

# **Sustainable Farming Fund Project L06/061.**

## **Measuring grape damage as an indicator of bird pressure.**

**Annual vintage report on damage to grapes in conjunction with the Falcons for Grapes Project.**

Valerie Saxton, PhD.  
Centre for Viticulture and Oenology, Lincoln University, New Zealand.

### **Introduction**

The Falcons for Grapes project began in late 2005 when the first nestlings were translocated from nests in the hills of the Waihopai Valley to artificial nests in mussel barrels in vineyards. The first nest was located in the pine forest adjacent to the Winegrowers of Ara (Waihopai) vineyard, and one on the border of the (Marris) Wither Hills and the Nobilo-Valleyfield vineyards. These two nests hosted the first four chicks. A feeding station was located beside the nest tree in the Wither Hills vineyard, and another was progressively moved across the paddock from the pine forest to within the Winegrowers of Ara vineyard. In addition to these sites, four other prospective sites were surveyed for bird damage in 2006 but these sites were abandoned for falcon establishment following electrocutions of falcons in 2007, because they had uninsulated transformers that were considered a danger.

### **2006 and 2007 surveys**

In the second year of the project 16 more nestlings were translocated from the wild to artificial nests in four more vineyards. Due to deaths particularly through electrocution of some birds, many birds were moved mid-season and settled at one site until nest sites could be found that had a minimum risk of electrocution. Due to the uncertainty of the falcon establishment, 2007 was used to comply with the SFF technology transfer contract. Vineyard staff at all the vineyards where the falcons were in 2007 gave an undertaking to survey and attended workshops, but data collection by vineyard workers did not happen in the face of pressure of harvest, so no data were obtained in 2007.

In the third year of the falcons project (2008 vintage) birds were established at seven sites with a minimum of objective danger.

### **2008 Survey**

Grape damage surveys were conducted in March 2008 according to the methodology developed in SFF project L05-036 (Saxton, 2006). Damage needs to be surveyed as late as possible before harvest, but without inconvenience to vineyard harvest operations. Close liaison with the Falcons for Grapes project and with vineyard management (established on a previous visit in January 2008) pinpointed the weekend

before Easter and Easter weekend itself as optimal for 2008. Altogether 13<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> of March and 20<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> of March were dedicated to the surveys.

Seven vineyards were surveyed, each of them several times at varying distances from the falcons' feeding trays. The distances measured depended on the vineyard layout, and were between 20m and 2km from the trays. At each location 20 sample bunches were selected using a rod and string with a Latin square type progression to objectively select a bunch without bias, according to the method developed by Saxton (2006). Bunch damage was estimated visually. Calibration of the visual estimates was by collecting every 20<sup>th</sup> bunch and later counting missing and damaged berries and comparing with the estimate. All estimates were then adjusted according to the averaged discrepancy. (See Saxton, 2006 for details of calibration method and correction calculation).

The seven vineyards surveyed were:

Aunstfield

Barracks Vineyard (Cloudy Bay)

Nobilo-Valleyfield vineyard

Chaytors Vineyard

Stembridge vineyard

Winegrowers of Ara (formerly Bankhouse)

Brancott vineyard (Pernod Ricard)

A total of 1420 bunches were sampled and damage estimated. Data were classified into two categories – interior vines (that generally do not sustain much damage) and edge vines that are vulnerable and generally sustain the worst damage. Both categories were further classified into five distances from the falcon feeder trays: less than 100m, 100-300m, 300-600m, 600-1000m, 1000-2000m. A non-parametric Kruskal-Wallis ANOVA was run on the data groups (Genstat 10).

## **Results 2008**

Edge vines:

Mean damage to bunches less than 100m from the falcon feeding tray was 0.15% (Figure 1, median 0%, n = 90), between 100 and 300m 1.4% (median 0%, n = 200), between 300 and 600m 5.25% (median 0%, n = 400), between 600 and 1000m 24.5% (median 15%, n = 40) and between 1000 and 2000m 20.5% (median 3.5%, n = 220). There was a significant difference at the  $p = 0.01$  level ( $H = 130.1$ ,  $df = 4$ ).

Interior vines:

Mean damage to interior vines was 1.9% (Figure 2, median 0%, n = 180). There was no significant difference to damage levels of interior vines at varying distances from the falcon feeding trays.

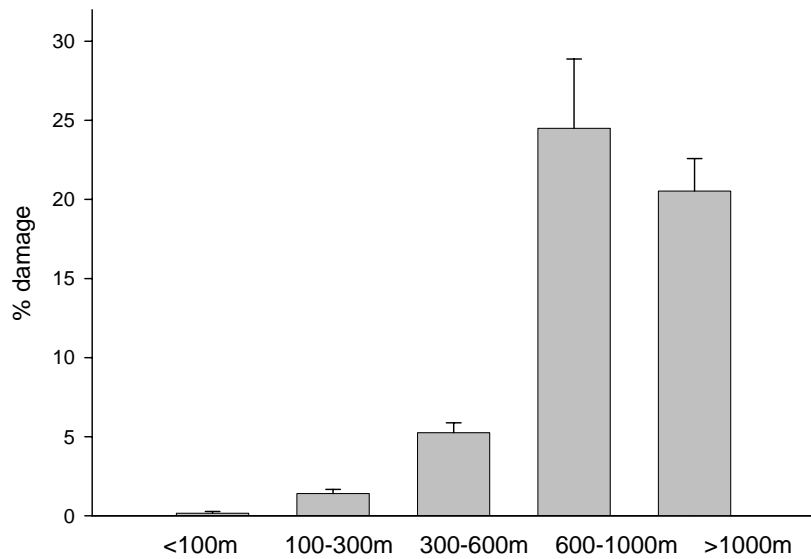


Figure 1: Mean damage in 2008 to grape bunches at varying distances from falcon feeding trays. All vines were unnetted. Scores were from edges i.e. from vines within 10m of the edge of the vineyard block.

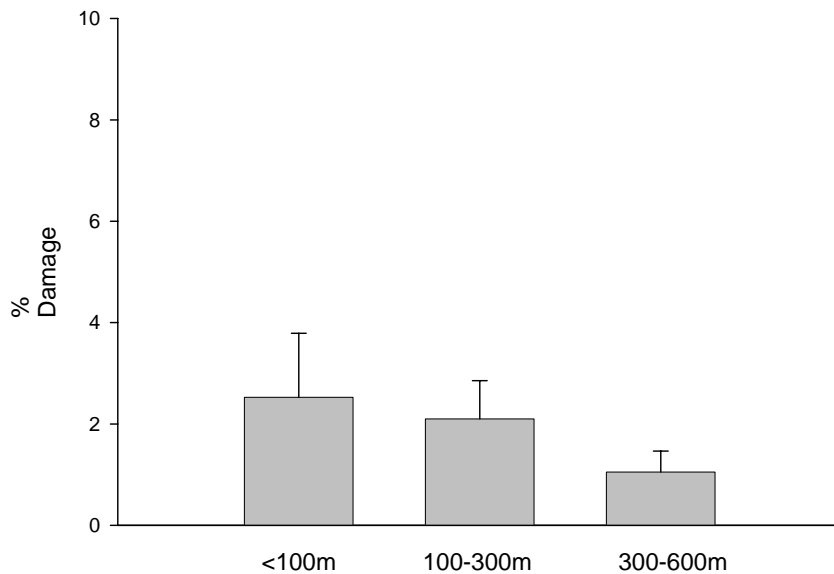


Figure 2: Mean damage in 2008 to grape bunches at varying distances from falcon feeding trays. Scores were from interior vines, i.e. minimum of 50m from the edge of the vineyard block.

### Discussion and conclusion:

In accordance with the anecdotal observations of the vineyard managers, there was no bird damage to vines where the falcons were known to be regularly present. In 2006 the falcons were very young. In 2007 the falcons were not established and data were

not available. In 2008 data have been obtained from all sites where falcons have been established, both young and older falcons.

The edge vines sampled would normally be subject to severe bird pressure. The reduced damage close to the feeding trays supports the hypothesis that falcons prevent bird damage by inhibiting the presence of damaging bird species.

Interior vines did not sustain significantly different levels of damage at varying distances from the feeding trays. The vines themselves would offer cover to birds in the interior which would reduce the impact of falcon presence.

One characteristic feature of bird damage generally is shown by the difference between mean and median values, which indicates the uneven nature of bird damage. Some bunches are heavily damaged which raises the mean value, while many more are not damaged at all, shown by the median value.

This is the first year that reliable data have been able to be collected. There remains one further year that is funded by this SFF contract. After that period data could still be collected by vineyard staff or others, due to the technology transfer focus of last season (2007) and the survey method made available via the New Zealand Winegrowers website.

300m radius from the feeding trays is an area of 28 Ha. where less than 1.4% damage was measured. 600m from the feeding trays is an area of 113 Ha with only 5% damage. This area if covered by the falcons represents large savings made through not having to net or shoot. Even if falcons are not there all the time it is demonstrated that regular presence such as twice a day at the feeding trays is sufficient to reduce damage to virtually nil over 28 Ha and to less than economic threshold over 113 ha.

## **References:**

Saxton, V. P. 2006. To develop a robust statistical methodology for assessing bird damage for crops that suffer bird damage, particularly fruit crops. Report for Sustainable Farming Fund. Available on <http://www.nzwine.com/reports/>