



Geographe Mosquito Management Group



Mosquito Management Program

2009 Annual Report

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1. Executive Summary

The 2009 mosquito season started with an administration change as the Shire of Busselton and the Shire of Capel combined resources and joined as a Contiguous Local Authority Group (CLAG) to form the Geographe Mosquito Management Group. This allows for a greater sharing of resources and consistency between the two Shires as to how they manage mosquitoes. The CLAG collaborates with the Department of Health specifically the Mosquito Borne Disease Control Branch to implement mosquito management strategies that help to manage the incidence of Ross River virus and Barmah Forest virus.

This report summarises the 2009 season detailing adult trap numbers, larval monitoring, aerial treatments, emergence results and review for improvements. Improvements made to the program don't necessarily ensure the community are not impacted at certain times by adult mosquitoes but do allow us to maintain a program that is in line with best practice in Australia and internationally. It is important to ensure that the community and visitors take personal responsibility for their protection through appropriate clothing and repellents to prevent the transmission of mosquito borne disease.

Key outcomes for the 2009 season:

- 5 aerial treatments were conducted over Capel and 3 aerial treatments were conducted over Busselton.
- 1210 Ha of wetland in Busselton and Capel were covered by aerial treatment.
- An average larval control of 84% for Busselton and 78% for Capel.
- 5 complaints have been received for Capel overall and 39 complaints for Busselton have been received overall.
- Low numbers of cases for both viruses were recorded in both Capel and Busselton.
- Introduction of batboxes at the Shire of Capel to attract insect eating microbats.
- Implementation of Moz – E – News in the Shire of Capel.
- The Shire of Busselton used an estimated 50 briquettes and the Shire of Capel used an estimated 700 briquettes for hand treatments.

2. Introduction

The mosquito management program for both Shires has been operating since 2006, although no treatments occurred in 2006 due to low rainfall. Mosquitoes are a fact of life in the southwest of Western Australia; this is due to the quantity of wetlands in both the Shire of Capel and Busselton. A need for housing developments and reduced land availability means there are very few areas that are not within 5km of a mosquito breeding site, increasing the risk of becoming infected with a mosquito borne virus.

The mosquito management programs have been developed to meet the risks posed by mosquito borne diseases. It is simply not possible or environmentally desirable to eradicate mosquitoes as they are an important part of the ecosystem. However, it is possible to manage mosquito populations and the incidence of mosquito borne diseases such as Ross River virus with effective mosquito management.

The mosquito management program consists of 4 factors:

- Pre treatment larval monitoring
- Larviciding (aerial and hand treatments)
- Post treatment larval monitoring
- Adult mosquito trapping, identification and counting

The water from the wetlands south of the Capel River flow into the Vasse Wonnerup estuary, a Ramsar declared wetland (Ramsar wetlands have international significance for their unique habitat and for bird life). The Ramsar declared wetlands resulted in the Shire of Capel and Busselton making applications to the Federal Department of Environment and Heritage to operate a mosquito management strategy in this area which is protected under the provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. The application for the Shire of Capel was approved on 14 March 2006 with no conditions. The application for the Shire of Busselton was approved on the 22 April 2005 with conditions. Below is a summary of the conditions for Busselton:

- Mosquito control program will operate on a 3 year basis only.
- S-methoprene will be used in accordance with the manufacturer's directions.
- A maximum of four applications per calendar year.
- Environmental monitoring.
- Monitoring of waterbird species.
- Avoidance of helicopter flight paths in known waterbird breeding areas.

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- Ornithologist present to monitor and write a report on how to minimise the impacts of spraying operations and helicopter flight paths on waterbirds.

The Shire of Capel has a total of 929ha of wetland which stretches from Dalyellup down through to Forrest Beach and the Shire of Busselton has a total of 1459ha which stretches from below Forrest Beach through to Toby's Inlet near Dunsborough. Of this an estimated 1115ha is Ramsar protected wetland.

There have been some changes this season with the trialling of a product called Teknar 1200 SC which is a bacteria based product. There is a section within this report devoted to this product. The Shire of Capel also joined the Mosquito Control Association of Australia; this enables the Shire to have up – to – date information on mosquito control and allows us to monitor what other Shires and States are doing about mosquito control.

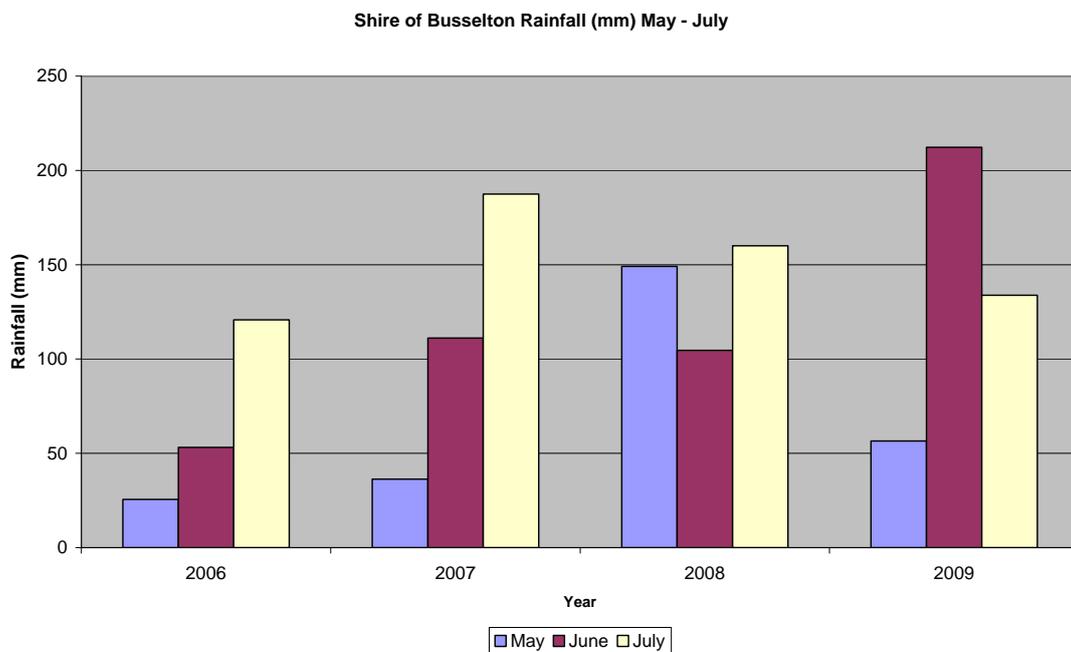
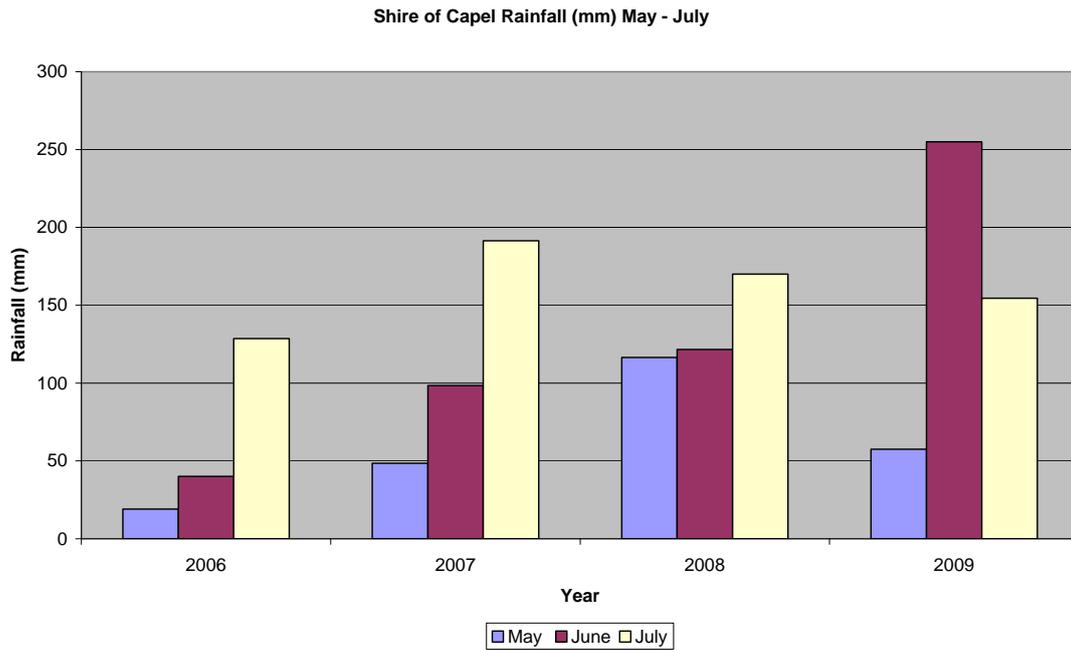
3. Weather Influences

The water level of the majority of wetlands within the two Shires is rainfall driven not tidal. There are a couple of tidal influenced sites in Busselton and Capel. The first tidal site for Busselton is Toby's Inlet and the top end of the Vasse Wonnerup wetland near Layman Bridge. Within Capel there are two isolated tidal influenced areas close to the coast one near Peppermint Grove Beach and the other south of Minninup Beach.

In 2009 the total rainfall from July to December was 443.4mm for Busselton and 413.5mm for Capel. In 2008 this same period had 394.5mm in Capel and 300.8mm in Busselton. The 2009 season like the 2008 season was particularly drawn out with treatments needed through to the end of November, due to late heavy showers.

As the tables below show Capel received high rainfall at the beginning of the season which caused higher than average water levels within the wetlands. This was different to other seasons where the rain was either low at the beginning of the season or evenly spread throughout the season. As the main target species needs water level rises to inundate the eggs, allowing them to hatch, the high rainfall at the beginning of the season caused high density, widespread breeding.

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4. Larval Monitoring

Larval monitoring is broken into two categories, pre treatment monitoring and post treatment monitoring. Pre treatment monitoring identifies the larval density, location, stage, species and water depth. Post treatment monitoring identifies the success of the treatment.

Larval monitoring for the Shire of Capel began as the wetland water levels began to rise on the 9th July 2009. Water levels were at a

depth of 10-25cm with larval densities from 100-1000 per m². The wetlands were almost completely inundated at this early stage of the season. Due to this early high water levels the larval density was widespread. The cooler weather slowed the progress of larvae and the first aerial treatment didn't occur until the 27th August 2009.

Larval monitoring for the Shire of Busselton began on the 14th of July as water levels were slower in accumulating. Larval density was low and numbers varied from <10 - >10000 per metre squared. Webster Rd had been dry in previous seasons but was completely inundated this season. The first treatment for Busselton occurred on the 19th September 2009.

5. Adult Trapping

5.1 Shire of Capel Adult Trapping

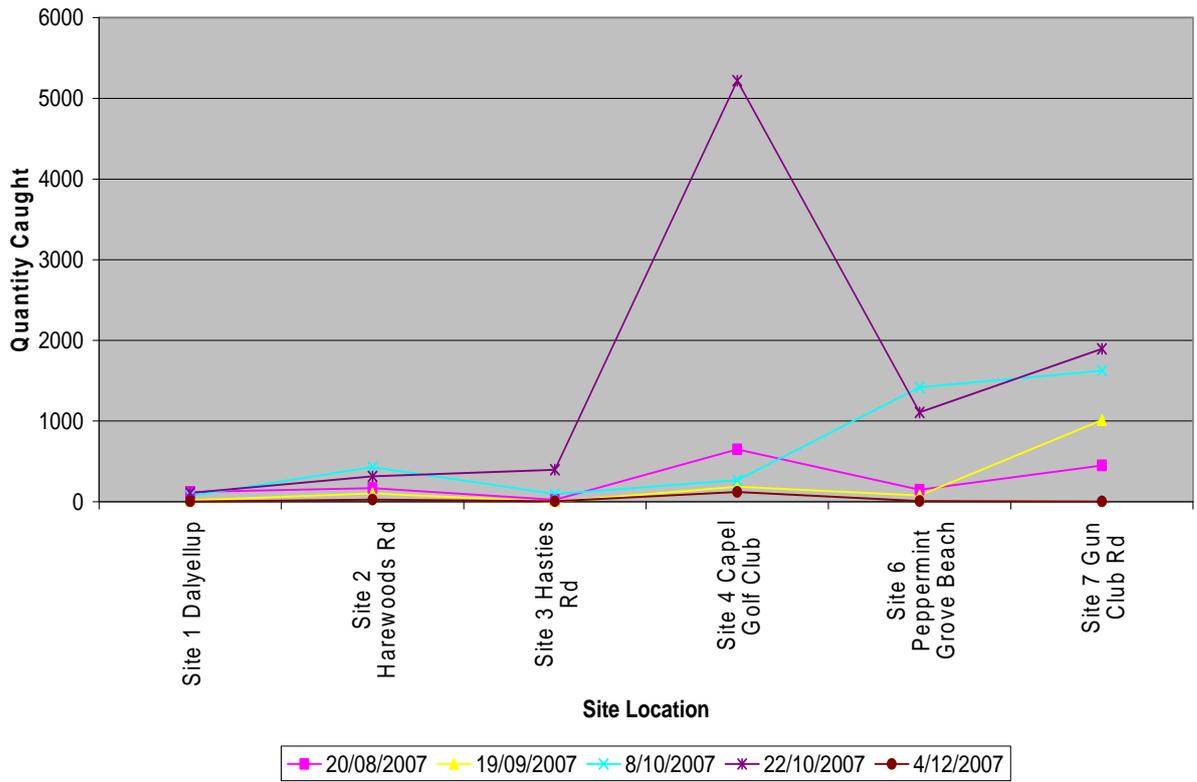
Adult trapping went far smoother in 2009 than 2008 as there was a regular supply of dry ice which is needed to attract the adult mosquitoes. An adult mosquito trap consists of several components; first one is an insulated tin where the dry ice is stored. Then there is a battery operated motor which rotates a small fan and operates a light. The mosquitoes are attracted to the trap by the CO₂ given off from the dry ice as it melts and the light, they are then sucked down into the trap by the fan. A container attached to the trap by a mesh sock holds the mosquitoes until they are ready to be processed.

Below are the adult trap numbers for the main target species *Aedes camptorhynchus* (salt marsh mosquito). This species is a vicious biter and carries both Barmah and Ross River virus; it predominantly likes brackish water and is mainly found in salt marshes. The site locations are where the traps are set; it doesn't mean that the site is responsible for the mosquito numbers.

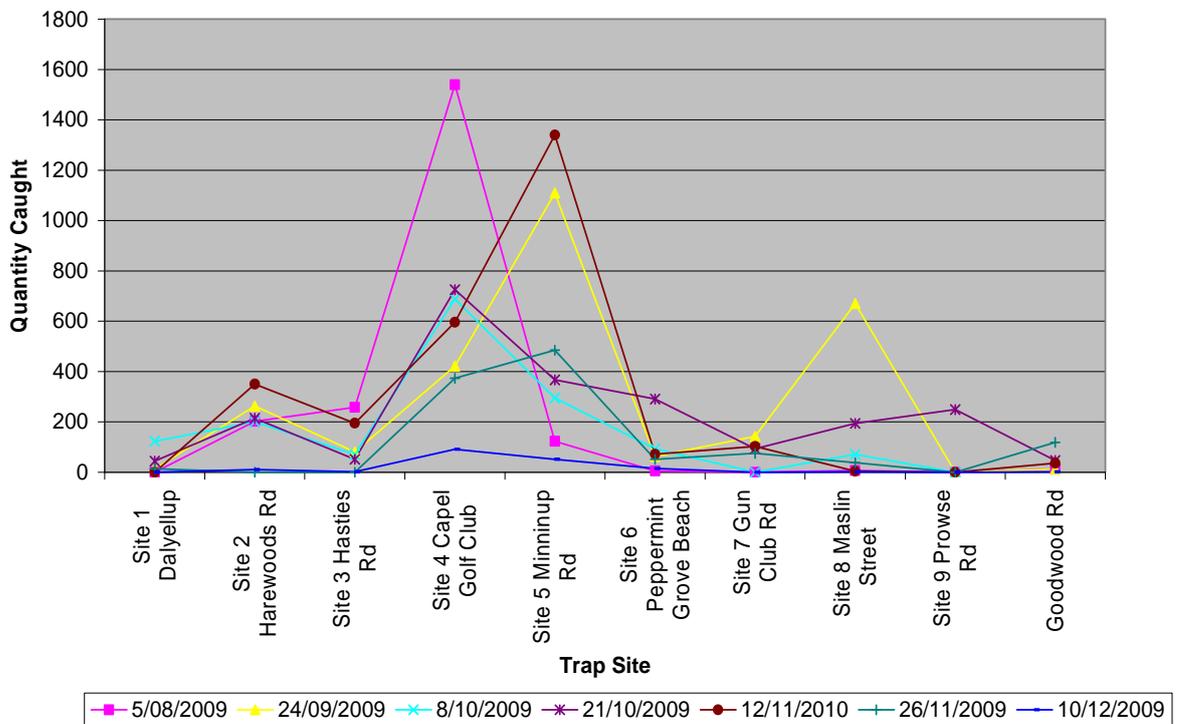
The highest recording area is Stratham, due to the heavy vegetation cover and high acid soils making it harder to conduct aerial treatment. The numbers of adults caught has reduced overall since 2007 (16 070 adults) considering 2009 (12 764 adults) was a wet season.

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Aedes camptorhynchus Adult Trap Results 2007



Aedes camptorhynchus Adult Trap Results 2009



5.2 University of Western Australia Adult Trapping

The University of Western Australia Arbovirus Surveillance and Research Laboratory, also conducts trapping fortnightly. These mosquitoes are processed and used for detection of virus isolates. There are six trap sites within the Shires stretching from Woods Road in Capel through to Wilson Road, Quindalup in Busselton.

4. Larviciding Operations

4.1 2009 Larval Treatment Summary

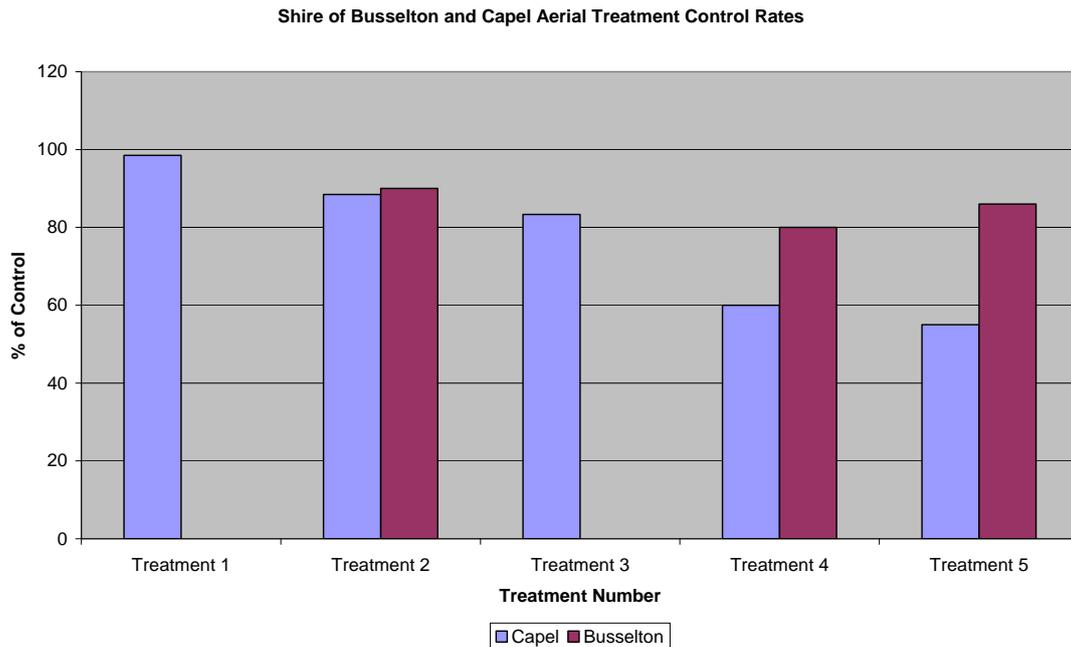
There are two methods of treatment undertaken to reduce the amount of adult mosquitoes. The first and main one used is aerial treatment where Prolink Prosand an insect growth regulator, is placed onto the wetlands via a helicopter where it dissolves in the water. The second method is hand treatment primarily using Prolink Briquettes which are placed out into the wetland using stakes. The briquettes are small grey blocks which slowly release the insect growth regulator over time.

The 2009 season started off with large aerial treatment areas due to the early large amounts of rain inundating the wetlands. This prompted widespread breeding compared to previous seasons where breeding has been mainly along the edge of the wetland. Below is a rundown on the quantities of larvicide used per season to date:

Year	Quantity Used (kg)	
	Busselton	Capel
2007	2060	2580
2008	1300	2445
2009	1740	3100

The Shire of Busselton conducted aerial treatments on the 19th September, 30th October and 21st November 2009. The Shire of Capel conducted treatments on the 27th August, 19th September, 1st October, 30th October, and 21st November. Below in Figure 3 are the control rates received from each of the treatments. The zero values for Busselton for Treatment 1 and 3 are due to Busselton not needing to treat on these two days.

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Hand treatments were carried out in two areas in Capel. The first was an area around the Dalyellup College and the Lutheran College on Wake Drive, where significant mosquito breeding was found in wetlands close to the education establishments. The second and far larger area was through Five Mile Brook in Gelorup. Whilst the hand treatment allowed for a continual control of mosquitoes it is very labour intensive as the briquettes have to be replaced on a continual basis, usually every two to three weeks.

4.2 Teknar 1200 SC

Another product we trialled for hand treatments was liquid BTI, this product was applied using knapsacks and sprayed directly onto the water. Teknar 1200 SC is a selected microbial mosquito larvicide which contains delta-endotoxin and spores of *Bacillus thuringiensis* subspecies *iraelensis* serotype H14 (BTI). The bacteria are ingested by the mosquito larvae which results in the larvae's midgut membrane to be destroyed, death usually occurs within 6 - 72 hours depending on external factors.

BTI can be applied when the larvae are at their 1st, 2nd, 3rd and early 4th stage of development. The application methods can be via hand or for larger areas via aerial treatment from a helicopter. Hand application methods can be either via a knapsack or via a spray unit. Although knapsacks were suitable for smaller areas a larger spray unit like the one below right would be more suitable for areas in Capel and Busselton.

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BTI is far more effective in regards to reducing time and labour costs associated with a mosquito management program. Its quick kill time 6 – 72 hours means the effectiveness can be quickly gauged and a back up application can be applied before the mosquito larvae move through to hatch. Whereas s-methoprene can only be gauged for effectiveness on adult hatching rates, by then it is too late to apply any back up treatments.

A handtreatment of BTI occurred on the 21st November 2009 on a small tidal area near Minninup Beach, Stratham. This area, see photo below, is an isolated wetland with occasional ground and tidal surges and rainfall inundation. A wetland to the east opens up into this area, by placing pressure on floodgates which open into this small tidal area. The treatment occurred late afternoon after an aerial treatment was conducted in all other areas using s-methoprene. Total treatment time was an estimated 30 minutes applied at the rate of 1.2L/ha. The total area treated was an estimated 3000m².

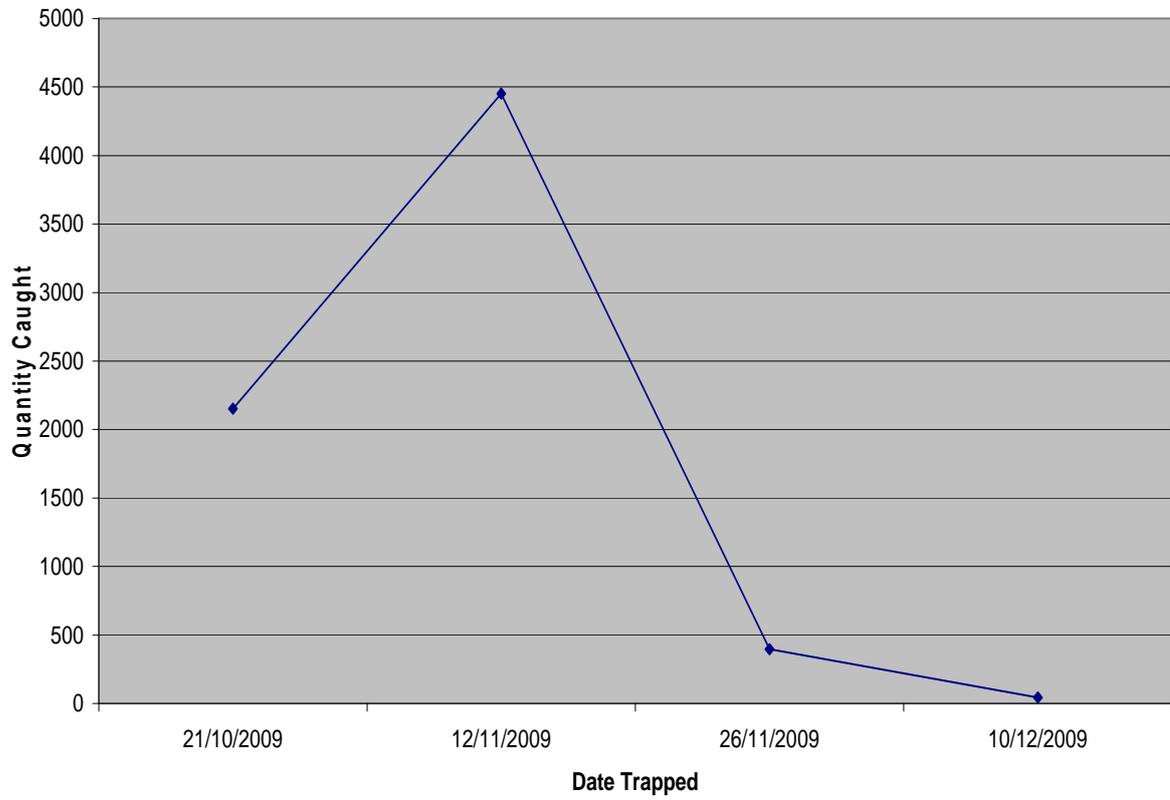


As the treatment occurred on late Saturday, the area couldn't be checked again until the Monday. This showed only a small amount of breeding <10/m² compared to >3000/m². There was a greatly reduced amount of adults within the area and adult trapping see chart below conducted a

few weeks latter showed a reduced amount of adults. The Shire of Capel was happy with the speed and succuss of the treatment.

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Aedes camptorhynchus Adults Trapped 2009 Minnipup Rd Near Fishermans Road



5. New Projects for 2009

5.1 Microbats

The aim of the Geographe Mosquito Management Group is to have an intergrated approach to mosquito control. Part of this approach is to encourage natural predators into the area. One of these predators is the microbat which can eat up to 1000 mosquitoes in a night. To encourage the microbat into the Shire of Capel, two projects were initiated.

The first one was the placement of 3 large capacity microbat boxes at the Capel Golf Club. The Capel Golf Club volunteered their time to aid the Shire of Capel in creating more habitat. The batboxes were built by the Capel Gold Club and placed in locations around the golf course. The aim is to have microbats habit the boxes within the next 6 to 18 months. Although it can take as long as 3 years for a microbat box to become inhabited.

The second project was to run a workshop on how to build microbat boxes for the community. The workshop was conducted in Gelorup and had a positive turn out, with everyone taking their microbat box home to place in an ideal location around their home. The aim of this project was to encourage microbats into areas where their previous habitat may have been destroyed by urban development and to increase the number of predators of mosquitoes within the Shire of Capel.

5.2 Mosquito Newsletter

The final project for the season was to develop a mosquito newsletter which is to be distributed via email. A competition was advertised for the naming of the newsletter which became the Moz-E – News. Two issues were distributed to interested parties in December and redistribution will start in July at the beginning of the mosquito season. If you wish to be on the mailing list for this newsletter, please send your email address to info@capel.wa.gov.au.

6. Recommendations for 2010 Season

6.1. BTI treatments

As previously mentioned the BTI operations reduced the human resource hours and had the benefit of a faster kill. The use of this product using hand treatments is suited to many areas in Capel and Busselton.

6.2. Updating of Record Forms

The recording of mosquito management activity aids in the transference of data if new staff start and also to review each season. A couple of changes needed to the current format of forms are the inclusion of aerial photographs outlining the areas treated, to be filed with the aerial or hand treatment forms as an improved record of the location of treatment.

Another change is to the post treatment form so that it includes the emergence results (control rates). This will reduce the amount of forms needed and sent up to the Department of Health for their records.

6.3. Increased Mapping and Identification of Areas

For the Shire of Capel there is a need to further identify and map hand treatment areas. This allows for transference of information and the calculations of treatments.

The Shire of Busselton need to further identify and investigate adult trap sites and mosquito breeding areas. This will help to improve on treatment and larval monitoring.