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Use of *Baccillus thuringiensis* subspecies *kurstaki* pesticide (Btk) for Control of Gypsy moths in Lambton County

Introduction

According to Health Canada, *Baccillus thuringiensis* subspecies *kurstaki* pesticide (Btk) is a bacterium found naturally in soils. It has been used worldwide as a biological pest control agent to combat a group of insects called lepidopterans (which include the gypsy moth) in forestry and agricultural settings. Btk is also approved for residential and commercial use including aerial application over residential areas. The Btk bacterium produces a protein crystal during the spore-forming stage of its life cycle which is toxic only to the larvae (caterpillars) of specific insect species. These microscopic crystals are ingested by insects when they are feeding on foliage that has been treated with Btk. In the alkaline environment of the susceptible insect's digestive system, the crystals are converted into toxic protein molecules that destroy the walls of the insect's stomach. The insect usually stops feeding within hours and dies within 2 to 5 days.

Discussion/Background

Btk can be applied using both ground and aerial spray methods. Aerial spraying may be used in forestry and urban areas to ensure adequate coverage and effectiveness.

Health Canada's Pest Management Regulatory Agency (PMRA) is responsible for ensuring the human health and environmental safety of all pest control products prior to their approval for use in Canada. Only products that are scientifically reviewed and found to be effective and safe for use within minimal risk to human health and the environment are registered by PMRA. In Canada, the PMRA has classified all Btk products registered for use in forests, woodlands and residential areas as "restricted". Restricted class products require special permits or licensing from the regulatory authority in the province/territory for purchase. In the case of Btk use, only applicators who have a passed a provincial certification exam may use Btk products. Btk was re-evaluated by PMRA and the decision (published on May 6, 2008) states that: "an evaluation of available scientific information found that products containing Bacillus thuringiensis do not present unacceptable risks to human health or the environment when used according to label directions".

According to Health Canada, Btk poses little threat to human health either through handling products directly or through indirect exposure such as aerial spraying. The US EPA also categorizes the risks posed by Btk strains to non-target organisms as minimal to non-existent. BTK toxins, as mentioned above, only work in certain alkaline conditions that exist only in certain insects' digestive systems; not in the acidic stomachs of humans and animals. There have been no documented cases involving toxicity or endocrine disruption potential to humans or other mammals in Canada. Studies have shown that even if Btk spores are ingested or inhaled, they are eliminated without any adverse health effects.

In addition to the active ingredient Btk, other ingredients (formulants) are added to create the final product. These normally include water and ingredients to make the product stick to leaves and needles of trees. Studies carried out in many different countries have indicated that there are no public health problems identified with the use of Btk products, nor have any significant environmental concerns have been raised (see references).

The public are unlikely to experience any symptoms if inadvertently exposed to Btk spray, and no special precautions are necessary or required. However, if individuals have some concerns, they can take reasonable precautions to avoid exposure during a spray program in the same way they would avoid pollen or other airborne materials during days when air quality advisories are issued.

There has been Btk bio pesticide moth control programs carried out in Ontario by the City of Mississauga, the City of Hamilton and the City of Toronto. In 2008, the City of Hamilton Public Health Services published *a "2008 Position Paper on the City of Hamilton's Proposed Spring, 2008 Gypsy Moth Control Program using Foray 48B (Btk- Bacillus thuringiensis ssp kurstaki)",* in which it had no public health-based objections to aerial spraying for gypsy moth using Btk. City of Hamilton Public Health Services, Peel Region Health Department, City of Toronto Public Health, and Halton Region Public Health, all had no objections to the use of Btk in the aerial spraying programs in their jurisdictions after their individual reviews.

Conclusion

Lambton Public Health has reviewed Hamilton's Position Paper on the use of Btk, as well as documents from respected agencies such as Health Canada, the World Health Organization, and other Health Units that have previously implemented a Gypsy Moth Control Plan with the use of Btk. Lambton Public Health has no public health-based objections to aerial spraying of Btk as part of a moth control plan provided that the rules of application as outlined by the Pest Control Products Act and other applicable federal or provincial legislation are strictly followed.

References:

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3. Toronto Public health. Website Review at https://www.toronto.ca/services-payments/water-environment/trees/forest-management/threats-to-trees-insects/european-gypsy-moth/ Review of European Gypsy Moth.

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