



# BITING FLIES



THE UNIVERSITY OF  
WESTERN AUSTRALIA  
*Achieve International Excellence*

## FROM ROTTING CROP RESIDUES

Rotting crop residues of vegetables such as cauliflower, broccoli, celery, cabbage and lettuce have been continually shown to produce extremely high numbers of biting flies if not managed properly (from 100 to >1,000 flies/m<sup>2</sup> of soil). Livestock producers and rural residents across many Shires around Perth continue to bear the impact of this fly.



**Fig.1.** An adult biting fly with prominent biting mouthpart (LHS) and all the stages of the biting flies life cycle (RHS) from egg (left) to actively feeding larvae or maggot (centre, top), dormant pupae that lie in the soil (right) and adult biting fly that emerges from the pupae and digs its way to the soil surface where it flies away in search of a blood meal.



**Fig.2.** 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.



**Vegetable crop residues that allow for biting fly development include either:**

- i) stalks, leaves and fruit left in or on the ground after harvesting,
- ii) harvested crop waste (i.e., damaged/reject produce, processing scraps) either dumped into open pits, left in piles on the ground, or fed out to livestock, or
- iii) abandoned crops where all remaining fruit rot

Reject and/or damaged produce of vegetables such as eggplant, cauliflower, lettuce, cabbage, bell peppers, pumpkin, zucchini, beetroot, chinese radish, potato, spring onion, tomato and celery, left to rot on the ground allow for significant numbers of biting flies to develop. Where possible, every piece of reject produce needs to be either removed and placed into a deep pit before being covered with 300mm of sand every 3-4 days and/or sprayed if it is impractical and too costly to pick up this reject produce.



**Fig.3.** 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. Proper management of this material can significantly reduce the numbers of biting flies that are capable of developing (see below).



**Fig.4.** Reject and/or damaged produce such as eggplant (aubergine) (LHS) or abandoned crops (roma tomatoes RHS) left to rot allow the biting fly to develop from every fruit. As these crops are picked daily for several months, the reject produce must be moved into an open pit and deep buried weekly with at least 300mm of soil or the abandoned crop sprayed and left to prevent fly development until completely dry.

## HOW DO I KNOW I HAVE BITING FLIES?

The biting fly or “stable fly” is very similar in size and appearance to the common house fly and bush fly – the major difference between these flies is that the biting fly has, as their name suggests, a prominent biting mouthpart. Stable flies are persistent biters, feeding on animals several times a day, preferring to bite cattle and horses, but will also attack humans, dogs, pigs, newborn lambs, pet kangaroos and emus. Their bite causes a sharp pain as it quickly draws blood – the fly punctures the skin several times before drawing blood and they can increase their body weight by up to 3 times when fully fed.

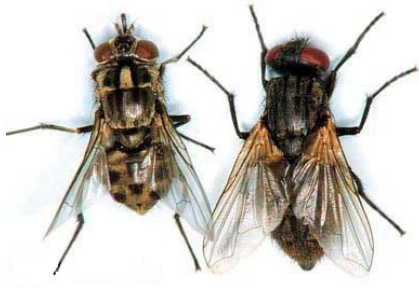


Fig 5. Biting fly (LHS) v House fly (top view)

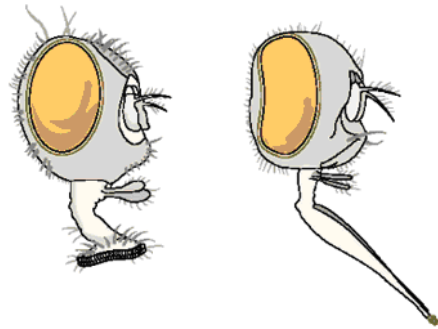


Fig 6. Housefly mouthparts v Biting Fly (Right)



Fig. 7. Biting Fly piercing mouthpart



Fig 8. A Biting fly drawing blood from a human

The picture on the far left shows that the biting or stable fly is slightly smaller than a house fly but has the prominent black piercing mouthpart sticking out the front of its head – this is lowered and used to pierce the skin of animals and humans to draw blood, as is shown in Figs 7 and 8. House flies have sponge-like mouthparts that release saliva down onto a surface and then suck back up the food they have contacted (see Fig 6).

# WHAT YOU CAN DO TO REDUCE BITING FLY BREEDING FROM CROP RESIDUES

**The following must be done with regards to managing crop residues on a regular and on-going basis to minimise the development of biting flies:**

1. All vegetable crop residue remaining after harvest is to be mechanically broken down into as small a pieces as possible with a high speed mulcher as soon as possible and/or within 3 days of harvesting being complete.
2. This crop residue must be then sprayed with registered pesticide against fly maggots (eg Dipterex 500, Lepidex 500, Chemag Dichlorvos, Barmac Dichlorvos 500, David Grays DDVP 500 or Divap 500EC) in a high spray volume of at least 1400-1600L/ha of water to ensure adequate penetration into the soil and coverage of the crop residue. This is to be done **either immediately prior to, or immediately after** incorporation of the crop residue into the soil.
3. The area treated with pesticide is to then to have no additional overhead watering and left undisturbed for at least 7 days. This is so that any eggs and/or fly larvae are killed when moving about in the residue as well as preventing any adult biting flies from laying eggs on this material. Adult biting flies that do manage to survive are killed when they contact the pesticide residue barrier when they dig their way up out of the soil.
4. Any reject crop produce or processing scraps (eg leaves, stalks, damaged fruit) that are generated from post-harvest sorting and processing are to be deep buried weekly and covered with at least 300mm of soil.
5. Whole crops abandoned due to market forces, financial hardship, disease, irrigation failure etc represent a high risk of biting fly development in the rotting produce and must be slashed and then sprayed to prevent flies developing in the material.

Both Dr David Cook and officers of the Shire of Gingin will continue to regularly inspect all commercial vegetable grower properties to ensure that this management plan is adhered to in order to reduce the numbers of biting flies. The Gingin Shire Council expects yours and many other industries cooperation in reducing the biting fly populations across the Shire.

Disclaimer: Neither the University of WA nor the Shire of Gingin endorse any of the products mentioned on this information brochure. Any product omission is unintentional and prices quoted are current as at November, 2011.

**Authors:** David Cook and Ian Dadour

© Centre for Forensic Science, University of Western Australia, Nedlands WA 6009



**November, 2011**