Native grass seed development

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INTRODUCTION

Since the 1970s, there has been considerable interest and support for the use of native species to revegetate disturbed areas. For example, both the reports of the Mackenzie Valley Pipeline Inquiry (1977) and of the Clayquot Sound Scientific Panel (1995) recommended the use of native species in the areas relevant to these reports. Possible benefits of using native species may include any of the following:

- assist in retention of local biodiversity
- create a more harmonious end vista
- increase long-term survival prospects
- improve reseeding potential
- decrease costs through lower fertilization and seeding rates

Other political jurisdictions, such as Australia, Alaska, and much of the contiguous United States, have legislation that requires the use of native species in restoration of public lands. This is not the case in western Canada where vast amounts of introduced grass seed are added annually to our landscape. For instance, on Vancouver Island over 100 000 kg of non-native seed is distributed annually by just two of the major participants in reclamation—the forest industry and the Ministry of Transportation and Highways.

Small projects can collect the seed of "wild flowers," multiply and harvest this seed, and then use it to reseed disturbed areas. The restoration of the Red Heather Meadows and Elfin Lakes areas of Garibaldi Provincial Park was completed in this manner. For most species, however, the cost will be exorbitant. No large-scale user (public or private) operating under budgetary constraints will voluntarily support such a program, except on a few very high-profile locations. Furthermore, the total impact on the amount of non-native seed added to the landscape will be insignificant, whether the seed collected is directly applied to the disturbed area, or whether plants are grown in the field or a greenhouse and then transplanted to the disturbed site. Thus, programs in which minor quantities of native seed are collected from the wild will not solve the overall problem.

The lack of a reliable, cheap source of native seed species has been a major barrier to their large-scale use in British Columbia reclamation programs. This barrier has inhibited the introduction of new legislation that would require the use of native species in restoration of public lands. With grasses, the problem is more one of agricultural economics than plant biology. Native grasses will grow and survive, if the species is appropriate to the region. The questions that need consideration are:

- Will the use of native grasses achieve the goals of any specific reclamation scenario?
- At what cost can reclamation success be achieved?

Citation —

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M. Vaartnou and Associates are involved in two separate programs to answer these questions for Vancouver Island and northwestern Canada, respectively. The long-term objective of these programs is to harvest enough seed from breeders' seed plots to allow established seed companies to, in turn, grow sufficient supplies for large-scale purchasers. The following basic conditions must be met for large-scale users to order native grass seed.

- Sufficient native seed is available for large-scale reclamation.
- Trial results for the native species plots are comparable to results achieved on control plots of introduced agronomic species.
- The cost of native species seed is no more than minimally higher than the cost of agronomic seed.

METHODS

To date, we have undertaken the following activities to achieve our long-term objective:

- collect seed from selections of grasses, which are native to the relevant area(s);
- increase the available seed, using a selection/seed-increase nursery, to establish trial plots;
- establish replicated trial plots on disturbed sites (accompanied by control plots seeded to the optimal mixture of available introduced agronomic selections) to determine the utility of the selections collected for reclamation purposes;
- evaluate trial plots for ground-cover production on a species-by-species basis using the "Daubenmire" methodology;
- *t*-test the ground-cover percentages of native seed plots versus the agronomic seed control plots;
- test germination of the most successful selections; and
- establish breeders' seed production plots to ascertain the seed production potential of the native selections and subsequent cost of the seed to the end-user.

DISCUSSION

Vancouver Island Program

On Vancouver Island, Forest Renewal British Columbia is funding a long-term research program that, if successful, will result in the use of native grass species, and possibly some legumes, for forestry, and other, reseeding purposes. The native species in this program may also be applicable to the Coastal Western Hemlock biogeoclimatic zone on the mainland coast. In the last 4 years, 104 native selections have been collected. These were seeded to flats in a greenhouse at the University of British Columbia. The seedlings were then transferred to a seed-increase nursery established just south of Duncan. Many selections were eliminated because of poor germination or poor performance, but 60 selections are currently established at the nursery. Seed from these selections has been used to create five native grass-seed mixtures. Each mixture was seeded to replicated trial sites and unique demonstration sites on Vancouver Island. Although 45 trial sites were established throughout Vancouver Island, these have not yet provided definite conclusions. However, initial results at each replicated trial site indicate that native species furnish ground cover comparable to that of the agronomic cultivars on the control plots. In 1999, the 11 selections with the greatest initial success were seeded to breeders' seed production plots near Dawson Creek. Performance on these plots will provide a good indication of the eventual cost of the native selections when grown at field-scale.

Northwestern Canada Program

For northern reclamation purposes, M. Vaartnou and Associates are working with the Alberta Research Council and the Dawson Seed Company to ensure a reliable, reasonably priced source of native grass seed. Northern selections were tested from 1976 to 1995 at numerous locations throughout northern Alberta, northern British Columbia, and the Yukon Territory, as well as some locations in the Rocky Mountains and the Northwest Territories. These northern selections were seeded to field-scale production in the late 1970s, and again in the early 1990s; however, these programs have been terminated. We incorporated the results of these field trials into the Yukon Department of Renewable Resources' reclamation manual ("Guidelines for Reclamation/ Revegetation in the Yukon"). Results were also presented at conferences (e.g., the 1988 Conference for the 25th Anniversary of the Boreal Institute of the University of Alberta; the 1992 British Columbia Mine Reclamation Symposium at Smithers, B.C). In early 1998, the Alberta Research Council expressed an interest in working with our selections. Eight selections were subsequently sent to Alberta for possible development into registered northern agronomic cultivars. Initial results are promising, and it is probable that some agronomic cultivars will be registered by 2002–2004. In 1999, the Dawson Seed Company requested permission to grow our northern native species selections for seed production and marketing. These selections have been successful in northern field trials, and seed from this latter initiative could be on the market by 2002.

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