



**Container Mosquito Vector Control
Vehicle Mounted WALS™ of VectoBac® WDG Bacterial Larvicide**

**STANDARD OPERATING PROCEDURE (SOP) FOR THE USA
VERSION 1.6
January 2019**

WHAT IS WALS™?

WALS is a biorational, wide-area larvicide application strategy designed and proven to control container mosquitoes in small, cryptic and expansive larval habitats.

WALS VECTOBAC WDG SPRAY APPLICATION

WALS application of VectoBac® WDG is recommended when container mosquito larval habitats less than 10 gallons in volume capacity are present in a specific area. Such small containers are often hard-to-locate or hard-to-reach with conventional application methods. An improved spray method to reach all small containers across a wide area is presented here. This WALS standard operating procedure (SOP) will complement existing vector control measures including direct larvicide treatment of large containers (>10 gallons).

LARVAL HABITATS

Common larval habitats for Zika, dengue, chikungunya and West Nile virus vectors include artificial containers made from various materials such as cement, clay, plastics, metal, fiberglass, etc. Examples of such containers are trash (eg. plastic bags, bottle caps), tires, toys, concrete drainage systems, roof gutters, and any other containers which can hold water. Habitats also include natural containers which can hold water, such as leaf axils, bromeliads, tree holes, leaves, natural pools with leaf litter, and others.

VEHICLE MOUNTED APPLICATIONS

Vehicle mounted WALS applications can cover large areas (spray blocks) of special concern, including areas of virus transmission (hot spots), or where populations of container mosquitoes are high due to the presence of many small containers. In these strategic areas, multiple residential blocks should be treated to assure coverage of the target zone. Vehicle mounted WALS applications are dependent upon wind conditions and access to the spray block from streets or alleyways to achieve coverage. If local conditions are not favorable to coverage, aerial or backpack WALS applications may be needed to achieve full coverage.

For vehicle mounted WALS applications, VectoBac WDG is suspended in water and mixed to the desired concentration prior to transferring into the selected spray equipment. VectoBac WDG suspension is then sprayed from vehicles driving on streets and alleyways in the target block. The spray cloud is distributed by wind to achieve coverage of the block. Coverage of blocks is completely dependent upon downwind movement of the spray cloud to achieve deposition of drops throughout the block. Spray equipment capable of generating appropriate droplet spectra which can be distributed across the intended swath by wind is required for this type of application.



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APPLICATION RATE AND SPRAY VOLUME

WALS VectoBac WDG application rate is 0.25 to 0.5 lb/acre (4.0-8.0 oz/acre or 250-500 grams/hectare) for most situations. Higher doses (up to 14 oz/acre or 1000 grams/hectare) are occasionally needed and may be used when local experience indicates the need for higher rates to control larvae in specific habitat types. Spray volume should range from 0.125 to 0.5 gallons per acre (gpa), depending on swath, speed and equipment flow capacity. It will be important to maintain proper droplet size with the flow rate and concentration selected.

SPRAY EQUIPMENT AND DROP SIZE

Power spray equipment capable of generating drops in the extremely fine to fine (EF/VF/F) size classification (ASABE S572.1 Standard) is recommended for this application. Drop spectra larger than this range are not recommended since they may cause heavy deposit near the sprayer, resulting in deposit on parked vehicles in or near the street. They may also cause waste of spray volume due to fallout of large drops near the sprayer, which may not reach the target properties. Targeted drop size for WALS truck mounted spraying is based both on coverage (drops per unit area) and downwind deposition across the intended swath under local conditions.

Drop size preference is a balance between maximizing coverage and maintaining spray deposit within the targeted block. Local conditions and equipment type will dictate the most efficient drop size and effective swath. These conditions include wind speed, initial spray cloud height, equipment flow capacity, distance between drivable roadways and/or alleyways, building height and density, and density of vegetation in the blocks. Equipment type will dictate achievable drop spectrum, so it is best to select equipment type based on typical conditions in location of use.

Spray equipment should be capable of delivering flow rates which are sufficient for coverage of swaths from 100 to 300 feet at vehicle speeds of 5 to 10 mph. Table 1 illustrates required flow rates in gallons per minute needed for various target swaths, vehicle speeds and two spray volumes. Not all spray equipment will be able to achieve the higher flow rates and also generate appropriate drop sizes at the required concentrations. Equipment models will need to be selected based on capacity and tested locally with mixed product.

Table 1 – Required flow rates in **gallons per minute** for various swath widths, vehicle speeds and two spray volumes/mix rates to achieve 0.5lbs VectoBac WDG per acre.

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	0.5 gallons per Acre 12% mix (1 lb VectoBac WDG/gallon)			0.25 gallons per Acre 24% mix (2 lbs VectoBac WDG/Gallon)		
Swath	100 ft	200 ft	300 ft	100 ft	200 ft	300 ft
5 mph	0.5	1.0	1.5	0.25	0.5	0.76
10 mph	1.0	2.0	3.0	0.5	1.0	1.5

NOTE: Flow rates and/or mix concentration may be adjusted achieve application rates lower or higher than 0.5 lbs/acre. Consult your Valent BioSciences representative for assistance with these adjustments.

EQUIPMENT TYPES

Two types of vehicle mounted spray equipment have been successfully used for WALS VectoBac WDG applications.

- Air blast sprayers
- Cold fogging machines

Each of these equipment types offer advantages and disadvantages. Cold fogging machines tend to generate relatively small drops and have proven useful for treatment of suburban areas with large single family lots and no alleyways. The drop spectra from these machines can often move the entire distance between suburban streets even in light winds to achieve coverage. It is important to note that cold foggers specifically designed for mosquito adulticide spray do not typically offer the volume capacity needed for the WALS approach. Specialized sprayers are recommended.

Air blast sprayers offer greater vertical projection of the spray cloud than do cold fogging machines. This can be advantageous in dense urban settings where multi-story buildings and walled properties are present. Initial release of the spray cloud to greater heights by these sprayers allows distribution up and over these obstacles. In order to consistently produce drop spectra in the targeted range, installation of a Micronair® AU5000 kit with EX6353 (short) fan blades set at a pitch of 55 degrees (notch #2) is recommended for all air-blast machines.

Properly configured rotary atomizers also prevent excessive drop coalescence, which can occur with hydraulic nozzles placed in the air blast tube. In locations with consistently high winds (>10mph) blade angle may be adjusted to produce slightly larger drops. Consult your VBC representative before making adjustments.

Table 2 - Examples of equipment types for vehicle mounted WALS applications.



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TYPE	RECOMMENDED ATOMIZER	Recommended Use
AIR BLAST	Micronair® AU5000 55 deg blade angle (notch #2)*	Urban with wind 3-15 mph
		Urban with wind 3-15 mph
COLD FOGGER	ULV Vortex or Air Assist	Suburban with wind 1-8 mph
		Suburban with wind 1-8 mph

*EX6353 short fan blades and 20 Mesh screens

APPLICATION PROCESS

Operations should be well planned and mapped in advance of spraying. While spraying, vehicles should drive perpendicular to prevailing winds on streets and alleyways in the spray block at speeds of 5-10 mph. Spraying should begin at the downwind end of the block and successive spray passes should be made moving upwind with each pass. Spray routes will ultimately need to be customized for each targeted spray block.

SPRAY MIX PREPARATION

VectoBac WDG spray mix should be prepared with clear water within 12 hours before the spray. If weather conditions or operational issues prevent utilization of prepared spray mixes, mixed product should be used within 48 hours, but may be used up to 72 hours after mixing.

It is recommended that the spray mix not be prepared in the insecticide tank of the spray equipment, but rather in a separate mixing system. Mixing can be done in buckets or barrels with paddle agitation or paint stirring devices, but specialized mixing systems are recommended for large scale operations. These include Venturi inductor and paddle tank mixing systems.

VectoBac WDG suspends readily in water and will stay suspended during normal application periods. Brief mixing might be necessary if the spray mixture is left undisturbed for several hours.

SPRAY CONDITIONS

It is highly recommended that spraying be conducted when wind is 1 to 15 mph and meteorological conditions at the treatment site allow the spray cloud to remain near ground



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and not drift upward into the atmosphere. **These conditions occur most often in the night and cool morning hours**, after an inversion develops and when atmospheric mixing (turbulence) is low.

WIND CONDITIONS

Effective swath coverage is entirely dependent upon wind conditions. Winds between 1 and 15mph are recommended to achieve adequate spray distribution. If possible, smaller drops should be selected for lower wind conditions. Applications in completely calm conditions (no wind) will not yield acceptable results.

EQUIPMENT CLEAN UP

All spray equipment used to spray VectoBac WDG must be cleaned after use. Flush the used nozzle/orifice with water. Immediate cleaning and proper flushing of the nozzle will prevent the coating of VectoBac WDG on spray equipment components.