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RE: Additional pesticide evaluations (mosquito controls)

This document provides preliminary tier rankings according to the standard protocol for five mosquito controls. Please be aware that this report is by no means a complete evaluation, but merely a screening according to the methodology for ranking in the tables.

Summit B.t.i. Briquets

This product is a mosquito larvacide based on the active ingredient *Bacillus thuringiensis* subspecies *israelensis* (10%). Inert ingredients (90%) are unknown. The product is in the form of a solid briquet that floats on the surface of standing water and releases effective levels of B.t.i. for a period of "30 days or more under typical environmental conditions," according to the product label. B.t.i "is a naturally occurring soil bacterium registered for control of mosquito larvae. Bti was first registered by EPA as an insecticide in 1983. Mosquito larvae eat the Bti product that is made up of the dormant spore form of the bacterium and an associated pure toxin. The toxin disrupts the gut in the mosquito by binding to receptor cells present in insects, but not in mammals."[1]

The product bears signal word CAUTION, indicating EPA hazard category III or IV. No off-target toxicity warnings are found on the label, and B.t.i. is considered to be selective to lepidoptera in its toxicity.

The environmental half-life of B.t.i. is expected to be shorter than the 30 day release period of the briquets, since the physical form of these devices is designed to increase their period of effectiveness. Products contain both the bacterial spores and the associated toxins, which are crystals made of protein. These crystals have the shortest life, while the spores may persist longer, especially in soils. Most sources quote persistence in the range of one to two weeks. For example, Thiravirojana found 50% mortality of *Aedes aegypti* larvae at 12-18 days in rainwater, with no effectiveness after 43 days.[2] B.t. is susceptible to degradation by sunlight. Most formulations persist on foliage less than a week following application[3], but the persistence in water can be longer. The soil mobility of B.t.i. is not applicable for this product, since it is applied directly to water.

Based on this information, a ranking in Tier 3 is recommended, but it is suggested that the identity of the inert ingredients be requested from the manufacturer to screen for any concerns.

Vectolex WDB

This product is a mosquito larvacide based on *Bacillus sphaericus* (51.2%). Inert ingredients (48.8%) are unknown. The product bears signal word CAUTION, indicating EPA hazard category III or IV. No off-target toxicity is mentioned on the label.

According to EPA, "*Bacillus sphaericus* is a naturally occurring bacterium that is found throughout the world. *B. sphaericus* was initially registered by EPA in 1991 for use against various kinds of mosquito larvae. Mosquito larvae ingest the bacteria, and as with Bti, the toxin disrupts the gut in the mosquito by binding to receptor cells present in insects but not in mammals. VectoLex CG and WDG are registered *B. sphaericus* products and are effective for approximately one to four weeks after application."[1]

In addition to infecting a different group of mosquito species than B.t.i., *Bacillus sphaericus* is a potentially valuable insecticide because it remains effective in stagnant or turbid water. Although *Bacillus sphaericus*, as it occurs naturally, does cycle and maintain itself in the environment, insecticidal formulations currently under development do not cycle in water to infect subsequent generations of mosquito larvae.[3]

Based on this information, a ranking in Tier 3 is recommended, but it is suggested that the identity of the inert ingredients be requested from the manufacturer to screen for any concerns.

Altosid XR
This product is a mosquito larvicide based on the active ingredient methoprene (2.1%) and formulated as briquets. Inert ingredients (97.9%) are unknown. The product label bears signal word CAUTION, indicating EPA hazard category III or IV. The product label indicates that it is toxic to aquatic dipteran (i.e. mosquitos). According the EPA Registration Eligibility Document (RED) fact sheet for methoprene, the agency has concerns about the use of methoprene briquets in estuarine environments because of toxicity to aquatic invertebrates.[4]

The halflife of methoprene in soil is reported to be about 10 days. In its RED fact sheet in 1991, EPA indicates that methoprene is very short lived in water but that slow-release briquets may pose unacceptable risks to aquatic invertebrates. At that time additional testing was being requested to evaluate these risks. In 1997, EPA issued an unconditional reregistration for Altosid, including briquet formulations.

Based on the above information, a Tier 2 ranking is required for possible off-target effects.

Altosid XR-G
This product is a mosquito larvicide based on the active ingredient methoprene (1.5%) and formulated as slow release granules. Inert ingredients (98.5%) are unknown. The product label bears signal word CAUTION, indicating EPA hazard category III or IV. The product label indicates that it is toxic to aquatic dipteran and chironomid (midges)

Based on this information and the environmental fate and toxicity described above, the product is placed in Tier 2.

Agnique MMF
This product is a mosquito larvicide and pupicide that acts as a monomolecular surface film on water. The active ingredient (100%) is poly(oxy-1,2-ethanediyl),a-isooctadecyl-w-hydroxyl, which is an ethoxylated isostearyl alcohol surfactant. The product label bears signal word CAUTION indicating EPA hazard category III or IV. No warnings of off-target toxicity are found on the label. The persistence of the film is 5-22 days according to the product label.

According to the material safety data sheet, the product may contain up to .002% 1,4-dioxane (not dioxin), a carcinogenic contaminant frequently found in ethoxylated surfactants. This contaminant would likely be found in many pesticide products that contain such surfactants.

The potential for dioxane contamination was disregarded in the tier rating because 1,4-dioxane contamination is possible in so many products, from pesticides to household cleaners to personal care products.[5] Most manufacturers don't mention the possibility of contamination on MSDS sheets, and without testing data there is no fair way to identify or quantify this risk for different products. The product is placed in Tier 3.

References

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4. US EPA. RED Fact Sheet Methoprene. 1991.
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