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A COMPARISON OF YEAST HYDROLYSATE AND SYNTHETIC FOOD ATTRACTANTS FOR CAPTURE OF *ANASTREPHA SUSPENSA* (DIPTERA: TEPHRITIDAE)

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Monitoring for the presence and relative abundance of tephritid fruit flies is an important component of area-wide control. Trap captures are used to delimit populations, direct control efforts and measure their effectiveness, and influence whether or not vulnerable agriculture commodities can be exported to un-infested states and countries (Simpson 1993).

Various pest fruit flies are attracted to pheromones, pheromone precursors, and parapheromones (e.g., Sivinski & Calkins 1986). However, the standard trap for the capture of *Anastrepha* species in general and the Caribbean fruit fly, *Anastrepha suspensa* (Loew), in particular is the McPhail trap, an invaginated glass bottle baited with an aqueous protein (yeast) hydrolysate solution (McPhail 1939). Food bait attractants are generally considered to be relatively inefficient compared to other forms of attractants available for other fruit fly species. But unlike well known parapheromones such as methyl eugenol, trimedlure, and cuelure that attract only males (Sivinski & Calkins 1986), food baits capture both sexes, with a bias toward females (Heath et al. 1993).

Because the capture of mostly females and relatively few males results in fewer flies to process and identify during sterile male releases (SIT), improved food-based lures have been developed that employ volatile chemicals emitted from yeasts, bacteria, and other potential food sources (Heath et al. 1995; Heath et al. 1997). BioLure ® (Suterra LLC, Bend, OR), consisting of a three component blend of putrescine, ammonium acetate, and trimethylamine, was originally designed to attract the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann), and has been widely deployed to both assess the efficacy of SIT and detect the presence of low density *C. capitata* populations (Florida Fruit Fly Detection Manual, Revision 6). The usefulness of these components in the capture of *Anastrepha* spp. also has been investigated. Both Thomas et al. (2001) and Heath et al. (2004) found that two component blend of putrescine and ammonium acetate lures were particularly efficacious attractants for the Mexican fruit fly, *Anastrepha ludens* (Loew). The first compared these two components to yeast slurry and the second to ammonium acetate and trimethylamine or ammonium acetate, trimethylamine, and putrescine. In studies conducted in Guatemala, traps baited with ammonium acetate and putrescine captured six *Anastrepha* species of economic importance, as well as thirteen other *Anastrepha* spp. (Martinez, USDA/APHIS, Edinburgh, TX, personal communication). Thomas et al. (2001) found that traps baited with putrescine and ammonium acetate captured marginally more *A. suspensa* in traps baited with yeast hydrolysate, but capture by the three component Biolure was not tested.

In this report, we compare captures of *A. suspensa* in three different trap/bait combinations: glass McPhail traps baited with 4 torula yeast/borax tablets (ERA International LTD, Baldwin, NY), in 300-350 mL of water; plastic McPhail-like traps (IPM® trap; Great Lakes IPM®, Vestaburg, MI) baited with a three component lure blend (putrescine, ammonium acetate, and tri-methylamine) or with a two component lure blend (putrescine and ammonium acetate). Tests were conducted between Jun and Oct 2002 in an abandoned citrus grove containing common guava, *Psidium guajava L.,* scattered throughout the area. For both the two and three component lure treatments, a 10% solution of propylene glycol (Prestone Low-Tox® antifreeze, Prestone Products Corp., Danbury, CT) was added to the bottom of the traps as a fly preservative. The addition of propylene glycol solution serves not only as a fly preservative, but also enhances capture rates (Thomas et al. 2001). These traps were placed in six scattered, wild guava trees, a principal host of *A. suspensa* (Norrbam & Kim 1988), in Indian River County, FL. During the experiment all fruit stages were present. Traps containing individual treatments (bait combinations) were placed ~1 m apart at heights of 2-3 m in each tree canopy. Traps were left for 7 d, their contents were counted, and the traps were then rotated into positions previously held by a different treatment. The synthetic lures and preservatives were changed following a 6 wk field exposure period,

while the torula yeast solution was replaced weekly (Fruit Fly Detection Manual, Revision 6). The five 3-wk complete trap rotations resulted in an equivalent of 90 weeks of exposure for each trap-attractant combination. Mean trap catches were compared by Tukey (HSD) test (Statistix for Windows 1998).

Yeast hydrolysate-baited McPhail traps captured an average (±SD) of 3.2 (±7.1) flies per week, the three component lure-baited IPM traps captured 9.7 (±17.3) flies per week, and the two component lure-baited IPM traps captured 18.2 (±36.0) flies per week (F = 9.2, df [total] = 269, P = 0.0001). There was no difference between the number of flies captured by the three component lure-baited traps and yeast hydrolysate-baited traps. However, the two component lure-baited IPM traps captured significantly more flies than either of the other two treatments.

Recent comparisons of food-based *Anastrepha* attractants have employed different arrays of chemicals/baits exposed to different species of fly. Heath et al. (2004) used the same traps and attractants as the present study but investigated the response of *A. ludens*. Thomas et al. (2001) studied *A. suspensa* in Florida but did not compare three to two component lures. The later also encountered considerable differences in relative capture rates in different locales. Given the variety of methods and variance in results we suggest that further comparisons of attractants be performed under different environmental conditions in hopes of revealing patterns that will further trap development and deployment tactics.

Summary

We demonstrated that a synthetic lure consisting of putrescine and ammonium acetate (two-component Biolure) was more efficacious in the capture of Caribbean fruit flies, *Anastrepha suspensa* (Loew), than either the same synthetic with tri-methylamine added (three-component Biolure) or the historically standard attractant, hydrolyzed yeast slurry.

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