Understanding dormancy and the chill requirement of raspberry

Nikki Jennings and Lynne Ferguson

SSCR Soft fruit winter meeting, 16th February 2017

Background

- RBC Raspberry breeding programme
- Bud break issues in trials after successive mild winters
- Apparent genotype differences in chill requirement
- Potential delay in release of new cultivars
- Better understanding of genotype differences in dormancy and chill response will lead to:
  - Help industry manipulate cultivars to maximise production
  - Future breeding strategies to select genotypes with resilience to environmental change

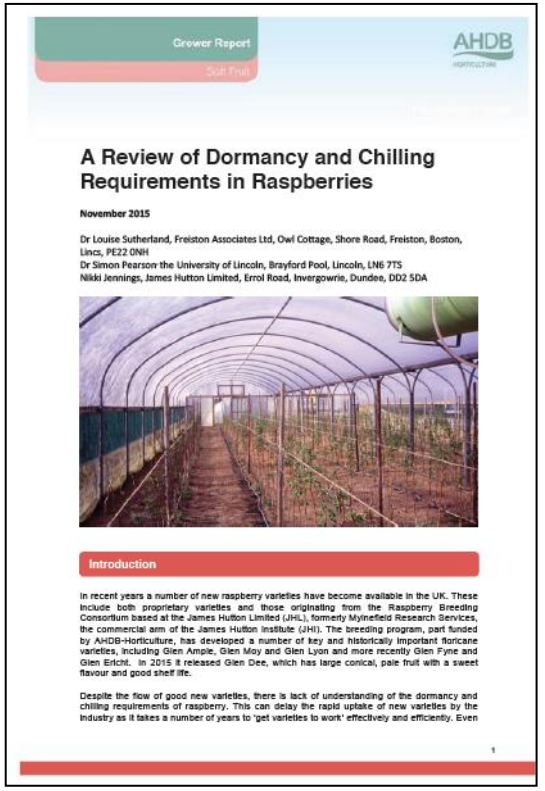
Poor bud break, JHI 2015

Dormancy investigations

- Exploratory dormancy experiment initiated in 2015/16 to assess and compare chill requirement of advanced selections and cultivars
- Based on an established blackcurrant protocol (Jones *et al*, 2015)
- Modified for raspberry canes

In addition

- Review of historical development data and Met Site records at JHI (Louise Sutherland, RBC Chairman)
  - Literature review
  - Provisional model of dormancy response and chilling requirement of genotypes
  - 'Dormancy and chilling in raspberries' published by AHDB as a KT Note


Grower Report

Soft Fruit

AHDB

A Review of Dormancy and Chilling Requirements in Raspberries

November 2015

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Introduction

In recent years a number of new raspberry varieties have become available in the UK. These include both proprietary varieties and those originating from the Raspberry Breeding Consortium based at the James Hutton Limited (JHL), formerly Mylnefield Research Services, the commercial arm of the James Hutton Institute (JHI). The breeding program, part funded by AHDB-Horticulture, has developed a number of key and historically important floricane varieties, including Glen Ample, Glen Moy and Glen Lyon and more recently Glen Fyne and Glen Ericht. In 2015 it released Glen Dee, which has large conical, pale fruit with a sweet flavour and good shelf life.

Despite the flow of good new varieties, there is lack of understanding of the dormancy and chilling requirements of raspberry. This can delay the rapid uptake of new varieties by the industry as it takes a number of years to 'get varieties to work' effectively and efficiently. Even

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Raspberry dormancy experiment

- Full canes from established plants harvested fortnightly from October-March
  - 5 reps / genotype
  - Initial assessments of tip fruit and senescence recorded at each harvest
  - Top 25 buds assessed for bud break over 3 weeks
- Data loggers at sampling sites to record hourly temperatures
- Accumulated chill hours calculated
- JHI Met site data to supplement additional information

Raspberry dormancy experiment

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- Six genotypes, established cultivars and advanced breeding selections
- Comparison of two sites in year 1
- Addition of tipping effect in year 2

2015/16*	
Glen Dee*	
Glen Dee (defoliated)	
0485K-1*	
0435D-3*	(Early)
0658C5	
Glen Ample	
Octavia*	

2016/17	
Glen Dee	
Glen Dee (tipped)	
0485K-1	
0435D-3	(Early)
RBC16F6	(Early)
Glen Ample	
Glen Ample (tipped)	

*canes from 2 sites; JHI and Norfolk

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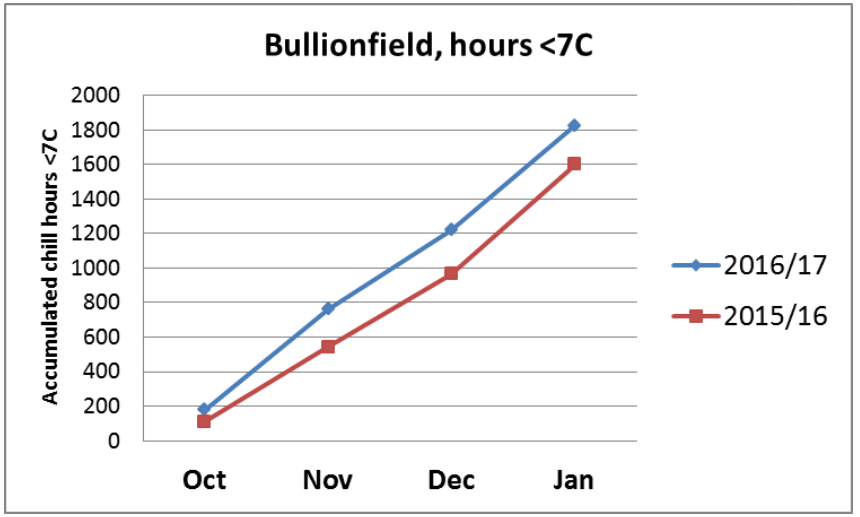
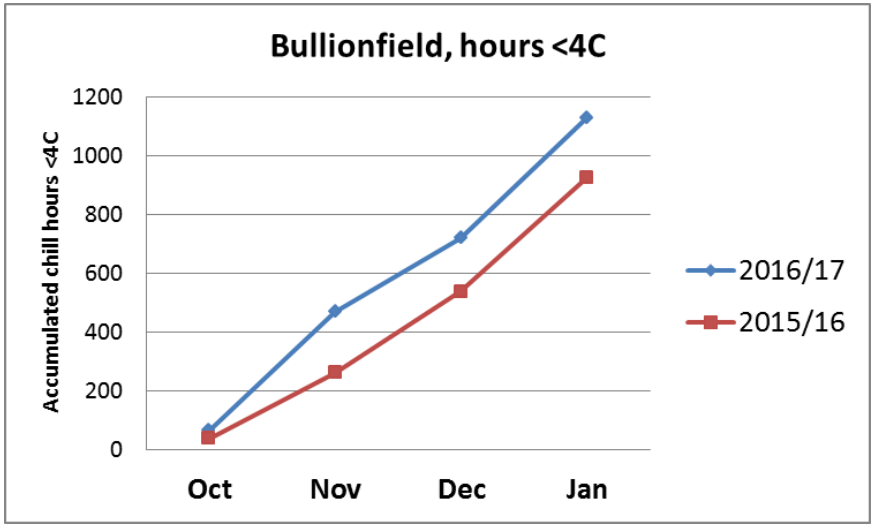
Chilling hours

- Data loggers record temperature in situ in the field
- Various chilling temperature thresholds exist
  - Hours <7.2°C is the most common
  - Hours <4°C more relevant
- Heat unit accumulation >12°C also calculated
  - Sustained periods >12°C Nov-Jan
  - Warm temperatures may negate chill





Anecdotal observations

- Genotype variation in senescence rate in the field
- Effect of defoliation
- Glen Dee and 0485K-1 appear to require a higher chill than Glen Ample

Genotype differences in senescence

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Glen Dee 0485K-1 0435D-3 Glen Ample

Defoliation at sampling time

Defoliated canes appeared to break buds sooner

Next steps….

- Experiment to be completed March
- Data collated and results analysed in 2017
- Additional seasons' data beneficial
- Dormancy experiment conducted annually with new advanced genotypes
- Provide key information to growers when establishing new cultivars

Many thanks

James Hutton Institute

Rex Brennan

Sandra Gordon

Alison Dobson, Met site

Raspberry Breeding Consortium

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