

## CANADIAN USER PERSPECTIVES ON BT USE FOR

### PROTECTION AGAINST SPRUCE BUDWORM

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#### Abstract

Reference is made to a recent inter-provincial review of the performance of present-day B.t. viz a viz conventional chemicals. The argument is presented that in the Canadian context its practical acceptability to resource managers remains highly jurisdictionally-specific for reasons over and above conventional technical assessments. The New Brunswick situation is reviewed as a case in point.

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I want to say at the outset that the invitation to take part in this symposium was received with pleasure and surprise. Surprise because I believe this is the first or at best the second unsolicited opportunity ever extended to the New Brunswick B.t. user community to say something on its own behalf about the B.t. issue. The closest exception, in Boston a year ago, was also welcomed but was not the open forum that this one is.

I was pleased because it comes at a juncture in the evolution of attitudes and practice in budworm control when generalization about such questions as the viability of B.t. as an alternative to conventional insecticides is no longer enough. I confess to be a bit sensitive about this because in the past year or two it has been driven home to me very forcibly that New Brunswick's performance with B.t. and its alleged attitude toward it is not held in much esteem in some circles. I can agree that there is some justification for this by comparison with the record of our neighbors in Quebec, Maine and, indeed, Nova Scotia. But what I find particularly disturbing and what needs to be challenged is the accusation that this reflects an ignoble pro-chemical, anti-biological mindset that stubbornly ignores superior wisdom elsewhere. To believe that is to ignore a long record of at least decent, self-propelled attention to the question and to reveal a lack of appreciation of the most compelling reasons that ultimately come into play in the performance of individual jurisdictions.

What I was asked to address here, as the program states, are good and bad B.t. experiences in the eastern Canadian scene. My first intention was to approach this in a way that would underscore the point that judgments of good or bad, acceptability or unacceptability cannot

be generalized in the Canadian context, or indeed across international boundaries. Outside experience can be an invaluable guide and technically-qualified advice absolutely imperative. But ultimate responsibility for choices of action or inaction as the case may be are the responsibility of the individual jurisdictions because it is there that accountability lies. Without pointing the finger more in one direction than the other Canadian forestry has historically experienced some difficulty with this distinction at both federal and provincial levels.

With these convictions in mind I had decided to attempt here a synopsis of the good and bad B.t. experiences in the four Canadian jurisdictions judged by the forest managers of those jurisdictions, but without editorial comment. As luck would have it I have been spared that job by the timely issuance of the proceedings of an invitational B.t. seminar organized by my New Brunswick colleague, Rod Carrow, last September. For those who have not received copies it contains assessments of B.t. user experience over the past three years in Ontario, Quebec, New Brunswick, Nova Scotia and Maine. The assessments are made on the basis of four criteria: efficacy, cost, operational peculiarities, and environmental status. This was the first such forest manager-oriented seminar to be held on B.t. in Canada and I particularly commend to you the summary provided by Dr. Carrow on pp.85-90. Capsulized, it says the following.

- (1) Cost remains the major obstacle to greater use.
- (2) There is promise of continuing decline in the cost of the product.
- (3) Application, and therefore over-all costs cannot be presented in a way that permits valid comparisons between jurisdictions. Relative cost of B.t. vs chemical use by jurisdiction provides a more meaningful statistic.
- (4) Recent product and application developments appear to be producing better and more consistent protection, particularly the use of higher BIU rates.
- (5) Certain inherent characteristics of B.t. ensure more difficult application problems.
- (6) The narrower timing window is a fact of life.
- (7) The faith of B.t. developers and users in its greater environmental safety is given insufficient and inconsistent recognition in regulatory circles.

From this applicator's position there is absolutely nothing to disagree with in this assessment. But where Dr. Carrow and I might part company would be in the validity of one of the stated objectives of his seminar, namely "to develop a consensus on the potential for expanded use of B.t. against spruce budworm". In my

opinion, as long as significant advantages to chemical usage remain, until B.t. usage becomes legislated, and while outbreaks continue to exist on their current scale, such consensus is an unrealistic expectation. What must be realized by the more technically-oriented community of B.t. promoters is that the four areas of concern addressed in Dr. Carrow's seminar, which are those also conventionally addressed in generalized reviews by the Canadian Forestry Service and CANUSA do not constitute all of the necessary ingredients of the decision making process in any jurisdiction. It is those extra, highly jurisdictionally-specific factors that defy the development of the jurisdictionally-transferable models of B.t. or chemical usage that some managerially-detached opinion seems to envisage. Perhaps the following table will illustrate the point.

Perspective on Protection Need and Action  
Eastern Canada 1983

|                                          | Ont.    | Quebec | N.B.    | N.S.     |
|------------------------------------------|---------|--------|---------|----------|
| M-S Infestations<br>M/ha                 | 9000    | 21000  | 5300    | 600      |
| Assessed need<br>extensive<br>protection | Minimal | High   | Maximal | Mounting |
| Sprayed M/ha                             | 3       | 1254   | 1495    | 21       |
| % Infestation<br>Sprayed                 | 0.04    | 6      | 28      | 3.5      |
| B.t. Usage M/ha                          | 3       | 46     | 10      | 21       |
| % B.t. Usage                             | 87      | 4      | 0.7     | 100      |

It might also clarify the managerial perspective, and correct some misconceptions as well, to examine the New Brunswick story as a case history.

When I took over the management of Forest Protection Limited nine years ago I took over a spraying program already designed and ready to go. It was the largest, most complicated and most costly program attempted up to that time - 2.7 million hectares at a cost of 8.5 million dollars. It had also, as I came to learn, been designed under the tightest budgetary constraints of any previous program. One way of stretching the dollars was to resort to lower dosages. It was a gamble taken in the worst possible year. As some of you will recall, and as the literature testifies, 1975 proved to be a year of such exceptionally virulent budworm activity that exceptionally poor spray results were experienced not only throughout New Brunswick but in Quebec and Maine as well. The results were reminiscent of an earlier cost-cutting experiment in 1956; each case had to be followed by the largest programs ever undertaken up to that time, and in the case of 1976 probably the largest program

ever. At \$15.9 million for 3.9 million hectares it was an experience that has left both government and industrial sponsors very distrustful of chancy and unproven tactics.

As it happens one of the five insecticides used in 1975 was B.t. at a single application of 8 BIUs on 1500 acres. It was an independent initiative of my predecessor who was eager to get B.t. experimentation underway in New Brunswick as well as Quebec. Forest Protection Limited had helped Dr. Smirnoff organize some of his first field trials three or four years previously and had volunteered to substitute B.t. on the watershed of the City of Saint John's water supply. It was turned down, incidentally, because of public apprehension about "germs".

As reported by Ed Kettela at the 1976 Abbott symposium the 1975 trial produced better results than a single chemical application and only slightly less protection than a double. Although I had had nothing to do with the venture I soon became aware that B.t. could be a very touchy subject. The Abbott proceedings also record the late Dr. J.J. Fettes' opinion that such ad hockery was scientific mockery and that such user initiative represented dissipation of effort. Perhaps that is why that result has yet to appear on any CFS score card of "positive" results.

But more important to the case history is that that was the one and only decision taken for or against operational B.t. use by the manager of Forest Protection Limited. To understand the implications of this it is necessary to realize that Forest Protection Limited is a government-industry consortium with the sole purpose of conducting spruce budworm spraying on behalf of its sponsors. Shares in the corporation are owned 90% by the province, 10% by industry. Representation on the Board of Directors to which I am responsible is preponderantly Department of Natural Resources. Until the Department of Natural Resources took over responsibility for biological surveys and assessments in 1983 company decisions relied upon estimates and advice provided by the Canadian Forestry Service through the Maritimes Forest Research Centre. Whatever opinion I, as Managing Director of Forest Protection Limited have had about the viability of B.t. usage in New Brunswick has closely reflected that advice. Under the new Crown Lands and Forests Act industry decides upon and pays for protection on its freehold land; the Department of Natural Resources is responsible for Crown lands and small private ownerships.

As I have said, the evident inadequacy of spraying in 1975 greatly alarmed its sponsors. One major industrial sponsor stated publicly that the formulations used in that year "were no more effective than dishwasher". This, combined with the revelation of the Reye's Syndrome hypothesis pushed budworm management onto the floor of the provincial legislature with demands that the government ensure sufficient research and development to resolve the problem. It commissioned Dr. Gordon Baskerville to advise on budworm control alternatives and a substantial

research and development budget was erected from federal/provincial shared-cost funds. My Board of Directors authorized a Forest Protection Limited research and development budget of up to 3% of total spray budgets.

The way in which this funding came to be applied reflected in large part Dr. Baskerville's advice that the only foreseeable alternatives to conventional protection practice were B.t. and pheromones and that the best pay-back for immediate research and development investment would be in improved technology for conventional practice. Forest Protection Limited then pressed ahead with already-existing endeavors to develop a provincially-based interest and competence in spray delivery technology which has included B.t. usage. The Department of Natural Resources directed some funding to CFS research on budworm dispersal and modelling and deliberated how resources should be directed toward the B.t. and pheromone areas. The decision came down in favor of pheromones. Influenced somewhat by the puzzling antipathy toward user initiative in B.t. trials exposed at the Abbott symposium, and a great deal by the heroic B.t. investments being made by Quebec, it was reasoned that the wiser course would be to concentrate our province's support on pheromone R&D. That recommendation was accepted but in retrospect we realize that it was politically and otherwise not the best. It has been misinterpreted as a lack of faith in B.t. without earning much appreciation for some heavy investments in the pheromone alternative. On the B.t. scorecard, by all means score that episode as a New Brunswick mistake.

So much for that regret, how else does the New Brunswick B.t. record stack up? If numbers mean anything we have sprayed a few more hectares than Ontario, about one quarter as many as Nova Scotia and a pittance compared to Quebec. We have attempted to protect more private woodlots than the others and have severely tested B.t.'s suitability for very sick trees in the process. In more healthy and less difficult targetting situations I believe our record for success or failure by CANUSA standards is not that much different from equivalent experience elsewhere. The tentative indication at this point is that B.t. performed as well or better than fenitrothion for woodlot protection last year. This is encouraging in one way but cold comfort in another, because neither result was that good. As for attitude, this applicator for one has not doubted for some time that given a break with some highly unpredictable and uncontrollable variables, the right application technology and enough money, B.t. could give decent protection. That seemed evident enough in 1975 and from what could be observed elsewhere. We have not been entirely derelict in testing its usability for our needs, witness our efforts in 1979, 1980, 1982 and 1983. But we have been equivocal about spending money in the same old way again and again with no likelihood that we would be the wiser whatever the result. We have not been unwilling to pull our weight in R&D that we could believe in, witness our activity in delivery technology and in shared-cost fundamental research with CANUSA and the CFS.

So what's the problem? As I have already stated it comes back to some totally non-scientific facts of managerial life. It is much easier to accept a greater risk of failure, a higher per hectare cost, and be environmentally noble under an Ontario model than a New Brunswick one. There is no problem accepting limited forest protection with B.t. in Nova Scotia, when it is the only insecticide permitted. It must be a wonderful experience to our colleagues in Quebec to be told to use B.t. for 40% of their 1984 program and that the extra funding will be provided to maintain the same size program. Resource managers in New Brunswick phantasize about getting on the side of the angels too so it cannot be with much pleasure that our industrial managers have concluded that they can afford only chemicals on their private holdings in 1984 and that government managers once again have regretfully settled for less woodlot protection and B.t. usage than they had hoped for. It's a tough decision to opt for a hectare of B.t. spraying with the knowledge that it will deny protection to an extra hectare or two somewhere else.

Let me conclude with these thoughts. Surely much of the advocacy for B.t. in the past few years has been the kind of wheel spinning Jim Fettes warned against in summing up the Abbott symposium in 1976. Did not the CANUSA core test fit the description of the sort of scientific ad hockery he so disparaged? Some spray practitioners may have needed the evidence it provided to convince themselves that B.t. could be made to work - in New Brunswick it merely begged the real questions. Is it not regrettable that some salesmanship from scientific circles, of all places, should resort to inaccurate and unproved disparagement of chemicals while these remain so critically essential to the most hard-pressed users? Is it not still as evident as it was to Jim Fettes, that the kind of fundamental research that is needed to fully understand successes and failures has remained sadly neglected and that most of the advances made since have been principally by commercial development and empirical trial and error? So, though it may seem to be a strange reversal of roles, let a spray manager now take up the cudgel for more fundamental research as well as for better understanding of the other fellow's position.

#### Literature Cited

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