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# Seasonal Occurrence and Control of Rice Skipper, *Parnara guttata* Brener et Grey (Lepidoptera: Hesperiidae) in Paddy Field

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**ABSTRACT** : In Iksan, Korea, *Parnara guttata* Brener et Grey spend three generations per year, 1st generation adult emerged mid to late May from pupa developed from overwintered larva in weeds on bank around rice paddy field or on hillside and moved to rice paddy field to lay eggs on leaves of rice. The damage to rice by 2nd generation larva began to increase late July and reached peak from mid to late August. The 3rd generation adults were observed early to mid September and flew away from rice paddy field. There was significant relationship between the transplanting time and the occurrence of *P. guttata* in rice paddy fields. *P. guttata* preferred the rice transplanted in late season in paddy field. Insecticide treatment on late July about a week before the peak larval occurrence reduced the damage by *P. guttata* up to 91.2%, whereas the treatment on early August was a lot less effective reducing only 57.2% of the damage.

**KEY WORDS** : Rice skipper, *Parnara Guttata*, Occurrence pattern

**초 록** : 익산지역에서 벼 줄점팔랑나비(*Parnara guttata*)는 1년에 3세대를 경과하며, 5월중 · 하순부터 월동처에서 우화하여 논으로 이동한 다음 벼 잎에 산란하기 시작하였다. 유충에 의한 벼의 피해는 7월 하순부터 증가하여 8월 중 · 하순 사이에 가장 많은 것으로 관찰되었으며, 3세대 성충이 우화하기 시작하는 시기는 9월 중순이었다. 벼의 이앙시기와 줄점팔랑나비에 의한 피해는 만식한 논에서 컸다. 살충제를 유충발생 최성기 약 1주일 전인 7월 하순에 처리하였을 때 91.2%의 방제효과를 나타낸 반면 8월 초순에 처리할 경우에는 방제효과가 57.2%로 낮았다.

**검색어** : 줄점팔랑나비, *Parnara Guttata*, 벼 발생양상

The butterflies in family Hesperiidae reported in Korea includes 33 species, among them those being observed in southern part of Korea are 28 species including *Satarupa nymphalis* and *Bibasis striata*, a large butterflies, and *Aeromachus inachus*, a small butterfly.

The damage to rice by rice skipper can be diagnosed by the typical symptom of the rolled leaf made by either rolling down the tip of a leaf or folding the two edges of a single leaf or two adjacent leavestying them with silk thread to make a protected chamber, inside which larvae feed and develope causing removal of leaf tissues and veins and sometimes leaving only the midrib of rice blade (personal observation).

Diverse microhabitats in upland environment such as drought, downpours, floods, and misuse of pesticides, are conducive to the outbreak of rice skipper affecting the beneficial organism unfavorably which in nature keep the pest under control at some extent (Hirai *et al.*, 2001). Fifteen primary and seven secondary parasitoids were recorded from *P. guttatus* in Japan including, a host-specific parasitoid, *Apanteles baoris*, and an oligophagous parasitoid, *Pediobius mitsukurii* (Matsumura, 1992). Rice skipper prefers rice. It also feeds on grasses such as *Cynodon sp.*, *Eleusine sp.*, *Paspalum sp.*, maize,

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sorghum, and sugarcane (Nakasuji *et al.*, 1986).

Only a few studies on this pest have been done. The relationship between population density and crop damage, and the best control methods are examined (Senbongi *et al.*, 2002). In Korea, Oh *et al.*, (2002) reported the sublethal dosage of some pesticides against rice skipper. Morphological characteristics and life cycle of *P. guttata* were studied (Lee *et al.*, 2003) which is only one study that had been done on the biology of rice skipper. In this paper we report seasonal occurrence and development pattern of rice skipper, *P. guttata*, in Iksan, Korea.

## Materials and Methods

Rice was transplanted at two different time, May 17 and June 21 in paddy field in experimental field of Honam Agricultural Research Institute, Iksan, Korea. Other cultivation practices than the time of transplant were done according to the standard cultivation methods. And we observed how the differences affect the occurrence of the skipper in the fields and what difference in the damage rate the skipper show in response to the transplanting dates. The number of hills damaged by skipper were recorded every 10 days out of 20 plants sampled randomly, observations were replicated 5 times, from July 29 to late August 28, 2003.

The damage occurrence was observed every 10 days in a paddy fields in Iksan from early July to late August for two years from 2002 to 2003 by counting the number of tillers with damaged leaves from 20 plants. And the periods of occurrence of adults, eggs, larvae, and pupa were recorded about every 10 days from early July to mid September 2003.

A pesticide, fenthion EC, was sprayed at two different time at 29th July and at 8th August and estimated the control effects by comparing the number of damaged leaves out of twenty plants in the treated plot to those of the control plot.

## Results and Discussion

The rice transplanted late June after harvesting barley got more damage from rice skipper than those planted mid May. The damage on the rice transplanted late June increased abruptly to 30.0% at early August from the damage that was as low as 8.0% at late July, and it reached up to 32.7% at late August, while the rice transplanted mid May suffered a lot less damage, only 4.5% of the hills had damaged leaves (Table 1). It coincided very well with the occurrence pattern of rice skipper shown in Fig. 1, in which the population went up rapidly at early August (Fig. 1), and supports the general knowledge that rice skipper prefers the young seedling of rice (Lee *et al.*, 2003).

In 2003, the damage to leaves of rice by rice skipper began to appear early July and increased abruptly to about 30% of the leaves by early August. In 2003 as well, though the damage increase was not so abrupt as it was in 2002, it reached to almost the same level as for 2002 showing peak at about 26% by mid August.

The occurrence pattern of rice skipper in time was observed for each development stages in paddy fields in Iksan in 2003. Adult rice skipper began to fly early July in the field transplanted with rice after harvesting barley and lasted until late July for the 1st generation, and 2nd generation began to fly early September and continued until mid September. Eggs could be seen during from mid July to late July, larva from early July to late August, and pupa from mid August to early September. Comparing to the observation by Lee *et al.*

**Table 1.** Damage to rice by *P. guttata* according to transplanting time

| Transplanting date | Damaged rice in percent[1)] | | | |
|---|---|---|---|---|
| | July 29 | August 7 | August 18 | August 28 |
| May 17 | 1.3 | 2.0 | 2.7 | 4.7 |
| June 21 | 8.0 | 30.0 | 32.0 | 32.7 |

[1)] The number of hills with damaged leaves out of 20 plants

(2003) in Jeonbuk province, the number of generations of each the two populations of rice skipper went through in Iksan and Jeonbuk province was not different but in the time of their occurrences, the 2nd generation adults in Jeonbuk province began fly late July two-third of a month later than in Iksan, it was reversed for the 3rd generation, which began in Jeonbuk late August about 10 days earlier than in Iksan.

There was significant relationship between the transplanting time and the occurrence of *P. guttata* in rice paddy fields. *P. guttata* preferred the rice transplanted in late season in paddy field. Insecticide treatment on late July about a week before the peak larval occurrence reduced the damage by *P. guttata* up to 91.2%, whereas the treatment on early August was a lot less effective reducing only 57.2% of the damage (Table 2). Taking the time of the larval occurrence (Fig. 1) into consideration and referring to the high larvicidal activity of fenthion against all the larval instars reported by Oh *et al.*, (2002), the high control effect achieved by the application on late July suggest that the time of application should be coincided with the peak occurrence of larva.

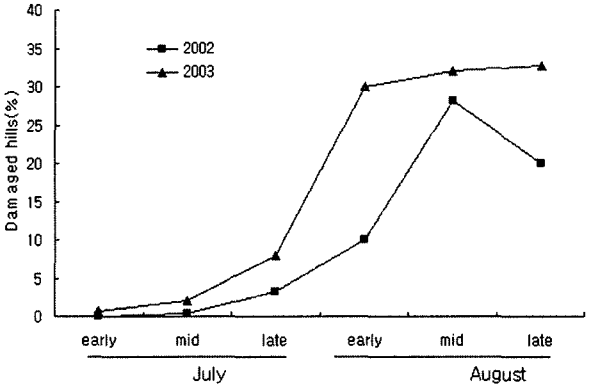


**Fig. 1.** Percentage of damaged leaves by time

**Table 2.** The control effects to rice skipper of fenthion EC by the time of application

| Date of application | Damaged hills (%)[1)] | Control effect (%) |
|---|---|---|
| July 29 | 2.7 | 91.2 |
| August 8 | 14.0 | 57.2 |
| Control | 32.7 | - |

[1)] The damaged hills were counted 15 days after the treatment of the pesticide.

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