

TREES FOR BEES CORNER

WINNING WITH WILLOWS: DIVERSE SPECIES FLOWERING



Dr Linda Newstrom-Lloyd

Willows are the backbone of spring bee colony build-up in most regions of New Zealand because they are so abundant and have prolific and nutritious pollen for bees.

A short willow flowering season can leave a pollen gap that can result in population declines, right when maximum-strength hives are needed for honey harvesting and pollination services in November.

Pollen deficits after willows stop flowering and before clover blooms can be due to a severe lack of on-farm diversity. Such a pollen deficit gap can be filled in with other species such as ash, maple and oaks but willows

themselves can also fill that gap. A diversity of willow species can be sequenced to extend the flowering season from end of July through to December.

Trees for Bees and the New Zealand Poplar and Willow Research Trust conducted a joint study of 30 willow species and 21 hybrids held in the living germ plasm collection in Aokautere by Rural Supplies Technologies (RST) Environmental Solutions, located in Palmerston North. From 28 July 2014 to 5 January 2015, we observed flowering times every three days (except during rain) and collected pollen for crude protein content and lipid analyses.

The flowering chart below presents selected male willow trees with prolific catkin production. For example, if you wanted to have late flowering willows at the end of October through November, you could plant *Salix alba* 'Lichtenvoorde' (PN 655), *S. cantabria* (PN 712) and especially *S. pentandra* 'Dark French' (PN670).

For more information on willows and a PDF of our new willow booklet, see the New Zealand Poplar and Willow Research Trust at (<http://www.poplarandwillow.org.nz/>). A collection of poplars at the same Aokautere site could provide valuable sources of propolis for bees as well.

Flowering Times for Selected Willows

Selected male trees and shrubs of <i>Salix</i>			Wk 0	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23
Species name	Genotype Name	Register No.	Jul 28th	Aug 4th	Aug 11th	Aug 18th	Aug 25th	Sep 1st	Sep 8th	Sep 15th	Sep 22nd	Sep 29th	Oct 6th	Oct 13th	Oct 20th	Oct 27th	Nov 3rd	Nov 10th	Nov 17th	Nov 24th	Dec 1st	Dec 8th	Dec 15th	Dec 22nd	Dec 29th	Jan 5th
<i>aegyptiaca</i>		PN 229																								
<i>X reichardtii</i> (<i>caprea</i> x <i>cinerea</i>)	Pussy Galore	PN 215																								
<i>X reichardtii</i> (<i>caprea</i> x <i>cinerea</i>)	Muscina	PN 714									0.7															
<i>viminialis</i> (var. <i>aquatica</i> ?)	Korso	PN 669																								
<i>purpurea</i>	Rubra	PN 221					0.9			0.1																
<i>opaca</i>		PN 283					0.3				0.7															
<i>eriocephala</i>	Americana	PN 376					0.3												0.1							
<i>nigra</i>	Pryor 62-91	PN 735						0.3			0.7															
<i>appenina</i>		PN 710						0.3				0.3														
<i>candida</i> 'Furry Ness'	Furry Ness	PN 385						0.3											0.1							
<i>purpurea</i>	Links Dutch	PN 382							0.9							0.1										
<i>caprea</i>	N	PN 233							0.4					0.6												
<i>nigra</i>	AR 115	PN 733							0.4								0.7									
<i>alba</i>	I 2-59	PN 357								0.9				0.1												
<i>hookeriana</i> 'Furry Ness'	Furry Ness	PN 685								0.9																
<i>reini</i>		PN 688									0.9			0.6												
<i>X dichroa</i> (<i>aurita</i> x <i>purpurea</i>)		PN 680									0.9				0.1											
<i>nigra</i>	Pryor 62-27	PN 734									0.9															
<i>alba</i>	I 8-59A	PN 361									0.3			0.6												
<i>triandra</i>	Black German	PN 374									0.3											0.1				
<i>X forbyana</i> (<i>purpurea</i> x <i>viminialis</i>)	Sessilifolia	PN 305											0.9					0.1								
<i>purpurea</i>	Leicestershire Dicks	PN 610											0.9										0.7			
<i>purpurea</i>	Lancashire Dicks	PN 611											0.4													
<i>alba</i>	Lichtenvoorde	PN 655											0.4									0.1				
<i>cantabria</i>		PN 712																								
<i>pentandra</i>	Dark French	PN 670																								

Flowering times of selected male willow trees and shrubs observed from July 28th, 2014 to January 5th, 2015 in the Aokautere living germ plasm collection in Palmerston North. ■ cells = anthers open and pollen available all 7 days of week, ■ = proportion of week with some anthers presenting pollen.

Source: Reprinted with permission from the *Trees for Bees* booklet 'Winning with Willows' by Linda Newstrom-Lloyd, Ian McIvor, Trevor Jones, Manon Gabarret and Blandine Polturat, June 2015, pages 6–7.

continued...

Willow species near apiaries

For some time, beekeepers have been concerned about the continued removal of willow species by land managers in critical areas near apiaries. While *S. fragilis* (crack willow) and *S. cinerea* (grey willow) are recognised as weed species around water courses and wetlands, with careful siting and management the other willows listed in New Zealand should not pose an issue for weediness. It is recommended that you consult with your regional council, particularly around vulnerable sites such as rivers and wetlands, because some willow species are prone to breaking off and all of them root readily in water.

Trees for Bees is working with Environment Canterbury and other Regional Councils to evaluate the willow species that we have selected as great nutrition for bees. To this end, we have planted 19 willow genotypes from 14 species onto 10 Trees for Bees demonstration farms throughout New Zealand. We will test the behaviour and survival of these selected species and consult with regional councils on the value of each species. We hope that many alternative willow species can be added to the planting mixes for erosion control and riparian protection to diversify pollen nutrition and extend the duration of the willow flowering season to help bees thrive in the spring.

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[Editor's note: this is the first of a regular series of articles provided by the Trees for Bees team.]

Trees for Bees French intern students, Blandine Polturat (right) and Manon Gabarret (left), working in the Aokautere Willow Collection in Palmerston North.

