

BITE BACK!

With Aquabac 200G for Unsurpassed Mosquito Control

AQUABAC® 200G Mosquito Biolarvicide Granule

AQUABAC® is a microbial insecticide effective against mosquitoes in a variety of habitats. It's produced from a strain of *Bacillus thuringiensis* subspecies *israelensis*, a naturally occurring bacterium that produces a protein toxin (crystals) and a spore. The activity of the AQUABAC formulations and all BTI formulations is due to the presence of the protein toxin. The spore has no effect on the larvicide activity.

AQUABAC 200G on Corn Cob Granules is specifically manufactured to enhance larvicidal effects of the protein toxin and to ensure the toxin's biological stability.

AQUABAC formulations are manufactured in the U. S. under strict specifications, ensuring that the products are of high quality with no harmful contaminants.

The potency of AQUABAC is controlled within specific limits using a bioassay procedure based on toxicity to larvae of *Aedes aegypti*. Quality control bioassays are conducted prior to release of each lot of product. Other laboratories conduct analyses on each lot to assure there are no microbial contaminants present in the formulations.

AQUABAC 200G is available in 40 pound bags. Recommended application rate for control is 2.5 -10 lb. per acre. Please see bag for more specific information.

MODE OF ACTION

Mosquito and blackfly larvae are killed by ingesting the protein crystal (deltaendotoxin). The crystal is broken down in the larval midgut by a combination of enzymes and the alkaline environment. The epithelium of the midgut is destroyed, resulting in gut paralysis, complete loss of ionic regulation between the midgut and hemocoel and larval death. Because the AQUABAC must be ingested to be effective, the product does not affect pupae, adults, or late larval stages when active feeding has ceased.

Death of larvae is rapid, often occurring within one hour at field use rates. Complete mortality occurs in the laboratory within 24 hours. Blackfly larvae usually die within eight hours of treatment of the stream or river.

EFFECT ON NON-TARGET ORGANISMS

ENVIRONMENTAL FATE:

AQUABAC is naturally occurring and safe to the environment. It shows no cross resistance to chemical larvicides and is especially well suited for use in areas where there is demonstrated resistance to organophosphates or pyrethroids.

AQUABAC does not persist in soil or water. The protein crystals separate from the aquatic environment and settle to the bottom. They are deactivated by becoming food for other micro-organisms or being absorbed to soil or other organic particles. Spores do not recycle or regenerate in the field.

INVERTEBRATE TOXICOLOGY:

Bacillus thuringiensis subspecies *israelensis* (BTI) has no toxic effects on beneficial insects such as lady bird beetles, honeybees, mayflies, dragonflies, damselflies, stoneflies, caddisflies, and true bugs. Among *Diptera Chaoboroides* species *Ephydra riparia*, *Musca domestica*, *Odontomyia* species, and *Polpedilum* species are not susceptible to BTI. Some mortality occurs among *Chironomus pulmosus*, *Chironomus stigmaterus*, *Dixa* species, *Goeldichironomus holoprasinus* and *Palpomyia* species but at rates of 10 to 1000 times the field use rates for mosquito control.

Some mortality has been observed against *Toxorhynchites* larvae that ingested prey immediately following intoxication. Filter feeding first instar *Toxorhynchites* larvae are as susceptible to BTI as mosquito larvae. Later instars are relatively insensitive to BTI when intoxicated prey are absent.

OTHER NON-TARGET SPECIES:

No toxicity was observed against crustacea including copepod species, *Gambusia*, oysters, shrimp, crabs, mollusks, flatworms and amphibia.

In addition to safety to non-target vertebrates and invertebrates, BTI based larvicides have been used in large scale mosquito and blackfly control programs for 20 years with no adverse effects on humans.

Water conditions such as temperature, organic matter content, chlorine, some inorganic salts, and pH may affect performance of AQUABAC formulations. Larval feeding rates, subsequent ingestion of AQUABAC protein toxin and larval mortality rates are positively correlated with water temperature. Organic matter and algae represent an alternative food source for mosquito larvae. Therefore, the higher labeled rates are required to assure control. Water habitats containing high levels of mosquito larvae require a greater dose of AQUABAC for effective larval control.

Presence of free chlorine or some inorganic salts such as BaCO_3 , K_2CO_3 , and MgCO_3 can inhibit the activity of the protein toxin. The effectiveness of BTI is not impacted by pH levels near 7. Higher rates of AQUABAC are recommended for alkaline habitats with pH levels equal to or greater than 9.4.

The effectiveness of BTI is also influenced by larval feeding behavior. Lower mortality rates have been observed with all BTI based formulations among *Anopheles* larvae because of this genera's preference for feeding at the surface. Although AQUABAC®xt has been specifically formulated to enhance its suspension in the upper feeding horizon, the protein toxin does gradually settle out of the upper levels of water becoming inaccessible to these larvae.

For more information or to place an order, please call Rob Smith at 512-656-8825 or Mark Wiesepape at 214-986-6611.

