REGULATING NURSERY SEEDBED DENSITIES

DEVELOPING SOWING PLANS

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Abstract. This paper presents the steps used by the State of Pennsylvania to develop a sowing plan. It also discusses the processes used to maintain records and to calculate sowing rates. Several examples of records and forms are provided in the appendix.

We are quite fortunate in Pennsylvania to have our own seed testing laboratory, seed cleaning and storage facilities and a computerized inventory system. All of these facilities and aids, we feel, make it easier to plan for seedling production.

By cleaning and storing seed, we can take advantage of good seed crop years to collect and store seed for future use. The seed laboratory allows us to not only test for germination of newly received lots, but also to retest stored lots at a moderate cost per seed lot. This testing system often saves us many dollars by detecting the poorer lots for which we can revise sowing rates. We may also reject a lot being purchased commercially. Of course, a computerized inventory system provides (with little effort and at low cost) excellent information on the seedlings produced from a particular amount of viable seed sown.

Although some nurseries do not have the above facilities or aids available to them, seedling production planning can be accomplished if good records are kept on the amount of viable seed sown and the number of 1-0 gross seedlings produced.

Years ago (prior to 1976), we used curves and formulas to develop rates for sowing seed. Since we have been using the method described in this article, we have come closer to planned densities and have had fewer culls.

The following procedures and forms are used for planning and for handling seed. We have been using this record system since 1956, and find that it has been quite satisfactory. It often has made it possible to provide information useful in forest management, for insect and disease problems, and for tree improvement work in addition to nursery managment.
The best way to present the development of a plan is to list the steps chronologically that must be met on schedule to permit the completed plan to be ready on time.

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SOWING PLAN DEVELOPMENT

The development of *a* sowing plan for seedling production requires observations in the field, seed test information, data on past years' shipments, estimates of new production levels for various species, information on areas available for sowing at the nurseries, seedbed density counts, etc.

The example that follows shows the schedule used in the preparation of our 1982-83 sowing plans:

1. September '81 - Set up seed testing program.

2. Winter '81-'82 - Update viable seed/sq.ft.-density data (nursery survival factors) from information on inventory printouts of 1-0 stock.

3. Winter '81-'82 - Test seed. Have results of all tests available by July 15, 1982.

4. June '82 - Pit stratify white ash and tulip poplar.

5. July '82 - Nurserymen take seedbed density counts on 1-0's.

6. July-August '82 - Nurserymen submit areas available for Fall '82 and Spring '83 sowing.

7. Early August '82 - Develop production schedule for F'82-S'83 sowing (Appendix 1) based on:

   a) Amounts of each species shipped from each nursery (prior year).

   b) Total amounts of each species shipped prior year
   Note: For both the above: also look *at* trends for last ten years.

   c) Estimates of tree seedlings needed for mines, State forests, private market, and special projects (20 Fund, USFS, etc.).

   d) Changes we wish to initiate (introduction of JP, GA, cut WP for western strip mine planting, etc.).

8. Compile notes from field observations at each nursery on seedling and seed performance that were taken over the previous growing season.

9. September 1 to 15 - Prepare sowing plans for F'82-S'83. (Using seed test results, seed on hand list, production plan, viable seed/density data, field observations and area available information from nurserymen). (Appendix 2, calculations 1, 2 and 3).

10. September 15 to October 1 - Preparation of final sowing plans for Fall '82 sowing at each nursery, and seed distribution list for the seedbank located at the Mont Alto Nursery.

11. January 15 to 31 - preparation of final sowing plans for Spring '83 sowing for each nursery and seed distribution list for the seedbank at Mont Alto Nursery. (Appendix 3).

12. June 1983 - prepare "Seeding in State Nurseries" final report table. (Appendix 4).

After the seed is sown at each nursery in either the fall or spring, each nurseryman completes a Daily Record of Seeding Form.* (Appendix 5). This form shows what was actually seeded at each nursery (amount and rates of seed, lineal feet, etc.). This report may vary from the original plan of seeding for a particular nursery for a number of reasons (the nurseryman may have used more or less footage for a particular seedlot than originally planned, etc.). Therefore, in constructing the report "Seeding in State Nurseries" only the Daily Record of Seeding Forms are used (original seeding plans are not used).

*After the Form has been completed by the nurseryman, a copy is submitted to the Nursery Supervisor's office in Harrisburg.

ACCESSORY FORMS

There are a number of special formats and printed forms needed to record standard information. Appendixes 6-11 present several forms used by the state of Pennsylvania.

PRODUCTION SCHEDULE FOR FALL '82-SPRING '83

Species	Total Seedlings	Seedlings Per Sq.Ft.	Greenwood No. Seedlings	Greenwood Lin. Ft.	Mont Alto No. Seedlings	Mont Alto Lin. Ft.	Penn No. Seedlings	Penn Lin. Ft.
WP Imp.	250,000	25	50,000	500	125,000	1250	75,000	750
WP Reg.	900,000	25	190,000	1900	325,000	3250	385,000	3850
RP	1,250,000	25	320,000	3200	100,000	1000	830,000	8300
NS	600,000	25	100,000	1000	300,000	3000	200,000	2000
JL[2] Imp.	75,000	25	0	0	0	0	75,000	750
JL[2] Reg.	800,000	25	190,000	1900	0	0	610,000	6100
JL[1] Imp.	100,000	20	0	0	100,00	1250	0	0
JL[1] Reg.	250,000	20	100,000	1250	150,000	1875	0	0
AP	800,000	25	180,000	1800	200,000	2000	420,000	4200
EA[1] Reg.	150,000	20	50,000	625	25,000	315	75,000	940
BL[1]	500,000	20	100,000	1250	125,000	1565	275,000	3435
VP[1] Imp.	50,000	20	0	0	50,000	625	0	0
WS	500,000	25	100,000	1000	100,000	1000	300,000	3000
HP	110,000	--	110,000	--	--	--	---	--
TP	30,000	7	15,000	535	15,000	535	0	0
PB	40,000	20	0	0	10,000	120	30,000	375
EWB	40,000	20	0	0	10,000	120	30,000	375
RO	35,000	7	10,000	355	15,000	535	10,000	360
SM	20,000	7	5,000	180	10,000	355	5,000	180
WA	35,000	7	10,000	355	10,000	355	15,000	535
BW	30,000	7	10,000	355	20,000	715	0	0
BC Imp.	20,000	7	0	0	20,000	715	0	0
BC Reg.	10,000	7	0	0	0	0	10,000	360
Pitch X Lob.	30,000	20	0	0	30,000	375	0	0
Sycamore	5,000	20	5,000	60	0	0	0	0
Jap. Bl. Pine	5,600	20	5,600	70	0	0	0	0
AP X JRP	20,000	20	20,000	250	0	0	0	0
Green Ash	35,000	20	35,000	435	0	0	0	0
Jack Pine	38,500	20 25	20,000 18,500	250 185	0	0	0	0
Hemlock	20,000	25	10,000	100	10,000	100	0	0
Totals	6,749,100		1,654,100	17,555	1,750,000	21,055	3,345,000	35,510

Calculations

Red Pine

Lot	Source	Lbs. On Hand	Seed/lb.	Germ. %	'81 Viable Seed Sown G	MA	P	1-0 Density Per Sq. Ft. G	MA	P
675	Michigan	37 3/4	50,395	95	46	40	65	15	28	45
					46	43	42	34	24	32
778	Dists. #9 & #14	127 1/4	48,082	83						
779	District #6	4 1/4	48,535	86	56	51	--	23	30	--
827	Western PA	3 1/2	43,455	90						
847	Mid. PA	20 3/4	46,085	81						
735	-----	--	43,047	95	--	--	50	--	--	28

Lineal Feet Needed

G	MA	P
3200	1000	8300

G = Greenwood Furnace Nursery

MA = Mount Alto Nursery

P = Penn Nursery

Calculations - page 2

Object: Use up small lots and lots with poorest germination first.

Lot 779, Red Pine (small lot) Greenwood Nursery

(Bagged seed/lb) (Germ.%)
48,535 X .86 = 41,740 Viable seed/lb.

Sow @ 55 viable/sq.ft.* = 220 viable/lin.ft.

(Viable seed/lb.) (lbs. in lot)
41,740 X 4.25 = 177,395 total viable seed/lot

$$\frac{\text{Viable seed in lot}}{\text{Viable seed/lin.ft.}} = \frac{177,395}{220} = 805 \text{ lin. ft. (make to closest 5 foot unit)}$$

$$\frac{805 \text{ (tot.lin.ft.)}}{25 \text{ (lin.ft./100 sq.ft.)}} = 32.2 \text{ Units}$$

4.25 lbs. in lot x 16 = 68 ozs. in lot

$$\frac{68 \text{ ozs. in lot}}{32.2 \text{ Units}} = 2.1 \text{ ozs./unit}$$

* The viable seed/sq.ft. figure is based on the reports from previous years for the species (and seedlot when possible) of the viable seed sown compared to the gross 1-0 seedlings produced. These records are kept on a set of index cards (since 1976) in the Nursery Supervisor's Office, Harrisburg.

Calculations - page 3

Lot 675, Red Pine Greenwood Nursery

3200 total feet needed
805 Lot 779
2395 Lot 675

50,395 x .95 = 47,875 v./lb. == 2992 v./oz.
Sow @ 46 v./sq.ft. → x 4 = 184 v./lin.ft.

2395 x 184 = 440,680 v. seed needed = 9.25 lbs. (to nearest one-quarter poun
47,875 v. seed/lb.

2395 lin. ft. needed = 95.8 Units
25 lin.ft./unit

9.25 lbs. x 16 = 148 ozs. to be used

148 ozs. = 1.5 ozs./unit
95.8 units

Lot 675, Red Pine Penn Nursery

Need 8300 feet

37.75 lbs. in lot initially
9.25 lbs. used for Greenwood
28.50 lbs. left to use at Penn

25.75 lbs. used for Penn
Therefore, 2.75 lbs. left to use toward Mont Alto footage.

Plus: used lot 778 (1 lb.) at Mont Alto to finish red pine sowing

Sowing Plan - Spring 1983 - Penn Nursery

Species	Lot No.	Bagged Seed/lb.	Germ. %	Est. Trees Per Lin.ft.	Estimated Production	Viable Seed /sq.ft.	Seeding Rate oz./100 sq. ft.	Lineal Feet	Amount of Seed (lbs.)
Norway Spruce	171	64,365	59	25	100,000	65	2.7	1,000	6.75
Norway Spruce	206	62,143	72	25	100,000	42	1.5	1,000	3.75
Japanese Larch	678	107,390	56	25	263,000	80	2.1	2,630	14.00
Japanese Larch	821	111,833	47	25	347,000	76	2.3	3,470	20.00
Japanese Larch	PS0711B	89,722	56	25	75,000	71	2.3	750	4.25
Austrian Pine	795	22,453	86	25	92,500	47	3.9	925	9.00
Austrian Pine	798B	23,542	91	25	327,500	47	3.5	3,275	28.75
E. Black Alder	324A	277,418	44	20	75,000	95	1.3	940	3.00
Black Locust	258	21,797	44	20	275,000	32	5.3	3,435	45.75
Paper Birch	273	2,615,004	10	20	30,000	114	0.7	375	11.0 oz
E. White Birch	280	1,068,682	23	20	30,000	69	0.5	375	6.8 oz
TOTALS								18,175	135.25 l + 17.8 c

Appendix 3 (1)

SEED DISTRIBUTION LIST
Spring 1983

Species	Lot No.	No. of Pounds (except where noted) Greenwood	Mont Alto	Penn	Total
Norway Spruce	104	2.75	9.25		12.00
Norway Spruce	171	4,50	9.00	6.75	20.25
Norway Spruce	206			3.75	3.75
Japanese Larch	678	6.25		14.00	20.25
Japanese Larch	821	6.75		20.00	26.75
Japanese Larch	PSO711B			4.25	4.25
Austrian Pine	795	4.00	4.00	9.00	17.00
Austrian Pine	798B	11.75	11.50	28.75	52.00
E. Black Alder	324A	2.00		3.00	5.00
E. Black Alder	843		6.00 ozs.		6.00
Black Alder	844		3.30 ozs.		3.30
Black Locust	258	15.50	21.00	45.75	82.25
Paper Birch	273		1.20 ozs.	11.00 ozs.	12.20
E. White Birch	280		0.90 ozs.	6.80 ozs.	7.70
Sycamore	274	9.25 ozs.			9.25
Green Ash	876	2.25			2.25
Jack Pine	78	0.50			0.50
Speckled Alder	710	3.00 ozs.			3.00
Scotch Pine	869	____	2.40 ozs.	____	2.40
Totals		56.25 +12.25 ozs.	54.75 +13.80 ozs.	135.25 +17.80 ozs.	246.25 +43.85

Pennsylvania Department of Environmental Resources
Seeding in State Nurseries Fall 1982 - Spring 1983

Time Seeded	Species	Stock Type	Lot No.	Germination: Germ %	Germination: Hard Seed %	Germination: Hollow Seed %	Bagged Seed/lb.	Viable Seed Sown Per Sq. Ft.: G	MA	Penn	Seeding Rate Ounces/100 Sq. Ft.: G	MA	Penn	Seed Sown Pounds (Except Where Noted): G	MA	Penn	Total	Seedbed Lineal Feet: G	MA	Penn	Total	Planned Net Seedlings/ Lineal Foot	Potential Seedling Production: G	MA	Penn	Total By Seed Lot	Total By Species
F	White Pine	Reg.	2478	73	1	4	22,771	69	51	70	6.5	4.8	6.6	17.00	27.50	37.00	81.50	1,045	2,280	2,233	5,558	100	104,500	228,000	223,300	555,800	
F	White Pine	Reg.	783	84	3	2	28,471	70		75	4.7		5.0	10.00		20.00	30.00	855		1,395	2,450	100	85,500		139,500	245,000	
F	White Pine	Reg.	832	96	1	1	25,175		53			5.5			8.50		8.50		960		960	100		96,000		96,000	896,800
F	White Pine	Imp.	PSO 734	92	0	0	16,012	62		63	6.7		7.0	1.50		13.25	14.75	90		750	840	100	9,000		75,000	84,000	
F	White Pine	Imp.	DSO 782	83	0	3	21,410		55			5.0			0.50		0.50		40		40	100		4,000		4,000	
F	White Pine	Imp.	PSO 834	85	0	8	18,688	65	55		6.6	5.5		6.75	16.75		23.50	410	1,210		1,620	100	41,000	121,000		162,000	250,000
F	Red Pine		673	95	0	3	50,395	46	40	45	1.5	1.5	1.5	9.25	2.75	16.25		2,395	825	6,219		100	239,500	82,500	621,900		
										30			1.0			9.50	37.75			3,734	11,173	100			373,400	1,117,300	
F	Red Pine		778	83	0	4	48,082		57			2.3			1.00		1.00		175		175	100		17,500		17,500	
F	Red Pine		779	86	0	10	48,535	35			2.1			4.25			4.25	805			805	100	80,500			80,500	1,215,300
F	White Spruce		708A	77	9	2	128,913	94	89	93	1.5	1.4	1.5	3.25	3.75	11.75	18.75	855	1,045	3,130	5,030	100	85,500	104,500	313,000	505,000	
F	White Spruce		838	93	1	1	188,063	75			0.7			0.25			0.25	145			145	100	14,500			14,500	519,500
F	White Spruce														1.75		1.75		625		625	80		50,000		50,000	50,000
F	Virginia Pine	Imp.	BSO 376A	95	0	2	39,917		27			1.1															
F	Japanese Larch	Reg.	678	36	0	43	107,390	90	75		2.4	2.0		3.75	5.00		8.75	625	980		1,605	80	50,000	78,400		128,400	
S	Japanese Larch	Reg.	678	36	0	43	107,390	99		80	2.7		2.1	6.25		14.00	20.25	930		2,625	3,573	100	93,000		262,500	485,908	
F	Japanese Larch	Reg.	821	67	1	31	111,833	93	83	76	2.9	2.6	2.3	4.50	2.75	1.75	9.00	623	425	300	1,350	80	50,000	34,000	24,000		
S	Japanese Larch	Reg.	821	67	1	31	111,833	93		76	2.8		2.3	6.75		20.00	26.75	930		3,474	4,404	100	93,000		347,400	350,400	
F	Japanese Larch	Reg.	830	55	0	44	99,611		73			2.2			3.00		3.00		540		540	80		43,200		43,200	1,079,300
F	Japanese Larch	Imp.	PSO 711B	56	0	44	89,722		72			2.3			7.25		7.25		1,275		1,275	80		102,000			
S	Japanese Larch	Imp.	PSO 711B	56	0	44	89,722			69			2.2			4.25	4.25			775	775	100			77,500	179,500	179,500
F	Hemlock		172	29	2	29	158,215	93	76		4.0	3.2		0.75	1.00		1.75	75	125		200	100	7,500	12,500		20,000	20,000
F	Black Cherry	Imp.	PSO 393	19	65	1	4,173			50			60.0			0.75	0.75			5	5	28			140	140	
F	Black Cherry	Imp.	PSO 833	19	66	0	4,145		36			72.8			98.25		98.25		540		540	28		13,128		13,128	
F	Black Cherry	Imp.	PSO 837	19	77	0	4,173		38			77.0			19.25		19.25		100		100	28		2,800		2,800	
F	Black Cherry	Imp.	PSO 874	Est 98	-	-	4,761		18	18		6.2	6.3		1.25	5.50	6.75		80	350	430	28		2,240	9,800	12,040	
F	Black Cherry	Reg.	886	c 98	-	c 2	1,875		38			33.3			3.75		3.75		45		45	28		1,260		1,260	31,360
F	Sugar Maple		855	36	2	36	6,725	21	21	21	8.9	9.0	8.9	4.00	6.75	4.00	14.75	180	300	180	660	28	5,040	8,400	5,040	18,480	
F	Sugar Maple		856	63	2	18	2,290		19			20.0			3.00		3.00		60		60	28		1,680		1,680	20,160
F	White Ash		4328	12	25	-	10,090	26	25	26	35.0	32.5	34.0	12.75	13.00	19.25	45.00	145	160	225	530	28	4,060	4,480	6,300	14,840	
F	White Ash		889	c 84	-	c 14	3,997	12	13		3.8	4.1		2.00	0.47		2.47	210	47		257	28	5,880	1,316		7,196	
F	White Ash		879	c 93	-	-	8,820		41			7.8			0.88		0.88		45		45	28		1,260		1,260	
F	White Ash		880	c 86	-	c 12	10,800		99			10.2			1.13		1.13		44		44	28		1,232		1,232	
F	White Ash		881	c 60	-	c 40	11,639		55			12.5			1.25		1.25		40		40	28		1,120		1,120	
F	White Ash		882	c 89	-	c 11	3,771		40			12.5			1.25		1.25		40		40	28		1,120		1,120	
F	White Ash		883	c 84	-	c 16	9,394		77			13.6			1.75		1.75		45		45	28		1,260		1,260	28,028
F	Tulip Poplar		369A	20	-	-	22,699	18	17		6.4	6.2		8.50	8.50		17.00	535	545		1,080	28	14,980	15,260		30,240	30,240
F	Norway Spruce		104	74	3	4	60,028	74	66		2.8	2.4		2.75	9.25		12.00	400	1,560		1,960	100	40,000	156,000		196,000	
S	Norway Spruce		171	99	0	38	64,365	71	99	58	3.0	2.3	2.5	4.50	9.00	6.75	20.25	600	1,445	1,095	3,140	100	60,000	144,500	109,500	314,000	
S	Norway Spruce		206	72	0	23	62,143			42			1.5			3.75	3.75			1,000	1,000	100			100,000	100,000	610,000
S	Austrian Pine		795	86	0	4	22,453	68	64	90	4.0	3.6	3.3	4.00	4.00	8.81	16.81	400	640	1,065	1,905	100	40,000	64,000	106,500	190,500	
S	Austrian Pine		798B	91	0	6	23,342	65	39	94	3.4	3.0	3.3	12.85	11.50	28.75	53.10	1,990	1,560	3,510	6,660	100	199,000	156,000	351,000	666,000	836,300
F	Pitch x Loblolly		799	89	-	-	30,210		37			2.2			2.00		2.00		370		370	80		29,600		29,600	29,600
S	Black Locust		238	44	53	0	21,797	30	31	30	5.0	5.2	5.1	15.50	21.00	45.75	82.25	1,250	1,625	3,618	6,493	80	100,000	130,000	289,440	519,440	519,440
S	European Alder		329A	44	-	-	277,418	100		95	1.3		1.3	2.00		3.00	5.00	625		940	1,565	80	50,000		75,200	125,200	
S	European Alder		843	33	-	-	334,757		55			0.8			0.38		0.38		190		190	80		15,200		15,200	
S	European Alder		844	34	-	-	313,873		50			0.8			0.21		0.21		110		110	80		8,800		8,800	149,200
F	Paper Birch		273	10	-	-	2,615,004		116			0.7			0.11		0.11		61		61	80		4,880			
S	Paper Birch		273	10	-	-	2,615,004		82	116		0.5	0.7		0.08	0.69	0.77		60	375	435	80		4,800	30,000	39,680	39,680
F	Eur. White Birch		280	23	-	-	1,068,682		61			0.4			0.06		0.06		61		61	80		4,880			
S	Eur. White Birch		280	23	-	-	1,068,682		58	69		0.4	0.5		0.06	0.43	0.49		60	375	435	80		4,800	30,000	39,680	39,680
S	Sycamore		274	26	-	-	119,750	73			3.9			0.38			0.38	60			60	80	4,800			4,800	4,800
F	Black Walnut		887	c 93	-	-	-		8			1.0Bu			19.50Bu		19.50Bu		510								
									8		687.3			610.00			610.00	355			863	28	9,940	14,280		24,220	
F	Black Walnut		873	c 84	-	-	-		8			2.2Bu			2.25Bu		2.25Bu		20		20	28		560		560	
F	Black Walnut		884	c 96	-	-	-		8			1.9Bu			6.00Bu		6.00Bu		80		80	28		2,240		2,240	
F	Black Walnut		885	c 92	-	-	-		8			2.3Bu			6.00Bu		6.00Bu		65		65	28		1,820		1,820	28,840
F	Red Oak		877	c 72	-	-	96		8			190.9			109.75		109.75		230		230	28		6,440		6,440	
F	Red Oak		888	c 73	-	-	89	8	7			173.5		133.00	99.75		232.75	300	230		530	28	8,400	6,440		14,840	
F	Red Oak		890	-	-	-	-			8			106.6			86.60	86.60			322	322	28			9,016	9,016	30,296
F	Japanese Black Pine		863-4	Est 73	-	-	33,748	45			2.9			0.22			0.22	30			30	80	2,400			2,400	
F	Japanese Black Pine		863-7	Est 73	-	-	30,028	42			2.9			0.11			0.11	15			15	80	1,200			1,200	
F	Japanese Black Pine		863-11	Est 73	-	-	27,397	45			3.4			0.22			0.22	25			25	80	2,000			2,000	5,600
F	AP x JRP		551	94	0	1	29,484	38			2.2			0.94			0.94	170			170	80	13,600			13,600	
F	AP x JRP		801	80	-	-	26,808	38			2.8			0.56			0.56	80			80	80	6,400			6,400	20,000
F	Jack Pine		78	55	-	-	101,426	45			1.3			0.81			0.81	250			250	80	20,000				
S	Jack Pine		78	55	-	-	101,426	38			1.1			0.50			0.50	185			185	100	18,500			38,300	38,300
F	Ponderosa Pine		851	75	0	22	9,888	50			10.8			1.63			1.63	60			60	80	4,800			4,800	4,800
F	Scotch Pine		869	86	3	3	79,361		38			0.9			0.14		0.14		60		60	80		4,800		10,000	10,000
S	Scotch Pine		869	86	3	3	79,361		38			0.9			0.13		0.13		65		65	80		5,200		35,800	35,000
S	Green Ash		876	c 92	-	-	15,967	20			6.4			7.25			7.25	430			430	80	33,000			3,600	3,600
S	Speckled Alder		710	22	-	-	413,985	91			1.6			0.19			0.19	45			45	80	3,600				
F	Hybrid Larch		MSO 848	15	0	82	97,864		89			11.2			3.00		3.00		107		107	80		8,560		8,560	8,560
														899.11	512.42 +33.75Bus	361.78	1,773.31 +33.75Bus	17,785	21,305	35,915	75,205		1,567,100	1,785,948	3,401,436	6,754,484	6,754,484

DAILY RECORD OF SEEDING
PENNSYLVANIA STATE FOREST TREE NURSERIES

Nursery Penn

Season Spring Year 1983

Date	Species	Lot No.	Block & Section	Beds	Lineal Feet	Seeding Rate Oz./100 ft.^{2}	Pounds Sown	Seeding Method/Cover
5/26	NS	171	J-4	1,2	780			Drill sown on soil surface, covered with ¼" S&S & hydr mulch.
				3E	315	2.46	6.75	
					1095			
5/26	NS	206	J-4	6,7	780			"
				5W	220	1.5	3.75	
					1000			
5/27	PB	273	I-3	1	280			Broadcast by h covered by nee & Hydromulch
				2E	95	.73	11.00 oz	
					375			
5/27	EWB	280	I-3	7	280			"
				6W	95	.45	6.80 oz	
					375			
5/27	EBA	324A	I-3	3W	195			"
				4,5	560			
				6E	185	1.28	3.00	
					940			
5/26	AP	795	J-4	3W	75			Drill sown on s surface, covere with ½" S&S
				4	390			
				5E	170			
			K-1	1E	170			
				2E	260	3.30	8.81	
					1065			
6/8	AP	798B	H-1	1-3	810			
			B-4	1-6	1950			
6/15			K-1	2W	190			
			A-5	5-8	560	3.28	28.75	"
					3510			

DAILY RECORD OF SEEDING
PENNSYLVANIA STATE FOREST TREE NURSERIES

Nursery Penn

Season Spring Year 1983

Date	Species	Lot No.	Block & Section	Beds	Lineal Feet	Seeding Rate Oz.	Pounds Sown	Seeding Method
6/15	BL	258	F-4	1W	115			Drill sown or soil surface, covered with ½" S&S.
				2	415			
				3W	93			
				4M	65			
			H-8	1-7	2100			
			I-3	2W	185			
				3E	85			
			A-5	1-4	560	5.06	45.75	
					3618			
6/17	JL	678	J-3	1-7	2625	2.13	14.00	Drill sown on soil surface, covered with needles & hydromulch.
6/16	JL	821	H-5	1-6	1704			
			H-7	1-6	1770	2.30	20.00	"
					3474			
6/16	JL Imp.	PSO 711B	H-7	7	295			
			B-2	5E	160			
				6E	160			
				7E	160	2.19	4.25	"
					775			
			TOTAL LINEAL FEET		18,852			

Appendix
Example
1

Pennsylvania Department of Environmental Resources
Bureau of Forestry

SEED AND CONE COLLECTION

Species (common name) Red PINE Forest District # 9

Date collected 10/16/82 Collector's Name Walter Scipione

Location: County Clearfield Township Moore

Stand Data:

Natural or Planted Natural Trees Standing or Cut Standing

Approximate Elevation 800' Date Cut ——

Approximate Stand Age 50

Bushels Enclosed 73

Notes

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

Date 10/25/82

NURSERY Penn

.eceived 73 bushels of Red Pine (cones) ~~(seed)~~

collected from Clearfield county, Pennsylvania by:

(Name and Address of Collector):

Walter Scipione
RD1
Woodland, PA. 16100

John Jones, Forester District 9
Signature of Department employee

Walter Scipione
Signature of Collector or
his representative

SEED TEST NO. 1940

DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF FORESTRY

SEED INFORMATION AND TEST SHEET

Species Red Pine — Pinus resinosa
Common Name — Scientific Name — Variety or Strain

Lot Number 897 — Total lbs. in Lot 24# +o.
Received from Penn Nursery — Date Received January 13, 1983
Sender's Lot No., etc. — Origin of Seed
Place Collected USA — Pennsylvania — Clearfield County
Country — State or Province — Locality
Collected By Walter Scigiano — Date Fall 1982 — Altitude 800'
How Collected:
Standing Trees ✓ — Felled Trees — Date Felled
Ground — Squirrel Cache
Total Cones in Lot 73 Bushels (bushels or pounds)
Yield: 5.32 g/Bu.
Remarks concerning collection, processing, damage, etc.

SUMMARY OF TEST

Is the seed true to type? Yes
Container No. (s) , , , ,
Moisture Content 7.2 %, %, %, %
Purity 98.8 %, %, %, %
Bagged Seed/lb. 51,138 , , ,
Clean Seed/lb. 53,063 , , ,
Total Germination 92.50 %, %, %, %
(In 28 days)
Hard Seed 0 %, %, %, %
Hollow Seed 2.25 %, %, %, %

Used for calculations:
Weight of sample 5.00 grams Number of seed in sample 567
Weight of clean seed 94 grams
Weight of impurities 1.14 grams

Remarks on condition of seed during testing

Date Reported 03/08/83 To JAH Test Made By N. Kirch

(To be kept at Mont Alto Nursery - copy to Harrisburg)

Species Red Pine Lot Number 897 Test Number 1940

Container Number D 21

Stratification: Date started: Date ended: Total Days:
In germinator: Date started: 2/9/83 Date ended: 3/8/83 Total Days: 27

No. of seed Days	A	B	C	D	Total	Cum. average
7	36	38	45	42	161	40.25
14	52	48	45	48	193	88.50
21	3	5	3	5	16	92.50
28	0	0	0	0	0	92.50
35						
TOTAL	91	91	93	95	370	92.50
HARD SEED	0	0	0	0	0	0.00
HOLLOW SEED	3	2	1	3	9	2.25

Container Number

Stratification: Date started: Date ended: Total days:
In germinator: Date started: Date ended: Total days:

No. of seed Days	A	B	C	D	Total	Cum. average
7						
14						
21						
28						
35						
TOTAL						
HARD SEED						
HOLLOW SEED						

COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Resources
Bureau of Forestry

SEED LOT RECORD

Seed Lot Number 897 Species Red Pine Pounds in Lot 24# 4 oz.
Seed Received from Penn Nursery Date Received January 13, 1993
Received as: Cones 73 Bus. Seed _____ Fruit _____ Other _____
Senders Marks: Lot Number, Order Number, etc. _____
Source: as stated by Dealer or Collector _____
Collected by Walter Scalone Date Collected Fall 1952
Place Collected USA Pennsylvania Clearfield County [illegible]

Purity: 98.8% No. Clean Seed/lb. 52,063 No. Bagged Seed/lb. 51,435
Moisture Content % 7.2 , _____ , _____ Date _____
Yield 5.32 oz/bu
GERMINATION TESTS:

Date	Test Number	Germination %	Stratified No. of Days
3/8/83	194c	92.5c	0

EXTRACTION AND STORAGE:

Cone Storage _____ Place Extracted _____ Date Extracted _____
Date Seed Stored _____ Place Stored _____ Container No. _____
Temp. in Storage _____ F Remarks _____

	Nursery	Bed Location	No. Beds	Date Sown	Seeding Rate Oz.	Lineal Feet	Lifting Count
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

Department of Environmental Resources
Division of Forest Advisory Services

SEED INVENTORY

Species Red Pine

Lot No. 897

Received from Penn Nursery, February 9 1983

DATE	TRANSFERRED	VOUCHER NO.	RECEIVED	ON HAND
2/9/83		802	24# 4g	24# 4g

DEPARTMENT OF EUVI RO/CMENTAL RESOURCES
BUREAU OF FORESTRY
DI VISION OF FOREST ADVISORY SERVICES

Seed Transfer Voucher No. 802

Mont Alto Nursery Storage February 8, 1983

We have today: transferred to Mont Alto Nursery Storage
received from Penn Nursery + JAH + SW
extracted and cleaned

Species	Seed Lot	Pounds	Time Seed Collected	Bagged Seed/lb.	Germination* Percent
Red Pine	895	2#4oz	Fall 1982 (Gearhart)		
Red Pine	896	1#6oz	Fall 1982 (B. Farlamon)		
Red Pine	897	24#4oz	Fall 1982 (W. Scigliano)		
Evr. Black Alder	DS 9-1	3#12oz	Fall 1982 (Degree Seed Orch.)		
Evr. Black Alder	898A	7oz.	(First 1/2)		
	898B	4#4oz.	(Second 1/2)		
Evr. Black Alder	900	9oz.	Fall 1982 (Fredericksburg Source)		
Evr. Black Alder	899	7oz.	Fall 1982 (Hessenfall Source)		

Strip Mine Area - Dist 6

*When germination percent isn't supplied at time seed is distributed it will follow on a memo later.

To be completed on the day sexed is removed from storage for either immediate transfer or stratification and later transfer. One copy to Harrisburg Office, one copy to Nursery concerned and one copy to be filed at Mont Alto. Include seed for Mont Alto Nursery'.