

## LARVA SAMPLING/LARVICIDING GUIDELINES/LOG

### ***Culex tarsalis* larval habitat**

*Culex tarsalis* has a wide range of habitats in grassland and open woodland areas, usually in warmer water areas exposed to the sun. In the spring, small numbers of *Culex tarsalis* larvae usually can be found in shallow, permanent and semi-permanent ponds, irrigated areas and weedy roadside ditches. However as populations build during the summer, larvae may be found in temporary water bodies, including artificial containers, water-filled hoof prints near livestock watering sites, bird baths, used tires and foul water in corrals and around feedlots.

### **Monitoring for Mosquito Larvae**

Testing or monitoring for the presence of mosquito larvae in standing water is a critical “first step” in any mosquito control program. Biological larvicides such as Vectobac, Aquabac or Vectolex will not work unless there are mosquito larvae at a certain stage of development present. Testing for mosquito larvae is usually done with a dipper which has a handle about 3’ long with a white cup or dipper attached to the end. There are commercially made dippers available, but you can make your own using a 3’ long dowel with a white plastic container (500 g yogurt containers work well) attached to the end. The old white enamel dippers that were used on the farm in the past are excellent – but are hard to find.

### **Performing a Dip**

When you are searching for mosquito larvae it is important to not disturb the larvae that may be on the water surface. Mosquito larvae will quickly swim to the bottom of the water body or hide under vegetation or other debris if disturbed.

- When approaching a water body, move slowly and carefully. Vibrations from your footsteps, disturbing the vegetation or your body casting a shadow over the water can be enough to cause larvae to dive to the bottom.
- Mosquito larvae of the *Culex tarsalis* genera are typically found on the surface of the water and usually next to vegetation or surface debris. In larger bodies of water, they are found in more shallow water areas with vegetation, such as grasses and sedges present. These are along the edge of larger water bodies. Mosquito larvae are not typically found in the more open deeper water areas where there is excessive wind and wave action.
- Dipping should be concentrated in areas where there is vegetation or floating debris.
- If there is a strong wind, dipping should be done on the downwind side of the water body where the larvae and pupae may be concentrated.
- Dipping for mosquito larvae is not effective if it is raining.

## Dipping Techniques<sup>1</sup>

### Complete Submersion and Simple Scoop Method

- A “dip” is made by quickly scooping a dipperful of water. Mosquito larvae such as *Culex tarsalis* are frightened easily and will try to avoid the dipper, if the dip is taken too slowly; therefore it is important that a dip be done quickly.
- Quickly plunge the dipper below the surface of the water, and then bring back a “scoop-full” of water; avoid over-filling as the larvae may be lost in the overflow.
- This is the most common way of performing a dip.

### Partial Submersion and Flow-In Method

- This method is used when you need to test for larvae at the edges of vegetation in shallow water.
- Push the dipper, tilted at approximately 45°, straight down into the mud and beside clumps of grasses or sedges. This causes the water around the vegetation to flow into the dipper, carrying the larvae with the flow. There is no need to move the dipper and make sure to pull the dipper up before it is full.

### Scraping Method

- Used to collect larvae that are hiding under floating or other vegetation, such as cattails.
- Dip from the water towards the vegetation and then using the dipper to scrape up against the base or underside of the vegetation to dislodge the larvae.
- This method can be more effective if the bottom of the dipper is screened.

### Treating Larvae

Once you have determined that there are mosquitoes present in a water body, you can now treat that area with the biological control agent, *Bacillus thuringiensis var. israeliensis* or *B.t.i.* for short (Vectobac or Aquabac). These products come in either a liquid or granular form. The liquid can be applied with conventional spray equipment and is suitable for open water bodies, such as roadside ditches in the spring. However, when there is thick vegetation present by late spring or summer, the small granule form is preferred as it falls through the vegetation to the water surface. *B.t.i.* granules can be applied by hand using a pail and a scoop or by small hand-held grass seed or fertilizer spreaders if the water body is small. If a water body is too large to be treated by hand, then a backpack blower can be used.

- *B.t.i.* is the most effective when the larvae are in the 2<sup>nd</sup> and 3<sup>rd</sup> instar or development stage. It does not work on pupae.

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<sup>1</sup> C. O'Malley, *Wingbeats*, Winter 1995, p.24

- Apply at rates recommended on label. The application rate for all methods averages 5 – 10 kg/ha. (approx. 4.5 – 9 lbs/ac.) or 1g/m.
- Use in temporary pools in pastures and woodlots, irrigation or roadside ditches, natural marshes, catch basins and sewage lagoons.
- Use higher rates in deep, very cold water, and/or polluted water, and when late 3<sup>rd</sup> or 4<sup>th</sup> instar larvae predominate.

A new biological control agent, *Bacillus sphaericus* (Vectolex WDG, Vectolex WSP and Vectolex CG) has been registered for use in Canada. Vectolex CG is a granular form of the product that can be used to treat mosquito larvae found in waste tires. It should be applied at a rate of 0.56 – 1.68 g product/m<sup>2</sup> with the higher rate to be used in water with a high organic content and water with a high level of suspended solids.

### When to treat

The following table gives an estimate of larval density and can be used as a guide for treating or not treating a water body<sup>2</sup>. The counts are based on taking 10 dips taken around and close to the vegetation edge of the water body. At each “dip” the mosquito larvae are counted.

Density	Low	Medium	High
No. larvae in 10 dips	1-4	5-60	>60
Treatment required	No *	Yes	Yes

\*Treating a site with low numbers depends on size. If it is small, then you can treat it. If the water body is large, then treatment is not cost-effective

Larva sampling of sites should be completed each week. Typically, larval treatment at any given site using *Bti* will need to undertaken on average every two weeks.

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<sup>2</sup> Based on guidelines from the City of Winnipeg, Insect Control Branch

## Mosquito Larvae/Larviding Log

MAP ID <sup>3</sup>: \_\_\_\_\_

DATE: \_\_\_\_\_

LOCATION: \_\_\_\_\_

SIZE: \_\_\_\_\_

TYPE <sup>4 5</sup>: \_\_\_\_\_

VEGETATION: \_\_\_\_\_

PREDATORS: \_\_\_\_\_

NO. OF DIPS: \_\_\_\_\_ QUANTITY/DIP: \_\_\_\_\_

					TOTAL	
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INSTAR STAGE(S): \_\_\_\_\_ PUPA \_\_\_\_\_

### APPLICATION INFORMATION

PRODUCT: \_\_\_\_\_

RATE/AMOUNT: \_\_\_\_\_

APPLICATION METHOD: \_\_\_\_\_

WEATHER: \_\_\_\_\_

APPLICATOR: \_\_\_\_\_

<sup>3</sup> ID number for sites should be assigned from maps of the community

<sup>4</sup> roadside ditch, drainage ditch, shallow slough, swamp or bog; large pond or lake, seepage area, dugout, wastewater retention pond, oxbow or sluggish stream, tire pile, other

<sup>5</sup> **Temporary** – shallow (< 1 foot – 30 cm) lasting 2-6 weeks. Mostly grasses and sedges but can also have reed grasses, whitetop, or rushes where water stays the longest. **Semi-permanent** – 1 to 3 feet (30 cm – 1 metre) in depth lasting through most of season. They often dry up by end of year. Vegetation is mostly cattails but can have bulrush in deeper areas. Generally no open water in middle – generally do not produce mosquitoes early in the spring, but can have multi-voltine (multi-generational) mosquitoes develop later when water warms up. **Permanent** - > 3 feet (1 metre) deep that do not dry up during the season. Emergent deep marsh vegetation (i.e. cattails and bulrush species) and open water in middle with submergent vegetation – can produce some mosquitoes in emergent vegetation zone but an abundance of natural predators can keep populations in check.