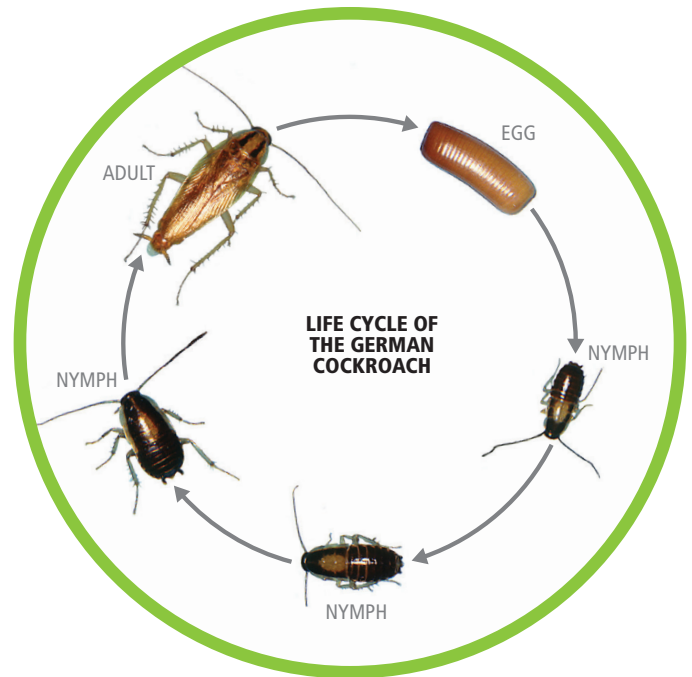




# Cockroaches in Confined Livestock Facilities Protocol


## Importance of German Cockroach Control

- Cockroaches are active foragers, frequently moving between nurseries, barns and other locations within livestock facilities, particularly in swine production, impacting bio-security.
- Cockroaches can contaminate food and surfaces through mechanical transfer of pathogens, including Salmonella and E. coli.
- Controlling cockroaches can be challenging due to their reproductive capability, longevity, and complex biology.
- Cockroaches are hitchhikers and can easily be transported to and from worker's homes.
- Feces and cast skins are powerful allergens and may contribute to asthma and other respiratory problems.



## German Cockroach Biology and Life Cycle

- Cockroaches have 3 life stages: egg, nymph and adult.
- Nymphs are similar in appearance to adults, but smaller. Each nymphal stage is larger than the previous one. Number of molts varies by species.
- Freshly molted cockroaches are soft and white. The cuticle hardens and darkens to normal coloration over a few hours.

GERMAN COCKROACH <i>Blattella germanica</i>	IDENTIFICATION	IMMATURES	ADULTS
	1/2 - 5/8 inches long Light brown 2 dark stripes on the pronotum	30 - 40 eggs per case Females carry egg cases, drop about 24hrs prior to hatching 6 - 7 nymphal instars	Egg to adult in 54 - 215 days Adults typically live 100 - 200 days



## Inspection

- Locate all harborage sites. Focus on areas with the following conditions: high humidity/standing water, darkness, and limited air movement.
- Cockroach populations can be monitored with visual counts and/or glue traps.
- Assess the level of infestation by setting out glue boards where cockroaches may be found and examining the number of cockroaches captured after 24 hours. Infestation levels can be categorized as high, medium, or low.
  - High – large numbers of cockroaches can be found inside and outside common harborage areas.
  - Medium – moderate number of cockroaches can be found in common harborage areas.
  - Low – few cockroaches can be found in common harborage areas.



HIGH INFESTATION



MEDIUM INFESTATION



LOW INFESTATION

## Pre-Treatment

- Reduce harborage areas by sealing holes in common harborage areas, such as:
  - Crates
  - Gates
  - Walls and doorways
  - Behind junction boxes
  - Other loose items and void areas
- Clean and disinfect rooms, drain plenums if applicable, and allow surfaces to dry prior to treatment.
- Turn off room fans prior to application.

## Interior Control Measures (When Animals Are Not Present)

- Prior to any treatments, follow all label directions, restrictions, and PPE requirements.
- Apply premise control products such as Tobex® Multi MoA Concentrate, Sumari® Insecticide or Onslaught® FastCap Spider & Scorpion Insecticide in farrowing rooms and other rooms on the walls, around windows and fans, and in manure pits, focusing on areas where cockroaches rest or travel. In hallways and other areas, applications may also be made to floors as needed.
- Apply NyGuard® IGR Concentrate to floors and other surfaces frequently contacted by animals in farrowing rooms.
  - The active ingredient in NyGuard is an insect growth regulator that mimics natural growth hormones produced by insects preventing immature insects from developing into reproductive adults.
- Apply approved dust products into wall voids and other harborage areas.

## Interior Control Measures (When Animals Are Present)

- Riptide® Waterbased Pyrethrin ULV and ULD® BP-100 Contact Insecticide II are synergized pyrethrin concentrates used for direct application to kill cockroaches.
- Turn off room fans prior to application.
- Ultra-Low Volume (ULV) applications can be directed above animals and into plenums. Allow sufficient time for product to travel to the end of the plenum.

## Baiting

- Locate harborage areas prior to baiting. In breakroom kitchens and storage areas, look under sinks, toilets, refrigerators, near trash containers, inside cabinets and storage areas.
- Apply baits where animals do not have access to them. In farrowing, rooms or other areas where animals are present, bait can be applied in stations and placed in locations inaccessible to animals.
- Check consumption a week after application, replacing consumed bait as needed.

## Post-Treatment

- Re-inspect after 2 - 4 weeks and make a new assessment of the infestation level.
- Continue to monitor populations to catch infestations early and target insecticide treatments.



PRODUCT	IRAC GROUP	ANIMALS PRESENT DURING APPLICATION	RATES	APPLICATION METHODS
<b>NyGuard® IGR Concentrate</b>	7C	Poultry Only	4-12 ml per 1,500 sq. ft.	Apply as a spot, crack and crevice treatment, general surface broadcast treatment, or as ULV/fog. NyGuard may be tank mixed with other insecticides.
<b>Onslaught® FastCap Spider &amp; Scorpion Insecticide</b>	3A	No	1 fl. oz. per gallon OR 1 fl. oz. in sufficient water to cover 1,000 sq. ft.	Apply as a general surface, spot treatment, and/or crack and crevice treatment where cockroaches are or may be present.
<b>Riptide® Waterbased Pyrethrin ULV</b>	3A	Yes	Space Spray: Undiluted at 0.25- 1 fl. oz. per 1,000 cu. ft. or diluted at 1 part concentrate to 10 parts water and applied at 1-2 fl. oz. per 1,000 cu. ft. Surface Spray: 3 fl. oz. per gallon	Apply as space spray, directing spray toward to the upper portions of the enclosure, above the animals. When applied as a surface spray, spray into cracks and crevices, molding, walls, floors, and other surfaces, contacting as many insects as possible.
<b>Shockwave® 1 Flushing, Killing &amp; Residual Aerosol</b>	3A; 7C	No	20 seconds per 100 sq. ft.	Apply when animals are not present into harborage areas, including cabinets, meter boxes, sinks, behind and beneath appliances, and behind baseboards.
<b>Sumari® Insecticide</b>	4A; 7C	No	1 fl. oz. per gallon per 1,000 sq. ft.	Apply as outdoor broadcast, spot, or crack and crevice treatment when animals are not present.
<b>Tobex® Multi MoA Concentrate</b>	3A; 7C	No	1-2 fl. oz. per gallon per 1,000 sq. ft.	Apply as a general surface or spot treatment when animals are not present.
<b>Vendetta Nitro® Cockroach Gel Bait</b>	4A; 7C	No	Rates vary depending on infestation. Grams per 100 sq. ft. • Maintenance: 0.25-0.50 grams • Light: 1-3 grams • Clean Out: 6-12 grams	Apply beads of bait as a spot, crack and crevice treatment, or in stations.
<b>ULD® BP-100 Contact Insecticide II</b>	3A	Yes	1 fl. oz. undiluted or 1-2 fl. oz. diluted with suitable oil per 1,000 cu. ft. of room space.	Select dilution and apply with ULV equipment over animals, into attics, plenums, and other voids.

## Recommended Spray Equipment

- Cold foggers (ULV) – Generate fog by a mechanical action that breaks down the liquid while combining it with high volume of air at low pressure. Users can calibrate the unit to produce droplets of the optimum size for the situation or product being used.
- Backpack or hand sprayer – Commonly used for spot, crack or crevice treatments around the premises. Users can opt for fan spray or pin stream. Do not apply insecticide to runoff.

## Tips and Tricks From the MGK Technical Department

- Aerosols such as Shockwave 1 Flushing, Killing and Residual Aerosol are useful tools for locating and flushing cockroaches from harborage areas.
- For best results when applying a contact insecticide like Riptide Waterbased Pyrethrin ULV and ULD BP-100, avoid applying with overhead lights on and use a head lamp. Apply when areas have been dark for at least one hour to ensure cockroaches are active outside of harborage areas.
- Focus bait applications in areas with medium or low level infestation. When treating high level infestations, prioritize knockdown applications.
- Combat insecticide resistance by rotating insecticides to include different modes of action. For liquid insecticides, rotation every 6 months is common. For baits, rotation every 3 - 6 months is common.



## COCKROACH BAITS



### Vendetta Nitro® Cockroach Gel Bait

- Bait matrix attracts bait-averse and non-averse cockroaches
- Highly palatable bait that kills cockroaches where they hide
- Formulated with NyGuard® IGR for dual modes of action to control immature and adult insects

## INSECT GROWTH REGULATORS



### NyGuard® IGR Concentrate

- Insect growth regulator that keeps insects in juvenile state and provides residual activity
- Breaks life cycle of over 50 insects and is effective at low concentrations
- Can be tank mixed with adulticides to control immature and adult insects

## OVER-ANIMAL INSECTICIDES



### Riptide® Waterbased Pyrethrin ULV

- Contains botanically based pyrethrins synergized with piperonyl butoxide (PBO) for knockdown and kill
- Formulated with a 1:5 pyrethrins to PBO ratio to combat resistance and increase effectiveness
- Designed for use in automatic misting systems or can be manually applied



### ULD® BP-100 Contact Insecticide II

- Oil-based fogging concentrate containing botanically based pyrethrins synergized with piperonyl butoxide (PBO)
- Formulated with a 1:5 pyrethrins to PBO ratio to combat resistance and increase effectiveness
- No withholding time periods for use before animal processing

## PREMISE SPRAYS



### Onslaught® FastCap Spider & Scorpion Insecticide

- Formulated with a knockdown agent and microencapsulated residual insecticide for fast-acting and residual control
- Synergized with piperonyl butoxide (PBO) to combat metabolic resistance and increase effectiveness
- Can be tank mixed with an insect growth regulator to control immature and adult insects



### Shockwave® 1 Flushing, Killing & Residual Aerosol

- Formulated with five active ingredients to provide flush, kill and residual control
- Contains NyGuard® IGR for dual modes of action to control immature and adult insects
- Dual-synergized to combat metabolic resistance and increase effectiveness



### Sumari® Insecticide

- Contains clothianidin, offering a rotational option for pyrethroid products
- Formulated with NyGuard® IGR for dual modes of action to control immature and adult insects
- Provides residual control of insects



### Tobex® Multi MoA Concentrate

- Combines a knockdown agent with controlled-release technology for residual control
- Formulated with NyGuard® IGR for dual modes of action to control immature and adult insects
- Synergized with piperonyl butoxide (PBO) to combat metabolic resistance and increase effectiveness

Contact your local MGK or distributor sales representative for more information.

See the label for a full list of insects controlled, detailed instructions and proper PPE.

Toll Free: 800.645.6466 | Tel: 763.544.0341 | Fax: 763.544.6437

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