

# Stink bug study reveals Gold3 preference

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An Italian study of feeding damage by brown marmorated stink bug found major damage in the month before harvest in Gold3, when high fruit-drop occurred. Injured Hayward had much lower fruit drop and there were no differences in post harvest storage performance between injured and non-injured fruit.

## Introduction

**B**rown marmorated stink bug has a wide host range and can cause serious damage on many fruit crops. This damage is caused by the insects' piercing mouthparts during feeding and is usually invisible to the naked eye. Increased reject rates have occurred due to fruit staining associated with insect excrement. This trial was performed to identify the key times when stink bugs feed and cause damage on fruit, providing insights into critical control times. Damage was assessed both in the field and following storage.

## Trial overview

Field trials were carried out in Northern Italy (Emilia-Romagna region) on Hayward and Gold3 plots with overhead netting, using what was considered a low natural stink bug population, based on monitoring data. No insecticides were used (representing a worst-case scenario).

Trial fruit were bagged immediately after fruitset to prevent damage by external stink bugs. At eight exposure times throughout the season, starting from 40-50 days after petal-fall, 40 fruit per cultivar had one lab-reared, adult stink bug placed inside a bag for three days to one week (*Photo 1*). The control consisted of bagged fruit not exposed to stink bugs.

Fruit were evaluated weekly to assess:

- Evidence of damage (visible stings or deformations);



*Photo 1. Gold3 kiwifruit bagged with adult stink bugs (left) and dropped fruit as a consequence of stink bug feeding damage (right).*

- Fruit detachment from the vine ('dropped') (*Photo 1*);
- Insect mortality.

All prematurely dropped fruit were peeled to assess and count the number of stink bug 'stings' (evidence of feeding activity) (*Photo 2*). The remaining fruit were harvested according to standard Zespri clearance criteria. For Hayward, 25 percent of fruit was assessed for stink bug damage and fruit quality compared to fruit not exposed. The remaining fruit was stored in standard conditions for 12 weeks and assessed for rot development. All Gold3

harvested was assessed as described for Hayward. However, storage quality could not be determined because such a high percentage of fruit had been lost due to fruit drop (refer to *Figure 3*).

## Key results

During fruit development, no external symptoms - such as fruit deformation or visible stings - were seen in either variety. The main effect observed in the field was fruit drop due to stink bug stings (*Figure 1*), an impact most notable in Gold3 having the highest loss in a single monitoring



Photo 2. Gold3 kiwifruit peeled to assess the number of BMBS stings.

Gold3		Hayward	
Exposure Period	Fruit drop (%)	Exposure Period	Fruit drop (%)
June 17-24	32.5	July 1-8	2.5
July 1-8	52.5	July 19-26	2.5
July 15-22	60.0	August 12-19	5.0
July 29 - August 5	45.0	August 30 - September 6	30.0
August 12-19	92.5	September 17-24	22.5
August 30 - September 6	60.0	September 30 - October 7	20.0
September 10-13	40.0	October 7-14	22.5
September 17-20	47.5	October 14-21	5.0
September 23-26	2.5	October 21-28	2.5

Figure 1. Stink bug exposure period timings and associated fruit drop.

period (92.5 percent) compared with Hayward at 30 percent.

Stink bug stings also caused latent damage to kiwifruit flesh that was only visible after peeling the fruit (Photo 2). This feeding damage was more prevalent on Gold3 than Hayward throughout the season.

Figure 1 shows the timing of damage being highest in August (about one month prior to harvest, which is usually performed the third week of September). A high level of insect mortality was observed (Figure 2). We suspect this was due to the inability of the adults in the bags to seek shelter from high temperatures, dry conditions and wind.

After 12 weeks of storage, Hayward fruit quality was similar in fruit both with and without stink bug damage and there was no increase in post harvest rots. This has provided reassurance that post harvest segregation of stung fruit to avoid impact to undamaged fruit is not required as initially believed. However, Zespri will continue to monitor feedback from consumers regarding any adverse reactions to the corky plug that develops following feeding damage.

### Take-home message

Gold3 is very susceptible to stink bug attack, as shown by the high percentage of fruit drop observed in the field, especially in the month before harvest. This means

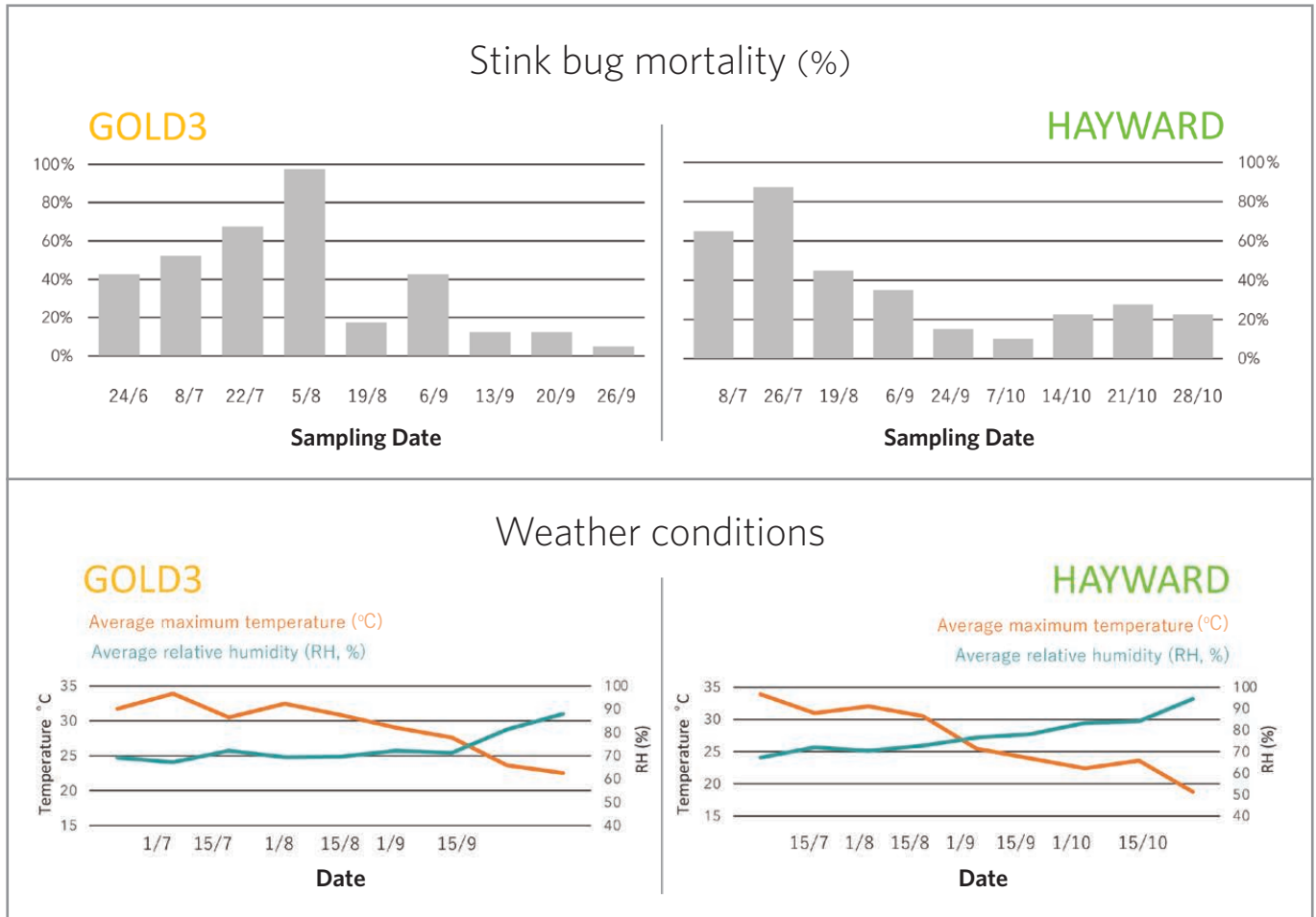


Figure 2. Stink bug mortality as a function of weather in the two tested kiwifruit varieties, by exposure periods.

that measures to protect Gold3 must be implemented as soon as the first bugs are detected in the field. Hayward is also subject to stink bug attack but fruit drop is limited and the damage is evident only after peeling the fruit, which has potentially greater implications for the final consumer of the fruit compared to damaged Gold3 which is unlikely to make it to consumption.

The full report of this work can be requested from the Innovation team ([zespri.innovation@zespri.com](mailto:zespri.innovation@zespri.com)). ■