

Short paper

## First report of damage caused by white-spotted stink bug, *Eysarcoris ventralis* (Westwood) (Hem.: Pentatomidae) on rice in Iran

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**Abstract:** White-Spotted Stink bug, *Eysarcoris ventralis* (Westwood) (Hem.: Pentatomidae) was reported as one of the major destructive pests attacking rice worldwide. In Iran, it has been recorded on weeds, grape, alfalfa and wheat. In a survey on rice pests in Guilan province (Northern Iran) during 2017-2018, a large number of adult stink bugs were collected on rice panicles feeding on grains. The sucking on rice grains by adults as well as nymphs caused various symptoms, either empty glumes or spots around the feeding site. This is the first report of the damage symptoms caused by *E. ventralis* on rice in Iran (Guilan province).

**Keywords:** Paddy fields, Pecky Rice, Guilan province

### Introduction

Most of the pentatomid bugs (Hemiptera: Pentatomidae) are phytophagous and polyphagous, and feed on cultivated (such as legumes and cereals) and uncultivated plants. Phytophagous pentatomids feed on different parts of the host plant (especially the seeds and immature fruits) (Panizzi, 1997). The damage of pentatomid pests has more recently been reported in crops such as rice. Among the many pentatomids that feed on rice, *Eysarcoris ventralis* (Westwood, 1837), has become a problematic pest in different countries (Li *et al.*, 2017). It should be considered that the genus *Eysarcoris* contains small and dark brown stink bugs and can be easily distinguished from other pentatomid genera by the presence of two small, yellow, or pale smooth spots located on either basal side of the scutellum. The white-spotted stink bug, *E. ventralis*, is widespread in

tropical and subtropical regions of Africa, Asia, Europe and Australia. This species can hibernate as an adult in near the root of grass or under the leaves falling on the ground. The mating and oviposition of hibernating stink bugs begin at the end of May and the new generation of adults has been observed in the middle of July (Hemala *et al.*, 2014).

It seems that *E. ventralis* may cause various damages at different stages of rice phenology. The stink bug feeding during the early endosperm development (the milk stage) would result in either empty glumes or considerably atrophied kernels. However, sucking by stink bug during later stages of grain maturity (dough and hard stages) can cause a chalky discoloration around the feeding site (Arias, 1998; Nakajima *et al.*, 2010). The reason for the chalky discoloration is probably the entry of bacteria or fungi from the sucking points. Rice grains showing such symptoms are called "Pecky Rice". Such grains are poorly structured and often break under mechanical pressure during the milling. Obviously, the quality and consequently the price of rice, which has some pecky grains, decreases depending on the amount of contamination

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(Nakajima *et al.*, 2010). Furthermore, the transmission of microorganisms during the feeding period of stink bugs, would increase the potential damage caused by the sucking pest to rice (Panizzi, 1997).

White-spotted stink bug has been reported in most regions of Iran such as Ardebil, East Azarbaijan, West Azarbaijan, Sistan & Baluchestan, Fars, Guilan, Golestan, Kerman, Khorasan Razavi, North Khorasan, Khuzestan, Lorestan, Markazi, Mazandaran, Semnan, Tehran, Yazd, Bushehr, Hormozgan and Zanzan (Linnavuori, 2012). Although many crops (especially rice) have been reported as host of *E. ventralis* in the world (Nakajima *et al.*, 2010), in Iran only weeds, grapes, alfalfa and wheat have been reported as host plants of the stink bug (without reference to insect damage) (Linnavuori, 2008; 2012).

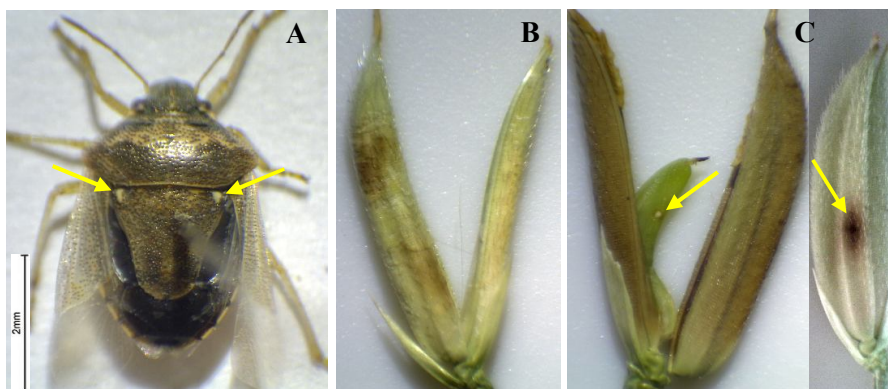
### Materials and Methods

White-spotted stink bugs were collected from rice *Oryza sativa* L. panicles while feeding on grains, from different paddy fields of Guilan province, during 2017-2018. A total of 50 light traps were used to study the population distribution of white-spotted stink bug in paddy fields of Guilan province. Furthermore, the number of stink bugs in the light trap located in paddy fields of Rice Research Institute of Iran was recorded for the population fluctuation. In order to determine the symptoms of stink bug damage on rice, a number of rice seedlings were planted in pots and some

panicles were covered with net under greenhouse conditions. Then, five adult stink bugs were released under the net and permitted to feed on plants. Symptoms of damage were evaluated after five days.

### Results

A large number of adult stink bugs were collected from different paddy fields of Guilan province including Rasht, Astara, Fouman, Sangar, Lahijan, Langrood, Kalachai, Rudsar and Shaft. According to field observation in Shaft and Rasht regions, emergence of overwintering adults individually occurred on rice plants in June. Adults of new generation (Fig. 1-A) were observed in early July. Adult emergence of new generation reached a peak on rice panicles in late August, when high population of adults and different nymphal stages were feeding on panicles (early ripening phase including milky and dough stages). The results showed that there were 5-6 white-spotted stink bugs (adults and nymphs) piercing on each panicle, resulting in empty glumes in milky stage (Fig. 1-B) or spotted grains in dough stage (Fig. 1-C) after 4-5 days. A two-year survey of light trap in paddy fields of Rasht region (Rice Research Institute of Iran) revealed that adults of *E. ventralis* were monitored until late October even after rice was harvested (Fig. 2). At this time, it seems that they fed on weeds in paddy fields. This is the first report of the damage symptoms caused by *E. ventralis* on rice in Iran (Guilan province).



**Figure 1** White-spotted stink bug, *Eysarcoris ventralis*; A) adult, dorsal view, arrows refer to two small, yellow and smooth spots on either basal side of the scutellum, B) empty glumes in milky stage, C) spotted grains in dough stage.

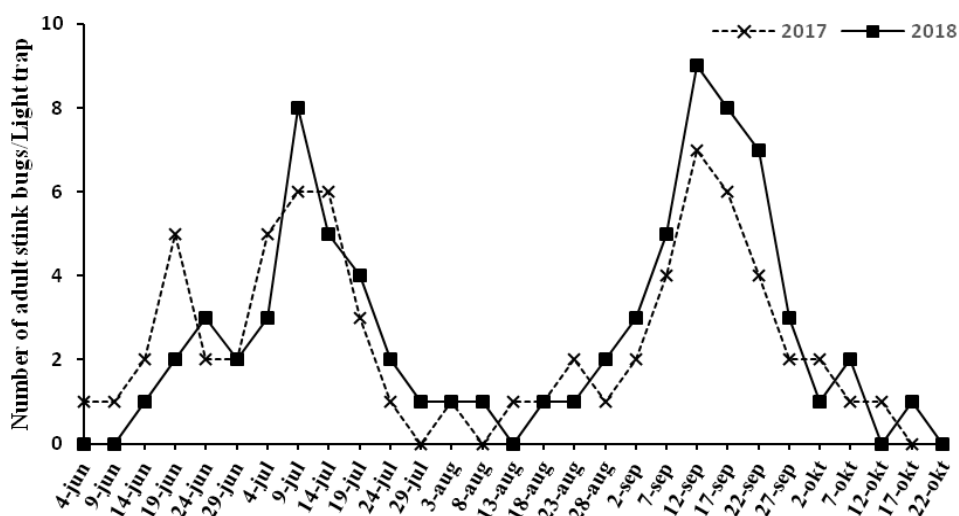


Figure 2 Population fluctuation of adult white-spotted stink bug, *Eysarcoris ventralis* during 2017 and 2018.

## Discussion

Although *E. ventralis* was previously reported from different parts of Iran (Linnavuori, 2008; 2012), prior to this study, there was no information on its damage to the rice plant in Iran. Authors' observations indicate that the population of *E. ventralis* in the last few years has increased in paddy fields of Guilan province, such that pest damage symptoms (empty glumes or spotted grains) are easily visible on farms. According to other researches, more stink bug damages in paddy fields can be due to climate change (Kiritani, 2007; Musolin, 2007). Kiritani (2007) has suggested that climate change (rising global winter temperature) by reducing the mortality rate of the overwintering stages of stink bugs, has increased the population and damage of these pests on rice. Therefore, it seems that the recent increase in population and damage of white-spotted stink bugs in the paddy fields of Iran might be due to climate change. Due to the process of rising temperature in Iran (Dastorani and Poormohammadi, 2016), rice stink bugs outbreaks would be predictable in future.

## Acknowledgements

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## References

- Arias, A., Jimenez, J., Rodriguez, J. A., Casado, J. M., Garcia, C., Lancharro, A. J. and Vazquez, J. 1998. The pecky rice stink bug, *Eysarcoris ventralis* West, in Extremadura (Spain): The rice colonization and protection strategies. *Boletín Sanidad Vegetal Plagas*, 24 (1): 79-100.
- Dastorani, M. T. and Poormohammadi, S. 2016. Mapping of climatic parameters under climate change impacts in Iran. *Hydrological Sciences Journal*, 61 (14): 2552-2566.
- Hemala, V., Cunev, J. and Franc, V. 2014. On the occurrence of the stink bug *Eysarcoris ventralis* (Hemiptera: Heteroptera: Pentatomidae) in Slovakia, with notes on its distribution in neighbouring countries. *Klapalekiana*, 50 (1-2): 51-59.
- Kiritani, K. 2007. The impact of global warming and land-use change on the pest status of rice and fruit bugs (Heteroptera) in Japan. *Global Change Biology*, 13: 1586-1595.
- Li, R., Zhang, H., Li, S. and Bai, M. 2017. Geometric morphometric analysis of *Eysarcoris guttiger*, *E. annamita* and *E. ventralis* (Hemiptera: Pentatomidae). *Zoological Systematics*, 42 (1): 90-101.
- Linnavuori, R. E. 2008. Studies on the Acanthosomatidae, Scutelleridae and Pentatomidae (Heteroptera) of Gilan and the

- adjacent provinces in northern Iran. Acta Entomologica Musei Nationalis Pragae, 48 (1): 1-21.
- Linnavuori, R. E. 2012. Studies on Pyrrhocoroidea, Coreoidea and Pentatomoidea of Khuzestan and the adjacent provinces in Iran (Hemiptera: Heteroptera). Acta Entomologica Musei Nationalis Pragae, 52 (1): 67-88.
- Musolin, D. L. 2007. Insects in a warmer world: ecological, physiological and life-history responses of true bugs (Heteroptera) to climate change. Global Change Biology, 13: 1565-1585.
- Nakajima, H., Ishihara, A., Sawa, Y. and Sakuno, E. 2010. 3-(4-Methylfuran-3-yl) propan-1-ol: a white-spotted stinkbug (*Eysarcoris ventralis*) repellent produced by an endophyte isolated from green foxtail. Journal of Agricultural and Food Chemistry, 58 (5): 2882-2885.
- Panizzi, A. R. 1997. Wild hosts of Pentatomids: ecological significance and role in their pest status on crops. Annual Review of Entomology, 42: 99-122.

## اولین گزارش خسارت سن لکه‌سفید (*Eysarcoris ventralis* (Westwood) (Hem.: Pentatomidae) روی برنج در ایران

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**چکیده:** سن لکه‌سفید (*Eysarcoris ventralis* (Westwood) (Hem.: Pentatomidae) به‌عنوان یکی از آفات اصلی برنج از نقاط مختلف دنیا گزارش شده است. این گونه در برخی مناطق ایران از روی علف‌های هرز، انگور، یونجه و گندم گزارش شده است. در پژوهشی که در سال‌های ۹۷-۱۳۹۶ روی آفات برنج در شالیزارهای استان گیلان انجام شد، سن‌های لکه‌سفید بالغ به تعداد زیادی در حال تغذیه روی خوشه‌های برنج جمع‌آوری شدند. تغذیه حشرات کامل و پوره‌ها موجب پوک شدن یا لکه‌دار شدن (در اطراف محل تغذیه) دانه‌های خوشه می‌شود. این اولین گزارش از مشاهده علائم خسارت آفت سن لکه‌سفید (*E. ventralis*) به برنج در ایران (استان گیلان) است.

**واژگان کلیدی:** شالیزار، برنج نیش خورده، استان گیلان