

## 2001 BCMoF Sowing Guidelines

The ministry sowing **guidelines** have recently been revised on the Seed Planning and Registry (SPAR) system as of Sept. 1, 2001 in preparation for the 2002 sowing season. The method of calculating grams of seed required (or potential seedlings) is equivalent to that used in 1999. Please refer to the Extension Note Update – Volume 3 – Number 4 for the background details [<http://www.for.gov.bc.ca/TIP/publications/updates/vol3no4.pdf>]. That document also contains specific instructions for changing sowing rules or gram amounts for seedling requests in SPAR.

The major change to the current ministry sowing **guidelines** is to the “seeds supplied per seedling” (Table 1). “Seeds supplied per seedling” has been adjusted to encourage the most effective use of seed and address specific issues concerning seed allocation. The new sowing **guidelines** (September 2001) allocate less seed to seedlots with a Germination Capacity [GC] > 88% and more seed to seedlots with a GC < 74%. Seedlots that have GC values between 75 and 87 remain unchanged in seed allocation (Figure 1).

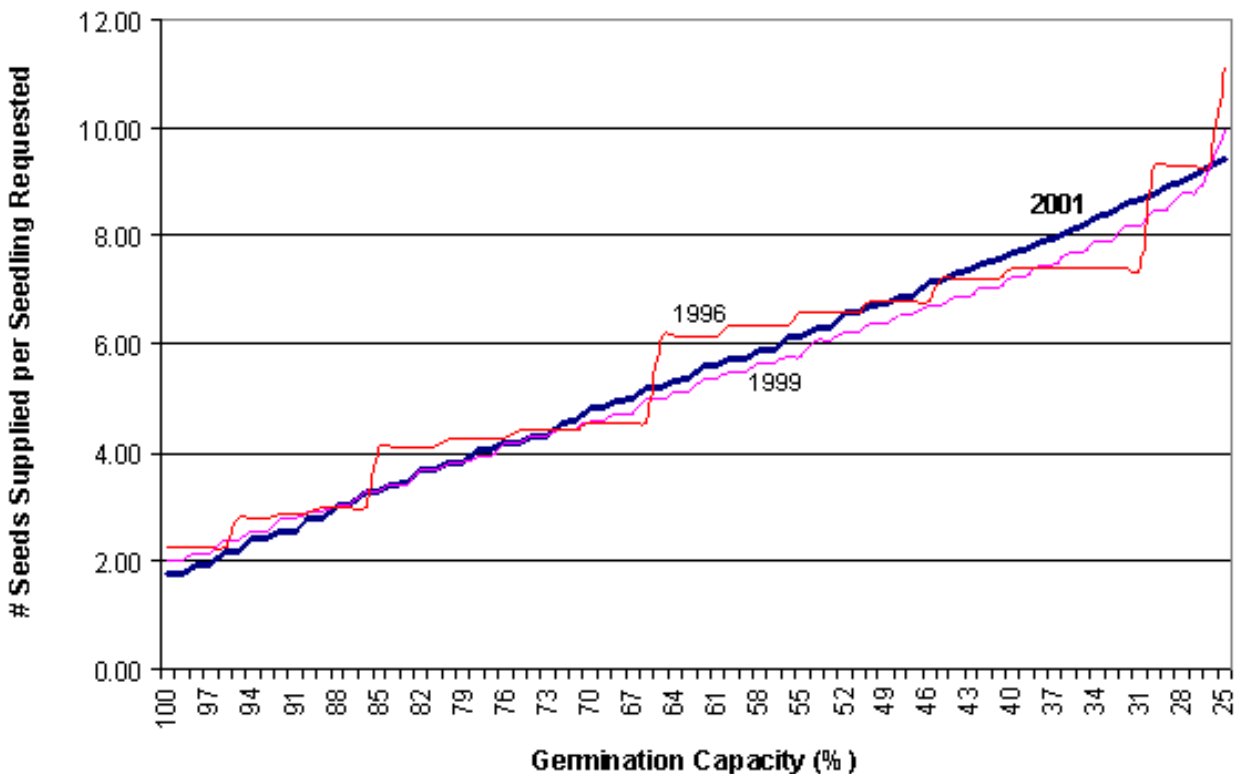


Figure 1. The seeds supplied per seedling requested over the germination capacity range for 1996, 1999 and the new 2001 sowing guidelines [colour lines for ease of reference].

## Background

Over the last five years the sowing **guidelines** have evolved to a more linear allocation of seed with changes in germination capacity (GC). Fractional sowing factors were introduced and most recently the allocation of seed to higher quality seedlots was reduced. The last change was introduced to address deficits in select (“A” class) seed, particularly in Pli and Fdc.

These recent changes have resulted in an increase in potential seedlings for select seed of 4.8% [over 15 million seedlings] and specifically a gain of 8.4% for Pli and 7.0% for Fdc (Table 2). These improvements are not overly aggressive and even larger gains in efficiency can be made through discussions between the nursery and seed owner. One of the major difficulties in producing sowing **guidelines** is the variability in seed use at the nursery. This variability is due to geographic location, type of growing environment, stock type, equipment available, labour issues and individual nursery policy. We strongly recommend that nurseries and seed owners discuss seed requirements to maximize seed-use efficiency. These are, after all, **guidelines** only. This is especially important for species in which select seed is in short supply.

### **Terms used in this Extension Note Update:**

<b>Germination Capacity (GC)</b>	Germination Capacity indicates the proportion of seeds that will germinate normally under favourable conditions. It is based on a specific pre-treatment and test duration provided at the Tree Seed Centre.
<b>Sowing Factor</b>	The average number of seeds per cavity within a container that should be sown to produce a seedling. The new guidelines use fractional sowing factors, e.g. 2.2 seeds per cavity. For information on how these fractions are managed in the nursery, refer to Extension Update Vol. 3 No. 4.
<b>Correction Factor (Oversow)</b>	The factor used to provide for an ‘oversow’ of the requested number of viable seedlings, to account for non-productive cavities.
<b>Nursery Handling Factor</b>	The factor used to ensure that nursery equipment has sufficient seed to enable sowing of all cavities. A factor of 0.2 seeds per cavity sown is used consistently for all container types.
<b>Seeds Supplied Per Seedling</b>	The number of seeds supplied to produce a seedling: <b>(Sowing Factor x Correction Factor) + (Nursery Handling Factor x Correction Factor)</b>
<b>Viable Seeds Supplied Per Seedling</b>	The viable number of seeds supplied per seedling that can be expected given the respective germination percent of the seed: <b>(Seeds Per Seedling x GC) / 100</b> . For example 100 seeds of an 80% germination seedlot supplies only 80 viable seeds. This information is valuable if one is contemplating seed upgrading at the nursery.
<b>‘Green Trees’ (% of Request)</b>	The number of cavities containing a viable germinant (relative to the number of seedlings requested) that a nursery can expect to start the crop cycle with given the germination capacity of the seed and suggested sowing and correction factors. It includes an additional 25% to account for losses during growing and possible culling to meet stock specifications at final lift.
<b>Percent Empty Cavities</b>	The percentage of empty cavities generated given the probability of obtaining a germinant at the stated sowing factor and seedlot germination %, assuming 100% sowing accuracy.

**Table 1. Sowing Factors and Seeds per Seedling by Germination Capacity (%) [September 2001].**

Germination Capacity %	Sowing Factor	Correction (Oversow) Factor	Nursery Handling Factor	Seeds Supplied Per Seedling	Viable Seeds Supplied Per Seedling	'Green Trees' - % of Request	Percent Empty Cavities
100-99	1.2	1.25	0.20	1.76	1.75	125%	0.40%
98-97	1.3	1.27	0.20	1.92	1.86	125%	1.77%
96-95	1.5	1.28	0.20	2.18	2.07	125%	2.35%
94-93	1.7	1.28	0.20	2.43	2.27	125%	2.25%
92-91	1.8	1.28	0.20	2.56	2.33	125%	2.28%
90-89	2.0	1.26	0.20	2.78	2.49	125%	1.11%
88-87	2.2	1.27	0.20	3.04	2.66	125%	1.29%
86-85	2.4	1.27	0.20	3.30	2.82	125%	1.39%
84-83	2.5	1.27	0.20	3.43	2.86	125%	1.59%
82-81	2.7	1.27	0.20	3.68	2.99	125%	1.47%
80-79	2.8	1.27	0.20	3.81	3.02	125%	1.53%
78-77	3.0	1.26	0.20	4.05	3.14	125%	1.14%
76-75	3.1	1.27	0.20	4.19	3.16	125%	1.36%
74-73	3.2	1.27	0.20	4.32	3.18	125%	1.59%
72-71	3.4	1.27	0.20	4.58	3.27	125%	1.65%
70-69	3.6	1.27	0.20	4.83	3.36	125%	1.66%
68-67	3.7	1.27	0.20	4.97	3.34	125%	1.81%
66-65	3.9	1.27	0.20	5.22	3.42	125%	1.69%
64-63	4.0	1.27	0.20	5.35	3.40	125%	1.78%
62-61	4.2	1.27	0.20	5.61	3.44	125%	1.93%
60-59	4.3	1.28	0.20	5.76	3.42	125%	2.21%
58-57	4.4	1.28	0.20	5.90	3.40	125%	2.51%
56-55	4.6	1.29	0.20	6.16	3.42	125%	3.62%
54-53	4.7	1.29	0.20	6.31	3.38	125%	3.93%
52-51	4.9	1.29	0.20	6.57	3.38	125%	3.97%
50-49	5.0	1.29	0.20	6.72	3.32	125%	3.29%
48-47	5.1	1.30	0.20	6.88	3.27	125%	3.80%
46-45	5.3	1.30	0.20	7.18	3.26	125%	4.16%
44-43	5.4	1.31	0.20	7.35	3.20	125%	4.76%
42-41	5.5	1.32	0.20	7.53	3.13	125%	5.43%
40-39	5.6	1.33	0.20	7.73	3.05	125%	6.19%
38-37	5.7	1.34	0.20	7.94	2.98	125%	7.04%
36-35	5.8	1.35	0.20	8.15	2.89	125%	8.00%
34-33	5.9	1.37	0.20	8.38	2.81	125%	9.09%
32-31	6.0	1.39	0.20	8.65	2.72	125%	10.34%
30-29	6.0	1.42	0.20	8.84	2.61	125%	12.28%
28-27	6.0	1.45	0.20	9.06	2.50	125%	14.53%
26-25	6.0	1.50	0.20	9.30	2.41	125%	17.11%
23-24	6.0	1.55	0.20	9.61	2.30	125%	19.27%
1-22	6.0	1.59	0.20	9.85	2.20	125%	22.52%

**Table 2. The changes in number and percent of select potential seedlings through the implementation of new sowing guidelines (2001 vs. 1999).**

<b>Species</b>	<b># Seedlots</b>	<b>Seedling Increase</b>	<b>% Increase</b>
Ba	4	-2,100	-3.79
Bn	1	-5,400	-5.28
Cw	21	510,900	2.01
Fdc	121	2,609,500	7.04
Hw	66	2,167,000	5.09
Lw	4	453,800	6.16
Pli	36	864,300	8.42
Pw	42	108,700	3.42
SS	21	1,530,100	10.15
Sx	80	7,195,100	3.94
SxS	1	1,600	7.73
Yc	2	0	0.00
<b>ALL</b>	<b>420</b>	<b>15,433,500</b>	<b>4.77</b>

### **Sowing Guideline Calculations and Examples**

Use the following formula and Table 1 (to determine seeds supplied per seedling) to calculate the 'grams of seed' required for a seedling request, based on the Ministry of Forests Sowing Guidelines:

$$\text{Grams of Seed} = \frac{\text{No. of Seedlings Requested} \times \text{Seeds Supplied Per Seedling}}{\text{Seeds Per Gram}}$$

Use the Table 1 to determine the **Seeds Per Seedling** based on the **Germination Capacity (%)** of a seed lot. The **Germination Capacity (%)** and **Seeds Per Gram** for all seed lots are available from SPAR. Alternatively the number of potential seedlings from a given quantity of seed can be calculated by rearranging the equation as shown below. A 415B block type is used as the default for potential seedling calculations on SPAR.

$$\text{Potential Seedlings} = \frac{\text{Grams of Seed} \times \text{Seeds per Gram}}{\text{Seeds Supplied per Seedling}}$$

#### **Sample Calculation:**

No. of Seedlings Requested = 15,200

Seed Lot = 60277      Germination = 91%      Seeds Per Gram = 349

$$\text{No. of Grams} = \frac{15,200 \text{ seedlings} \times 2.56 \text{ seeds supplied per seedling}}{349 \text{ seeds per gram}} = 111.49 \text{ grams}$$

**Note:** Seed withdrawals at the Tree Seed Centre are done to the nearest gram (whole number) - e.g. 112 grams. SPAR will automatically round the No. of Grams calculation upwards to the nearest whole gram. You will often see the message '*Potential Trees have been recalculated*' in SPAR when entering a seedling request, due to the rounding factor

## ***Extension, Education and Communication***

A variety of issues were considered in the development of the new sowing **guidelines**. It was decided that unique sowing **guidelines** would not be developed based on species, genetic class, genetic worth, growing environment or stock type. Client feedback indicated that seed allocation should be a function of seed quality (namely germination capacity). The large variability in seed use at the nursery and the lack of data with respect to seed allocation for the factors mentioned above made the decision easier. Unfortunately, the economic incentives for seed efficiency are not completely developed at present.

The first step to gains in seed efficiency is an understanding of how the sowing **guidelines** work. This will allow informed discussions (or negotiations) between the seed owner and nursery. In some situations large seed-use efficiency gains can be made (i.e. single-seed sowing of Pli), but not all nurseries will have the appropriate combination of geographic location, type of growing environment, stock type, equipment available, labour issues and individual nursery policy to meet every need. Consider available options. Each nursery has a set of constraints and each seed owner has a certain limited mix of species and seedlots. These new sowing **guidelines** are considered the best 'average', but efficiency gains can be made by going beyond average performance considering your unique situation.

The introduction of fractional sowing factors has made seed allocation more linear with respect to germination capacity. Many nurseries were already practising this to gain efficiency in growing space, but it was new to others. To help clients get a better handle on all the seed allocation factors and how they can be changed for a set number of seeds per seedling a spreadsheet has been developed by Eric van Steenis. This spreadsheet allows one to look at what the effect of changes in one factor have on all other factors. It should be clear that the **guidelines** in Table 1 are just that. Because a seedlot has a GC of 90% does not mean one has to sow at 2 seeds per cavity with an oversow of 1.26. One can sow at an average of 1.5 seeds per cavity with an oversow of 1.64 or you can single-sow and oversow at a rate of 2.32! Contact Eric Van Steenis for a copy of his 'Seed Calculator Spreadsheet'.

Additional information will be forthcoming in the Seed Handling Guidebook that has a chapter dedicated to Seed Sowing. A Tree Improvement Workshop is also planned later this year. Information will be coming your way soon.

Feedback on the sowing **guidelines** is encouraged and appreciated. Written feedback is particularly helpful. The sowing **guidelines** are not static and will evolve as new business requirements arise. Good Luck with 2002 sowing.

### ***For more information and assistance, contact:***

**Dave Kolotelo**  
BCMOF Tree Seed Centre  
18793 - 32<sup>nd</sup> Ave.  
Surrey BC V4P 1M5  
(604) 541-1683 ext. 228  
[Dave.Kolotelo@gov.bc.ca](mailto:Dave.Kolotelo@gov.bc.ca)  
fax: (604) 541-1685

**Susan Zedel**  
Tree Improvement Branch  
PO Box 9518  
Victoria BC V8W 9C1  
(250) 356-1598  
[Susan.Zedel@gov.bc.ca](mailto:Susan.Zedel@gov.bc.ca)  
fax: (250) 356-8124