REPORT TO THE ELVENIA J. SLOSSON ENDOWMENT FUND,
December, 2006

Project Title: **Selection of Pest and Disease Tolerant Dwarf Lilacs (*Syringa*) With Low Winter-Chill Requirement and Extended Bloom Period for the Home Gardener.**

PI: **J.G. Waines, Department of Botany & Plant Sciences, University of California, Riverside, CA 92521-0124.**
Tel: 951-827-3706; Fax: 951-827-4437; e-mail:<giles.waines@ucr.edu>

Affiliates: **Members of the Southern California Lilac Council, including Mr. Robert Ludicans, Cook's Nursery, Visalia, CA, and the lilac-garden volunteers at Descanso Gardens, La Cañada-Flintridge, CA.**

Introduction

Hybrids and species of lilac (*Syringa)* are desirable flowering shrubs in California, the sun-belt States, and the USA. Drawbacks for home gardeners in urban Southern California include: 1) plant size is too large for many small gardens; 2) cultivars may flower poorly because of insufficient hours of winter chill; 3) bloom period is only 3 to 5 weeks from mid-March through April; 4) some cultivars are susceptible to Pierce's disease (*Xylella fastidiosa*) and leaf powdery mildew. A previous grant funded selection of shorter seedlings out of *S. x hyacinthiflora* 'Pocahontas' that were grown and flowered at Riverside, Sunset zone 19. The pollen parents were a selection of commercial cultivars that flower well in the UCR Botanic Gardens. Because the earlier Descanso Hybrids have pale flower colors, and were selected on nurseries at nearby Chino and Upland (zone 18) Pocahontas was chosen as the female parent to impart darker flower colors, which it did. I also knew from earlier selection work, by Dr. L.C. Erickson, that plants out of Pocahontas could have short adult stature, from 2-4 feet in height, which would be desirable for modern home gardens. I did not know in the mid 1990s that Pocahontas is susceptible to Pierces disease, vectored by the glassy-winged sharpshooter, which is recently introduced from Florida and now common on citrus in the Riverside area. Two plants of Pocahontas, including the original female plant in the Botanic Gardens have since died. Other isolated plants at Riverside and four at Irvine appear healthy. One of the original male parents was undoubtedly *S. x hyacinthiflora* 'Excel', a sister release of Pocahontas by the F. Skinner Nursery in Manitoba, Canada (Hardiness zone 3), which also grows and flowers well at Riverside, and which is also susceptible to *Xylella*. Around 25% of the original short selections died by December 2005, on the UCR Experiment Station and about the same number of 400 open pollinated short seedlings from different mother plants. However, most commercial cultivars in the Botanic Gardens and on the Experiment Station appear tolerant, and these also acted as male parents, along with Excel, of the open-pollinated seeds of Pocahontas originally used.

Goals and Objectives

The goal of this project, and of the Southern California Lilac Council, is to popularize lilac species and hybrids in southern California and areas with similar climate. The

objective is to grow replicated trials at Riverside (Sunset zone 19) and Irvine (Sunset zone 23) of taller, commercially-available cultivars and new, shorter selections, and exotic species and hybrids not previously grown in southern California. By doing so we will test and select plants that cover the defects for home gardeners in the introduction, namely: 1) shorter size, preferably with less suckering; 2) plants will grow and flower well with less hours of winter-chill temperatures; 3) extend the bloom period of available cultivars from 3 – 6 weeks to up to 16 weeks in spring, by selecting desirable plants that bloom earlier or later in the season, and plants that will repeat bloom in spring, summer and fall; 4) select plants that are tolerant to Pierces disease and to leaf powdery mildew, the main diseases of lilac in southern California.

Discussion

1). Shorter Plants. It is easy to select short stature lilac plants (2 – 4) feet tall) from open pollinated seed collected from different known mother plants of commercial cultivars. It is not difficult to make controlled crosses with known maternal and paternal parents. The secret is to not be reticent to cut off unwanted flowers in a maternal inflorescence and only cross pollinate a few with specific pollen. One pollinated flower may develop up to four F_1 hybrid seeds in a capsule. These four seedling plants will have to be grown several years to self or cross pollinate to produce an F_2, by bagging an inflorescence, or another open pollinated generation. Some plants appear to readily set selfed seeds, others appear to cross pollinate, or be shy seed producers. Between one quarter and one third of seedlings will fall into the range of short plants (2 – 4 feet tall when mature), depending on the maternal parent. Nurserymen breeders in the 19th and 20th centuries must have consciously selected for tall plants, to look appropriate in large estate gardens, the owners of which were the main patrons of lilac nurseries in those times. Around 30 of the original 150 shorter seedlings of Pocahontas, planted out on the UCR experiment station, were selected by a review team as being of good inflorescence characteristics and worthy of further observation in 2001. This number was further reduced each year by susceptibility to *Xylella* bacterium, especially in the very hot summer of 2006, but there are still some short plants with good flower and inflorescence characteristics that remain. Cuttings of some of these were rooted in spring 2005 and 2006 and are in pots in the lath house at UCR to evaluate further. Those whose mother plant died in summer 2006 from *Xylella* will be discarded, at least for growing in southern California. Dr. Erickson's original short selection, 'Ramona' (out of Pocahontas), and taller 'Bardwell' (out of blue-flowered 'President Lincoln') were also increased by cuttings and are also in pots in the lath house. I do expect we will release some shorter plants with good flower characteristics that will be tolerant to Xylella bacterium, and adapted to southern California conditions.

Plant height in December 2006 varied from 74 (65-85) cm for Adelaide Dunbar to 180 (153-210) cm for California Rose and 180 (175–195)cm for Esther Staley.(Table1.)

2). Adaptation to low winter chill: Twenty Eight original bare-root commercial cultivars were planted at Irvine in winter 2003. The plants were donated by Mr. Robert Ludicans of Cook's Nursery, Visalia CA. Shrubs were planted in four randomized replications. Each plant has a micro-sprinkler. Slow-release fertilizer was applied at planting and in the second year and two subsequent years, when some cultivars grew

vigorously. Plant height measured December 18th, 2006 showed, in most cases, modest gains over previous years (Table 1).

3). Flowering in the 28 cultivars was sparse at the South Coast Research and Extension Center, Irvine. At least 13 of the cultivars have yet to flower in spring or fall. They are Adelaide Dunbar, Alphonse Lavallée, Belle de Nancy, Charles Joly, Common Eastern Lilac, Congo, Ludwig Spaeth, Madam Lemoine, Michel Buchner, Monge, President Grevy, President Poincaré and Primrose. Most of the same cultivars did not flower at Riverside either. I conclude they are not suited to winter temperatures in southern California, which are warmer than those at Visalia in the Central Valley. Charles Joly does flower well in the Botanic Gardens at UCR, but the plant in the lath-house at UCR has yet to flower. Light intensity is known to affect flowering in lilacs. Surprisingly for a supposedly under-story shrub, lilacs prefer full sun.

Of the remaining 16 cultivars, most had spring flowering displays at Irvine, though there was a tendency for inflorescences not to expand into large cones (thyrses) as at Riverside, but to be intermediate between fall unexpanded, globose, inflorescences and fully expanded cones. Flowering at Irvine was usually a month behind that at Riverside. This may have to do with cooler day time temperatures at Irvine, which is six miles inland from the coast at Laguna Beach. Cool day temperatures may affect adversely the development of individual flower pedicels and peduncles in the inflorescence. My understanding of a paper in Dutch is that day temperatures above 70 F are required for optimum pedicel growth. These temperatures may not be reached for a sufficient number of hours in winter-spring at Irvine. This may be an explanation for the production of unexpanded, globose, winter blooms in Excel and Pocahontas and other cultivars at Irvine and Riverside. A minimum number of degree days may be required for optimum inflorescence size in lilacs. What is clear from plants that flowered in spring 2003, 2004, 2005 and 2006 is that cultivars do not flower as well at Irvine as at Riverside. This may be due at Irvine to lack of winter-chilling temperatures, and/or due to lack of minimum temperatures necessary for optimum inflorescence development.

The cultivar with the most spectacular blooms at Irvine in spring 2006 was ‘Krasavitsa Moskvy’, (Beauty of Moscow) bred in Russia by Kalesnikov, 1947. All four replications had stunning double white-pale-pink, inflorescences. It is listed as a cultivar in the Vulgaris group, so there may be other vulgaris cultivars from Russia that are adapted to Irvine, coastal, conditions. Unfortunately, by August 2006, three of the four plant replicates showed susceptibility to *Xylella* at Irvine. Only one or two branches are affected, but we shall wait to see how the disease progresses next year. Still this should not deter testing other cultivars released by Kalesnikov, or from other Russian breeders at Irvine. There are several other Russian cultivars available in the USA, and these probably have not been tested near the coast or inland in southern California. Krasavitsa Moskvy flowers well on the Experiment Station and in the lath house at Riverside, where to-date is Pierce disease free.

Some Descanso hybrid cultivars, selected at Chino and Upland (zone 18) such as ‘Angel White’, ‘F. K. Smith’ and ‘Lavender Lady’ did flower at Irvine in spring, as did ‘Esther

Staley' selected at San José, and Pocahontas and Excel bred in Manitoba, Canada, and 'Anabel' bred in Iowa. All are in the Hyacinthiflora group, being hybrids of *S. oblata* from China and *S. vulgaris* from southeast Europe. Other Hyacinthiflora Descanso hybrids such as 'California Rose' did not perform as well at Irvine. Pocahontas, Excel, Anabel and Angel White have a tendency not to fully expand their inflorescences into cones.

With one or two exceptions, eg. Krasavitsa Moskvy and perhaps 'Katherine Havemeyer' most Vulgaris group cultivars did not flower at Irvine, and some did not grow well either eg. 'Adelaide Dunbar', 'Congo' and 'Madame Lemoine'.

Working Hypothesis: One way to over come the shyness of cultivars to flower at Irvine near the coast is to make crosses among the cultivars that do flower well there, and select among seedlings at Irvine for plants that flower as well as or better than the parents. These will probably be hybrids of *S. oblata* and *S. vulgaris* (such as Katherine Havemeyer or Krasavitsa Moskvy), or hybrids of *S. oblata* with cultivars in the Hyacinthiflora group, that do flower at Irvine, such as Esther Staley, F. K. Smith, or Lavender Lady, and possibly Angel White, though the latter appears to be susceptible to *Xylella.* In effect such seedlings would be back crosses to *S. oblata.*

Multiflora types and Fall flowering: One Hyacinthiflora cultivar, Esther Staley, flowers at Irvine in the spring, in late summer and fall. All four replicates flowered in early November and mid December, 2006. The display, while not as striking as spring inflorescences, is attractive, even though the cones are only half expanded. Excel and Pocahontas also flower in fall and winter, but with tight globose inflorescences where the pedicels do not expand.

Suckering: Some lilac cultivars are notorious for forming lateral shoots from buds at the base of the main stem, or from buds on the main lateral roots. To overcome this, some cultivars are grafted onto privet rootstocks, but the root stock may also sprout or sucker. Notes were taken on the degree of suckering of cultivars on their own roots. In general, the more vigorous a cultivar, the more tendency it had to sucker.

Leaf Mildew: All cultivars at Irvine developed some powdery mildew on the leaves in autumn. It was not a great problem, except perhaps on Adelaide Dunbar, which is not well adapted to growing near the coast.

Fall Color: Anabel has attractive yellow to rust brown color of adult leaves in fall. Pocahontas has deep purple leaves in early fall, but looses its leaves completely by December. Several other cultivars retain leaves until after Christmas.

Xylella: Infection by Xylella bacteria started in summer 2006 at Irvine, vectored by the glassy winged sharpshooter. There are many groves of citrus and avocados on the Irvine Station. Angel White, Belle de Nancy, Charm, Krasavitsa Moskvy, President Grévy, President Poincaré, Primrose, and Sensation all showed one or more plants with burned leaves that looked like fire-blight on one or more stems. We shall have to see how the

disease progresses next year. I suspected Angel White is susceptible at Riverside, but an adult plant in the Botanic Gardens appeared to grow out of the infection, though it is less vigorous than it used to be. The same is true of Burgandy Queen. To date Excel and Pocahontas have not been infected at Irvine, while plants have died at Riverside. I shall retain this replicated lilac planting at Irvine for several more years to observe how many cultivars are infected by the bacterium which is indigenous to Orange County and which attacks members of several genera in the olive family.

Summary: The cultivars best adapted to growth and flowering at the South Coast Research and Extension Center between 2003 and 2006 were **Lavender Lady**, and **Esther Staley.** Other cultivars such as Anabel, Angel White, Excel, F.K. Smith, Krasavitsa Moskvy, Katherine Havemeyer, Pocahontas President Lincoln and Syringa x Chinensis, all flowered once or more, sometimes with globose inflorescences, but they need to be observed for a longer time to give a recommendation on their suitability and disease resistance.

Table I. Growth of Lilac (*Syringa*) Cultivars Planted at Irvine South Coast Research and Extension Center, February, 2003.

Name	Group	Mean height (Range) in cm		
		Dec. 2004	Dec. 2005	Dec. 2006
Adelaide Dunbar	V	54(42-70)	59(35-78)	74(65-85)
Alphonse Lavallee	V	82(74-90)	107(105-110)	140(109-165)
Anabel	H	100(82-124)	113(97-150)	162(118-185)
Angel White	H	113(105-120)	106(100-110)	118(105-142)
Belle de Nancy	V	77(63-90)	80(69-94)	89(85-100)
Burgandy Queen	V	93(86-101)	96(90-108)	113(93-131)
California Rose	H	99(77-110)	122(110-130)	180(153-210)
Charles Joly	V	72(55-85)	74(60-82)	92(53-128)
Charm	V	86(70-102)	90(78-108)	99(82-110)
Common Eastern Lilac	V	105(76-127)	109(75-130)	131(73-160)
Congo	V	58(45-79)	63(50-80)	86(78-93)
Esther Staley	H	128(115-140)	135(125-142)	180(170-195)
Excel	H	87(68-100)	89(80-98)	115(110-123)
F.K. Smith	H	124(120-144)	136(105-170)	156(120-190)
Katherine Havemeyer	V	131(117-145)	108(98-120)	139(122-172)
Krasavitsa Moskvy	V	115(109-120)	126(110-140)	136(120-150)
Lavender Lady	H	96(86-107)	108(100-123)	144(122-160)
Ludwig Spaeth	V	86(73-95)	88(75-95)	96(75-120)
Madame Lemoine	V	68(61-75)	70(60-78)	86(75-95)
Michel Buchner	V	78(70-90)	80(70-90)	108(96-112)
Monge	V	106(100-112)	114(110-127)	129(122-136)
Pocahontas	H	108(100-123)	108(110-122)	113(105-127)
President Grévy	V	82(80-85)	83(70-91)	106(90-135)
President Lincoln	V	113(112-116)	115(100-125)	128(105-145)
President Poincaré	V	105(90-125)	98(73-110)	106(102-155)
Primrose	V	60(50-70)	60(55-70)	80(69-89)
Sensation	V	81(66-90)	93(77-115)	106(72-131)
Syringa x Chinensis	C	136(130-145)	133(130-142)	156(148-165)

C = Chinensis Group
H = Hyacinthiflora Group
V = Vulgaris Group.