Integrated pest management for nuisance flies on cattle feedlots

While the feedlot industry has significantly improved manure management practices over the past decade, thereby reducing both odour and fly problems, flies continue to be a seasonal problem at many feedlots.

The impact of flies on production and animal and human health and welfare, as well as the threat of insecticide resistance and a desire to minimise the use of chemicals, have underpinned the development of a more integrated approach to fly control.

Key benefits

- More effective control of nuisance and biting flies, improved cattle welfare and potential production gains
- Better working conditions for feedlot staff
- Reduced risk of disease transmission
- Reduced insecticide usage
- Lower risk of resistance to insecticides in major fly species
- Lower risk of chemical residues in Australian feedlot beef
- Positive impact on beneficial predators and parasites
- Reduced risk of complaints about flies from neighbours
- Enhanced 'clean and green' image of feedlot industry and associated market benefits
- Reduced negative environmental impact

Recommended IPM system

Integrated pest management (IPM) systems use a range of cultural (mechanical and physical), biological and precisely targeted chemical control methods to reduce pest populations. They must be tailored to particular situations and incorporate all available approaches in order to provide cost-effective control with minimal insecticide usage.

The recommended **RULES** for an integrated pest management approach for nuisance flies in cattle feedlots are presented below:

Reduce fly breeding sites

Manure

Regularly remove manure from major fly breeding areas such as under fence lines. Remove wet manure from sedimentation systems and drains. Pay attention to lightly stocked areas that may be overlooked such as hospital pens and stable areas. Manage manure stockpile and composting areas to minimise exposure of wet manure for fly breeding.

Spilt feed

Regularly remove feed residues around feed bunks, hay racks in hospital areas, stables and feed processing areas.

Silage

Clean up spills, cover tops of silage pits completely and manage the silage pit face to minimise exposure.

Carcases

To prevent breeding of blowflies, completely cover carcases in both burial pit and composting facilities. Composting is the preferred option because of generally lower odour emission and the ability to recycle the compost.

Feedlot maintenance

Monitor water troughs for leaks and rectify problems promptly. Ensure that water trough cleaning does not result in prolonged wet patches on the pen surface. Control vegetation in drains and around the perimeters of sedimentation systems and effluent ponds. Regularly mow grassed areas around the feedlot.

Use insecticides selectively

Application

Only apply insecticides after the fly population exceeds a pre-determined threshold and other cultural control methods have failed. Follow the label instructions and do not use chemicals on a routine calendar basis.

Rotate chemical groups

Rotate chemical groups to minimise resistance. Apply insecticides from the major chemical groups (eg organophosphates, synthetic pyrethroids and insect growth regulators) in rotation. Rotation of baits with larvicides has delayed the development of resistance.

Target application

Target application to 'hot spots' rather than broadcasting across the entire feedlot, eg fly resting places on exterior of feed bunks, fence lines, underside of shade cloth, trees and vegetation. Apply larvicides to major breeding sites, eg under fence lines, drains and sedimentation systems. Insecticides should never be applied to feed or areas that come into direct contact with feed.

Larvicides

Larvicides provide better control over an extended time than adulticides. Cyromazine is the preferred larvicide as it does not detrimentally affect beneficial insects such as parasitic wasps.

Adulticides

Residual insecticides provide longer-term control than knockdown formulations. They should be sprayed or painted on major fly resting places, not on manure residues. Repeated use of the same chemical adulticide can increase the potential for chemical resistance in the fly population.

Baits

House fly baits can be applied in bait stations, scattered or painted on surfaces. Behavioural resistance to azamethiphos-based baits may limit their effectiveness.

Lotfeeding design principles

Pen foundation and slope

Employ appropriate pen foundation construction methods and materials to produce a uniform, durable pen surface capable of withstanding the loadings from cattle and cleaning machinery without breaking down to form pot holes and depressions.

Pen slope should be from 2.5% to 4% to promote rapid drainage and drying of the manure pad after rainfall, while manure transport from the pen area is minimised. Pen cross-slope should be less than the pen down-slope to avoid pen to pen drainage.

Feed and water troughs

Feed and water troughs should be designed for ease of cleaning, with enclosed, vertical sides to eliminate any build-up of spilt feed or manure underneath. They should be equipped with durable aprons (generally concrete) sloping away from the trough in order to promote drainage while avoiding pot hole formation.

Water troughs should be designed for ease of waste water disposal and cleaning, incorporating low volume, shallow, narrow troughs to minimise waste water volume generated by cleaning. Waste water should be discharged away from the pen, preferably in a durable surface drain or via underground sewer pipe, to prevent the formation of wet patches.

Fences

Fence panels should be relatively widely spaced (up to 3.2m) to improve the efficiency of under-fence cleaning. The bottom fence cable or wire should be approximately 400mm above the constructed pen surface to allow easier under-fence cleaning.

Drains, sedimentation systems and effluent holding ponds

Drains should be designed to avoid deposition of manure while allowing for ease of cleaning, generally with either V or trapezoidal ___/ cross-sections and gently sloping batters (sides). Drains and sedimentation basins should have a firm, durable base to allow cleaning machinery access as soon as possible after rain.

Sedimentation systems and holding ponds should be designed to enable mowing and/or spraying of vegetation around the perimeter.

Manure stockpile and composting area

Manure stockpile and composting areas and carcase composting areas should be established on durable, well-drained earth pads.

Enhancing populations of biological control agents

Biological control agents play an important role in fly control

Parasitic wasps killed 21% to 35% of developing flies in three Australian feedlots. Other natural control agents identified include predatory mites and entomopathogenic fungi.

Preserve parasite and predator populations through appropriate management

Most insecticidal treatments also kill beneficial parasitic wasps. Fly populations recover more quickly than parasitic wasps, resulting in reduced biological control during this lag period. Consequently, insecticide applications should be avoided or, when necessary, used judiciously.

By keeping fly breeding substrates (manure, spilt feed and vegetation) dry, fly breeding is impeded while parasitic wasp and mite breeding is promoted.

Augment natural parasite populations through releases

In the US, commercially bred parasitic wasps are released to augment natural populations, thereby increasing the level of biological control. While none of the beneficial wasps are currently commercially available in Australia, a proposed research project in conjunction with an Australian biological control company may make this a viable option in the future.

Systematic monitoring of fly populations

Fly population monitoring is an important element of an IPM program. Information on the identity of the problem species and population fluctuations can provide early warning of anticipated fly waves before adult fly numbers escalate.

Scouting

In some horticultural industries, professional scouts monitor pest populations by gathering information on the identity, abundance and location of pests. They also assist in selecting suitable treatments and assessing their effectiveness. This concept could be applied to fly monitoring in the feedlot industry.

Scouting should be used to regularly and systematically monitor both adult and larval populations throughout the entire fly season. A single operator can generally provide more consistent results, which should be recorded and assessed immediately after collection. Graphs can be used to identify fly population trends and to initiate actions when populations exceed a predetermined threshold.

Adult fly monitoring

Adult fly populations can be monitored by structured observations of fly resting sites, using sticky sheets or traps.

Fly counts on preferred fly resting sites can be used as a rough indicator of fly populations. This method is less accurate than using sticky sheets or traps, as counts may depend on time of day, weather conditions, etc. It is also difficult or impossible to identify fly species.

Commercially available sticky sheets retain flies landing on the sheet. They should be placed on vertical walls or posts near preferred fly resting sites, away from excessive dust.

Alternatively, fly tapes or fly ribbons could be used. The species and number of flies caught on the sticky sheet over a fixed time, eg 1 to 7 days, can be determined. The exposure time of the sticky sheets must be chosen to avoid saturation with flies. Major feedlot flies can be identified using tips & tools FL14: *Feedlot flies – identifying the problem and some solutions.*

Alsynite traps selectively attract stable flies by reflecting the sun's UV light from a cylindrical Alsynite panel. A transparent sticky sheet is wrapped around the Alsynite cylinder to catch landing flies. These traps are commercially available from the US.

Larval density ratings

Monitoring larval populations gives an earlier indication of increases in fly populations than adult monitoring. The extent of fly breeding can be established by closely examining manure at major fly breeding sites. Manure needs to be turned over and examined at several locations and a larval rating assigned to each site. House fly and stable fly larvae can be distinguished using tips & tools FL14: *Feedlot flies – identifying the problem and some solutions*.

Animal observations

The research has shown that the number of adult flies in the feedlot is closely related to observed cattle behaviour. The number of tail swishes, ear flicks and head tosses observed over a specified time on several animals can be used to gauge house fly and bush fly populations. Likewise, the number of leg stomps correlated well with the stable fly populations.

- IPM systems incorporate cultural, biological and chemical methods to provide cost-effective fly control with minimal insecticide usage.
- An IPM system for flies on cattle feedlots involves:
  - **R**educing fly breeding sites
  - **U**sing insecticides selectively
  - **L**otfeeding design principles
  - **E**nhancing populations of biological control agents
  - **S**ystematic monitoring of fly populations
- Implementation of fly IPM, incorporating the above system, will provide benefits to individual operators, the feedlot industry and the community.

Summary

It is recommended that feedlot operators develop and implement an IPM program to control nuisance flies on their feedlots, incorporating the **RULES** outlined in this tips & tools. IPM programs must be tailored to meet the specific characteristics and management preferences of each individual feedlot. This will enable individual operators, the feedlot industry and the wider community to reap significant production, animal and human health welfare, community amenity and environmental benefits.

Further research will be required to develop a practical program for incorporating the use of biological control agents, such as commercially bred parasitic wasps and entomopathogenic fungi, into IPM programs for the control of feedlot flies. It will be particularly important to ensure that biological control methods are used optimally, along with the range of previously identified design and management practices, to more effectively control flies while minimising insecticide usage.

For more information

More details of an integrated approach to nuisance fly control in cattle feedlots are provided in tips & tools FL14: *Feedlot flies - identifying the problem and some solutions*.

The information in these tips & tools is based on the results of a recent two-year study funded by Meat & Livestock Australia (FLOT.306). A copy of the full report is available, or the summary document: *Nuisance flies on cattle feedlots* (FLOT.306) – key research findings.

For a copy of any of these publications call the MLA Producer Hotline on 1800 675 717

Key contact

Des Rinehart, MLA
Ph: 0417 728 785
Email: drinehart@mla.com.au

MEAT & LIVESTOCK AUSTRALIA

Level 1, 165 Walker Street
North Sydney NSW 2060
Ph: 02 9463 9333
Fax: 02 9463 9393
www.mla.com.au

Reprinted July 2006
ISBN: 1 74036 581 X

ABN 39 081 678 364

Queensland Government
Department of Primary Industries and Fisheries