

## ISOCYCLOSERAM: AN INNOVATIVE COMPOUND FOR COCKROACH CONTROL

<sup>1</sup>BOB CARTWRIGHT, <sup>2</sup>BRIGITTE SLAATS, <sup>1</sup>ANGELA SIERRAS,  
<sup>2</sup>MARK HOPPÉ, <sup>1</sup>RAJ SARAN

<sup>1</sup>Syngenta Crop Protection LLC, Greensboro, NC, USA; <sup>2</sup>Syngenta Crop Protection AG, Basel, Switzerland

**Abstract** Isocycloseram (IRAC Group 30: isoxazoline) emerges as an innovative insecticidal compound, particularly for cockroach control. Researchers at Syngenta employed a streamlined process of design, synthesis, testing, and analysis to create and produce isocycloseram, also known by its brand name PLINAZOLIN<sup>®</sup> technology. It is a broad-spectrum insecticide and acaricide, controlling blattodea, hemipteran, coleopteran, hymenopteran and dipteran pest species. Formulations of the active ingredient include sprayable products, granular baits as well as cockroach and ant gel baits, all of which have exhibited exceptional efficacy in laboratory and field trials. A cockroach bait containing 1% isocycloseram demonstrated a high level of effectiveness against a broad spectrum of economically relevant cockroach species (American, German, Brown-Banded, Oriental and Turkestan cockroaches) in a series of laboratory arena trials with different cockroach densities. At application rates spanning from 0.5 g of bait to 2.0 g of bait per m<sup>2</sup> over 90% control was achieved between 10 and 14 days after exposure. Furthermore, research conducted by others showed isocycloseram's effectiveness against resistant German cockroach strains. Complete control of adults and nymphs in four out of five tested strains resistant to multiple conventional insecticides was achieved, with 96.7% mortality in the fifth strain, underscoring isocycloseram's potential in combating insecticide resistance. The gradual onset of isocycloseram's biological activity enables effective population control through horizontal transfer among conspecifics. Research conducted in 2024 by D. Miller at Virginia Tech and C.-Y. Lee at the University of California, Riverside (UCR) explored this phenomenon, focusing on coprophagy and emetophagy. In the Lee study, five male adult primary donors were exposed to 1% cockroach gel bait for 24 hours. After removing the adults and bait, ten first instar nymphs were introduced, resulting in 100% mortality within four days of exposure to the primary donors' excretions. Similarly, in the Diller study, ten non-gravid female adults served as primary donors, followed by the introduction of fifteen first instar nymphs. This trial achieved approximately 95% nymph mortality six days post-exposure. These findings underscore isocycloseram's potential for efficient cockroach population management through secondary kill effects. The introduction of compounds with novel modes of action, such as isocycloseram plays a vital role in staying ahead of evolving pest challenges, ensuring the long-term success of cockroach management strategies.

**Key words** gel bait; insecticide; isocycloseram; cockroaches