Parks and Open Space Management

Saskatchewan Parks and Recreation Association Inc.

Blower and Argo Handbook

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Introduction and Disclaimer of Liability for Use of the Document

This Parks and Open Space Management Handbook, provides a description of procedures associated with maintenance activities performed within park settings.

The concept of maintenance standards requires the application of best practices within the local operation system. To assist with the establishment of such standards, this resource provides guidelines to aid staff in addressing their daily management operations. There are, however, situations where the standards outlined may require revision by those staff implementing the procedure, to best meet their needs. Specific site conditions, operating budgets, available human resources, and capacity to offer training associated with the practices outlined in this document may warrant alterations to the procedures.

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Blower and Argo Introduction

It was mid morning and I had just felt a drop of rain. I was quite surprised actually, the sun was shining and there hadn't been any rain in the forecast. In fact, there hadn't been any rain in the forecast for weeks. We were experiencing a dry spell and as a result, the mosquito numbers were down considerably. Everywhere you went you would hear people comment on how nice it was to be able to enjoy being outside.

Elaine and I were just finishing up at the airport site. "Well, let's load up the Argo and we will drive down the Lewvan to the other side of Gordon Road", I said. "Even though we have had no rain lately, there will still be some standing water there – there always is".

Loading up the Argo only took a few minutes and then we were off! Elaine and I were guessing how many larvae we would find in the first 10 dips. As Elaine pulled over to park the truck and trailer, we agreed that who ever was the closest would get to drive the Argo for the rest of the day. We unloaded the Argo and decided together which way would be the best to enter the area.

Blower and Argo Introduction Continued….

I was on the 7th dip and it looked like I was going to be driving the Argo for the day. Elaine had guessed 30 and I guessed 18 and so far we had only identified 12. “You’re cheating,” Elaine said. “Cheating – how can I cheat, the larvae don’t lie,” I laughed.

Well, I finished making the 10 dips…I won! Actually we all won. The larvae counts were remaining low and everyone benefits from that.

Blower and Argo Overview

Interestingly enough the use of the word mosquito dates back to 1583 so I am not so sure how much of an overview this module needs. We all know what they are and how annoying they can be. They hinder our outdoor activities; they can carry disease and overall can just be a downright nuisance. This is why it is so important that communities continually test and treat areas where the mosquito larvae live. Mosquitoes thrive in standing water and marsh like areas. You would be surprised at just how little water they require to be able to go through their life cycle. These areas can be treated with Vectobac™, which is a larvicide, or in simpler terms – a substance that causes death in mosquito and biting fly larvae.

For the smaller areas within the municipal limits, for example: parks, along railway tracks, and ditches along some roadways, an individual crew member can be sent out with a Backpack Blower that they will strap to their back treating the area with Vectobac™ as they walk the area.

Blower and Argo Overview Continued….

In the larger areas, for example; irports, school grounds, and ditches, a two-person crew can transport an Argo to the site and, once unloaded, they can begin to test and treat areas. The Argo is an amphibious 8 wheeled vehicle that you are able to drive on land as well as in water. It has a Backpack Blower specially mounted on its posterior end. One crew member drives slowly and the other is free to test and treat areas for mosquito larvae.

To test for larvae you will perform “dips” which we will cover more thoroughly later on in the module. If you find sufficient mosquito larvae you can treat the area with Vectobac™.

Your Day Begins…

Safety Equipment Overview

From your past experience you know the importance of wearing the correct clothing and safety gear used by Pest Management workers. The safety gear for the one person Backpack Blower crew is the same as the safety gear for a two person crew working with the Argo, with the exception of head gear.

Safety Gear

- Hard Hat - Required *(never worn backwards or over another hat, and to be worn on all roadways)*
  OR
  Bike Helmet - Required *(wear on all roadways when operating the Argo)*
- Safety Vest - Required *(wear on all roadways)*
- CSA Approved Safety Boots - Required
  OR
  CSA Approved Rubber Boots - Required
- Work Gloves - Recommended
- Rubber Gloves - Recommended
- Safety Glasses - Recommended
- Ear Plugs - Recommended
- Insect Repellent - Required
- Fire Extinguisher - Required
- First Aid Kit - Required
- 2 Way Radio - Required

Safety Equipment Overview Continued….

The hard hats do not do you much good when you are driving in the Argos. You are usually driving on some pretty rough terrain and the hard hats have a tendency to just bounce off your head. Now crews wear bike helmets for head protection, which offer better protection; they are cooler because of the ventilation and the most important feature - they have a chin strap which must be done up at all times.

Safety First!

Do not wear radio or music headphones. Using any type of equipment requires your full attention.

Backpack Blower Circle Check

As mentioned earlier, the Backpack Blowers are used to apply the control product in the smaller concentrated areas within the community's limits.

Before you leave the shop perform a Circle Check on your Backpack Blower.

There are two different types of Backpack Blowers used by our crews. When you are mixing the gas and oil for your fuel keep this in mind:

- Redmax blowers use a 50:1 gas/oil mixture.
- Robin blowers use a 40:1 gas/oil mixture.

After you perform your Circle Check on your Backpack Blower, you can secure it in the back of the truck using a bungee cord. Now you are ready to head off to the location you are scheduled to test and treat.

Starting the Backpack Blowers

Remember, whether you are starting a Backpack Blower that you intend to wear on your back, or if you are starting the Backpack Blower that is mounted onto the back of the Argo, it is the exact same piece of equipment.

1. Your Backpack Blower should be sitting firmly on the ground or mounted firmly on the back of your Agro.

2. Push the Primer Button 3 or 4 times.

3. You pull the starter grip lightly until you feel some resistance, and then pull it briskly. Do not let the starter grip go causing it to snap back against the Backpack Blower. Instead, gently guide the starter grip back into its casing.

Starting the Backpack Continued….

4. Adjust the throttle (red lever on the right) accordingly. This controls the levels (0 through 5 – 5 being the fastest) of motor speed/acceleration.

5. There is a black lever to the left of the red lever. You use this lever to control when the blower sprays out the Vectobac™. Pulling the lever upward will start the spraying, a downward motion will stop the spraying and it also adjusts the flow rate. As you go along testing for mosquito larvae, you will treat the areas where you find larvae by blowing the Vectobac™ onto the surface of the desired area.

Argo Circle Check

The Argo's mobility lets you cover a larger area in a shorter amount of time, not to mention some of the marsh areas, which would be very difficult to cover on foot. The Argo is very effective in a community's efforts to control the mosquito population.

Before you leave to start treating areas you must perform your Circle Check on the Argo.

Argo Maintenance Check

Maintenance Check List

	BEFORE EACH USE	AFTER INITIAL			EVERY					SECTION REF.
		2hrs.	8hrs.	20hrs.	10hrs.	25hrs.	50hrs.	100hrs.	250hrs.	
CHECK COOLANT LEVEL (CONQUEST)	X									
CHECK FAN BELT TENSION (CONQUEST)	X									
CHECK FUEL LEVEL	X									2.2
CHECK TIRE INFLATION	X									7.2.6
CHECK TWIST GRIP THROTTLE OPER.	X									2.2
CHECK STEERING LEVER TRAVEL	X									2.2
CHECK ENGINE INTAKE/EXH. FOR OBSTR.	X									2.2
CHECK THAT DRAIN PLUGS ARE IN PLACE	X									5.6
CHECK ENGINE OIL LEVEL	X									6.1.1
CHANGE ENGINE OIL & OIL FILTER										
- KAWASAKI				X			X			6.1.3
- BRIGGS & STRATTON			X				X			6.1.3
CHECK TRANSMISSION OIL LEVEL		X					X			6.2.1
CHANGE TRANSMISSION OIL				X				X		6.2.2
CLEAN AIR PRE-CLEANER						X				6.3.1
CHECK CLEAN/REPLACE AIR FILTER								X		6.3.1
REPLACE FUEL FILTER									X	6.3.2
LUBRICATE DRIVEN CLUTCH							X			6.4.2
SERVICE DRIVER & DRIVEN CLUTCH									X	6.4.2
LUBRICATE DRIVE CHAINS					X					6.4.3
REMOVE, CLEAN & LUBE. DRIVE CHAINS								X		6.4.3
LUBRICATE IDLER CHAINS					X					6.4.4
REMOVE, CLEAN & LUBE. IDLER CHAINS								X		6.4.4
LUBRICATE AXLE FLANGE - OUTER CAVITY						X				6.4.5
LUBRICATE AXLE FLANGE - INNER CAVITY								X		6.4.5
LUBRICATE INNER AXLE BEARINGS									X	6.4.7
LUBRICATE IDLER BEARINGS									X	6.4.6
LUBRICATE STEERING LEVERS						X				
CHECK BATTERY FLUID LEVEL & CAPS							X			7.1.2
CLEAN BATTERY TERMINALS & CONNEC.								X		7.1.2
CLEAN BATTERY									X	7.1.2
CLEAN, ADJUST/REPLACE SPARK PLUGS								X		7.1.4
CHECK THE DRIVE BELT						X				7.2.1
CHECK NYLON SLIDERS - DRIVEN CLUTCH							X			7.2.2
CHECK SLIDERS - CHAIN TAKE-UP SYSTEM		X			X		X			7.2.4
CHECK & ADJUST IDLER CHAINS		X					X			7.2.5
SERVICE THE CLUTCH UNITS									X	6.4.2
INSPECT BRAKE PADS						X				7.3.1
ADJUST HOLDING BRAKE						X				7.3.5
CHECK HYD. BRAKE FLUID LEVEL/COND.							X			7.4.2
CHECK FUEL TANK CONNECTIONS/LINES								X		
INSPECT WIRING HARNESS								X		
TIGHTEN BEARING EXT. BOLTS			X					X		7.2.8
CLEAN OUT SPARK ARRESTER							X			7.1.5

Starting the Argo

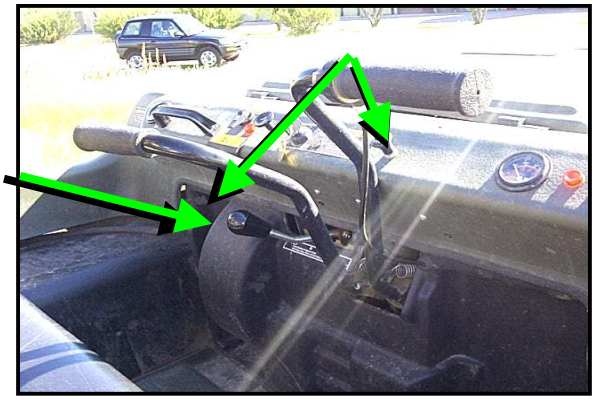
Before you actually start the Argo up we wanted to take an opportunity to remind you one more time how important it is that you are very aware of your surroundings and the terrain that you are driving on. If you happen to be treating an area and it is necessary that you cross a roadway, a good rule of thumb is that if you couldn't cross the street yourself walking at a normal pace – then it's not safe to cross in the Argo.

1. The control lever should be in the neutral (N) position and the park brake should be on.
2. Turn the key to the ON position.
3. Check for any warning lights or alarms.
4. Throttle up the engine using the hand grip.
5. If it is cold out you will have to pull and hold the choke while you are starting the Argo.
6. Turn the key fully to the right and start the motor. If the Argo doesn't start with the first try, allow the starter to cool for 15 seconds and then repeat this step. Only crank the motor over for 3 seconds at a time to avoid killing the battery. Once the Argo is running, always allow the Argo to run for 2 minutes to warm up.

Driving the Argo

Changing Gears:

Steering / brake levers.



The Argo is equipped with a four position transmission, reverse, neutral, low and high.

- ☑ Reverse (R) is used for backing up.
- ☑ Neutral (N) is when starting the engine or when the Argo is left to idle.
- ☑ LOW is used when you are traveling at low speeds over rough terrain and when you require extra pulling power.
- ☑ HIGH is used for normal operating speeds.
- ☑ Remember not to change gears while the Argo is moving. To change gears, bring the vehicle to a complete stop by throttling down, let the engine idle down completely and then move the shift lever to the desired gear.

Driving Forward:

Once the engine is idling you will shift into reverse (R) first, and then shift into either LOW or HIGH gear. **(This will save wear and tear on the transmission).** Then you push the handle levers straight ahead towards the dash. Turn the throttle hand grip slowly, the clutch will engage on its' own and the Argo will begin to move forward. You can increase your speed by turning the hand grip.

Driving the Argo Continued….

Turning the Argo:

You will learn that the rear of the Argo swings outward during a turn. Always keep this in mind when you are turning. Riding the brakes while making turns will cause excessive heat, brake fade and lead to premature brake wear.

☑ If you are making a **left turn**, gently pull back on the left handle lever while applying a little throttle. When the turn has been completed, push the left handle lever forward towards the dash.

☑ If you are making a **right turn**, gently pull back on the right handle lever while applying a little throttle. When the turn has been completed, push the right handle lever forward towards the dash.

Backing Up:

While your engine is idling, shift the transmission into reverse (R). Now push the handle levers forward (towards the dash). Then turn the throttle hand grip slowly, the clutch will engage on its' own and the Argo will begin to move backward. Same as when you are moving forward, you can increase your speed by turning the hand grip.
You make your turns the same as when you are moving forward; the only difference is that you would be in reverse (R) gear as opposed to LOW or HIGH gear.

Driving the Argo Continued….

Stopping the Argo:

- ☑ Be cautious that you are stopping in a safe area.
- ☑ Let the Argo idle down.
- ☑ Put your park brake on. Both levers have them. One is sufficient for normal parking, but use both on slopes if necessary.
- ☑ Put the transmission in neutral (N).
- ☑ Let the engine cool off for a few moments.
- ☑ Turn the key to the OFF position.
- ☑ Remove the key from the Argo.

Getting Unstuck:

You drive through some pretty marshy areas with the Argo and it is not unheard of to get stuck in the mud. For this very reason, there is a winch on the front of the Argo and you will have an extra cable with you.

- ☑ There is a black lever on the dash for the winch. Flip the lever upwards. The winch cable should be pulled out in neutral and only used until the Argo is free then unhooked and wound up without extra weight.
- ☑ Wrap the extra cable around whatever it is that you have chosen to use to pull the Argo out with, (something solid like a telephone or power pole, your truck or trailer), then attach the winch hook to the cable hook. Be careful not to kink the cable.
- ☑ Shift into LOW gear, engage the winch, and slowly crawl forward as the winch tightens up – pulling the Argo forward.

Driving On Different Terrain

General:

When driving the Argo, LOW is used when traveling at a low speed, over rough terrain and when you require extra pulling power; HIGH is used for normal operating speeds.

Uphill/Downhill:

If you have to drive uphill, it is important to approach the incline head-on and have the Argo in LOW gear. This will reduce the risk of the Argo sliding sideways or rolling over. You will then move forward, slowly, keeping your traction. If you lose traction, the Argo could slide backward or sideways. If this ever happens, gently apply the brakes to stop it from sliding. By releasing the brakes gradually off and on, you will be able to coast to the bottom of the hill.

If you have to drive downhill again, you have to approach the decline head on. Gently apply the brakes to control the speed of the Argo as you are going down the hill. Careful not to slam on the brakes as this could cause the Argo to roll over frontward. Another way to drive downhill is to keep the Argo in LOW gear and keep your engine speed up just enough to keep the clutch engaged.

Marsh Areas:

When you are entering marsh areas be sure that you are in LOW gear so that you are able to avoid stopping and sinking while you are trying to shift.

Entering Water:

When entering deep water or water of unknown depth ALWAYS back in. This will allow the lighter rear-end of Argo to float keeping the ATV more level. Driving straight in may result in the front of the Argo going under water.

Loading The Argo

1. Back the Argo onto the trailer. Back it in all the way so the rear tires are right up to the trailer frame. Apply the Argo brakes to hold it there and shut the Argo off. You will learn how important it is to use the four point tie-down. This will ensure that your load is secure.

2. Loop the chain from the trailer, through the Argo, back to the trailer and secure the chain.

3. The winch strap on the passenger side of the trailer gets looped through the front of the Argo and is attached and tightened to the driver's side of the trailer. Now release the park brakes so they are not engaged while driving to and from sites.

4. The driving ramp can be lifted into place and the pins inserted to secure the ramp.

Unloading The Argo

When you arrive at the shop in the morning your Argo may already loaded from the previous day and ready to go. Take a few minutes to be sure that you have all the proper safety gear and equipment that you will require for the day. Once you arrive at the work site:

1. Be sure to park on level ground.
2. Remove the pins from the sides of the ramp at the back of the trailer.
3. Loosen and remove the winch strap from the front of the Argo.
4. Remove the chain from the back of the Argo.

5. You start the Argo, remembering to let it run for 2 minutes to warm up.
6. You drive the Argo slowly and carefully down the ramps, off the trailer and onto the ground.

Performing A Dip

We have been mentioning “testing and treating” areas where mosquito larvae are found. When performing a “dip” you are actually testing the area to see if there are any mosquito larvae in the water. You will use a dipper which has a handle about 3’ long with a small white cup attached to the end.

When you are searching for mosquito larvae try not to disturb the larvae that may be at the waters surface. Approach the area with caution, moving slowly and carefully. Vibrations from your footsteps, your body casting a shadow or moving vegetation can be enough cause for larvae to dive to the bottom of the water. Mosquito larvae of most genera, particularly the common Culex, Aedes and Anopheles, are typically found at the water’s surface and frequently next to vegetation or surface debris. In larger bodies of water, they are typically near the sides – not in the open deep water.

You want to concentrate on dipping around floating debris and aquatic and emergent vegetation. If there is a strong wind, dipping should be done on the windward side of the habitat where the larvae and pupae are most heavily concentrated. You can’t perform dips for larvae if it is raining.

Different Methods for Performing a Dip

There are 7 basic ways of performing a dip depending on the genera of mosquito present, the habitat that you are testing along with the weather conditions.

Shallow Skim Method

This is the first and usually the best method to begin with. Submerge the leading edge of the dipper, tipped approximately 45 degrees and about an inch below the surface of the water. Quickly but gently move the dipper along a straight line in the water. To prevent overflow, end the stroke just before the dipper is filled. This method is particularly effective for Anopheles who tend to remain at the surface of the water longer than Aedes and Culex. Anopheles are usually associated with floating vegetation and debris.

Complete Submersion Method

This method can be performed in water, with or without floating objects. Many mosquito larvae, particularly those of the genera Aedes and Psorophora, are very active and if disturbed will quickly dive below the surface. You will quickly plunge the dipper below the surface of the water, and then bring the dipper back up to the surface through the diving larvae. Do this carefully to avoid losing the larvae in the overflow current.

Partial Submersion Method

This method is used when you need to test for larvae at the edges of vegetation in the water. Push the dipper, tilted at approximately 45 degrees, straight down adjacent to the vegetation. 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 horizontally. Pull the dipper up before it is full.

Flow-In Method

This method is used in very shallow waters. Larvae can be collected by pushing the dipper into the substrate of the water and letting the shallow surface water, debris and larvae flow into the dipper. Do not move the dipper horizontally.

Scraping Method

This method is used when testing for larvae under floating or emergent vegetation. Dip from the water towards the vegetation and end by using the dipper to scrape up against the base or underside of the vegetation to dislodge the larvae. This method is usually more effective if the bottom of the dipper is screened and it is often used to test for Coquillettidia and Mansonia mosquitoes.

Simple Scoop Method

This is the “dipping to get water” method. It consists of simply scooping a dipper full of water. This is the most common way of performing a dip; however, it can only be successfully used to collect Culex larvae.

Background Method

This method is especially useful in wooded areas and other shallow water. Submerge the dipper completely to the bottom and then slowly move it around. The darker mosquito larvae and pupae will stand out against the background of your dipper. Once the larvae can be seen, slowly lift your dipper out of the water.

Treating Larvae

You have learned how to start your Backpack Blower and the Argo, as well as learning how to check for mosquito larvae – now you are about to learn how to treat an area that you have determined has mosquito larvae.

There are a few different methods used by Integrated Pest Management crews when applying Vectobac™ and the method used depends on the size and location of the bodies of water. The application rate for all methods averages 5 – 10 Kg/Ha or 1g/m.

- The smaller pools of water can be treated by hand using a pail and a scoop.
- When there is a stretch of water and it's too large to treat by hand, a Backpack Blower is filled with Vectobac™ and used to treat the area.
- For larger bodies of water that are far off the roadways the Argo is used with a blower and a second crew member treats as you move along.

Filling the Container on a Backpack Blower

You should carry several bags of Vectobac™ with you in the Argo. If you are not using an Argo and are instead walking with the Backpack Blower, then the Vectobac™ should be kept in the box of your truck.

The container on the top of the Backpack Blower holds the Vectobac™. The lid on the top screws off and the opening is quite large. You can add the Vectobac™ until the container is full.

Treating an Area with Vectobac™

You have performed a dip and you have found mosquito larvae, now you must treat the area with Vectobac™. You will use the black lever on the Backpack Blower to control the amount of the Vectobac™ that comes out of the Blower and onto the desired area's surface. Test each site and treat as required.

Treatment Signs

If you have treated an area, you are required to post the proper signage informing the public of the date the area was treated. When you are posting the sign, use the T "China" marker or white hockey tape to write the date on the sign.

There should be a telephone number on the sign that the general public can call if they require further information. Typically you would post one treatment sign per site, however if you have treated a large area you may need several. Some communities also treat areas within 10km outside of their limits. Treatment signs should be posted at all sites within limits and outside the limits up to 1km out.

Recording Treatment Information

Treatment information must be recorded in a worksheet as well as in your log books. The information that you are required to record is as follows; size of the area treated, the date the area was treated, the average number of larvae seen after performing 10 dips, the amount and product that was applied. The date on the sign will need to be updated after each visit to that site.

This will help you keep track of the areas treated, just in case someone calls in because they have seen the sign posted – that information will be available. It is also required by law to have this information recorded.

If you are a one person crew, you will be responsible for recording the information. If you are a two person crew with an Argo, the skilled labourer is responsible for recording the required information, but both crew members must have this info in their individual log books.

Treating Areas Outside Municipal Limits

Every year you may decide to send out permission letters to landowners and tenants for a distance of 10km outside the municipal limits. Landowners and tenants may sign these letters granting you access to their land to treat for mosquito larvae.

When you are entering these areas, avoid damaging any crops that are planted. Try to follow the paths that already exist to avoid making ruts on the property. Remember, it is very important that you close all gates that you opened to gain access to the property.

Vectobac™

Vectobac™ is a larvacide used to kill mosquitoes in the larval stage of their life cycle. Many communities use Vectobac™ in areas with standing water. For instance, creeks, along ditches and catch basins are prime breeding grounds for mosquitows. Vectobac™ contains a naturally occurring bacterium, *Bacillus thuringiensis, Var. israelensis* (Bti), that is common in soils throughout the world. The Vectobac™ is scattered or sprayed on the water's surface. The larvacide becomes part of the food eaten by the larvae and damages their stomachs, causing the larvae to stop feeding and die before they can go through the next life cycle stage and reach adulthood.

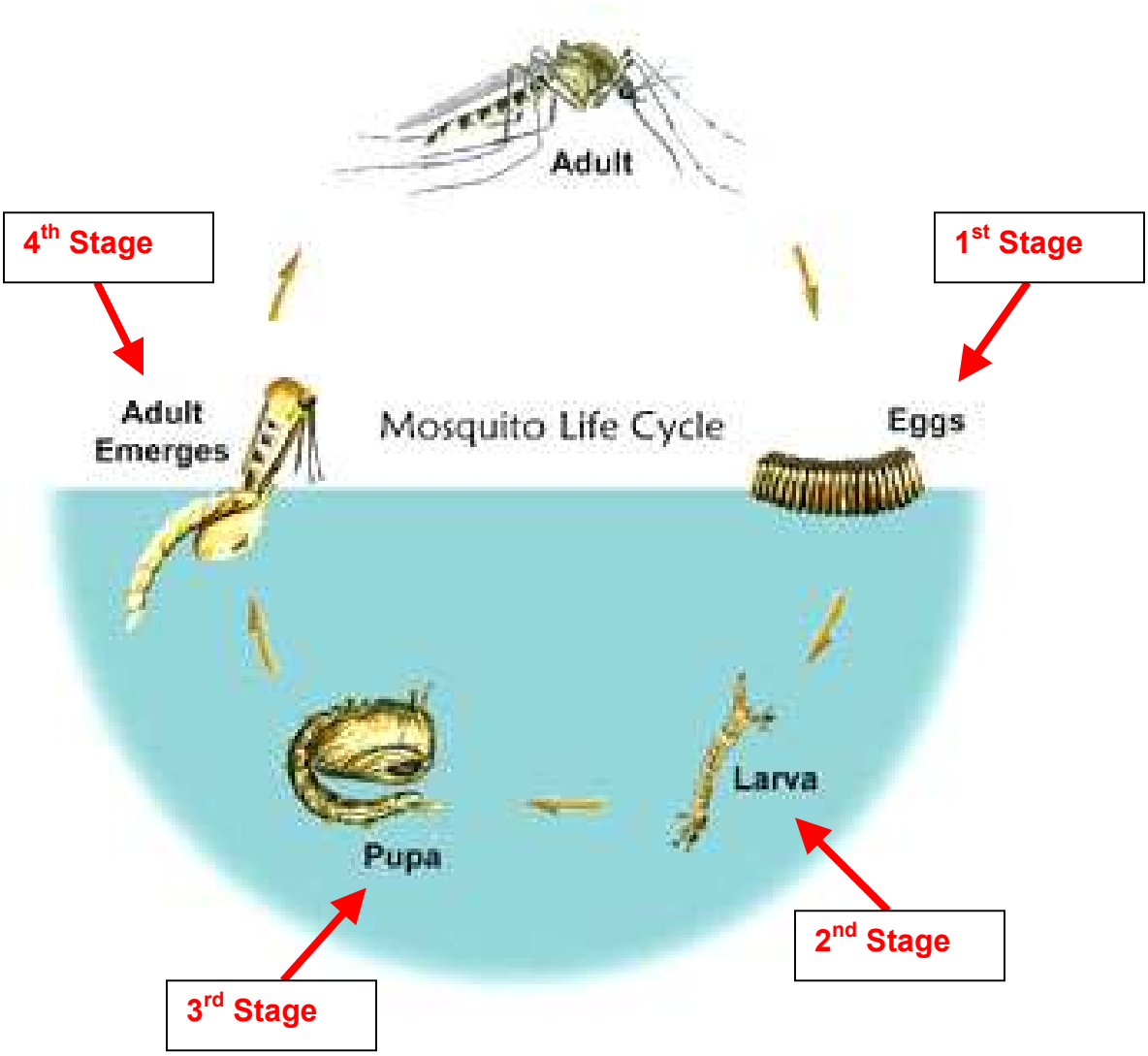
Vectobac™ is fast acting; however, it does not provide long term control (approximately 24 – 48 hours). This is why you must regularly treat areas that are known to have a problem with standing water.

Tests have shown that this particular larvacide has little to no effect on the plants, fish or other beneficial organisms that live in the water.

FIRST AID FOR MOSQUITO BITES
- Wear your repellent.
- Wash bite with soap and water.
- Apply anti-itch medication.
- Apply cold cloth for swelling.
- Watch for infection.

Mosquito Life Cycle

Before you begin to learn about the larvacide and the equipment used in the battle to fight mosquitoes we thought we would provide you with a little information on the mosquito life cycle. The mosquito goes through four separate distinct stages of its life cycle.



1st Stage of Cycle

Eggs are laid and formed to resemble a “raft” that floats on the surface of the water or in areas that will become flooded. The eggs may lay dormant for several years or until conditions are suitable. It looks like a speck of soot, about 1/4” long and 1/8” wide and could consist of anywhere from 100 to 300 eggs. A female mosquito may lay a raft of eggs every third night during her life span. She needs blood to help her produce those eggs.

2nd Stage of Cycle

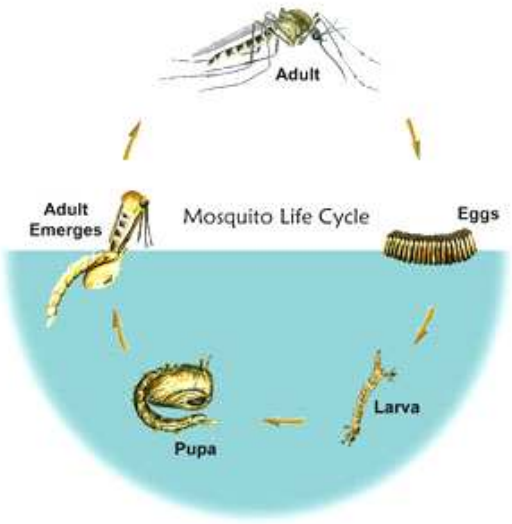
Larva emerge from the egg within a 24 – 48 hour time frame and can live in water from 4 – 14 days depending on the temperature of the water and the weather conditions. For oxygen, larva come to the water’s surface regularly. At this stage in their life cycle they are constantly feeding and growing. During growth, the larva sheds its skin four times. This shedding process is referred to as “instar”. It reaches about 1/2” in length and stops feeding after its third instar. After the fourth instar, the Larva becomes a Pupa. This stage is known as the “wiggler”.

3rd Stage of Cycle

Pupa is a resting, non-feeding stage of development. They are able to move using their tail. This is the cycle that the mosquito changes into adulthood – like the caterpillar that turns into a butterfly. This cycle last about 48 hours and is known as the “tumbler” stage.

4th Stage of Cycle

Adult mosquitoes rest on the surface of the water for a short time to allow them to dry and their bodies to harden. They spread their wings out to let them dry so they can fly. Females require nector before a blood meal. Blood feeding and mating does not occur for about 48 hours after the adult merges. Only female mosquitoes bite.



Mosquito Facts

Just for fun we thought we would include some interesting facts on mosquitoes. After all, they are so common, yet, how much do we really know about them…read on and find out!

- Females are the only mosquitoes that bite and they drink about 5-millionths of a liter per serving. They require a human or animal's blood to nourish and produce eggs (between 100 – 300 at one time). They even take a nap after having a blood meal to assist in the digestion process.

- Adult male mosquitoes only feed on nectar and plant juices.

- There are approx. 2,000 different kinds of mosquitoes found around the world. (Now we know there's no getting away from them).

- A mosquito weighs about 2 to 2.5 milligrams.

- Some people seem more prone to mosquito bites. While it is true that mosquitoes are drawn to the carbon dioxide and lactic acid (produced by muscle metabolism) in your breath they can also detect infra-red light from your body. Various other scents like perfume, perspiration and other smells can make one person more attractive to a mosquito than another.

- Wearing looser, lighter colors of clothing, long sleeves and pants will reduce your chances of being bitten; mosquitoes tend to be attracted to darker colors because they are better at absorbing heat and light.

- Mosquitoes are most active in searching for blood during the hours around dawn and dusk.

Mosquito Facts Continued….

- When mosquitoes bite they inject their saliva, an anti-coagulant into their victim to prevent a person or animal's blood from clotting. Our body's auto-immune response to this causes an itching, swelling or burning feeling that is quite normal.

- Mosquitoes can fly up to 10 mph, dart between raindrops and even fly backwards. Most live and die close to where they hatch, but some are strong flyers that travel many miles in search of a blood source.

- Mosquitoes wings actually have scales on them. That's why when they flutter their wings very fast, (some as much as 250 times per second); they produce that high-pitched buzzing you hear.

- Mosquitoes are the most dangerous animals in the world because of the disease that they can carry (malaria, yellow fever, sleeping sickness, hepatitis and more commonly known, West Nile Virus). They can also transmit parasites such as heartworm to pets.

- According to the World Health Organization, there are 300 to 500 million clinical cases of malaria alone each year, resulting in 1.5 to 2.7 million deaths.

At the End of the Day

On the drive home from work that day you are listening to the news. The announcer just happens to be making a comment on how the mosquito numbers are actually down this year.

Your first thought is that you won't get eaten alive while you play ball tonight. Your second thought puts a smile on your face as you think of your daily contribution to keeping those mosquito numbers down.

Blower and Argo – Job Aid
Safety Gear

From your past experience you know the importance of wearing the correct clothing and safety gear used by Integrated Pest Management workers. The safety gear for the one person Backpack Blower crew is the same as the safety gear for a two person crew working with the Argo, with the exception of head gear.

Safety Gear

Hard Hat - Required *(never worn backwards or over another hat, and to be worn on all roadways)*

OR


Bike Helmet - Required *(wear on all roadways when operating the Argo)*


Safety Vest - Required *(wear on all roadways)*


CSA Approved Safety Boots - Required

OR


CSA Approved Rubber Boots - Required


Work Gloves - Recommended


Rubber Gloves - Recommended


Safety Glasses - Recommended


Ear Plugs - Recommended


Insect Repellent - Required


Fire Extinguisher - Required


First Aid Kit - Required


2 Way Radio - Required

Blower and Argo – Job Aid
Backpack Blower Circle Check

As we mentioned earlier, the Backpack Blowers are used to apply the control product in the smaller concentrated areas within the community's limits.

Before you leave the shop perform a Circle Check on your Backpack Blower.

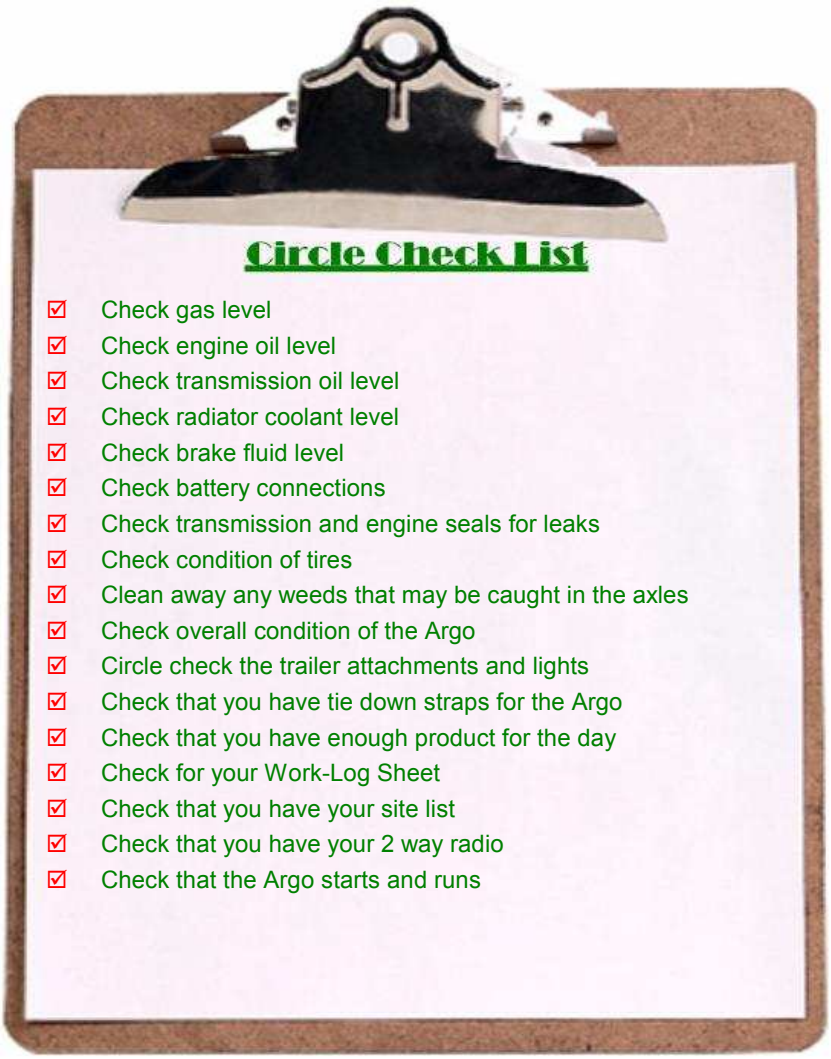
There are two different types of Backpack Blowers used by our crews. When you are mixing the gas and oil for your fuel keep this in mind:

- Redmax blowers use a 50:1 gas/oil mixture.
- Robin blowers use a 40:1 gas/oil mixture.

After you perform your Circle Check on your Backpack Blower, you can secure it in the back of the truck using a bungee cord. Now you are ready to head off to the location you are scheduled to test and treat.

Blower and Argo – Job Aid
Argo Circle Check

The Argo's mobility lets you cover a larger area in a shorter amount of time, not to mention some of the marsh areas which would be very difficult to cover on foot. Before you leave to start treating areas you must perform your Circle Check on the Argo.



Blower and Argo – Job Aid
Argo Maintenance Check

	BEFORE EACH USE	AFTER INITIAL			EVERY					SECTION REF.
		2hrs.	8hrs.	20hrs.	10hrs.	25hrs.	50hrs.	100hrs.	250hrs.	
CHECK COOLANT LEVEL (CONQUEST)	X									
CHECK FAN BELT TENSION (CONQUEST)	X									
CHECK FUEL LEVEL	X									2.2
CHECK TIRE INFLATION	X									7.2.6
CHECK TWIST GRIP THROTTLE OPER.	X									2.2
CHECK STEERING LEVER TRAVEL	X									2.2
CHECK ENGINE INTAKE/EXH. FOR OBSTR.	X									2.2
CHECK THAT DRAIN PLUGS ARE IN PLACE	X									5.6
CHECK ENGINE OIL LEVEL	X									6.1.1
CHANGE ENGINE OIL & OIL FILTER										
- KAWASAKI				X			X			6.1.3
- BRIGGS & STRATTON			X				X			6.1.3
CHECK TRANSMISSION OIL LEVEL		X					X			6.2.1
CHANGE TRANSMISSION OIL				X				X		6.2.2
CLEAN AIR PRE-CLEANER						X				6.3.1
CHECK CLEAN/REPLACE AIR FILTER								X		6.3.1
REPLACE FUEL FILTER									X	6.3.2
LUBRICATE DRIVEN CLUTCH							X			6.4.2
SERVICE DRIVER & DRIVEN CLUTCH									X	6.4.2
LUBRICATE DRIVE CHAINS					X					6.4.3
REMOVE, CLEAN & LUBE. DRIVE CHAINS								X		6.4.3
LUBRICATE IDLER CHAINS					X					6.4.4
REMOVE, CLEAN & LUBE. IDLER CHAINS								X		6.4.4
LUBRICATE AXLE FLANGE - OUTER CAVITY						X				6.4.5
LUBRICATE AXLE FLANGE - INNER CAVITY								X		6.4.5
LUBRICATE INNER AXLE BEARINGS									X	6.4.7
LUBRICATE IDLER BEARINGS									X	6.4.6
LUBRICATE STEERING LEVERS						X				
CHECK BATTERY FLUID LEVEL & CAPS							X			7.1.2
CLEAN BATTERY TERMINALS & CONNEC.								X		7.1.2
CLEAN BATTERY									X	7.1.2
CLEAN, ADJUST/REPLACE SPARK PLUGS								X		7.1.4
CHECK THE DRIVE BELT						X				7.2.1
CHECK NYLON SLIDERS - DRIVEN CLUTCH							X			7.2.2
CHECK SLIDERS - CHAIN TAKE-UP SYSTEM		X			X		X			7.2.4
CHECK & ADJUST IDLER CHAINS		X					X			7.2.5
SERVICE THE CLUTCH UNITS									X	6.4.2
INSPECT BRAKE PADS						X				7.3.1
ADJUST HOLDING BRAKE						X				7.3.5
CHECK HYD. BRAKE FLUID LEVEL/COND.							X			7.4.2
CHECK FUEL TANK CONNECTIONS/LINES								X		
INSPECT WIRING HARNESS								X		
TIGHTEN BEARING EXT. BOLTS			X					X		7.2.8
CLEAN OUT SPARK ARRESTER							X			7.1.5

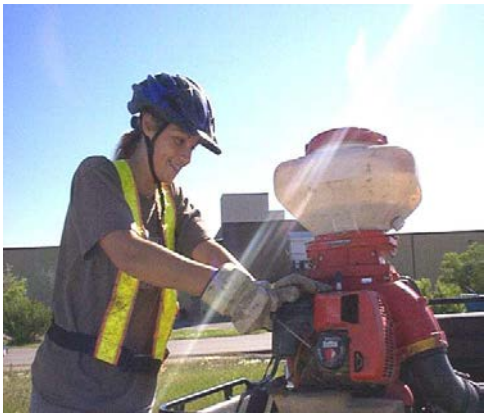
Blower and Argo – Job Aid
Starting the Backpack Blowers

Remember, whether you are starting a Backpack Blower that you intend to wear on your back, or if you are starting the Backpack Blower that is mounted onto the back of the Argo…it is the exact same piece of equipment.

1. Your Backpack Blower should be sitting firmly on the ground or mounted firmly on the back of your Agro.

2. Push the Primer Button 3 or 4 times.

3. You pull the starter grip lightly until you feel some resistance, and then pull it briskly. Do not let the starter grip go causing it to snap back against the Backpack Blower. Instead, gently guide the starter grip back into its casing.



4. Adjust the throttle (red lever on the right) accordingly. This controls the levels (0 through 5 – 5 being the fastest) of motor speed/acceleration.

5. There is a black lever to the left of the red lever. You use this lever to control when the blower sprays out the Vectobac™. Pulling the lever upward will start the spraying, a downward motion will stop the spraying. It also adjusts the flow rate.

As you go along testing for mosquito larvae, you will treat the areas where you find larvae by blowing the Vectobac™ onto the desired area's surface.

Blower and Argo – Job Aid
Starting the Argo

Before you actually start the Argo it is important that you are very aware of your surroundings and the terrain that you are driving on. If you happen to be treating an area and it is necessary that you cross a roadway, a good rule of thumb is that if you couldn't cross the street yourself walking at a normal pace – then it's not safe to cross in the Argo – you won't be winning any Indy 500's in an Argo.

1. The control lever should be in the neutral (N) position and the park brake should be on.

2. You turn the key to the ON position.

3. You check for any warning lights or alarms.

4. Throttle up the engine using the hand grip.

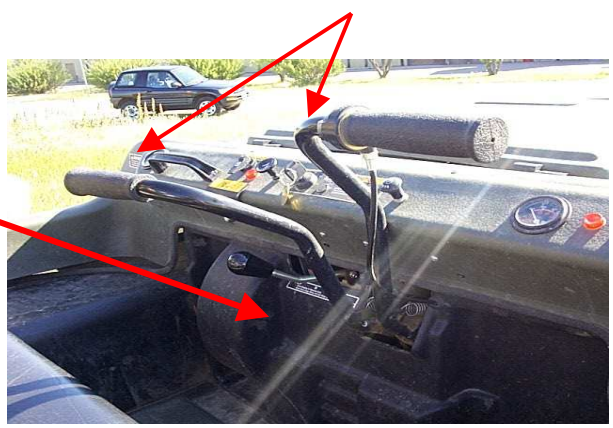
5. If it is cold out you will have to pull and hold the choke while you are starting the Argo.

6. Turn the key fully to the right and start the motor. If the Argo doesn't start with the first try, allow the starter to cool for 15 seconds and then repeat this step. Only crank the motor over for 3 seconds at a time to avoid killing the battery. Once the Argo is running, always allow the Argo to run for 2 minutes to warm up.

Blower and Argo – Job Aid
Driving the Argo

Changing Gears

The Argo is equipped with a four position transmission, reverse, neutral, low and high.



- ☑ Reverse (R) is used for backing up.
- ☑ Neutral (N) is when starting the engine or when the Argo is left to idle.
- ☑ LOW is used when you are traveling at a low speed over rough terrain and when you require extra pulling power.
- ☑ HIGH is used for general normal operating speeds.
- ☑ Remember not to change gears while the Argo is moving. To change gears, bring the vehicle to a complete stop by throttling down, let the engine idle down completely and then you can move the shift lever to the desired gear.

Driving Forward

Once the engine is idling you will shift into reverse (R) first, and then shift into either LOW or HIGH gear. (This will save wear and tear on the transmission).

Then you push the handle levers straight ahead towards the dash. Turn the throttle hand grip slowly, the clutch will engage on its' own and the Argo will begin to move forward. You can increase your speed by turning the hand grip.

Blower and Argo – Job Aid
Driving the Argo

Turning the Argo

One thing you have learned is that the rear of the Argo swings outward during a turn. Always keep this in mind when you are turning. Riding the brakes while making turns will cause excessive heat, brake fade and lead to premature brake wear.

- ☑ If you are making a **left turn**, gently pull back on the left handle lever while applying a little throttle. When the turn has been completed, push the left handle lever forward towards the dash.
- ☑ If you are making a **right turn**, gently pull back on the right handle lever while applying a little throttle. When the turn has been completed, push the right handle lever forward towards the dash.

Backing Up

While your engine is idling, shift the transmission into reverse (R). Now push the handle levers forward towards the dash. Then you turn the throttle hand grip slowly, the clutch will engage on its' own and the Argo will begin to move backward. Same as when you are moving forward, you can increase your speed by turning the hand grip.

You make your turns the same as when you are moving forward; the only difference is that you would be in reverse (R) gear as opposed to LOW or HIGH gear.

Stopping the Argo

- ☑ Be cautious that you are stopping in a safe area.
- ☑ Let the Argo idle down.
- ☑ Put your park brake on. Both levers have a park brake. One is sufficient for normal parking, but use both on slopes if necessary.
- ☑ Place the transmission in neutral (N).
- ☑ Let the engine cool off for a few moments.
- ☑ Turn the key to the OFF position.
- ☑ Remove the key from the Argo.

Getting Unstuck

You drive through some pretty marshy areas with the Argo and it is not unheard of to get stuck in the mud. For this very reason, there is a winch on the front of the Argo and you will have an extra cable with you.

- ☑ There is a black lever on the dash for the winch. Flip the lever upwards. The winch cable should be pulled out in neutral and only used until the Argo is free then unhooked and wound up without extra weight.
- ☑ Wrap the extra cable around whatever it is that you have chosen to use to pull the Argo out with, (something solid like a telephone or power pole, your truck or trailer), then attach the winch hook to the cable hook. Be careful not to kink the cable.
- ☑ Shift into LOW gear, engage the winch, and slowly crawl forward as the winch tightens up – pulling the Argo forward.

Blower and Argo – Job Aid
Loading the Argo

1. Back the Argo onto the trailer. Back it all the way so that the rear tires are right up against the trailer frame. Then apply the Argo brakes to hold it there and shut the Argo off.
2. You remember from your training how important it is to use the four point tie-down. This will ensure that your load is secure.
3. Loop the chain from the trailer, through the Argo, back to the trailer and secure the chain.
4. The winch strap on the passenger side of the trailer gets looped through the front of the Argo and is attached and tightened to the driver's side of the trailer. Now release the park brakes so they are not engaged while driving to and from sites.
5. The driving ramp can be lifted into place and the pins inserted to secure the ramp.





Blower and Argo – Job Aid
Unloading the Argo

When you arrive at the shop in the morning your Argo may already be loaded from the previous day and ready to go. Take a few minutes to be sure that you have all the proper safety gear and equipment that you will require for the day.

1. Be sure to park on level ground.
2. Remove the pins from the sides of the ramp at the back of the trailer.
3. Loosen and remove the winch strap from the front of the Argo.
4. Remove the chain from the back of the Argo.
5. You start the Argo, remembering to let it run for 2 minutes to warm up.
6. You drive the Argo slowly and carefully down the ramps, off the trailer and onto the ground.

Blower and Argo – Job Aid
Performing a Dip

Shallow Skim Method

This is the first and usually the best method to begin with. Submerge the leading edge of the dipper, tipped approximately 45 degrees and about an inch below the surface of the water. Quickly but gently move the dipper along a straight line in the water. End the stroke just before the dipper is filled to prevent overflow. This method is particularly effective for Anopheles who tend to remain at the surface of the water longer than Aedes and Culex. Anopheles are usually associated with floating vegetation and debris.

Complete Submersion Method

This method can be performed in water, with or without floating objects. Many mosquito larvae, particularly those of the genera Aedes and Psorophora, are very active and will quickly dive below the surface if disturbed. You will quickly plunge the dipper below the surface of the water, and then bring the dipper back up to the surface through the diving larvae. Do this carefully to avoid losing the larvae in the overflow current.

Partial Submersion Method

This method is used when you need to test for larvae at the edges of vegetation in the water. Push the dipper, tilted at approximately 45 degrees, straight down adjacent to the vegetation. 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 horizontally. Pull the dipper up before it is full.

Flow-In Method

This method is used in very shallow waters. Larvae can be collected by pushing the dipper into the substrate of the water and letting the shallow surface water, debris and larvae flow into the dipper. Do not move the dipper horizontally.

Scraping Method

This method is used when testing for larvae under floating or emergent vegetation. Dip from the water towards the vegetation and end by using the dipper to scrape up against the base or underside of the vegetation to dislodge the larvae. This method is usually more effective if the bottom of the dipper is screened and it is often used to test for Coquillettidia and Mansonia mosquitoes.

Simple Scoop Method

This is the “dipping to get water” method. It consists of simply scooping a dipper full of water. This is the most common way of performing a dip, However, it can only be successfully used to collect Culex larvae.

Background Method

This method is especially useful in wooded areas and other shallow water. Submerge the dipper completely to the bottom and then slowly move it around. The darker mosquito larvae and pupae will stand out against the background of your dipper. Once the larvae can be seen, slowly lift your dipper out of the water.

Blower and Argo – Job Aid
Treating Larvae

You have learned how to start your Backpack Blower and the Argo, as well as learning how to check for mosquito larvae – now you are about to learn how to treat an area that you have determined has mosquito larvae.

There are a few different methods used by the Integrated Pest Management crews when applying Vectobac™ and the method used depends on the size and location of the bodies of water. The application rate for all methods averages 5 – 10Kg/Ha or 1g/m.

- The smaller pools of water can be treated by hand using a pail and a scoop.
- When there is a stretch of water and it's too large to treat by hand, a Backpack Blower is filled with Vectobac™ and used to treat the area.
- For larger bodies of water that are far off the roadways the Argo is used with a blower and a second crew member treats as you move along.

Filling the Container on Backpack Blower

You should carry several bags of Vectobac™ with you in the Argo. If you are not using an Argo and are instead walking with the Backpack Blower, then the Vectobac™ should be kept in the box of your truck.

The container on the top of the Backpack Blower holds the Vectobac™. The lid on the top screws off and the opening is quite large. You can add the Vectobac™ until the container is full.