



The Director General

Maisons-Alfort, 16 August 2011

## **OPINION**

### **of the French Agency for Food, Environmental and Occupational Health & Safety**

**on the analysis of the risks to health and the environment related to strategies in French Guiana to combat the *Hylesia metabus* moth (Lepidoptera: Saturniidae), the agent responsible for “Caripito itch” dermatitis**

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*ANSES undertakes independent and pluralistic scientific expert assessments.*

*ANSES primarily ensures environmental, occupational and food safety as well as assessing the potential health risks they may entail.*

*It also contributes to the protection of the health and welfare of animals, the protection of plant health and the evaluation of the nutritional characteristics of food.*

*It provides the competent authorities with the necessary information concerning these risks and the requisite expertise and technical support for drafting legislative and statutory provisions and implementing risk management strategies (Article L.1313-1 of the French Public Health Code).*

*Its opinions are made public.*

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On 8 August 2011, ANSES received an urgent request from the Ministries for the Environment, Health and Labour to analyse the risks to health and the environment of the different control strategies for *Hylesia metabus* in French Guiana.

#### **1. BACKGROUND AND PRESENTATION OF THE ISSUE**

Since the end of May 2011, certain communities close to mangrove swamps in coastal areas of French Guiana have been infested by a nocturnal moth, *Hylesia metabus*, commonly known as the Yellowtail or Ashen Moth. An unusual feature of the female is the presence of microscopic urticating hairs on its abdomen that it releases into the air, which in humans cause persistent rashes and itching. The pruritic dermatosis caused by these moths is known as Caripito itch (also “lepidopterism”, “butterfly itch” or “moth dermatitis”). Lesions appear on the skin 15 to 30 minutes after contact. They consist of papular-vesicular lesions accompanied by intense itching that worsens at night. Ophthalmological reactions (conjunctivitis or keratitis) are observed occasionally and, still more rarely, respiratory effects. Cutaneous symptoms generally disappear between the 7<sup>th</sup> and 15<sup>th</sup> day, without treatment.

The Ashen Moth is found along a coastal strip stretching from the north of Brazil to the east of Venezuela. The species lives in non-tidal mangrove swamps; this environment, particularly favourable for the development of *Hylesia metabus*, consists largely of mangrove trees over 20 metres tall.

The complete development cycle of *Hylesia metabus* lasts about three months, with four generations per year. It passes successively through the following stages: eggs, caterpillars, chrysalises and adult moths. The adults have no mouthparts and therefore do

not feed. Their lifetime is consequently limited to 3 or 4 days, which corresponds to the mating period.

The females lay from 100 to 300 eggs and remain motionless during the daytime among the foliage or on tree-trunks. They are mainly active at dusk, especially around points of light, where their fluttering causes them to release their hairs, occasionally forming a light cloud that can easily be carried along by the wind or a draft.

In French Guiana, the adult moths are mainly observed after the end of the rainy season, when they emerge in July and October.

In 2011, the adult moths were present in such numbers and for so long a period that the result was an exceptional infestation of *Hylesia metabus*, although this phenomenon has been observed previously in the region and recurs periodically.

Sinnamary, and also Iracoubo, are particularly affected by this phenomenon. The moths are attracted by white light and invade residential areas starting at sundown (6.30pm in French Guiana) and through the first half of the night. The urticating hairs are released during the flight of hundreds of thousands of moths through residential areas. This situation obliges municipal authorities and residents to cancel events planned to be held in the open air in July and August (parties, concerts, sports meetings, meals, etc.) and to shut themselves away in the half-light after sundown.

Since mangrove swamps have developed considerably in the Larivot, Cayenne and Rémire-Montjoly areas over the last few years, Cayenne Island is likely to be affected by this phenomenon, which has also been reported in the past at the site of the French Guiana Space Centre in Kourou.

In view of this situation, the Directorate General for Health (DGS) issued an urgent request to the National Centre for Vector Expertise (CNEV) to report<sup>1</sup>:

- firstly, on the current situation regarding the proliferation of *Hylesia metabus*;
- secondly, on the possible strategies and methods for control and prevention (mechanical or chemical, with larvicides, adulticides, etc.) to address this situation while protecting the specific ecological environment of the mangrove swamps.

ANSES also received a request from the DGS and the Directorate General for Risk Prevention (DGPR) to analyse the risks to health and the environment of the different strategies and methods for combating *Hylesia metabus* in French Guiana proposed in the context of the expert assessment entrusted to the CNEV.

## ■ ISSUES INVESTIGATED

To analyse the risks, ANSES was asked to:

- identify and analyse the available knowledge on the affects on health and the environment of the different methods for combating *Hylesia metabus* that could be used locally (safety for the population, impact on the mangrove swamps), while taking into account the experiences of other countries and the regulations currently in force and applicable to the different conditions of use for these insecticides;
- identify substances authorised or under examination in the framework of European Directive 98/8/EC as Product Type (PT) 18 and effective for combating *Hylesia metabus* in one of its stages, and to provide an opinion on the efficacy of aerial spraying of mangrove swamps;

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<sup>1</sup> CNEV (2011). Response to the Request concerning “*Stratégies et méthodes de lutte optimales contre Hylesia metabus, agent de la papillonite en Guyane française*” (Best strategies and methods for combating *Hylesia metabus*, the agent for Caripito itch in French Guiana). Opinion for the attention of the DGS, Montpellier, 12 August 2011, 21p.

- compare the data on the efficacy of control methods with data on the safety of these methods as reported in all studies on the subject, in order to rank them for their use at local level in French Guiana.

## **2. ORGANISATION OF THE EXPERT ASSESSMENT**

### **■ GENERAL ORGANISATION**

This expert appraisal was carried out, under emergency conditions, in accordance with the French standard NF X 50-110 "Quality in Expert activities – General competence requirements for expertise (May 2003)".

ANSES drew on the competence of the various units within the Agency and appointed three expert rapporteurs.

The results of the assessment were presented to the Expert Committee (CES) on Assessment of the risks related to biocidal substances and products, to allow it to monitor the work in progress.

### **■ APPROACH TAKEN FOR THE EXPERT ASSESSMENT**

Considering the urgent nature of this Request and the possible risk to the population and the environment of the different control strategies, ANSES based its expert appraisal on:

- the conclusions of the expert appraisal by CNEV identifying the strategies for combating *Hyleisia metabus* in French Guiana;
- the Agency's previous expert appraisals analysing the risks related to the use of insecticides for vector control;

a review of the elements available in the framework of the regulatory assessment of substances (EU Directive 98/8/EC, known as the Biocides Directive, and Regulation (EC) N° 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC;

- a review of the available scientific literature and such scientific and technical data as could be collected rapidly;
- telephone discussions with experts and players in the field.

Concerning the risk assessment scenarios, ANSES based its analysis on the control strategies favoured by the CNEV and selected some of them for further analysis:

- *Bacillus thuringiensis* var. *kurstaki* (Btk) for use as a larvicide in mangrove swamps by aerial spraying;
- deltamethrin in peri-urban areas, used to treat the sheets in light traps as an adulticide.

The other scenarios are the result of risk-assessment studies in the context of expert appraisals carried out by the Agency<sup>2</sup>.

To ensure that the work of ANSES and the CNEV proceeded in a consistent and complementary manner, telephone conferences were held on a daily basis and all scientific information and data were shared.

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<sup>2</sup> Reports by AFSSET on control strategies for *Aedes albopictus* in the context of the Chikungunya epidemic on Réunion Island (2007).

#### ■ MAIN LIMITATIONS AND UNCERTAINTIES

It cannot be guaranteed that the literature consulted was exhaustive, considering the short time available to respond to this request.

Uncertainties remain concerning the methods for implementing the different control strategies in the field and, in this context, it is not possible to guarantee that the modelling tools used to assess the exposure of workers, the population and the environment are totally representative. The conclusions are therefore based either on exposure models used in a regulatory context taking certain assumptions into account by default (which are relatively biased in favour of the protection of public health and ecosystems) or on the transposition of the results of an expert appraisal by the Agency in 2007 on vector control in the context of the Chikungunya epidemic on Réunion Island, with the assumption that the control strategy could be applied in much the same way to combat the Ashen Moth in French Guiana. These results have therefore been used as a basis for the Agency's recommendations on the potential risks to the population and the environment but should under no circumstances be considered as the results of quantitative risk assessments.

The assessment of the risks to health and the environment was limited to risks related to active substances. Consequently, no attempt was made to study the effects of co-formulants in commercial products.

The acceptability of the risks were rated, depending on the active substances described, on the basis of the principles defined in Directives 91/414/EC, since repealed and replaced by Regulation (EC) No.1107/2009 on the authorisation of plant protection products or Directive 98/8/EC.

Lastly, the work described in this document should not replace the risk assessment carried out for requests for active substances to be included in Annex I and marketing authorisation for products, in the framework of the Biocides Directive or plant protection regulations.

### 3. THE AGENCY'S CONCLUSIONS AND RECOMMENDATIONS

ANSES recommends that the guidelines drawn up by the Regional Health Agency of French Guiana be distributed and implemented immediately on a large scale, especially those designed to control and reduce the risk of contact with the moths during periods of infestation.

ANSES concurs with the conclusions of the CNEV and recommends a rapid increase in the number of simple light traps (not impregnated with insecticide) on the outskirts of the municipalities affected by the outbreak of Ashen Moths. They have been shown to be an effective way of protecting the population in the event of large-scale emergence of *Hylesia metabus*. These traps should, however, be used together with complementary measures such as a reduction in lighting (public and private) at times when the moths are active.

The latest information from French Guiana suggests that the current outbreak of Ashen Moths is receding. Bearing this in mind, ANSES recommends a measured approach to the use of chemical control strategies against *Hylesia metabus*. In the short term, and considering the moth's development cycle, ANSES recommends combating the moth's adult form in order to reduce the discomfort and the impact on health related to *Hylesia metabus* outbreaks. As regards the use of larvicides, even biological ones such as *Bacillus thuringiensis* var. *israelensis* (Bti) or var. *kurstaki* (Btk) and in the absence of sufficient information to guarantee both their efficacy and the possibility of controlling the risk to the population and the environment in the mangrove swamps of French Guiana, ANSES recommends against treating the larval stages of *Hylesia metabus* in mangrove swamps with insecticides.

■ **SHORT-TERM CHEMICAL CONTROL STRATEGIES**

In the short term, ANSES recommends that if chemical control methods based on deltamethrin are used against the moth's adult form, the following principles should be respected:

• **Concerning the use of deltamethrin**

Deltamethrin was notified (to the Commission) under the terms of the Biocides Directive and, after assessment, the European Commission proposed a Directive amending Directive 98/8/EC of the European Parliament and Council so that deltamethrin could be included as an active substance in Annex I (20 May 2011). During this period, products containing deltamethrin as an active substance are authorised.

The available data show the efficacy of this insecticide against the adult form of *Hylesia metabus*. It does, however, present risks of some concern to ecosystems, especially those in aquatic environments and also to bees. As a member of the family of alpha-cyano pyrethroids, it is capable of causing paraesthesia in humans.

It should only be used in a framework of accompanying measures guaranteeing the safety of ecosystems and the health of local populations.

i) **Recommendations for the use of deltamethrin to treat sheets illuminated in light traps**

The use of light traps with deltamethrin-treated sheets has been shown to be effective, particularly at the French Guiana Space Centre (CNES) in Kourou. These devices also reduce the dissemination of the insecticide in the environment and among the population. It should be the first strategy for action in the event of outbreaks.

On the basis of its risk assessment scenario, ANSES recommends:

- i) setting up traps in peri-urban areas (between the mangrove swamps and the residential areas), at a sufficient distance from any aquatic environment (at least 100 m),
- ii) strictly adhering to the product's instructions for use as regards doses,
- iii) the use of formulated commercial products in aquatic environments that do not require the addition of solvents during application,
- iv) suitable protection (goggles, gloves and water-proof working clothes) to be worn by those carrying out these operations, and respect for best practice and conditions of hygiene,
- v) that the treatment be applied with a knapsack pressure sprayer rather than a nebuliser, in order to reduce dissemination of the product into the environment, especially into the surrounding atmosphere,
- vi) installing a system to collect contaminated runoff from the sheets in the event of rain, to reduce any dispersion into the aquatic environment; such effluent should then be disposed of in such a way as to avoid contamination of the aquatic environment,
- vii) limiting site access to the personnel responsible for maintaining the traps,
- viii) lastly, using suitable premises to collect, if necessary store, and ultimately incinerate the sheets at the end of a campaign.

ii) **Recommendations for the use of deltamethrin in spraying outdoor areas around light traps**

Particularly high numbers of *Hylesia metabus* can be found near light traps in the event of strong outbreaks, requiring spatial spraying of deltamethrin to destroy remaining live moths. It is therefore necessary to guarantee the safety of those responsible for maintaining the traps.

On the basis of a risk assessment scenario developed in the context of vector control, ANSES recommends:

- i) strictly adhering to the product's instructions for use as regards doses,
- ii) leaving an untreated buffer zone of at least 50 m around any aquatic environment,
- iii) the use of formulated commercial products in aquatic environments that do not require the addition of solvents during application,
- iv) suitable protection (goggles, gloves and water-proof working clothes) to be worn by those carrying out these operations, and respect for best practice and conditions of hygiene,
- v) limiting site access to the personnel responsible for maintaining the traps,
- vi) where appropriate, protection of apiaries during treatment campaigns by a warning system for beekeepers.

**iii) Recommendations for the use of deltamethrin in spraying near housing**

In the specific case of *Hylesia metabus* control, ANSES does not recommend spatial spraying with deltamethrin near housing.

Spraying with pressurised water, possibly mixed with a wetting agent, is preferable to eliminate moths resting in the daytime on walls, fences or tree trunks.

The main solutions for controlling the larval stage involve the potential use of Btk and Bti.

- **Concerning the use of Btk**

The subspecies *Bacillus thuriengensis* var. *kurstaki* has not been notified under the Biocides Directive and commercial products for biocide purposes containing this substance have been withdrawn from the market. Its use in biocidal operations will require a waiver.

Btk, a microbiological insecticide, is particularly selective when used against caterpillars. However, insufficient data are currently available to assess the impact on the various species dependant on the mangrove swamps.

Considering its regulatory status and the absence of specific tests for a quantitative assessment of the potential impacts on the ecosystem to be treated, in the short term ANSES recommends not using Btk to treat the larval stages of *Hylesia metabus* in mangrove swamps.

Future use of this insecticide in mangrove swamps should include experiments to assess the impact of such treatment on the environment.

- **Concerning the use of Bti**

The AM65-52 strain of *Bacillus thuriengensis* var. *israelensis* serotype H14 was notified under the Biocides Directive and, after assessment, the European Commission proposed a Directive amending Directive 98/8/EC of the European Parliament and Council adding this strain as an active substance to Annex I (20 May 2011). During this period, the sale of products containing this strain is therefore authorised.

Bti is a microbiological insecticide effective against diptera (the aquatic larvae of mosquitoes, Chironomidae, Simuliidae, etc.), and is widely used against harmful or disease-carrying mosquitoes. Any efficacy of Bti on the caterpillars of *Hylesia metabus* would be an exception, although some studies and field experiments suggest that it is effective. This should be studied further as a potential solution, since it is well tolerated by other lepidoptera and the aquatic stages of some diptera.

In the absence of experimental field data confirming the efficacy of Bti on *Hylesia metabus* and of data on the potential impact on the ecosystem to be treated, ANSES recommends not using Bti in the short term to treat the larval stages of *Hylesia metabus* in mangrove swamps.

Future use of this insecticide in mangrove swamps should include experiments to assess the impact of such treatment on the environment.

- **MEDIUM-TERM CONTROL STRATEGIES AND OUTLOOK**

During outbreaks of Ashen Moths and when human populations are already affected, it is often too late to implement a fully effective control strategy. Medium-term control strategies and methods against Ashen Moths should therefore target caterpillar populations.

ANSES concurs with the conclusions of the CNEV and recommends undertaking studies to identify sustainable control strategies and methods against *Hylesia metabus*.

The first priority must be to set up a monitoring system to be able to anticipate events and alert the population. The objectives of such a system would be to prepare control measures (setting up and maintaining barrier systems such as light traps), implementing a specific epidemiological monitoring system for cases of Caripito itch and, when appropriate, triggering control measures.

A lack of knowledge of the factors influencing the size of populations of Ashen Moth limits our ability to design new tools for efficient control before the emergence of adult insects. ANSES therefore recommends initiating specific research.

Although Btk, and especially Bti (considering its upcoming inclusion in Annex I under the Biocides Directive), are clearly worth investigating for use in controlling the caterpillar stage of *Hylesia metabus*, it should be noted that other potential solutions should also be explored (particularly bearing in mind the risk of developing resistance). Mating disruption techniques could prove to be a credible alternative in the medium term.

**The Director General**

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**KEYWORDS**

Pest control, insecticide, biocide, pyrethrinoid, *Bacillus thuringiensis*, papillonitis, *Hylesia metabus*.