Alvarez, G.; Etxebeste, I.; Sánchez, E.; Gallego, D.; Pajares J.A. Effective traps for live trapping of PWN vectors *Monochamus* spp. In: Schröder, T. (ed.), Pine Wilt Disease Conference 2013, pp. 14-16, Braunschweig, ISSN: 1866-590X

Effective traps for live trapping of PWN vectors *Monochamus* spp.

Alvarez G, Etxebeste I; Sánchez E, Gallego D, Pajares JA

ABSTRACT

Pheromone-kairomone blend recently developed has shown a high power to attract *Monochamus galloprovincialis* beetles to traps. This lure may be used for effective monitoring and even mass trapping of pine wood nematode vectors. However, for this to be true, an effective trap for trapping these species is required. *Monochamus* beetles are very agile and easily escape from most of traps if they are not killed. However, keeping the captured beetles alive is a key feature for monitoring nematode loads in the beetles and for obtaining other valuable information on the beetle population. Several designs of traps were tested to determine their suitability in maximizing *M. galloprovincialis* caught beetles and in keeping them alive. These included different modifications on conventional multiple-funnel traps and cross-vane traps, as one-way funnels, slippery coated inner surfaces, extended collector cups or wire screen bottoms. Experiments were carried out under different field conditions in Spain using randomized block designs. Traps were suspended from poles 2m height and baited with the kairomone/pheromone blend. Catches were sampled weekly during *M. galloprovincialis* flying period. Some experiments were replicated in other countries. Results of several experimental years showed that a slippery coat on the trap doubled catches, whereas the slippery coat and a tight wire screen on the collection cups bottom avoided escape of trapped live adults and increased their survival. These results have led to commercial development of two models of efficient traps.

INTRODUCTION

Insects of the genus *Monochamus* (Coleoptera: Cerambycidae) include species that colonize recently dead or heavily damaged conifers by factors as drought and attack by other organisms. Although they have been usually considered as secondary pests, their reported role as vectos of the pine wood nematode *Bursaphelenchus xylophilus*, has given them a main role in pest management. Since the introduction of the nematode in Europe, *M. galloprovincialis* has been confirmed as its only vector. A great deal of knowledge has been achieved in recent years on its chemical ecology leading to a pheromone-kairomone blend recently developed that has shown a high power to attract *Monochamus*

galloprovincialis beetles to traps. This lure may be used for effective monitoring and even mass trapping of pine wood nematode vectors. However, for this to be true, an effective trap for trapping these species is required. *Monochamus* beetles are very agile and easily escape from most of traps if they are not killed. However, keeping the captured beetles alive is a key feature for monitoring nematode loads in the beetles and for obtaining other valuable information on the beetle population.

MATERIAL AND METHODS

From 2010 to 2012, several designs of traps were tested in field assays to determine their suitability in maximizing *M. galloprovincialis* caught beetles and in keeping them alive. Assay in 2010 included multiple-funnel traps for 5 different treatments: 1) collecting cup provided with a small piece of DDVP (dimethyl 2,2-dichlorovinyl phosphate) insecticide strip (Econex S. L., Murcia, Spain) to kill trapped beetles; 2) collecting cup without modifications or insecticide; 3) collecting cup internally coated with slippery substance (Teflon); 4) both multiple-funnel trap and collecting cup coated with Teflon and 5) collecting cup sheathed in a polystyrene cover and tight wire screen bottom with the aim of reduce internal temperature and improve insects survival. The assay carried out in 2011 compared the efficacy of catching insects and mantaining them alive of three different designs of traps: conventional multiple-funnel trap, cross-vane trap and polytrap (a type of cross-vane trap). Finally in 2012, effectiveness of new multiple-funnel traps were compared with used multiple-funnel and cross-vane traps with the aim of evaluate the suitability of these different models and the possible loss of efficacy of Teflon-coated traps two years after having been coated. All these experiments were carried out using randomized block designs. Traps were suspended from poles 2m height and baited with the kairomone/pheromone blend. Catches were sampled weekly during *M. galloprovincialis* flying period.

DISCUSSION

Comparison between conventional multiple-funnel trap and this same provided with insecticide showed that exist a proportion of caught insects that escape from collecting cup. The number of insects obtained with collecting cup internally coated was not different from that using conventional collecting cup, but collecting cup covered with polystyrene got better results, due to better conditions inside the collecting cup, reducing temperature and keeping insects quiet on the background grid. However, the number of catches obtained by both multiple-funnel trap and collecting cup slippery coated was three times more than that by conventional multiple-funnel trap, suggesting that the key is not only to avoid escape of insects but maximize the number of attracted insects that fall into the collecting cup. The proportion of living insects was not different between treatments without insecticide. Comparison between different model of traps in 2011

showed no differences between cross-vane trap and multiple funnel trap, although polytrap showed clearly inferior (Figure 1). Finally, 2012 experiments showed no differences between old traps and new ones and confirmed no differences between cross-vane traps and multiple-funnel traps. Anyway, Teflón-coated traps have been not tested more than two years after being coated and long durability of Teflon coating under field conditions is unknown. The loss of effectiveness during time would have the double effect of not only escape of insects but a decrease in the number of catches. These results have led to the commercial development of both teflon-coated traps, ECONEX MULTIFUNNEL-12® and CROSSTRAP® (Econex S.L., Murcia, Spain), that are efficient enough to be recommended for monitoring and for mass trapping of *M. galloprovincialis* They are currently being used in Spain in the PWN eradication programs and live adult trapping is allowing the sampling for pine wood nematodes carried in the caught beetles within these programs.

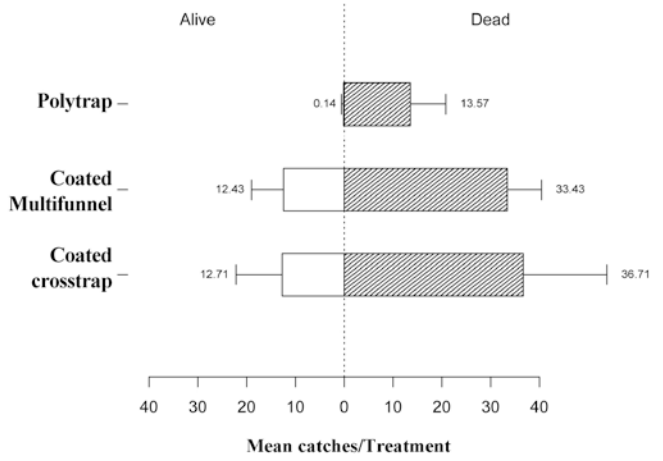

Fig. 1) Different type of traps tested in 2011 field assay.