

Intergeneric Attraction of *Ramosia rileyana* and *Synanthedon pictipes*

JAMES A. BURNSIDE and THOMAS E. MOUZIN
Fruit and Vegetable Insects Research
Agri. Res. Serv., USDA, Vincennes, Indiana 47591

Introduction

In 1972, during tests of trap design for and population monitoring of the lesser peachtree borer, *Synanthedon pictipes* (Grote and Robinson), a serious pest of peach trees, significant numbers of male *Ramosia rileyana* (Hy. Edwards) were found in pheromone traps containing virgin females of *S. pictipes*. This intergeneric attraction was therefore studied in 1972, 1973 and 1974.

Methods and Materials

Trap Placement—Five each virgin female lesser peachtree borers obtained from a laboratory culture were placed in screen-wire cages (5½ x 2½-in. diam) that were put into 1-gal cylindrical cardboard cartons coated inside with Stikem® (Wong and Cleveland 1970). In May 1972, 6 such traps were placed in a 10-acre peach orchard (later found to contain scattered growth of *Solanum carolinense* L., the host plant of *R. rileyana*) to evaluate trap design and to monitor the emergence characteristic of *S. pictipes*. An additional 6 traps placed near stacks of infested peach trees that had been removed from an orchard and were being allowed to dry before burning were used to determine the number of moths that would complete development within these trees (thus adding to the population of adult moths in the area). The traps were checked, and fresh females were added every 3 days until September 4.

Again in May 1973 and 1974, 6 similar traps were placed in the 10-acre orchard to detect the initial emergence of *R. rileyana* so field and laboratory tests could be initiated. Also, live *R. rileyana* males were captured by placing 5-10 virgin female lesser peachtree borers inside a cylindrical screenwire cage (9 x 3½ in. diam) suspended from a peach tree limb. The attracted *R. rileyana* males were then easily captured by placing a similar container over them as they hovered near the trap. Female *R. rileyana* were captured by netting them as they rested on *S. carolinense*. A few males were also obtained by this method.

Attempts to cross-mate the *R. rileyana* and *S. pictipes* were made by placing varying numbers of each inside a 1 x 1 x 1 screen-wire cage. The lesser peachtree borer females used in these tests were taken from the laboratory colony and held for 24 h after eclosion to insure sexual maturity. These moths and the captured male *R. rileyana* were held in a darkened room maintained at 60 ± 2° F to reduce flight activity and injury. All cross-mating tests were performed between 8 and 11 AM, the optimum mating period for lesser peachtree borers (Cleveland and Murdock 1964).

Results and Discussion

In 1972, the 1st and last *R. rileyana* moths were caught July 12 and August 23, respectively; a total of 58 was taken, 44 in the orchard and 14 from traps near the peach tree stacks (there were no host plants within 100 m). In 1973 and 1974, the 1st moths were captured August 1 and August 3, respectively. This trapping was then discontinued. However, 6 of the 10 separate attempts made in 1973 to lure *R. rileyana* males with lesser peachtree borer females were successful, and a total of 19 specimens was obtained. These attracted *R. rileyana* demonstrated definite pre-copulatory activities such as direct flight, hovering near calling females, clasper expansion, and striking, responses that are typical of *S. pictipes*. An additional 20♀ and 4♂ were netted while resting on host plants. Then since all but one female caught in 1973 were gravid, the primary effort in 1974 was to net females from which we could obtain eggs that could be placed on rearing medium. Twenty-one♀ and 3♂ were netted, and 3 additional were captured by luring with female lesser peachtree borers.

TABLE 1. Intergeneric sexual response of *S. pictipes* and *R. rileyana*.

Trial No.	No. (♂:♀)	Couplings		Precopulatory behavior a/
		No.	Length	
<i>R. rileyana</i> ♂ x <i>S. pictipes</i> ♀				
1	1:10	0		W
2	6:5	0		O
3	4:10	0		O
4	2:5	0		S
5	2:5	0		M
6	3:10	0		S
7	7:10	4	10,85,50 and 70 sec	S
8	5:10	2	momentary, 4 1/2 min	S
<i>S. pictipes</i> ♂ x <i>R. rileyana</i> ♀				
9	10:1	1	4 min	S

a/ O = none; W = weak (hovering); M = moderate (clasper extension); S = strong (striking).

Nine attempts at cross-mating *R. rileyana* and *S. pictipes* were made in 1973 and 1974. Table 1 shows the numbers used and the results. Within 2 min after each of 7 couplings was terminated, the females resumed calling, an indication of an unsuccessful mating. The one time when a male *S. pictipes* coupled with a female *R. rileyana* took place in a cage that contained both male and female *S. pictipes* so this may have been an accidental connection. It has frequently been observed that male lesser peachtree borers exposed to a conspecific sex pheromone will "strike" at other males, non-calling females, inanimate objects such as small peach tree twigs, and even the likeness of moths drawn on the outside of cages containing calling females. In only 2 of the 9 trials was there no coupling and/or pre-copulatory activity.

The data thus indicate a definite attraction of *R. rileyana* males to the sex pheromone emitted by *S. pictipes*. This result does not correspond to the

results obtained by Nielsen et al. (1975). They reported the capture of only conspecific males in traps baited with female *S. pictipes* through *R. rileyana* did respond to a fraction of the *S. pictipes* pheromone extracted with ether. In addition, they reported that only *S. pictipes* responded to (E,Z)-3,13-octadiadien-1-ol acetate, a synthesized attractant, which led them to believe that the primary sex attractant of *S. pictipes* is species specific and plays an important role in reproductive isolation of this moth.

It has been theorized that certain sex pheromones contain 2 compounds; one that aids in mate location and the other that stimulates copulation. Therefore, different species may be attracted to a calling female, but the specificity of the stimulatory compound would insure reproductive isolation. In fact, the intergeneric couplings reported here indicate that a physical barrier, perhaps the genitalia of one or both of the species, may actually be responsible for the ultimate reproductive isolation of these 2 species.

Running Head

Intergeneric Attraction

Indexing Phrases

Ramosia rileyana

Syanthedon pictipes

Lesser Peachtree Borer

Intergeneric Attraction

Sex Pheromones

Literature Cited

1. CLEVELAND, M. L., and L. L. MURDOCK. 1964. Natural sex attractant of the lesser peach tree borer. J. Econ. Entomol. 57:761-2.
2. NIELSON, D. G., F. F. PURRINGTON, J. H. TUMLINSON, R. E. DOOLITTLE, and C. E. YOUNG. 1975. Response of male clearwing moths to caged virgin females, female extracts, and synthetic sex attractants. Environ. Entomol. 4:451-4.
3. WONG, T. T. Y., and M. L. CLEVELAND. 1970. Flourescent powder for marking deciduous fruit moths for studies of dispersal. J. Econ. Entomol. 63:338-9.