EVALUATING THE PERFORMANCE OF BAITS AGAINST COCKROACHES (DICTYOPTERA: BLATTARIA) IN THE LABORATORY

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Over the last decade there has been a steady growth in the use of insecticidal baits to control cockroaches, particularly since the development of slow-acting, non-repellent compounds such as hydramethylnon and, most recently, fipronil. These baits have become increasingly popular for a number of reasons including user-friendliness, minimal inconvenience to the consumer and proven success in difficult situations. Paradoxically, one of the key features of a successful bait "delayed action" is sometimes perceived as a weakness, such that new products may be promoted as "faster-acting" although speed of action varies with test method and should not detract from the prime objective of controlling the pest. Examples of the affect of experimental design upon bait performance, drawn from tests with different compounds or products, are given which are intended to emphasise the role of test method, rather than to compare products.

An attractive gel matrix is used as the vehicle for candidate bait compounds in screening tests to identify bait potential. Concentrations of active ingredient (ai) from 0.01 – 10% are evaluated in choice and no-choice conditions, using mixed age *Blattella germanica.* Baits are weighed and corrected for weight loss of samples that are inaccessible to the insects to help determine whether activity is via ingestion, contact or fumigation.

In secondary tests, product optimisation and comparisons are made. Speed of action is affected by experimental design to a significant degree. Multi-harborage arenas contain 5 alternative harborages, 2 food and 2 water sources. When a bait and cockroaches were introduced into a test arena on the same day, 50% mortality was recorded 24 hours later, which was 2 days faster than when the insects were left to acclimatise in the arena for 3 days before introducing the same bait. Video-filming into a bait station showed a significant increase in the number of visits to the bait when the number of harborages was reduced from five to one. In the assays, males tended to succumb first, followed by females and more variable results with nymphs – a mortality profile that reflects published differences in foraging behaviour. By using females that have recently deposited their first ootheca, female feeding behaviour is more consistent (and better for product comparisons) – but may exaggerate the speed of action over a normal situation in the field. Some baits appear to be palatable to adults and much less so to nymphs – in one case, less than 10% of *Blattella* nymphs were killed during a 2 week test, when adult mortality was 90%. Secondary kill should be particularly significant for controlling nymphs and females that tend to remain in harborages, rather than forage. When the only source of bait in an arena was dead males, the effects were comparable to those obtained when a gel bait was introduced, indicating the potential (though unproven) contribution that secondary bait consumption can make to product performance.

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Wm H. Robinson, F. Rettich and G.W. Rambo (editors). 1999.