 (Summer 1998): 31-39, 58.

"Research Reviews: Study Shows Citrosa Ineffective as Mosquito Repellent." *Herbalgram*. 41 (Fall 1997): 18.

Sedgwick, Frederica. "A Profusion of Lemons: *Pelargonium citronellum* 'Mabel Grey' and Her Hybrids." *Geraniums Around the World*. (Summer 1995): 13-14.

Tisserand, Robert B. *The Art of Aromatherapy: The Healing and Beautifying Properties of the Essential Oils of Flowers and Herbs*. Rochester, VT: Healing Arts Press, 1977.

Tucker, Arthur O. and Brian M. Lawrence. "Botanical Nomenclature of Commercial Sources of Essential Oils, Concretes and Absolutes." In *Herbs, Spices and Medicinal Plants*. Vol.2. Edited by Lyle E. Craker and James E. Simon. Phoenix, AZ: Oryx Press, 1997.

Wilder, Louise Beebe. *The Fragrant Path*. New York: Macmillan, 1932.

Wilson, Anne. "A Handful of Fragrant Geraniums." *The Herbarist*. 18 (1952): 27-28.

HSA Library *Pelargonium* Resources

Books

*Becker, Jim and Faye Brawner. *Scented Geraniums: Knowing, Growing and Enjoying Scented Pelargoniums*. Loveland, CO: Interweave Press, 1996.

Becker and Brawner discuss scented *Pelargonium* botany, nomenclature, landscape uses, propagation, indoor and outdoor cultivation, pruning (including creating standards and espaliers), uses in cooking, potpourri and floral designs. The book also includes sections on variegations, hybridization, diseases, pests, and descriptions of “varieties to grow” organized by scent group. With bibliography, plant source list, index, and color photographs/line drawings.

*Bown, Deni. *The Herb Society of America New Encyclopedia of Herbs & Their Uses*. New York: DK, 2001.

The three pages devoted to pelargoniums provide a brief introduction to the genus with profiles of 12 species and cultivars. Includes color photographs.

*Brawner, Faye. *Geraniums: The Complete Encyclopedia*. Atglen, PA: Schiffer Publishing Ltd., 2003.

Brawner’s work includes chapters covering zonal pelargoniums, dwarf and miniature zonals, fancy leaf cultivars and sports, specialty and unusual flowered pelargoniums, stellar and formosum hybrids, regals, angels, ivy leaf pelargoniums, scented leaf pelargoniums, species and species hybrids, as well as cultivation, propagation, hybridization, pests/diseases, and standards and espaliers. Also includes bibliography, index and many color photographs.

Conder, Susan. *The Complete Geranium: Cultivation, Cooking and Crafts*. New York: Clarkson N. Potter, 1992.

This compact hardcover includes information on *Pelargonium* history, cultivation, types of pelargoniums, garden uses (including planting in containers, raised beds, formal and informal bedding, edging, ground cover, rock gardens, herb gardens), growing in conservatories, flower arrangements, potpourri, and recipes. With color photographs, including some reproductions of pelargoniums in paintings.

*Crocker, Pat, Caroline Amidon and Joyce Brobst. *Scented Geranium – Pelargonium: 2006 Herb of the Year*. Neustadt, Ontario: Riversong Studios Ltd., 2006.

HSA members Pat Crocker, Caroline Amidon and Joyce Brobst provide information on *Pelargonium* history, folklore, nomenclature/classification, botany, varieties, cultivation, propagation, pests/diseases, and landscape and culinary uses. The nomenclature section includes a description of five *Pelargonium* sections. The varieties section includes descriptions of 20 species and 41 cultivars, organized by fragrance and illustrated with black and white and color photographs. The book also includes a resource list, bibliography and index, and a variety of recipes for scented infusions, grains, chicken, fish, pork and beef, desserts, and beverages.

*Feltwell, John. *Geraniums and Pelargoniums*. Buffalo, NY: Firefly Books, 2001.

The first half of this book covers geraniums and the second half, pelargoniums. The *Pelargonium* portion is divided into sections about ivy-leaf, scented-leaf, zonals, highfields, stellars, startels and cacti, dwarfs, regals, butes, angels, deacons and miniatures. Includes index, list of plant sources and many

large color photographs.

*Key, Hazel. *1001 Pelargoniums*. London: B.T. Batsford, 2000.

Primarily a collection of color photographs with brief text, this book is divided into sections on primary hybrids, regals, angels, uniques, scented-leaf, single zonals, double and semi-double zonals, deacons, Irene zonals, pelfi/pac, fancy leaf zonals, cactus zonals, rosebud zonals, stellar zonals, miniature zonals, dwarf, ivy-leaf and "Hazel's Favourites," with a list of *Pelargonium* and *Geranium* societies.

*Lis-Balchin, Maria, ed. *Geranium and Pelargonium: The Genera Geranium and Pelargonium*. London and New York: Taylor & Francis, 2002.

This collection of scientific articles addresses *Pelargonium* and *Geranium* history, phytochemistry, cultivation, taxonomy and uses. Part two, devoted exclusively to the genus *Pelargonium*, includes information on the pharmacology of *Pelargonium* essential oils, chemical composition of the essential oils of various species and cultivars, *Pelargonium* micropropagation and cultivation, interactions between pelargoniums and arthropod pests, distillation of geranium (*Pelargonium*) oil, and the use of geranium (*Pelargonium*) oil in perfumery, food preservation and aromatherapy.

*Miller, Diana. *Pelargoniums: A Gardener's Guide to the Species and Their Hybrids and Cultivars*. Portland, OR: Timber Press, 1996.

Miller's 175-page book provides authoritative information on *Pelargonium* history, classification, taxonomic sections, cultivation, propagation, pests/diseases, and descriptions of *Pelargonium* species organized by section. It also includes a glossary, bibliography, indices, line drawings and color photographs.

*Taylor, Jan. *Geraniums and Pelargoniums: The Complete Guide to Cultivation, Propagation and Exhibition*. Marlborough: Crowood Press, 1988.

Pelargonium botany, cultivation and pests/diseases are discussed, with sections devoted to scented, uniques, regals, zonals and ivy-leaf. Includes black and white line drawings, color photos, appendices and index. Although the bulk of the text is devoted to the genus *Pelargonium*, Taylor also includes chapters on related genera.

*Taylor, Jan. *Pelargoniums for Colour and Variety*. Marlborough: Crowood Press, 1990.

This 128-page paperback includes chapters on scented-leaved, regals, zonals, ivy-leaved, cultivation, potting, garden uses, pests/diseases and a grower's calendar (UK). With plant lists, glossary, index and color photographs/illustrations.

*Tucker, Arthur O. and Thomas DeBaggio. *The Big Book of Herbs*. Loveland, CO: Interweave Press, 2000.

Tucker and DeBaggio provide information on *Pelargonium* cultivation, propagation, pests, and chemistry, and include descriptions of a wide variety of *Pelargonium* species, hybrids and cultivars. With botanical key, black and white line drawings and extensive reference list.

van der Walt, J.J.A. *Pelargoniums of Southern Africa*. Vol. I. Hillscheid: Fischer GmbH & Co, 1979.

This is the first in the series of three separately published volumes that comprise van der Walt's authoritative and frequently cited work. Volume one includes descriptions of 50 species (including a few botanical varieties). Descriptions include distribution, color botanical illustrations and

Pelargoniums: An Herb Society of America Guide

some folklore/historic uses. The work also includes a bibliography, glossary and common name index.

van der Walt, J.J.A. and P.J. Vorster. *Pelargoniums of Southern Africa*. Vol. 2. Cape Town: Juta, 1981.

The second volume in the series includes descriptions of 50 species with color plates for each species.

van der Walt, J.J.A. and P.J. Vorster. *Pelargoniums of Southern Africa Including Some Representative Species from Other Parts of the World*. Vol. 3. Kirstenbosch: National Botanic Gardens, 1988.

The third volume in the series follows the same format as the first two with descriptions and color illustrations of 50 additional species (including a few botanical varieties and subspecies). This volume includes the master index for all three volumes.

Wilson, Helen van Pelt. *Geraniums – Pelargoniums for Windows and Gardens*. New York: M. Barrows and Company, Inc., 1946.

In this early version of her classic text (which was later revised, updated and published as *The Joy of Geraniums*), Wilson shares her personal experience and love of pelargoniums and addresses *Pelargonium* history, description, cultivation, propagation, hybridizing, uses, training into standards, growing in window boxes, greenhouses and pests/diseases. Includes black and white photos/line drawings, glossary and index.

Wilson, Helen van Pelt. *The Joy of Geraniums: The Standard Guide to the Selection, Culture, and Use of the Pelargonium*. New York: M. Barrows and Company, Inc., 1965.

This is the significantly revised and updated version of Wilson's *Geraniums – Pelargoniums for Windows and Gardens*. Wilson discusses the different types of pelargoniums (including single, double and fancy-leaved zonals, dwarfs, ivy-leaveds, scented and regals). She also provides information on cultivation, propagation, pests/diseases, growing in California, container growing, tree forms and tips for photographing pelargoniums. With black and white line drawings/ photographs and color plates.

Pamphlets

Manteuffel, Sandy and Jenny Kingery. *Scented Geraniums: To Know Them is to Love Them*. Thyme Graphics, [n.d].

This 8-page pamphlet provides a brief overview of *Pelargonium* history, botany, cultivation, propagation, pests and uses, with information on the meanings of the Latin names of *Pelargonium* species. It also includes recipes and a cultivar list organized by scent-group.

Peddie, Mary, Judy Lewis and John Lewis. *Growing & Using Scented Geraniums*. Pownal, VT: Storey Communications, 1991.

This 32-page Storey Publishing Bulletin discusses *Pelargonium* history, description of the various scent groups, cultivation, propagation, pests/diseases, craft and culinary uses, with profiles of 12 recommended species and cultivars. Includes information on growing in the landscape, in containers and as standards, topiary and bonsai. Craft uses discussed include potpourri, tussie mussies, pressed flowers and paper making. Also includes Growing & Usage Chart for 25 species/cultivars.

Simmons, Adelma Grenier. *Breath of the Past: The Little Book of Scented Geraniums*. Coventry, CT: Caprilands Herb Farm, [n.d.].

This 44-page booklet begins with an overview of *Pelargonium* history, but the majority of the

text is devoted to descriptions of various cultivars and their uses in the garden, window baskets and hanging baskets. Simmons also includes recipes for tea biscuits, pudding cake, angel cake with rose geranium jelly, rose geranium tea, rose-scented alcohol rub, and a scented “peace pillow.”

Tucker, A. O. *Scented-Leaf Geraniums: Introduction & Recipes*. Dover, DE: Department of Agriculture and Natural Resources, Delaware State University, [n.d.].

Dr. Tucker provides brief information on *Pelargonium* cultivation and one legend and includes a listing of species and cultivars organized by scent group. The booklet also includes recipes for scones, muffins, baked apples, pudding, custard, jelly, honey, cream, wine, punch, lemonade, tea, sugar, iced tea syrup, ice cubes, an ice ring, tea crystals, cake, frosting and butter.

Selected Articles from *The Herbarist*

Amidon, Caroline and Joyce Brobst. “To Grow Pelargoniums is to Know Them.” *The Herbarist*. 71 (2005): 4-10.

Amidon and Brobst discuss 19 *Pelargonium* species, providing information on habit, cultivation, propagation, pests and uses. The article includes black and white photographs and a reference list.

Amidon, Caroline W. and Joyce E. Brobst. “Fun With Pelargoniums.” *The Herbarist*. 67 (2001): 26-30.

Amidon and Brobst share their personal experience and passion for pelargoniums and provide descriptions and advice for growing *Pelargonium crispum*, *P. odoratissimum*, *P. tomentosum*, and *P. grossularioides*, with general information about *Pelargonium* cultivation, propagation and culinary, craft and therapeutic uses. Includes photographs and bibliography.

Brigham, Dorcas. “Old Friends, Refreshingly New.” *The Herbarist*. 18 (1952): 24-26.

This brief article provides advice for propagating and growing scented geraniums and using them in the landscape. Species and cultivars discussed include ‘Mrs. Taylor,’ ‘Clorinda,’ ‘Brilliant,’ ‘Capri,’ ‘Shrubland Rose,’ ‘Prince of Orange,’ apple, nutmeg, peppermint, prostrate oak, oak-peppermint, ‘Skelton’s Unique,’ *P. capitatum* and *P. denticulatum*.

Manteuffel, Sandy. “Pelargoniums in Pottery.” *The Herbarist*. 71 (2005): 13-15.

Manteuffel describes the process for pressing *Pelargonium* leaves into pottery – with illustrations of the making of a bowl. The leaf is burned off in the firing, but the imprint remains and can be stained green. The article includes photographs.

McNenny, Brenda R. “It Can’t Be Done.” *The Herbarist*. 44 (1978): 62-67.

Describes the author’s experience and instructions for propagating scented geraniums (pelargoniums) from individual leaves and a trial of McNenny’s method at Hilltop Herb Farm in Texas. Includes line drawings and black and white photographs.

Oberliesen, Janet M. “Micropropagation of Herbs: Scented *Pelargonium* spp.” *The Herbarist*. 51 (1985): 102-109.

Provides an introduction to micropropagation (propagating plants from tissue culture) methods and concepts. The main focus of the article is the attempted clonal propagation of ‘Mabel Grey,’ ‘Skeleton Rose,’ ‘Variegated Prince Rupert’ and ‘Variegated Nutmeg’ from tissue culture. Includes black and white photographs and a table of tissue cultured herbs.

Pelargoniums: An Herb Society of America Guide

Peddie, Mary. "Growing Scented Pelargoniums: Delightful Plants for Difficult Places." *The Herbarist*. 64 (1998): 36-38.

Provides suggestions for growing *Pelargonium* cultivars as ground covers in both sun and shade, in borders and beds, hedges, rock gardens, patio gardens, tabletop/miniature gardens, hanging baskets and as bonsai.

Tucker, Arthur O. "What is the scientific name of the rose geranium?" *The Herbarist*. 71 (2005): 11-12.

Dr. Tucker discusses the nomenclature confusion surrounding *Pelargonium graveolens* and related hybrids. The article includes a chart of chromosome counts for *P. graveolens*, *P. xasperum* (*P.* 'Graveolens' cultivar group), *P. capitatum* and *P. radens*.

Tucker, Arthur O. and Michael J. Maciarello. "Is This Plant a Hoax?" *The Herbarist*. 67 (2001): 51-55.

In this reprint of the 1993 Otto Richter Memorial Lecture at the International Herb Growers and Marketers Association Conference, Tucker and Maciarello discuss a variety of plant hoaxes, including the one involving the alleged "mosquito-fighter" geranium, *Pelargonium* 'Citrosa.'

Wilson, Anne. "A Handful of Fragrant Geraniums." *The Herbarist*. 18 (1952): 27-28.

The author relates her personal story of a trip to the hospital to visit a friend with a gift of scented geraniums. Along the way, she shares some of the plants with a teenage patient and hospital employees.

Wilson, Helen Van Pelt. "Scented Geraniums." *The Herbarist*. 13 (1947): 17-27.

Wilson discusses the history, classification, description, culture and use of scented geraniums in gardens, potpourri and cooking. With lists of "Finest Flowering Scenteds," "Variegated-leaved Scenteds," "Tallest Scenteds," "Rambling or Prostrate Scenteds" and "Compact Scenteds." Includes line drawings.

Other Articles

Becker, Jim. "A Rose by Another Name: Scented Pelargoniums Smell as Sweet." *The Herb Companion*. 10(3) (February/March 1998): 39-41.

Becker describes rose-scented pelargoniums including 'Attar of Roses,' 'Both's Snowflake,' 'Peacock,' 'Dr. Livingston,' 'Candy Dancer,' 'Charmay Snow Flurry,' 'Crowfoot Rose,' 'Rober's Lemon Rose,' and 'Round-Leaf Rose.' The article includes color photographs and recipes for Rose Geranium Tea, Rose Geranium Scones and Rose Geranium Jelly.

Becker, Jim and Faye Brawner. "Fragrant Pots: Scented Geraniums and Containers are Made for Each Other." *The Herb Companion*. 8 (3) (February/March 1996): 28-33.

Becker and Brawner discuss the benefits of growing scented pelargoniums in pots, with information on starting from cuttings and how to water, fertilize and prune. Includes color photographs and a chart of favorite scented.

Lewis, Judy. "Growing Scented Geraniums Indoors." *The Herb Companion*. 5(2) (December 1992/January 1993): 60-63.

Lewis discusses soil, fertilizing, watering, growing under lights or in a garden room or solarium, and dealing with pests and diseases. Includes color photographs and a list of recommended upright

plants and plants for hanging baskets.

Martin, Tovah. "Scented Standards: Shape a Geranium to Your Will – It's Easy." *The Herb Companion*. (February/March 1989): 16-18.

Martin describes the process for shaping a scented geranium plant into a single-stemmed, tree-like standard, and recommends species and cultivars well-suited to standard training. Martin also provides recommendations for standard care and maintenance. Includes color photographs.

Parrot, Mary. "Scented Geraniums: Choosing, Propagating and Enjoying a Family of Old Favorites." *The Herb Companion*. (February/March 1989): 10-15.

This article begins with an overview of *Pelargonium* history, and then discusses propagating from cuttings (including leaf cuttings, the "shade and sand" method, and using a pot-in-pot rooting bed), and propagating from seed. Parrot also addresses garden and container growing, pests/diseases and using scented geraniums in the kitchen and in decorative art. Includes a recipe for rose geranium syrup, color photographs, and a usage chart.

Sangwan, R.S., B. Arora and N.S. Sangwan. "Spectral Modulation of Essential Oil Biogenesis in the Scented Geranium, *Pelargonium graveolens* L." *Journal of Herbs, Spices & Medicinal Plants*. 10(1)(2002): 85-91.

This study examined the effect of light quality on *Pelargonium graveolens* oil biosynthesis, exposing leaves to blue, green, yellow, orange, red and far-red colored light. Results indicated that leaves exposed to red light had higher levels of monoterpenoids.

Wild, Steve. "Landscaping with Scented Geraniums." *The Herb Companion*. 3(4) (April/May 1991): 40-45.

Wild provides advice for growing scented in the landscape and recommends growing en masse "for best effects." Topics include soil preparation, maintenance, propagating from cuttings and landscape planning taking into account plant size, color, texture and fragrance. Includes color photographs, a planting chart with information on 22 species/cultivars, and a list of plant sources.

Wilson, Rickie K. "Celebrating the Scented." *The Herb Quarterly*. 106 (Spring 2006): 22-25.

Provides information on *Pelargonium* history, cultivation and propagation with a page devoted to medicinal and culinary uses.

*Indicates materials that circulate to HSA members