

SHIRE OF GINGIN

2010-2011 CONSULTANCY

STABLE FLIES

The first 4 weeks of work specifically targeting fly breeding, and in particular stable flies, has shown that fly breeding is occurring in a vast range of industries and that virtually everybody in the Shire has a role to play in reducing fly breeding. However, some industries have a far greater responsibility and urgent need to reduce fly breeding given the extent of their operations and the sheer numbers of stable flies they are capable of producing. In particular, the 3 major areas of concern that have come out of the first month of work in the Shire of Gingin are:

- 1) crop residues associated with vegetable crops (eg cabbage, broccoli, cauliflower)**
- 2) reject vegetables fed out to livestock; and**
- 3) olive pulp residue simply left on the ground after processing**

1) Crop Residues - given that raw poultry manure will not be available for use by commercial growers in the near future, then the major source of stable fly breeding primarily revolves around crop residue remaining after harvest, which comprises i) stalks, leaves and fruit (either left in or on the ground after harvesting) and ii) harvested crop waste (i.e., damaged and rejected produce, processing scraps) dumped into open pits or fed out to livestock. This has been supported by past research and samples collected from commercial vegetable growers' this February, March and now October 2010.

Most market gardeners still complain about being targeted by the Shire over the stable fly issues, but there is a very good reason for that, and that is because the commercial growing of vegetables produces the vast majority of the stable flies that are affecting livestock and people in this shire. Rotting crop residues are capable of allowing the developing of one to several hundred stable flies per square meter of trashed crop and up to nearly 1,000 stable flies per square meter. When a crop such as broccoli, cauliflower or cabbage is finished being harvested, the sheer amount of vegetable matter on the ground represents a significant potential risk for stable fly breeding if it is left to rot for more than 3-4 days and/or is simply rotary hoed into the soil with minimal physical breakdown in the size of the vegetable matter. If this material is slashed and broken up with a high speed mulcher then left to dry on the surface, then this material will breed very few if any stable flies. I am currently working with Monte & Sons on Sappers Road to make sure that they come up with the optimal equipment to break down their crop residues of the 3 crops mentioned previously. By breaking the crop residue down into small pieces, it will prevent fly breeding AND have the added benefit of allowing them to

put another crop in that area sooner and a reduced risk of disease transmission to the following crop by physically breaking down the residue so that it is rapidly decomposes and returns organic matter to the soil. So, we are asking growers to do something that is counter productive to their vegetable growing regimen. I met with and spoke to Maureen Dobra (President of Vegetables WA) at the Loose Leaf Lettuce Company and talked to her about the work that I am doing in the Shire and the background to the whole issue, to which she was very supportive. I am seeking to give a presentation at the next meeting of the WA Vegetable Growers Association to indicate the dire necessity for proper handling and management of their crop residues.

2) Reject Vegetables Fed to Livestock: Several cattle grower properties were found to have fed out excessive amounts of reject carrots (predominantly), cauliflowers and broccoli to cattle (and to a lesser extent horses), which when left in a large pile/heap results in the cattle trampling on the material, defecating and urinating on the vegetables and as all the vegetables are invariably not eaten due to the volume left and the fact that many get soiled, this material is left to rot on the ground. It may take several weeks for this vegetable matter to breakdown to the point where it is attractive to stable flies, but the resultant mixture of rotting vegetables, manure and urine presents an ideal environment for stable fly breeding to occur. This practice is easily overcome by simply spreading out the vegetables in long, thin lines so that it is all eaten and there is minimal risk of excess material being trodden into the ground and left to rot. I monitor the Loose Leaf Lettuce Company every week to check that where they rake over area lettuce processing scraps fed out to cattle and spread lime to reduce acidity and minimize stable fly breeding. Their current management practice is infinitely better and working well with no evidence of fly breeding.

3) Olive Processing Residue: The process of pressing olives leaves a pulp and seed residue that is simply pumped out onto the soil nearby to the processing plant, where it forms a “larval flow” appearance and is about 50-60cm thick. This material is quite acidic and fermented and has been found to contain significant numbers of fly larvae as the material is exposed to flies after processing and splits and dries forming a cracked and crazed surface that is ideal for flies to search and explore and lay eggs on the moist rotting organic material below. This is a standard method of disposal of the pulp residue across all processing sheds.

SIGNIFICANT FINDINGS/EVENTS

Rotting pile of reject snowpeas and sugar snap peas (Bookine Road)

about 10 cubic metres of rotting material, thousands of maggots
owner buried in large pit, sprayed with Lorsdan, covered with soil, then sprayed soil again to prevent any adult emergence

Reject cauliflowers fed out to cattle (Beermullah Road)

Found large pile of reject cauliflowers mixed with cattle dung, that was alive with maggots – had a work order put out immediately and owner sprayed area with

Lorsban next day to kill all larvae, which on inspection several days later were all found to be dead.

Reject carrots fed out to cattle (Coonabidgee Road)

Cattle owner had placed excessively large pile on ground, cattle would not eat it all – no evidence of fly breeding when inspected, but a very high risk

Delivery of 2 piles of egg layer PM

Prosecution Pending

Pending prosecution – maggots in manure on delivery already, either way the poultry enterprise the manure came from, the cartage contactor and the person who ordered it will all face prosecution

Fly larvae in rotting cauliflower and cabbage crop residue (Sappers Road)

The remains of both a cauliflower and cabbage crop were simply rotary hoed into the soil after harvest was complete and left to breakdown over several weeks – continual rotary hoeing does not kill any fly larvae it simply moves them about.

Fly larvae in old olive processing pulp residue (Hancock Road & Cowalla Road)

Found large numbers of fly larvae in the processing pulp of olives that is left to simply dry after processing during the months of June to August every year. Many old and spent pupal cases indicated that many flies had already developed from this residue.

Fly larvae in wet manure/grain mix in large cattle feedlot (Cullalla Road)

Fly larvae were found in large numbers in a large cattle feedlot due to continually overflowing water troughs – the flies developing from this material are predominantly stable flies due to the high grain content of the manure. The owners are upgrading the float systems to stop the overflow. .

David Cook

Consultant Entomologist

16th November, 2010

SHIRE OF GINGIN

2010-2011 CONSULTANCY

STABLE FLIES

The first 4 weeks of work specifically targeting fly breeding, and in particular stable flies, has shown that fly breeding is occurring in a vast range of industries and that virtually everybody in the Shire has a role to play in reducing fly breeding. However, some industries have a far greater responsibility and urgent need to reduce fly breeding given the extent of their operations and the sheer numbers of stable flies they are capable of producing. In particular, the 3 major areas of concern that have come out of the first month of work in the Shire of Gingin are:

- 1) **crop residues associated with vegetable crops (eg cabbage, broccoli, cauliflower)**
- 2) **reject vegetables fed out to livestock; and**
- 3) **olive pulp residue simply left on the ground after processing**

1) Crop Residues - given that raw poultry manure will not be available for use by commercial growers in the near future, then the major source of stable fly breeding primarily revolves around crop residue remaining after harvest, which comprises i) stalks, leaves and fruit (either left in or on the ground after harvesting) and ii) harvested crop waste (i.e., damaged and rejected produce, processing scraps) dumped into open pits or fed out to livestock. This has been supported by past research and samples collected from commercial vegetable growers' this February, March and now October 2010.

Most market gardeners still complain about being targeted by the Shire over the stable fly issues, but there is a very good reason for that, and that is because the commercial growing of vegetables produces the vast majority of the stable flies that are affecting livestock and people in this shire. Rotting crop residues are capable of allowing the developing of one to several hundred stable flies per square meter of trashed crop and up to nearly 1,000 stable flies per square meter. When a crop such as broccoli, cauliflower or cabbage is finished being harvested, the sheer amount of vegetable matter on the ground represents a significant potential risk for stable fly breeding if it is left to rot for more than 3-4 days and/or is simply rotary hoed into the soil with minimal physical breakdown in the size of the vegetable matter. If this material is slashed and broken up with a high speed mulcher then left to dry on the surface, then this material will breed very few if any stable flies. I am currently working with Monte & Sons on Sappers Road to make sure that they come up with the optimal equipment to break down their crop residues of the 3 crops mentioned previously. By breaking the crop residue down into small pieces, it will prevent fly breeding AND have the added benefit of allowing them to

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David Cook

Consultant Entomologist

16th November, 2010

SHIRE OF GINGIN

2010-2011 STABLE FLY CONSULTANCY

The past 6 weeks (mid November to late December 2010) around the Shire of Gingin has again demonstrated that fly breeding, and in particular breeding of the stable fly, is occurring across a range of industries. All reference to the stable fly will now be replaced with “biting fly” to more accurately reflect what this fly is doing to livestock and humans alike. The name “stable fly” is an historical name given to the fly when it originally became a problem in the northern hemisphere when people housed their animals over the cold winter in stables and pens – unable to change the straw bedding for months on end resulted in the animals manure and urine mixing with the straw and allowing the “stable fly” to develop in high numbers. The name “stable fly” suggests that this fly only comes from stables, which is simply not the case in and around the Shire of Gingin. Horse stables rarely produce high numbers of biting flies as their manure is removed at least once daily and horse manure is just too dry for this fly to develop in.

It is no coincidence that the stable fly problem across this shire has continued to escalate with the infusion of large scale vegetable production from the early 1990’s. This is not about pointing the finger but making and doing something about it as quickly and effectively as possible. The vegetable growing industry has an urgent and ongoing responsibility to monitor their crop waste for fly breeding given the extent of their operations and the sheer numbers of biting flies that they are capable of producing if their crop waste is not properly managed. In particular, the three major areas of concern that have come out of the second month of work in the Shire of Gingin are:

- 1) **crop residues associated with vegetable crops (eg celery, lettuce)**
- 2) **effluent pond pig manure waste;**
- 3) **feedlot cattle manure management**

1) Crop Residues – once again month again highlighted that a continual major source of biting fly breeding is vegetable crop residue remaining after harvest is a continual and massive source of this fly. This material consists of primarily of stalks, leaves and fruit either left in or on the ground after harvesting is complete. The worst crops for producing biting flies are celery, cauliflower, cabbage and lettuce. When a broccoli, cauliflower, cabbage or celery crop is finished being harvested, the sheer amount of vegetable matter on the ground represents a significant potential risk for biting fly breeding if it is left to rot for more than 3-4 days and/or is simply rotary hoed into the soil with minimal physical breakdown in the size of the vegetable matter. The rotting residue of these crops produce almost exclusively biting flies every time a sample is collected and the numbers they can produce are alarming to say the least. The Shire of Gingin must continue to visit commercial vegetable growers because they are producing the vast majority of biting flies that are affecting livestock and people in this shire. Breaking down the crop residue down into small pieces will significantly minimize fly breeding

AND have the added benefit of allowing growers to put another crop in that area sooner and a reduced risk of disease transmission to the following crop by physically breaking down the residue so that it is rapidly decomposes and returns organic matter to the soil.

2) Pig Manure Effluent Ponds: Piggeries have an enormous amount of manure to dispose of from their intensive animal husbandry. The standard method of disposal is to run the manure it through a series of effluent ponds where microbial activity breaks down the manure over time till a substance “inert” to fly breeding is left. Unfortunately this process has revealed some serious misgivings in terms of fly breeding and if it goes wrong, the level of fly breeding can be astronomical. Pig manure mixed with straw bedding in particular presents a great risk of breeding biting flies with the manure/organic matter mix favouring their development. Piggeries typically attract huge numbers of flies due to their odour, but their ability to lay eggs and produce more adult flies can be significantly reduced by having a robust fly management plan in place involving trapping of adult flies, prevention of egg/larval breeding sites (principally sanitation), insecticides (surfaces where flies congregate and places of manure accumulation) and regular monitoring of high risk fly breeding situations.

3) Cattle Feedlot Manure Management: Housing large numbers of animals in a small area inevitably runs the risk of manure accumulation and potential fly breeding as highlighted previously with piggeries. Cattle held in a feedlot situation can produce biting flies if either (i) their manure gets wet either through leaking water troughs or poor drainage around where manure accumulates; or (ii) there are spilled areas or wet areas of grain feed, which rot and ferment and attract biting flies. As cattle dung ages, it becomes more attractive to biting flies, but it takes at least 21 days before cattle dung is utilized by biting flies. In a normal paddock situation, cattle dung rarely gets this old due to dung beetle activity and the rapid drying out of the dung in our hot climate. However, cleaning out of feedlot pens can produce a large amount of cattle dung, which must be handled properly to prevent biting fly breeding.

David Cook
Consultant Entomologist
10th January, 2011

SHIRE OF GINGIN

BITING FLY UPDATE

The numbers of biting flies affecting livestock and residents have eased over the past month principally due to a concerted effort to target major commercial vegetable growing enterprises. Continual revisiting and monitoring of the major vegetable producers in the Shire has started to see an easing off of the biting fly outbreaks from what was experienced over summer. This demonstrates that continual vigilance and advice on treatment of crop residues infested with biting fly larvae can make a difference. But there is no need for any celebration as there are still too many biting flies and there are still some people being badly affected. It is no coincidence that the stable fly problem across this shire has continued to escalate with the infusion of large scale vegetable production from the early to mid 1990's. It is neither practical nor feasible for Shire Environmental Health Officers to continually monitor every major grower for biting flies when a more sustainable and long term solution will obviate the need for this continual "policing".

The local vegetable industry (Vegetables WA) have just recently contributed funding towards better management of their crop residues, which continue to be a primary source of the biting flies. Ideally a method of getting their crop residues off the ground as soon as harvest is complete (or whilst doing final harvest) would be the most beneficial. This material could then either be composted on site or be collected for composting or bio-fuel production elsewhere. That would remove the need for continual mechanical treatment (mulching, rotary hoeing) to break down the crop residues in the soil as well as the need for pesticide application (cost to producer, cost to the environment, risk of resistance development in biting fly population, cost to the consumer). Continual application of pesticides to control biting fly larvae in rotting crop residues is NOT a viable long term solution to this problem, either from an economic or environmental perspective, so we welcome the input of the vegetable industry towards finding a better way of managing their crop residues.



Fig.1. Rotting leaves and stalks left after harvest is complete from leafy crops such as cauliflower (LHS) and celery (RHS) allow biting flies to develop in huge numbers on sandy soils that are regularly watered overhead.

Past research and samples collected during 2010-2011 from commercial vegetable growers have shown that as many as 1,300 biting flies/m² can emerge from the soil of a trashed vegetable crop. Typically, one to several hundred biting flies develop from the rotting residue of broccoli, cabbage, cauliflower, celery and lettuce crops - the sheer amount of vegetable matter on the ground represents a significant potential risk for biting fly breeding if it is left to rot for more than 3-4 days and/or is simply rotary hoed into the soil with minimal physical breakdown of the material. Breaking down the crop residues with a high speed mulcher, then leaving them to dry on the surface with no overhead watering reduces biting fly development AND have the added benefit of: (i) allowing growers to put another crop in that area sooner; and (ii) reduced risk of disease transmission to the following crop.



Fig.2. The huge amount of leaves and stalks and reject produce left after harvesting is complete in crop such as cabbage (left) and silverbeet (right) provide a perfect breeding ground for biting flies.



Fig.3. Reject and/or damaged produce such as eggplant (aubergine) (LHS) and paprikas (bell peppers) (RHS) left on the ground to rot allow the biting fly to develop from every fruit. As these crops are picked daily for several months, the reject produce must ideally be either (i) physically removed, put into an open pit and deep buried weekly with at least 300mm of soil; or (ii) sprayed every week with a high volume pesticide application.

The worst crops for producing biting flies are celery, cauliflower, cabbage, lettuce, broccoli and eggplant. When a broccoli, cauliflower, cabbage or celery crop is finished being harvested, the sheer amount of vegetable matter on the ground represents an optimal breeding site for the biting fly. The residue of these crops produce >90% biting flies every time a sample is collected and the numbers they can produce are alarming to say the least.

Dr David Cook
Consultant Entomologist
25th March, 2011