TECHNICAL USE INFORMATION

VectoBac® 200G

Biological Insecticide

VectoBac® 200G Biological Larvicide is a granular formulation of *Bacillus thuringiensis* subsp. *israelensis* strain AM65-52 for control of mosquito larvae. VectoBac 200G is a safe and trusted larvicide used for controlling vector borne or nuisance mosquitoes around the world. Two granule sizes are offered in Canada and the potency of both formulations is 200 International Toxin Units (ITU) per milligram against Aedes aegypti larvae. The size, shape, and density of VectoBac granules lessen the potential for off-target application due to aerial drift and enable good penetration of dense vegetation.

Features and Benefits

FEATURES	BENEFITS
Biorational larvicide Biological larvicide mode of action	Not harmful to non-target organism populations
Broad control of all mosquito species Available in large and small granule sizes and commercial and restricted registrations	Application flexibility
Quickly kills mosquito larvae (2-24 hours)	Results observed quickly in the field
Virtually dust-free-dry formulations	Less respirable and particulate dust

VALENT BIOSCIENCES

Mode of Action

Bti produces complex crystal proteins known as protoxins during sporulation. When these proteins are applied to larval habitats of mosquitoes, the mosquito larvae ingest them by filter feeding. The crystal proteins are solubilized by the alkaline juices in the larval midgut and are cleaved by the midgut proteases, yielding active peptide toxins called delta-endotoxins. The delta-endotoxins cause the formation of holes in the midgut cell wall, leading to lysis of cells and larvae death within 2–24 hours.

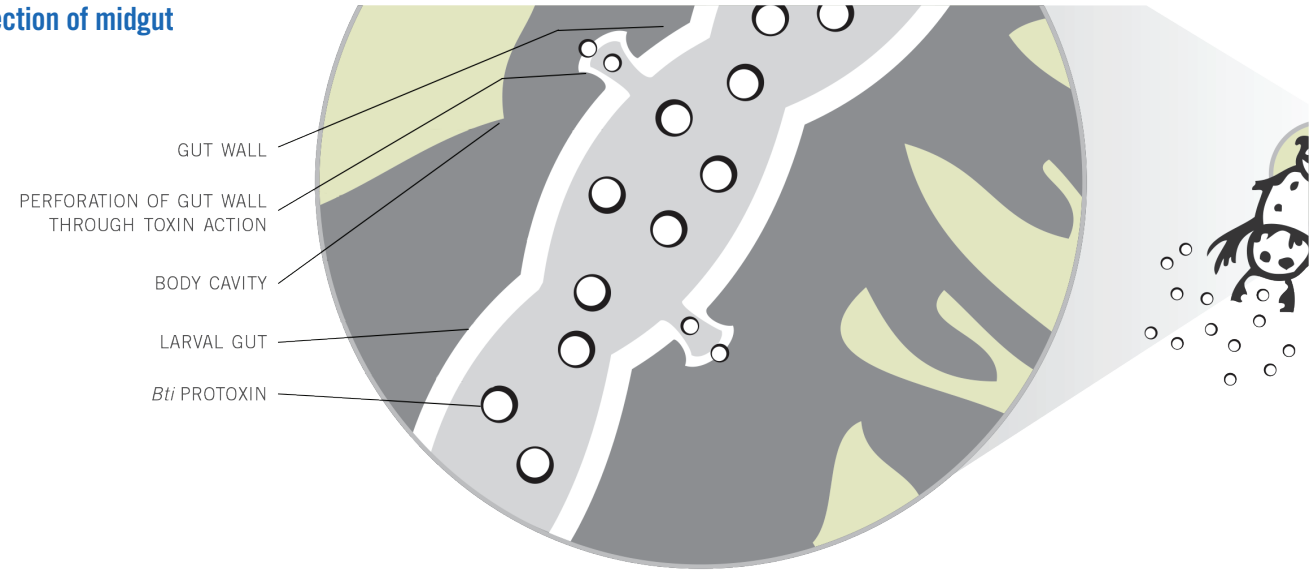
The reason Bti has remained effective since its introduction is the synergistic nature of four protein toxins that give Bti its efficacy. These four delta-endotoxins belong to three distinct toxin classes, each of which Bti releases when ingested by target larvae:

Cyt1A (27 kDa)
Cry4A (134 kDa)
Cry4B (128 kDa)
Cry11A (66 kDa)

While studies in a laboratory setting have shown resistance potential when individual toxins were isolated[1] from a particular strain of Bti,[2] no empirical or operational evidence of resistance has ever been substantiated when using the naturally occurring wild-type Bti strain AM65-52—a fact that has been documented by many of the foremost public health scientists in the world.[3] For this reason, it is not uncommon to hear Bti (including AM65-52) referred to as the single most important active ingredient available for public health larviciding programs.

1. Wirth. "Mosquito resistance to bacterial larvicidal toxins." The Open Toxinology Journal, 2010, 3:126–140.
2. Paul A, et al. "Insecticide resistance in *Culex pipiens* from New York." Journal of the American Mosquito Control Association, 2005, 21(3):305–309.
3. Becker N, Ludwig M. "Investigations on possible resistance in Aedes vexans field populations after a 10-year application of B*acillus thuringiensis israelensis*." Journal of the American Mosquito Control Association, June 1993, 9(2):221–224.

Enlarged section of midgut



VectoBac Mode of Action

- Mosquito larvae ingest Bti protoxin
- Protoxin activated in alkaline environment of the midgut
- Larval proteolytic enzymes break down activated protoxin into polypeptide fractions
- Polypeptide fractions act on midgut cells
- Midgut cells lyse
- Larvae die

VALENT BIOSCIENCES

Granule formulations

VectoBac 200G (5/8)

VectoBac 200G, the first Bti granule established for public health use in the early 1980's, contains both floating and sinking granules to ensure distribution of active ingredient throughout larval feeding zone. Granule size is approximately 2.4-4.0mm (5/8) mesh with a mean bulk density of 432 kg/m^3 (27 lbs/ft^3).

VectoBac 200G (10/14)

The smaller granule VectoBac 200G ensures maximum coverage at low rates. Granule size is approximately 1.4-2.0mm (10/14) mesh with a mean bulk density of 545 kg/m^3 (34 lbs/ft^3).

Rate in kg/hectare (lbs/acre)	COVERAGE			
	VectoBac 200G (5/8) (65 granules per gram)*		VectoBac 200G (10/14) (485 granules per gram)*	
	Number of granules per m^2	Number of granules per ft^2	Number of granules per m^2	Number of granules per ft^2
2.8 (2.5)	16.2	1.7	121.2	12.5
5.6 (5.0)	32.5	3.4	242.5	25.0
8.4 (7.5)	48.8	5.1	363.8	37.5
11.2 (10.0)	65.0	6.8	485.0	50.0

* Granules per gram and number per m^2 (ft^2) are approximations.

Application Information

Habitats:

- Standing Water
- Irrigation or roadside ditches
- Temporary and permanent pools in pastures and woodlots
- Natural marshes or estuarine areas
- Catch basins
- Sewage lagoons
- Water contiguous to fish-bearing water

An application rate range of 3–10 kg/ha (2.7-8.9 lbs/acre) is recommended. Use the high rate when late 3rd and early 4th instar larvae are predominate, mosquito populations are high, water is heavily polluted (sewage lagoons, animal waste lagoons), and/or algae are abundant.

A 3 to 14 day treatment interval should be applied.

DO NOT apply directly to treated, finished drinking water reservoirs or drinking water receptacles when the water is intended for human consumption. DO NOT apply by any type of irrigation system.

Packaging

VectoBac 5/8 large granules are available in 18.1kg bags and VectoBac 10/14 small granules are available in 18.1kg and 5kg bags.

Please refer to the label for more detailed usage information.