SPot Farm Scotland Results

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SPot Farm Scotland

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

SPot

- 3 year project
- Scottish Gov funded
- Focus on Potato productio
- Field scale trials
- Network

SPot Scotland 2016 Background

- Grower: Bruce Farms
- Variety: Maris Piper
- Soil type: sandy loam
- Planted: 11 May, emerged 2nd June
- Machinery:
  - Grimme Bedformer, Bedtiller, CW-150 destoner and GB-330 planter
- Standard practice: ploughed at 12”, grubbed 12-14”, bedformed at 12”, bedtilled at 12” where necessary, destoned to 12”, planted 6”

SPot Scotland 2016
Secondary cultivation regimes

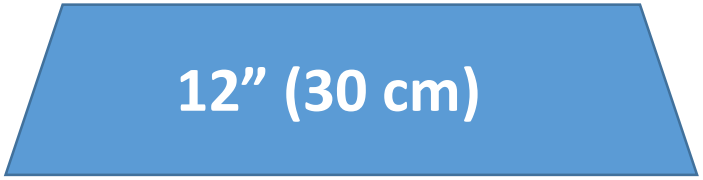
- 8 regimes. Combinations of:
  - Depth
  - Number of secondary operations
  - Machine type
- Unreplicated strips
- ‘Plots’ 6 beds x 622 m
- Costs used:
  - Diesel £0.40/l
  - Adblue £0.30/l
  - Labour £15.00/h

Cultivation treatments (10/11th May)

1. Tillerstar 12” (30 cm)
2. Bedform 12”, Bedtill 12”, Destone 12” (Commercial)
3. Bedform 12”, Bedtill 12”, Destone 11” (27.5 cm)
4. Bedform 12”, Bedtill 12”, Destone 10” (25 cm)
5. Bedform 12”, Bedtill 6” (15 cm), Destone 12”
6. Bedform 12”, No bedtilling , Destone 12”
7. Bedform 12”, No bedtilling, Destone 10”
8. Bedform 10”, No bedtilling”, Destone 11”

Bedformed profiles

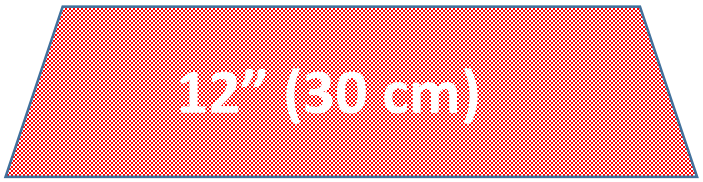
Commercial



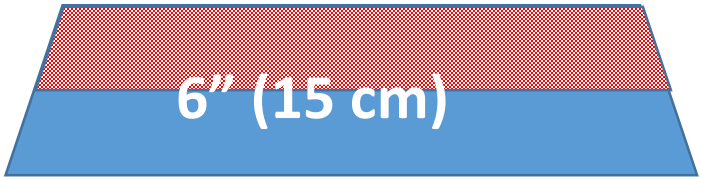
Shallow

Bedtilled profiles

Commercial



Shallow



Destoned profiles

12” (30 cm)

11” (27.5 cm)

10” (25 cm)

Rates of work (ha/h, average not spot)

No.	Regime	Bedforming	Bedtilling	Destoning
1	Tillerstar	-	-	0.46
2	**12”,12”,12”**	**1.48**	**0.58**	**0.52**
3	12”,12”,11”	1.48	0.58	0.55
4	12”,12”10”	1.48	0.58	0.60
5	12”,6”,12”	1.48	0.87	0.49
6	12”,None,12”	1.48	-	0.35
7	12”,None,10”	1.48	-	0.42
8	10”,None,11”	1.63	-	0.31

Fuel and labour costs (combined secondary, £/ha)

No.	Regime	Fuel (inc. Adblue)	Labour	Total
1	Tillerstar	41.54	32.31	73.85
2	**12”,12”,12”**	**28.26**	**65.05**	**93.31**
3	12”,12”,11”	28.17	63.32	91.49
4	12”,12”10”	27.42	61.24	88.65
5	12”,6”,12”	23.86	58.11	81.97
6	12”,None,12”	19.69	52.82	72.51
7	12”,None,10”	19.03	49.90	64.93
8	10”,None,11”	20.75	57.66	78.41

Costs

- Destoning still the most labour-costly operation
- Reducing destoning depth by 1” reduced costs by 2.5 % (£2.33/ha) but virtually no saving in fuel
- Removing bedtilling operation reduced costs by 24% (£22/ha) despite the slower destoning operation
- Tillerstar high fuel costs (but one-pass operation so total cost comparable to destoning without bedtilling)
- Half-depth bedtilling is an option to reduce costs
- Shallow bedforming followed by deeper destoning increased costs – need to match depths

Tuber number, yield and dry matter (All regimes)

No.	Regime	Total no. (000/ha)	S.E.	Yield >40 mm (t/ha)	S.E.	[DM] (%)	S.E.
1	Tillerstar	523	55.8	49.3	4.40	18.8	0.73
2	**12”,12”,12”**	**520**	**51.2**	**47.3**	**7.87**	**19.1**	**0.44**
3	12”,12”,11”	530	40.6	47.5	5.79	18.8	0.41
4	12”,12”10”	594	23.9	49.7	5.20	18.9	0.74
5	12”,6”,12”	525	36.5	52.4	6.96	19.2	1.12
6	12”,None,12”	520	40.6	51.8	4.59	19.8	1.36
7	12”,None,10”	529	29.2	49.9	3.91	19.2	1.23
8	10”,None,11”	553	31.0	49.1	3.14	19.2	0.37

Yield (Destoning depth)

Regime	Total yield (t/ha)	S.E.	Yield >40 mm (t/ha)	S.E.	DM yield (t/ha)	S.E.
Tillerstar	51.5	4.86	49.3	4.40	9.7	0.98
Destone 12”	52.5	6.07	50.5	6.22	10.2	1.48
Destone 11”	50.9	4.44	48.3	4.26	9.7	0.88
Destone 10”	52.5	4.18	49.8	4.11	10.0	1.06

Yield (Bedtilling)

Regime	Total yield (t/ha)	S.E.	Yield >40 mm (t/ha)	S.E.	DM yield (t/ha)	S.E.
Tillerstar	51.5	4.86	49.3	4.40	9.7	0.98
Bedtill†	49.4	6.05	47.3	6.11	9.4	1.01
No bedtill†	53.1	3.82	50.9	3.95	10.4	1.39

†10” and 12” destoning depth comparisons

Yield

- Unreplicated strips. No direct statistical comparison possible, only inferences of differences possible
- Bedtilling appeared to reduce yields
- Reducing destoning depth did not change yield

Common scab and greening (All regimes)

†% surface area infected

No.	Regime	Proportion packable tubers (%)	S.E.	Scab severity (% SA)†	S.E.	Greening Incidence (%)	S.E.
1	Tillerstar	96.2	2.67	1.26	0.498	6.7	6.83
2	**12”,12”,12”**	99.0	0.34	0.77	0.050	1.5	1.98
3	12”,12”,11”	98.3	0.75	0.96	0.207	1.2	1.08
4	12”,12”10”	99.4	0.49	0.82	0.236	1.9	2.03
5	12”,6”,12”	99.1	1.56	0.81	0.250	3.8	5.05
6	12”,None,12”	98.7	1.51	0.87	0.167	4.3	3.65
7	12”,None,10”	97.5	1.59	1.06	0.285	4.2	2.10
8	10”,None,11”	96.7	4.22	1.10	0.401	4.5	1.79

2016 RESULTS

		1 Tillerstar	2 Farm Standard	3	4	5 Reduced Bedtill	6	7 No Bedtill (NIAB CUF)	8
Crop Harvested	No. Boxes	18	19	20	22	21	21	23	21
Graded Product	Tonnes	14.3	15.3	15.3	17.5	17.3	17.0	19.0	17.4
PACKOUT FIGURES	Packout %	72.11%	74.16 %	87.96 %	74.84 %	76.67%	81.56 %	82.05%	74.06 %
Yield	t/ha	28	30	35	34	36	36	41	34

Summary

- Only small reductions in fuel and labour by reducing destoning depth by 2” but rate of work improved by 17 %. Major advantage when soil conditions marginal
- Bedtilling increased rate of destoning by 46 % but increased costs despite slower destoning. Need to consider timeliness at planting e.g. half-depth bedtilling?
- Tillerstar was 12 % slower than pre-tilled destoning but 31 % faster than where no bedtilling took place. Total cost comparable to destoning without bedtilling
- Full-depth bedtilling appeared to reduce yields
- Reducing destoning depth did not affect yield
- All destoning depths had similar levels of scab (i.e. low)
- Bedtilling did not improve common scab