**Biting Fly (Stable Fly)**

*Farmnote 101/2006 [Reviewed March 2012]*

*By David Cook, Entomologist, University of Western Australia*

**Summary**

The cosmopolitan biting fly or stable fly (*Stomoxys calcitrans*) has become an increasingly serious pest of livestock (mainly beef cattle, horses, goats and sheep) surrounding Perth and along the Swan Coastal Plain from Lancelin to Cape Naturaliste. This fly is a seriously deleterious pest of cattle, horses, goats, dogs, pigs, newborn lambs and humans by inflicting its painful bite and drawing blood. Methods of cultural and chemical control are described.

Stable fly or more correctly Biting fly (*Stomoxys calcitrans*) (Fig. 1) is closely associated with humans and their activities and is a serious pest of livestock around animal enclosures, stables, feedlots and paddocks or pastures. First recorded in Australia in 1881 and in Western Australia in 1912 this fly is very heat tolerant and is present in large numbers from late spring through to late autumn; localised outbreaks can occur in many regions of south-western Australia even during winter when temperatures are mild.

![Figure 1. Adult Biting fly at rest (Left) and feeding on a human (Right).](image)

**Impact on Livestock**

Cattle and horses are most affected by the biting fly (Fig 2). They will try to avoid the fly by foot stamping, tail switching, throwing their head down toward their front legs, and kicking sand up onto their legs and body. In cattle and horses this generally leads to reduced weight gain from the continual movement and damage to their skin and hide.

When biting flies are present in large numbers (>25/animal), cattle will often bunch together in an effort to get to the centre of the group and avoid the fly, or they may stand in open water to avoid being bitten. This continual agitation reduces the animals normal grazing and many have moved to feeding at night when the fly is not active. This bunching by cattle is particularly hazardous in summer where animals can be at risk of heat stroke. Biting fly numbers can be monitored by counting the flies on all four legs of about 10 animals. When
the average numbers is >10 flies/animal (treatment threshold), control measure should be implemented. At >20 flies/animal, measurable reductions in weight gain and condition occur with numbers >50 flies/animal reducing weight gain by 25% and milk production by 40-60%.

Figure 2. Adult Biting fly feeding on a horse leg (Left) and covering the side of a bull (Right).

Fly Life Cycle

The life cycle of the fly, from egg to adult, is about 13-18 days in temperatures ranging from 24-30°C (Fig. 3). After obtaining and ingesting a blood meal, the female fly lays around 90 eggs over 4-5 different places in rotting vegetable matter or ageing animal manure mixed with organic matter (and up to 600 eggs in her lifetime). The eggs hatch in as little as 20hrs where the active larval stages feed for up to a week at 30°C and much longer in cooler temperatures. The larvae or maggots feed and grow over 5 to 8 days and are extremely heat tolerant, surviving on our hot, grey-black sands. In warmer areas the stable fly may breed all year and in lower temperatures (10°C) development from egg to adult takes 3 to 5 months.

Figure 3. Adult biting fly life cycle (LHS) and stable fly larvae in rotting vegetable residue.

The dormant pupal stage (red brown to black, size of a grain of rice) takes from as little as 5days at high temperatures and up to 30 days to complete in cooler temperatures (<20°C). Once completed, the adult fly digs its way up to the soil surface usually before sunrise and disperses over several to tens of kilometers in search of livestock. Both male and female
adult flies blood feed as quickly as 6hrs after emergence. The adult flies live for about 21-28 days with extreme heat (>35°C) reducing their lifespan to just several weeks. The flies mostly feed in the morning and again in the late afternoon where they extract 26mg of blood with each meal. The fly will make several attempts to bite an animal, adding to its level of distress. Once settled on the animal, they take as long as 2-5 minutes to complete their blood meal after which they seek a shady place on a fence, wall or vegetation to digest the blood.

This highly adaptable fly will breed in virtually any accumulation of decaying vegetable matter where there is a high degree of bacterial activity (fermentation) in addition to old and ageing livestock manure (cattle, poultry, pig) that is mixed with organic matter (eg straw). Key areas of breeding include (i) rotting vegetable crop residues left after harvest is complete including reject produce; (ii) straw bedding mixed with urine and faeces; (iii) reject vegetables fed out to livestock in large piles; (iv) rotting hay, straw or sawdust, fermenting feed and piles of grass clippings.

The adult stable fly is slightly smaller than a house fly and slightly bigger than a bushfly, but differs in having a checkerboard of dark spots on the back of the abdomen. However, the main distinguishing feature is its prominent, black proboscis that is used to pierce the skin and draw blood from livestock and humans alike (Figure 4).

The key to biting fly control is management of their larval habitats, ideally by either removal, drying out or deep burial. Treating livestock with insecticides and repellants can aid in control, however the impact is often short-lived (hours to days); application to the lower legs and underbelly of the animals is critical. The use of fly traps (commercial or home-made) can help to reduce the fly numbers in localized situations.

**Cultural Control (Sanitation)**

Sanitation or removal of potential breeding sites must be the first step attempted in a control program as it is by far the most effective. For example, rapid high speed mulching and incorporation of vegetable crop residues into the ground after harvest or regular removal of animal manure accumulating in pens or yards will lessen the need for chemical control. Placement of reject vegetable produce into pits and covering regularly with sand or spreading of animal manure into thin layers on the ground to dry out help prevent places for the before incorporating it into a heap. Regularly (weekly) removal of spilled grain feed and accumulations of animal manure in pen corners around water troughs and under fences and gates all help to remove the possibility of this fly breeding in the manure as it ages and particularly when it gets wet (rainfall, overflowing troughs) and is mixed with organic matter.
Manure should only be stockpiled for a short period (<3 days) before covering with plastic to protect from getting wet – alternatively this material should be removed and used as a blend for compost production or sprayed with an insecticide to prevent fly development.

**Fly Traps**

Protein-based traps (rotting smell) that are put out to catch houseflies, blowflies, bushflies and other nuisance flies WILL NOT catch any biting or stable flies. Only white boards with a sticky surface will catch biting flies as they like to rest on a cool, vertical surface after a blood meal and are not attracted to rotting protein. The Williams Trap is the simplest form of a biting fly trap that uses a white alsynite board panel (see Fig. 5) with a non-drying glue (“Stikem”) painted onto the surface to catch the flies. These traps are very specific to biting flies and will catch very little else. Secure the white board to a star picket 1m from the ground to avoid getting covered in dirt and dust. Paint both sides of the board with the non-drying glue; heat on a hot plate first so that it thins out and can be painted on more easily.

![Image of a protein-based fly trap, Williams Trap, and a commercially available stable fly trap](image)

*Figure 5. The Williams Trap (Left), commercially available Stable Fly traps (Centre) and a Protein-Based fly trap that catches other nuisance flies (Right)*

**Chemical control**

**Insecticides and Repellents** can be used to keep biting flies away from livestock, animal yards and places where the fly rests. There are numerous products on the market ranging from residual sprays to animal backline pour-on’s and sprays to insecticide-impregnated ear tags. The relative effectiveness of these products in controlling biting flies has not been tested. Most repellents have been found to last only a few hours to a few days at best given the huge numbers of biting flies affecting livestock around Perth. The flies quickly overcome any initial repellent action. The best option is to use 3 or 4 different repellent sprays, rotating through them every day. **Residual sprays** should be applied where the flies rest (eg shady surfaces, fences, walls and vegetation) so the insecticide residue can be absorbed, killing them. These are effective for about 1-2 weeks, but rain, high temperatures and sunlight can all reduce the residual effect. Check the website [www.apvma.com.au/products/index.php](http://www.apvma.com.au/products/index.php) for up to date information on product registration against stable or biting flies.

**Further reading**

- Farmnote No. 57/91 'Fly control on dairy farms' (Agdex 410/614).