White Pine Weevil Resistance Study

NELMA Field Tour – June 27, 2017

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Location: Demeritt Forest

Design: Replicated, completely randomized test of white pine weevil (*Pissodes strobi*) resistance, using clonally reproduced seedlings from select improved trees in New Brunswick. 15 blocks of 64 trees, planted on 1.4 x 1.8 m spacing; total planted =960, plus "extras" for refilling.

History

- Planted 2008, on former red pine plantation site clearcut two years previously.
- Preharvest site-preparation with glyphosate to kill raspberry and grasses.
- All but clones 38-48 were standard containers.
- Clones 38-48 were large potted seedlings.
- Mortality from *Hylobius congener* about 25% in year of planting; treated with insectide to prevent further mortality.
- Mortality was replaced from extra seedlings on 6 blocks in spring, 2010. 4X4 ft brush blankets from Arbortech (BC) installed around every surviving tree on these 6 blocks. No treatment on remaining 9 blocks. (photo)
- Weevils collected in July, 2012; all trees over bh challenged with 2 weevils in Oct. 2012. (Blocks 5, 7 only).
- Complete measurement of height, dbh, weevil status in 2012, May 2016, Sept. 2016.

Plantation thinned in Oct. 2016, rogueing out non-resistant and competing stems:


Plantation after refilling, May 2010

	All Living Trees	Weevil Attacks
Retained	321	39
Rogued Out	256	245
Total	577	284

282 trees with no attacks

73 of these are clones with no attacks.

538 trees per acre remaining (9 foot spacing).

Results:

15 clones with no attacks! Some of these are weakly represented, or may have simply escaped attack because they were much shorter than the dominant stems.

Clone	Number Attacks	Alive in 2016	Avg Ht (m)	Avg dbh (cm)
25	0	5	3.74	5.5
52	0	4	3.37	3.4
17	0	5	3.06	3.9
117	0	5	2.78	3.2
60	0	7	2.65	2.9
55	0	5	2.46	2.6
113	0	2	2.37	2.5
51	0	6	2.31	2.3
64	0	2	2.09	4.7
112	0	4	2.07	1.9
62	0	4	1.98	1.7
30	0	8	1.83	1.5
53	0	6	1.74	1.4
67	0	2	1.71	1.2
58	0	8	1.36	1.0

Attacks by year:

Year	Number	Percent
2016	38	7%
2015	76	13%
2014	82	14%
2013	59	10%
2012	32	6%

The plantation has suffered chronic losses from an undiagnosed root rot, especially in Block 2.

We plan to challenge the 73 unattacked trees again in 2017.

Data for the “Top 5” Clones: (3 trees were challenged in 2012). Metric units (ht = m, dbh cm).

Block	Clone	ogued_2016	Ch12	Dbh_2015	Ht2015	TotalAttacks	Ht2012	Ht2011	Ht2010	T_Dbh_Rati	Notes	Star Tree?
7	25	1		4.2	3.43	0	122	75	54	81.67		Y
5	25	1	Y	6.7	3.94	0	188	142	89	58.81		
6	25	1		4.9	3.45	0	132	93	49	70.41		
4	25	1		6.1	4.04	0	181	133	86	66.23		Y
8	25	1		5.5	3.85	0	159	114	88	70.00		Y
Block	Clone	ogued_2016	Ch12	Dbh_2015	Ht2015	TotalAttacks	Ht2012	Ht2011	Ht2010	T_Dbh_Rati	Notes	Star Tree?
7	52	1	Y	3.77	4.5	0	182	128	79	119.36		
5	52	1		3.2	3.16	0	120	73	41	98.75		
6	52	1		3.9	3.47	0	163	103	63	88.97		
14	52	1		2.7	2.33	0	91	58	44	86.30		
Block	Clone	ogued_2016	Ch12	Dbh_2015	Ht2015	TotalAttacks	Ht2012	Ht2011	Ht2010	T_Dbh_Rati	Notes	Star Tree?
7	17	1	Y	3.9	2.89	0	183	114	71	74.10	rust	
5	17	1		4	3.12	0	107	60	43	78.00		
8	17	1		1.6	1.92	0	63	33	27	120.00		
9	17	1		4.9	3.59	0	150	95	59	73.27		
1	17	1		5.3	3.79	0	174	128	95	71.51		
Block	Clone	ogued_2016	Ch12	Dbh_2015	Ht2015	TotalAttacks	Ht2012	Ht2011	Ht2010	T_Dbh_Rati	Notes	Star Tree?
14	117	1		2.2	2.31	0	91	59	51	105.00		
13	117	1		2.8	3.17	0	114	69	41	113.21		
13	117	1		5.6	3.83	0	172	105	66	68.39		Y
12	117	1		3.7	2.86	0	128	95	60	77.30		
Block	Clone	ogued_2016	Ch12	Dbh_2015	Ht2015	TotalAttacks	Ht2012	Ht2011	Ht2010	T_Dbh_Rati	Notes	Star Tree?
7	60	1		4.3	3.76	0	133	78	68	87.44		
5	60	1		1	1.69	0	96	75	53	169.00		
6	60	1		5.2	3.95	0	151	82	60	75.96		Y
4	60	1		0.6	1.44	0	60	34	20	240.00		
10	60	1		4	2.68	0	130	86	55	67.00		
8	60	1		2.8	2.71	0	108	71	53	96.79		
13	60	1		2.1	2.29	0	121	87	57	109.05		

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49	118	47	61	47	65	39	47	33	109	61	64	33	47	47	37	61	10	42	114	5	5	65	14
20	10	19	5	58	37	65	5	63	113	112	7	52	118	1	65	7	48	47	33	26	63	39	65
114	61	112	109	10	37	58	38	10	63	47	44	5	26	63	9	33	47	37	15	63	8	117	61
117	33	49	5	64	114	118	118	8	16	37	116	49	65	42	31	34	49	49	65	45	5	47	37
15	58	113	65	45	7	47	31	5	61	44	117	20	7	20	117	117	45	56	42	10	112	60	38
70	42	45	13	109	61	29	20	45	58	61	109	70	112	58	114	109	9	37	114	20	19	58	7
5	58	44	8	116	116	117	48	116	47	61	13	65	39	7	10	65	48	47	44	58	56	7	9
58	7	9	63	48	65	9	7	64	9	15	5	29	58	48	113	5	64	63	112	61	44	58	116
20	8	65	19	42	61	47	64	61	117	10	58	61	113	114	42	39	38	48	19	51	54	16	11
7	65	109	49	113	56	20	112	112	47	44	56	48	33	64	65	49	41	42	61	62	27	65	50
47	61	5	61	114	37	42	44	47	7	56	14	14	13	52	116	56	59	63	24	60	70	66	52
10	29	5	49	58	7	37	5	114	30	65	5	29	47	15	117	22	53	3	57	44	37	30	67
64	116	45	113	24	10	15	47	7	37	116	5	20	22	43	49	55	1	4	33	17	47	45	32
58	48	114	34	30	9	56	37	33	37	65	38	48	5	113	22	64	14	26	5	34	8	28	36
48	65	45	7	29	52	61	37	37	28	31	9	65	31	20	61	25	35	46	29	13	43	58	31
47	117	44	65	114	117	116	5	9	37	47	5	112	61	44	45	40	9	68	20	6	18	23	15
20	35	58	61	24	26	1	32	59	4	22	42	18	29	8	37	3	25	48	14	32	47	8	57
38	17	28	56	31	59	54	46	66	56	41	62	9	16	44	49	51	70	33	22	55	54	52	40
30	55	8	33	9	53	50	23	46	60	38	31	57	53	52	33	65	17	20	41	9	66	67	49
60	3	4	13	45	19	27	43	32	47	51	39	67	55	23	70	58	26	11	27	1	19	13	6
42	68	64	29	18	63	48	37	11	34	40	15	35	26	14	61	16	24	31	61	34	5	35	64
6	11	57	49	47	16	40	14	48	30	13	65	43	63	36	50	62	4	68	50	53	28	60	29
22	39	70	51	41	5	62	44	1	19	25	24	27	20	17	68	63	56	38	59	37	43	30	36
65	52	15	66	67	36	25	34	3	45	58	5	6	28	64	54	44	42	46	45	39	23	15	18
70	58	65	53	29	48	42	37	56	16	30	42	17	45	28	15	41	58	42	9	56	38	13	47
64	43	40	41	35	62	1	52	25	41	19	66	35	52	57	38	44	65	30	8	11	18	40	54
20	9	34	3	31	**25**	8	15	4	48	39	54	1	53	67	33	64	20	25	17	61	4	27	59
44	26	27	22	67	36	28	18	43	60	11	24	44	58	50	27	63	29	31	62	6	16	33	22
30	45	47	14	57	46	56	68	51	23	47	31	61	26	5	70	53	37	60	36	57	5	68	1
50	19	60	11	13	6	24	61	29	46	3	32	8	62	59	40	55	34	24	14	45	49	70	51
16	23	5	55	59	49	51	4	64	22	14	9	68	49	65	36	23	52	48	15	28	43	19	32
39	54	32	63	66	38	33	17	20	55	34	13	6	18	63	37	50	26	23	39	3	35	67	46
14	68	17	23	53	35	33	67	13	29	48	58	61	56	39	6	55	6	23	3	36	42	27	22
46	61	5	26	28	30	42	60	33	38	27	59	40	31	68	64	61	40	15	67	41	33	29	32
48	43	22	25	29	47	52	62	9	23	70	34	53	15	5	43	39	25	24	54	65	53	34	1
27	54	44	20	57	8	19	56	41	22	42	54	28	44	4	8	16	47	46	49	50	20	56	8
59	51	55	24	45	3	13	49	47	30	62	37	17	55	24	32	37	66	51	4	60	26	18	48
65	37	58	11	66	38	40	36	50	25	66	67	57	19	18	26	28	63	30	38	13	70	45	14
4	18	32	15	39	41	9	1	63	3	52	49	35	16	51	46	19	57	59	43	44	5	62	17
31	34	63	16	70	6	64	50	14	11	20	45	60	1	65	36	35	52	64	9	31	11	58	68