

Managing Stable Flies

By Dr David Cook, Entomologist, University of Western Australia

Summary

The stable fly (*Stomoxys calcitrans*) or biting house fly has become an increasingly serious pest of livestock (mainly beef cattle, horses and goats). This fly is a seriously deleterious pest of cattle, horses, goats, dogs and humans by inflicting pain as it draws blood, causing full bite and drawing blood. Several methods of cultural and chemical control are described.

Stable fly (*Stomoxys calcitrans*) are 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 throughout many areas of south-western Australia.



Figure 1. Adult stable fly at rest (Left) and feeding on a human (Right).

Impact on Livestock

Cattle and horses are most affected by the stable 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 can lead to reduced weight gain from continual movement, and allergic reactions on their skin from the flies feeding. When stable 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. Stable 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 stable flies feeding on a horse (Left) and covering the side of a bull (Right).

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 3).

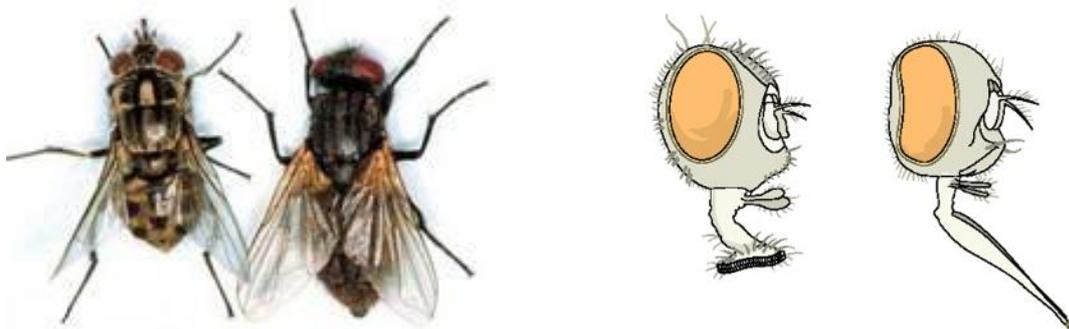


Figure 3. The stable fly alongside a house fly (left picture) and a comparison of their mouthparts (right picture) with the house fly head (left) and stable fly head (right).

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. 4). 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 (10-15°C) development from egg to adult takes 3 to 5 months.



Figure 4. Adult stable 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 5 days 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 3-4 weeks with extreme heat (>35°) reducing their lifespan to just two weeks. The flies mostly feed in the morning and again in the late afternoon where they extract 5 times as much blood as a mosquito does with each meal. The fly makes several attempts to feed, 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 adaptable fly will breed in any rotting decaying vegetable matter where there is a high degree of bacterial activity 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 key to stable 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

Removal of potential breeding sites must be the first step in any effort to manage stable flies as it is by far the most effective. For example, 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 and grass clippings into thin layers on the ground to dry out help prevent them becoming a suitable place for the fly to develop. Weekly removal of spilled grain feed and build-up of animal manure in pen corners around water troughs and under fences and gates all help to remove possible breeding sites for this fly, especially as the manure ages and if it gets wet (rain, overflowing troughs) and is mixed with organic matter. Animal manures should only be stockpiled for a short period (<3 days) before covering with plastic to protect from getting

wet. Alternatively this manure should be removed and used as a blend for compost production or sprayed with an insecticide to prevent fly development.

Fly Traps

The simplest form of a biting fly trap that uses a white board or panel with a non-drying glue painted onto the surface to catch the flies. These traps are specific to biting flies and will catch very little else, so they are very effective. Secure the white board to a star picket or along a fence line with cable ties at 1m from the ground to avoid getting covered in dirt and dust. Paint one or both sides of the board with the non-drying glue, which must be heated on a hot plate first till it has thinned and can be painted on more easily – it must be painted on quickly and any drops on you or anything else will only come off with baby oil. You can buy simple white boards such as Corflute for less than \$5 (900 x 600mm) as well as Melamine, Aligloss, Acrylic sheets, Masonite white boards and MDF Melamine. Stikem® is available in Australia from www.theolivecentre.com (3kg tins cost \$120 + postage) and also from www.bugs4bugs.com.au (3kg costs \$78.50 plus postage); a 3kg tin will easily paint 30 trap boards. Once the white boards are covered with flies, remove with a paint scraper then re-paint on the glue. Multiple boards cleared daily and re-painted with gel can remove several thousand stable flies. Remember that protein-based traps (rotting smell) put out to catch houseflies, blowflies and bushflies WILL NOT catch stable flies.



Figure 5. The Williams Trap (Left) and a commercially available stable fly trap (Centre)

Chemical control

Insecticides and Repellents can be used to keep stable 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 stable 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 stable flies affecting livestock around Perth. 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) so the insecticide residue can be absorbed, killing them. These are effective for about 1-2 weeks, but rain, high temperatures and sunlight all reduce the residual effect. Check www.apvma.com.au/products/index.php for up to date information on product registration against stable flies.