Trial report

‘Air-Pot grown trees compared to the growth of trees in the open field’

December 2019

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1. Introduction

At the end of 2018, Bas van Dijk and Rutger Hornix from Air-Pot® set up a trial to compare the growth of trees cultivated in 7.5L and 45L Air-Pot Kits in comparison to the growth of trees in the open field. Cultus Crop Research independently verifying the measurements. The assessments were performed by Air-Pot® and Cultus Crop Research together and this report describes the findings of the first year of the demonstration trial.

Cultus Crop Research specialises in research for all agriculture and horticulture sectors in the Netherlands, such as demonstrations and screenings, carrying out test platforms, tests with statistical justification and integrity surveys for private GEP certification. Cultus Crop Research is in the possession of both the TNG certificate and the GEP certificate, which means that they are authorised to carry out tests with as yet uncertified pesticides.

Client	**: Air-Pot**
Contact	: Bas van Dijk , Rutger Hornikx
Reporting	**: Cultus Crop Research BV**
Contact	: Chiel van der Voort
Trial location	**: Boom. ‘De Kwekerij’**
	: Oirschot, the Netherlands

2. Trial execution

2.1 Trial goal

The goal of this demonstration trial is to show the added value of Air-Pot grown trees compared to cultivation in the open field. Because the trial was set up as a demo, no statistical processing occurred and only findings will be described. The starting plant material was grown in an Air-pot U system and supplied by 'Volentis'.

2.2 Trial setup

Period:	October 2018 – October 2019
Replications:	None
Trees per object:	25
Crops:	Carpinus betulus 'Lucas' Liquidambar styraciflua 'Worplesdon' Tilia europaea 'Pallida'
Objects per crop:	Air-Pot Kit 7.5 L Air-Pot Kit 45.0 L Open field
Potting soil recipe Air-pot:	30% Baltic peat – Fine grade 20% Baltic peat – Medium grade 20% Irish peat 30% Coco (fiber and chips)
Soil classification open field:	Light sandy loam
Basic fertilization Air-Pot:	Osmocote Exact 16-18M, 15-8-11+2MgO+TE Micromax Premium
Basis fertilization Open field:	Osmocote PrePlant 16-18M, 17-8-10+2MgO+TE Micromax Premium Compost before planting
Fertilization regime:	In addition to the fertilizer regime below, in the Air-Pot objects extra fertilisation was given by the fertigation system of Boom 'De Kwekerij' with an additional EC of 0.6-0.8.

	7.5L Air-Pot		45L Air-Pot		Open field (per tree)	
Crop	**Osmocote**	**Micromax**	**Osmocote**	**Micromax**	**Osmocote**	**Micromax**
Carpinus	65g	2.5g	250g	15g	250g	15g
Liquidambar	65g	2.5g	250g	15g	250g	15g
Tilia	70g	2.5g	275g	15g	275g	15g

2.3 Aims and measurements

To measure the tree growth in the different systems (Air-Pot and open field), the diameter of the stem was measured using a caliper at a height of 1m above the soil. The aim of the demo was to have an comparison of the following objects;

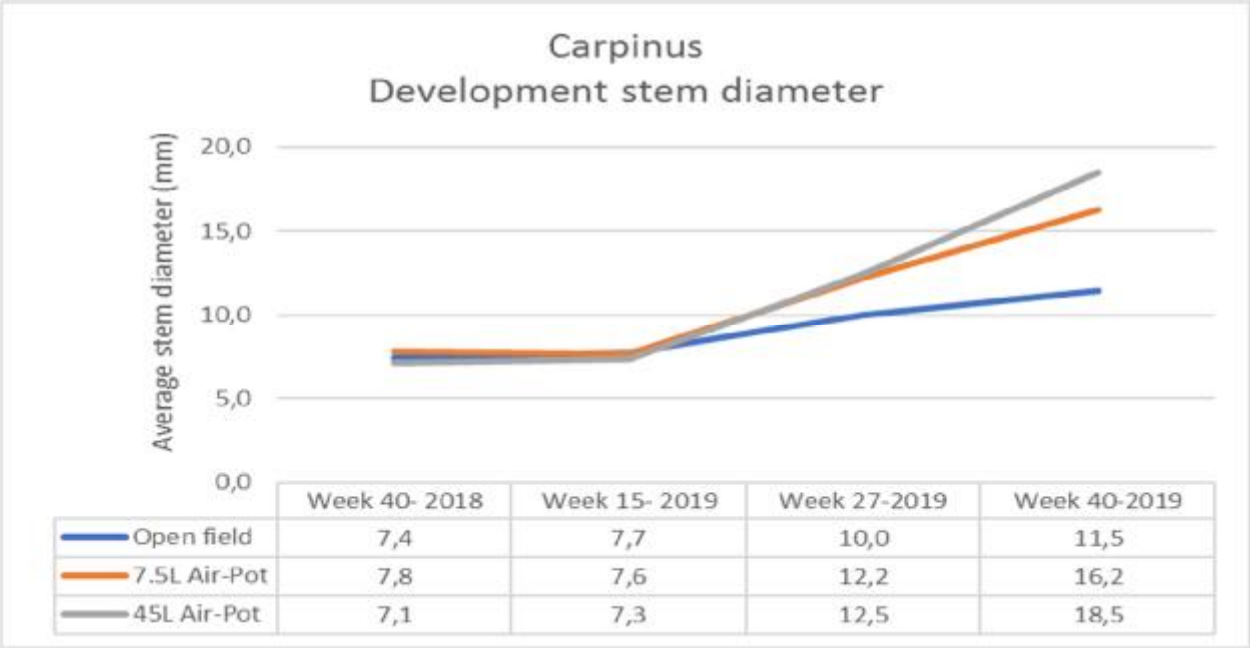
- The growth rate of the trees grown in a 7.5L Air-Pot to those in the open field
- The growth rate of the trees grown in a 45L Air-Pot to those in the open field
- The growth rate of the trees grown in a 7.5L Air-Pot to those in a 45L Air-Pot

2.3.1. Measurement timing

During the season measurements were taken in week 40-2018 and week 15, 27 and 40 in 2019. Within each plot the diameter (mm) of all 25 trees have been measured. The average diameter in each object at the different times is shown in figure 1 to 6 in chapter 3.

3. Elaboration of the assessments

3.1 Carpinus betulus ‘Lucas’



	Week 40- 2018	Week 15- 2019	Week 27-2019	Week 40-2019
Open field	7,4	7,7	10,0	11,5
7.5L Air-Pot	7,8	7,6	12,2	16,2
45L Air-Pot	7,1	7,3	12,5	18,5

Figure 1: Development stem diameter of Carpinus

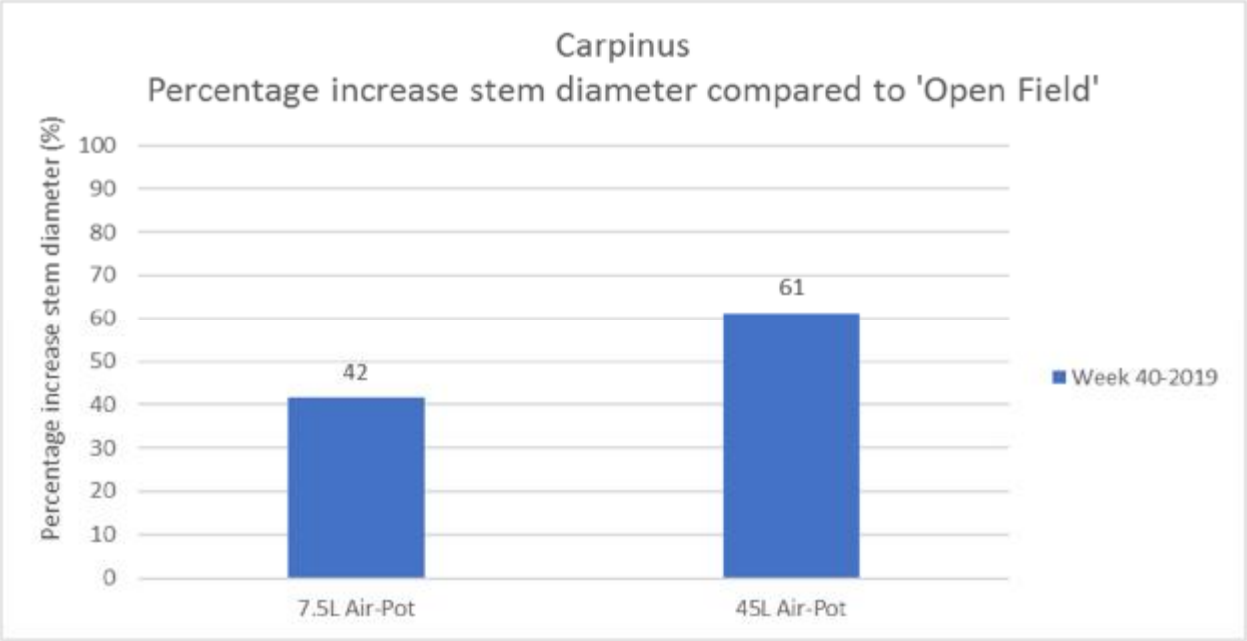
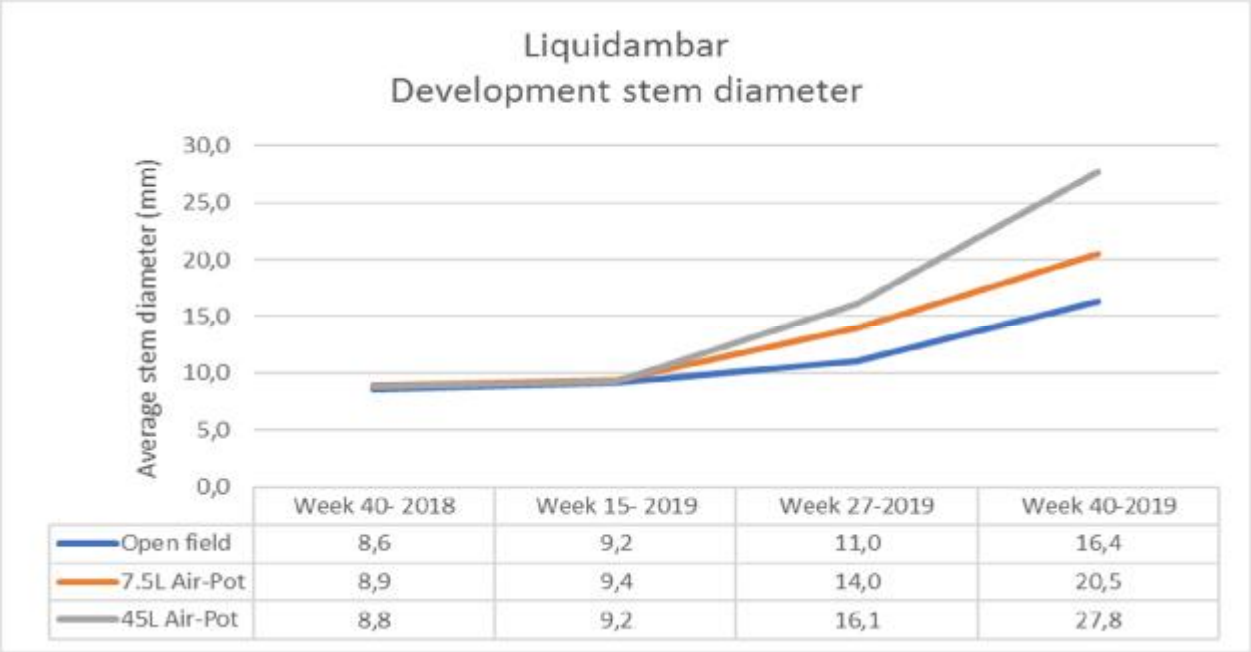


Figure 2: Increase stem diameter of Carpinus

3.2 Liquidambar styraciflua ‘Worplesdon’



	Week 40- 2018	Week 15- 2019	Week 27-2019	Week 40-2019
Open field	8,6	9,2	11,0	16,4
7.5L Air-Pot	8,9	9,4	14,0	20,5
45L Air-Pot	8,8	9,2	16,1	27,8

Figure 3: Development stem diamater of Liquidambar

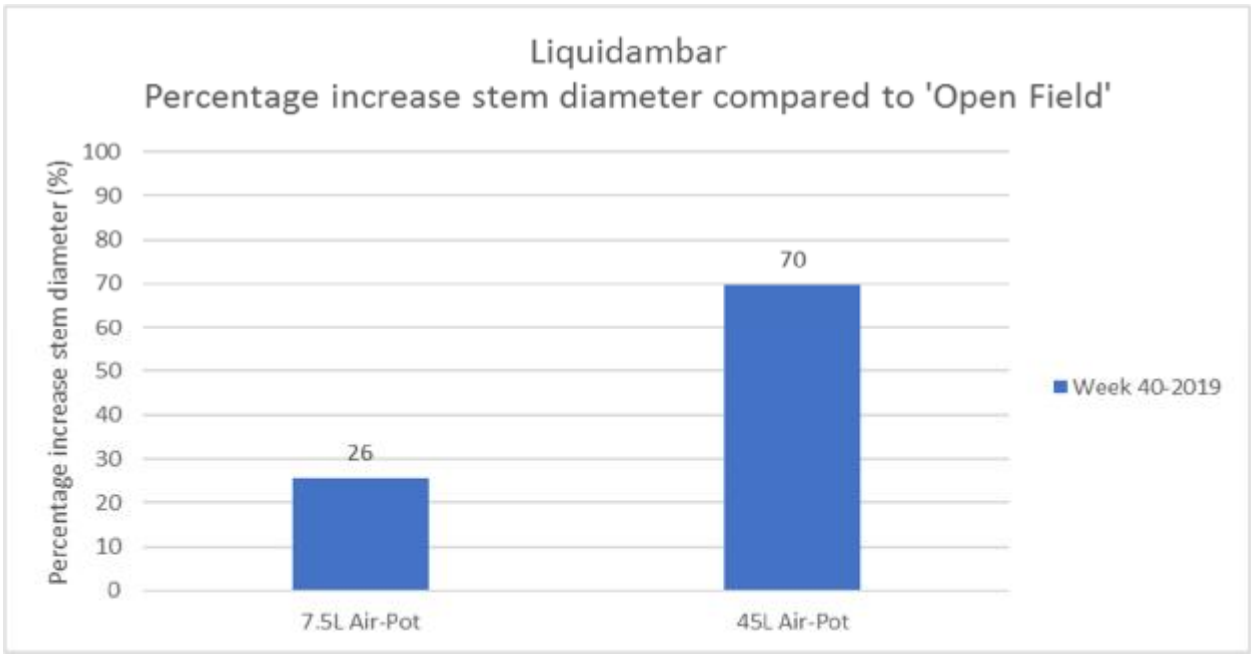
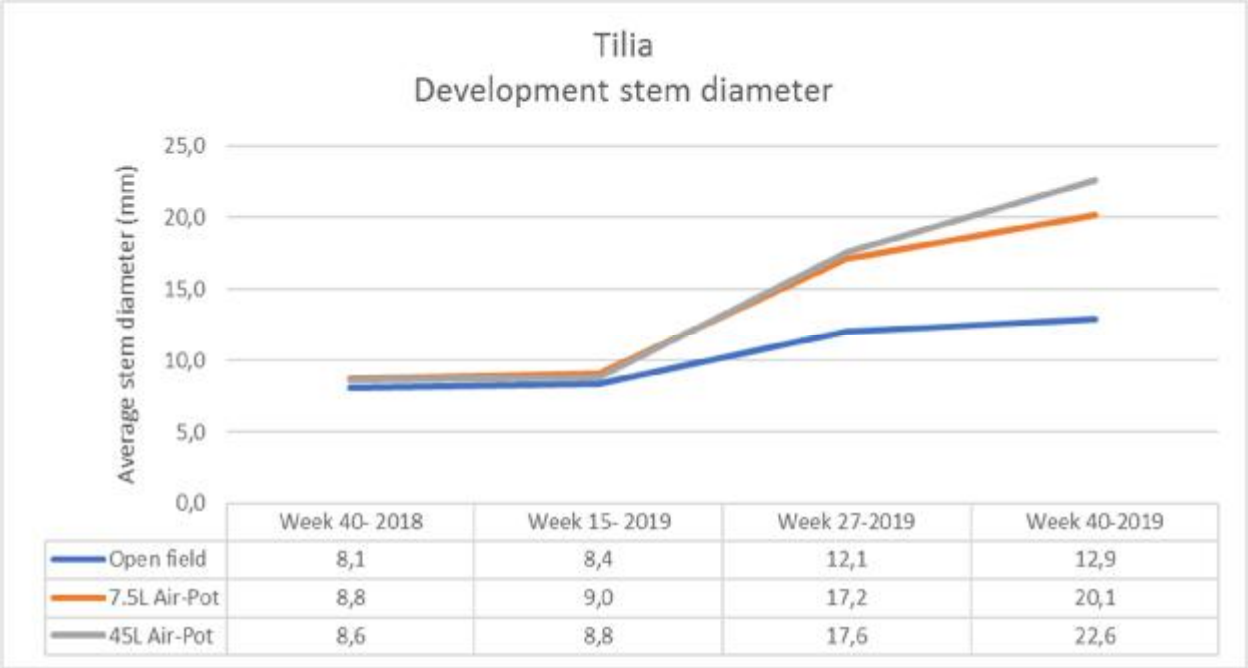


Figure 4: Increase stem diameter of Liquidambar

3.3 Tilia europaea ‘Pallida’



	Week 40- 2018	Week 15- 2019	Week 27-2019	Week 40-2019
Open field	8,1	8,4	12,1	12,9
7.5L Air-Pot	8,8	9,0	17,2	20,1
45L Air-Pot	8,6	8,8	17,6	22,6

Figure 5: Development stem diameter of Tilia

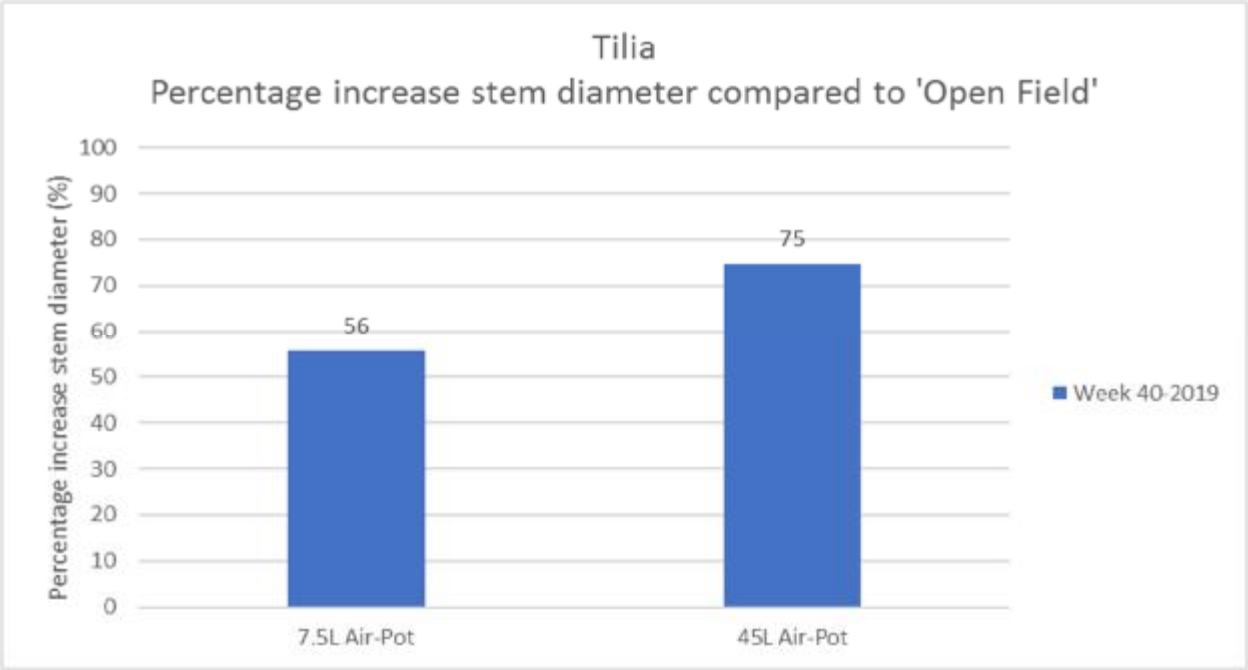


Figure 6: Increase stem diameter of Tilia

4. Findings

The differences in stem thickening originated from week 15 of 2019, after the winter period. In all three cultivars the stem diameter of the Air-Pot grown trees was increased in comparison with the trees grown in the open field. In Carpinus and Tilia the stem development of both 7.5L and 45L is almost equal until week 27 of 2019. In Liquidambar the differences in stem diameter occur already at week 15 of 2019. At the last observation in all three cultivars the thickest average stem diameter is obtained in object ‘Air-Pot 45L’.

Cultivation in a 7.5L Air-Pot has lead to an increase of the stem diameter of 26-56% compared to the cultivation in the open field.
Cultivation in a 45L Air-Pot has even led to an increase of the stem diameter of 61-75% compared to the cultivation in the open field.

A number of advantages of cultivation in an Air-Pot have emerged from the demonstration trial:

- Increase of the stem diameter
- Increase of the crop growth, trees cultivated in the Air-Pot have a fuller crown
- Possibility of fertigation, more efficient control of fertilization and irrigation
- More compact root growth
- More flexibility of the trees during the growing season

Appendix 1; Pictures

Figure 7: Liquidambar after one year, grown in the open field

Figure 8: Liquidambar after one year, grown in a 45L Air-Pot container.

Figure 9: Compact root development in Air-Pot container