Overview of MFNZ's High Performance Mānuka Seedlings –

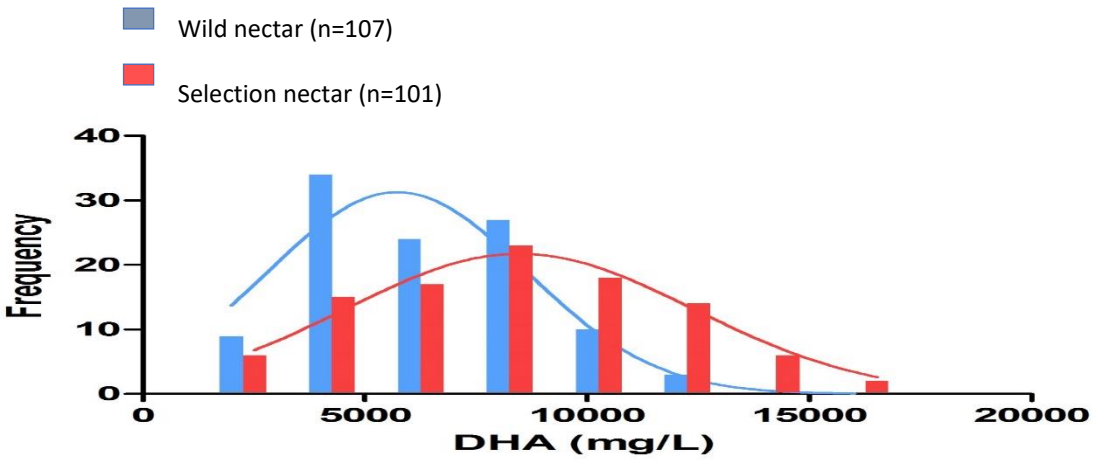
Contents

1. Description of the Breeding Programme

Manuka Farming in association with MFNZ and Comvita have developed a range of seedlines that are suitable for plantation development. These seedlines have been shown to be field-hardy in a number of environments throughout New Zealand and have been selected for floral density and flowering times.

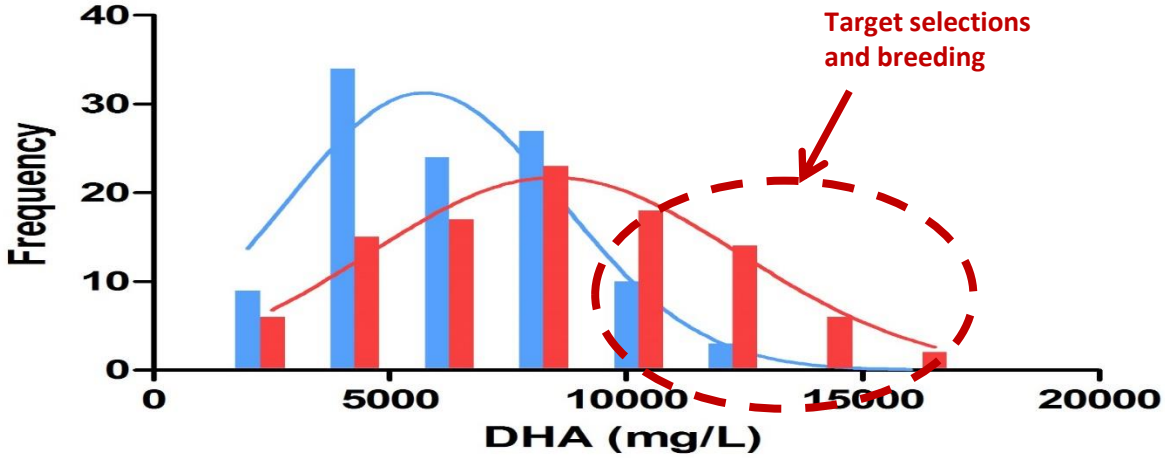
The initial selection of these genomes involved analysis of honey crops in areas that consistently yielded manuka honey with elevated UMF levels. Parent material was sourced from homogenous districts of *Leptospermum scoparium*. This parent material was subjective to a number of evaluations, including field adaptability and honey potential, and the best candidates were propagated to form trial plantation seed orchards.

These seed orchards have been further evaluated, poor-performing individuals have been removed, and the seed for CVT seedline is harvested from the remaining parents. Flowering time and geographic separation ensures that the CVT seedline parentage remains true to type.



Selection Criteria for Breeding

- Field survival
- Growth rate
- Floral density
- Bee visitation
- DHA in nectar
- Manuka markers



2. CVT Descriptions

CVT 1

The initial parent material was selected from *L. scoparium* var. *incanum* populations. The CVT 1 seedline flowers early in September and is only suitable for warm sheltered environments where the honey bee can work in early spring. This variety is not adapted to summer-dry hill country, however will perform well given an appropriate environment.

CVT2

CVT 2 is a generalist seedline. The initial parent stock was sourced from *L. scoparium* var. *scoparium* which has a widespread distribution throughout New Zealand. CVT 2 typically flowers in October into November, and consequently is a prime candidate for honey harvest. This seedline is adaptable to hill country and the variety is encountered from Northland to the Marlborough Sounds and Nelson province.

CVT 3

The parent material utilised for the development of this seedline was a variant of *L. scoparium* var. *scoparium*. CVT 3 flowers in November into December and is well-adapted to exposed conditions and exhibits a high degree of drought-tolerance. Accordingly, this seedline is useful for ridgelines and exposed north facing slopes in plantation development.

CVT 4

The initial parent stock for this seedline was *L. scoparium* var. *linifolium*. CVT 4 exhibits a higher degree of cold-tolerance, and furthermore whilst is successful on moderate hill country is also adapted to a degree of water-logging. CVT 4 typically flowers in December during the start of summer and yields a robust honey crop.

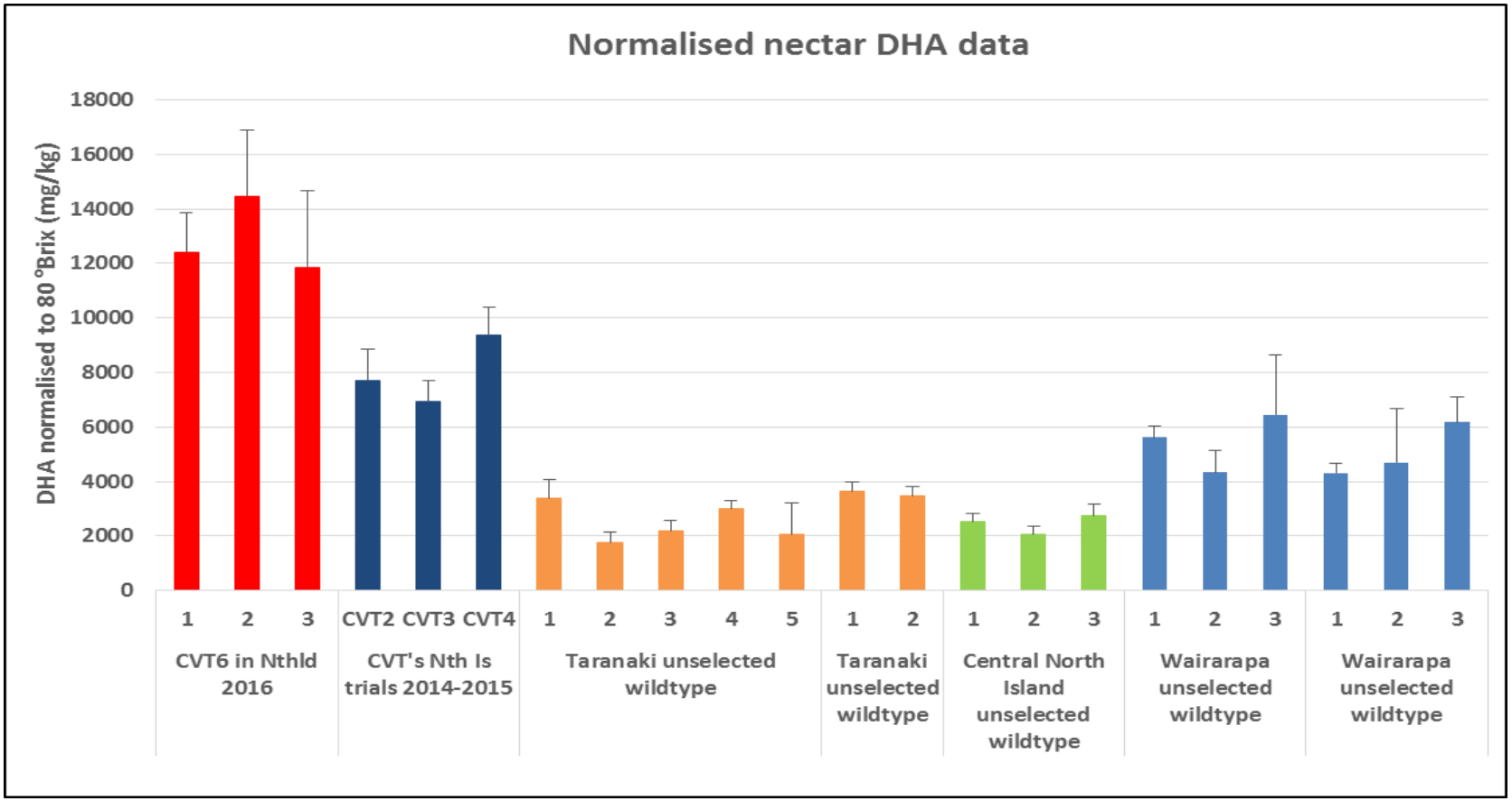
CVT 6 (new)

The parent stock for this seedline is a number of PVR clones that display elevated beneficial characteristics, for example floral density and honey potential. This seedline flowers predominantly in October and can be used in lieu of CVT 2 where conditions are suitable.

CVT Overview Table

Cultivar Ref	Origin	UMF Potential (based on DHA levels)	Hardiness	Flowering Period	Generally Suitable for :		Generally Not Suitable For :
					Terrain	Region	
CVT 1	Northland	Mean DHA Level = 5200	Low	Sept	• Warm sheltered environments where bees will work in early spring	Northland, Bay of Plenty, Coromandel	• Very windy conditions • Frosty • Summer dry conditions
CVT 2	Hokianga /Dargaville	Mean DHA Level = 6950	Moderate	Oct – Nov	• Hill country	General North Island plus Marlborough and Nelson	• Slightly intolerant to frosts but more tolerant than CVT 1
CVT 3	Wairarapa	Mean DHA Level = 7000	High	Nov – Dec	• General hardy - good survival in summer and winter conditions. • Steep country, exposed conditions, useful for ridgelines and exposed north facing slopes.		• Very warm climate
CVT 4	Waikato	Mean DHA Level = 8000*	Moderate	Dec	• Higher degree of cold/frost tolerance	While successful on moderate hill country, is also adapted to wet conditions	• Dry conditions
CVT 6	Hybrid	Mean DHA Level = 12000	Low	Oct – Nov	Similar to CVT 2 (and can be used to substitute for CVT 2) but is less hardy		
Wild Manuka		*Mean DHA Level = 3900*					

3. Normalised Nectar DHA



4. Flowering Period 2012 – 2017 for different CVTs (taken at Rangitatau (Wanganui/South Taranaki) plantation.

		Start	Peak	End	Duration
CVT1	2012/2013	20-10-12	10-11-12	29-11-12	40
	2013/2014	30-09-13	17-10-13	13-11-13	44
	2014/2015	10-09-14	01-10-14	30-10-14	50
	2015/2016	02-10-15	30-10-15	10-12-15	69
	2016/17	06-09-16	25-09-16	30-10-16	54
CVT 2	2012/2013	05-11-12	25-11-12	10-12-12	35
	2013/2014	10-10-13	10-11-13	05-12-13	56
	2014/2015	05-10-14	05-11-14	17-12-14	73
	2015/16	05-11-15	05-12-15	18-12-15	43
	2016/17	25-10-16	18-11-16	08-12-16	44
CVT3	2012/2013	05-11-12	25-11-12	10-12-12	35
	2013/2014	25-10-13	14-11-13	05-12-13	41
	2014/2015	25-09-14	25-10-14	17-12-14	83
	2015/16	25-10-15	15-11-15	12-12-15	48
	2016/17	15-10-16	30-10-16	01-12-16	47
CVT4	2012/2013	10-11-12	29-11-12	15-12-12	35
	2013/2014	10-10-13	10-11-13	05-12-13	56
	2014/2015	12-10-14	20-11-14	30-12-14	79
	2015/16	05-11-15	10-12-15	26-12-15	51
	2016/17	22-10-16	22-11-16	18-12-16	57
Wild	2012/2013	29-11-12	15-12-12	16-01-12	-318
	2013/2014	14-11-13	30-11-13	20-12-13	36
	2014/2015	15-11-14	16-12-14	10-01-15	56
	2015/16				0
	2016/17	04-12-16	01-01-17	20-02-17	78