



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
OFFICE OF
PREVENTION, PESTICIDES, AND
TOXIC SUBSTANCES

DP Barcodes: D291468
PCCode: 056801
Date: July 1, 2003

MEMORANDUM:

SUBJECT: Review of Minnesota Department of Agriculture and Minnesota District Court Information Materials Related to Bee Kill Incidents and Carbaryl Use on Hybrid Poplar Plantations

To: Anthony Britten, PM Team Reviewer
Michael Goodis, Product Manager
Special Review and Reregistration Division (7508C)

FROM: Thomas Steeger, Ph.D., Senior Biologist
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THRU: Elizabeth Behl, Chief
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The Environmental Fate and Effects Division (EFED) has reviewed information forwarded by Mr. Paul M. Liemandt of the Minnesota Department of Agriculture (MDA) regarding investigations of [alleged] bee kill incidents. The materials represented copies of MDA correspondence/closure letters to Minnesota beekeepers regarding beekeeper complaints of [alleged] bee mortalities due to the use of carbaryl (Sevin XLR Plus[®]) in hybrid poplar plantations to control cottonwood leaf beetle (*Chrysomela scripta*). Poplar plantations in the vicinity of the bee kills were operated primarily by International Paper Company and in some cases were maintained by the Minnesota Department of Natural Resources. In general, investigations conducted by the MDA concluded that the plaintiffs did not have sufficient data to support claims that carbaryl was responsible for reduced numbers of bees in commercial colonies in close proximity to poplar plantations. Although in at least one instance, carbaryl use on poplars was associated with the loss of a significant number of hives, the investigation indicated that the hives had been inadvertently sprayed when the spraying protocols were not adequately followed.

According to court records, in most of the bee kill incidents, carbaryl was applied by licensed applicators following label instructions. Additionally, carbaryl applications were conducted at night to minimize impacts to beneficial insects. The defendants (International Paper and the MDA) argued beekeepers in Minnesota were experiencing difficulties with their hives prior to 1998 when

carbaryl use was initiated on poplar plantations and that carbaryl residues have not been detected in the majority of incidents investigated. Furthermore, the defendants indicated that other pesticides, *e.g.* methyl parathion and coumaphos, may have been responsible for bee kills rather than carbaryl.

Plaintiffs have argued that they have suffered financial losses due to the impact of carbaryl and that failure of state investigators to detect carbaryl residues is likely due to poor sample collection methodology or inadequate levels of detection. The plaintiff's testimony suggests that carbaryl residues may not dry sufficiently on plants and residues are carried back to the hive on pollen. Although no data are provided to support their claim, beekeepers testified that carbaryl residues in the hives impact the survival of young bees. Declining bee survival is reportedly interpreted by the bees to indicate that the queen is impaired and that she must be eliminated.

Although EFED has data indicating that carbaryl is highly toxic to bees on an acute exposure basis, there are no data currently available on the chronic effects of carbaryl exposure on bees. Therefore, it is not possible to EFED to comment on the potential for carbaryl to be transported back to the hive or at what concentration effects on bees are likely. EFED therefore recommends that a chronic honey bee study be initiated to evaluate the sublethal effects of carbaryl; this study requirement is similar to one recently suggested for the registration of clothianidin. The honey bee study should evaluate the effects of carbaryl on the hive over time and should include but not necessarily be limited to the following criteria: **a)** an evaluation of two complete life cycles (~130 days) including egg, larvae, adult stages, and mortality of the honey bee colony; **b)** an evaluation of the exposure and effects to the queen during these life cycles; **c)** provide carbaryl residue analysis of the stored nectar, honey, and pollen at the beginning of the study, at periodic time intervals during the study and at the end of the study; and **d)** the study must include replicated data with statistical comparison to controls.

While it is clear that some Minnesota beekeepers believe they are experiencing bee mortality due to the use of carbaryl on poplar plantations, there are insufficient data to clearly implicate carbaryl with the majority of recent bee kill incidents in the state. The current label contains a bee warning; however, in order for EFED to determine whether more restrictive label language is warranted to protect bees, chronic bee toxicity data are necessary. If risk managers require additional information regarding EFED's recommendation for additional studies, please do not hesitate to contact me.