



Newsbulletin

Tree Seed Working Group

NO. 9 MARCH 1988

A WORD FROM THE CHAIRMAN

As indicated in the November 1987 issue of the Newsbulletin one of the mandates of the Tree Seed Working Group is to promote tree seed science and technology through exchange of information on seed-related problems. To this end, we have this Newsbulletin. It helps to keep us informed. However, we have another vehicle through which to upgrade our understanding, broaden our knowledge base, and to learn of seed-related problems and what is being or can be done about them. That other vehicle is a Group Session or Workshop at the biennial meeting of the parent association.

It is my aim as your chairman to see that such a session is organized for the next meeting (Edmonton, August 14-18, 1989). Given that aim, decisions have to be made as to what form the session should take, and as to what topic or topics it should address.

The 1985 Canadian Forestry Service Information Report PI-X-53 by Owens and Blake exposed a number of large gaps in our knowledge base. Has there been progress in closing those gaps? Is work being done on the hardwoods? The recent series of workshops on seed testing may have exposed new concerns or provided new insights that demand wider dispersal. Was that the case? Regional workshops on such topics as controlled pollination suggest the need for a wider knowledge base on all related matters. Is this a real need? More and more is coming to light on tree-to-tree (or clonal) variation in capacity to produce reproductive structures. What is known concerning the reasons behind this vari-

ation and can the variation be overcome? What are the relationships between reproductive and vegetative development?

It is my hope that some of you, the members of this Working Group, will provide me with feedback. What would you like to have in a half-day? or full-day? session in August 1989? Maybe the questions raised in the foregoing will help to promote reaction. Our Alberta members would know of items of "local" interest that might be woven in to whatever package is devised. Information of that nature would be most welcome. I would like to be able to report progress, and I hope a decision on the nature and scope of the session, in the November Newsletter. We really need that amount of lead-time to effectively carry the planning to a worthwhile conclusion. I look forward with hope to an enthusiastic response.

NOTE THESE ADDRESSES

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Queries, comments, and contributions to the "NEWSBULLETIN" are welcomed by the chairman or the editor.

EDITOR'S NOTES

Its pep-talk time again. Have you noticed: if it isn't me, asking you the membership, for contributions to the Newsbulletin, then its your Chairperson. Its been sort of informally arranged that we take turns at this task.

Back in Issue #7, I tried to compliment you all for offering so many contributions. It wasn't necessary for me to spend a lot of time coaxing people for articles. Issue #8 and this one were also put together with only a little encouragement from me. Frequently, when I phone someone, I'm told they have been thinking about making a contribution but have not sat down to do the actual writing. A simple expression of interest by me is all that is needed to get them writing.

I am delighted with this willingness to contribute. It makes me feel we are finally beginning to mature as an organization. Its going to be bigger and better things from now on!!! --- Don't all of you that are still sitting on your contribution feel left out? Get with it. Become a real member of the group. Send me your contribution for the next issue of the Newsbulletin.

How was that for a pep-talk?

In the above text there is one thing I hope you all caught on to as you were reading: "we are beginning to mature as an organization". Each of us is becoming more and more aware of what is going on throughout the country and we have started to take advantage of this awareness. Communication within the TSWG is contributing to the progress of seed work throughout the country.

Recently, it's been brought to my attention on several occasions that individuals wishing to contract Newsbulletin contributors have had difficulties in doing so because addresses were not readily available. Issue #3 provided a membership/address list, but at that time

we had only 93 members. Now we have 154 members, so the old list certainly is incomplete. This difficulty is rectified with the inclusion of an up-to-date membership/address list with this issue. I encourage you all to make good use of it.

Hugh Schooley

FOREST BIOTECHNOLOGY CENTRE

The Federal and B.C. Provincial Governments and the B.C. Research Council have agreed to provide \$4.8 million to fund the establishment and development of a Forest Biotechnology Centre.

The centre, located at B.C. Research's facilities near the University of B.C. campus, will develop and improve seedlings and processes -- for bigger and hardier trees -- through genetic engineering and tissue culture. These seedlings and processes, when incorporated into traditional forestry operations, will enhance reforestation and forest productivity across the country.

"Some 15 individuals with expertise in molecular biology, tissue culture, biochemistry, tree physiology, microbiology, plant pathology and ecophysiology will be employed by the centre. The centre will market its services to government, forest companies, biotechnology firms, international development agencies and organizations funding basic and applied research".

OTIC UPDATE

The Ontario Tree Improvement Council (OTIC) began operations in January 1985 (see Newsbulletin #6) and since then has concentrated on the classical approach to tree improvement across Northern Ontario. The strategy employed for both black spruce (Sb) and jack pine (Pj) is the extensive selection of individuals from wild stands followed by the establishment of seedling seed orchards and open-pollinated family tests.

Northwestern Region

Boise-Cascade Ltd., Great Lakes Forest Products Ltd. and the Ontario Ministry of Natural Resources (OMNR), in the Fort Frances-Dryden area, have cooperated to select 900 Pj plus trees and these will be established in two seed orchards and six family tests by 1989.

North Central Region

Abitibi - Price Inc., Great Lakes Forest Products Ltd. and OMNR, in the area west of Lake Nipigon, have cooperated to select 450 Pj plus trees and to establish them in a 14 ha seed orchard and four family tests last summer. Approximately 500 Sb have been selected and will be established in two 16 ha seed orchards and four family tests in 1988.

Northern Region

Abitibi - Price Inc., OMNR and Quebec-Ontario Paper Co., in the Lake Abitibi-Cochrane area have cooperated to select 450 Sb plus trees and will establish a 36 ha orchard and four family tests by 1989. OMNR, Quebec-Ontario Paper Co., and Waferboard Corp., in the Timmins-Kirkland Lake area, have cooperated to select 450 plus trees of both Sb and Pj. A 12 ha Sb and 16 ha Pj seed orchard along with family tests will be outplanted this spring.

Because of the large quantities of seed required, OTIC has decided to establish soil-based orchards within the pertinent breeding zones for first generation production. The opportunity exists, however, to move quickly to potted indoor orchards for seed production in the second generation or for those species with smaller seed requirements. OMNR has intensively selected hundreds of white spruce (Sw) whose ramets are in clone banks and orchards. These excellent clones could be regrafted, for potted indoor orchards and brought to production quickly to supply the Sw seed requirements for virtually all the North Central and Northern regions. In addition, if interest is shown in a species such as tamarack, a potted indoor orchard could be quickly established with a few intensively selected individuals. Likewise, as the best individuals from the best

families are identified in current tests, OTIC may utilize potted indoor orchards to produce second generation seed for such high value planting programs as on prime sites.

Jim Coles

SHELTERBELT TREE IMPROVEMENT

In recent years several new tree improvement programs have been initiated at the Prairie Farm Rehabilitation Administration (PFRA) Tree Nursery, Indian Head, Saskatchewan. Current emphasis is on genetic improvement of shelterbelt species through plus tree selection, provenance testing, establishment of seed orchards and progeny tests. Work has concentrated on the following species:

1. Poplar - In the past five years over 200 selected clones have been propagated. In 1986 one of the selections, 'Assiniboine', was released for planting in prairie shelterbelts.
2. Green ash - In 1985 and 1986 seed was collected from the northern part of the species range. This included 100 families from 36 sources from Nebraska, N. Dakota, S. Dakota, Manitoba and Saskatchewan. Provenance planting will commence in 1989.
3. Scots pine - To date over 300 inter-provenance breeding crosses have been completed. Progeny tests were established in 1987 and plus trees were grafted for establishment of a clonal seed orchard in 1988. A superior Siberian strain of Scots pine has been developed with first production stock being available in 1991.
4. Siberian larch - A program was initiated in 1985 with the collection of seed from the native range. Provenance tests were established in the fall of 1987. Extensive research on propagation (seed and cuttings), nursery management and establishment techniques is underway.
5. Ponderosa pine - A progeny test was established in 1986. The planting includes 1365 trees from 65 families spaced at 2.5 x 3.6 m (8' x 12').

6. USSR seed collection - In July of 1987 a trip was made to the Soviet Union to obtain germplasm of tree and shrub species that could be incorporated into PFRA's shelterbelt program. In return the Soviets will be provided with seed of native Canadian species used in our shelterbelt programs. The Soviets are far more advanced than us in planting shelterbelts in agriculture areas.

W.R. (Bill) Schroeder

TREE IMPROVEMENT RESEARCH IN ACTION

Tree breeders are always looking for ways to increase the rate of progress in achieving genetic gain. Ontario Ministry of Natural Resources (OMNR) Northern Region has developed a clonal (rooted cutting) production programme for black spruce, and it is desirable that original seedlings of as high genetic value as possible be utilized. OMNR approached the Tree Breeding and Genetics project at Petawawa National Forestry Institute (PNFI) for help in accelerating the rate of genetic improvement. Thanks to the far-sighted efforts of Kris Morgenstern in establishing black spruce progeny tests in northern Ontario nearly two decades ago, researchers were able to estimate the genetic value of parent trees for these tests and to carry out controlled pollinations among clones of the best parents.

In the fall of 1986, PNFI sent 300 controlled-pollinated seeds to OMNR, and these were entered into the clonal production process together with about 2700 other controlled-pollinated seedlings from other sources. In a rigorous process of seedling selection based on growth rates and form, the original 3000 seedlings were reduced to approximately 350. Almost all of the Petawawa material survived this selection procedure and about 100 rooted cuttings from each of the original seedlings have now been produced for use in the clonal testing programme. In addition, rooted cuttings are continuing to be produced, with a target of 800,000 which

will be used in operational plantations. In only 1½ years after being produced, PNFI's 300 seeds will have been used to plant several hundred hectares of forest.

In 1987, PNFI produced over 1000 controlled pollinated seed from matings among genetically superior parents for use in the clonal production programme, and these should prove to be at least as good, if not better than the 1986 seed.

Tim Boyle

WEYERHAEUSER CANADA LTD., SASKATCHEWAN SEED ORCHARDS

The Prince Albert Pulpwood Division of Weyerhaeuser Canada Ltd. began a tree improvement program for jack pine in 1978, and a program for white spruce in 1983. Clonal orchards have been established in both programs. The jack pine orchard is now producing small amounts of seed for operational planting. Some controlled cross pollinations are being done within the orchard. Family tests for 200 select jack pine are established. The oldest ones have had seven (7) growing seasons in the field. In the white spruce program a seed production area has also been established, (to provide a seed supply until the orchard comes into production). A program to establish family tests of 200 select spruce trees has been initiated.

At the seed orchard site is a small, experimental greenhouse where seedlings from selected pine and spruce parents are produced for outplanting in family tests. This greenhouse is also used for grafting to supplement a regular field grafting program for the orchards.

Seeds collected from the jack pine orchard, and any batched "leftover" seeds from select trees (not needed for the family tests), are used to produce container stock in provincial government greenhouses. The provincial government also provides larger seedlings to use as grafting rootstock.

Cone and seed processing of all tree improvement material is done right at the seed orchard. Cones are dried in a portable building fitted with electric heat and fans, then tumbled to extract seed. Seed is hand-dewinged then cleaned in a clipper screen seed cleaner and an air column blower. Cones collected from seed production areas and from cutting operation slash are also processed with this equipment.

Diane Roddy and Spencer McDougald

RED SCOTS PINE

In October-November 1987 two Petawawa National Forestry Institute researchers visited Siberia in order to collect Scots pine seed. This was in response to a great deal of interest among operational tree breeders throughout Canada in southern Siberian Scots pine, and followed several years' investigation and negotiation. Scots pine has a very large natural range and can be very productive in many different climatic conditions. However, seed from poorly adapted sources has frequently been used in the past, resulting in slow growth and bad stem form. Sources from the Ukraine and Byelorussia perform satisfactorily in central Canada, but Siberian sources from an area of greater climatic similarity to Canada should be better still.

The objective of the 1987 seed collection was therefore to sample as many populations as possible from as far south as possible in the natural range of Scots pine in Siberia. In two weeks, four different areas were visited. Almost 100 kg of Scots pine cones were collected by a combination of climbing and felling. Most of the stands visited were 60-80 years old and trees were 25-30 metres tall. The seed from these cones has been extracted at Petawawa and will be distributed to forest services and industry throughout the country for testing and operational planting. In a small test of seed samples obtained from southern Siberia two years

ago, the Siberian sources outperformed the best Ukrainian sources in the first two years.

In addition to Scots pine, about 20 kg of Siberian pine seed was obtained, together with almost 15,000 seeds of what the Soviet State Committee of Forestry consider to be their best source of Siberian larch (Tuva A.S.S.R.).

Tim Boyle

'PREVAC' METHOD FOR REMOVAL OF DAMAGED SEEDS

Swedish University of Agricultural Sciences, seed researchers have written an article that describes the successful use of the 'PREVAC' method to remove mechanically damaged seed from seed lots of Scots pine. The method involves applying a low absolute pressure to seeds lying in water and then releasing it. The seeds with mechanical damage quickly lose their buoyancy and sink and can thus be separated from the floating undamaged seeds. Their studies indicated the most crucial of the tested physical properties was the level of pressure. The time of treatment (1-20 min.) was of less importance, and the water temperature (5-40°C) was unimportant. Treatment at approximately 97 kPa below atmospheric pressure (3-5 kPa absolute pressure) for 1 up to 20 min. resulted in removal of almost all mechanically damaged seeds in the four studied seed lots (containing up to 26% damaged seeds). For more details of their work read:

Bergsten, U. & Wiklund, K. 1987. Some physical conditions for removal of mechanically damaged Pinus sylvestris L. seeds by using the PREVAC-method. Scand. J. For. Res. 2, 315-323.

POLLEN COLLECTING

Breeding of conifers for research purposes has been conducted at Petawawa National Forestry Institute since the 1930's.

Standard procedures have been adopted for pollen collection and really, there is nothing new, but each year the question remains 'when to get that pollen'? Too soon and it won't mature, too late and well, too late! Obviously, to get results, it's all in the timing.

Each species has varied flowering characteristics which necessitate a particular expertise to efficiently obtain pollen requirements. This expertise has as its basis two time sequences for gathering pollen; both work well but on different genera of trees.

1. Collecting premature strobili and allowing final maturation to occur in regulated laboratory conditions. This technique allows for a more relaxed schedule and eliminates the chance of missing a collection.

Pinus spp. are responsive to this technique. The strobili are large so that the stages of development to maturity are readily recognized. Collections can be made as early as three days prior to natural dehiscence. At this time the strobili when squeezed are almost dry and the pollen when rolled between the fingers are powder like. In regulated laboratory conditions of low humidity and high temperatures the strobili will continue to develop and release pollen within 2-3 days.

2. Constant monitoring of the strobili in the field and collection at the first indication of dehiscence.

This technique is necessary for Picea and Larix spp. Their strobili are small and sensitive. They readily abort if collected before the last stage of development. The time of collection is critical and should take place at the first indication of dehiscence by strobili usually located on the southerly side of the trees. The collected strobili will generally release their pollen within 24 hours. As dehiscence time approaches continuous monitoring to determine the time of collection is essential. A couple of hours of good

weather conditions can make the difference between success or waiting until next year to try again.

The best results, regardless of genera, occur when the strobili are collected as close to natural dehiscence as possible.

Peter Copis

CONE AND SEED DISEASE UPDATE

In the last TSWG Newsbulletin (Nov. 1987) the Cone and Seed Pest Working Party provided an update on cone and seed insect research in Canada. This time we provide an update on cone and seed disease research.

Cone and seed pathogen research is currently being conducted by Jack Sutherland at the Pacific Forestry Centre, Canadian Forestry Service, in British Columbia. Early work showed that about one-third of all spruce seedlots in British Columbia were infected by the cold fungus. Infection by this fungus has been traced to the practice of collecting cones from the ground and especially from squirrel caches. Another disease, Sirococcus blight was also shown to be seed-borne on all species of spruce and some pines. Seed-borne inoculum results in serious outbreaks of the disease in container nurseries. Recently it has been found that incorporating a fungicide into the water used during the seed stratification process provides excellent control of the disease in the nursery. Research on the Inland Spruce cone Rust, the most serious disease of spruce cones in Canada (cone losses of up to 60% often occur) has demonstrated that the disease can be controlled by applying Ferbam fungicide to cones at least twice during the pollination period. The fungicide is now registered for use against this pathogen. In cooperation with Jack, Don Summers of the British Columbia Ministry of Forests, is continuing to test fungicides against spruce cone rust and it looks like Bayleton is as good as Ferbam. Further testing is needed before recommendations can be made. In 1987, a book was published on Cone and seed

Diseases of North American Conifers which summarizes the biology, host, life cycles, damage and management of these and other cone and seed diseases on North American conifers. Copies of the book are available from the International Forestry Branch, Canadian Forestry Service, Government of Canada, Ottawa, Ontario. K1A 1G5.

R.K. Mittal worked for 2½ years as a NSERC Visiting Fellow and scientist at the Petawawa National Forestry Institute (PNFI) before returning to India in July 1987. His research focused on the seed-borne fungi of white spruce and eastern white pine and their impact on germination and early seedling development. He also worked on the effect of surface sterilization of seed on germination and seedling development and cooperated in the revision of a world wide checklist of microorganisms associated with tree seeds. Reprints of his published research results may be obtained from B.S.P. Wang at PNFI.

A special effort has been made to list recent (1986-present) Canadian publications on cone and seed pests in the RECENT PUBLICATIONS section of this Newsbulletin. Interested readers should also consult previous issues. Copies of the publications listed should be available from the authors; many of whom are TSWG members and have their addresses listed in this Newsbulletin.

Peter De Groot

NEW CHECKLIST FOR CONE AND SEED INSECTS CORRECTIONS

The checklist by Yates that appeared in the Journal of Entomological Science [1986 volume 21(2) 142-168] "Checklist of Insect and Mite Species Attacking Cones and Seeds of World Conifers" contains four proofing errors.

p. 147 line 40

"Dasineura rachiphaga Tripp"
should be "Dasineura rachiphaga Tripp"

p. 153 line 46

"Xyela apligena (Strobl)"
should be "Xyela alpigena (Strobl)"

p. 160 line 12

"Cydia illutana (Herrich-Schäffer)"
should be "Cydia illutana
(Herrich-Schäffer)"

p. 161 line 4

"Epinotia nigricana (Herrich-Schäffer)"
should be "Epinotia nigricana
(Herrich-Schäffer)"

Harry O. Yates III

CALL FOR PARTICIPANTS IN A 1989 CONE AND SEED PEST WORKSHOP

I am inviting feedback from researchers regarding the possibility of a workshop on cone and seed insect pest problems at the 1989 Annual Meeting of the Entomological Society of Canada to be held in St. John's, Newfoundland, 2-4 October. I am suggesting as a topic "Problems and Opportunities in the Control of Cone and Seed Pests." The workshop would begin with a 30-40 minute overview by an invited speaker such as Dr. Gary DeBarr, followed by five or six 20-25 minute papers and conclude with an informal discussion.

Please let me know of your interest in attending such a workshop, suggestions for papers and authors, and your willingness to present a paper.

R.J. West

Newfoundland Forestry Centre
P.O. Box 6028
St. John's, Newfoundland
A1X 5X8

UPCOMING MEETINGS

International Congress of Genetics

The XVth International Congress of Genetics will be held at the Metropolitan Toronto Convention Centre, August 20-27, 1988. The Congress is sponsored by the International Genetics Federation, the Genetics Society of Canada, the National Research Council, the Royal Society of Canada and the Biological Council of Canada. The theme of the Congress will be "Genetics and the Unity of Biology". The program will consist of approximately 45 invited symposia emphasizing the most recent and exciting developments in genetics and allied sciences. In addition, there will be poster presentations, workshops, specialized pre- and post-Congress meetings, a large commercial exhibition and an interesting and varied social program. It is the aim of the Organizing Committee to make the Congress Program as ecumenical as possible. Thus, it should be of interest to a broad range of scientists whose primary interest may not be in genetics itself.

The program will be subdivided into four main areas as follows:

- I. Genes and Chromosomes
- II. Genomes and Organisms
- III. Populations and Evolution
- IV. Genetics and Society

If you are interested in attending the Congress, and wish to have your name in the mailing list for Congress announcements, please write to:

Mr. Laurier Forget
Office of Conference Services
National Res. Council of Canada
Ottawa, Ontario, K1A 0R6

North American Forest Biology Conference

The 10th North American Forest Biology Conference will be held at the University of British Columbia, Vancouver, July 20-22, 1988. The theme of this meeting is the Physiology and Genetics of Reforestation. Sessions will include keynote and volunteer speakers on (1) Preconditioning of seed,

(2) Characterization and manipulation of the physiological quality of nursery stock, and (3) Field performance of nursery stock. For further information contact:

Dr. D.T. Lester, Program Committee
Faculty of Forestry
University of British Columbia
#270-2357 Main Mall
Vancouver, B.C.
V6T 1W5

Canadian Botanical Association Meeting

The Annual Meeting of the Canadian Botanical Association will be held at University of Victoria, Victoria, B.C. June 6-9, 1988. Symposia on (1) The Biology of Trees, (2) Recent Advances in Studies of North American Aquatic Plants, and Contemporary Issues in Fungal Physiology will be held and pre- and post-meeting field trips will be held. For further information contact:

R. Hebda
Royal British Columbia Museum
Victoria, B.C.
V8V 1X4

IUFRO Cone and Seed Insect Working Party Conference

The International Union of Forest Research Organizations (IUFRO) Working Group S2.07.01, Cone and Seed Insects will hold a conference at Empress Hotel, Victoria, B.C. June 27-30, 1988. About 25 papers dealing with insect biology and the control of pests will be presented. For further information contact:

G. Miller
PFC, Canadian Forestry Service
506 West Burnside Road
Victoria, B.C.
V8Z 1M5
Phone: 604-388-0600

ISTA Forest Tree Seed Workshop

The International Seed Testing Association (ISTA) is sponsoring a workshop on seed testing at Macon, Georgia, USA, August 1-5, 1988. The program will include discussion of:

1. Germination including the paired test concept, x-ray and germination, abnormal seedling description, and tropical seed.
2. Quick estimates of seed viability using tetrazolium, excised embryo, and x-rays.
3. Moisture testing - standardization and procedures.
4. New purity definitions for conifer seeds.
5. Computerization of testing operations.

For further information contact:

Robert P. Karrfalt
National Tree Seed Laboratory
Route 1, Box 182B
Dry Branch, Georgia 31020
U.S.A.
Telephone: 912-744-3312

International Congress of Entomology

The 18th International Congress of Entomology will be held at the University of British Columbia, Vancouver, July 3-9, 1988. Sessions will include plenary symposia and lectures as well as special interest group symposia, meetings and workshops. Pre- and post-congress field trips and tours are planned. For further information contact:

Congress Secretariat
Venue West Ltd.
801-750 Jervis St.
Vancouver, B.C.
V6E 2A9

RECENT PUBLICATIONS

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