

OUR CASE AGAINST MOTH SPRAYING

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REVISED EDITION



SOCIETY
TARGETING
OVERUSE OF
PESTICIDES

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PREFACE

Since 1992, Agriculture Canada has sprayed over 300,000 litres of the bacterial, chemical pesticide Foray 48B over much of the Lower Mainland and Vancouver Island, at an estimated cost to the taxpayers of 7 million dollars.

Foray 48B contains 2.1% Bacillus thuringiensis (B.t.) and 97.9% "inert" ingredients. We are not allowed to know what chemicals the inert ingredients may contain as they are protected under the Trade Secrets Act. In fact, this vital information is even denied to a physician who may need it to safely treat a victim of pesticide poisoning.

Further, we are not allowed to know what pesticides our blood may contain, neither are our physicians. The results of any such test must be sent to Health Canada. (or prior to April, 1995 to Agriculture Canada) The only alternative is to have one's blood sent to the Environmental Health Centre in Dallas, Texas. Dr. June Irwin, a Montreal Medical Specialist has spent some \$20,000 of her own money sending her patients blood samples to Dallas for analysis. The results have been shocking.

The Environmental Appeal Board (EAB) has recommended that all the ingredients in Foray 48B be disclosed to the public that is being sprayed with it. However to-date, all recommendations made by the EAB, including this one, have been ignored.

Enacted over half a century ago, the Trade Secrets Act was intended to protect manufacturers from competitors who might copy their recipe. However, now that companies can use commonly available "reverse engineering" techniques to find out the inert ingredients in their competitors' products, it renders the Act obsolete. Today, this information is kept secret from the public only.

It is interesting to note, that most manufacturers of cosmetic and toiletry products now list the ingredients on the label. It doesn't seem to have done their business any harm, nor do they appear to be concerned about their competitors copying their recipe!

The chemicals used as inert ingredients include some of the most dangerous substances known. For example, Methylene Chloride, banned in the United States 10 years ago as a suspected carcinogen, is still being used in 127 pesticides in Canada. Methylene Chloride is a "food grade" additive, used to strip caffeine from coffee beans.

An Agriculture Canada interoffice memo names Sodium Hydroxide (caustic soda) and Potassium Phosphate as two of the main inert ingredients in Foray 48B. An EPA document identifies Methyl Paraben as another. Sulfuric Acid (battery acid) and Phosphoric Acid are also used in the production of Foray 48B. The rest are unknown.

All these noxious chemicals are registered food additives and, although no more than a few parts per million are allowed in the finished product, there will never be a better reason for avoiding highly processed "junk" foods.

Sodium Hydroxide is on an EPA's Special Health Hazard list, and is so corrosive that no more than 10% is allowed to be used in drain openers. Homeowners are advised to wear masks when using products containing this substance.

Potassium Phosphate is also highly corrosive to skin and mucous membranes and it can cause ulcers. This chemical was registered by EPA as an active pesticide ingredient (a biocide) as was Methyl Paraben a toxic synthetic compound which causes birth defects in laboratory animals and, which is on the FDA's list of additives requiring further study.

In order to have a pesticide registered in Canada, a chemical company must produce certain studies to show that, in effect, it won't kill everyone in sight in an obvious fashion. Some of these studies are carried out by the company itself; companies such as Monsanto and Velsicol who have both been investigated for fraudulent research work.

Or, the studies are farmed out to privately-owned testing laboratories that are chosen, and paid for, by the chemical company. Laboratories such as Industrial Biotest and Craven Labs of Texas, who have both been convicted for falsifying information on numerous pesticide safety tests.

Eighty-two pesticide testing companies were under investigation by EPA and the FDA during one four year period for fraudulent or careless testing work.

In Canada, we are not allowed to see these studies as they are classified "proprietary" under the Trade Secrets Act, however, they can be obtained from the United States. (see page 8)

Contrary to what we've been told, B.t. is not, in fact, "found in the soil all around us." In the United States, in a survey of soils never previously treated with B.t. Delucca et al, (1981) found B.t. with a frequency of only 0.75% in the approximately 32,000 bacteria isolates obtained. They rated it as relatively rare in natural soils. However, being ubiquitous in soils is no guarantee of safety; it is a "common soil bacteria" that causes leprosy.

Of course, the soil in Vancouver and area today, after 3 years of nonstop spraying with this bacteria, which has the potential to grow and replicate in the environment, could no longer be considered natural and is bound to be saturated with B.t.

We are told that organic growers use B.t., yet organic growers appealed the spraying of Saltspring Island in 1993 for the following reason: "There is a concern that organic produce could be contaminated through drift which could result in growers losing their organic status." Evidence was produced to show that Foray 48B is not approved for use by organic growers in the U.S.A. And, the U.S. Department of Agriculture in "Gypsy Moth Management in the U.S." recommends; "Establishing untreated buffer zones around organic farming operations to mitigate the potential for drifting insecticides landing in fields."

Promoters of the moth spraying have stated that several urban areas, in the northeastern part of the United States and Canada have been aeriually sprayed with B.t. This is incorrect. Aerial spraying in eastern Canada has been restricted to forests and rural areas. They don't spray Toronto and Montreal! While in the northeastern part of the United States the B.t. spray programs are always voluntary and are not carried out over major cities.

We are also being expected to believe that nobody ever got sick from the spraying. This is utter rubbish! The fact is, there have always been health reactions reported in areas sprayed, but these "warning bells" have often been ignored by local authorities in much the same way as they have been in B.C.

In fact, The B.C. experience is no doubt being touted in other areas targeted for spraying as "no reason for concern." After all, not only did no-one get sick (officially) but there was even a \$64,000 government-funded health study designed to "prove" it!

After Lane County, Oregon was sprayed in 1985/'86, B.t. was found in the bloodstream of a man who died of pneumonia. Citing this and other incidents Dr.Art Edamura of the Preventive Medicine Center asks:-
"DO WE HAVE TO WAIT FOR AN AUTOPSY BEFORE WE HAVE PROOF?"

Perhaps we do! However, according to Novo Nordisk (the manufacturer of Foray 48B) "there is no single test available that can be used in a normal hospital laboratory to conclusively distinguish the production strain" (of Foray 48B) so perhaps the spraying's dark secrets will remain hidden forever.

B.t. products are no longer available for domestic use.

On November 5, 1985 Agriculture Canada held a private strategy session entitled "Understanding the gypsy moth threat" at the Robson Square Media Centre in Vancouver. Local delegates as well as those from other parts of Canada and the United States attended. Here are some of their comments:

"There are serious impediments to pest eradication efforts growing in Canada. One is the attitude that aerial spraying is no longer politically possible."

A.C. Schmidt, Chief,
Plant Health Division, Agriculture Canada

"Can we ask anyone here to be serious about the gypsy moth, with a few adult males reported in Fort Langley, and small populations in the area of Chilliwack and Courtenay?"

Jack W. Toovey, Chief Forester,
B.C. Forest Products

"The gypsy moth could be called its own worst enemy. It has such a high reproductive rate that the 2nd year of heavy defoliation is usually the last before the population collapses from starvation, disease and parasites."

James O. Nichols, Chief,
Division of Pest Management, Pennsylvania

"Untreated infestations collapse naturally after two years."

James O. Nichols

"Surviving insects can produce as many new egg masses after spraying as existed before spraying."

James O. Nichols

"There are no mysteries or secrets involved in organizing an effective spraying program...The keys are adequate planning which is a year round job..obtaining money..along the way you mix in government forms ...obscene phone calls..and assorted attorneys. A polished bureaucrat will have no problems with these items. That's why they pay us so much."

James O. Nichols

"We are not solving the gypsy moth problem in Pennsylvania, nor is it being solved anywhere."

James O. Nichols

GYPSY MOTH IN B.C. - (a background)

The first recorded visit of the gypsy moth to B.C. was in 1912, when it was accidentally introduced to Vancouver in shrubs from Japan. It did not establish here.

(C.Gordon Hewitt, B.C. Entomology Proceedings, 1913)

Pheromone trapping began in B.C. in 1977 when 72 traps were deployed throughout the province and no moths were found. Prior to this, there was no way of knowing how many moths visited here at any given time. Then in 1978, 210 traps intended by Ottawa to be used throughout B.C. were set up in the Kitsilano area alone and (of course) moths were found.

Agriculture Canada applied for a permit to aerial spray 100 city blocks in Kitsilano, warning of economic disaster if the spraying did not take place. Public opposition halted the aerial spraying, and a limited, voluntary ground spray program covering 8 city blocks took place instead. The gypsy moth did not return to Kitsilano.

(The Vancouver Express, May 30, 1979)

The number of moths found is in direct proportion to the number of traps set. For example; 2,050 traps were deployed in 1980 and 1 moth was found. Then by 1992 the number of traps had increased to 23,000 and 162 moths were found.

Entomologists were unable to identify the european strain of gypsy moth from the asian one until a genetic coding technique (not accepted by many experts in the field) was discovered in 1992. And presto, the very same year asian gypsy moths were "discovered" in the Vancouver area, and a state of "emergency" declared by Agriculture Canada.

Moth and man have co-existed peacefully in this province for over 80 years, and not a single tree in B.C. has ever been defoliated by gypsy moths. The moths do not flourish here and tiny colonies, if left untreated, will collapse naturally in a couple of years. The facts speak for themselves. There is no need to spray! Why then was the spraying "jumpstarted" in 1992 and continues to this day?

We believe it's a simple matter of job security. Agriculture Canada is a duplication of the B.C. Ministry of Agriculture and the redundancy axe is poised and ready to strike. 45,000 federal government employees will be made redundant over the next 3 years. However, if a federal bureaucrat can prove himself "indispensable" as in saving B.C. from "monster" moths then he might be able to hang onto his job and department for a while longer, providing he keeps on spraying!

There are a great many snouts around the moth spraying trough and, if the program were cancelled it would leave a glut of trappers, sprayers, organizers, promoters, P.R. people etc. all applying for unemployment insurance and looking for a job in the private sector. Nobody wants to be tossed out on the reject pile - arrogant bureaucrats with a god complex least of all. So there's obviously a vested interest for some, in keeping the moth spraying going as long as possible. The spray program has sinister undertones, and a full public enquiry is the only way to clear the air.

Every year the spraying continues, its potential to cause disease and death increases. The American Cancer Society reports that the rate of leukemia rises sixfold among children who have been exposed to pesticides in play areas and schoolyards. And, according to a study published in the American Journal of Public Health (1995) children whose yards are sprayed with pesticides are four times more likely to get cancer (soft-tissue sarcomas) than their healthy counterparts.

Anyone who still believes the spin doctors when they tell us that Foray 48B is harmless to humans, should consider the following: Health and Welfare Canada report that 370 pesticides, once deemed "safe" (officially) have been removed from the market over the last 10 years, indicating that many pesticides currently in use will meet the same fate in future.



Society
Targeting
Overuse of
Pesticides

THE GYPSY MOTH POSES NO THREAT TO B.C. TREES

The gypsy moth is known as the "GANGRENE MOTH" because it only attacks trees which are already stressed, diseased and dying.

- 1) "Based on the amount of movement of people and goods between countries in this modern era, it is highly likely that both the Asian and European gypsy moth have been introduced into Vancouver on at least several occasions. The fact is that they are not established in the area indicates that it is more than likely that they would not become established."
Dr. Donald Lee Dahlsten, Professor of Entomology,
University of California at Berkeley
- 2) "Gypsy moth does not occur in Britain or Scandinavia, areas that have climates most similar to Vancouver and many areas of B.C."
"..gypsy moth is not present in coniferous forests typical of British Columbian forests."
Dr. Judith Myers, Professor of Entomology,
University of British Columbia
- 3) "It is strange that cargo ships have been coming here from Asia for many years but only recently has the gypsy moth been given attention. Why haven't there been infestations already if we have a vulnerable forest?"
Dr. Kenneth Graham, Professor, Forest Entomology,
University of British Columbia
- 4) "I am opposed to the current gypsy moth spray program for a number of reasons of which the following are primary: The originally stated purpose of the spray program was eradication. That is impossible in practice because the moth is now so widely spread in North America. The actual purpose is abatement."
Dr. Bryan P. Beirne, Professor, Pest Management,
Simon Fraser University
- 5) "..There is little evidence to demonstrate that what is being done is in fact effective in dealing with the problem. The gypsy moth prefer broadleaf trees such as oaks and willows. The aerial spraying program will only provide a short term solution and therefore repeated spraying will be required."
Dr. Manfred Mackauer, Professor, Pest Management,
Simon Fraser University

Our Case Against Moth Spraying

- 6) "...If left untreated, gypsy moth populations will soon collapse of their own accord and leave little if any lasting damage."

Dr. Stanley Wecker, Professor of Biology,
City College, New York

- 7) "I am unaware of the fact that gypsy moths (of our eastern variety) will eat coniferous needles. What they will do is "barber" the new growth needles, biting them off near the tip but unable to digest them, spit them out."

Dr. D.J. Ecobichon, Professor, McGill University

- 8) "I believe that Russian ships have been discharging moths for many years into Vancouver, and they just have not been able to reproduce here."

Jorma Jyrkkanen, Environmental Consultant,
Terrace, B.C.

- 9) "Ministry cancels spraying programs for gypsy moths and budworm - In the past 10 years of research into the effects of gypsy moth in Ontario, the Ministry of Natural Resources and Forestry Canada have observed that this insect has had very little impact on forests. Tree mortality in infested stands has been similar to natural mortality in forest stands."

News release from the Ontario Ministry of
Natural Resources, dated February 13, 1992

- 10) "Our recommendation for the control of the gypsy moth, is not to use any treatment at all."

Common-Sense Pest Control, The Taunton Press 1991
Dr. William Olkowski, Pest Management Consultant

- 11) "...the direct impact of an established gypsy moth population on B.C.'s natural resources would likely be small." (page 3)

"Apart from the susceptible Garry oak stands and perhaps aspen (especially in early years) B.C. forests should be quite resistant to gypsy moth. Outbreaks only occur in stands composed of the most favoured hosts, and particularly in open, stressed stands of these trees. As well, a substantial component of the complex of natural enemies of the gypsy moth already occurs in B.C. including predators, parasitoids and disease." (page 33)

"There was unanimity among most stakeholders that gypsy moth is considered primarily a "people pest" and does not pose a serious forest health threat." (page 35)

"In the years since gypsy moth has become established, (in Ontario) no Ontario shipments of logs, Christmas trees or nursery stock have ever been denied access to U.S. markets because of detected gypsy moth life stages." (page 39)

A Risk Assessment of European Gypsy Moth in
British Columbia (Ministry of Forests 1994)

- 12) "As an entomologist, it is my opinion that the 1994 Victoria/Saanich "eradication" program is not only impractical but also economically unsound. The presence of this species in Eastern Canada, the lower Mainland, and various U.S. states makes "eradication" an exercise in futility. Without an effective quarantine control program aimed at B.C. borders and between Vancouver Island and the United States and Canadian mainland, prevention of the introduction of European and Asian moths by transportation modes will be next to impossible."

Dr. Celso E. Mendoza,
Toxicologist & Entomologist

- 13) "Gypsy moth has been established in North America since its introduction in 1868. Its larvae feed on a very wide variety of plants - some 78 species of deciduous and coniferous trees in the wild and a further 39 under laboratory conditions. It can therefore exploit a wide range of habitats and successfully resist eradication attempts. Control, rather than eradication, is a more attainable goal, and requires less drastic measures."
"Alternative methods for control of Gypsy Moth which are specific to that insect are available, namely the use of traps baited with sex-attractant pheromones, and these should be the methods of choice."

Dr. Rory P. Finegan, Biologist,
University of Victoria

- 14) "The gypsy moth tends to attack areas of the forest that are not especially healthy, and there is evidence that the moth may actually do some good."
"..The gypsy moth isn't a pest..indeed, if the gypsy moth population gets any lower, I may "import" some from neighboring valleys.."

Daniel Smiley, Biologist, commenting on his observations of gypsy moths on his 7,500 acre resort estate in Mohonk Lake, New York.

THE EFFECT OF MOTH SPRAYING ON HUMAN HEALTH

- 15) "Bacillus thuringiensis - A species that is an insect pathogen and that has been implicated in human and mammalian infections."
Stedman's Medical Dictionary (latest edition)
- 16) "Bacillus thuringiensis toxin (Btk) can be fatal to people using anti-ulcer drugs."
Dr. Joseph E. Cummins, Assoc. Professor
University of Western Ontario
- 17) "Foray 48B contains compounds additional to B.t. that are potentially harmful to man and animals, such as sodium hydroxide which is on an EPA hazards list."
Dr. Bryan P. Beirne, Professor Emeritus
Simon Fraser University
- 18) A nine-year old boy suffered a life-threatening reaction when his yard was sprayed with Foray 48B. He had a rash over his entire body, including his face, and a temperature of 103 degrees F. He was vomiting and had diarrhea and his skin was non-peeling. A blood test confirmed that B.t. had cultured in his system. The B.t. culture was resistant to Penicillin and several other antibiotics.
The boy was hospitalized for 5 days then released. A week later he suffered a relapse, and was readmitted to hospital for an additional 2 days.
The symptoms listed in the New Jersey Department of Health report include a "temperature of 103 degrees F lasting for 5 days, bilateral conjunctiva-injected, red, dark papillae tongue, skin peeling on palms and soles of feet, scaly and erythematous, rash on entire body."
From an EPA access to information request
Re an "Unreasonable Adverse Effect Incident"
involving Foray 48B.
- 19) "The reported case is of a woman of unspecified age, apparently well and without significant past illness, who was accidentally sprayed with Thuricide (a B.t. formulation) on 25 April 1988. She immediately experienced burning, itching, and swelling of her face and upper chest. Over the next four days, she developed a febrile illness, became delirious, and the day of admission to hospital apparently had a generalized seizure."
From Dr. Andrew Jin's report: "Btk as a Human Pathogen" prepared for the Vancouver Health Department, September 20, 1988

Our Case Against Moth Spraying

- 20) "When bacterial (B.t.) spores are inhaled or rubbed into the skin, they become "foreign proteins" and can cause serious allergic reactions in certain susceptible individuals."
Dr. William Olkowski, Pest Management Consultant
Common-Sense Pest Control, The Taunton Press 1991
- 21) "The three reported cases in the Oregon Study have clearly isolated and identified the organism B.t.k from these patients. The one immunocompromised patient who subsequently died because of the infection was found to be septicemic and suffered pneumonitis."
"..B.t.k may be pathogenic to sheep fed corn with the formulation."
"Under American F.D.A. rules these "inerts" (the non-active ingredients in pesticides) may in fact be hazardous chemical wastes. (Hazardous Waste News #258, November 6, 1991, page 8)"
Dr. Donald Cameron, Neurologist
North Vancouver
- 22) "..the Oregon Health Division received a report from a health care provider about a patient who apparently had an allergic reaction to Foray 48B used during the Asian gypsy moth spray program in north Portland." (1992)
"The individual's initial symptoms included difficulty breathing, chest tightness, itching in the mouth and throat, nasal congestion and plugging of the ears, and hoarseness. These symptoms were followed within 45 minutes by upper body joint pain and a variety of neurologic symptoms. According to the individual's physician, the reported symptoms were typical of previous allergic reactions."
Dr. Michael Heumann, Epidemiologist,
Oregon Health Division to Novo Nordisk
- 23) "In New Brunswick, a poorly documented incident of an aerial overspray of two elderly people by a B.t. formulation raised concerns about post exposure, nonspecific health effects including dermal rash, hive-like wheals, increased incidence of respiratory infections and general malaise."
Dr. D.J. Ecobichon, Professor of Toxicology,
McGill University

New Brunswick designates buffer zones to protect homes from aerial spraying. The buffer zone for Bt is 500 feet from the nearest human habitation.

Our Case Against Moth Spraying

- 24) "After reviewing the literature, I believe there is a statistically significant risk of serious health consequences to a minority of the population."
"Do we have to wait for an autopsy before we have proof?"
Dr. Art Edamura, Preventive Medicine Centre
Vancouver
- 25a) "In the product monolog, there is a precaution to avoid inhalation or contact with eyes or open wounds."
"Another product monolog...states that if someone has already developed an allergy to one of the components of Foray 48B or has asthma of a type that could be initiated by irritants such as tobacco smoke or pollens, then this patient could be affected by exposure to even small quantities of Foray 48B."
Dr. Jeremy Road, Respirologist,
University of British Columbia
- 25b) B.t. can cause irritation or inflammation.
U.S. Department of Agriculture 1995 citing
U.S. Environmental Protection Agency (EPA) 1986
- 26) "Until the scientific community agrees unanimously that aerial spraying is harmless to respiratory health, the Lung Association will continue to say "no" to the practice."
The B.C. Lung Association
- 27) "The British Columbia Society of Allergists and Immunologists has gone on record opposing the use of the bacterial insecticide (B.t.) in the use against the gypsy moth. I would like to align myself with that position."
Dr. R.M. Schaffrin, Asthma & Allergy Specialist
Vancouver
- 28) "The concern of the Association is that there is inadequate research into the short and long term health effects of this product.(B.t.k.)"
The Association of Naturopathic Physicians
of British Columbia
- 29) "Foray 48B, the bacterial insecticide, is causing weakness in the pancreas, lungs, and liver. This noxious substance is producing symptoms that are related to the above organs."
"The most common symptoms that I have seen are a pressure feeling on the chest or chest pain, headaches, nausea, sore throat, coughing, chilliness, diarrhea, and drowsiness. Long term effects are, of course, unknown but when major organs and glands are thrown into disarray and malfunction for months or years, life threatening illness could result."
Grant Smith, Certified Acupuncturist
State of California #530

Our Case Against Moth Spraying

- 30) "However, I am now in way over my head. As the attached letter from Dr.Cameron, a neurologist, shows, while there is nothing in the medical literature, there may be individual sensitivities. This would make an aerial spray in a populated area a problem. Since I cannot review this on my own, I would like if you would refer this to the Provincial Medical Advisory Committee or contact with somebody to do a complete evaluation. This is a plea for help as I told Dr.Cameron I am more concerned with airplanes spraying in a built-up area than I am with the Bacillus. However, Dr.Cameron is using a scatter-gun approach to his letter - if he is right, we should be more concerned, and, if he is wrong, the facts should be set out. Can you help - please!"
Dr. F.J. Blatherwick, Vancouver Health Officer
to the Provincial Health Officer, March 9, 1992
(one month later half-a-million people were
subjected to the first in a series of 4 aerial
sprayings, and in many cases 4 ground sprayings
as well)
- 31) "In this current case the Board believes that the communications team should have included medical expertise provided by Agriculture Canada to support their claims of safety."
And, referring to the Health Study which was funded by Agriculture Canada; "...there was no planned surveillance program and one had to be hastily put together."
Metropolitan Board of Health of Greater
Vancouver, June 25, 1992
- 32) "Pesticides should be banned. There is nowhere to hide from those who have the power to control and to kill nature. Aerial spraying of chemicals, insecticides or herbicides is a terrorism."
Dr. June Irwin, Medical Specialist
Pointe-Claire, Quebec
- 33) "Spreading of pesticides from aircraft is forbidden."
Swedish Code of Statutes, Ordinance on
Pesticides, Section 13, 21 November 1985
- 34) A healthy 18 year old agriculture worker accidentally splashed Dipel (a B.t. formulation) into his right eye. He immediately developed a conjunctivitis. Three days of treatment with an antibiotic ointment was not effective. He then began treatment with a corticosteroid ointment and after 7 days of this he developed a corneal ulcer. Cultures of the corneal ulcer produced B.t.k. cells, the same as those in the Dipel.
Corneal ulcer caused by a biological insecticide
J.R. Samples & H. Buettner, American Journal of
Ophthalmology, 95 (2) February 1983

- 35) A healthy 24 year old laboratory worker accidentally stuck a needle contaminated with B.t. and Acinetobacter into the webspace between his third and fourth fingers. Within 2 hours the finger became painful and 4 hours after the accident he admitted himself to an emergency department. The finger was discoloured and the hand was swollen. Despite antibiotic therapy lymphangitis developed, reaching the shoulder and the patient remained toxic. Over a finger joint about 5 cm from the inoculation site, B.t. cells were grown. He recovered after 5 days.

R.E. Warren, D. Rubenstein et al
The Lancet, March 24, 1984

Studies in Support of EPA Registration of Foray 48B, 1990

- 36) "Gross pathological examination revealed mottled lungs, sometimes dark, the number of animals affected was greater in Group 2 where the majority of animals showed this finding. Results obtained from the analyses showed that B.t.k. could be isolated from lung samples which indicated that the formulation was respirable. The results also showed that B.t.k. was poorly eliminated from the rat lung over a period of 28 days." (at which time the animals were sacrificed.)

Acute Inhalation Toxicity Study in Rats
Oshodi, R.O. et al, Inveresk Research Internat.

- 37) "A group of 10 mice, 5 males and 5 females was treated with inactivated (autoclaved) test material in an amount which would be comparable to 10⁸ CFU per animal. The observation period was 7 days following treatment. Mortality was seen on day 2 at the 10⁸ CFU per animal dose." (4 out of 5 males and 3 out of 5 females died)

Screen for pathogenicity and Toxicity of Strain
by Injection of Mice, Novo Nordisk, Denmark

- 38a) Four of five rats died within 23 hours. Edema and hemorrhages were seen in the pyloric part of the stomach in all rats; two rats had enlarged spleens; the rat that was killed had a necrotic tail and extensive oedema and hemorrhages on the hindquarters stretching down on the hind legs.

Acute Intravenous Toxicity/Pathogenicity Study
on 5 rats, Berg, N., Novo Nordisk A/S, Denmark

- 38b) "Up to 3 weeks after the injection of the test organism a treatment related unspecific reactive hepatitis was seen in the treated rats."

Acute Intravenous Toxicity/Pathogenicity Study
on 32 rats, Berg, N., Novo Nordisk A/S, Denmark

- 39) Eye irritation studies 91504 and 91505 showed that Foray 48B may be considered a "moderate" irritant. Study 90135 showed it to be a "substantial" eye irritant.

Eye Irritation Study in Rabbits with the End
Product Foray 48B, 1991, Berg, N., Novo Nordisk

- 40) "Prominent in-life observations included activity decrease, alopecia, piloerection and polyuria." (in other words - the rat's hair was standing on end, as in a state of shock, and falling out either completely or partially. The increased frequency in urination indicates the body's way of eliminating toxins).
Acute Inhalation Toxicity Study in Rats (1991)
with Foray 76B, Holbert, M.S., Stillmeadow, Inc.
- 41) "Subcutaneous injection of B.t. led to alteration in the immunological reactivity of the test animals of both the specific and nonspecific type, manifested by increased sensitization of peritoneal macrophages."
Changes in Cell Mediated Reactivity of Guinea Pigs during Sensitization with B.t.
V.P. Padalkin et al, Moscow Journal of Microbiology #6 (1985)
- 42) A study of 1,043 vineyard workers who were exposed to 16 pesticides over a period of 294 days found that in 10 of the 25 cases of skin rash, B.t. had been sprayed on the vineyard within 14 days of the rash occurrence. No other chemical was found to have been applied to the vineyards within 14 days of the rash occurrence on more than five occasions.
Winter, C.K. and P.H. Kurtz, September 1985
Bulletin of Environ.Contam.& Toxic. Vol.35, No.3
- 43) "Bacterial preparations such as Entobakterin (a B.t. preparation) are being increasingly used in agriculture in the USSR."
"..continued inhalation of the material by white rats had unfavourable lung effects, which are described.
This suggests that workers applying such materials should be protected."
"There were also allergic effects on laboratory animals in contact with the material."
The Use of Bacterial Insecticides Needs Care
V.I. Murza et al, Zashchita Rasteni #5
- 44) B.t. due to its mutagenic potential, may be hazardous to humans and other mammals. Chromosomes were found to be the primary target and in some cases the DNA system became inhibited. B.t. has an action which breaks the cell membrane and research continues on its possible use in studies on cancer cells. Thus, it has the potential to damage all cells. The authors end the study with the following warning:
"The data conclusively indicate the need for caution against large scale use of microbial insecticides in crop fields."
Cytogenetic Hazards from Agricultural Chemicals
C.B.S.R. Sharma et al, Mutation Research #46

- 45) On August 14, 1992 a laboratory reported that a group of workers who were out in a forest when it was sprayed with Foray 48B experienced burning throats and skin irritations. (HI Log #26521)
The National Pesticide Telecommunications
Network, Health Sciences Center, Texas Tech Univ.
- 46) "B.t.k. has been used extensively as an insect biocide but has not been adequately studied in neutropenic (immunosuppressed) animals or characterized as to its risk for neutropenic patients."
"Lethality in neutropenic mice receiving B.t. was 50%"
"Virtually all non-neutropenic mice survived challenge.."
"Further studies are warranted to characterize the pathogenicity of B.t. and exclude a possible role in human disease."
R.E. Bryant et al, Health Sciences University
Portland, Oregon (1993)
- 47) During the 1986 gypsy moth spraying of Lane County Oregon, the personal B.t. exposure monitoring results were as follows;
Breathing zone (BZ) samples for personnel involved in the spraying indicated B.t. exposure ranged from 0 to 11,000 Colony Forming Units per cubic meter of air. (CFU/m³)

General Public BZ samples ranged from 0 to 1600 CFU/m³. A grocery store clerk and a service station attendant, who were not in direct contact with the spray had positive B.t. exposure of 1000, and 1600 CFU/m³ respectively.

General area air monitoring results for B.t. include 50, 500, and 800 CFU/m³ at restaurant locations within the spray area, and indicate the general public exposure potential. A sample result of 4200 CFU/m³ collected at a heavily trafficked road intersection immediately following the spray also reflects public exposure potential.

"Air sampling results for this project indicate that microbial insecticides of this type (B.t.k.) can be transmitted throughout the environment. Future sampling efforts and results should indicate the prominence and proliferation these organisms can gain in the environment after such wide scale application.

Therefore, careful consideration should be given prior to the deliberate release of genetically modified microorganisms.(such as B.t.k.) The public health, ecological and occupational health consequences must be carefully explored and evaluated before these novel organisms are used."

The National Institute for Occupational Safety and Health (NIOSH) Health Hazard Evaluation Report, Gypsy moth control project, Oregon 1986

Is there a Military Involvement in B.t. Spraying?

48) Genetic Engineering, Biological Warfare and the Military

"We believe that perhaps the greatest potential for bio-hazards involving alterations of micro-organisms relates to possible military applications.

We believe strongly that construction of genetically altered micro-organisms for any military purpose should be expressly prohibited by International Treaty, and we urge that such prohibitions be agreed upon as expeditiously as possible."
Raymond Zilinskas, Politics & the Life Sciences,
Volume 2, No.1. August, 1983

49) "Other agencies such as the Research Branch of Agriculture Canada and the Department of National Defence will assume key roles also."

R.F. Deboo, B.C. Forest Service, Agriculture
Canada Gypsy Moth Strategy Session, Van. 1985

50) "There have always been persistent rumours of a military involvement in the aerial spraying of Vancouver and area residents. Yet, when Agriculture Canada officials were questioned, under oath, at the Environmental Appeal Board Hearing in March, 1993 as to whether or not you were an active member of the Canadian Armed Forces they denied any knowledge of this. We would like to take this opportunity to ask, why you, an army doctor, is involved in a surveillance program which monitors the health reactions of a civilian population to pesticide spraying.?"

Letter to Lt.Colonel C.J. Cook, M.D.
From the Society Targeting Overuse of Pesticides
Dated February 18, 1994 (to-date we have not
received a reply to our letter)

51) "ISLANDERS HIT BY SECRET MILITARY SPRAYING"

"At least five Salt spring residents have suffered adverse health reactions after two unmarked Canadian Forces helicopters spent an unlucky Friday, March 13 spraying an unknown substance over the island."

"The symptoms match those of B.t.k. poisoning. A weeklong investigation by Green Islands has revealed that Canadian Forces Sea Kings have been flying purported "training missions" to prepare their pilots for an intensive B.t.k. spraying campaign over densely populated neighborhoods in Vancouver, the Gulf Islands and lower B.C. mainland."

Green Islands Press Release, March 22, 1992

- 52) "Just what was sprayed over Saltspring Island on March 13 and the two days prior to that date? Who authorized it and why?"
"Minister, enough con games. Human health is at risk here."
"As you know, your department is trying to steamroll the experimental spraying of B.t. on the residents of much of the City of Vancouver, supposedly to prevent an outbreak of Asian gypsy moth. You are probably aware that Vancouver residents do not appreciate their being used as guinea pigs by promoters of this scheme."
Jim Fulton, M.P. to the Minister of Agriculture
March 30, 1992
- 53) The risk of developing antibodies to the spray bacteria increases not only with the degree of exposure, but the chronology of exposure. The highest level of B.t.k. antibodies were found in workers who had been exposed for two consecutive years.
B.C. Ministry of Health 1992
citing Valero & Letarte, 1989
- 54) Industrial reports indicate that B.t.k. can be cultured from various superficial sites on exposed humans and that antibodies to B.t.k. are greater in individuals in areas sprayed with B.t.k. than in individuals in untreated areas.
Abbott Labs, November 1992
- 55a) Endotoxins are bacterial toxins which contaminate the air and make people ill. Mold can also cause a number of health reactions including respiratory problems.
Health Canada & Canada Mortgage & Housing Corp.
Study of Molds and other contaminants
- 55b) One litre of Foray 48B contains approximately 25 grams of delta endotoxin. And, Foray 48B contains viable yeasts and molds.
Novo Nordisk re Foray 48B, March 26, 1992
- 56) "The argument about the safety of B.t.k. because it occurs naturally is spurious. The organism of tetanus, as well as the pus organism *Bacillus pyocyaneus* (*pseudomonas aeruginosa*) are naturally occurring too."
Dr. Kenneth Graham, Professor Emeritus,
Forest Entomology, U.B.C.
- 57) "...concerning the use of B.t. formulations for gypsy moth (or spruce budworm) etc., the Province of New Brunswick still has in force a setback zone of 150 metres (not 75 metres) from human habitation for all formulations."
Dr. D.J. Ecobichon, Professor of Toxicology,
McGill University

- 58) "Evidence has been inadequate to show the safety of Foray 48B for spraying on human populations. In my personal and professional opinion, mass spraying programs for gypsy moth eradication cannot be justified and the potential risks to human populations and the environment do not justify an aerial spraying program of the magnitude proposed by Agriculture Canada in the Saanich/Victoria area.
As a toxicologist, I would prefer to err on the side of safety where there is any doubt as to the safety of the urban spraying of Btk. Given recent studies, I have considerable doubt as to its safety and its efficacy to "eradicate" the gypsy moth."
Dr. Celso E. Mendoza, Toxicologist and Entomologist
- 59) "There is a rich literature on the harmful effects on animal and human health of B.t. formulations."
"The use of aerial spray techniques is inappropriate in urban areas where it will expose large numbers of people to a bacterial fallout."
(the proponents of the spray program) "...may in mistaken belief in the harmlessness to human and environmental health of the spray materials to be used, disregarding or deemphasizing evidence to the contrary, in future years become subject to lawsuits of the sort that now beset blood transfusion workers who in the past disregarded evidence that the blood they were transfusing might be contaminated by the AIDS virus."
Dr. R.P. Finegan, Biologist,
University of Victoria
- 60) "There is always a possibility that allergic or asthmatic people may react to minute quantities of any substance. This is the reason for saying in reference to B.t. that it may not be 100% safe for a small group of people. If your family members are chemically sensitive, they may react to B.t. use around the house."
Health Protection Branch
Health and Welfare Canada, April 5, 1993
- 61) "Serious infections caused by organisms of the genus Bacillus developed in seven patients."
"At least two patients with no underlying illness and one with chronic asthma who was receiving prednisone therapy, also had fatal Bacillus infections develop."
Serious Infections from Bacillus sp.
Carmelita U. Tuazon et al, JAMA Vol.241, #11

- 62) "Although one cannot extrapolate directly to humans, these results indicate that B.t.k. is not "safe" in rats. That is there is evidence of lung injury on exposure to it. These results also indicate that B.t.k. is respirable. I would be surprised if any ethics committee appointed to review whether this product can be safely tested in humans, would approve it for testing in humans based on the results of this study in rats."

A Review of the Inveresk Research International
Acute Inhalation Study on Rats

Dr. Jeremy Road, Respiriologist, U.B.C.

- 63) In 1992, ground spray workers in Vancouver suffered from a number of health complaints including dry, itchy skin; chapped lips; red, itchy, burning, puffy eyes; headache; dry, sore throat; "runny" nose; stuffy sinuses; cough and tightness in chest; nausea and diarrhea.

Twenty-four physicians in the spray area took a nasal swab sample from the first 5 patients to walk into their office. The results showed that more than 11% of the exposed people were carrying B.t. in their tissues.

Noble M. et al, 1992

- 64) Of the 251 individuals who reported health complaints, over 40% were consistent with eye/nose/throat irritation or allergic rhinitis (hayfever). Viral gastroenteritis symptoms ("intestinal flu") were reported by 14%, 9% reported exacerbated asthma, 8% exacerbated allergies and 7% allergic skin reactions such as hives or swelling. Rashes occurred in 45 individuals (18%). Other symptoms were reported by 29%. Six individuals received treatment in emergency rooms, five for allergic skin reactions and one for asthma.

"Reducing the exposure of populatons to spray would be one method of eliminating any possibility of health effects...preventing the organisms from reaching the North America mainland would eliminate the need for future spray programs. Rigorous efforts in this area should be continued."

"Anecdotal reports indicate that the spray program was potentially distracting to drivers...Sun glare from spray on the windshields caused temporary risk to motorists, who had to pull off the highway to clean their windows. Low flying helicopters were potentially distracting to drivers. These safety issues should be considered as additional public health issues."

Washington State Department of Health
Report of Health Surveillance Activities
Asian Gypsy Moth Control Program, March 1993

Bacillus thuringiensis/Cereus/Anthracis

The above mentioned bacteria are so closely related they are interchangeable.

- 65) "As some of you know, although B.thuringiensis and B.anthraxis were assigned to varietal status (Bacillus cereus var. thuringiensis and Bacillus cereus var. anthracis) by Smith, Gordon & Clark (1952) and later by Gordon, Haynes & Pang (1973), Bergey's Manual still recognizes B.thuringiensis and B.anthraxis as separate species.

When Dr.Smith agreed to write the section on the genus Bacillus for the sixth edition of the Manual he asked Dr.Breed, Editor of the Manual, for his advice on the presentation of these two species. Dr.Breed said that because B.anthraxis had great historical and medical importance and B.thuringiensis was of economic importance, he would advise their being recognized as separate species. Who says the definition of a species is not dependent on the opinion of the editor!

In the two succeeding editions of the Manual, I unsuccessfully opposed this recognition because, as I have said, I firmly believe that a species should be so described that the name of a strain cannot change from that of one species to another because of its loss of an unstable property. I should like to see B.thuringiensis follow B.mycooides and become B.cereus."

Dr. Ruth E. Gordon, Microbiologist,
Waksman Institute of Microbiology,
Rutgers University

- 66) "The present study demonstrated that B.t. produces a hemolysin identical with that produced by B.cereus, a toxigenic organism of food poisoning. Therefore spraying of living cells of B.t. as an insecticide should be re-examined with respect to its safety for humans."

T. Honda et al, FEMS Microbiology Letters 79 '91

- 67) Three family members who ate honey on Christmas day developed an illness characterized by vomiting and diarrhea. A sample of the honey was provided to the Chief of Microbiology at the University of Missouri who identified it as Bacillus cereus. The Centers for Disease Control subsequently received the isolate for confirmation and determined that it was B.t. and not B.cereus.

Our Case Against Moth Spraying

"B.t. is very closely related to B.cereus, differing mainly by the ability of B.t. to produce a crystalline toxin which acts as an insecticide."

"Microbiologists at FDA have demonstrated that 9 of 11 commercially available strains of B.t. tested to date elaborated the diarrhea-producing enterotoxin associated with B.cereus food poisoning."

"B.t. is used widely and may contaminate many food sources. This raises the possibility that it may be an important foodborne pathogen. Since the illness is likely to resemble B.cereus food poisoning and have a short incubation period and short duration, few outbreaks are likely to be reported or investigated fully."

New Jersey Division of Disease Control
Via N.J. Beekeepers Association News

- 68) "Although it has not been specifically linked with food poisoning, the practice of applying viable preparations of B.t. to food crops as an insecticide by both home gardeners and commercial growers may present a special hazard.

The ability of B.t. cultures to induce fluid accumulation in the ligated rabbit ileum (Spira and Goepfert 1972) and to produce diarrhea in monkeys (Bennett and Harmon 1986) plus the easily demonstrable presence of the diarrheal antigen in culture fluids of most B.t. strains with the microslide gel diffusion test (Bennett and Harmon 1986) raise doubt about the safety of this practice.

Certainly, thorough rinsing of leafy vegetables that have been treated with B.t. is a minimal precaution: there is no published information to suggest that B.t. is less capable of proliferating in foods than are the enterotoxigenic B.cereus strains. To the contrary, the two species behave similarly in susceptible foods at ordinary foodholding temperatures."

Dr. Reginald Bennett, Microbiologist,
U.S. Food and Drug Administration (FDA)

- 69) "We suggest that isolates of B.cereus from cases of soft-tissue infection in countries where B.t. is widely used be examined for parasporal inclusions to see if natural B.t. infections are being overlooked."
- "The possibility of transfer of toxigenic plasmids from B.t. to B.cereus in the environment is raised. Indeed the species may need to be redefined."

R.E. Warren et al, The Lancet Medical Journal,
March 24, 1994

- 70) "Bacillus cereus is primarily associated with foodborne gastro-enteritis due to pre-formed toxin. Even so, its role as a pathogen responsible for various sometimes severe, local and systemic infections is being increasingly recognized. It is most commonly implicated in fulminant infections of the eye which include endophthalmitis and panophthalmitis, wound infections, septicaemia, endocarditis, meningitis, osteomyelitis, septic arthritis and prosthetic joint infections, all associated with morbidity and mortality."
Bacillus Cereus Meningitis In Two Neurosurgical Patients, D.Barrie et al, J. of Infection 25, '92
- 71) "Both B.t. and B.sphaericus are entomopathogens which can cause disease in man."
F.A. Drobniowski et al
Journal of Applied Bacteriology, Vol.76 (1994)
- 72) B.t. has been reported to be a mammalian pathogen in one case where it was identified as the causal agent in a fatal case of bovine mastitis.
Gordon, R.E., Some Taxonomic Observations on the Genus Bacillus, 1977.
- 73) "Thus B.t. can easily take up an anthrax plasmid and create anthrax related disease in mammals. Such plasmid transfers readily take place in nature. It is grotesque and improper for people who claim expert knowledge to maintain that plasmid exchanges are out of the question. Indeed, government bureaucrats and university administrators are clearly showing a common malady, scientific imperialism. They are using their positions to promote views that are contrary to well established facts and palming off such views on poorly informed members of the public."
Dr. Joseph E. Cummins, Professor (Genetics)
University of Western Ontario
- 74) One of the oldest known diseases of animals and man, anthrax was first mentioned by Moses in the Old Testament (Exodus 9:9). In recent times, an outbreak of anthrax in Russia killed 500 people in a matter of hours.
The New York Times, March 18, 1980
- 75) There has even been a case, described by scientists as "surprising" of successful plasmid transfer between B.t. and the distantly related species E.coli.
Trieu-Cuot et al., 1987, FEMS Microbiol.Lett.48

- 76) A Health Department investigation found that an outbreak of Legionnaire's disease in Burnaby which claimed two lives in June, 1993 was caused by bacteria multiplying in a hot tub.

"There's never been another incident of a hot tub user contracting Legionnaire's disease before. So, why did this tragedy suddenly occur in Burnaby last summer?"

A possible explanation is the aerial spraying with the bacterial pesticide B.t. which took place on June 9, just one day prior to the victims of this deadly disease falling ill.

The hot tub was located only four miles from the spray zone and B.t. when aeriually sprayed drifts many miles from point of application. It is also well known for its mutagenic tendencies.

Could B.t. have drifted into the hot tub on that fateful day in June and mutated?"

Chemical Drift Theory Cited

J. Friesen, Burnaby Now, November 28, 1993

B.t. and Streptococcus Bacteria

- 77) "Acceptable levels of Streptococci, Staphylococcus, Coliform bacteria and Salmonella sp. are allowed in B.t. formulations."

Dr. Roy Ellis, B.T.K. January 1991

Prairie Pest Management

- 78) "According to Agriculture Canada this contaminant (streptococcus) represented either non-or low-order pathogenicity, and exposure under typical forestry-use applications would not likely produce adverse health effects." (But what about city-use applications?)

Dr. Roy Ellis, B.T.K., January 1991

Prairie Pest Management

- 79) B.t. spray programs in the United States and Canada have been repeatedly put on hold due to the discovery of high levels of Streptococcus bacteria. In 1987 this happened in Ontario. "Ontario has sent samples of its B.t. to the Ministry of Health Laboratories, and anticipates results this week."

Ontario Ministry of Natural Resources

News Release, May 15, 1987

- 80) Researchers at the Centres for Disease Control in Atlanta have cautioned that Group A Streptococcus infections have re-emerged as a public-health problem. Streptococcus Type A has generated itself from a much more common streptococcus bacteria that is present in the throats of 10 percent of the population. This demonstrates how easily species of bacteria through the free exchange of genetic information can mutate into "super-germs."

In May 1994 an outbreak of Strep A in Britain killed 11 people, while others lost limbs to the disease. In March 1995 there were 4 deaths in Quebec from Strep A within a 2 week period. The deaths of an adult mother and daughter in Montreal within one week from Strep A has led health officials to believe that the disease may be contagious.

B.t. is a live bacteria and is extremely prone to mutation. It stands to reason, that this type of mutagenic pathogen, found to be contaminated by high levels of Streptococcus in the past, should not be sprayed anywhere near human populations. Especially, since deadly bacterial infections for which there is no cure, are on the rise.

- 81) B.t.k. produces a crystal that dissolves in the alkaline gut of moth larvae and causes disease. As the human stomach is acidic (so the theory goes) it is, therefore, unaffected if B.t.k. is ingested.

Unfortunately, there is a serious flaw in this line of reasoning as our acidity is not a constant. We can, when we have a cold or flu, or when we are taking antacids or other ulcer medications lose acidity very rapidly thus becoming just as vulnerable to the B.t.k. toxin as the moth.

However, even those who do not have a cold or flu, and are not taking stomach medications may also be at risk. The Canadian Journal of Health & Nutrition-Alive, (February 1995) contained a report about researchers who believe that the main cause of chronic fatigue, which is now reaching pandemic proportions, is lack of acidity. For some reason we are becoming more alkaline. (like the moth!)

- 82a) "...those with a specific absence or reduction of gastric acidity following gastric surgery, antacid or ulcer-healing medication could face a risk." (from B.t.k.)
Dr. F.A. Drobniowski,
Journal of Applied Bacteriology, 1994, Volume 76
- 82b) "In my opinion, ingesting unwashed treated produce could be fatal to humans with reduced gastric acidity."
"Bacillus thuringiensis toxin (B.t.k.) can be fatal to people using anti-ulcer drugs."
Dr. Joseph E. Cummins, Professor (Genetics)
University of Western Ontario
- 83) "Nobody likes to be sprayed by government with anything at any time."
Dr. John Blatherwick, Vancouver Health Officer
to Agriculture Canada, January 4, 1994

Health Reactions Reported After Foray 48B Spraying.

- 84) "The percentage of sixty-two people reporting allergies to the spray was 22.6%; almost dying, 3.2%; experiencing anaphylactic shock from exposure, 1.6%; brain & nervous system disorders, 56.5% digestive disorders, 77.4%; emotional reactions, 64.5% respiratory tract difficulties, 114.5%; other symptoms, 30.6%; skin problems 17.7%; systemic infection, 8.1%; very sick with unusual cold/flu symptoms, 71%."

Concerning Human and Environmental effects
of Exposure to Foray 48B.
Victoria/Saanich 1993-1994
The Ecological Health Alliance

- 85) Following every Foray 48B spraying there are literally hundreds of reported health reactions. For example, during the 1994 spraying of Saanich, 290 such incidents were recorded by the Ecological Health Alliance.

The few case histories which follow are typical of the type of calls that have been received by environmental health societies in the lower mainland and Vancouver Island since the spraying began in 1992.

- (a) A five-year old child who had been aurally sprayed with Foray 48B as she ran towards the family car immediately began to vomit. She had never vomited before. The incident was reported to the Burnaby Health Officer by the attending physician and subsequently to Dr. Rick Mathias (Agriculture Canada's medical spokesperson) who stated that the health reaction was not spray related.
Health Action Network Society
- (b) A two-year old child who suffered a seizure and stopped breathing after Foray 48B was sprayed 1 kilometer from his Saanich home in 1993, was denied appropriate blood analysis and culture for B.t.k.
Ecological Health Alliance
- (c) A seven-year old child suffered sudden onset asthma after being caught in the 1992 Vancouver spraying.
Kristen J. Eirikson, Attorney
- (d) A 36-year old woman, in excellent health, who has worked for B.C. Tel for 18 years spent a great deal of time in Stanley Park during the massive spraying of 1992. She began to experience severe migraine headaches, depression, and neurological symptoms such as extreme dizziness, numbness and disorientation. Her family physician referred her to a number of specialists and she was eventually hospitalized. Her symptoms improved after approximately 6 months but recurred again in April, 1993 when she was exposed to the spraying of Burnaby.
Society Targeting Overuse of Pesticides

Our Case Against Moth Spraying

- (e) A 28-year old man, in excellent health, who was caught in a direct overspray while on a barge in Tacoma in 1992 experienced severe respiratory problems which lasted approximately 6 months. Several medical specialists were consulted.

Society Targeting Overuse of Pesticides

- (f) A North Vancouver resident with multiple chemical sensitivities left her home while it was being aerielly sprayed in 1992. When she attempted to return to North Vancouver several days later she suffered a life-threatening reaction while travelling through the heavily sprayed Stanley Park area.

This individual is convinced that she would have died had she remained in her home while it was being sprayed. The incident was reported to her physician, to Agriculture Canada, and with her permission, her medical records were made available to Dr. Rick Mathias who, to-date, has never contacted her.

Society Targeting Overuse of Pesticides

- (g) A Victoria resident with Hashimoto's thyroiditis, an auto-immune disease suffered problems in connection with the first day of spraying in 1993, for which she was hospitalized. Since that time, she has continued to experience recurring infections. On the written orders of her doctor and specialist, she was required to leave the spray area for four days each spray period during 1994 (which meant leaving on and off for several weeks due to numerous announcements and postponements of the spray program).

This presents a significant handicap for an unwell person living on a small disability pension, yet apart from expensive lawsuits against the federal government, no process is in place for legitimately affected persons to receive compensation for even their expenses incurred in leaving the spray area.

It may be of interest that in response to my telephone inquiries, solicitors for Agriculture Canada fell back on tired argument that any such compensation could open the floodgates for too many claims. This not only offends our common sense of humanity, but adds further evidence to the argument that a significant portion of the population could have documented medical problems relating to Btk spraying that the current registration system simply overlooks."

Kristen J. Eirikson, Lawyer

- 86) In view of the above, it is interesting to note that when Parksville was sprayed in 1990 Agriculture Canada paid for the expenses of those wishing to leave the spray area.

"CHOICE OF QUALICUM BEACH HOTEL FOR MAY 22, 1990

The Sand Pebbles Inn was chosen because it is the only suitable accommodation in Qualicum Beach. The purpose of booking the hotel is to accommodate certain residents in Parksville with medical concerns for the duration of the aerial spray on May 23, 1990."

Agriculture Canada interoffice memo, May 11, 1990

- 87) "An additional precaution for individuals with serious immune disorders: Individuals with leukemia, AIDS, or other physician diagnosed causes of severe immune disorders may consider leaving the spray area during the actual spraying. Such individuals should consult their doctor for advice about avoiding exposure before the spray project begins."

Oregon Department of Agriculture
Gypsy Moth Spray Program, 1992

The Oregon Department of Agriculture together with the Mayor's Office and Health Division, arranged a shelter program which offered residents who had health concerns free accommodation outside the spray areas.

- 88) "It is regrettable the attitude and activities of Agriculture Canada officials in this project have been such as to produce backlashes that could inhibit financing and public support of more worthy and better planned future projects."

Dr. Bryan P. Beirne, Professor Emeritus of Pest Management, Simon Fraser University and former Director of Agriculture Canada's Biological Control Research Institute

- 89) "In fact, the same Agriculture Canada people who attempted the ill-fated gypsy moth spraying over Kitsilano in 1979, a Mr. Powell and Mr. John Bell - are again at work. If you recall Minister, Agriculture Canada warned of the devastation of B.C. forests if Kitsilano was not sprayed. Direct action efforts by residents prevented the wholesale spray program in 1979 - yet not a single gypsy moth outbreak resulted!

Minister, enough con games. Human health is at risk here."

Jim Fulton, M.P. to the Minister of Health,
March 30, 1992

- 90a) Remaining indoors with windows and doors shut during the spraying reduces exposure by 80 percent. People with asthma should use a bronchial dilator or other medication prior to the spraying.

Dr. Greg Cook, Agriculture Canada's medical spokesperson. Richmond News, March 3, 1993

- 90b) "Agriculture Canada admits there are people with respiratory problems who shouldn't be around in areas when spraying occurs."

Richmond Review, February 28, 1993

- 91) Exposure to any chemical or biological agent will be associated with some level of risk, and the risk will be assessed with some level of uncertainty.

Both workers and the general public may be subject to cumulative effects through the repeated application of a control agent during a single season or the application of a control agent over several seasons.

As with any preparation containing microorganisms, potential concerns include pathogenicity, persistence of the microorganism in the human body, the genetic stability of the microorganism in the environment, and the ability of the microbial agent to interact with other microorganisms.

As a complex mixture of chemicals, formulations may have toxic properties that are unrelated to the presence of B.t.k. For example, the available data regarding human exposure to B.t.k. formulations suggest that they cause eye, skin, and respiratory tract irritation. It is not clear, however, that these effects are caused by the microorganisms.

United States Department of Agriculture
Gypsy Moth Environmental Impact Report 1995

And, we'll give the final word on B.t.k. spraying and human health to Agriculture Canada:

Question: "What should I do when the planes go over. Is it (B.t.k.) harmful to infants (4-6 months old)?"

Answer: "If you feel uncomfortable stay inside but there is no need to. Agriculture Canada does not recommend leaving the area. It all depends on your personal level of comfort."

Question: "Can I stand under the plane and watch?"

Answer: "Yes, if you wish. There will be a public open house at a later date where questions such as these could be asked and answered by professionals in that field."

Question: "Any effect on human beings, animals, etc.?"

Answer: "No, physicians state that there is no risk in aerial spraying."

From the Minutes of Agriculture Canada's
Stakeholders Meeting, Chilliwack, January 31/'95

92) TOPIC: BACILLUS THURINGIENSIS

Treatment Overview - Symptoms, if they appear, are those of bacterial food poisoning. Monitor the patient for fluid and electrolyte loss. Control vomiting and diarrhea as needed. Treatment is supportive; there is no antidote.

Inhalation exposure - Decontamination: Move patient to fresh air. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. Administer 100% humidified supplemental oxygen with assisted ventilation as required.

Eye Exposure - Decontamination: Exposed eyes should be irrigated with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, lacrimation, or photophobia persist, the patient should be seen in a health care facility.

Dermal Exposure - Decontamination: Wash exposed area extremely thoroughly with soap and water. A physician may need to examine the area if irritation or pain persists.

Animals - Show fever, appetite loss, hematological changes and electrolyte changes post *B. thuringiensis* administration via oral, intravenous, intranasal and intradermal routes (Pivovarov et al).

Case Reports - Three of four volunteers who ingested food contaminated with 1×10^5 to 1×10^9 cells per gram of *Bacillus thuringiensis* developed nausea, vomiting, diarrhea, fever, colic-like abdominal pains, and tenesmus. The incubation period was 8 hours. (Pivovarov et al)

Dr. David Spoerke, Tomes Editorial Board
Tomes (R) Medical Management
(c) 1987-1992 Micromedex Inc. Volume 14

THE EFFECT OF MOTH SPRAYING ON THE ENVIRONMENT

No Environmental Impact Studies have been done

- 93) "It has not been possible to obtain environmental impact assessments relating to the target area for the Gypsy Moth eradication program in Victoria or for any other target area in British Columbia. That is, the proponents (Agriculture Canada) do not appear to have carried out any studies relating to the site, its geography, geology, hydrology, epidemiology, ecology, vegetation, wildlife or human inhabitants. There are no baseline studies, inventories of plant and animal species and communities, risk assessments, or cost/benefit studies. There is only an area on a map with some record of the occurrence of a few Gypsy Moths and egg clusters, based on trapping surveys using pheromones."
Dr. Rory P. Finegan, Biologist
University of Victoria
- 94) "We again stress the importance of having studies done in coastal B.C. on the effects of B.t.k. on non-target species, in order that there would be a clearer understanding of the effect of B.t.k. on the overall ecosystem."
Habitat Protection, Fish & Wildlife Management,
B.C. Ministry of Environment, January 7, 1994
- 95) Aerial spraying remains the most highly wasteful, polluting practice still being used in agriculture today. An estimated 85 to 90% of the pesticide drifts off target and less than 1% is necessary to control the target insect. Pesticides can drift for as far as 50 miles from site of application and in less significant concentrations for hundreds of miles depending on particle size, wind conditions, temperature, humidity etc.
Dr. Marion Moses, Clinical Professor,
Univ. of California, Pesticide Education Center,
- 96) Ground spraying also pollutes the environment with high-pressure hydraulic hoses that gush out torrents of pesticide with such force that birds nests can be knocked right out of trees. The drift from this type of application can range from 50 to 200 feet. Rotary mist-blowers have a jet turbine generator which rotates an aerosol with a range of 150 feet and blankets both sides of the street for blocks and blocks. Drift from mist-blowers has been measured from 160 to 740 feet.

Pressure accidents caused by blown hoses, and the resulting spills are a potential hazard to the public when residential areas are sprayed. The Washington State Department of Health reports 10 such accidents involving ruptured hoses, and the subsequent injury claims in their 1993 annual report.

Drift data quoted from The Journal of Pesticide Reform, Spring 1995, Vol.15, No.1

Our Case Against Moth Spraying

- 97a) "...aerially applied B.t. formulations can be detected up to 80 kilometers from the site of release."
From a 1993 study by J.A. Addison, Forestry
Canada citing Major, L. et al 1985 Gov't of Que.
- 97b) In general, the concentration of spores present in air samples was higher following aerial treatment of a nearby area (within 20 kilometers) with B.t.k..."
From a 1993 report by Imre S. Otvos, Forestry
Canada citing Major, L. et al 1985 Gov't of Que.
- Washington State Department of Agriculture received 400 pesticide related complaints in 1993. 29.2% of these calls involved spills, disposal and other, 21.5% direct overspray exposure and 49.3% were related to drift! (1994 Pesticide Incident Reporting & Tracking)
- B.t. can grow and replicate in the environment; spores remain in the air for up to 17 days after spraying, in soil for 3 years, and in water for 70 days.
- 98a) B.t. has the ability to germinate, survive and multiply within the soil system.
Saleh, S.M. et al, 1970 J. Invertebr.Pathol.15
- 98b) "After 11 months, B.t.k. was still present in the soil, and in 85% of the samples the concentration of B.t.k. exceeded pre-application levels."
From a 1993 report by Imre S. Otvos, Forestry
Canada citing Cardinal & Marotte 1987, Que.Gov't
- 99a) After almost 3 years following treatment, B.t. could still be detected in the soil.
West, A.W. et al, 1984 J. of Invert.Pathology 44
- 99b) In a field trial conducted in Quebec, two 40 hectare plots were aerially sprayed with B.t.k. Viable B.t.k. spores were recovered in the air in both plots up to 17 days after spraying and reached a high 8 days after spraying.
Smirnoff et al, Canadian Journal of For. Res.3
- 100) In a study conducted in a citrus grove, B.t. persisted in the orchard for 2 years after spraying and remained toxic to lepidoptera for 2 years.
Huang,Y.et al, Academy of Agricultural Sciences
Chinese Journal of Biological Control, 6, 1990
- 101a) "Approximately 1 year after treatment, viable B.t.k. endospores were recovered from white spruce branch samples that received either Dipel or Thuricide treatment in 1981."
Reardon, R.C. et al, Can. J. Entomology, Vol.116
- 101b) "After 5 days 40% of the B.t. was still in the air over 3,300 ft from where it had been sprayed."
Air Pollution from Pesticides and Agricultural
Processes, R.E. Lee, Jr.

- 102) "Survival of B.t.k. in the 4 types of water (deionized, tap, lake, and sea water) indicated that it was broken down more quickly in sea water than in fresh water.

A 90% reduction of B.t.k. in sea water was observed in 30 days while only a 50% reduction in distilled and tap waters was evident after 20 days. In lake water a 50% reduction of B.t.k. was achieved in approximately 50 days."

"The amount of residual chlorine normally applied to a standard water purification system does not appear to be sufficient to destroy B.t.K."

Menon, A.S. et al,
Water Air Soil Pollution, Vol. 25, 1985

The Impact of B.t. on Water

- 103) Further to the study mentioned above (102) another experiment recovered viable B.t.i. cells from the water for up to 200 days, and in the sediment for up to 270 days after application.

Hoil, S.L. et al, The Environ. 11(1) 1991

- 104) The nitrogen in B.t. robs the water of oxygen

"We would be concerned about the contribution of nitrogen in B.t. to the eutrophication of oligotrophic surface waters." (eutrophication=deficient in oxygen, oligotrophic=high in oxygen)

"The information on impacts of B.t. on aquatic organisms does not include impacts on aquatic insects, including adult insects which may use riparian vegetation."

R.S. Gill, Environmental Specialist,
California Regional Water Quality Control Board

- 105) "A bucket of water exposed to the aerial application contained 22,800 spores per mL of water, but this number was reduced to 7,800 spores per mL 2 months later after the water had been kept refrigerated in darkness."

Impact of (B.t.) aerial treatment on non-target Organisms. Buckner et al, Report CC-X-59, Ottawa

- 106a) "One species of Plecoptera, (Stoneflies) Taeniopteryx nivalis, showed an average of 30 percent mortality, significantly higher than the mortality in the control, at the end of the 9-day observation period."

Lethal & Sublethal Effects of B.t. on aquatic Insects in Outdoor Streams, Kreutzweiser et al, Bull.Environ.Contam.Toxicol.49 1992

- 106b) "...two species of stoneflies in the families Leuctridae and Taeniopterygidae were found to be susceptible to B.t.k. at field application rates (30 BIU/ha or 2-6 IU/ml) for gypsy moth."

Envir.Impact Statement 1995, U.S. Dept of Ag.
citing Eidt 1985; Kreutzweiser 1992 and 1993

Our Case Against Moth Spraying

- 107) "At the highest concentration of unfiltered suspension, 10 percent of the eels were dead after 96 hours."
Tolerance de la Faune Marine a *B.thuringiensis*
Alzieu et al. Bull.Inst.Peches Marit.250
- 108) "The application of B.t. over large areas in the forest environment may present a potential hazard to fish in lakes and streams through effects on their food organisms, most important of which are aquatic insects."
Toxicity of B.t.k. to Aquatic Insects
Eidt, D.C., Canadian Entomol. 117, 1985
- 109) "Ground application is preferred when feasible because it allows thorough coverage of host foliage while minimizing drift onto non-target habitats. Small bodies of water such as fish ponds and swimming pools are easily safeguarded by covering them with tarps."
Final Environmental Impact Report (Gypsy moth)
California Department of Agriculture 1992
- 110) Elevated drift rates of Mayfly *Baetis* spp. (one of the many fish food organisms) was noted after a direct B.t.k. application to an in situ stream mesocosm observation apparatus located at a study site on Vancouver Island.
Limnotek Research Inc.
B.C. Ministry of Forests 1992
- 111) "Some juvenile coho salmon died at the high dose when they were exposed for 7 days to doses ranging from 5.2×10 to 26.4×10 spores per mL."
Review of B.t.k. - With Special Emphasis on the
Aquatic Environment, Surgeoner, G.A. et al, 1989
- 112) "Exposure of *Biomphalaria alexandria* snails to low concentrations of Thuricide (a B.t. formulation) caused a significant decrease in both ovipository activity and size of egg masses and reduced the percentage of egg hatchability."
Osman G. et al, Anz Schaedlingskd Pflanzenschutz
Umweltschutz, Volume 64 (7) 1991
- 113) During the spraying of Vancouver and area in 1992, B.t.k. spores in Capilano Lake soared to 45 percent by the end of April, and to almost 70 percent by June 4.
Greater Vancouver Water District
Quality Control Annual Report 1992

Our Case Against Moth Spraying

- 114a) Mussels exposed to high concentrations of B.t.k. spores suffered 28% mortality. B.t.k. may also be toxic to earthworms and to brine shrimp.

The U.S. Environmental Protection Agency (EPA)
Office of Pesticides & Toxic Substances, 1988

- 114b) B.t.k. adversely affected black fly *Simulium vittatum* and perhaps black fly *Prosimulium fascum/mixtum*.
Eidt, D.C. 1985, Canadian Entomologist, Vol.117

The Impact of B.t. on Non-Target Lepidoptera,
Beneficial Insects and Birds

- 115) Non-target beneficials may be at risk to side effects of B.t.k. directly from the insecticidal spray, or indirectly due to residue contaminated foliage surfaces. The alteration of the food sources of natural enemies may also account for some of the observed detrimental effects of B.t.k. in field studies.

Environmental Report & Current Status of B.t.k.
Dr. Imre S. Otvos, Forestry Canada, March 1993

- 116) "As B.t. affects other species of lepidoptera, the massive spraying will affect them detrimentally and therefore the parasites and predators of the lepidoptera which (the lepidoptera) are thus liable to increase, some perhaps to outbreak proportions, as they recolonize the treated areas."
Dr. Bryan P. Beirne, Professor Emeritus of Pest Management, Simon Fraser University.

- 117) "My primary objection to the spraying is that it uses dynamite to kill a merely alleged mosquito, killing all species of butterflies and moths in the caterpillar stage.

This crazy dynamite tactic endangers every single local threatened butterfly habitat.

It has obliterated in Vancouver a normally hardy and also attractive and very interesting native butterfly, Lorquin's Admiral.

It may well have obliterated the Stanley Park Colony of Johnson's Hairstreak. No specimens of this butterfly have been seen in another refuge, the Lynn Valley Headwater Park, since that was sprayed in 1992.

It has wiped out the Spring Azure, an attractive blue butterfly, in all except the far periphery of the attacked areas."
Roger Ashton, Butterfly expert and author

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Our Case Against Moth Spraying

- 118) "Further research on the impact of B.t. on non-target lepidoptera and insectivorous birds is needed considering the increasing use of the insecticide in forest management."
Szuba K.J. et al, Faculty of Forestry,
University of Toronto 1990
- 119) "Rare non-target species of lepidoptera may be ecologically at risk in large-scale pest control programs based on B.t.k. The study showed that both numbers of non-target insects over the test period and species richness were depressed for 3 years following treatment. A reduction in caterpillar abundance could negatively affect the population dynamics of some birds."
Miller, J.C. American Entomol. Vol.36, 1990
- 120) "Use of B.t.k. should be prohibited in areas where it has the potential to drift, flow, wash or otherwise enter the habitat of any endangered/threatened species of lepidoptera or reduce the food source of any insectivorous listed species, such as the endangered least Bell's vireo (*Vireo bellii pusillus*)."
United States Department of the Interior
August 7, 1991
- 121) B.t.k. can cause irritation and allergy-like symptoms in vertebrates and indirectly, birds and mammals that feed on lepidopteran species have a reduced number of prey items to eat. Bats feeding exclusively on lepidoptera could also be affected as strongly suggested by a study of the Virginia big-eared bat in West Virginia.
U.S. Dept. of Agriculture, Gypsy moth management
in the United States, 1995 Appendix G, 9-11
- 122) "The U.S.D.A. Forest Service will not spray for spruce budworm this spring on the Deschutes, Mt.Hood and Willamette National Forests. Studies have been started to learn more about the possible effects of B.t. spraying on the food sources of the (insectivorous) Townsend's big-eared bat."
Media release from the United States Department
of Agriculture Forest Service, 1993
- 123) "B.t.k. caused losses in 3 species of song birds and increased mortality and decreased growth in chicks of wild spruce grouse. B.t.k. sprayed from the air into the forest canopy, knocked down caterpillars of low shrubs and herbs up to 65% over 4 weeks."
Effect of B.t.k. on Insects, Small Birds and
Chicks of Spruce Grouse, Bendell, J.F. et al,
Faculty of Forestry, University of Toronto 1990

Our Case Against Moth Spraying

- 124) "An operational spray of B.t.k. reduced the abundance of caterpillars of low vegetation and this in turn caused changes or declines in numbers, age structure, survival, growth, movements, and feeding habits of wildlife. If caterpillars are needed as food by a species it cannot replace this item with alternatives."
Effect of B.t.k. on Song Birds, Chicks of Spruce Grouse, Masked Shrew, and Caterpillars of Low Vegetation. Bendell, J.F. et al, March 1992
- 125) B.t. is a potential avian toxin, in eight studies done on the effect of B.t. on birds, birds were impacted. Symptoms of effects ranged from mild to severe and included death at the 1% level. Other symptoms included emaciation, blood in gizzard, hemorrhage in gastro-intestinal tract, reduced feeding and weight gains. Reduced egg production.
From an affidavit by Jorma Jyrkkanen, Terrace, B.C. Filed in Federal Court
- 126) "The toxicity data reported here show that B.t.k. had a severe impact on survival of the larvae of ladybird beetles."
B.t.k. killed over 23 percent of the eggs and 91 percent of the larvae of newly hatched Ladybird beetles in a period of 3 days.
Impact of Pesticides on Ladybird Beetles, 1982
Olszak R., Roczn. Nauk Roln. Ser.E. Ochr.Rosl.12
- 127) "A mortality rate of 100% was observed after a 2-month exposure period of test earthworms to the smallest dose of B.t.t."
Smirnoff, W.A. et al, J. Insect Pathol. Vol.3
- 128) "The braconid wasp suffered mortality of 39% and 100% respectively at the two higher concentrations within 14 days of feeding, as compared with 9% in the controls."
Muck, O. et al. (1981) Z. Ang. Ent. Volume 92
- 129) B.t.k. caused population declines in ground beetles, nematodes and predatory mites.
Addison, J.A. (1993) Canadian Journal of Forest Research 23:2329-2342
- 130) "The spray application apparently caused a decrease in the numbers of adult males (of masked shrews) that were replaced by juveniles. Moreover, the insecticide significantly reduced the abundance of lepidopteran larvae. This suggests that the reduction in numbers of lepidopteran larvae caused increased mortality and (or) dispersal of adult males."
Effects of B.t.k. on Sorex Cinereus (masked shrew) in a Jack Pine Plantation in Ontario
Bellocq, M.I. et al, Can.J. Zool. Vol.70, 1992

- 131) "A reduction in food consumption, body weight, and egg production of hens was recorded when two formulations of B.t. was incorporated into the feed."

Effect of Feeding B.t. to Caged Layers for Fly Control, Burns et al, J.Econ.Ent.Volume 54

The Impact of B.t. on Bees

- 132) "Bees were harmed or killed in feeding trials though the dosages achieved were in excess of those expected in the fields. End-points other than mortality were mainly overlooked in the bees however, so that there exists the potential to affect other parameters at lower dosages, for example, feeding, growth, or honey production, posing a potential risk to bees, and to honey and to pollination of legumes and other beneficial plants."

Jorma Jyrkkanen, Environmental Consultant, 1992 Affidavit filed in the Federal Court of Canada

- 133a) High concentrations of B.t.k. spores can be toxic to bees.

U.S. Environmental Protection Agency (EPA)
Office of Pesticides & Toxic Substances, 1988

- 133b) Dipel (a B.t.k. formulation) caused some toxicity to honey bees in a 1981 study.

Atkins, E.L. et al (1981)
Leaflet 2883, University of California.

- 134) "During the appeals, a suggestion was made by one of the Appellants, the Richmond Beekeepers Association, that a study hive be specifically sited in one of the treatment areas and monitored during and after the spray program. .the Panel recommends that Agriculture Canada consider pursuing this suggestion"

Environmental Appeal Board, April 8, 1993
Vancouver, B.C.

The study on bees was not carried out in Richmond in 1993, nor to-date, has it been done in any other spray area.

- 135) "The Degroffs, a Fourth Avenue family with a large collection of iguanas and snakes occupying their living room had their property officially named a no-spray area Tuesday. A Thurston County Judge ruled that the State Department of Agriculture had no data to show that the spray program's insecticide wouldn't hurt the reptiles."

The Olympian News, May 19, 1993

- 136) A site inspection of Victoria/Saanich after the urban aerial spraying of Foray 48B found among other things, generally lower bird populations, dead fledgling birds, many bird species gone, no more house finches, and 3 dead chickens. No honey bees from the first spray to the end of July, reduction in wasp populations, reduction in bumble bee populations, ladybird populations drastically depleted all season, drastically reduced butterfly and skipper populations and population explosions of other moth/caterpillar species outside the sprayed area. Three sprayed pond fish developed tumors.

The Ecological Health Alliance
November 1994

THE EFFECT OF B.T. ON PLANTS

It has been noted that B.t. has a burning effect on plants, particularly if sprayed on warm days.

- 137) "There is some concern that this insecticide would be a plant mutagen when sprayed on plants."

Sharma, C.B.S.R. et al, Mutation Research,
Volume 46:(19-26)

- 138) Report of a fifteen foot, fifteen year old apple tree dying as a result of pesticide application using B.t.

Washington State Department of Agriculture
Case Report 54W-93, May 24, 1993

EFFECTIVE ALTERNATIVES TO B.T. SPRAYING

There are many proven safe and effective alternatives which can be used to control the gypsy moth without resorting to the most extreme measure of all; aerial broadcasts of pesticides over urban areas.

- 139) Prevention - Border Inspection of Vehicles

California has a Pest Exclusion Program which includes vehicle checks at 16 border inspection stations. As a result 337 moths were intercepted in 1990 and the State has been gypsy moth free since 1989.

It is clear, that Agriculture Canada should be following California's example and concentrating their efforts on prevention rather than simply allowing an insect (they deem so dangerous) entry and then doing massive, aerial broadcasts of urban areas which cause great public anxiety and are financially prohibitive.

(a) Introduction of natural predators

The gypsy moth has many natural enemies in B.C., which include the species listed below. More could be introduced, if deemed necessary.

Predators are animals which actually eat the gypsy moth and they include; mice, shrews, raccoons, skunks, squirrels, beetles, spiders, carpenter ants and about 40 species of birds which include chickadees, tanagers, blue jays, robins, vireos, orioles, grackles, starlings, blackbirds and cuckoos.

Parasites are usually insect species which consume and kill the gypsy moth by living inside it. There are over 100 known insect parasites of the egg, larval and pupal stages. Certain flies and small non-stinging wasps are examples of gypsy moth parasites.

(b) Mating Disruption - High density pheromone trapping

Traps baited with a female hormone that attracts male moths are more effective than pesticides which kill only larvae. Mass trapping kills adults.

Mass trapping-only projects have been carried out successfully in many areas including Appleton, Delevan, Monana, Sheboygan and Melon in Wisconsin. No further moths are reported in these areas.
Wisconsin Department of Agriculture 1991

(c) Egg hunts - Destroying Egg Masses

The Environmental Appeal Board recommended that a bounty system be considered for in-tact, in-situ egg masses. A suggestion that has to-date, been ignored by Agriculture Canada.

This method has been successful in other locations including New Brunswick, where forestry and biology students, boy scouts and environmental groups search and destroy egg masses every spring. Local merchants donate prizes and provide pizza and pop for the participants.

(d) Sterile Insect Release Program

Large numbers of laboratory reared male gypsy moth pupae are treated with gamma radiation, then allowed to mature into adults. These sterile moths are then released to mate with native (wild) females. Female moths that mate with sterile males lay infertile eggs.

Our Case Against Moth Spraying

(e) **Tree Banding**

Sticky barrier bands intercept caterpillars on their way up the tree. The tiny caterpillars will attempt to cross the sticky material, become stuck and die. The barriers are removed from the trees at the end of the caterpillar season in late June.

Burlap hiding bands installed around trees will catch gypsy moth caterpillars on their way down the trees. This method is more labour intensive than the sticky tape mentioned above as the caterpillars have to be destroyed, preferably every day, by sweeping them into a container of soapy water.

(f) **Fungus Routs Gypsy Moth Outbreak**

"Last summer, the fungus *Entomophaga maimaiga*, which efficiently checks gypsy moths in its native Japan, unexpectedly proliferated in the northeastern United States. It slaughtered gypsy moths in droves, producing their first known massive fungus-induced die-off in North America."

Experiments by Insect Pathologist Dr. Ann E. Hajek of the Boyce Thompson Institute for Plant Research in Ithaca, New York showed that scientists could deliberately use the fungus in the wild to induce gypsy moth die-offs of up to 90%.

Science News, August 4, 1990

B.T. IS NOT EFFECTIVE

140) We are not satisfied with the performance of Foray 48B; because of our wet climate the residual activity is poor.
Washington State Department of Agriculture 1995
Olympia, Washington

141) "B.t. is unreliable, one year you'll get good results with B.t. and the next year you won't."
Ralph Houghton, Head of Agriculture Canada's
Plant Products Division, Ottawa, April 25, 1979

142) "In some areas, we get spectacular results with B.t. but in other areas, the moth population actually increases and is even healthier."
Robert H. Tichenor Jr.,
Head of the Gypsy Moth Section
Maryland Department of Agriculture 1984

Our Case Against Moth Spraying

- 143) (re B.t.k.) "Even among highly susceptible pests, efficacy varies from spray to spray and from year to year due to variations in climate, larval instar, and spray deposit."
Kettela, E.G., Review of Pest Management
Research & Development in New Brunswick in 1989
- 144) "The efficacy of B.t.k. is variable among target lepidopterans; it provides excellent control of some insects like the spruce budworm and somewhat less reliable control of the gypsy moth and the Douglas-fir tussock moth."
Trial, H. Jr., Operational Experiences with B.t.
in the Eastern United States. Proceedings
Symposium:Microbial Control of Gypsy Moths, 1984
- 145) "Fifty-five organic vegetable growers in the U.K. were interviewed in 1987 to determine their perceptions of pest problems and how to deal with them."
"Although over half the growers use some form of curative control such as debris, pyrethrum and B.t., the majority thought they were ineffective and uneconomic."
L. Peacock et al, Agric.Ecosyst.Environ.31, 1990
- 146) "Inconsistent efficacy is not surprising considering that B.t. has to be ingested and exhibits poor residual toxicity, features that tend to make treatment success more dependent on favourable conditions."
Kees van Frankenhuyzen, et al,
Canadian Entomologist 125, May/June 1993
- 147) "Recent published research on the development of resistance to B.t. by the diamondback moth ought to be a warning of the dangers of reliance upon B.t."
Carol Waddington, Senior Entomologist, Tri Cal.
- 148) "Much of the B.t. resistance that has appeared in the field is thought to be due to massive crop spraying of the B.t. toxins themselves. The spraying has exposed insects to high doses and accelerated their rate of evolution into increasingly resistant breeds."
Christopher Anderson, Nature, Vol.355, Feb.1992
- 149) "Often touted as one of the most effective weapons in biological pest control, bacteria called B.t. may have met their match."
Science News, Vol.142, Sep.12, 1992

Our Case Against Moth Spraying

- 150) "Colonies of Indianmeal moth, and Almond moth reared in the laboratory on diet treated with B.t. became resistant to B.t."
McGaughey, W.H. et al, J.Econ.Entom. 81 (1) 1988
- 151) "Reports coming from Hawaii, Florida, New York, the Philippines, Thailand, and Japan suggest the bloom is off the rose for B.t. One major plant pest-the diamondback moth-has evolved resistance to B.t. toxins, and university researchers have bred several other insects in their labs that show signs of it.

Worse, no quick fixes emerged from a colloquium of researchers, environmentalists, and regulators who gathered in Washington, D.C. last week for The "B.t. Resistance Workshop" sponsored by the National Audubon Society on 21 October 1991 to look for strategies to nip the problem of B.t. resistance in the bud.

The fate of B.t., attendees concluded, will depend on voluntary efforts by farmers (and others) to use B.t. sparingly and to adopt other pest management tools."

Moths Take the Field Against Biopesticide
Science, Volume 254, November 1, 1991

The U.S. Department of Agriculture recommends high density trapping for gypsy moths when there are less than 10 egg masses per acre. And, the sterile insect release method when there are less than 2.5 egg masses per acre. Why then is Agriculture Canada aerial spraying hundreds of hectares in densely populated urban areas when only a few egg masses, and in some cases no egg masses are found?

For example: 18,813 hectares in Vancouver and area were aeri-ally sprayed in 1992. No egg masses were found.

430 hectares in Richmond were aeri-ally sprayed in 1993.
8 egg masses were found.

120 hectares in Nanaimo were aeri-ally sprayed in 1994.
5 egg masses were found.

120 hectares in Victoria were aeri-ally sprayed in 1994.
1 egg mass was found.

We are calling for a full public enquiry into the moth spraying.

Prepared by Dianne Wharton
S.T.O.P. North Vancouver
July, 1995

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