



Bayer Environmental Science

BAYER ENVIRONMENTAL SCIENCE

German Cockroach Gel Bait Rotation Protocol

General

Previous Technical Experience

Gel bait aversion behavior has been documented in German cockroaches (*Blattella germanica*) in various locations in the United States and Canada. Research had determined that gel bait aversion is a genetically heritable trait that is the result of selection pressure of utilizing gel baits as the primary insecticide formulation for control over extended periods of time. Selected German cockroaches have mutations in taste receptors that will be expressed as repellency to specific food ingredients (not the insecticide) that are common to commercially available cockroach gel baits. Also, German cockroach populations have been collected from the field with some low levels of resistance to all insecticides that are used in baits. While these low levels have not (yet) led to operational failure in actual use, a continued use of a single active ingredient in cockroach gels risks accelerating development of more severe resistance problems.

The development of Maxforce® Impact™ cockroach gel bait was designed to address gel bait aversion behavior by formulating a bait matrix that did not contain the matrix components known to select for this problem. Maxforce® Impact™ also uses a new insecticide from a class of chemistry with a different mode of action than is found in the most common cockroach gel baits. This protocol describes the recommended method of rotation of gel baits to maintain efficacy of these important cockroach management tools.

Site and Design

Application/Assessments

Target pests:

German cockroaches (*Blattella germanica*)

Note that gel bait aversion has not been observed in any other pest species of cockroach.

Bait Rotation Model

Gel bait rotation periods are defined under the following categories:

Clean Out (also: 'Crisis' and 'Complaint'): This period is the initiation of the rotation cycle and/or as a response to eliminating large, or out of control, populations. These conditions would include initiation of service in a new account; responding to population pressures that put the account in jeopardy; or a response to an imported population or 'flare-ups' as reported by the customer. The goal is to respond quickly and drop population counts/activity to zero as soon as possible.

Recommended Product: Maxforce FC Magnum

Recommended Period: 90 Days

Rotation: Following the completion of the 'Clean out' cycle, switch all gel bait application in the account to the 'rotation' bait. Maintain the rotation bait as per operational procedures (replacement/replenishing and/or new placements) exclusively with the rotation bait throughout this period. The rotation period will insure that any surviving German cockroaches that may have the aversion behavior are exposed to this new bait matrix. This rotation will eliminate cockroaches that may be gel bait-averse and prevent creating a population increase of cockroaches with this characteristic. The rotation of the new active ingredient in Impact will contribute to managing development of tolerances or resistance to existing insecticides.

Recommended Product: Maxforce Impact

Recommended Period: 90-120 Days, minimum. This rotation period accounts for the generational reproductive cycle of the German cockroach.

For operational management purposes the rotation period may be adjusted to accommodate service requirements and/or complexities as long as the minimum rotation period is maintained. Suggestions for changing the rotation cycle include: using holidays as the start/stop dates; utilizing an 'in-season' period as the start/stop date (rotation bait during 'roach-season', maintenance bait during 'off-season'); using calendar dates as the start/stop date.

Maintenance: Following the completion of the 'Rotation' cycle or whenever an account isn't experiencing an on-going problem with German cockroaches, switch all gel bait application in the account to the 'maintenance' bait. Maintain the maintenance bait as per operational procedures (replacement/replenishing and/or new placements) exclusively with the maintenance bait throughout this period.

Recommended Product: Maxforce FC Select

Recommended Period: As per the Rotational period described above.

The cycling between the Rotational and Maintenance periods should continue as long as German cockroach activity in the account remains a threat. The goal of this protocol is to continually expose German roaches to different bait matrixes and different active ingredients that will prevent the selection pressure of gel bait aversion &/or insecticide resistance.

Fundamental Baiting Tips:

- Place baits directly into harborage sites or between harborages and resource sites.
- Avoid applying gel baits in long beads or strips. Make multiple spot/dab placements where populations are large.
- Where practicable, remove old, dried gel bait deposits. Old gel bait is an aversion trigger.
- Do not spray liquid or aerosol insecticide formulations over gel bait deposits. Avoid dust deposits on gel placements.