POTATO COUNCIL

Seed rate guide

King Edward

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 efficiently, helping you 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 the guide

Step One

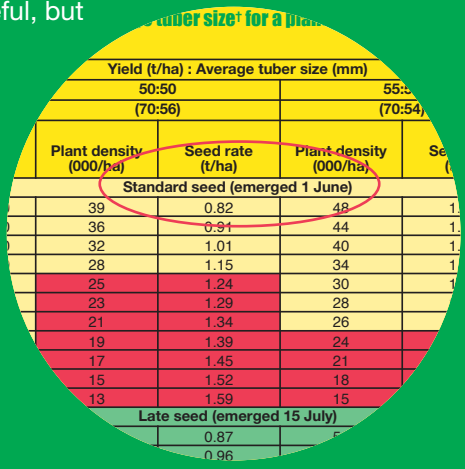
Determine seed age

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 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 first section of the table, shaded beige.

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

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

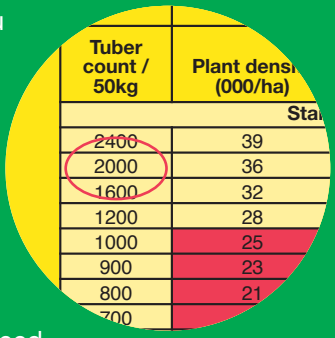


Yield (t/ha) : Average tuber size (mm)			
50:50 (70:56)		55:5 (70:54)	
Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Se
Standard seed (emerged 1 June)			
39	0.82	48	1
36	0.91	44	1
32	1.01	40	1
28	1.15	34	1
25	1.24	30	1
23	1.29	28	
21	1.34	26	
19	1.39	24	
17	1.45	21	
15	1.52	18	
13	1.59	15	
Late seed (emerged 15 July)			
	0.87		
	0.96		

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.

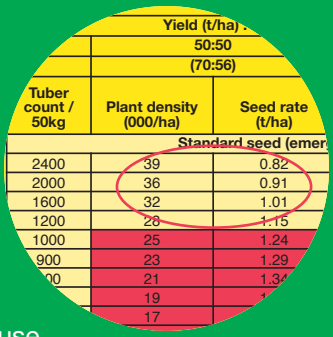


Tuber count / 50kg	Plant densi (000/ha)
	Sta
2400	39
2000	36
1600	32
1200	28
1000	25
900	23
800	21
700	

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 from 50 to 70t/ha and average tuber sizes between 50 and 56mm. Your target yield will determine which column you use. In our example we have a target yield of 50t/ha and an average tuber size of 50mm.

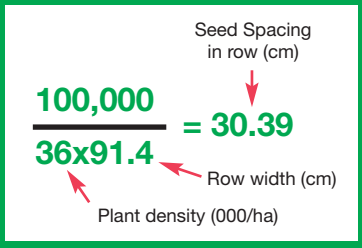


Yield (t/ha)		
	50:50	
	(70:56)	
Tuber count / 50kg	Plant density (000/ha)	Seed rate (t/ha)
		Standard seed (emer
2400	39	0.82
2000	36	0.91
1600	32	1.01
1200	28	1.15
1000	25	1.24
900	23	1.29
00	21	1.3
	19	1
	17	

Make a note of the seed rate, in this case 0.91t/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



Step Five

Are these seed rates appropriate?

Areas shaded red indicate plant populations below 26,000 plants per hectare which are not generally recommended. Planting at wide spacings can result in unacceptably gappy crops, particularly where planting is irregular or emergence is poor. Total yield may be reduced as a result so planting at higher populations should be considered, although increasing the plant population can be expected to reduce the average tuber size.

Seed rate recommendation for King Edward for specified yield and target average tuber size† for a planting date of 15 April

Yield (t/ha) : Average tuber size (mm)				
	50:50		55:50	
	(70:56)		(70:54)	
Tuber count / 50kg	Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Seed rate (t/ha)
Standard seed (emerged 1 June)				
2400	39	0.82	48	1.00
2000	36	0.91	44	1.10
1600	32	1.01	40	1.23
1200	28	1.15	34	1.40
1000	25	1.24	30	1.51
900	23	1.29	28	1.56
800	21	1.34	26	1.63
700	19	1.39	24	1.69
600	17	1.45	21	1.77
500	15	1.52	18	1.85
400	13	1.59	15	1.93
Late seed (emerged 15 July)				
2400	42	0.87	51	1.05
2000	38	0.96	47	1.17
1600	34	1.08	42	1.31
1200	29	1.23	36	1.49
1000	26	1.32	32	1.60
900	25	1.37	30	1.66
800	23	1.42	28	1.73
700	21	1.48	25	1.80
600	19	1.55	23	1.88
500	16	1.62	20	1.97
400	14	1.69	16	2.06

†Average tuber size is the grade with the greatest proportion of yield and yields indicated are the total tuber yields. The column headed 50t/ha and 50mm mean tuber size is suitable for most crops.

Where yields over 50t/ha are expected, an increased seed rate is required to maintain a target average tuber size of 50mm and this will reduce the proportion of large tubers; use of the lower seed rates should be considered if this is not important as ware yield may be unchanged and few large tubers are likely unless very high yields are achieved. Where the average tuber size is 50mm, over 15% of yield may be below 40mm but little yield above 75mm is likely. (Coefficient of variation assumed to be around 0.22). 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 Late seed where planting dates are substantially later than 15 April the chronological age of the seed may be regarded as falling into the Standard 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/knowledge-hub/publications). These include:

Factors affecting tuber numbers per stem leading to improved seed rate recommendations. DM Firman & SJ Daniels. 2011

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

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