Proceedings of the Eighth International Conference on Urban Pests
Gabi Müller, Reiner Pospischil and William H Robinson (editors) 2014
Printed by OOK-Press Kft., H-8200 Veszprém, Papái ut 37/a, Hungary

IMPACT OF INSECTICIDE SPRAY ON NON-TARGET TERRESTRIAL ARTHROPODS WHILE TREATING FOR *LINEPITHEMA HUMILE* (HYMENOPTERA: FORMICIDAE)

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Abstract As part of a study investigating experimental insecticide formulations for control of Argentine ants, *Linepithema humile* (Mayr), in outdoor locations, the imidacloprid-based product Premise 2 (Bayer Environmental Science) was used as a commercial standard. During the study, Premise 2 provided the most significant control of *L. humile* compared to the experimental products. The focus of this abstract is the resulting management of *L. humile* with an emphasis on the impact of the treatment on non-target terrestrial arthropods. Premise 2 was applied at the highest label rate of 0.1% to four trees with heavy trails of *L. humile* on the campus of Clemson University, Clemson, SC, USA, and another tree about 20 m away with similar ant trails was used as a control. Approximately 4 L of spray was applied 1.5 m up trunks and approximately 1.5 m around tree bases. The control tree was treated with water in a similar manner. Ant numbers were determined by counting the largest trail of *L. humile* passing a point on each tree in 30-sec. Numbers were recorded at 1 wk pre- and 1, 4, 8 and 12 wks post-treatment. One pitfall trap also was placed within 1 m of each tree. Thirty ml of antifreeze (Arctic Ban, Camco Mfr. Greensboro, NC, USA) was added to pitfall traps for one week before collection. Samples (0, 1, 4, 8 and 12 wks) were identified to order, family or genus. Pretreatment ant numbers averaged 27 on treated and 37 on the control tree. At 8- and 12-wks post-treatment, the mean percent decrease of *L. humile* was 100% on treated trees, the percent ant increase for the control tree was 35 and 41 at 8-and 12-wks post-treatment, respectively. Many arthropods were collected, but adult beetles (Coleoptera) and ants (Hymenoptera) were the most abundant groups captured in traps. Ten beetle families were collected in pitfall traps, with nine in treated sites and four in the control site. These included Carabidae, Curculionidae (Scolytinae), Histeridae, Montomidae, Nitidulidae, Scarabaeidae, Silvanidae, Staphylinidae, and Tenebrionidae in treated sites; and in the control, Chrysomelidae, Curculionidae (Scolytinae), Nitidulidae, and Staphylinidae. The Nitidulidae were the most common beetles captured; there were no other discernable patterns in beetle diversity or abundance during the study. Ant genera collected did show some patterns. At treatment and control sites, one week before treatments, *L. humile* was the most abundant ant species collected in pitfall traps. Ant numbers were low with 24 *L. humile* trapped at treatment sites and three at the control site. *Paratrechina* also were captured at pre-treatment Premise 2 sites with one *Hypoponera* sp. at the control site. Throughout post-treatment evaluations (1-12 wks), *L. humile* was the only ant species collected in

pitfall traps in the control site. In treatment sites, *L. humile* decreased to zero at 4-wks post-treatment with a corresponding increase in diversity and number of ant genera in the control. From 1- to 12-wks around treated trees, *Paratrechina, Pheidole, Solenopsis, Strumigenys,* and *Technomyrmex* ants were collected, the most abundant being *Solenopsis molesta*. It was difficult to discern patterns in arthropod diversity and abundance between treated and untreated sites, but *L. humile* was a keystone species in relation to other ants. After *L. humile* were reduced, diversity and abundance of other genera increased. This study indicates that other ant genera quickly fill a void created by reduction of an invasive species. In general after treatment, the original pest ant may rebound.