ABSENCE OF SYNERGISM IN THE RESPONSE OF FLORIDA LESSER PEAChTREE BORER MALES TO SYNTHETIC SEX PHEROMONE

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ABSTRACT

The response of male lesser peachtree borers, Synanthedon pictipes (Grote and Robinson), in Florida to the sex pheromone \((E,Z)-3,13\text{-octadecadien-1-ol acetate}\), unlike that of borer males in Wisconsin, was not synergized by the addition of the \(Z,E\) isomer. These geographically separated populations may thus respond to different pheromones.

The lesser peachtree borer, Synanthedon pictipes (Grote and Robinson), utilizes \((E,Z)-3,13\text{-octadecadien-1-ol acetate}\) \((E3,Z13-18:Ac)\) as its sex pheromone (Tumlinson et al. 1974). Tumlinson et al. (1974) also reported that \(Z3,Z13-18:Ac\) will inhibit the response of male \(S.\) pictipes to the pheromone. This is an unfortunate circumstance because the \(Z,Z\) isomer is a major contaminant in the synthesis of the pheromone, and it can only be removed by costly chromatographic techniques (Tumlinson and Heath 1976).

Therefore, we were intrigued by a report (Karandinos et al., 1977) of a synergistic effect of the \(Z,E\) isomer on the response of male \(S.\) pictipes to \(E3,Z13-18:Ac\) in Wisconsin. We reasoned that such a synergistic effect might overcome the inhibition of the \(Z,Z\) isomer. The experiment designed to test that hypothesis revealed an apparent difference in the response of Florida and Wisconsin \(S.\) pictipes males to traps baited with synthetic sex pheromone.

METHODS

The chemicals used were synthesized by Dr. R. E. Doolittle of this laboratory as were those used by Karandinos et al. (1977), and they were subjected to the same purification procedures. These purified materials were then used to bait Pherocon 1C® sticky traps placed in a peach-nectarine orchard near Lowell, Fl.

In the first experiment (fall test), the traps were baited with stainless steel planchet containing one of 5 treatments mixed with 1% by volume of UOP 688®, which served as a keeper and antioxidant (McLaughlin et al. 1976): 1) 100 µg of \(E,Z\); 2) 100 µg of \(E,Z\) plus 100 µg of \(Z,E\); 3) 100 µg of \(E,Z\) plus 1 µg of \(Z,Z\); 4) 100 µg of \(E,Z\) plus 100 µg \(Z,E\) plus 1 µg \(Z,Z\); and 5) 100 µg of \(Z,E\). Two rows of traps separated by ca. 40 m were established. Each row contained 5 traps baited randomly with each of the 5 treatments. The traps were placed ca. 1 m above the ground (mid-tree height) and were sepa-

* Mention of a commercial or proprietary product in this paper does not constitute an endorsement of that product by the USDA.
rated by ca. 22 m. The study was begun on 8 October 1975, and the traps were checked 11 times in 16 days. A clean sticky surface was placed in each trap each time it was checked, and each trap with its particular bait was moved to the next trap location in the row.

Since our fall test revealed no synergistic effect of the Z,E isomer, we conducted another experiment the following spring in the same orchard to determine whether there was a seasonal difference in the behavior of the insect. The treatments were placed (without antioxidant) into 0.31-cc polyethylene vials (Olympic Plastic Co., Los Angeles, Ca.) with closed lids. Three treatments were tested: 1) 50 μg E,Z; 2) 50 μg Z,E; and 3) 50 μg E,Z plus 50 μg Z,E. Three rows of 3 traps each were established. The same experimental design and procedures were used as before. The traps were placed in the field 31 March 1976 and checked 9 times in 13 days.

Results and Discussion

The Z,E isomer had no apparent effect on the capture of male S. pictipes in traps baited with the identified sex pheromone, E3,Z13-18:Ac, and it did not overcome inhibitory effect of the Z,Z isomer (Table 1). Traps baited with the Z,E isomer alone did capture a few S. pictipes during the first 2 days of the 2nd test, probably because of contamination by some E,Z.


<table>
<thead>
<tr>
<th>Isomer</th>
<th>Male captures/trapping interval(^{a,b})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SE</td>
</tr>
<tr>
<td>E,Z (100)</td>
<td>7.3 ± 1.0 a</td>
</tr>
<tr>
<td>E,Z:Z,E (100:100)</td>
<td>8.0 ± 1.3 a</td>
</tr>
<tr>
<td>E,Z:Z,Z (100:1)</td>
<td>1.7 ± 0.4 b</td>
</tr>
<tr>
<td>E,Z:Z,Z:Z,E (100:1:100)</td>
<td>2.3 ± 0.4 b</td>
</tr>
<tr>
<td>Z,E (100)</td>
<td>0</td>
</tr>
<tr>
<td>E,Z (50)</td>
<td>24.0 ± 5.5 a</td>
</tr>
<tr>
<td>E,Z:Z,E (50:50)</td>
<td>18.1 ± 4.5 a</td>
</tr>
<tr>
<td>Z,E (50)</td>
<td>1.1 ± 0.9 b</td>
</tr>
</tbody>
</table>

\(^a\)Means of 22 values in test 1 and 27 in test 2.

\(^b\)Means followed by uncommon letters differ significantly (1%) by Duncan's new multiple range test (Z,E not included in test 1; comparisons made only within tests).

The results confirm preliminary observations in Georgia (Tumlinson et al. 1974) that the Z,E isomer does not influence the attraction of S. pictipes males to E3,Z13-18:Ac. Since Karandinos et al. (in press) found that Wisconsin populations of S. pictipes are influenced behaviorally by this
isomer, there is a possibility that *S. pictipes* populations in various geographic areas of the U. S. respond to different pheromones (see Klun and Cooperators 1975 and references therein).

ACKNOWLEDGMENT

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LITERATURE CITED


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**BOOK NOTICE**

*Insects and the Life of Man.* Vincent R. Wigglesworth. 1976. *Halsted Press,* New York. 217 p. $12.50. A collection of essays and lectures for the general audience, written across a span of 40 years of the author's distinguished career. Selected titles: Insects and Human Affairs; DDT and the Balance Of Nature; Science, Pure and Applied; The Science and Practice Of Entomology; Insects and the Farmer; Malaria In Ceylon; Malaria In War; The Insect As A Medium For the Study Of Physiology; Fifty Years Of Insect Physiology; Prenatation and Insect Development; Experimental Biology, Pure and Applied; Wordsworth and Science; and The Religion Of Science.—*J. E. Lloyd*