

# National Pear Breeding Program

2009



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**Victoria**  
The Place To Be



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## Key objectives

- Good appearance and eating quality.
- Good storage & shelf life.
- A spread of harvest maturity.
- Resistance to Scab.

# Seedling populations at DPI Tatura (stage 1)

| Breeding Phase             | No crosses | No. trees | No. trees removed | No. trees remaining |
|----------------------------|------------|-----------|-------------------|---------------------|
| 1 <sup>st</sup> generation | 131        | 56,000    | 46,500            | 9,500               |
| 2 <sup>nd</sup> generation | 81         | 7,000     |                   | 7,000               |
| Total                      | 212        | 63,000    |                   | 16,500              |



## Total Selections (stages 2 & 3)

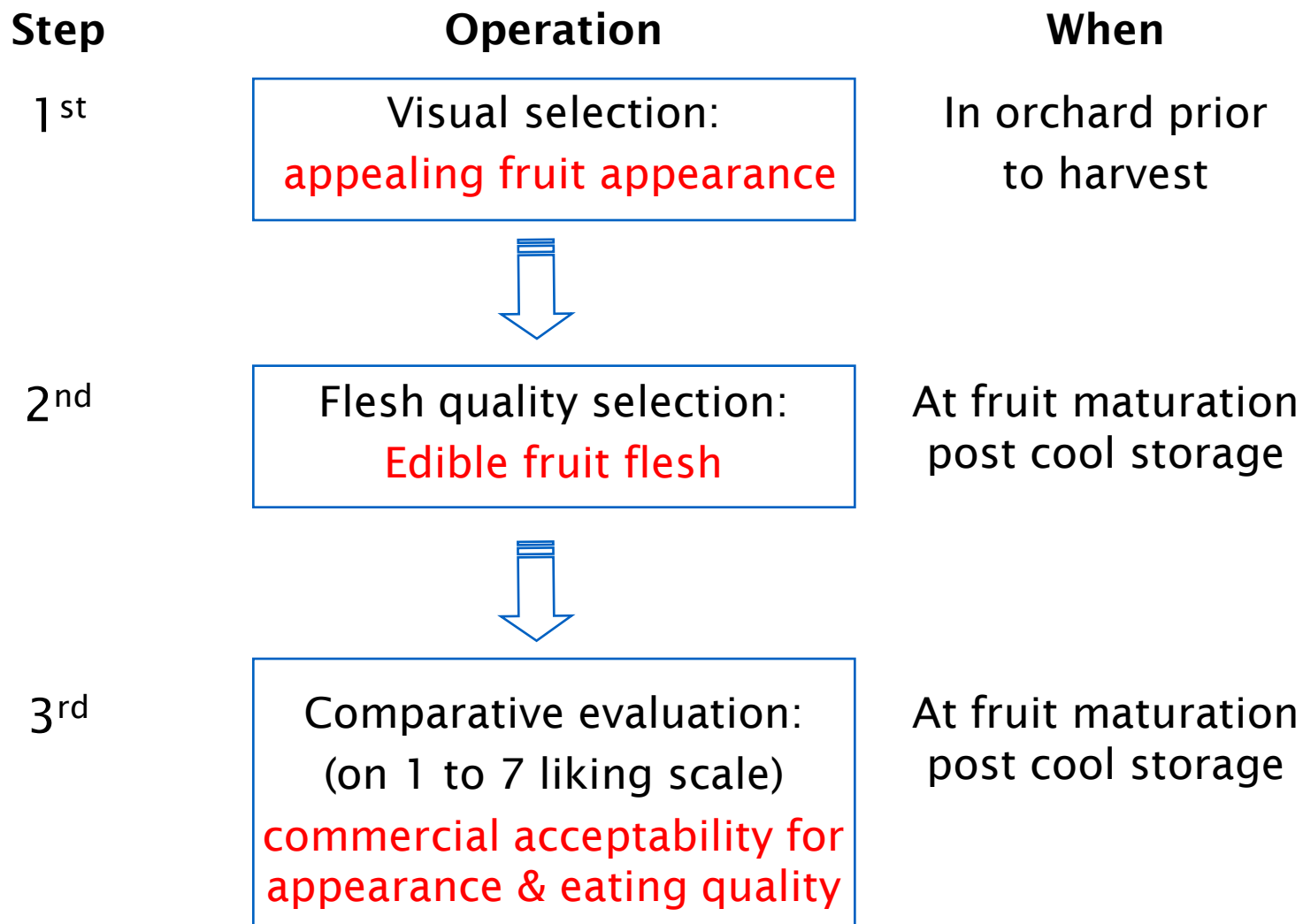
|               | Stage 2 selections<br>DPI trials |           |            | Stage 3 selections<br>APFIP large-scale trials |
|---------------|----------------------------------|-----------|------------|--|
| Crosses       | 01 - 08                          | 2009      | Total      | 2009   |
| European      | 248                              | 65        | 313        | 2  |
| Interspecific | 7                                |           | 7          |  |
| <b>Total</b>  | <b>255</b>                       | <b>65</b> | <b>320</b> | <b>2</b>                                       |

| Elite crosses | Female             | Male      | Total      | Selection rate |              |
|---------------|--------------------|-----------|------------|----------------|--------------|
|               | *Guyot             | Rogue Red | 86         | 0              | 3.4 %        |
|               | Guyot              | Corella   | 52         | 0              | 2.5 %        |
|               | BPM                | Corella   | 14         | 1              | 4.0 %        |
|               | Corella            | Comice    | 3          | 1              | 0.4 %        |
|               | <b>All crosses</b> |           | <b>320</b> |                | <b>0.6 %</b> |

# Australian National Pear Breeding Program

- Selection and evaluation process

# Three-step selection strategy



# Comparative evaluation

| Traits         | 1 to 7 liking scale   |
|----------------|-----------------------|
| Shape          | 1= dislike extremely  |
| Colour         | 2= dislike moderately |
| Appearance     | 3= dislike slightly   |
|                | 4= neutral            |
| Texture        | 5= like slightly      |
| Flavour        | 6= like moderately    |
| Eating quality | 7= like extremely     |



\*A selection must rate at least 5/6 or 6/5  
for appearance / eating quality.

# Fruit & tree evaluations

## Fruit

- Firmness
- Sugar (Brix<sup>o</sup>) & titratable acids
- Seed colour
- Starch
- Neck shrivel
- Limb rub
- Internal breakdown & scald
- Mealiness

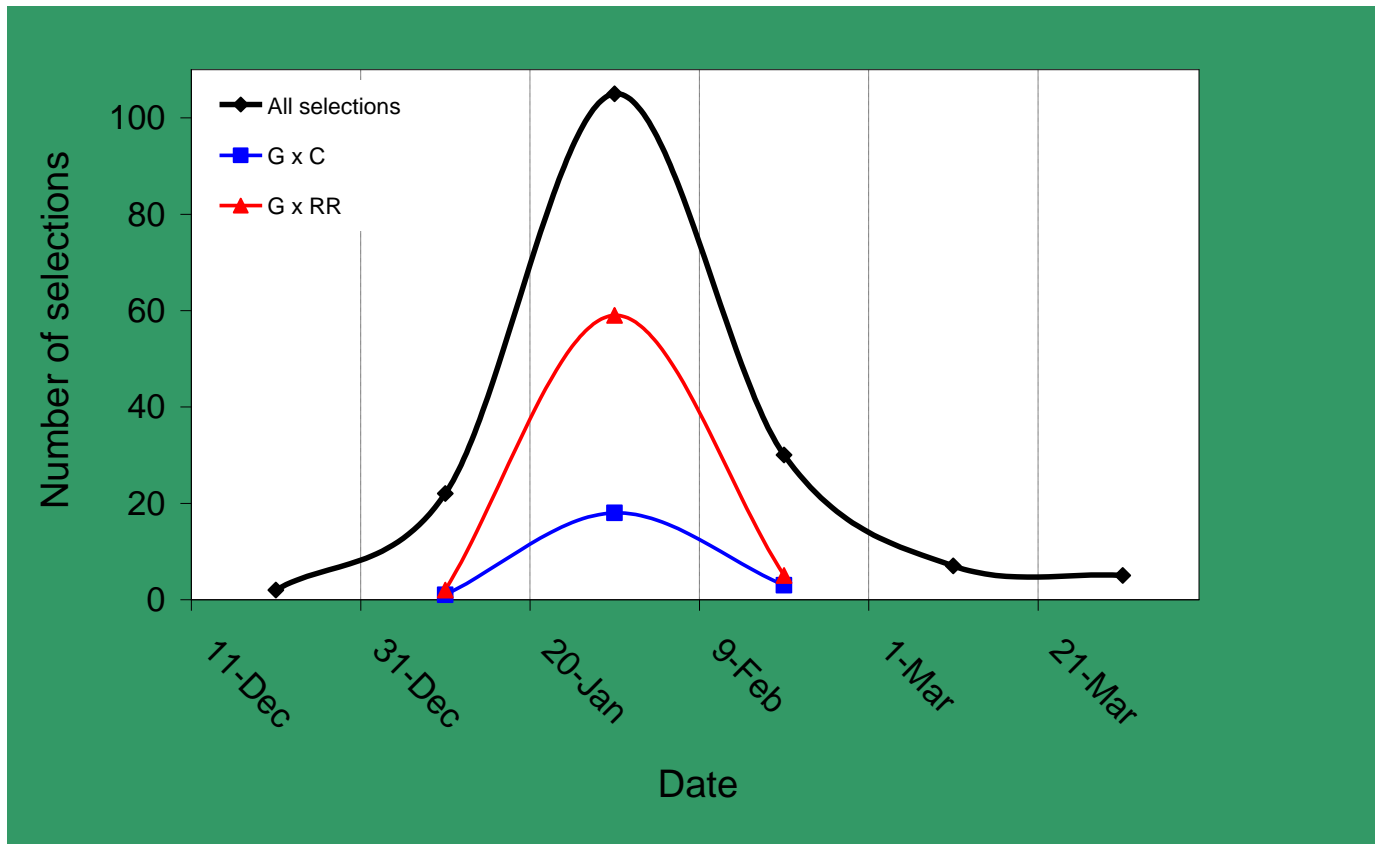
## Tree

- Crop load & av. fruit weight
- Tree vigour
- Tree growth habit
- Full bloom (chill requirement)
- Fruit set & position of fruit buds

# Australian National Pear Breeding Program

- Top pear selections

# Harvest range of selections



# 1: Bi-coloured series



\*ANP\_0903  
BPM x Forelle  
10 - 25 Jan



\* ANP\_0935  
Rogue Red x Guyot  
25 Jan – 20 Feb



ANP\_0638  
Rogue Red x Josephine  
14 – 28 Feb



ANP\_0131  
Corella x Comice  
14 – 28 Feb

## 2: BPM/Corella series



ANP\_0118  
BPM x Corella  
10 – 31 Jan



\* ANP\_0905  
BPM x Forelle  
15 Jan - 4 Feb



ANP\_0345  
BPM x Corella  
24 Feb – 6 Mar

## 3: Guyot/Corella series



\* ANP\_0943  
Guyot x Corella  
20 Jan – 4 Feb



\* ANP\_0947  
Guyot x Corella  
20 Jan – 4 Feb



ANP\_0534  
Guyot x Corella  
4 - 20 Feb



\* ANP\_0948  
Guyot x Corella  
20 Jan - 4 Feb

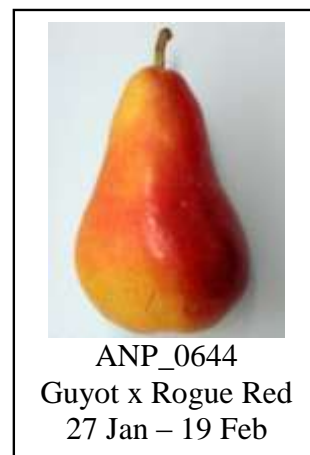
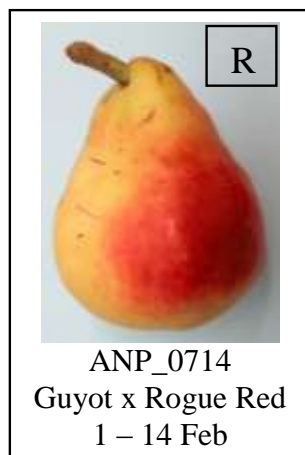
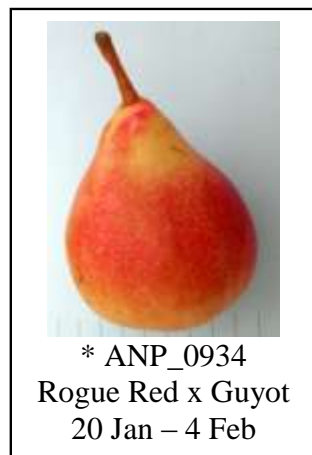
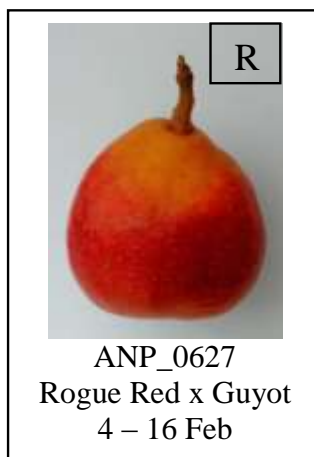
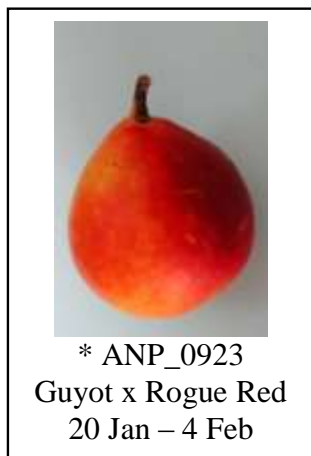


\* ANP\_0950  
Guyot x Corella  
30 Jan - 10 Feb



ANP\_0534  
Guyot x Corella  
19 Feb – 6 Mar

## 4a: Guyot/Rogue blushed series



## 4b: Guyot/Rogue red series



ANP\_0643  
Rogue Red x Guyot  
< 27 Jan



ANP\_0715  
Guyot x Rogue Red  
27 Jan - 17 Feb



ANP\_0721  
Rogue Red x Guyot  
27 Jan - 3 Mar

## 5: Fireblight/Packham series



ANP\_0603  
US65063-044 x  
Packham  
4 – 14 Feb



ANP\_0121  
HW606 x Packham  
9 – 19 Feb



ANP\_0312  
Harrow Delight x  
Packham  
14 – 24 Feb

# Scab resistance studies

S.M. Liu, G. Ye, S.M. Richards, K.F. Smith (2009) Segregation and transmission of resistance to scab (*Venturia pirina*) in pear breeding progeny under natural infection in an orchard. *Scientia-Horticulturae* 120, 222-229.

- Ya Li, Hood, BPM and Guyot have the more scab resistant genotypes.  
For example: Guyot x Hood and BPM x Ya Li, had up to 96% of progeny resistant to scab.
- A model of two triallelic genes was proposed to interpret the segregation patterns of the families, based on a scab scale rating 1 - 9 where highly resistant (HR) = 1, resistant (R) = 2, slightly resistant (SR) = 3-4, slightly susceptible (SS) = 5-6, susceptible (S) = 7-8 and highly susceptible (HS) = 9.
- The gene, designated as  $Vp_a$ , has an allele ( $V p_a^2$ ) conferring resistance and two alleles ( $V p_a^1$  and  $V p_a^3$ ) conferring susceptibility with  $V p_a^1$  being dominant to  $V p_a^2$  and  $V p_a^2$  being dominant to  $V p_a^3$
- Similarly, the gene, designated as  $Vp_b$ , has an allele ( $V p_b^2$ ) conferring moderate resistance and two alleles ( $V p_b^1$  and  $V p_b^3$ ) conferring susceptibility with  $V p_b^1$  being dominant to  $V p_b^2$  and  $V p_b^2$  being dominant to  $V p_b^3$
- Under the disease resistant model the segregation ratio of the major families of which we have selections is
  - 7 R : 9 S for Guyot x Corella cross
  - 1 R : 3 S for Guyot x Rogue Red,where R encompasses progeny from slight to high scab resistance.

