

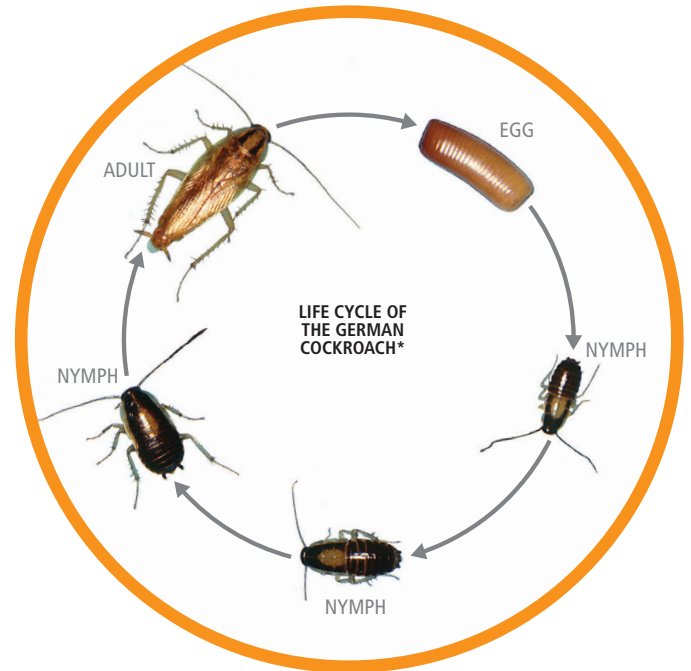


Cockroach Control Protocol



Understanding Cockroach Habits and Life Cycle

- Cockroaches undergo gradual metamorphosis, passing through three life stages – egg, nymph and adult.
- Nymphs are similar in appearance to adults, but smaller.
- As the nymph matures, it sheds its exoskeleton to grow. Freshly molted cockroaches are white, assuming their typical coloration within a few hours as their cuticle hardens.
- Each nymphal stage* is larger than the previous one and the adult emerges after the last nymphal stage.
- The life cycle from egg to adult is dependent upon environmental conditions and the specific cockroach species. Each cockroach species has a unique number of immature stages.
- In general, cockroaches need four things to successfully live in an environment: water, food, shelter and warmth. Different cockroaches have slightly different requirements, which will be helpful in knowing where to inspect and focus control efforts.



*German cockroaches have several nymphal stages (6-7 molts) before becoming adults. Number of molts varies by species.

Common Species

- American cockroach, *Periplaneta Americana*
- Brownbanded cockroach, *Supella longipalpa*
- Smokybrown cockroach, *Periplaneta fuliginosa*
- German cockroach, *Blattella germanica*
- Oriental cockroach, *Blatta orientalis*

See identifying characteristics on page 3.

Key Signs of Heavy Infestation

- Live or dead roaches, egg casings and fecal materials. Cockroaches which prefer moist environments, such as German, American and oriental cockroaches, have more liquid feces than those living in dry environments.
- Fecal points
- Odor

Inspection

- Locate all harborage sites. Focus on areas where the following conditions exist: high humidity/free water, darkness and limited air movement. Look under sinks, refrigerators, dishwashers and stoves, around toilets, near trash containers and inside cabinets and storage areas. See common harborage sites on page 5.
- Check behind objects attached to walls such as pictures, paintings, smoke detectors and posters.
- Do not restrict inspection to just well-known areas such as kitchens and bathrooms.
- Inspection aerosols are useful tools to locate and flush out roaches from harborage areas that are not easily accessible.



Pre-Treatment

- Stress the importance of sanitation to your customers and encourage them to remove competing food sources in order to increase the likelihood of cockroaches feeding on baits.
- Be careful not to contaminate bait placement areas with insecticidal dusts, aerosols, granules and liquid sprays. These products will likely reduce the palatability of the bait leading to reduced bait consumption.
- Use glue traps to assess the distribution of cockroaches within the premises and the density of cockroaches associated with each harborage area. Place glue traps as close to harborage areas as possible.
- For best treatment results, reduce water supplies, food supply and eliminate hiding places by reducing clutter.

Treatment

- Conduct visual/glue trap inspection, assess results and create a treatment plan.

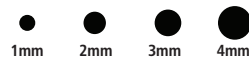
Vendetta Nitro™

- For maintenance treatments apply 0.25 to 0.50 grams of bait per 100 sq. ft. of treatment area.
- For light infestations apply 1 to 3 grams of bait per 100 sq. ft. of treatment area.
- For heavy infestations apply 6 to 12 grams of bait per 100 sq. ft. of treatment area.

BAIT WEIGHT:

Approximate weight per bead diameter	
4 mm bead = 0.032 grams	2 mm bead = 0.016 grams
3 mm bead = 0.025 grams	1 mm bead = 0.008 grams

SPECIFIED BEAD SIZES:



APPLICATION RATES:

Application type	Specified grams of bait per 100 sq. ft.
Maintenance	0.25 - 0.50 grams
Light	1 - 3 grams
Heavy or clean out	6 - 12 grams

Vendetta® or Vendetta® Plus

- For light infestations apply 4 to 6 bait spots per 100 sq. ft. of treatment area.
- For heavy infestations apply 12 to 24 bait spots per 100 sq. ft. of treatment area.

- Apply cockroach gel bait as “bait spots” (1/8-inch to 1/4-inch sized placement) into and around cockroach harborage areas and into cracks and crevices.
- Place bait in areas where cockroaches are seen, paying close attention to kitchens and bathrooms.
- Insect growth regulators like NyGuard® IGR are recommended to collapse populations. Apply NyGuard IGR as a broadcast, space spray, spot or crack and crevice treatment to reduce the reproductive potential of cockroaches and to achieve 6 months of residual cockroach control.

Baiting Tips

- Place bait close to harborage sites.
- Reduce competing food sources.
- Think 3-dimensionally.
- Place sufficient bait for the level of infestation. Larger populations require more bait placements.
- Reapply when bait is no longer visibly present, according to the level of infestation. Replace bait before it is completely consumed to keep cockroach populations from rebounding.
- Practice bait rotation. Remember, rotating different baits with different modes-of-action and attractants can help combat potential bait aversion and resistance.

Post-Treatment



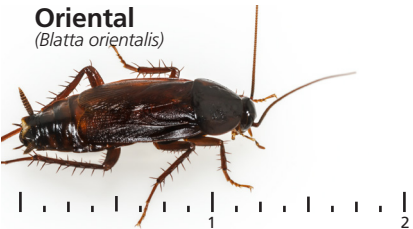


- Evaluate the results in 1-2 weeks following initial application of Vendetta, using glue traps to monitor populations. This will help you to determine if your bait program has been successful.
- If cockroaches are discovered during your evaluation, reassess the premise to determine current pest pressure and harborage areas. Apply additional bait to the infested areas.
- Check the life stages captured on a glue trap: predominately small instars indicate recent hatch; multiple life stages, especially adult males, likely indicate under-baiting of the particular harborage.



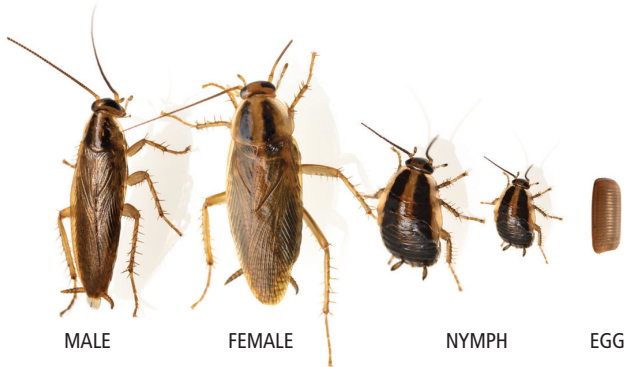
Cockroach Control Protocol

Identifying Cockroaches

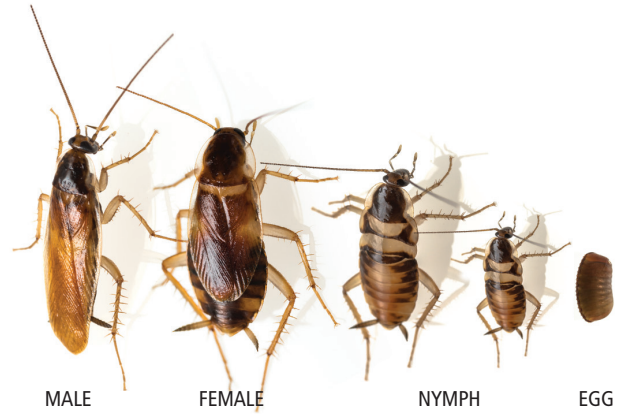
Characteristics of common domestic cockroach species.

COCKROACH SPECIES	LENGTH (INCHES)	COLOR AND MARKINGS	EGGS PER CASE	EGG TO ADULT (DAYS)	NUMBER OF MOLTS	AVERAGE LIFE SPAN OF ADULT (DAYS)	REPRODUCTIVE CHARACTERISTICS
Brownbanded <i>(Supella longipalpa)</i> 	1/2	Light brown to brown with two light yellow bands on the body.	14 – 18	90 – 276	6 – 8	90 – 115	Egg case glued to under surface of objects.
German <i>(Blattella germanica)</i> 	1/2 – 5/8	Light brown with two dark stripes on the pronotum	30 – 40	54 – 215	6 – 7	100 – 200	Females carry egg cases about 24 hours before hatching, then drops it in a secure place.
Oriental <i>(Blatta orientalis)</i> 	1 – 1 1/4	Dark red-brown-black	16	206 – 800	7 – 10	34 – 181	Egg case deposited in debris or food in sheltered place.
Smokybrown <i>(Periplaneta fuliginosa)</i> 	1 – 1 1/4	Dark reddish brown with black pronotum	20	140 – 716	9 – 12	215 – 218	Egg case deposited in cracks and crevices.
American <i>(Periplaneta Americana)</i> 	1 1/2 – 2	Reddish brown throughout with a pale band on the edge of the pronotum	14 – 16	168 – 786	10 – 13	90 – 706	Egg case carried up to six days before depositing in a safe place.

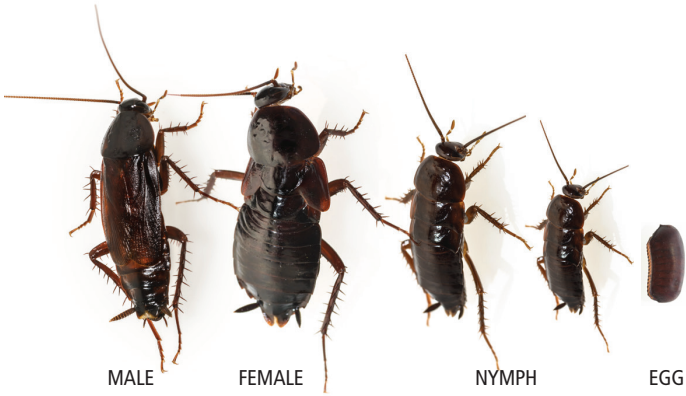
Cockroach Life Stages



German Cockroach



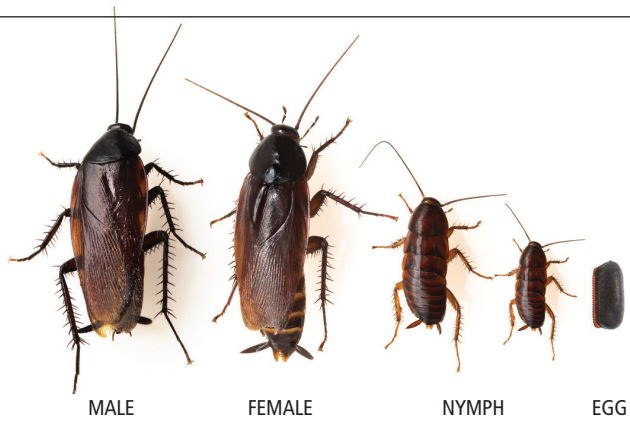
Brownbanded Cockroach



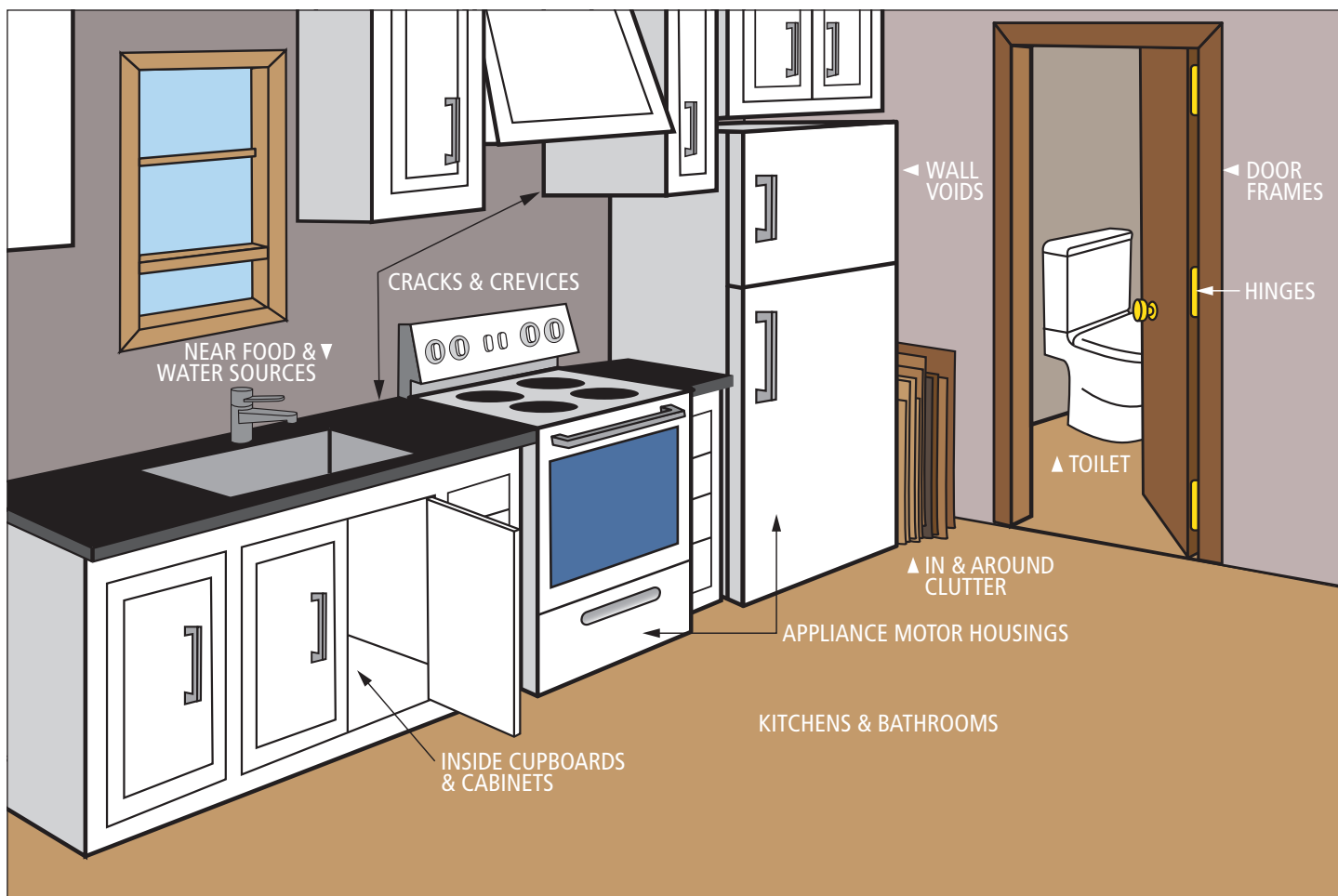
Oriental Cockroach



American Cockroach



Smokybrown Cockroach



Key Harborage Sites

- Kitchens and bathrooms
- Near food and water sources
- Inside cupboards and cabinets
- Toilet
- Hinges and door frames
- Cracks and crevices
- Wall voids
- Around motor housings in appliances
- In and around clutter (stacked boxes, cartons, cardboard, etc.)



Cockroach Control Protocol



Vendetta® Portfolio of Products Innovative Bait Matrix Technology



CLEAN OUT



GAIN CONTROL



MAINTAIN CONTROL



BREAK THE REPRODUCTIVE CYCLE

Vendetta Nitro™ Cockroach Gel Bait

- Use for heavy infestations
- No signal word
- Highly palatable to bait averse and non-averse cockroaches
- Contains NyGuard® IGR
- Breaks the lifecycle of cockroaches
- Stable in high heat

Vendetta® Plus Cockroach Gel Bait

- Highly palatable to bait averse and non-averse cockroaches
- Contains NyGuard® IGR
- Breaks the lifecycle of cockroaches
- Stable in high heat

Vendetta® Cockroach Gel Bait

- Highly palatable to bait averse and non-averse cockroaches
- Stable in high heat

NyGuard® IGR Insect Growth Regulator

- The only IGR with EPA Reduced Risk* status
- May be used in food and non-food areas
- Photostable so it can be used both indoors and outdoors
- Up to 6 months of residual cockroach control

Contact Your Local Distributor Rep for More Information

**Pyriproxyfen, the active ingredient in NyGuard, has EPA Reduced Risk status in food handling.*



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