

**SYSTEMS FOR URBAN GARDENERS TO GROW**  
*Phaseolus coccineus*  
**OUTDOOR TRIAL AT WALTHAM ST LAWRENCE,**  
**BERKSHIRE**  
**1/05/2019 – 19/10/2019**

**ABSTRACT**

Climbing runner beans (“Benchmark”) and dwarf runner beans (“Hestia”) were grown in seven sets of six plants, each using a different growing system.

The climbing plants were folded to curb apical dominance.

Yields were compared with:

- a. Norms per plant of 440g for dwarf and 1000g for climbers grown traditionally.
- b. The yield required by a small household (2,240g over a 28-day period).
- c. Prior year data.

Findings were:

1. Yields from the climbing beans showed improvement over 2018 yields, probably due to the greater distance between plants. This (space per plant) will be further increased in 2020.
2. Yields from the dwarf beans were exceptionally high (1,055.7g average per plant) – it may be concluded they are well suited to growing in pots.
3. The yield in weight from climbing beans grown in Vigoroot® pots was 40.9% higher than the yield when grown on pots of plastic material (cultivated the same way in all other respects).
4. The two most productive climbing bean sets used Wickes multipurpose compost 50/50 by volume with a proprietary liquid feed and using Vigoroot® pots (yields 834.3g and 779.5g per plant).
5. For these two sets the only variable was the choice of liquid feed. The difference in yield (7%) was not significant.
6. The third most productive (765.3g) used coir block (Growlite®) instead of peat/John Innes 3. The health of the plants in the first weeks was extremely poor but recovered when feeding began.
7. Against criterion (b) above the dwarf runners fared less well than their climbing cousins despite producing higher total yield (See 2. Above). Their crop *peaked* at a lower level but *lasted longer* to give a higher total crop yield).

The conclusions included proposals for the next trial with a request for suggestions on other cultivars to try.

Anthony Boyd,  
March 2020

Stephen Morton

# *SYSTEMS FOR URBAN GARDENERS TO GROW* *Phaseolus coccineus*

## **Outdoor Trial at Waltham St Lawrence, Berkshire**

1 May 2019–19 October 2019

Anthony Boyd

Stephen Morton

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## 1. PREAMBLE

1.1. The trial follows on from previous work (Trials 2017, 2018) comparing growing systems, and continuing to work with the most promising.

To recap :

The aim is to arrive at an integrated growing system :

- (a) Providing a crop sufficient for 2–3 person household and
- (b) Small enough to fit in a small space – for instance, a balcony, and
- (c) Contained within a frame keeping the area tidy.

Specifically:

- (a) Crop – Desired amount of beans in weight

*Which? Gardening* cites a total yield figure of 6–8 Kg as plenty for a 2–3 person household. (See *References 1*). Given the need to save space in this exercise we look for a result, which though not “plenty”, nevertheless meets the needs of the grower as defined below.

Runner beans are commonly sold in 280g bags. A two- to three-person household eating beans on a regular basis will purchase two bags per week (560g).

It seems reasonable to assume the household will wish to use at that rate for four weeks consecutively, before switching – wholly or in part – to another vegetable.

The desired yield for that period will then be 2,240g ( $4 \times 560\text{g}$ ).

Thus, in this context, a growing system deemed to be satisfactory will have at least one consecutive 28-day period during the harvest yielding not less than 2,240g of beans.

- (b) Space required

The above result needs to be achieved with the smallest possible number of plants.

The width of a set of plants (pots within a frame) is the most critical and should not exceed 30cm. The height should be well below the height of the ceiling of a balcony – Ideally low enough for the grower to be able to pick while seated.

With that in mind, we have hitherto grown climbing runner beans folded to horizontal. There is also some evidence suggesting that yields from runner beans thus grown may be expected to exceed the yields from those grown to climb in the traditional way. (See *References 2*).

In the present trial we have grown plants further apart to determine the extent to which this may improve crop.

- 1.2. We have added a set of dwarf runner beans (six plants) grown normally. These were

not included previously – yields being generally believed to be much less than from climbers (440g per plant versus 1,000g for climbers. See *References* 3 and 4).

There were 42 plants in the trial.

## 2. MATERIALS AND METHODS

(a) Scheme of Trial – See Schedule Attachment (1).

(b) Layout of Scheme – See Attachment (2)

Two plants per frame, three frames per set.

Yields recorded per frame (pair of plants) to avoid possible misreporting of individual plant yields resulting from proximity.

See Sketch of Frame Attachment (3) and photo number (8).

(c) Cultivation – See Attachment (4) and Trial Journal Attachment (5).

## 3. YIELDS – TOTAL CROP

3.1. Summary below. (More detail in Attachment (1b) Table of Yields)

Set No. /Cultivar	System	Yield (g) per plant	Ranked
1. <b>Benchmaster</b>	Vigoroot – Incredicompost-Incredicrop – Tomorite <sup>+</sup>	<b>581.8</b>	(5)
2. "	Vigoroot – Wickes/Ji3 – Tomorite <sup>+</sup>	<b>834.3</b>	(2)
3. "	Vigoroot – Incredicompost – Incredicrop	<b>499.2</b>	(7)
4. "	Plastic pot – Wickes/Ji3 – Maxicrop <sup>++</sup>	<b>553.3</b>	(6)
5. "	Vigoroot – Wickes/Ji3 – Maxicrop <sup>++</sup>	<b>779.5</b>	(3)
6. "	Vigoroot – Growlite (coir) – Tomorite <sup>+</sup>	<b>765.3</b>	(4)
7. <b>Hestia</b>	Vigoroot – Incredicompost – Incredicrop – Tomorite <sup>+</sup>	<b>1,055.7</b>	(1)

Wickes multipurpose compost and Incredicompost were chosen originally from *Which? Gardening* “best buys”.

3.2 The yield from Set 7 (See Photos (1) and (2)) was more than double the yield normally expected from *dwarf runner beans* (See 1.2. above). Taking out the yields from frames 39 and 40 (depredation by caterpillars – See Attachment (4) Cultivation) – the average per plant best 4 out of 6 was a high 1,165.5g. It has been reported that “dwarf cultivars, while decorative, were better suited to pots” (see *References* 4).

3.3. For the *climbing runners* – the two best performing systems were the same as in 2018 – using Wickes multipurpose compost with John Innes 3 in Vigoroot pots and a branded tomato feed.

Yields were somewhat below the 1,000g expected from climbers (See 1.2. above).

<sup>+</sup> Concentrated  
<sup>++</sup> Original

3.4. However, comparing the growing systems used in 2018 with the same systems used in 2019 (but plants grown wider apart – See Cultivation – Attachment (4)) showed an improvement year on year as demonstrated in the table below:

		<b>Yields per plant 2018 and 2019 (g)</b>			
<b>System</b>		<b>2018</b>	<b>2019</b>	<b>Difference</b>	<b>%</b>
Vigoroort	Wickes – Maxicrop <sup>++</sup>	502.5	<b>779.5</b>	277.0	55.1
Vigoroort	Wickes – Tomorite <sup>+</sup>	695.2	<b>834.3</b>	139.1	20.0
Vigoroort	Icredicompost – Incredicrop	404.5	<b>499.2</b>	94.7	23.4
Plastic pot	Wickes – Maxicrop <sup>++</sup>	434.7	<b>553.3</b>	118.6	27.3

3.5. Figures comparing the results from growing system elements of the same character in present trial are given below:

<b>Sets 4 and 5</b>	<b>Plastic pot</b>	<b>Vigoroort pot</b>	<b>Difference</b>	<b>(%)</b>
	3,320	4,677	1,357	40.9
<b>Sets 6 and 2</b>	<b>Coir</b>	<b>Wickes/Ji3</b>		
	4592	5,006	414	9.0
<b>Sets 5 and 2</b>	<b>Maxicrop<sup>++</sup></b>	<b>Tomorite<sup>+</sup></b>		
	4,677	5,006	328	7.0
<b>Sets 3 and 1</b>	<b>Incredicrop</b>	<b>Tomorite<sup>+</sup></b>		
	2,995	3,487	492	16.4

The differences in yield are small except for those between the yields using Vigoroort pots and using plastic pots. The 40.9% in favour of Vigoroort pots may be thought significant and is supported by data from our earlier trials.

#### **4. YIELDS – 28 DAY**

4.1. The yields over 28 days were calculated as moving 28-day totals for each growing system (Example calculation Attachment (6)). Attachment (7) shows the number per set achieving the desired crop of 2,240g (See 1.1. (a)), and occurrence.

4.2. In the “Benchmark” group, Set (2) was the most successful. This happened to be the set with the highest total yield (See 3.3.1.). However, although the “Hestia” Set produced the highest yield in the trial, this set ranked second in terms of 28-day crop yields. As can be seen in the graph (Attachment (8)), the Dwarf bean values peaked at the same stage as Benchmaster Sets (2) and (6) but at a lower level. Their higher total yield came about through a much longer harvest. See Graph and Photos (1) and (2)).

+ Concentrated  
<sup>++</sup> Original

- 4.3. 28-day crop figures of 2,240g or above for *four* plants (best two pairs) occurred only in Set (2).

## 5. CONCLUSIONS AND DISCUSSION

### 5.1. Total Yields

- a. Grown further apart yields improved for the “Benchmaster” group. We can replace the present frame with a different design growing the plants singly and separately. We can also change the sharp right angle fold to a curve (See Attachment 3).
- b. The Set (2) growing system has proved its worth in this and earlier trials and will use again in 2020 for climbing plants. We see very little difference in yield when using Tomorite<sup>+</sup> or Maxicrop<sup>++</sup> and will continue with Tomorite<sup>+</sup>. As previously, the advantage using Vigoroot pots versus plastic is shown to be significant.
- c. The yields from the dwarf runners were surprisingly high. It may be that the yield commonly quoted is for plants grown in soil. Perhaps they thrive particularly well in compost in pots We will continue to grow in frames to prevent the pods from becoming “dusty and muddy from being so close to the ground” (See *References* 4, p. 6). We will change growing system to Benchmaster Set 2.
- d. The result from Set (6) was surprising given the poor health of the plants before using the liquid feed (See Journal (Attachment (5)\* and Photo (4)). We will repeat the experiment. We would like also to compare with another peat-free proprietary matrix.

\* June 20, 22, 25 and July 6.

### 5.2. 28-Day Crops

- a. Proposals in 5.1. (choice of growing systems and cultivars) apply.
- b. However, it seems evident that a change of cultivars may be needed to satisfy the criteria in Section One. We need to identify cultivars which are good croppers peaking early in a harvest of relatively short duration.

*Advice on this will be greatly appreciated.*

Anthony Boyd  
March 2020.

Stephen Thorpe

+ Concentrated  
++ Original

# Attachments

## Attachment (1) Scheme Handypick Trial 2019

Dec-18      **Doff out Tomorite<sup>+</sup> in 9-Feb 2018**      **Runner Bean "Benchmaster"**      **REV 25 January – With Coir**

SET	PLANT	Plant Number	FRAME	Container Type	FILL (litres)	SUBSTRATE	FEED
1	1	N/a	1	Vigoroot	10	Incredicompost*	Tomorite <sup>+</sup>
	2	"	1	"	10	"	"
	3	"	2	"	10	"	"
	4	"	2	"	10	"	"
	5	"	3	"	10	"	"
	6	"	3	"	10	"	"
2	7	51	4	Vigoroot	10	Wickes/Ji3	Tomorite <sup>+</sup>
	8	"	4	"	10	"	"
	9	"	5	"	10	"	"
	10	"	5	"	10	"	"
	11	"	6	"	10	"	"
	12	"	6	"	10	"	"
3	13	70	7	Vigoroot	10	Incredicompost*	None
	14	"	7	"	10	"	"
	15	"	8	"	10	"	"
	16	"	8	"	10	"	"
	17	"	9	"	10	"	"
	18	"	9	"	10	"	"
4	19	9	10	Pot <sup>+</sup>	10	Wickes/Ji3	Maxicrop
	20	"	10	"	10	"	"
	21	"	11	"	10	"	"
	22	"	11	"	10	"	"
	23	"	12	"	10	"	"
	24	"	12	"	10	"	"
5	25	50	13	Vigoroot	10	Wickes/Ji3	Maxicrop
	26	"	13	"	10	"	"
	27	"	14	"	10	"	"
	28	"	14	"	10	"	"
	29	"	15	"	10	"	"
	30	"	15	"	10	"	"
6	31	N/a	1	Vigoroot	10	Coir	Tomorite <sup>+</sup>
	32	"	1	"	10	"	"
	33	"	2	"	10	"	"
	34	"	2	"	10	"	"
	35	"	3	"	10	"	"
	36	"	3	"	10	"	"

### Dwarf Runner bean "Hestia"

7	37	N/a	16	Vigoroot	10	Incredicompost*	Tomorite <sup>+</sup>
	38	"	16	"	10	"	"
	39	"	17	"	10	"	"
	40	"	17	"	10"	"	"
	41	"	18	"	10"	"	"
	42	"	18	"	10"	"	"

\* With Incredicrop  
Doff is a liquid feed like Tomorite

+Plastic but coloured (not black)

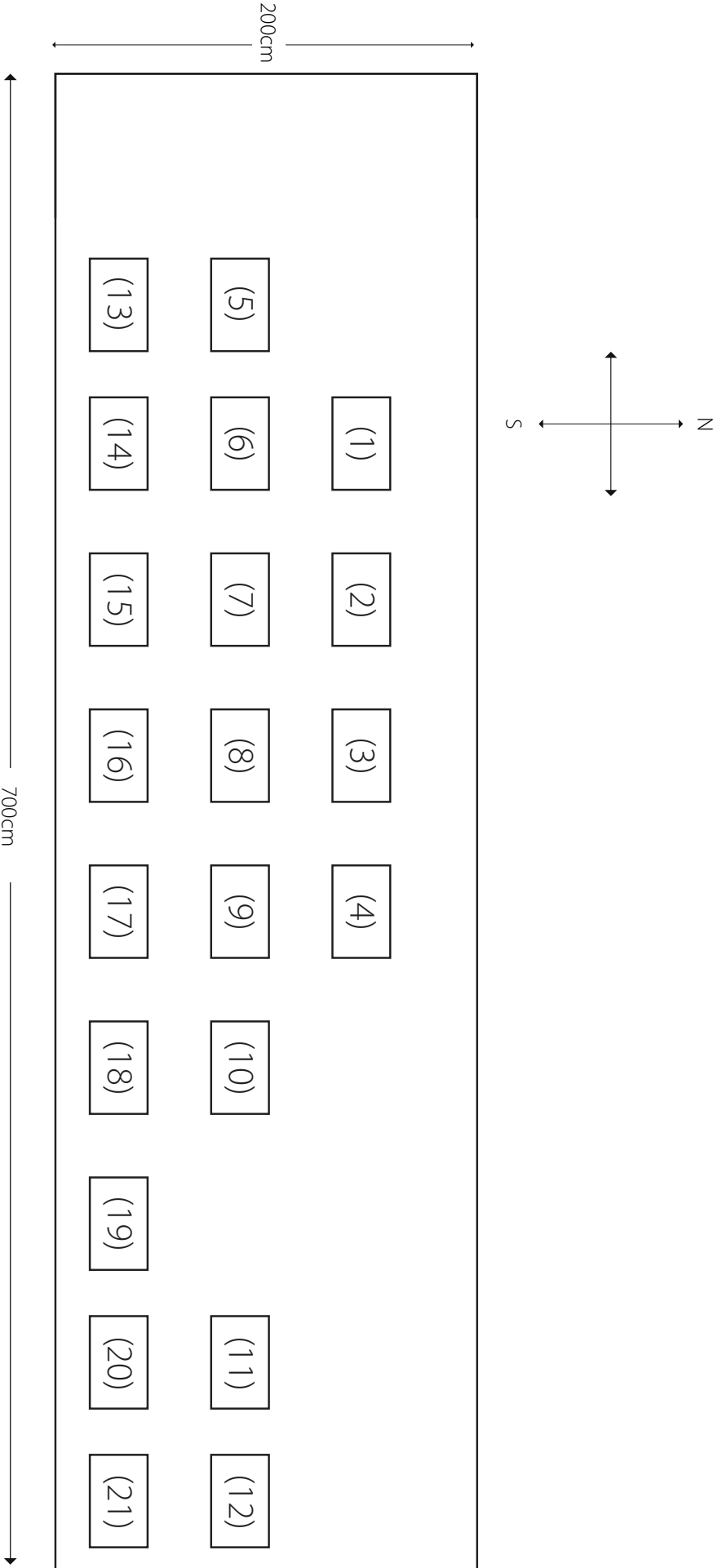
# Attachment (1b) Table of Yields

## Yields Table 1 Benchmark Sets 1–6 Hestia Set 7

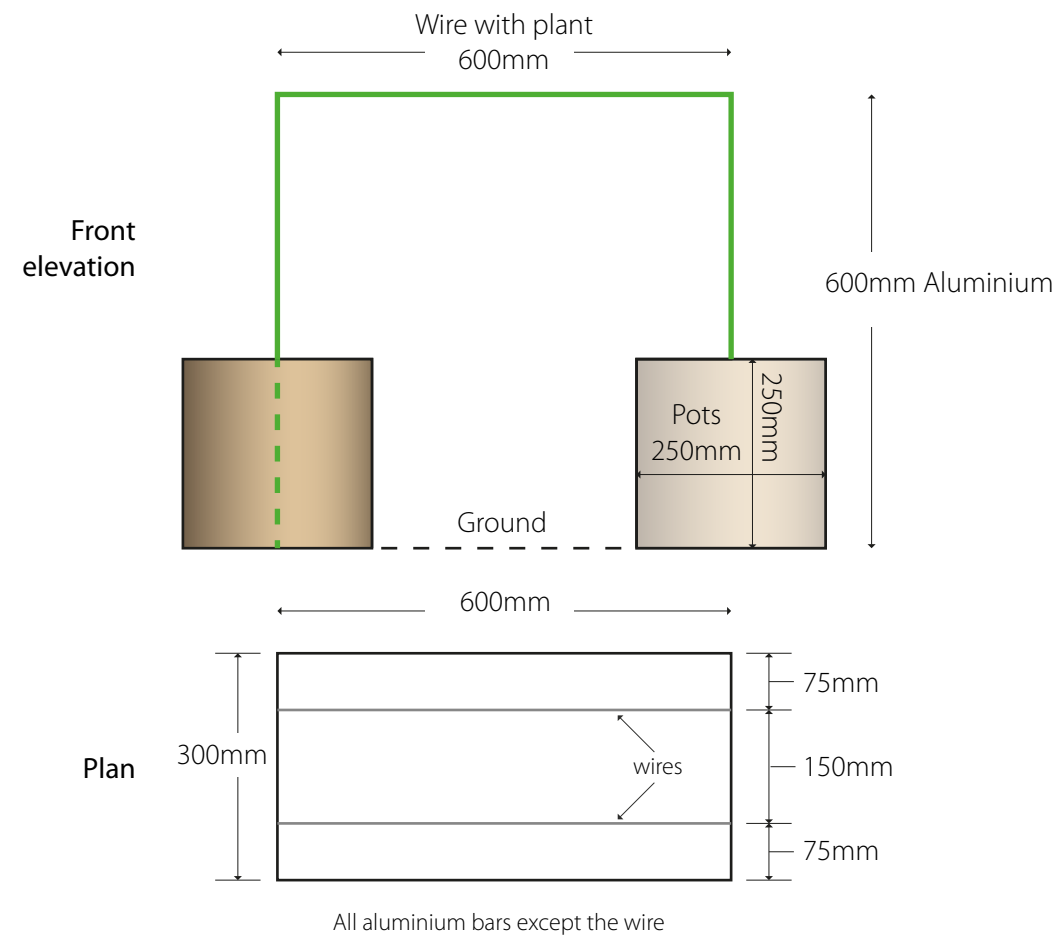
Set Number	Plant Numbers	Grams	Ranking	Pods	Pot	Substrate	Fertiliser	Grams per pod	Grams per plant
<b>One</b>	1+2	1155		77				15.0	577.5
	3+4	1259		81				15.5	629.5
	5+6	1077		70				15.3	536.5
	<b>TOTAL</b>	<b>3491</b>	<b>4</b>	<b>228</b>	<b>Vigoroot</b>	<b>Incredicompost</b>	<b>Incredicrop</b>	<b>15.3</b>	<b>581.2</b>
							<b>Tomorite+</b>		
<b>Two</b>	7+8	1344		86				15.6	672.0
	9+10	1745		99				17.6	872.5
	11+12	1917		142				13,5	958.5
	<b>TOTAL</b>	<b>5006</b>	<b>1</b>	<b>327</b>	<b>Vigoroot</b>	<b>Wickes Ji3</b>	<b>Tomorite+</b>	<b>15.3</b>	<b>834.3</b>
<b>Three</b>	13+14	846		62				13.6	423.0
	15+16	1057		53				19.9	528.5
	17+18	1092		55				19.8	546.0
	<b>TOTAL</b>	<b>2995</b>	<b>6</b>	<b>170</b>	<b>Vigoroot</b>	<b>Incredicompost</b>	<b>Incredicrop</b>	<b>17.6</b>	<b>499.2</b>
<b>Four</b>	19+20	963		62				15.5	481.5
	21+22	1270		64				19.8	635.0
	23+24	1087		96				11.3	543.5
	<b>TOTAL</b>	<b>3320</b>	<b>5</b>	<b>222</b>	<b>Plastic</b>	<b>Wickes Ji3</b>	<b>Maxicrop</b>	<b>14.9</b>	<b>553.3</b>
<b>Five</b>	25+26	1778		111				16.0	889.0
	27+28	1469		79				18.6	734.5
	29+30	1430		82				17.4	715.0
	<b>TOTAL</b>	<b>4677</b>	<b>2</b>	<b>272</b>	<b>Vigoroot</b>	<b>Wickes Ji3</b>	<b>Maxicrop</b>	<b>17.2</b>	<b>779.5</b>
<b>Six</b>	31+32	1619		128				12.7	809.5
	33+34	1601		106				15.1	800.5
	35+36	1372		92				14.9	686.0
	<b>TOTAL</b>	<b>4592</b>	<b>3</b>	<b>326</b>	<b>Vigoroot</b>	<b>Coir</b>	<b>Tomorite**</b>	<b>14.1</b>	<b>765.3</b>
<b>Seven</b>	37+38	2095		329				6.4	1047.5
	39+40	1672		223				7.5	836.0
	41+42	2567		282				9.1	1283.5
	<b>TOTAL</b>	<b>6334</b>		<b>834</b>				<b>7.6</b>	<b>1055.7</b>



# Attachment (2) Layout of sets



# Attachment (3) Sketch of Frame



# Attachment (4) Cultivation

- 1 Propagation** Seeds supplied by Thompson and Morgan.  
Batch Numbers: Benchmaster 241822  
Hestia 195024  
Sown 01/05/2019 into Sinclair seed compost in trays.
- 2. Planting** From 3" pots into 24 or 25cm (See Attachment ?) pots filled to 10 litres substrate. No topping up thereafter.  
The coir blocks were soaked in 27 litres water to make 60 litres substrate.  
Two plants per discrete frame only – space between support wires 15.0cm (2018 5.0cm)  
See Sketch of frame Attachment (3).  
10-litre pots as before.
- 3 Feeding** The feeding with liquid feed began two weeks after planting (as in 2019).  
Last feeding 12 weeks after planting.  
One gallon of diluted feed (20ml Tomorite<sup>+</sup> 15ml Maxicrop<sup>++</sup>) per two plants.  
every seventh day.  
The granular fertiliser (Incredicrop<sup>®</sup>) was mixed into the substrate (Incredicompost<sup>®</sup>) (Incredicompost<sup>®</sup>) at 3g per litre.  
Similarly the John Innes 3: 50% compost, 50% John Innes 3 by volume.
- 4 Other treatment** After some minor slug damage (Photo (5)), pellets Eraza (organic) were used. Foliage recovered.  
Two plants (Hestia 39 and 40) suffered damage by caterpillars. Treated with acetamiprid.  
Foliage largely recovered. Some residual damage.(Photo (3)).
- 5 Trimming** See Attachment 5 – Journal July 20.
- 6 Watering** Plants were checked daily and watered as needed, each plant receiving approximately the same quantity of water. Plants receiving liquid feed had more than the usual amount of water when fed (see 3.above).
- 7 Harvesting** Daily or every other day as needed.  
Lengths of pods: Benchmaster as close to 20cm as possible (not less than 20cm being chefs' preferred length).  
Hestia as close to 10cm (not less than 10cm) as possible.  
(apart from the few pods containing a single bean)

*For further information, see Journal. Attachment (5)*

<sup>+</sup> Concentrated  
<sup>++</sup> Original

# Attachment (5) Handypick Trial 2019 – JOURNAL

<u>Date</u>	Seeds sown 1/05/2019
<b>June</b>	
12	6 Plants from 12cm pots into coir into 10 litre Vigoroot. Used 27 litres water to make 62 litres coir substrate. Used 60 litres. (Seeds were sown May 1st). Slug pellets ("Eraza" round base of pots). Cloudy – occasional very light rain. No pots in trial will be topped up. Potting compost left on roots. (800ml). Compost used for seed and for 12cm pots Sinclair All Purpose Growing Compost (all plants).
14	Incredicompost pots all filled. 3g Incredicrop with every measured 2 litres Incredicompost. 60 litre batches. ( Wickes/John Innes 3 also 60). Slug pellets added round base of pots. One plant replaced (necrosis patches on leaves).
15	Two plants replaced (one necrosis, one potentially "poor doer". Coloured tapes on frames according to feed to be used. Horizontal wires onto frames. Frames were made for plants 37–42 but not needed. (dwarf beans) – will not be used. No slug/snail damage. Weather warmer. Showers. 55cm height for uprights would enable plants to reach top of frame sooner.
16	Tying up begun.
18	Stem snapped No 22. Replaced.
19	"33"
	Slight necrosis leaves NO 12.
20	No 32 necrosis widely spread. Leaves on 31, 32, 35,36 (coir substrate) yellowed.
22	More yellowing of leaves plants in Coir. (photo) Very little slug/snail damage – perhaps two plants. Except 32 quite extensive damage to leaves. (photo) No 5 relatively slow grower. Not reached top – most have. Switched from using hose spray attachment.
25	All runners now growing along the longitudinal supports except 11, 12, 31. 34 and 36 have barely reached top of verticals. Haxnicks advise lack of nitrogen likely reason for yellowing of plants in coir.
26	Four out of six Dwarf runners have blooms in bud. Plants 5 and 6 have grown double stems.
29	Hestia all in bloom (see photo). Some of runners also eg 21, 28. Several runners have double and triple stems eg 7, 5, 6, 20. Some have reached lower horizontal eg 18, 2, 8 11 is slow grower. No more growth on 31.
30	First liquid feeding. 31 bad slug/snail damage on one leaf. Put down pellets (organic).
<b>July</b>	
1	34 end withered and broken. 31 just reached top. 19 adjacent to 32 (coir). Some yellowing, some slug damage
3	Dead yellow leaves removed from 32 (2), 33 (2), 34 (2), 35 (2). Dead green leaf from 39. 28 and 15 each have a leaf part yellow. Very warm. Watering morning and evening (morning light, evening heavier. Most plant stems have reached end of top horizontal. More in bloom. For future design – cut stems at end of horizontal?
4	No. 1 reached ground – cut. No.2 close.
5	3, 5, 6 reached ground. 26 leaf part yellow. 3 some slug/snail damage. Two dead leaves taken from 41.
6	Plants in Coir – leaves back to green. Paler green than leaves on plants in other substrates. Watering twice daily – heavy PM light AM.
7	Second feeding. Cool. Occasional light rain.

## Attachment (5) (Contd.) Handypick Trial 2019 – JOURNAL

- 8 Any yellow or dead leaves removed.  
Best blooms (runners) 1 and 2 and 17 and 18.
- 11 Coir absorbs water faster than the peat composts.
- 12 Secondary stems (One each plant) 17 and 18 broken.  
Continues very warm – watering twice daily.  
First beans on all Hestias ( 37–42).
- 13 First runners (No 14),  
Plants in Coir – leaves back to normal green.
- 14 Fed
- 19 First bean picked (Runner and Dwarf runner).  
Persistent rain and cooler after prolonged period of hot weather.
- 20 No further tying down. Instead trimming new vertical stems and shoots to 20cm above frame (as in 2016).
- 21 Fed.
- 25 Extremely warm – forecast 39°C. Watering three times daily. Morning and afternoon light, evening heavy.
- 28 Fed. Frames are colour coded to ensure correct feed given.
- 30 Rain. Cooler. Started to pick misshapen pods unlikely to grow further although below specified length.
- 31 No beans so far from 11, 29, 31. Partner plants in sets moderate yields only – so probably not error in identifying plants.
- August**
- 3 On average picking 600–700g daily
- 4 Fed
- 5 Still dry, warm. Occasional slight rain.  
Low crop today – around 400g only.
- 10 Very low crops last few days but plenty of flower still.
- 11 Fed
- 18 “
- 25 “
- 26 Very warm. Watering morning and evening (morning light).  
High yields – about 800g daily.
- 28 Some damage to leaves plants 39 and 40. (photo).  
(caterpillars)
- 29 Sprayed 39 and 40 (Acetamidrid).  
Very few blooms left – except plenty still on Hestias.  
Yields still high.  
Less bee activity (previously very active).
- September**
- 8 Much colder. Sunshine most days. Crops much reduced.  
Hestia at same level – no reduction.  
Picking from now at two day intervals.  
Fed.  
Hestias all have flowers. Benchmaster maybe two to three plants.  
Some bee activity still.
- 13 New flowers on 25/26 (photos)
- 15 Fed
- 22 Fed. Foliage 39/40 recovered. Mostly back to normal.  
Bees active. Warm, humid.  
Still picking – small number each day.
- 29 Fed. Flowers still on pairs : 9–10, 39–40, 37–38, 33–34, 7–8.  
Foliage very abundant on all Benchmark.
- October**
- 2 Cut away foliage nine sets. Hestia left.
- 3 Slight overnight frost.
- 8 Most frames taken down.
- 9 Watered remaining plants.
- 22 All frames down

# Attachment (6) Example of Calculation

## Set (2) Plants Wickes Tomorite+ Vigoroot Best four plants

### Benchmark Previous 28 day 2019 Plants 9-12

Date	Day	9	10	11	12	TOTAL	CUM
Jul-26	1	49	40	0	0	89	
27	2	0	0	0	0	0	
	3	0	0	0	8	8	
29	4	0	0	0	0	0	
30	5	30	0	0	54	84	
31	6	0	0	0	26	26	
Aug-01	7	0	0	0	14	14	
2	8	0	0	11	13	24	
3	9	7	33	0	17	57	
4	10	39	47	38	23	147	
5	11	0	0	0	11	11	
6	12	117	24	30	31	202	
7	13	0	0	9	14	23	
8	14	99	0	0	0	99	
9	15	0	0	0	0	0	
10	16	0	0	0	6	6	
11	17	37	0	0	16	53	
12	18	14	9	0	9	32	
13	19	0	0	26	52	78	
14	20	0	0	0	0	0	
15	21	63	0	0	39	102	
16	22	0	0	0	0	0	
17	23	0	0	0	10	10	
18	24	20	0	0	22	42	
19	25	0	0	0	0	0	
20	26	39	52	0	80	171	
21	27	0	0	54	67	121	
22	28	0	0	0	0	0	
23	29	0	0	0	0	0	
24	30	34	15	56	20	125	
25	31	0	0	0	0	0	
26	32	0	0	69	65	134	
27	33	60	142	55	15	272	
28	34	23	0	26	70	119	
		631	362	374	682	2049	28 2049
29	35	148	0	118	14	280	280
							<b>26-Jul 89</b>
							2240
30	36	100	18	0	0	118	118
							<b>27-Jul 0</b>
							2358
31	37	0	0	0	0	0	0
							<b>28-Jul 8</b>
							2350
1-Sep	38	150	0	0	0	150	150
							<b>29-Jul 0</b>
							28 2500
	39	0	0	37	27	64	64
							<b>30-Jul 84</b>
							28 2480
3	40	0	8	161	13	182	182
							<b>31-Jul 26</b>
							28 2636
4	41	0	0	0	0	0	0
							<b>1-Aug 14</b>
							28 2622
5	42	10	17	17	0	44	44
							<b>2-Aug 24</b>
							28 2642
6	43	0	0	16	139	155	155
							<b>3-Aug 57</b>
							28 2740

## Attachment (7) Previous 28-Days Summary

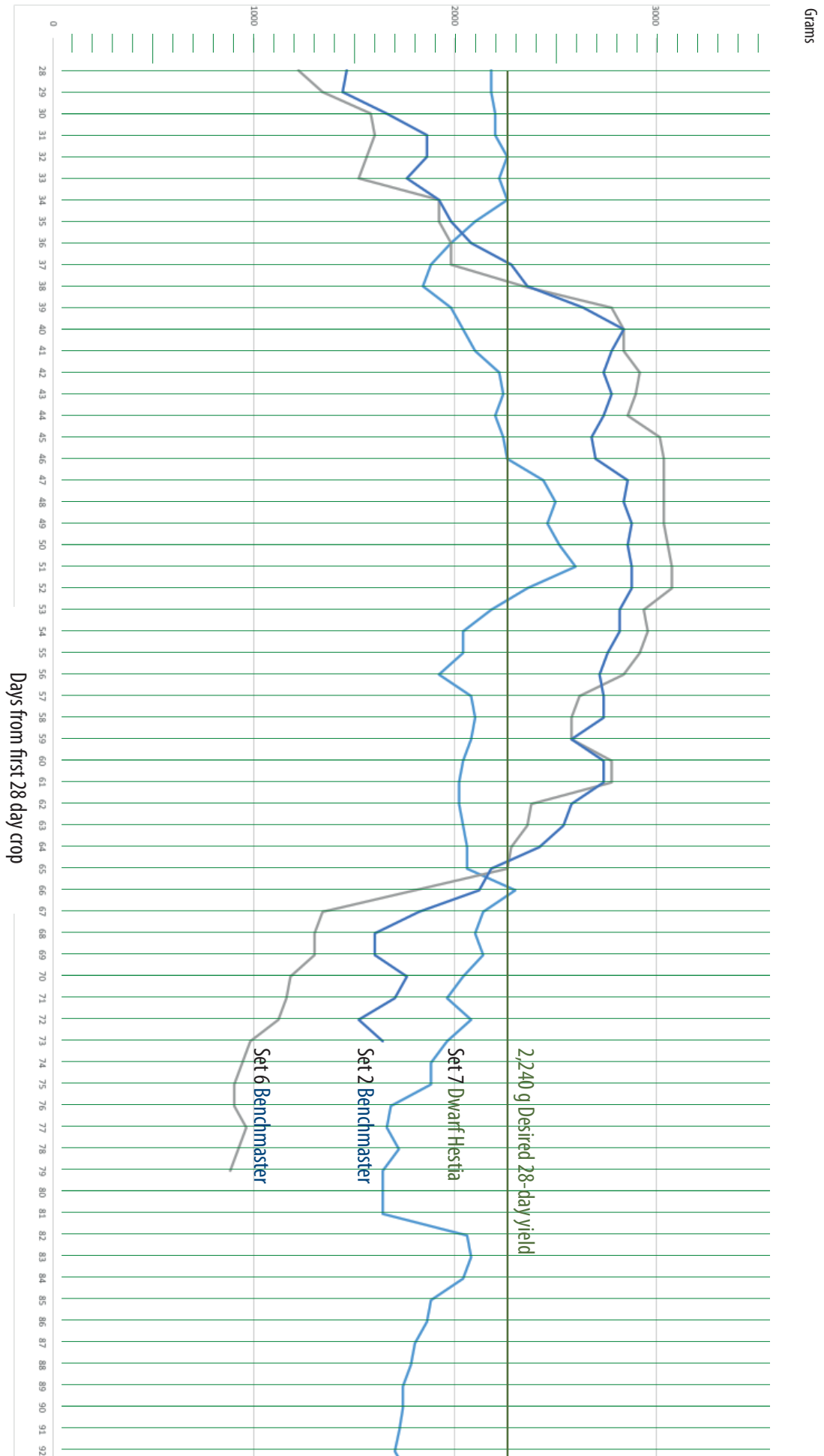
Incidence of yields 2,240g and over in moving 28-day totals

SET	VARIETY	GROWING SYSTEM	ALL SIX PLANTS	HIGHEST	BEST TWO PAIRS	HIGHEST
1	Benchmark	<b>Vigoroot Incredicompost/Crop Tomorite<sup>+</sup></b>	0	2,165	0	1,611
2	"	<b>Vigoroot Wickes/Ji3 Tomorite<sup>+</sup></b>	29	2,888	2	2,258
3	"	<b>Vigoroot Incredicompost/crop</b>	0	1,922	0	1366
4	"	<b>Plastic pot Wickes/Ji3 Maxicrop<sup>++</sup></b>	0	2,026	0	1307
5	"	<b>Vigoroot Wickes/Ji3 Maxicrop<sup>++</sup></b>	4	2,503	0	1,555
6	"	<b>Vigoroot Coir block Tomorite<sup>+</sup></b>	20	3,074	0	2,178
7	Hestia (Dwarf)	<b>Vigoroot Incredicompost/crop Tomorite<sup>+</sup></b>	11	2,602	0	1,984

<sup>+</sup> Concentrated

<sup>++</sup> Original

# Attachment (8) Graph – Occurrence of Desired 28-Day Yield





# Attachment (9) Photographs



1 "Hestia" first beans 13 June



2 "Hestia" still in bloom 15/09/2019



3 "Hestia" caterpillar damage Plants 39 and 40



4 Plants poor in Coir Matrix

Attachment (9) (Contd.) Photographs



5 Plants in coir – health improved after liquid feed



5 "Benchmaster" slug damage



7 Coir block about to be used.



8 Proximity of plants

# Attachment (10) References

- 1) Article in *Which? Gardening* and email exchange 9/03/2019
- (2) Letter from Dr D. G. Hessayon 23/02/2016  
Letter from Westland Garden Health Technical Development Manager  
9/02/2017
- (3) Email from Horticultural Advisor, RHS, 04/01/2019
- (4) RHS Bulletin Number 19, October 2007. Page 10.(Average per plant 969.19g)  
and Page 6 (dwarf runners in pots).

# Attachment (11) Acknowledgements

We acknowledge with thanks supply of material by:

**Thompson and Morgan:** Seeds and compost

**Haxnicks International Limited:** Pots and matrix

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**Royal Horticultural Society**

**Beth Otway FNVS**

**National Vegetable Society**

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