



Grower Summary

TF 224

East Malling Rootstock
Breeding Club (EMRBC)

Annual 2016

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

Project title: East Malling Rootstock Breeding Club (EMRBC)

Project number: TF 224

Project leader: Felicidad Fernández, NIAB EMR

Report: Annual report, 2015-16

Previous report: Annual reports for TF182 and TF172a&b (2014-15)

Key staff: Felicidad Fernández
Adam Whitehouse

Location of project: East Malling Kent

Industry Representative: Nigel Kitney, H L Hutchinsons Ltd

Date project commenced: 1 April 2015

Date project completed 31 March 2020

(or expected completion date):

GROWER SUMMARY

Headline

- NIAB EMR continues to develop improved rootstocks for apple and pear through breeding and trialling our own selections as well as material from other breeding programmes.

Background and expected deliverables

Improved rootstocks are essential for profitable and sustainable production in tree-fruit crops. Factors important to growers include dwarfing (to reduce the cost of pruning and picking), induction of precocious and reliable cropping, freedom from suckers, good anchorage and resistance to pests and diseases. Ease of propagation and good scion-stock compatibility are also important in the nursery.

In 2008, EMR (now NIAB EMR), the HDC (now AHDB Horticulture) and the International New Varieties Network (INN) launched a Rootstock Club (EMRC) to breed, develop, distribute and commercialise new rootstock breeding material from East Malling, world-wide.

For UK growers, the AHDB involvement in the development of new rootstocks from NIAB EMR's programme will ensure material will be available to UK levy payers. The AHDB helps to 'steer' breeding objectives to meet the specific requirements of UK growers and ensures that appropriate newly selected rootstocks are trialled further before release to the UK industry.

INN has members in the USA, Chile, South Africa, Australia, New Zealand and throughout Europe. In each country, members can produce virus-free (VF) certified rootstocks and premium quality VF certified finished trees. INN members will arrange, evaluate and select from their own trials to identify those rootstocks best suited to each country's specific growing conditions.

The EMRC aims to develop a range of apple, pear and quince rootstocks to suit different growing conditions. Breeding objectives include:

- new dwarfing and semi-dwarfing stocks for apple and pear
- improved scion-graft compatibility, in particular for pear
- increased precocity and productivity
- increased fire-blight and/or woolly apple aphid resistance
- enhanced tolerance to replant disease

Summary of the project and main conclusions

Preliminary trials

- Winter and harvest records were taken from the RF185 trial. This trial was planted with replicates of four selections from apple family M306 (AR86-120 x M20) in 2012. Significant differences were observed in girth and tree volume, but not any significant effects in terms of yield, cumulative yield, yield efficiency, numbers of fruit produced or pruning weights at this stage
- Preliminary records were taken for the trial of ten new pear rootstock selections planted in 2014. There were significant differences even at this early stage in terms of girth and numbers of suckers, but not any significant effects in terms of height. One of the rootstocks (PQ37-3) appears to have some compatibility problems with Conference with half the trees dying in Year 1

Second stage trials

- In the conventional trial planted in 2010 (EE207), where five new selections are being evaluated with Braeburn and Gala for a vigour range between M.27 and M.26, full harvest and winter records were taken and significant differences were found for all parameters measured. R59 continues to produce the smallest trees (~M.27) and has the highest yield efficiency but overall yield and size are not very encouraging. AR852-3 and AR839-9 are larger trees but produced much better yields of fruit (> 65 mm).
- In the low-input orchard also planted in 2010 (VF224), the four selections being trialled are evaluated with Red Falstaff. Full harvest and winter measurements were taken and R80 continues to be the most productive rootstock but it is also significantly more vigorous than M.116 and MM106. So far, AR10-3-9 is the closest in size to the control but seems to require significantly more pruning for comparable yields.
- The new trial evaluating Canadian rootstocks has been fully genotyped. Due to the large (10%) error rate in propagation or labelling, the trial design is unbalanced and the preliminary vigour data collected in 2015 was subjected to regression analysis but it is far too early to comment on any of these rootstocks.

Crossing programme

- Eight apple and three pear crosses were carried out in April-May 2015.

- In total, over 3,500 seeds from eight of the apple crosses were sown in December 2015 and germination rates from these seed lots were generally very good resulting in a population of 1,822 seedlings.
- No pear populations were raised in 2015.
- Spare seeds from both apple and pear crosses were stored as back-up.

Seedling populations

- A total of 1,342 apple seedlings from 8 families and 406 pear seedlings from five families raised in the last reporting were planted in August 2015 through mypex.
- Apple and pear families planted in 2013 were budded in August 2014.

Selection

- Field records (vigour, crop load and suckering) were made on existing apple and pear populations.
- Seventeen preliminary apple selections were made in September 2015 but they will be propagated, if retained, in 2017-18 with any other selections from the same families made in summer 2016.

Pest and disease screening

- Fireblight screening of four advanced selections in Agroscope (CH) confirmed the previously observed low susceptibility of AR295-6 and indicate that AR835-11 and AR839-9, although susceptible, are significantly less so than M.9. AR440-1 is also less susceptible than M.9 but should be considered fully susceptible.
- The glasshouse assay to test susceptibility to *P. cactorum* is still being developed and no results can be reported for 2015.
- A reduced number of genotypes were planted in a plot with both treated and untreated soils to evaluate the impact of Apple Replant Disease in different rootstocks.
- Screening by inoculation with woolly apple aphid was not particularly conclusive as the aphids failed to establish well in some well-known susceptible cultivars.

Financial benefits

There are major financial implications of developing and selecting rootstocks with improved agronomic performance, including reduced pruning and picking costs and the ability to grow material with reduced pest and disease susceptibility.

Action points for growers

- At this stage in the breeding programme, no action points have been identified for growers.