



# Grower Summary

FV 439

To identify pre-harvest, harvest and post-harvest management practices capable of reducing losses of pumpkins during storage

Annual 2016

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AHDB Horticulture is a Division of the Agriculture and Horticulture Development Board.

**Project title:** To identify pre-harvest, harvest and post-harvest management practices capable of reducing losses of pumpkins during storage

**Project number:** FV439

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**Report:** Annual report, April 2016

**Previous report:** Annual report April 2015 (Year 1)

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**Location of project:** Natural Resources Institute

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**Date project commenced:** 15 September 2014

**Expected completion date:** 28 February 2017

## **GROWER SUMMARY**

### **Headlines:**

- During 2015 the main cause of storage losses observed for pumpkins in Cambridgeshire and Hampshire was *Phoma*. In the final year of this project a spray programme against both *Phoma* will be assessed for efficacy and economic value.
- Spraying against Powdery Mildew increased yield for Mars, and increased pumpkin size for all three varieties tested; Mars, Harvest Moon and Racer.

### **Background**

The UK market for decorative (carving) pumpkins, currently estimated at £14-15M per year, is growing at a rate of 20% annually, and the market for culinary (edible) pumpkins is growing at an even faster rate from a much lower sales base. The levels of loss are estimated to be 15-20% of initially harvested crop, equating to an annual loss of £2-3M. This project seeks to identify and test practices to reduce these losses.

There is currently very little information on the relative importance of different causes of loss and the impact of pre-harvest, harvest and post-harvest management practices on these losses. In this project we are working closely with UK growers to understand the current situation through structured observations on-farm, field and storage trials. Recommendations provided to and practices used by growers in the USA have been reviewed, both through the literature and by direct consultation. By studying a range of decorative and culinary varieties, the characteristics associated with good storage potential will be identified.

### **Summary**

The overall project aim is to identify pre-harvest, harvest and post-harvest management practices capable of reducing losses of both edible and carving pumpkins during storage.

Specific project objectives are:

1. To collate and disseminate information on management of the pumpkin crop in the US, and associated research relevant to the UK industry.
2. To determine and rank the main forms of post-harvest loss (tissue breakdown, latent infection, post-harvest infection, harvest maturity) currently affecting pumpkins in the UK.
3. To determine and rank the key factors affecting the storage potential of pumpkins in the UK (harvest maturity, mineral nutrition, harvesting/post-harvest practices, and storage environment/practices.)

4. To determine the varietal characteristics that affect storage potential (including size, skin strength, pericarp thickness, dry matter content)
5. To identify and test pre-harvest management practices to improve storage potential.
6. To identify and test harvest/post-harvest management practices to improve storability, including the identification of maturity indicators to predict storage potential at harvest.

In the first year of the project information was collated on growing and storage practices in the US, where the pumpkin crop is particularly important. This was followed up by a visit to several US states in October 2015. One key observation was that US growers conduct a concentrated programme of spraying against powdery mildew as they believe that damage to the stalk (or handle) provides an entry point for rotting pathogens into the fruit and therefore increases postharvest losses. During 2015 a field trial was conducted in Cambridgeshire to determine the advantages of powdery mildew control for Mars, Harvest Moon and Racer. Although an increase in fruit number was observed for Mars, and an increase in fruit size for all three varieties, there was no indication that the treatment reduces postharvest rots.

In both Cambridgeshire and Hampshire, the main cause of storage losses observed was *Phoma* (Figure A). In the final year of this project a spray programme against both *Phoma* and Powdery Mildew will be assessed for efficacy and economic value.



**Figure A.** *Phoma* storage rot observed for pumpkins harvested in Cambridgeshire in 2015 and stored long-term to identify the main storage rots.

Varietal susceptibility to storage rots varies by growing location. A higher percentage of rots was observed for pumpkins from Hampshire compared to Cambridgeshire for Harvest Moon

and Mars, while the difference was not so obvious for Racer. A possible link with calcium nutrition was observed which should be investigated further.

A preliminary survey of pumpkin characteristics of a range of varieties over two seasons suggests that there are consistent differences among varieties in fruit firmness (whole, skin and flesh). As pumpkin growers move into the culinary market and try out a wider range of varieties, it will become more useful to understand the relationship between these characteristics and keeping qualities. Simple storage trials will be conducted in 2016 to test these relationships.

### **Financial Benefits**

Growers have reported postharvest losses of 7-35% in the field and 5-35% in stores. With the market for decorative pumpkins in the UK estimated to be at least £15M/year, this equates to losses of at least £1.5M annually and possibly 5 times greater than that. By reducing storage losses spray programme could help growers save up to 50% of these losses.

### **Action Points**

Growers should consider spray programmes against *Phoma* in order to reduce storage losses.