

## A PRELIMINARY TEST OF SEX PHEROMONE OF THE CIGARETTE BEETLE *LASIODERMA SERRICORNE* (F.) IN A TOBACCO WAREHOUSE<sup>1</sup>

RU-SHIOW TSAI<sup>2</sup>, YIEN-SHING CHOW and SHIOW-JEN RAU

Institute of Zoology, Academia Sinica, Taipei Taiwan 11529,  
Republic of China

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**Ru-Shiow Tsai, Yien-Shing Chow and Shio-Jen Rau (1989)** A preliminary test of sex pheromone of the cigarette beetle *Lasioderma serricornne* (F.) in a tobacco warehouse. *Bull. Inst. Zool., Academia Sinica* 28(1): 63-67. A merchandized trap that consisted of sex pheromone of the cigarette beetle *Lasioderma serricornne* (4S, 6S, 7S)-serricornin and food attractant (New Serrico®) was tested in a tobacco warehouse of Sung-shan cigarette factory located in Taiwan to catch the cigarette beetle. The result showed that there were no significant differences among the traps baited with plastic covered (4S, 6S, 7S)-serricornin plus food attractant disks, uncovered (4S, 6S, 7S)-serricornin plus food attractant disks and covered (4S, 6S, 7S)-serricornin disk. The result also indicated that the food attractant had no synergistic effect on action of the (4S, 6S, 7S)-serricornin in the tobacco warehouse. However, an unusual number of another stored-product rusty grain beetle *Cryptolestes ferrugineus* Stephens were caught by the food attractant.

**Key words:** Cigarette beetle *Lasioderma serricornne*, (4S, 6S, 7S)-serricornin (New Serrico®), food attractant (New Serrico®), synergistic effect, rusty grain beetle *Cryptolestes ferrugineus*.

Cigarette beetle *Lasioderma serricornne* (F.) (Fig. A1) is a cosmopolitan pest of cured tobacco leaf and also infests flour, spices, and all dry food materials (Howe, 1957). The sex pheromone of cigarette beetle was first identified as 4,6-dimethyl-7-hydroxynonan-3-one, (Chuman *et al.*, 1979). Its configuration was later elucidated as (4S, 6S, 7S)-serricornin (Mori *et al.*, 1981; Mori *et al.*, 1982). Recently, its attraction ability could be significantly inhibited by its 4S, 6S, 7S-enantiomer (Mori *et al.*, 1986). The pheromone gland of the beetle were discovered in the second abdominal segment of the female (Levin-

son *et al.*, 1983) and pheromone biology were discussed in detail by Levinson (1987). This experiment were studied the influence of food attractant on the action of serricornin (Fuji Flavor Co.) in a tobacco warehouse, and the comparision of the efficiency between plastic covered serricornin disk and the uncovered one.

### MATERIALS AND METHODS

Sticky traps were baited with A: plastic covered (4S, 6S, 7S)-4,6-dimethyl-7-hydroxynonan-3-one (serricornin) plus food attractant disks (New Serrico®), B: uncovered serricornin plus food attractant

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2. To whom reprint request should be sent.

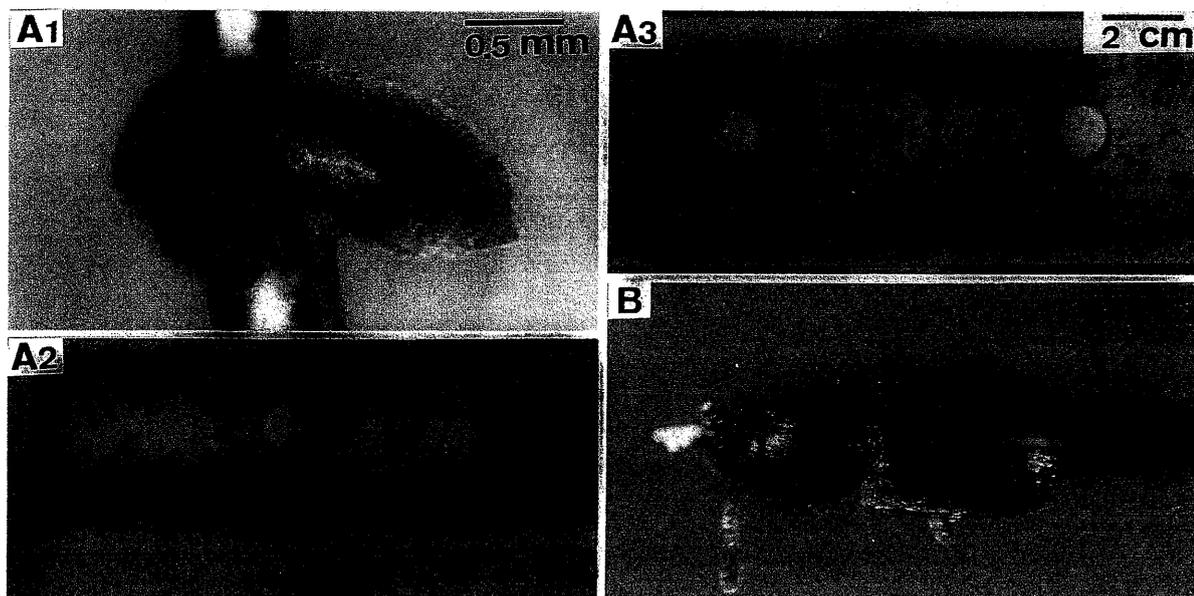


Fig. A. The cigarette beetle *Lasioderma serricorne*. 1, male beetle; 2, large number of beetles caught by a sticky trap baited with the covered sex pheromone serricornin disk; 3, same as 2 but baited with the sex pheromone serricornin and food attractant (arrowed).

Fig. B. The rusty grain beetle *Cryptolestes ferrugineus* Stephens.

disks, C: covered serricornin disk, D: covered food attractant disk, and E: control (no chemicals). Chemicals were donated by Fuji Flavor Co. (3-5-8 Midorigaoka, Hamura-machi, Nishitama-gun, Tokyo, 190-11, Japan). Two replicates of each treatment were allocated randomly in a 1097 m<sup>2</sup> tobacco warehouse of Sungshan Cigarette Factory. The numbers of cigarette beetle trapped were counted once for every one or two days. The position of traps was changed alternately after each counting.

According to the regular practice of the tobacco storage house, the amount of cured tobacco leaves changed daily, so the occurrence of the cigarette beetle fluctuated vigorously. In order to avoid large difference in our crude data, the datum of each treatment was divided by the total trap catch of that recorded day, and analyzed by Student *t* test. This experiment was proceeded from August 8 to 29, 1988.

## RESULTS

The collected data were showed in Table 1 showing thousands of cigarette beetles attracted by the sticky traps baited with plastic covered serricornin disk (Fig. A2) and the one with plastic covered serricornin plus food (Fig. A3) attractant disks, and their transformed data were listed in Table 2. Statistical analysis of the Table 2 showed that traps baited with plastic covered serricornin plus food attractant disks (A) had no significant difference from uncovered serricornin plus food attractant disks (B) (at P level 0.01  $t=2.845$ ) during 3 weeks. There was no significant difference between traps baited with serricornin plus food attractant disks (A) and serricornin disk (C) only (at P level 0.01), this result also indicated that food attractant had no synergistic effect on attracting the cigarette beetles of serricornin in the tobacco warehouse. The food attractant disk (D) was much less efficient than



serricornin disk (C) and had no significant difference from the control group (E) (at P level 0.01). Besides the cigarette beetles, the traps (A-E) caught another species of the stored-product rusty grain beetle *Cryptolestes ferrugineus* (Table 1, Fig. B) and the traps baited with food attractant (D) alone caught 19 beetles out of the total 31 insects.

### DISCUSSION

There was no significant difference between the covered serricornin disk and uncovered serricornin disk. This might be due to the high population of the cigarette beetle or the evaporating quantity of the plastic covered serricornin disk had reached the trapping efficiency limit. Therefore, more evaporating quantity of the uncovered disk did not increase the attractant efficiency of the sticky traps.

The combination of food attractant and sex pheromone worked very well in the rice storage house for controlling the American cockroach (Chow and Wang 1981). However, the food attractant seems no synergistic effect on the action of the serricornin in the tobacco warehouse in this experiment. Perhaps the high concentration of the flavor of cured tobacco leaves had concealed the one in the food attractant bait, and it might work in other storage product, such as flour mill factory (Personal communication with Fuji Flavor Co.).

The rusty grain beetle *Cryptolestes ferrugineus* Stephens was also an important stored-product pest of rice, corn, and sweet potato in Taiwan (Lin, 1968). This pest was caught by the food attractant for the first time. The result suggested that it might have infested the tobacco leaf and needed to be evaluated in the future.

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## 合成菸甲蟲性費洛蒙用於菸葉倉庫初步試驗

蔡如秀 周延鑫 饒秀珍

菸甲蟲 *Lasioderma serricorne* (F.) 之合成性費洛蒙 (4s, 6s, 7s)-Serricornin 及食物誘餌 (New serrico®) 配合粘膠式誘蟲盒，於一九八八年八月在臺北松山菸廠之菸葉倉庫進行誘蟲試驗。結果顯示，具有塑膠套的菸甲蟲性費洛蒙加食物誘餌、不具塑膠套的菸甲蟲性費洛蒙加食物誘餌及僅具塑膠套菸甲蟲性費洛蒙之間，其誘蟲效果並無顯著的差異存在。而以食物誘餌誘蟲之數量與未加任何物質的對照組間亦無差異，指出食物誘餌在菸葉倉庫的誘蟲試驗中，並無促進菸甲蟲性費洛蒙之誘蟲效果，但食物誘餌可誘捕到另一種倉庫害蟲角胸粉扁蟲 *Cryptolestes ferrugineus* Stephens，此蟲為初次在本省菸葉倉庫中發現。

