

# GYPCHEK

(The Gypsy Moth Virus Product)

## Gypsy Moth and a Naturally Occurring Viral Disease

The gypsy moth, *Lymantria dispar* (L.), is a serious defoliator of broadleaved forests in eastern North America. Historically, populations of this insect pest have resulted in widespread defoliation to an average of 3 million forested acres per year. The pest also defoliates trees and shrubs in residential areas and, when infestations are heavy, creates a nuisance to residents. The lifecycle consists of egg, larval, pupal and adult stages (below).



From left: Gypsy moth egg mass, young larvae, single gypsy moth larva, two pupae, female (left) and male (right) gypsy moth adults

Since the introduction of the gypsy moth into the Boston area of Massachusetts in 1869, it has spread south into North Carolina and west into Minnesota and continues to spread along the leading edge of infestation at the rate of approximately 12 miles per year. In



eastern North America, the gypsy moth is subject to a variety of infectious diseases. The naturally occurring viral disease is often referred to as "**wilt**" due to the soft, limp appearance of the diseased larvae (left). The disease is caused by a nucleopolyhedrosis virus (NPV) and can reach outbreak proportions as gypsy moth population densities increase. These outbreaks result from increased transmission rates as small larvae become infected and die on leaves in the crown of trees. These larval cadavers disintegrate and serve as inocula for healthy feeding larvae. The larva ingests the virus along with the foliage (bottom left). The virus invades through the gut wall and attacks internal tissues and organs of the larva, eventually causing a general viral infection. In many dense gypsy moth populations, the virus kills up to 90% of the larvae and reduces populations to levels where they cause only minimal defoliation and tree damage in the following year.

## Development of the Virus Product - Gypchek

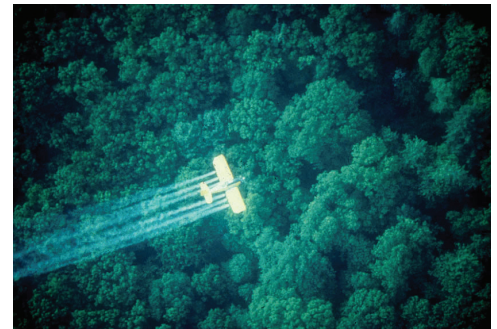
**Registration** - In April 1978, after many years of research and development, the gypsy moth nucleopolyhedrosis virus product Gypchek was registered by the U. S. Environmental Protection Agency (US-EPA) (EPA Registration #27586-2) as a general use insecticide for aerial and ground application to control gypsy moth. In 1996, the product satisfied all re-registration requirements established by the US EPA and was relabeled.



**Identity and Safety** - Based upon extensive safety testing, the virus that is the active ingredient in Gypchek has been shown to be unrelated to human and other mammalian viruses and only distantly related to other insect viruses. Toxicological and pathogenicity testing of Gypchek on laboratory animals, wild mammals, bird and fish in support of registration have revealed no effects at field doses.

**Production** - Gypchek is produced by the US Department of Agriculture Animal and Plant Health Inspection Service and the Forest Service. A standard laboratory strain of the gypsy moth is reared year-round and the larvae infected with the virus. The larvae die and are harvested and processed to produce a finely ground powder. The final product is subjected to quality assurance testing before packaging and distribution. In general, it takes between 500 and 1,000 infected gypsy moth larvae to produce enough Gypchek to treat one acre.

**Application** - Gypchek can be applied using aerial or ground application equipment. Its use is limited to wide-area public pest control programs sponsored by government entities. Gypsy moth larvae need to ingest the virus (i.e. Gypchek is not a contact insecticide), the virus interferes with food absorption and the larvae die in approximately 7-10 days. The addition of virus to the environment at dosages consistent with those used for control of the gypsy moth does not raise virus levels above those that would occur naturally. Gypchek is one of two biological insecticides, the other being the bacterium *Bacillus thuringiensis* var. *kurstaki*, (Btk) currently registered for use against gypsy moth. Gypchek kills only gypsy moth larvae, whereas Btk kills gypsy moth as well as other selected non-target lepidopteran larvae.



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For additional information concerning Gypchek, contact Dr. Richard Reardon, USDA Forest Service, Forest Health Technology Enterprise Team, Morgantown, WV at (304) 285-1566 or email - [rreardon@fs.fed.us](mailto:rreardon@fs.fed.us) or Dr. John Podgwaite, USDA Forest Service, Northern Research Station, Hamden, CT at (203) 230-4325 or email - [jpodgwaite@fs.fed.us](mailto:jpodgwaite@fs.fed.us) The material safety data sheet (MSDS) can be accessed at: [http://www.fs.fed.us/foresthealth/pesticide/pdfs/msds\\_gypchek.pdf](http://www.fs.fed.us/foresthealth/pesticide/pdfs/msds_gypchek.pdf)

