BRITISH POTATO COUNCIL

Seed rate guide

Estima

Cambridge University Farm

What's new?

Previous seed rate guides have offered recommendations simply to optimise yield from ware production. This new guide, based on BPC-funded research carried out at Cambridge University Farm, recognises the importance of tuber size to the value of your crop and accounts for effect of seed age on the optimum seed rate. Based on your target yield and optimum tuber size, you can use this guide to estimate required seed rate and plant density.

How will this help?

This will help you maximise the value of your crop through increasing yield of the desired size. Estima, for example, is usually grown with the aim of producing a crop with a high proportion of large tubers (60-85mm). Where the mean tuber size (the size with the greatest proportion of yield) is 60mm, almost half the yield will be 60-85mm tubers where variation in tuber size is relatively low. In a less uniform crop, there will be a greater proportion of very large tubers (>85mm) and small tubers (<40mm), which can mean less marketable yield.

How do I improve uniformity?

Mean tuber size and yield are related, and these can be changed through manipulating stem population. For a given yield, lowering stem population will increase mean tuber size, to 66mm for example. This will increase the proportion of 60-85mm tubers, but a relatively high proportion of very large tubers is also produced. So aiming for a higher mean tuber size is generally only advisable where high yields (above 60t/ha) can be reliably achieved. Similarly with an increase in yield, to maintain a mean tuber size of 60mm requires an increase in the stem population.

So how do I influence stem population?

Yæars of research at Cambridge University Farm have refined understanding of the relationship between the number of stems produced and seed size. Recent research has quantified how seed age – measured as the period from emergence of the seed crop to planting of the ware crop – also has an influence. These findings have been distilled into the new recommendations that account for both seed age and size – to produce more stems at the same plant population (within-row spacing) use older seed and/or larger seed.

How to use the guide

Step One

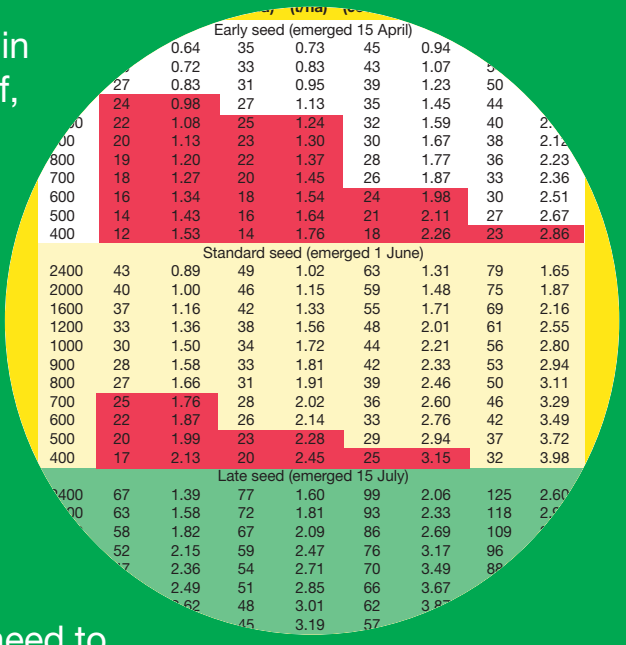
Determine seed age

Your seed supplier should be able to give you this information. Ideally it is the period from emergence of the seed crop to planting of the ware crop. If no information on seed emergence date is available, the date of herbicide application may be useful, but the date of planting is not a substitute.

Standard-aged seed will have emerged in early June – use the middle table overleaf, shaded beige.

Recommended plant populations are lower for earlier-emerging seed – use the top table, unshaded.

Recommended plant populations are higher for later-emerging seed– use the bottom table, shaded green.

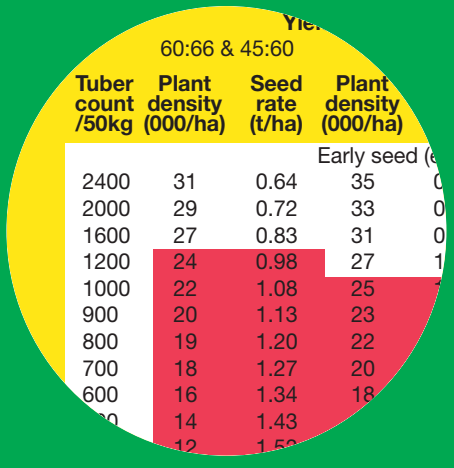


Early seed (emerged 15 April)								
		0.64	35	0.73	45	0.94		
		0.72	33	0.83	43	1.07		
	27	0.83	31	0.95	39	1.23	50	
	24	0.98	27	1.13	35	1.45	44	
	22	1.08	25	1.24	32	1.59	40	
	20	1.13	23	1.30	30	1.67	38	
800	19	1.20	22	1.37	28	1.77	36	2.23
700	18	1.27	20	1.45	26	1.87	33	2.36
600	16	1.34	18	1.54	24	1.98	30	2.51
500	14	1.43	16	1.64	21	2.11	27	2.67
400	12	1.53	14	1.76	18	2.26	23	2.86
Standard seed (emerged 1 June)								
2400	43	0.89	49	1.02	63	1.31	79	1.65
2000	40	1.00	46	1.15	59	1.48	75	1.87
1600	37	1.16	42	1.33	55	1.71	69	2.16
1200	33	1.36	38	1.56	48	2.01	61	2.55
1000	30	1.50	34	1.72	44	2.21	56	2.80
900	28	1.58	33	1.81	42	2.33	53	2.94
800	27	1.66	31	1.91	39	2.46	50	3.11
700	25	1.76	28	2.02	36	2.60	46	3.29
600	22	1.87	26	2.14	33	2.76	42	3.49
500	20	1.99	23	2.28	29	2.94	37	3.72
400	17	2.13	20	2.45	25	3.15	32	3.98
Late seed (emerged 15 July)								
2400	67	1.39	77	1.60	99	2.06	125	2.60
2000	63	1.58	72	1.81	93	2.33	118	
	58	1.82	67	2.09	86	2.69	109	
	52	2.15	59	2.47	76	3.17	96	
		2.36	54	2.71	70	3.49		
		2.49	51	2.85	66	3.67		
			48	3.01	62			
				3.19	57			

Step Two

Determine tuber count

Once you have chosen which table you need to use, find out what tuber counts are available. This will decide which row of the table you will use to determine plant density and seed rate.



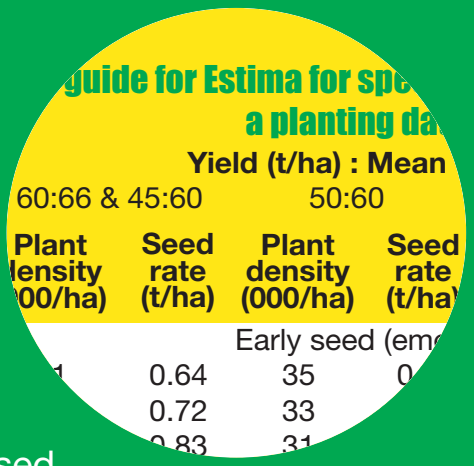
Tuber count /50kg	Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	
			Early seed (	
2400	31	0.64	35	0
2000	29	0.72	33	0
1600	27	0.83	31	0
1200	24	0.98	27	1
1000	22	1.08	25	
900	20	1.13	23	
800	19	1.20	22	
700	18	1.27	20	
600	16	1.34	18	
	14	1.43		
	12	1.53		

60:66 & 45:60

Step Three

Determine target yield and optimum tuber size

Field history and experience will determine target yield, while your target market may specify optimum mean tuber size. The table offers guidance on plant densities for a range of yields from 45 to 70t/ha, for a mean tuber size of 60mm. Your target yield will determine which column you use. Multiply the seed rate by your cropped area to calculate your total requirement. Note that for a target yield of 60t/ha and an increased mean tuber size of 66mm, a lower plant density should be planted, as shown in the left-hand column.



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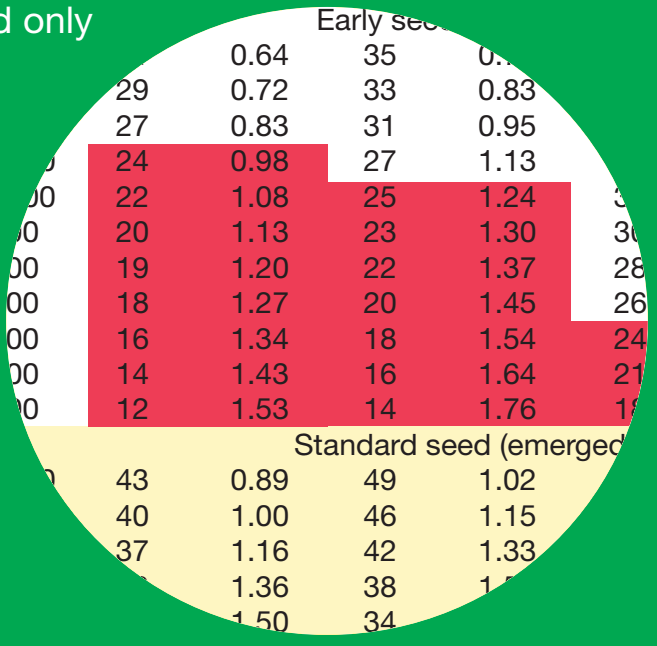
Yield (t/ha) : Mean			
60:66 & 45:60		50:60	
Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Seed rate (t/ha)
		Early seed (em	
	0.64	35	0
	0.72	33	
	0.83	31	

Step Four

Are these plant spacings recommended?

The red-shaded regions of the tables indicate where plant populations of 25,000 per ha or below are required to produce the specified crops. In practice using such low populations is not generally recommended. Planting at wide spacings can result in unacceptably gappy crops, particularly where planting is irregular or emergence is poor. Total yield and tuber quality could suffer as a result. If you are looking for a high proportion of large tubers at low yield (e.g. 60mm mean size at 45t/ha), late-produced seed (bottom, green table) is more appropriate. These crops can only be achieved from standard seed with a count of more than 700 (and only the smallest fraction of early-produced seed) without use of very low plant populations.



Early see				
	0.64	35	0.	
29	0.72	33	0.83	
27	0.83	31	0.95	
24	0.98	27	1.13	
22	1.08	25	1.24	3
20	1.13	23	1.30	3
19	1.20	22	1.37	28
18	1.27	20	1.45	26
16	1.34	18	1.54	24
14	1.43	16	1.64	21
12	1.53	14	1.76	1
Standard seed (emerged				
43	0.89	49	1.02	
40	1.00	46	1.15	
37	1.16	42	1.33	
	1.36	38	1.	
	1.50	34		

Seed rate guide for Estima for specified yield and mean tuber size† for a planting date of 15 April

Yield (t/ha) : Mean tuber size (mm)

Tuber count /50kg	60:66 & 45:60 Plant density (000/ha)	60:66 & 45:60 Seed rate (t/ha)	50:60 Plant density (000/ha)	50:60 Seed rate (t/ha)	60:60 Plant density (000/ha)	60:60 Seed rate (t/ha)	70:60 Plant density (000/ha)	70:60 Seed rate (t/ha)
Early seed (emerged 15 April)								
2400	31	0.64	35	0.73	45	0.94	57	1.19
2000	29	0.72	33	0.83	43	1.07	54	1.35
1600	27	0.83	31	0.95	39	1.23	50	1.55
1200	24	0.98	27	1.13	35	1.45	44	1.83
1000	22	1.08	25	1.24	32	1.59	40	2.01
900	20	1.13	23	1.30	30	1.67	38	2.12
800	19	1.20	22	1.37	28	1.77	36	2.23
700	18	1.27	20	1.45	26	1.87	33	2.36
600	16	1.34	18	1.54	24	1.98	30	2.51
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1600	58	1.82	67	2.09	86	2.69	109	3.40
1200	52	2.15	59	2.47	76	3.17	96	4.01
1000	47	2.36	54	2.71	70	3.49	88	4.41
900	45	2.49	51	2.85	66	3.67	84	4.64
800	42	2.62	48	3.01	62	3.87	78	4.90
700	39	2.78	45	3.19	57	4.10	73	5.18
600	35	2.95	41	3.38	52	4.35	66	5.51
500	31	3.14	36	3.61	46	4.64	59	5.87
400	27	3.37	31	3.86	40	4.97	50	6.28

† Mean tuber size (μ) is the grade with the greatest proportion of yield. Assuming a coefficient of variation of 0.19, c50% of yield is 60-85mm where μ = 60mm
Red-shaded areas indicate densities representing wide plant spacings that are not generally recommended; these can be avoided by use of late-produced seed.
An example planting date of 15 April is shown, if the crop is planted later (all other things equal), more stems would be predicted, resulting in more tubers. If the crop is planted earlier, fewer stems would be predicted, resulting in fewer tubers produced, however there may be confounding effects (notably that of soil temperature).

Written by DM Firman and EJ Allen, Cambridge University Farm