

# VECTOR

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# VISION™

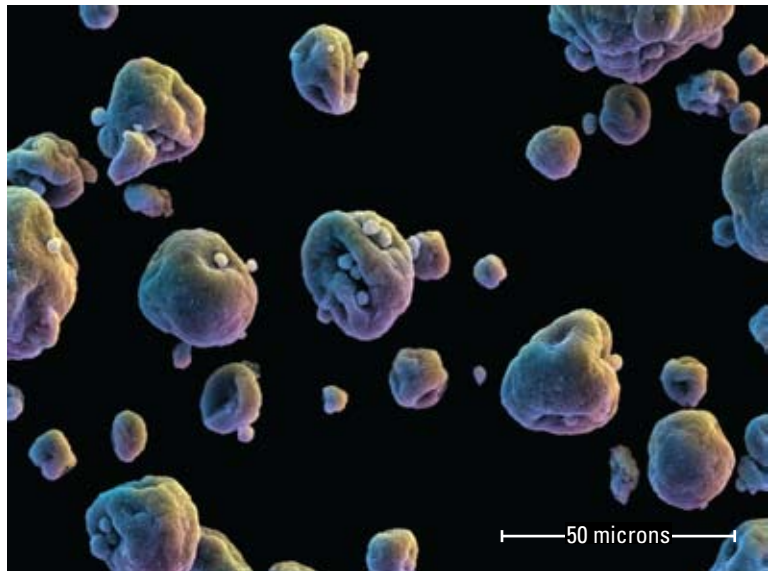
## Valent BioSciences Corporation Introduces VectoMax™ Advanced Biological Larvicide

Valent BioSciences Corporation is introducing a revolutionary product for mosquito control professionals worldwide. After extensive research and development efforts, Valent BioSciences Corporation is bringing to the market a new, advanced weapon for fighting mosquitoes – VectoMax™ Biological Larvicide.

VectoMax™ provides control of all mosquitoes through the actions of two naturally occurring microbial species, *Bacillus thuringiensis* subsp. *israelensis* (*Bti*) and *Bacillus sphaericus* (*Bsph*). *Bti* and *Bsph* are combined into every micro particle for ingestion by mosquito larvae. With each bite, larvae are exposed to the entire suite of *Bti* and *Bsph* toxins, resulting in quick kill of all mosquito species and extended residual in many habitats.

The key to this new product's broad-spectrum, long-lasting mosquito control lies within Valent BioSciences Corporation's new proprietary BioFuse™ technology that combines *Bti* and *Bsph* toxins into every micro particle during the manufacturing process. VectoMax™ is not a mixture of *Bti* and *Bsph*, but a unique **combination** of *Bti* and *Bsph* optimized to control all mosquito species.

In the United States, mosquito control professionals have expressed interest in a microbial product that combines the best features of *Bti* (quick kill, all species) with *Bsph* (residual control). Extensive large-scale field research shows VectoMax™ can



**VectoMax™ Technical Powder.** A proprietary technology called BioFuse™ combines two naturally occurring bacterial species in each and every micro particle of VectoMax™ biological larvicide.

meet those needs. Results from several of those field trials are included in this issue of *Vector Vision*™.

VectoMax™ is available in the United States in both granule (G, CG) and water soluble pouch (WSP) formulations in 2009. Please stop by the Valent BioSciences Corporation booth at AMCA to learn more about VectoMax™, or contact your local Valent BioSciences Corporation representative.

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**Aerial Application.** An Air Tractor 401B applies VectoMax™ CG to a field-trial site in the Woodbridge Ecological Reserve near San Joaquin, California.

## Fast Knockdown, Broad Spectrum, Long Residual Activity Demonstrated in San Joaquin Valley VectoMax™ CG Biological Larvicide Trial

The Sandhill crane is one of North America's largest birds. Standing nearly four feet tall and with wingspans that can approach six and a half feet, the birds summer in Canada and the northern U.S., and then migrate south for the winter.

For western cranes, one of the stops on their flight south is in the Central Valley of California. The Woodbridge Ecological Reserve near Lodi is a popular destination for the birds, tourists who come to view them – and a broad range of mosquito species that emerge as the reserve is artificially flooded in anticipation of the big birds' arrival.

It's the San Joaquin County Mosquito and Vector Control District's job to control both disease vectors and nuisance mosquitoes.

"We're faced with a challenge from floodwater mosquitoes every year," said Ed Lucchesi, assistant manager for the district. The water starts out fresh and clear, but becomes highly organic after two to three weeks. That's one reason why he and colleague Stacy Bearden, district entomologist, were eager to conduct a field trial with VectoMax™ Biological Larvicide, a new product from Valent BioSciences Corporation.



**Application Accuracy.** A bucket and stake mark one transect included in a VectoMax™ CG field trial. Cooperators noted broad-spectrum control and long residual activity.

VectoMax™ is a combination of two active ingredients – *Bacillus thuringiensis* subsp. *israelensis* and *Bacillus sphaericus* – fused in a specific ratio through a proprietary technology known as BioFuse™ technology. VectoMax™ G and CG are granular formulations intended for broadcast application; VectoMax™ WSP is a water-soluble pouch intended for use in catch basins.

Bearden and Lucchesi conducted the trial in September and October 2008. Initial flooding resulted in a hatch of *Aedes melanimon* and *Aedes vexans*. *Culex tarsalis*, *Culex pipiens* and *Culisetta* spp. quickly colonized the 50-acre site. Pre-treatment dips showed healthy populations of late-stage *Aedes* larvae.

After characterizing the fixed-wing plane for application accuracy, VectoMax™ CG, was aerially applied to the site on September 24 at a rate of 9.6 pounds per acre. "The application went beautifully," said Bearden. "We still had summer-like weather, and there was zero wind."

Bearden and Lucchesi saw an immediate effect. "At 24 hours post-treatment, and again at five days, we had virtually no larvae present. We continued to see excellent control of the target species all the way to the end of the trial."

Despite evidence of ongoing residual control, the San Joaquin trial ended 30 days after the treatment. The California Department of Fish and Game, which manages the ecological reserve, wanted to minimize disturbance of the birds from sampling, allowing tourists who flock to the area following the cranes the best possible viewing opportunities.

"We were very happy with the performance of VectoMax™," said Lucchesi. "The combination of the two bacteria in one product eliminates the need for a second application, especially with the long residual we saw. We anticipate continuing to use VectoMax™ as part of our arsenal."



## Multnomah County VectoMax™ CG Biological Larvicide Trial Demonstrates

### Quick Kill, Broad Spectrum Control, Residual Activity

**Large Trial.** A Bell 47 helicopter applies VectoMax™ CG to the Jewett Lake field trial site in Multnomah County, Oregon.

Lying at the confluence of the Columbia and Willamette rivers, Multnomah County is Oregon's smallest in area, but largest in population. It's also a nature-lover's paradise and is popular with fishermen, boaters and skiers, as well as hikers and bicyclists.

But the abundance of water also creates extensive habitats for mosquitoes. Keeping both disease vector and nuisance mosquito species in check is the job of Multnomah County Vector and Nuisance Control, a part of the Multnomah County Health Department.

David Turner is one of the county's five public health vector control specialists. "One of our goals has been to achieve economical residual control of *Culex* larvae and at the same time control the *Anopheles* larvae developing with the *Culex*," Turner explained. "In the past we have mixed products to get that kind of control."

But the process of mixing products – in a cement mixer – was very time-consuming, so Turner was pleased to have an opportunity to conduct a large-scale field trial with new VectoMax™ Biological Larvicide from Valent BioSciences Corporation in 2008. VectoMax™ is a combination of two active ingredients: *Bacillus thuringiensis* subsp. *israelensis* and *Bacillus sphaericus*. Through Valent BioSciences Corporation's new proprietary BioFuse™ technology, the toxins from each product are fused in a specific ratio into each micro particle of the formulation.

**Wetland Site.** An aerial photo shows the 245-acre Jewett Lake wetland on Government Island in the Columbia River near Portland, Oregon.

The trial location was the Jewett Lake Wetland, located on Government Island in the Columbia River. The 245-acre site is a mitigated floodplain wetland.

"Water's trapped in the wetland during spring flooding, then gradually dries down," Turner explained. "Our spring freshening events this season were the highest we've had in a dozen years, so we had plenty of water."

By mid-summer the wetland was populated with a broad spectrum of species – *Culex pipiens* and *tarsalis*, along with *Anopheles freeborni* – in stages from first-instar larvae through pupae. On July 23, VectoMax™ CG, a granular formulation, was applied by helicopter at a rate of 8.16 pounds per acre.

"We checked at 24, 48 and 72 hours post-treatment, and weekly thereafter," said Turner. "We found really good initial knockdown – almost 100 percent. And we had solid control all the way through 30 days. We were pleased."

Turner said his program plans to use VectoMax™ CG as a component of its summer aerial control program. "The broad spectrum control and residual – that's what we're after," he said. "We will happily retire the cement mixer and plan on using VectoMax™ in our ground- and aerial-based applications throughout the summer mosquito season."



## Great Salt Lake Marshland, Mudflats Create Mosquito Control Challenges

Davis County is one of Utah's smallest at 634 square miles. But more than half of its area is water, and much of the "dry"

land is actually marshes and mudflats surrounding the Great Salt Lake which lies on the county's western side.

All that water can create big challenges for mosquito control professionals, including Gary Hatch, manager of the Davis County Mosquito Abatement District. The district

deals with several different species, but *Ochlerotatus dorsalis* and *Culex tarsalis* are the main targets. That's why Hatch cooperated in a field trial with Valent BioSciences Corporation's new VectoMax™ Biological Larvicide during the summer of 2006.

## Great Salt Lake...

"We were excited about the possibility of having a new product that would offer a better way to control *Culex tarsalis* and the West Nile virus that it carries," said Hatch.

The field trial was conducted in late summer on a 60-acre plot at the Farmington Bay Wildlife Management Area. "The area was freshly flooded and we had *Cx. tarsalis* larvae in abundance."

VectoMax™ CG, a 10/14 mesh granular formulation, was applied by air at a rate of 8.6 pounds per acre. "We used the CG formulation, which has smaller granules than VectoMax™ G, because the site has such heavy vegetation," Hatch explained. "We have bulrushes, phragmite and salt grass, which can become thick and extremely matted."

Hatch's team made the first dip checks 48 hours after application. "We were pleased with the initial quick kill – we had 95 percent mortality in two days."

The trial continued until mid-September, and Hatch was happy with the results.

"We had three weeks of solid control," he said. "In fact, we were far enough into September that the *Cx. tarsalis* never recovered."

Hatch said the district has continued to use VectoMax™ in additional trials and operationally, including areas where both *Cx. tarsalis* and *Oc. dorsalis* are present. The same quick-kill, long residual performance resulted even in the presence of multiple species.

"My employees have been very happy with the performance of VectoMax™," he said. "The strong initial kill we've gotten gives them a lot of confidence in its long-term performance."

## VectoMax™ WSP Biological Larvicide Delivers Broad Spectrum, Long-Lasting Control of Catch Basin Mosquitoes

Catch basins to the left of them, catch basins to the right of them, catch basins in front of them ... well, for the staff of the Sacramento Yolo Mosquito and Vector Control District, there are catch basins just about everywhere.

"We're continuing to work with the cities to get an exact count, but the estimate is that we have somewhere between 150,000 and 200,000 catch basins in our district," said Randy Burkhalter, field operations supervisor. "Downtown Sacramento alone has some 12,000 to 14,000 basins. Not all of them hold water, but many do."

Those basins that do hold water also hold *Culex pipiens* and *Culex tarsalis*, both vectors of West Nile virus. To help protect the district's nearly 1.6 million residents from these mosquitoes, the organization conducts an aggressive larviciding program.

So, Burkhalter and his colleague, laboratory director Paula Macedo, were intrigued by the opportunity to test a new tool for mosquito control. They were asked to cooperate in a July 2007 field trial of a new Valent BioSciences Corporation product, VectoMax™ Biological Larvicide.

"Our objective was to control *Cx. pipiens* in the basins," Burkhalter recalled. "Getting an effect on populations of *Cx. tarsalis* was a bonus."

Burkhalter and Macedo selected a set of 22 basins for the trial. Pre-treatment counts ranged from 50 to 200 per dip, with a range of development stages from first-instar larvae to pupae.

The trial started on a good note, according to Macedo. "We used VectoMax™ WSP, the water soluble pouches, for the catch basins," she said. "Delivering the pouches to the basins was very, very easy ... nothing to measure or pour."

The product's initial performance also was good, according to Burkhalter. "We had a very quick kill," he said. "To go back in just a couple of days and see almost all the basins clear of larvae so quickly was encouraging."

He and Macedo were equally pleased with the long-lasting control VectoMax™ delivered. "We got great control right through 49 days," Burkhalter said. "With as many basins as we have to deal with, that long residual is critical for us. VectoMax™ is definitely another tool for us to use."

## Catch Basin Mosquitoes Meet Their Match

### *in Trial of VectoMax™ Biological Larvicide Water-Soluble Pouches*

Urban catch basins are ubiquitous in Alexandria, Virginia, and that makes them particular targets for mosquito control efforts by the city's health department.

Tim McGonegal, environmental health biologist, participated in a 2008 field trial with VectoMax™ Biological Larvicide to determine whether the new product from Valent BioSciences Corporation would provide long residual control of mosquitoes in their catch basins.

"We have many catch basins in our city – on the order of 4,000 – and a majority hold from four to 12 inches of water," he said. "Most of the basins are part of the stormwater system, but in Old Town area we have some that hold a combination of stormwater and sewage that creates a heavy organic environment."



**Organic Water.** High organic content is observed in an Alexandria, Virginia, catch basin. A number of basins in Old Town hold both stormwater and sewage, creating a highly organic environment.



**Catch Basin Check.** Staff with the Alexandria, Virginia, Health Department check one of the city's 4,000 catch basins before dipping for mosquito larvae.

For the VectoMax™ trial, McGonegal chose 34 basins, six of which were combination units. Though the summer of 2008 was a bit drier than normal, he said, pre-treatment dip samples showed anywhere from 150 to 200 larvae and pupae in each of the basins.

The trial began on July 7, when health department workers dropped one VectoMax™ WSP (water-soluble pouch) in each basin. The first post-treatment dips were made three days later.

"By day three there were literally no mosquitoes alive in the basins," he said. "We attribute that to the *Bti* component of VectoMax™. Even on day seven we found only one or two larvae out of all 34 basins in the trial."

The good results continued during the entire trial, McGonegal said. "With the combination basins, those that contained both stormwater and sewage, we had great results out to 35 days and really very good control out to seven weeks."

Results in the stormwater-only basins were even better. "We had solid control all the way out to 63 days. We did have a few rain events during that period, though nothing was very heavy. We were wondering what effect that would have on residual, but VectoMax™ continued to work."

The trial earned VectoMax™ WSP a place in McGonegal's mosquito control arsenal. "The residual was very good," he explained. "We typically had to treat every 30 days. With the longer residual we can reduce the amount of material we use and the labor to get it applied."

# IS IT A BOAT OR A TRUCK?



**YES.**

Not unlike new VectoMax™ Biological Larvicide. It's both *Bti* and *Bsph* – meaning it offers quick kill and residual control of multiple mosquito species in multiple habitats.

TALK TO YOUR VALENT BIOSCIENCES REPRESENTATIVE TO LEARN MORE.

**VectoMax™**  
Biological Larvicide



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Read and follow the label instructions before using.

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