

# Management of Site Insect Levels to Minimize Carcass Impact

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Seasonally, insect bites on market swine can cause skin lesions that can result in up to \$7.00-15.00/head trim loss in packing plants in the upper Midwest<sup>1</sup>. It is important to understand which insect you are dealing with and seek out professional help (i.e. entomologists) in seeking the proper mitigation response. Furthermore, understanding the behavior and needs of the insect of interest will be important when determining the best practices to employ. For example, mosquitos have a very limited energy source and will likely be multiplying just outside the barn rather than inside it.

Below is a collection of best practices that may be effective against a variety of insects. With most of these, it is important to start these mitigation strategies weeks prior to the marketing of swine as to prevent the development of insect bites on the animals. For example, mosquitos (depending on species) live for 2-3 weeks and can complete their lifecycle in 7 to 10 days. Trying to fix the environment a week before marketing will not be rewarding.

## Site Maintenance:

*General facility.* Effective and on-going sanitation and manure management programs are essential to maintaining fly populations at low levels. Manure, spilled feed, and wet bedding straw should be removed often in order to interrupt the fly breeding cycle. Compost facilities should be evaluated to ensure that no standing water is present on the concrete apron and all mortalities are properly covered. Rendering boxes should be kept away from facilities. Locate and drain stagnant pools of water as insects can reproduce in less than 1" of water.

*Grass.* The most effective method of control is to find and eliminate the egg laying habitat. All mosquitos require standing water to lay their eggs. It is important to keep the sites mowed short in order to reduce the habitat and harborage of insect nesting places.

*Trees.* Certain trees can be a refuge for certain insects so tree selection on-site may need to be considered. For example, mosquitoes will prefer conifers and cedars.

*Ponds.* Standing water with little to no movement are ideal areas for larvae growth. Proper management of ponds would include reducing perimeter vegetation and stocking ponds with species that will consume larvae. Additionally, consider the use of barley straw as this can also serve as good insect control.

*Building perimeter.* Having a good rock buffer adjacent to the building can help with water drainage after precipitation events to avoid pooling of water. Be sure to keep these buffers free of weeds as it disguises stagnant water pools, where many insects lay their eggs. Any refuse should also be removed as decomposing vegetation may harbor insect larvae.

*Lighting.* Adult insects are also attracted to light. Eliminate inside barn lights in after sunset. Consider turning off site lights near the building before dusk until after the sun rises again in the morning. Electric insect removal could be considered outside the building to draw insects away from the pigs.

*Curtains.* Occasionally, curtains should be manually raised and any rainfall or stagnant water should be drained.

*Barn interior.* The sprinkler settings should be evaluated to verify that the sprinklers are not operating at night and are on an interval timer to avoid creating standing water in the barn. A daily walkthrough of the barn should be conducted to ensure that there are no leaky watering devices in the barn that could create standing water. Any issues noted should be resolved immediately.

## Ventilation:

*Naturally-ventilated barns.* In the late evening and during the night, the wind typically decreases; however, the side curtains will most likely be down at this time as the barn temperature continues to drop to set point. In naturally ventilated barns, stir fans are the only source of controlled moving air during the day. During the summer, nighttime temperatures typically will be between 60°F and 70°F and the stir fans may be off. Consider decreasing the stir fan “on” temperature to keep them operating during the night. For larger pigs (>150 lb), this should not be an issue as these pigs have a lower thermal neutral temperature and will be able to tolerate increased airspeed at cooler temperatures (lower thermoneutral limit of 62°F to 57°F, with increased airspeed about 68°F to 63°F).

*Tunnel-ventilated barns.* As the outdoor temperature begins to reduce at night, this may cause the ventilation system to stage down, and in doing so, reduce the air movement inside the barn. With larger pigs (>150 lb), the controller may only reach the tunnel transition stage which depending on the design and operation can have good or poor air movement. One option is to decrease the room set point to cause the ventilation system to remain in the higher tunnel stages through the night. Alternatively, if there is poor air movement in tunnel transition, in the first tunnel stage, when the tunnel curtain begins opening, make sure the inlets are 100% open and in the second tunnel stage, make the inlets reduce to about 50% open (not fully shut). Also, ensure that there are no leaky watering devices in the barn that creates standing water as well and if there are, fix them immediately.

## Manure holding facilities:

*Underground concrete holding tanks.* The buildup of solid materials or the development of a crust on the top layer of the manure can be an ideal breeding area for flies, but not typically mosquitoes. The utilization of enzymes or other additives labeled for management of livestock manure holding facilities can be used to reduce the solid layer and prevent an opportunity for larvae to populate.

*Lagoons.* Flies and mosquitoes will reproduce around lagoons. Proper management of lagoons include reducing vegetation surrounding the lagoon.

## Insecticides

Insecticides may be applied as residual sprays, non-residual knockdown or contact sprays, baits, or feed additives will provide only temporary relief unless breeding sites are eliminated. Not all insecticides are labeled for treatment of all biting insects. Refer to manufacturer labels to identify insects that are managed as well as withdrawal times. Refer to the following website to assist in the selection of a product that may work for the desired control of selected insects. (<https://www.veterinaryentomology.org/vetpestx>). Note, many products have a minimum of a 5 day withdrawal period prior to harvest. Refer to manufacturer labels and federal guidelines for appropriate withdrawal requirements.

**With any insect control product, always read and follow all label directions carefully. It is a violation of state and federal law to use a pesticide in any manner that differs from the product label. Use only according to label directions to avoid environmental damage and animal or human injury.**

*On animal insecticides.* While the number of insecticides that are effective for insects are plentiful, there are actually only a few that can actually be used on the animal. Below are some categories of different types of insecticides.

## On Animal Sprays

Active Ingredients	MOA Group	Days to Slaughter	Examples of Brand Names**	Notes
permethrin	3A	5**	Permethrin-II, SwineGard, Atroban EC, Eciban WDL, GardStar, etc.	14 day re-treat
pyrethrins	3A	0	*ULD BP-100, *EverGreen Pro 60-6, *Pyronyl Crop Spray, *Riptide, PyGanic 5% EC	10 day re-treat

Source: University of Kentucky College of Agriculture, Food and Environment ENT-23: Insect Control on Swine

\*Source: [mwiah.com/our-insights/-/media/assets/mwianimalhealth/insights-articles/mosquito-bite-marks.pdf](http://mwiah.com/our-insights/-/media/assets/mwianimalhealth/insights-articles/mosquito-bite-marks.pdf)

\*\* Check the manufacturer label for specific withdrawal times

### Residual Fly Sprays

Treat walls, ceilings, posts, and other fly resting sites. Spray these areas thoroughly and to the point of runoff. In order to minimize control failures due to insecticide resistance, do not apply products containing the same active ingredient, or insecticides from the same chemical class, repeatedly throughout an entire season. See product labels for use rates. Rotation of pyrethroid and organophosphate insecticides can reduce the potential for development of resistance.

## Residual Fly Sprays

Active Ingredients	MOA Group	Brand Names
diazinon	1B*	Dryzon 50% WP
stirofos	1B*	Rabon 50% WP
stirofos + vapona	1B*	Ravap EC
bifenthrin	3A	ActiShield Insecticide 7.9%
cyfluthrin	3A	Optashield CS 6%, Tempo SC 11.8%
deltamethrin	3A	Annihilator Premise Spray 0.02%
lambda-cyhalothrin	3A	Grenade 10% WP
permethrin	3A	Atroban 25% WP or 11% EC, Gardstar, 10% Prozap Insectrin, Permethrin II 10% or 25% WP
spinosad	5	Elector 2.46%

\*Best to use these outdoors, away from any possible direct contact with swine

Do not contaminate food, water or utensils with spray. Do not treat animals directly. One gallon of spray treats 500-1,000 square feet, depending on the type of surface (See label directions). Apply to walls, ceilings and other fly resting sites. Alternate applications of pyrethroid insecticides and organophosphates. Residual fly spray materials listed above provide control for 1-7 weeks depending on fly infestation, weather, and surfaces treated.

Source: University of Kentucky College of Agriculture, Food and Environment ENT-23: Insect Control on Swine

### Larvicides

If you have standing water that cannot be drained, you could consider adding a commercially available larvicide, a commercially available methoprene product (insect growth regulator) which prevents larva from developing into an adult, or even the addition of a non-toxic oil (e.g. vegetable oil) will make the water inhospitable for the larvae to develop into adults.

## Fogging Devices

Oil-based natural pyrethrins (e.g. ULD BP-100) and/or water-based natural pyrethrins (EverGreen Pro 60-6; Pyronyl Crop Spray; Riptide) delivered through a fogger (listed below) are options for controlling insects in barns that are heavily infested with adult insects. Smaller, inexpensive, but effective fogger are very useful at this time. Some brands that have been successfully used (e.g. BP-100) are listed below:

RYOBI Defender – <https://a.co/d/0ayKDEmu>

KOBALT Handheld Fogger – Kobalt 0.53-Gallons Plastic 24-volt Battery Operated Handheld Fogger w/ Battery | eBay

BAUER Chemical Fogger – 20V Cordless, 1/2 Gallon Chemical Fogger - Tool Only <https://www.harborfreight.com/20v-cordless-12-gallon-chemical-fogger-tool-only-59565.html>

## Insect trapping to determine species

It is important to determine the exact genus and species of the insect that may be causing the problems. For example, there are over 50 species of mosquitos and some can differ on their habitat and behavior that can alter their mitigation strategy. There are several methods to do this, such as light traps or even stick cards. The simplest and easiest to apply is to acquire 5-10 sticky fly traps (hang vertically) and place in multiple places throughout the barn, spread out evenly<sup>2</sup>. A good rule of thumb is to hang in areas where they may be spider webs. Once the traps have accumulated enough insects, you can take a high definition picture of them or collect them and send them into your local insect control expert or consult with insecticide product representative who will help you get them submitted for proper identification.

## References

1. Schurrer JA, Dee SA, Moon RD, et al. Evaluation of three strategies for insect control on a commercial swine farm. J Swine Health Prod. 2006;14(2):76–81.
2. Lee Cohnstaedt, USDA Research Entomologist/Epidemiologist, personal communication