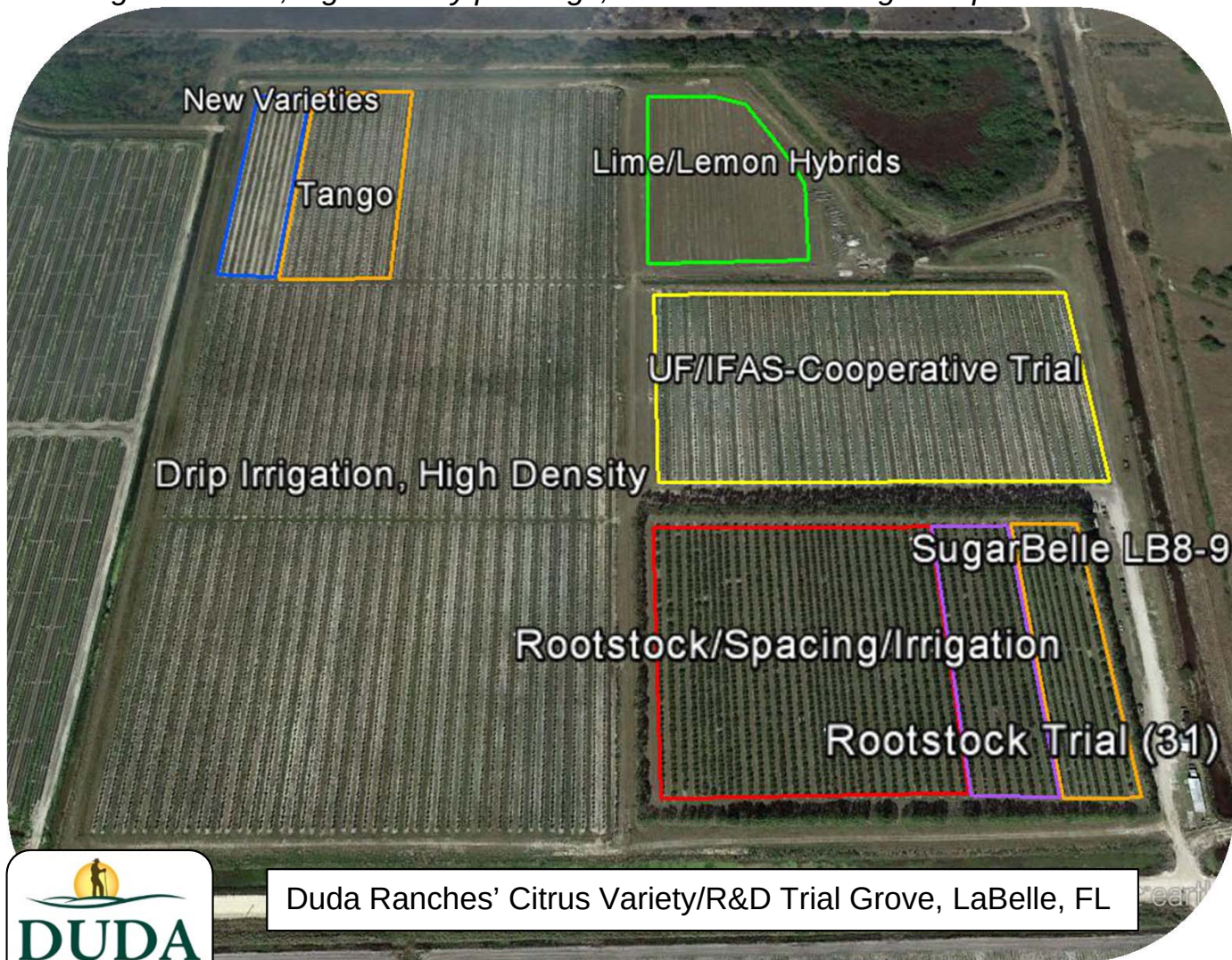


CRDF
Rootstock
Field Day

Tuesday, November 10, 2015

Variety/Rootstock/ Spacing/Irrigation Trials

Evaluating new varieties for quality, productivity, and consumer preference using dwarfing rootstocks, high-density plantings, and low volume irrigation practices.



Duda Ranches' Citrus Variety/R&D Trial Grove, LaBelle, FL

Sugar Belle – Planted March 2009

Harvest Date	Bx/Ac 897 (8x15)	Bx/Ac SWG (10x20)
12/11/2012	77	28
12/10/2013	434	232
12/22/2014	341	197

Sugar Belle/Tango – Quality- Size 120 – 11/4/2015

	897 (8x15)	SWG (10x20)	Tango/Kinkoji (10x18)
Brix°	10.4	10.0	8.2
Acid (%)	0.82	0.95	0.52
Ratio	12.7	10.5	15.8
Avg seeds/fruit	2.6	1.7	0.2
Dry fruit	15%	15%	1%

Duda APS/OHS Trial: VALENCIA Portion
10 x 20' Drip Irrigation
North

	tree	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	tree
Rep A	1	107	102	98	65	57	36	17	2	1
	2	107	102	98	65	57	36	17	2	2
	3	107	102	98	65	57	36	17	2	3
	4	107	102	98	65	57	36	17	2	4
	5	108	103	99	67	60	897	20	3	5
	6	108	103	99	67	60	897	20	3	6
	7	108	103	99	67	60	897	20	3	7
	8	108	103	99	67	60	897	20	3	8
	9	109	106	100	86	61	40	26	4	9
	10	109	106	100	86	61	40	26	4	10
	11	109	106	100	86	61	40	26	4	11
	12	109	106	100	86	61	40	26	4	12
	13	99	38	101	91	63	43	32	13	13
	14	99	38	101	91	63	43	32	13	14
	15	99	38	101	91	63	43	32	13	15
	16	99	38	DEAD	91	63	43	32	13	16
Rep B	17	102	109	13	17	2	91	60	40	17
	18	102	109	13	17	2	91	60	40	18
	19	102	109	13	17	2	91	60	40	19
	20	DEAD	109	13	17	2	91	60	40	20
	21	108	100	26	4	65	17	3	57	21
	22	108	100	26	4	65	17	3	57	22
	23	108	100	26	4	65	17	3	57	23
	24	108	100	26	4	897	17	3	57	24
	25	101	103	38	20	43	63	3	57	25
	26	101	103	38	20	43	63	3	61	26
	27	101	103	38	20	43	63	3	61	27
	28	101	103	38	20	43	63	3	61	28
	29	106	107	36	40	98	897	DEAD	86	29
	30	106	107	36	40	98	897	67	86	30
	31	106	107	36	40	98	897	67	86	31
	32	106	107	36	897	98	897	91	897	32
Rep C	33	100	99	38	17	3	3	91	20	33
	34	100	99	38	17	3	3	91	20	34
	35	100	99	38	17	3	3	91	20	35
	36	100	99	38	17	3	3	91	20	36
	37	109	102	26	2	36	3	2	4	37
	38	109	102	26	2	36	3	2	4	38
	39	109	102	26	2	36	3	2	4	39
	40	109	102	26	2	36	3	2	4	40
	41	38	26	20	897	57	40	3	60	41
	42	38	26	20	897	57	40	3	60	42
	43	38	32	20	897	57	40	3	60	43
	44	38	897	897	897	60	43	3	60	44
Rep D	45	897	100	2	3	17	897	63	13	45
	46	807	100	2	3	17	897	63	13	46
	47	897	100	60	3	17	897	63	13	47
	48	897	100	60	3	17	897	91	13	48
	49	897	109	26	897	3	60	20	2	49
	50	897	109	26	897	3	60	20	2	50
	51	897	109	26	897	3	60	20	2	51
	52	897	109	26	897	3	60	20	2	52
	Tree	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	Tree

Rootstocks for planting 16 Nov 09

	Rtstk no.	ID	Parentage
1	2	SO+50-7	Somatic Hybrid of SO + TO 50-7
2	3	WGFT+50-7	Somatic Hybrid of Wh Gft + TO 50-7
3	4	Changsha+50-7	Somatic Hybrid of Changsha Mand+ TO 50-7
4	13	Orange 4	N + HBP x Cleo + APT
5	17	Orange 19	N + HBP x Cleo + APT
6	20	SRxSH99-18	Tetrazyg of SO + Rangpur x Cleo + SO
7	26	RB 24-6	Ruby Swt x Argentine TO
8	32	RB 24-16	Fiwicke Swt x FD TO
9	36	6-5-56	Nakon x Page
10	38	SRxSH99-18	Thong Dee x Minneola
11	40	6-6-29	Nakon x Page
12	43	B11 R1 T37	Ridge Pineapple x Flying Dragon
13	57	B11 R4 T9	Flying Dragon x Obovoidea
14	60	B11 R5 T4	Flying Dragon x Obovoidea
15	61	B11 R5 T6	Flying Dragon x Obovoidea
16	63	B11 R5 T25	Flying Dragon x Duncan
17	65	B11 R5 T36	Flying Dragon x Duncan
18	67	B11 R5 T62	Flying Dragon x Ridge Pineapple
19	86	B21R2T21	DPI Flying Dragon x LB 1-21
20	91	B21R4T25	DPI Flying Dragon x LB 1-21
21	98	C-22 [PLN 1828]	Sunki x Swingle TF
22	99	C-54 [PLN 1829]	Sunki x Swingle TF
23	100	C-57 [PLN1830]	Sunki x Swingle TF
24	101	C-146 [PLN 1831]	Sunki x Swingle TF
25	102	62-109-1 [PLN 1832]	Sunki x Flying Dragon
26	103	62-137-2 [PLN 1833,34]	Shekwasha x English trifoliata
27	106	F-A 5 [PLN1835]	Cleo x Poncirur trifoliata (Spain)
28	107	F-A 13 [PLN 1836]	Cleo x Poncirur trifoliata (Spain)
29	108	F-A 31 [PLN1837]	Cleo x Poncirur trifoliata (Spain)
30	109	F-A 42 [PLN 1838]	Cleo x Poncirur trifoliata (Spain)
31	897	US 897	Cleo x Flying Dragon

Total spaces available: 416

*TO 50-7 was selected for superior Phytophthora resistance

Fertilizer Program			
OHS	Lbs N / Tree	Lbs N / Acre	Source
Year 1	0.18		Fertigation
Year 2	0.36		Fertigation
Year 3		102	Fertigation
Year 4		145	Fertigation + Dry
Year 5		145	Fertigation + Dry
Year 6		145	Fertigation + Dry

Current Vernia/Valencia Rootstock Trials HLB Severity Rating System

HLB Severity rating system:

0-0.5= No HLB symptom or few symptomatic leaves

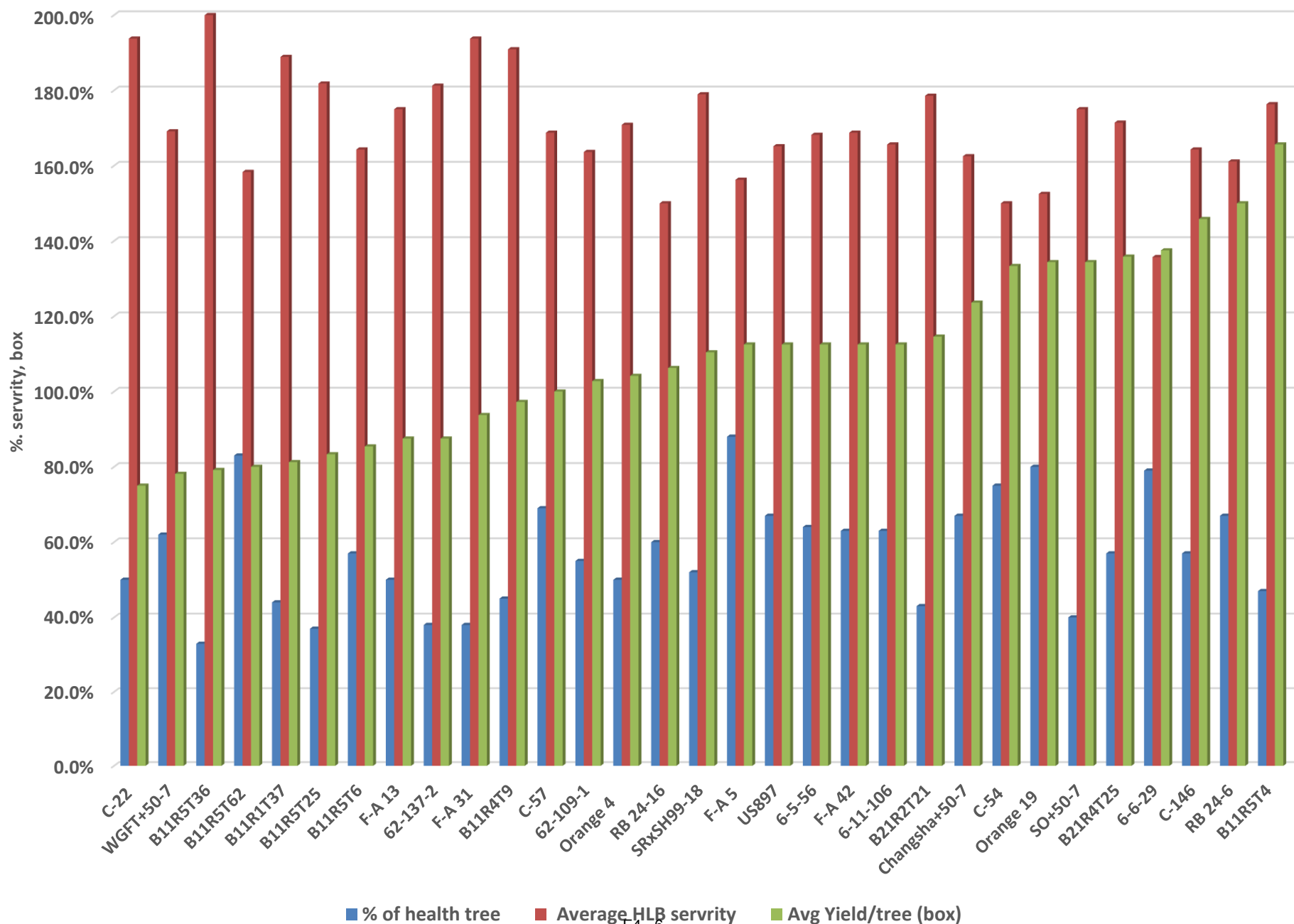
**1-1.5= 10% to 20% HLB symptomatic canopy 2-2.5= 25%
to 50% HLB symptomatic canopy**

3-3.5= more than 50% HLB symptomatic canopy

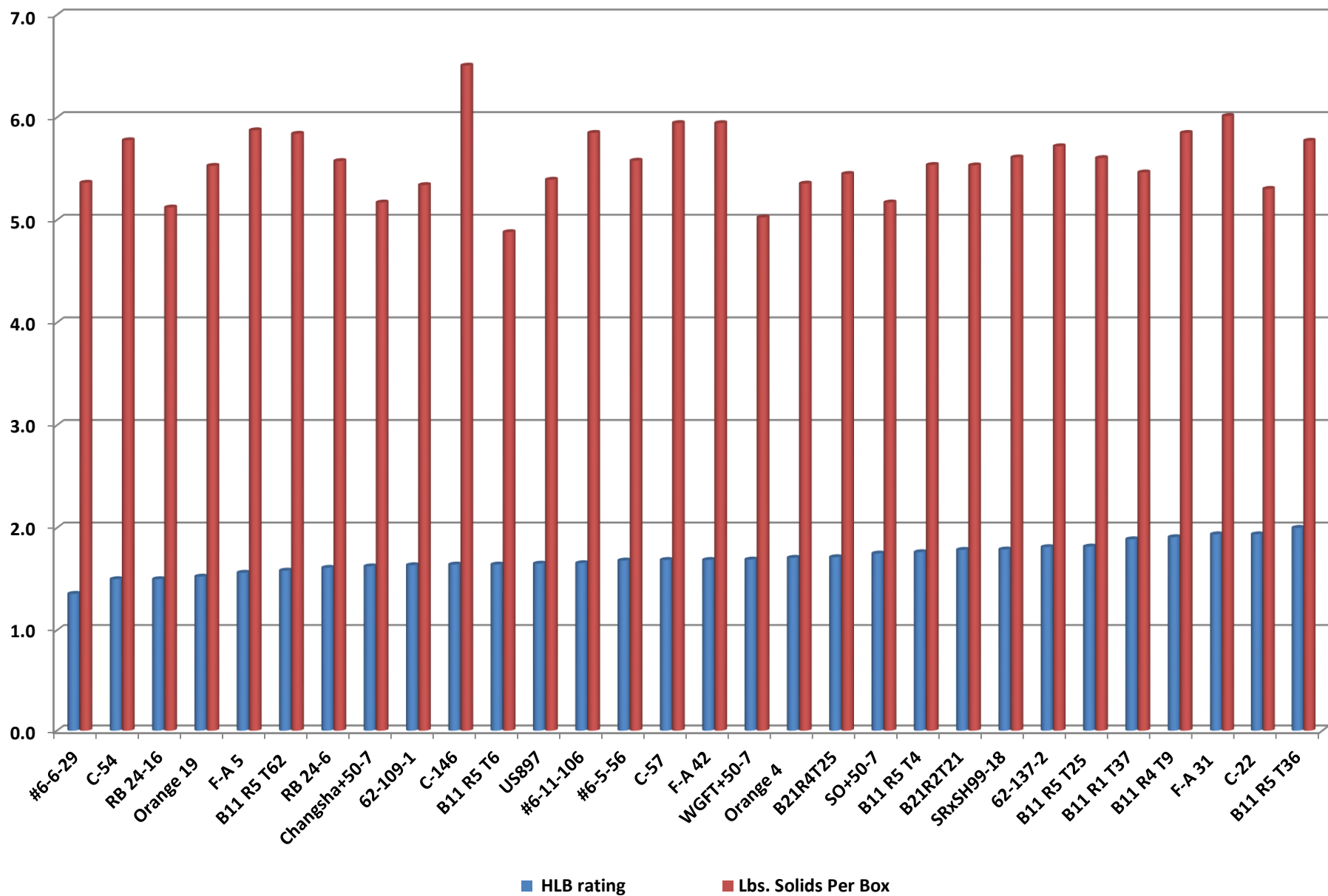
4= decline to death

Current Valencia (OHS) Rootstock Trial Assessments Under HLB Pressure

Valenica performaae by different rootstock under APS

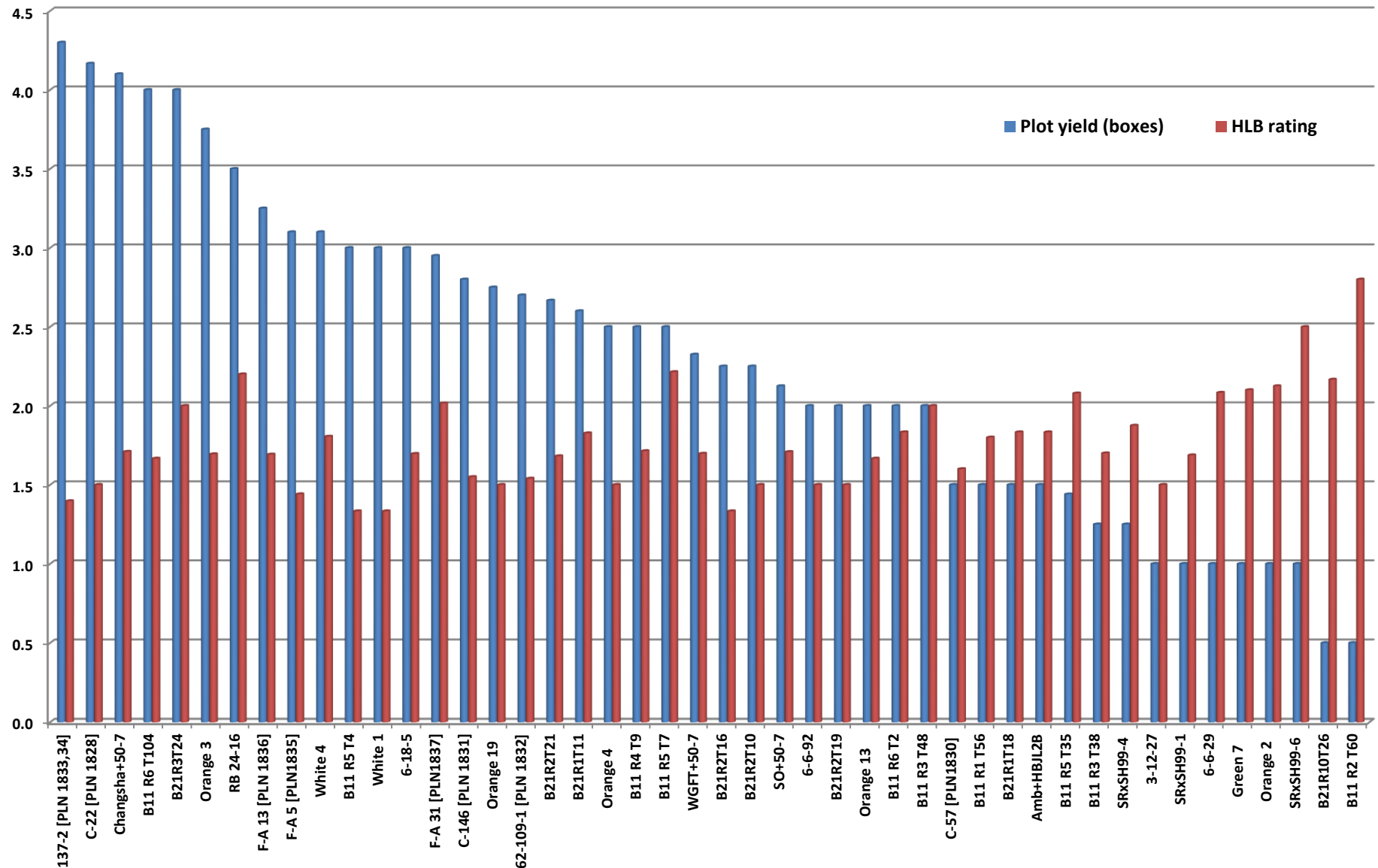


The Valencia (APS) LBS-Solids Per Box Performance of Different Rootstock Selections Under HLB Pressure



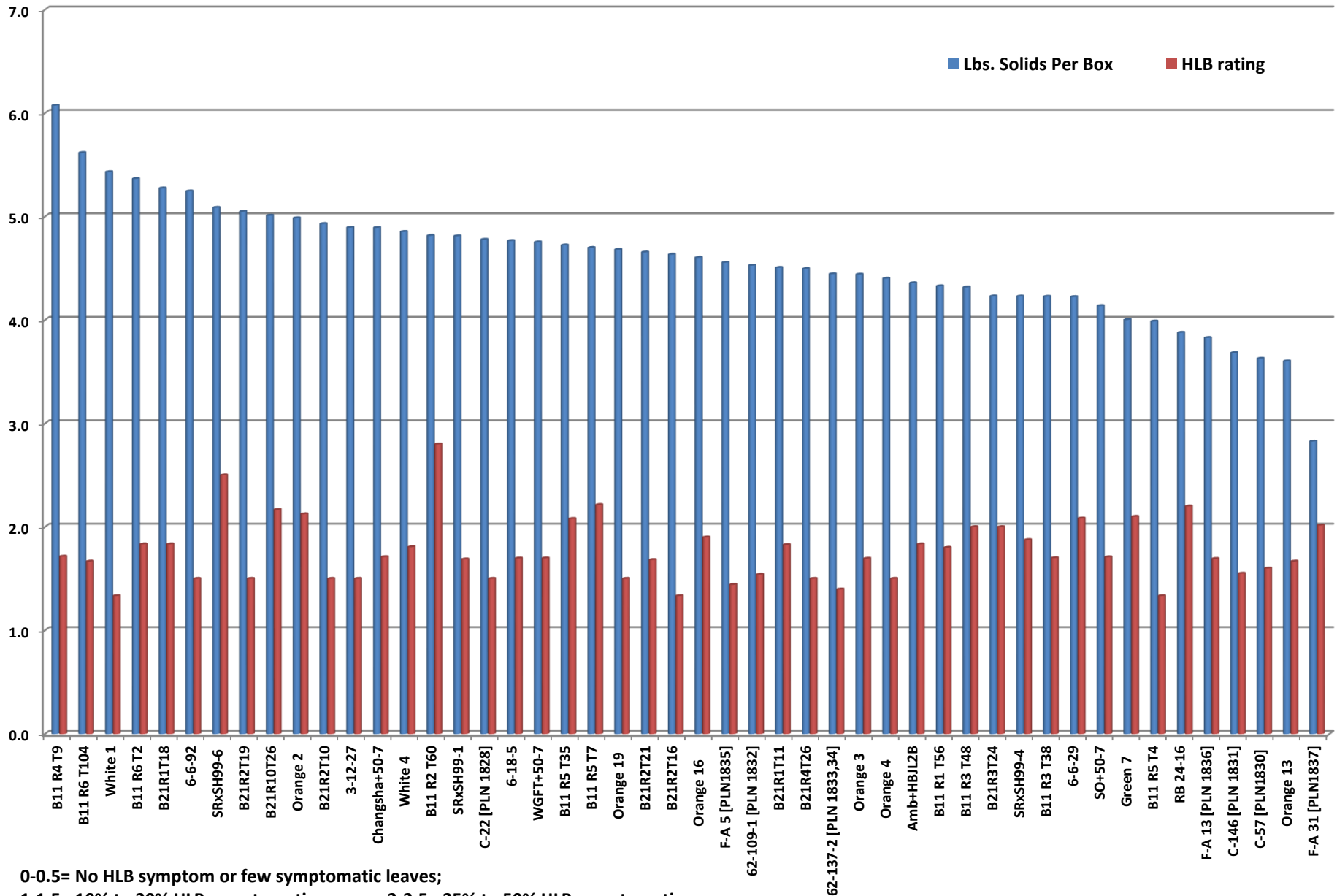
Current Vernia OHS Rootstock Trial Assessments Under HLB Pressure

The Vernia Plot Yield Performance of Different Rootstock Selections Under HLB Pressure



0-0.5= No HLB symptom or few symptomatic leaves; 1-1.5= 10% to 20% HLB symptomatic canopy
 2-2.5= 25% to 50% HLB symptomatic canopy; 3-3.5= more than 50% HLB symptomatic canopy
 4= decline to death

The Vernia LB-Solids Per Box: Performance of Different Rootstock Selections Under HLB Pressure



0-0.5= No HLB symptom or few symptomatic leaves;

1-1.5= 10% to 20% HLB symptomatic canopy; 2-2.5= 25% to 50% HLB symptomatic canopy;

3-3.5= more than 50% HLB symptomatic canopy; 4= decline to death

**CRDF DUDA Rootstock Trial, 10 Nov 2015. Valencia planted March 18,19, 2015 at 10' x 21.4 ft
7 rootstocks in 5 reps of 126 trees (7 x 18) in each rootstock plot = 630 trees
Minus buffers: 5 x 14 = 70 evaluation trees in each rootstock plot.**

CRDF has 8 measurement trees in each plot

Duncan's Multiple Range Test for each measurement; 8 Trees in each of 5 reps measured so
N = 40 trees of each rootstock. Rootstocks with different letters differ significantly at P<0.05.

**Tree Height (in cm & inches) in Mar 2015, from the nursery
UFR3 was the tallest, Swingle and US812 were the shortest**

Duncan Grouping		Mean (cm)	Mean (in)	N	Rootstock
	A	76.72	30.2	40	UFR3
	B	73.75	29.0	40	US942
C	B	72.47	28.5	40	UFR2
C	B	71.97	28.3	40	UFR4
C	B	71.80	28.3	40	UFR16
C	D	70.48	27.7	40	Swingle
	D	68.98	27.2	40	US812

**Tree Height (in cm & in) in Oct 2015 (6 months after planting)
US942 was the tallest, UFR3 the shortest**

Duncan Grouping		Mean (cm)	Mean (in)	N	Rootstock
	A	106.88	42.1	40	US942
	B	101.75	40.1	40	Swingle
C	B	100.88	39.7	40	UFR4
C	B	100.75	39.7	40	UFR16
C	B	100.25	39.5	40	UFR2
C	B	100.12	39.4	40	US812
C		96.75	38.1	40	UFR3

**Growth (in cm & in) = Change in Tree Height = (Tr Ht in Oct – Tr Ht in Mar 2015)
US942 grew the most, UFR3 grew the least from March to Oct 2015 (6 month)**

Duncan Grouping		Mean (cm)	Mean (in)	N	Rootstock
	A	33.12	13.0	40	US942
B	A	31.27	12.3	40	Swingle
B	A	31.15	12.3	40	US812
B	A	28.94	11.4	40	UFR16
B	A	28.91	11.4	40	UFR4
B		27.78	10.8	40	UFR2
	C	20.03	7.9	40	UFR3

Trunk caliper = 6-10 mm. Trunk Cross Section Area (mm² and in²) in March 15
US942 largest, Swingle the smallest caliper from the nursery

Duncan Grouping			Mean (mm ²)	Mean (in ²)	N	Rootstock
	A		45.57	0.07	40	US942
B	A		42.20	0.06	40	UFR4
B	A		42.16	0.06	40	UFR2
B	A	C	40.71	0.06	40	UFR3
B		C	37.76	0.06	40	US812
	D	C	35.90	0.06	40	UFR16
	D		32.76	0.05	40	Swingle

Duncan's Multiple Range Test for Disease Index rating (scale 0 to 10) in Oct 15
 0, no visible disease, 10 = all leaves with symptoms

So, very little HLB symptoms in Oct 15

Duncan Grouping		Mean	N	Rootstock
	A	0.325	40	UFR3
B	A	0.300	40	Swingle
B	A	0.225	40	US812
B	A	0.125	40	UFR2
B	A	0.100	40	US942
B	A	0.100	40	UFR16
B		0.020	40	UFR4

Leaf nutrients in Aug 15 in CRDF Duda rootstock trial—

Planted March 2015, So, trees were only 5 months old.

Leaves sampled from 8 trees & pooled in each of 5 rootstock reps (N= 5)

N % dw Optimum 2.5-2.7 % (for bearing trees) **No difference, all good**

Duncan Grouping	Mean	N	Treatmnt
A	2.8460	5	US_942
A	2.8380	5	UFR_4
A	2.7680	5	Swingle
A	2.7460	5	US_812
A	2.7160	5	UFR_3
A	2.6820	5	UFR_2
A	2.5740	5	UFR_16

P_ % dr wt Opt = .17-.3 %
UFR_3 highest P and US_942 & US_812 lowest P but all within optimum range.

Duncan Grouping	Mean	N	Treatmnt
	A	.22800	5 UFR_3
B	A	.21800	5 UFR_4
B	C	.18400	5 UFR_2
B	C	.18000	5 UFR_16
B	C	.17600	5 Swingle
	C	.17400	5 US_942
	C	.17000	5 US_812

K_ % dr wt Opt 1.2-1.7 %
UFR_2 & Swingle highest K and UFR_4, UFR_16 & US_942 lowest K but all high

Duncan Grouping	Mean	N	Treatmnt
	A	2.1220	5 UFR_2
	A	2.0820	5 Swingle
B	A	2.0500	5 US_812
B	A	2.0500	5 UFR_3
B		1.8080	5 UFR_4
B		1.8020	5 UFR_16
B		1.7960	5 US_942

Ca_ % Opt 3- 4.9%
UFR_16, US_812, US_942 & Swingle all good Ca but UFR_2, 4, & 3 low

Duncan Grouping	Mean	N	Treatmnt
A	3.4180	5	UFR_16
A	3.3340	5	US_812
A	3.3240	5	US_942
A	3.2500	5	Swingle
B	2.8620	5	UFR_2 low
B	2.8520	5	UFR_4 low
C	2.3020	5	UFR_3 low

Mg_ % Opt 0.3 -.49 %
UFR_4 highest Mg; Swingle & US_942 low Ca

Duncan Grouping		Mean	N	Treatmnt
	A	.41800	5	UFR_4
B	A	.38600	5	UFR_16
B	C	.34800	5	UFR_2
D	C	.32800	5	UFR_3
D	C	.32800	5	US_812
D	E	.28400	5	Swingle low
	E	.27400	5	US_942 low

Fe_ppm Opt 60-120 ppm **No difference, all good**

Duncan Grouping		Mean	N	Treatmnt
	A	83.810	5	US_942
	A	75.880	5	Swingle
	A	74.900	5	UFR_3
	A	70.400	5	UFR_4
	A	70.360	5	UFR_16
	A	70.330	5	UFR_2
	A	70.030	5	US_812

Mn__ppm Opt 25-100 ppm
US_942 low Mn

Duncan Grouping		Mean	N	Treatmnt
	A	32.516	5	UFR_3
	A	32.170	5	UFR_16
	A	30.484	5	UFR_4
	A	29.566	5	UFR_2
B	A	26.308	5	US_812
B	A	25.352	5	Swingle
B		20.268	5	US_942 low

Zn_ppm Opt 25-100 ppm
UFR_4 highest Zn & US_942 and UFR_2 lowest Zn but all good

Duncan Grouping			Mean	N	Treatmnt
	A		43.144	5	UFR_4
B	A		41.606	5	UFR_16
B	A	C	35.766	5	UFR_3
B	A	C	35.356	5	Swingle
B		C	32.874	5	US_812
		C	32.262	5	US_942
		C	29.714	5	UFR_2

Cu_ppm Opt 5-16 ppm (for nutition) So, all high from canker sprays

Duncan Grouping			Mean	N	Treatmnt
	A		272.34	5	Swingle
	A		265.64	5	UFR_16
	A		232.59	5	UFR_3
	A		202.33	5	UFR_4
	A		176.73	5	US_942
	A		163.82	5	UFR_2
	A		158.66	5	US_812

B_ppm Opt 36-100 ppm
UFR_3 highest B and US_942 & UFR_2 lowest B but all good

Duncan Grouping			Mean	N	Treatmnt
	A		96.650	5	UFR_3
B	A		92.530	5	UFR_16
B	A	C	81.720	5	Swingle
B	A	C	81.100	5	US_812
B		C	76.140	5	UFR_4
		C	74.730	5	US_942
		C	70.880	5	UFR_2

1

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12

1 US812	2 UFR 2	3 UFR 3	4 UFR 2	5 US 942
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6 SWG	7 UFR 2	8 US 942	9 US 812	10 SWG
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11 UFR 16	12 UFR 3	13 US 942	14 UFR 4	15 US 812
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16 UFR 3	17 UFR 4	18 UFR 4	19 SWG	20 US 942
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21 UFR 16	22 UFR 16	23 UFR 4	24 US 942	25 UFR 3
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26 UFR 2	27 UFR 16	28 SWG	29 UFR 16	30 UFR 4
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31 UFR 3	32 UFR 2	33 SWG	34 US 812	35 US 812
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↑ N
Tree spacing - 10' x 21.4' - 7586 tr
Plot size 7x18 - 126 tr - 4410 tr
Evaluation 5x14 - 70 tr

TYPICAL PLOT



The plot displays a grid of red 'o' characters. The grid is 5 rows high and 10 columns wide. The first four rows contain 10 'o's each. The fifth row contains 9 'o's, with the last position being empty. This represents a data visualization where the last element in the fifth row is missing or undefined.