

Management of manures and vegetable crop residue

Good management of animal manure and crop residue in vegetable production is critical to the control of Stable Fly and other nuisance flies.

The practices outlined in this document reflect current Good Practice for minimising fly breeding associated with the use of untreated manure and crop residues. Adopting these practices will also reduce the risk of excessive fly breeding in areas where use of untreated poultry manures is allowed.

Good management of animal manure and crop residue includes aspects that are described as being either

- **Essential** and therefore required in all situations or;
- **Advisory**, in which case they should be considered as part of Good Practice.

It should be noted that the sale, supply, storage and use of untreated poultry manure is not permitted in 12 (plus part of a 13th) local government area's (LGA's) on the Swan Coastal Plain from Gingin to Harvey. These LGA's are listed in the BAM (Stable Fly) Management Plan (2013). (View at www.biosecurity.wa.gov.au/bam-management).

To confirm your property is located in a prescribed area, check with your local DAFWA office or LGA office. Only poultry manure treated by a process such as composting or conditioning that prevents stable fly breeding may be used. Aside from poultry manure, management practices for the control of stable fly breeding in crop residues are also a requirement of the Stable Fly Management Plan.

Storage and delivery of manure

Minimise storage time and ensure that manure is kept dry at all times. The vegetable producer is responsible for co-ordinating the delivery, storage, spreading and incorporation of the raw manure.

Storage area – Essential

Provide adequate hard surface such as asphalt, concrete or compacted crushed limestone that:

- is outside the range of sprinklers,
- is located on high ground, well away (at least 30 metres) from any watercourse and not in any depression where surface water can accumulate.
- can be kept clean and free of raw manure between deliveries.

Delivery and application

- **Essential:** Coordinate delivery and spreading so that each consignment of raw manure will be spread within three days of the delivery to the storage area. If stored for longer than three days the consignment will be covered and sealed so that flies and water cannot make contact with the manure.
- **Advisory:** Ensure the manure is delivered in covered trucks and that it is dry, lump free and not infested with fly larvae.
- **Essential:** When the consignment of raw manure has been spread it shall immediately be incorporated or buried to a minimum of 100 millimetres.

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- **Essential:** Any spillage of manure between the storage area and cropping area must be cleaned up immediately.

Use of manure – application timing and method

Untreated poultry manure can be used on your property if it is not within the LGA's where it is not permitted under the BAM Act. Even in these unrestricted areas efforts should be made to minimise stable fly breeding, by better use of manure, to reduce the impacts on animals and humans. This will reduce the chance of new localities being added to the declared list and improve the reputation of the vegetable industry.

- **Essential:** In all situations manure rates should be adjusted to match the crop's requirement and the fertiliser program should be reduced to account for the nutrients supplied in the manure.
- **Advisory:** The delay between incorporation and seeding or planting should not exceed seven days.

Chemical control of fly breeding – Advisory

Insecticide control of fly breeding is limited. To maximise their effectiveness, insecticides should be applied

- within 3-5 days of manure application,
- late in the day when conditions are cool,
- to soil that is surface moist,
- in a least 700 to 800 litres of water per hectare.

Only use chemicals registered for use in vegetables to control fly breeding. Products must be applied in accordance with the label or minor use permit. For up to date information contact vegetablesWA or visit the Australian Pesticides and Veterinary Medicines Authority (APVMA) website at www.apvma.gov.au.

Management of crop residues

Significant stable fly breeding can occur in decaying vegetable material. For this reason practices outlined in the BAM (Stable Fly) Management Plan 2013 for control of stable fly breeding in crop residues must be followed. Minimising fly breeding in crop residue relies on the application of a range of management practices. Highest risks are associated with:

- crops that leave large volumes of fleshy vegetative matter,
- difficult to break up woody roots as in brassica, celery and lettuce,
- high temperatures in spring, summer and autumn.

Managing harvested field residues

The management practices include the use of insecticides, mulching to break up crop waste, allowing the crop to dry out and regular monitoring.

- **Essential:** Keep harvest period as short as possible. This will reduce the amount of time material is exposed to fly breeding.
- **Essential:** Thoroughly break up the crop residues within three days of completion of harvest using a high speed mulcher, flail mower or slasher. The more effectively this is done, the less fly breeding will result.
 - Apply an approved insecticide to the broken up crop residues.
 - Allow mulched crop residues to dry on the surface for seven days with minimal watering before incorporation into the soil.
 - In low risk situations a single rotary cultivation will usually be sufficient; any elevation of risk may require more cultivations.
- **Essential:** In all situations, carry out regular monitoring – see ‘monitoring’ section to assess management effectiveness in controlling fly breeding.

Other crop waste disposal

Surplus or unmarketable produce must be handled in a manner that does not give rise to fly breeding. Management practices required under BAM are:

- **Essential:** For reject produce left in the field during multiple harvests: EITHER remove the produce weekly, spray with approved insecticide, bury and cover with 30cm soil OR spray the produce with an approved insecticide weekly.
- **Essential:** For reject produce from processing: EITHER place in deep pit for burial, spray with approved insecticide OR feed to livestock, ensuring it is spread thinly so that it can be consumed very quickly and completely.
- **Advisory:** Compost the material either on site or remove to an offsite facility.

Whilst these management practices are required (i.e. essential under the BAM regulations in the designated areas), it is advisable growers attempt to adopt these practices in non-declared areas. This is for the same reasons mentioned above for use of untreated poultry manure in non-declared areas.

Monitoring – Advisory

Regularly monitor fly breeding by checking for the presence of fly larvae, particularly in clumps of manure, decaying crop waste (stalks and roots) and other sources of organic matter on your property.

To monitor potential fly breeding sites, collect ten samples with a small garden trowel or equivalent. Count the number of fly larvae present and if there are more than ten larvae in two or more samples take immediate steps to control them. If smaller numbers of fly larvae are present re-sample within a week.

Considerations for neighbours and the public - Advisory

Locate manure storage away from boundaries and avoid applying on weekends, public holidays and during windy conditions.