Project title:	Evaluation and development of new rootstocks for apples – on-going work on existing plantings
Project number:	TF 172a
Project leader:	Felicidad Fernández, East Malling Research (from April 2014)
Report:	Annual report, April 2015
Previous report:	Annual report, April 2014
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Date project commenced:	1 May 2012
Date project completed (or expected completion date):	Due 30 April 2016 but was merged into TF 224 on 30 March 2015

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AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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GROWER SUMMARY

Headline

- Neither rootstock AR801-11 nor AR680-2 were found to be an improvement on the M9 rootstock for 'Queen Cox' grown under conventional management.

Background and expected deliverables

A review of AHDB Horticulture-funded rootstock research projects (project TF 158) acknowledged that there was a strong need for new or improved rootstocks for apples, pears, plums and cherries that are dwarfing, precocious, high yielding and offer some measure of drought tolerance. The report recognised that rootstocks are a vital part of the currently used growing systems for tree fruits, but those currently used in tree fruit production have been grown for decades and all have some limitations. Breeding programmes in the UK and abroad have generated a number of promising rootstocks in recent years, which are becoming increasingly available to growers. The report recommended that UK trialling of promising UK and overseas material should continue and that technology transfer should be improved. This work was then undertaken in AHDB Horticulture project TF 172 (*Evaluation and development of new rootstocks for apples, pears, cherries and plums*).

This project (TF 172a) is a continuation of AHDB Horticulture project TF 172 but focuses only on apple rootstocks. The main aim of the project was to acquire, evaluate and develop (in UK growing conditions) new apple and pear rootstocks produced by breeding programmes both at EMR and abroad. This project provided continuity of the trialling of fruit tree rootstocks at EMR, looking for rootstocks of intermediate vigour between M27 and M9 and a replacement for M26 in apple, with continued evaluation of existing plots that were identified as having new rootstocks of potential merit.

Selection and release of improved rootstocks to the industry will be of benefit to growers, as the introduction of new rootstocks with increased precocity and yield with fewer requirements for chemical or mechanical growth control, will have a huge impact on the profitability of UK orchards.

Summary of the project and main conclusions

This project (TF 172a) is a continuation of AHDB Horticulture project TF 172 for the evaluation of trees in some of the existing plots from AHDB Horticulture project TF 172. These plots were those identified as containing rootstocks with potential as commercial rootstocks.

Three existing plots containing the following rootstocks were assessed:

- Plot CE190: Rootstocks planted in May 2004 with 'Queen Cox' scion and compared to M9 were AR801-11 and AR680-2.
- Plot EE207: AR852-3, AR839-9, B24, R59 and R104 were assessed with M26, M9 and M27 standards; the orchard was planted in March 2010 with 'Braeburn' and 'Gala' as scion varieties.
- Plot VF224: AR10-3-9, AR809-3, AR835-11, R80 were assessed with MM106 and M116 standards with 'Red Falstaff' as the scion variety. The orchard was planted in March 2010.

After reviewing cumulative trial data from CE190, selections AR801-11 and AR680-2 were found to offer no improvement over the standard rootstock (M9) when grown under a conventional orchard system with 'Queen Cox'. AR801-11 was therefore rejected and AR680-2 will remain in the breeding programme pending results from overseas trials. As no further useful data could be expected from this trial, the plot was grubbed in spring 2015.

Commercial yields have yet to be attained on rootstocks being tested in EE207 (Conventional, with 'Braeburn' and 'Gala') so it is too early to draw conclusions on which rootstocks, if any, have commercial value. However, stocks R104, AR852-3 and R59 appear to be showing potential against the relevant controls (R104 and AR853-3 cf. M9; R59 cf. M27)

It is also too early to determine if any of the selections in VF224 (Organic, 'Red Falstaff' scion) are suitable as replacement rootstocks, although AR809-3 and R80 may have potential with regard to reduced vigour and yield respectively.

Trials in EE207 and VF224 will continue and will form part of a new combined project, agreed by the AHDB Horticulture Tree Fruit Panel in March 2015, that will integrate these trials with the East Malling Rootstock Club (EMRC) as one project (TF 224).

Financial benefits

- Selections AR680-2 and AR801-11 were found to offer no significant improvement over M9 and are therefore unlikely to be of commercial value. However it is too early to determine if any of the rootstocks in EE207 of VF224 are suitable replacement rootstocks for commercial production.

Action points for growers

- There are no action points at present.

SCIENCE SECTION

Introduction

A review of AHDB Horticulture-funded rootstock research projects (project TF 158) acknowledged that there was a strong need for new or improved rootstocks for apples, pears, plums and cherries that are dwarfing, precocious, high yielding and offer some measure of drought tolerance. The report recognised that rootstocks are a vital part of the currently used growing systems for tree fruits but those currently used in tree fruit production have been grown for decades and all have some limitations. Breeding programmes in the UK and abroad have generated a number of promising rootstocks in recent years, which are becoming increasingly available to growers. The report recommended that UK trialling of promising UK and overseas material should continue and that technology transfer should be improved. This work was then undertaken in AHDB Horticulture project TF 172 Evaluation and development of new rootstocks for apples, pears, cherries and plums.

This new project is a continuation of the evaluation of trees in some of the existing plots from AHDB Horticulture project TF 172. These plots were those identified as the ones containing rootstocks with potential as commercial rootstocks rather than selections that were identified as ‘also ran’. The main aim of the project was to acquire, evaluate and develop in UK growing conditions new apple, pear, cherry and plum rootstocks produced by breeding programmes both at EMR (East Malling Rootstock Breeding Club) and abroad. In this continuation of the work, only selections of apple rootstocks that were deemed to have potential, related to the following objectives were evaluated:

- To select and develop apple rootstocks with intermediate vigour between M27 and M9, which perform well in the nursery and which produce precocious and consistently abundant yields of high quality fruits of the marketable size grades;
- To select and develop a replacement rootstock in the M26 vigour category, which does not suffer from burr knotting, poor calcium uptake or physiological disorders in the scion fruit. This rootstock should also induce precocious and abundant yields of high quality fruits;
- To select and develop dwarfing rootstocks for apple which exhibit improved resistance to drought (weed competition), replant disease and soil borne diseases (e.g. collar/crown rot).

Selection and release of improved rootstocks to the industry will be of benefit as the introduction of new rootstocks, with increased precocity and yield with fewer requirements for chemical or mechanical growth control, will have a huge impact on the profitability of UK orchards.

Further assessment of rootstocks on plots EE207 and VF224 at EMR will be integrated and assessed as part of project TF 224 in 2015, as agreed at the AHDB Horticulture Tree Fruit Panel meeting in March 2015.

Materials and methods

The trial was conducted at East Malling Research, New Road, East Malling, Kent. Three plots were evaluated: CE190 and EE207, which were under conventional management, and plot VF224, which was under organic management. Under conventional management tree rows were maintained weed free using conventional herbicides (a rotary hoe was used for plots under organic management) and the alleys between the rows were grassed down and maintained by frequent mowing. No supplementary irrigation was supplied to the trees once established. Minimal pruning was undertaken in the first few years following planting; the trees were, however, headed back when necessary to encourage the production of lateral branches, but no branch tipping was undertaken. Where appropriate, very upright branches were tied down towards the horizontal and a modified form of ‘long spur pruning’ employed. However, this minimum intervention approach had resulted in trees not easily comparable with commercial orchards. Therefore, it was agreed with the AHDB Horticulture Tree Fruit Panel in March 2015 that the two trials that are continuing (in plots EE207 and VF 224) would benefit from some corrective pruning to bring the trees into shape. Pruning weights were recorded in the field for each tree. It was also agreed that the pruning strategy to simulate commercial orchard management would be put in place from 2015-16.

No chemical growth regulators or root pruning techniques have been used to supplement growth control in any of the trials reported on. No chemical or manual fruit thinning was carried out.

Rootstocks planted in May 2004 in plot CE190 with ‘Queen Cox’ scion and compared to M9 were AR801-11 and AR680-2. In plot EE207, the rootstock selections AR852-3, AR839-9, B24, R59 and R104 were assessed with M26, M9 and M27 standards. The orchard was planted in March 2010 with ‘Braeburn’ and ‘Gala’ scion cultivars. Plot VF224, planted in

March 2010, and included AR10-3-9, AR809-3, AR835-11, R80, MM106 and M116 rootstocks with 'Red Falstaff' as the scion cultivar.

Each orchard was assessed in terms of:

- Tree growth: girth (mm), measured 15 mm above the graft union, and height and spread of the tree to give tree volume (m^3). In addition, pruning weights (g/tree) were measured for the first time in 2015;
- Cropping: total yields, yield of Class I >65mm (cumulative yields and yield efficiencies were calculated);
- Miscellaneous: notes of tree health, graft compatibility and anchorage were made where appropriate.

Results

Completed trial – Conventional orchard, cv. 'Queen Cox' (plot CE190)

In this plot, two East Malling Rootstock Breeding Club (EMRBC) selections (AR680-2 and AR801-11) were compared to M9 under conventional management with 'Queen Cox' as the scion. Yields in 2014 (Table 1) were comparable to 2013 and higher than those achieved in 2012. The trend for lower yields from both EMRC selections, when compared to M9, that had been observed in previous two years were repeated in 2014. However the cumulative yield of AR680-2 (Table 2) was found not to be significantly different from M9 and it showed identical yield efficiency. Although AR801-11 had a smaller tree volume than both AR680-2 and M9, this was not found to be significant.

Cumulative yield (both total and Class 1) for AR801-11 was however shown to be significantly lower than for M9 (Table 2). The trial data for both selections was reviewed at the East Malling Rootstock Breeding Club Policy Group meeting on 28 January 2015 and the members, including the AHDB Horticulture, agreed that the collection of further trial data would not be useful and it was therefore agreed that further assessment of these selections should cease. Previous disease screening tests carried out on both AR680-2 and AR801-11 also suggested that they are both susceptible to fire-blight and woolly apple aphid and this was taken into account. Trees from CE190 were grubbed in February 2015 and final tree (grubbing) weights recorded (Table 1).

Table 1. Growth and cropping in 2014 of cv. 'Queen Cox' trees (Plot CE190) on rootstocks from the EMRBC breeding programme planted in 2004

	Girth (cm / tree)	Tree Volume (m^3)	Tree weight (kg)	Yield (kg/tree)	Yield Class 1 >65 mm (kg/tree)	Suckers (No./tree)
AR801-11	16.0	10.0	6.7	11.1	2.0	5.7
AR680-2	18.8	17.0	11.7	6.3	0.9	7.5
M9	17.7	16.0	13.1	17.9	3.4	4.0
SED (27 df)	1.2	2.6	2.0	6.5	1.8	1.2
LSD (p=0.05)	2.4	5.3	4.0	13.7	3.6	2.5
Rootstock effect*	ns	ns	*	ns	ns	*

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Table 2. Cumulative yield and yield efficiency of cv. 'Queen Cox' trees (Plot CE190, 2004-2014) on rootstocks from the EMRBC breeding programme planted in 2004

	Cumulative yield 2004-14 (kg/tree)		Yield efficiency (kg / cm^2)
	Total	Class I >65mm	
AR801-11	63.3b	**24.4b**	7.0
AR680-2	71.7ab	24.9ab	9.2
M9	88.8a	39.7a	9.2
SED (27 df)	10.7	7.32	1.2
LSD (p=0.05)	21.8	15.0	2.5
Rootstock effect*	*	*	ns

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Ongoing trials:

Conventional orchard, cvs. 'Braeburn' and 'Gala' (Plot EE207):

Five East Malling Rootstock Breeding Club selections (AR852-3, AR839-9, B24, R104 and R59) were compared to M9, M26 and M27 under conventional management with 'Braeburn' and 'Gala' as scions.

Cv. 'Braeburn'

Significant differences were found in 2014 for all the parameters measured (Tables 4-6). R104 and AR852-3 gave the highest yields in the trial, as they had done in 2013, but not

significantly different from M9, or M26 for AR852-3. However, fruit size was not affected with fruit from R104 and AR852-3 being similar (not significantly different) from the controls (M9, M26, M27). Both R104 and AR852-3 did exhibit greater vigour (tree volume) than M9 and M26, although this was only significantly greater when comparing AR852-3 with M9. Conversely, B24 had significantly greater vigour (tree volume) than the controls, with significantly greater pruning weight than all other stocks (Table 6) but with a low yield (Table 4) and yield efficiency (Table 5), concurring with results from 2013.

R59 was similar in most respects to M27, but a slightly better yield efficiency (Table 5) although this was not found to be significant. AR839-9 was similar to M26 in terms of yield (Table 4) and yield efficiency (Table 5) but with a slightly greater tree volume, but narrower girth, than M26, although these differences were not found to be significant.

Table 4. Yield and numbers of fruit produced from cv. 'Braeburn' trees (Plot EE207, 2014) on rootstocks planted in 2010

	Yield	Yield	Yield Class I	Yield Class I >65mm
AR852-3	13.6	70.9	11.3	53.0
AR839-9	9.0	55.7	7.3	37.1
B24	7.5	47.7	5.1	29.2
M26	9.1	51.7	7.2	37.6
M27	6.3	38.4	4.3	23.4
M9	11.3	71.0	8.9	49.3
R104	13.0	84.4	10.5	58.5
R59	6.0	36.2	4.6	25.8
SED (43 df)	2.0	12.7	1.9	10.2
Rootstock	**	**	**	*

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Table 5. Cumulative yield and yield efficiency of cv. 'Braeburn' trees (Plot EE207, 2011-2014) on rootstocks planted in 2010

	Cumulative yield 2010-14 (kg/tree)		Yield efficiency (kg / cm^2)
	Total	Class I >65mm	
AR852-3	24.3	19.7	2.5
AR839-9	13.0	10.3	1.7
B24	9.5	6.4	0.9
M26	15.3	11.6	1.6
M27	13.6	9.2	3.3
M9	19.9	14.5	2.4
R104	26.1	18.8	2.8
R59	13.9	8.6	4.0
SED (43 df)	3.1	2.8	0.5
Rootstock effect*	***	***	***

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Table 6. Growth measurements of cv. 'Braeburn' trees (Plot EE207, 2014) on rootstocks planted in 2010

	Girth measurements (cm)	Tree Volume (m^3)	Suckers (No./tree)	Pruning weights (g/tree)
AR852-3	11.4	5.2	0.0	331
AR839-9	9.7	4.7	1.0	348
B24	11.4	6.0	0.0	584
M26	11.4	4.0	0.1	329
M27	7.1	1.8	0.9	84
M9	10.0	3.8	0.0	249
R104	10.8	4.7	0.0	324
R59	6.6	1.7	0.0	86
SED (43 df)	0.7	0.7	0.4	74
Rootstock effect	***	***	**	***

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Cv. 'Gala'

R104 and AR852-3 both gave a similar total yield to M26 and slightly less total yield when compared to M9 (Table 7), although in all cases this was not significant. Unlike cv. 'Braeburn' trees, both R104 and AR852-3 gave the lowest yield efficiencies (Table 8) with cv. 'Gala', although again these were not significant. AR852-3 had slightly less vigour than the M9 and M26 controls, whereas R104 showed more vigour (Table 9). AR839-9, as with cv. 'Braeburn' was similar to M26 both in terms of yield and vigour. B24 was the most vigorous rootstock, having a tree volume that was significantly greater than all of the controls (Table 9) which concurs with its effect on 'Braeburn' scion. However yield with cv. 'Gala' was similar to M26 in 2014, although cumulatively (Table 8) it is significantly lower. R59 performed well in 2014 in comparison with M27, of which it confers a similar vigour (Table 9). Both total and Class 1 yield (in 2014) and cumulative yield are slightly higher than M27 but not significantly so. These have contributed to R104 having the highest yield efficiency (Table 8) of all the rootstocks with cv. 'Gala'.

Table 7. Yield and number of fruit produced from cv. 'Gala' trees (Plot EE207, 2014) on rootstocks planted in 2010

	Yield (kg/tree)	Yield (number/tree)	Yield Class I >65mm (kg/tree)	Yield Class I >65mm (number/tree)
AR852-3	12.7	115.4	6.6	49.9
AR839-9	15.4	129.8	8.5	61.8
B24	13.2	103.8	7.6	56.7
M26	14.4	125.2	6.9	45.9
M27	7.5	83.7	1.6	12.4
M9	16.5	148.4	7.7	58.6
R104	14.5	164.2	4.2	34.0
R59	8.7	102.5	1.6	12.6
SED (40 df)	2.8	24.3	1.7	12.6
Rootstock effect	*	ns	***	***

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Table 8. Cumulative yield and yield efficiency of cv. 'Gala' trees (Plot EE207, 2011-2014) on rootstocks planted in 2010

	Cumulative yield 2010-14 (kg/tree)		Yield efficiency (kg / cm^2)
	Total	**Class I >65mm**	
AR852-3	23.2	10.9	2.3
AR839-9	26.6	15.2	3.5
B24	19.4	11.4	4.3
M26	28.4	14.9	2.9
M27	15.4	6.2	4.1
M9	31.2	14.7	3.7
R104	24.2	9.2	2.2
R59	18.2	6.1	4.6
SED (40 df)	4.6	2.9	1.3
Rootstock effect*	**	**	ns

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Table 9. Growth measurements of cv. 'Gala' trees (Plot EE207, 2014) on rootstocks planted in 2010

	Girth measurements (cm)	Tree Volume (m^3)	Suckers (No./tree)	Pruning weights (g/tree)
AR852-3	10.8	3.3	0.0	202.9
AR839-9	10.2	5.3	1.7	162.4
B24	11.9	7.0	0.0	495.1
M26	11.2	4.4	1.7	287.1
M27	6.9	1.6	0.8	162.6
M9	10.3	4.4	0.5	202.7
R104	11.4	4.7	0.0	488.4
R59	7.1	2.1	0.1	129.8
SED (40 df)	1.1	0.8	0.6	88.7
Rootstock effect	***	***	**	**

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Organic orchard, cv. 'Red Falstaff' (Plot VF224)

Five East Malling Rootstock Breeding Club selections (AR10-3-9, AR809-3, AR835-11 and R80) were compared to M116 and MM106 under organic management with 'Red Falstaff' as the scion cultivar.

R80 produced a significantly higher yield than any other selection in 2014 (Table 10) and this was mirrored in its cumulative yield (Table 11). However it also had the greatest tree volume (Table 12), although this was not significantly different from the controls (MM106 and M116). AR809-3 produced the significantly (p=0.05) smallest girth size and tree volume (Table 12) of all the rootstocks tested, which corresponds with the reduced vigour observed in the 2012 and 2013 trials. In addition, AR809-3 gave a yield comparable to the MM106 and M116 controls and had the second highest yield efficiency (Table 11), similar to R80, without any apparent detriment to the average fruit size. The remaining selections were not significantly different from the MM106 and M116 controls in terms of yield in 2014, fruit size, cumulative yield or yield efficiency.

Table 10. Yield and number of fruit produced from cv. 'Red Falstaff' trees (Plot VF224, 2014) on rootstocks planted in 2010

	Yield 2014 (kg/tree)	Yield 2014 (number/tree)	Yield Class I >65mm 2014 (kg/tree)	Yield Class I >65mm 2014 (number/tree)	Mean individual fruit weight (kg)
AR10-3-9	2.0	15.2	0.8	5.4	0.13
AR809-3	1.7	14.1	0.4	2.9	0.13
AR835-11	1.8	13.0	0.7	4.3	0.15
M116	2.2	17.4	0.6	4.3	0.13
MM106	1.8	14.8	0.4	2.8	0.14
R80	3.5	25.6	1.0	6.4	0.14
SED (35 df)	0.6	4.4	0.25	1.6	0.01
Rootstock effect	*	ns	ns	ns	ns

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Table 11. Cumulative yield and yield efficiency of cv. 'Red Falstaff' trees (Plot VF224, 2011-2014) on rootstocks planted in 2010

	Cumulative yield 2004-14 (kg/tree)		Yield efficiency (kg / cm^2)
	Total	Class I >65mm	
AR10-3-9	3.9	1.8	0.4
AR809-3	3.2	1.2	0.9
AR835-11	3.2	1.4	0.5
M116	4.0	1.2	0.5
MM106	4.3	1.8	0.6
R80	7.4	2.6	1.0
SED (35 df)	1.2	0.7	0.2
Rootstock effect	*	ns	**

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Table 12. Growth measurements on cv. 'Red Falstaff' trees (Plot VF224) on rootstocks planted in 2010

	Girth measurements (cm)	Tree Volume (m^3)	Suckers (No./tree)	Pruning weights (g/tree)
AR10-3-9	10.3	3.8	0	366
AR809-3	6.8	1.1	0	99
AR835-11	9.7	5.2	0	333
M116	11.1	3.8	0	469
MM106	10.4	4.1	0	447
R80	9.6	5.8	0.1	361
SED (35 df)	0.7	1.0	0.1	131
Rootstock effect	***	***	ns	ns

*rootstock effect was either non-significant (ns) or significant at the 5 (*), 1 (**) or 0.1% (***) level of probability

Discussion

Completed trial – Conventional orchard, cv. 'Queen Cox' (Plot CE190)

Although no significant differences were found in total and Class 1 yield between rootstocks in 2014, the trend for both selections has been for lower yields than M9 and, although the final cumulative yield (2004-14) for AR680-2 was not significantly lower than for the standard (M9), it is clear that neither rootstock showed a distinct improvement over M9 rootstock for cv. 'Queen Cox' grown under conventional management. Furthermore, disease screening tests carried as part of the East Malling Rootstock Breeding Club (project TF 182) in previous years strongly suggest that both selections are susceptible to fire-blight and woolly apple aphid. The performance of both selections was reviewed at the East Malling Rootstock Breeding Club Policy Group meeting on 28 January 2015 and the members, including the AHDB Horticulture, agreed that further assessment of these selections in this trial should cease as they did not offer an improvement on M9. AR801-11 has now been rejected, and a decision on AR680-2 is pending on results from overseas trials where it has been performing more satisfactorily. The CE190 plot was grubbed in spring 2015.

Ongoing trials:

<u>Conventional orchard, cvs. 'Braeburn' and 'Gala' (Plot EE207)</u>

R104 and AR852-3 show useful yield potential with cv. 'Braeburn', but this is not reflected to the same degree when grafted with cv. 'Gala'. The slight increase in vigour that appears to be conferred by R104 with both scions when compared to the M9 and M26 controls has yet to be found to be significant. The vigour (tree volume) of AR852-3 differs between the two scions tested but appears to be nearer to M9 than M26. AR839-9 is similar in vigour and performance to M26 for both scions, with slight differences observed to date in the parameters measured not showing significance. B24 was the most vigorous rootstock, but with a disappointing yield with cv. 'Braeburn' and a comparable yield to M26 with cv. 'Gala'. R59 conversely had the lowest vigour of the new rootstocks tested but the highest yield efficiency for both cvs. 'Braeburn' and 'Gala'. It seems to be similar in many respects to M27, but it is too early at this stage to conclude whether the slightly greater yield observed in 2014 for R59 over M27 would be of commercial significance.

The trial has yet to meet commercial levels of production and it is therefore still too early to draw any real conclusions on the effect of rootstocks with these scions when grown under conventional management at this stage.

Organic orchard, cv. 'Red Falstaff' (plot VF224)

Rootstocks R80 and AR809-3 appear to show the most potential to date from this trial. R80 showed a significantly higher yield and yield efficiency than all the other rootstocks, including controls, in 2014 but with greater vigour, although this was not found to be significant at this stage. AR809-3 had significantly lower vigour (girth and tree volume) than all the other rootstocks but had the second highest yield efficiency, which compares well to results from the previous two years. This is still a relatively young trial so it is too early to draw any conclusions from this plot.

Conclusions

- Neither AR801-11 nor AR680-2 was found to be an improvement on the M9 rootstock for cv. 'Queen Cox' grown under conventional management and both have been rejected from further assessment in these trials and plot CE190 has now been grubbed.
- Commercial yields have yet to be attained on rootstocks being tested in plot EE207 so it is too early to draw conclusions on which rootstocks, if any, have commercial value. However, stocks R104, AR852-3 and R59 appear to be showing potential against the relevant controls (R104 and AR852-3 cf. M9; R59 cf. M27).
- It is too early to determine if any of the selections in plot VF224 are suitable replacement rootstocks, although AR809-3 and R80 may have potential with regard to reduced vigour and yield respectively.