



Seed rate guide

Maris Peer



Cambridge
University
Farm

What's new?

Previous seed rate guides have offered recommendations simply to optimise total yield from ware production. This new guide, based on Potato Council-funded research, recognises the importance of tuber size to the value of your crop. It also accounts for the effect of seed age on main-stem numbers and their influence in determining optimum seed rate.

How do I influence stem numbers?

Years of research at Cambridge University Farm (CUF) 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 these recommendations, which account for both seed age and size. For example, to produce more stems at the same plant population (within-row spacing) you should use older and/or larger seed.

How will this help?

Based on your target yield and optimum tuber size, you can use this guide to estimate required plant density and seed rate. This will help maximise the value of your crop through increasing yield of the desired size. These recommendations should reduce waste and enable seed to be used more efficiently, helping save seed costs.

What about crop uniformity?

Uniform crop establishment and growth should reduce variability in size and quality of the harvested produce. In a less uniform crop there will be a greater proportion of very large and small tubers. Among other factors, planting precision, good soil preparation and pathogen/pest control will help uniformity and maintain tuber numbers and yield.

What other factors may influence seed rates?

It is recognised that factors other than those accounted for in this guide may affect the number of tubers and thus seed rates. Additional research is being carried out at CUF attempting to identify and quantify the important factors. Where appropriate the findings will lead to refined seed rate recommendations. At present these guides do not specify different seed rates for use of cut, physiologically-aged or chitted seed.

How to use this 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 current 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 section of the table, shaded beige.

Recommended plant populations are lower for **early-emerged seed** – use the top section of the table, unshaded.

Recommended plant populations are higher for **late-emerged seed** – use the bottom section of the table, shaded red.

In our example we are working with Early seed (top section of table).

		Yield (t/ha)	
		33	38
		22	25
Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Seed rate (t/ha)
Early seed (emerged 15 April)			
74	1.54	94	1.95
69	1.72	87	2.17
62	1.95	79	2.45
54	2.24	68	2.82
48	2.42	61	3.05
45	2.52	57	3.18
42	2.63	53	3.32
38	2.75	49	3.47
35	2.88	44	3.63
30	3.03	38	3.82
	3.19	32	4.00
Standard seed (emerged 15 April)			

Step Two

Determine seed tuber count

Once you have chosen which section of the table you need to use, count the number of tubers in a 50kg sample of the seed. This will decide which row you will use to determine density and seed rate.

Note that closely graded seed will produce a more uniform stem density in the subsequent crop.

Consider split grading highly variable seed and deal with each grade of seed separately. In our example we have a 2000 tuber count.

Large (43mm)	Small (37.5mm)
Tuber count / 50kg	Plant density / Seed rate
	Early
2400	74
2000	69
1600	62
1200	54
1000	48
900	45
800	42
700	38
600	35

Step Three

Determine target yield and optimum tuber size

Experience, field history and other factors will determine target yield, while your target market may specify a different optimum average tuber size. Discuss with your customer or agronomist to agree target yields and value of different fractions. The table offers guidance on plant densities for a range of yields and two different target tuber sizes; 43mm (standard) and 37.5mm (small). Your target yield and tuber size will determine which column you use. In our example we have a target yield of 33t/ha for standard tuber size. This planting density can also be used for a yield of 22t/ha with small tubers.

Tuber size (mm)	Plant density (000/ha)	Seed rate (t/ha)
43	74	1.54
43	69	1.72
43	62	1.95
43	54	2.24
43	48	2.42
43	45	2.52
43	42	2.63
43	38	2.75
43	35	2.86

Make a note of the seed rate, in this case 1.72t/ha, multiplying this by the number of hectares to be planted with this size seed will give you your total seed requirement.

Step Four

Calculate your within-row spacing

$$\frac{100,000}{69 \times 91.4} = 15.9$$

Labels: Seed Spacing in row (cm), Plant density (000/ha), Row width (cm)

Step Five

Are these seed rates appropriate?

Areas shaded red indicate densities and seed rates for late seed not generally recommended for producing Maris Peer crops with small tubers as high seed rates are required.

Seed rate guide for Maris Peer for specified yield and target average tuber size[†] for a planting date of 15 April

Tuber size [†]	Yield (t/ha) [‡]					
	33		38		43	
Standard (43mm)	22		25		28	
Small (37.5mm)	Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Seed rate (t/ha)
Tuber count / 50kg						
Early seed (emerged 15 April)						
2400	74	1.54	94	1.95	118	2.46
2000	69	1.72	87	2.17	110	2.75
1600	62	1.95	79	2.45	99	3.10
1200	54	2.24	68	2.82	86	3.57
1000	48	2.42	61	3.05	77	3.85
900	45	2.52	57	3.18	72	4.02
800	42	2.63	53	3.32	67	4.19
700	38	2.75	49	3.47	61	4.38
600	35	2.88	44	3.63	55	4.60
500	30	3.03	38	3.82	48	4.83
400	26	3.19	32	4.02	41	5.08
Standard seed (emerged 1 June)						
2400	96	2.00	121	2.53	153	3.20
2000	90	2.25	113	2.84	143	3.58
1600	82	2.56	103	3.23	131	4.08
1200	71	2.97	90	3.75	114	4.74
1000	65	3.23	81	4.07	103	5.15
900	61	3.38	77	4.26	97	5.38
800	57	3.54	71	4.46	90	5.64
700	52	3.71	66	4.69	83	5.92
600	47	3.91	59	4.93	75	6.24
500	41	4.13	52	5.21	66	6.58
400	35	4.37	44	5.52	56	6.97
Late seed (emerged 15 July)						
2400	133	2.78				
2000	126	3.15				
1600	116	3.63				
1200	103	4.29				
1000	94	4.71				
900	89	4.96				
800	84	5.23				
700	77	5.53				
600	71	5.88				
500	63	6.26				
400	54	6.71				

[†]Average tuber size is the grade with the greatest proportion of yield and yields indicated are the total tuber yields. **Standard** crop: average tuber size = 43mm, c. 45% of yield below 42mm and some yield >55mm may be expected (<10%). **Small** tuber crop: average tuber size = 37.5mm, c. >70% of yield below 42mm with very little yield >55mm. (Coefficient of variation assumed to be c. 0.18 for both standard and small crops).

[‡]Where achieved yields are greater than indicated an increase in average tuber size can be expected. Use of rates shown for higher yields reduce the risk of producing oversize tubers but seed requirements are greater. For red shaded area see Step Five in main text.

Using the new seed rates

Growers are encouraged to try the new seed rates on their own soil type and conditions by planting a few rows in the first year so that the new rates can be compared to standard practice.

Where seed age, planting date and target tuber size do not match the examples, some interpolation is required. For seed age, the crucial factor is the interval between emergence of the seed crop and planting of the subsequent crop. For example, for Standard seed, where planting dates are substantially later than 15 April the chronological age of the seed may be regarded as falling into the Early seed category, however there may be confounding effects (notably that of soil temperature).

Further information

There are a range of research reports, available to levy payers, on the Potato Council website providing additional information on factors affecting marketable yield (www.potato.org.uk/publications). These include:

Factors affecting tuber numbers per stem leading to improved seed rate recommendations. DM Firman. 2008

Production practices, storage and sprouting conditions affecting number of stems per seed tuber and the grading of potato crops - (Report No.2004/14). DM Firman, EJ Allen & VJ Shearman. 2004

Evaluation of an N management and yield prediction model by Cambridge University Farm: MF Allison, EJ Allen, DM Firman, MA Stalham. 2008

While every effort has been made to ensure that the information is accurate, no liability can be accepted for any error or omission in the content of this guide.



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