



# Seed rate guide

## Hermes



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 help reduce waste and also 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 (>85mm) and small (<40mm) 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 middle section of the table, shaded beige.

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

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

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

Yield (t/ha)			
	50	55	
Plant density (000/ha)	Plant density (000/ha)	Plant density (000/ha)	Plant density (000/ha)
Seed rate (t/ha)	Seed rate (t/ha)	Seed rate (t/ha)	Seed rate (t/ha)
<b>Early seed (emerged 1 May)</b>			
80	1.67	98	2.05
71	1.79	87	2.19
61	1.91	75	2.34
50	2.06	61	2.53
43	2.15	53	2.63
39	2.19	48	2.68
36	2.24	44	2.74
32	2.29	39	2.80
28	2.34	34	2.86
24	2.39	29	2.92
20	2.44	24	2.99
<b>Standard seed (emerged 1 June)</b>			
	1.81	106	2.21
	1.93	95	2.37
		81	

## 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 density	Seed rate (t/ha)
2400	80	1.67
2000	71	1.79
1600	61	1.91
1200	50	2.06
1000	43	2.15
900	39	2.19
800	36	2.24
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 60t/ha, for an average tuber size of 58.5mm. Your target yield will determine which column you use. In our example we have a target yield of 50t/ha.

	50		
Plant count / 50kg	Plant density (000/ha)	Seed rate (t/ha)	Early seed (cm)
2400	80	1.67	98
2000	71	1.79	87
1600	61	1.91	75
1200	50	2.06	61
1000	43	2.15	53
900	39	2.19	48
800	36	2.24	44
700	32	2.29	
600	28	2.34	
500	24	2.39	
	20	2.44	

Make a note of the seed rate, in this case 1.79t/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

$$\frac{100,000}{71 \times 91.4} = 15.4$$

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

### 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.

## Seed rate guide for Hermes for specified yield with a target average tuber size of 58.5mm<sup>†</sup> and a planting date of 15 April

Yield (t/ha)						
	50		55		60	
Tuber count / 50kg	Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Seed rate (t/ha)	Plant density (000/ha)	Seed rate (t/ha)
<b>Early seed (emerged 1 May)</b>						
2400	80	1.67	98	2.05	123	2.57
2000	71	1.79	87	2.19	110	2.74
1600	61	1.91	75	2.34	94	2.94
1200	50	2.06	61	2.53	76	3.17
1000	43	2.15	53	2.63	66	3.29
900	39	2.19	48	2.68	61	3.36
800	36	2.24	44	2.74	55	3.43
700	32	2.29	39	2.80	49	3.51
600	28	2.34	34	2.86	43	3.58
500	24	2.39	29	2.92	37	3.66
400	20	2.44	24	2.99	30	3.75
<b>Standard seed (emerged 1 June)</b>						
2400	87	1.81	106	2.21	133	2.78
2000	77	1.93	95	2.37	119	2.97
1600	66	2.08	81	2.54	102	3.19
1200	54	2.24	66	2.75	83	3.44
1000	47	2.34	57	2.86	72	3.58
900	43	2.38	53	2.92	66	3.66
800	39	2.44	48	2.98	60	3.74
700	35	2.49	43	3.05	54	3.82
600	31	2.55	37	3.12	47	3.91
500	26	2.61	32	3.19	40	4.00
400	21	2.67	26	3.27	33	4.09
<b>Late seed (emerged 1 July)</b>						
2400	94	1.96	115	2.40	145	3.01
2000	84	2.10	103	2.57	129	3.22
1600	72	2.26	89	2.77	111	3.47
1200	59	2.45	72	3.00	90	3.76
1000	51	2.55	62	3.12	78	3.92
900	47	2.61	57	3.19	72	4.00
800	43	2.67	52	3.26	65	4.09
700	38	2.73	47	3.34	59	4.19
600	34	2.79	41	3.42	51	4.28
500	29	2.86	35	3.50	44	4.39
400	23	2.93	29	3.59	36	4.50

<sup>†</sup>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 is generally suitable for crops with expected yields up to 50t/ha. Where yields >50t/ha are expected, the increased seed rate indicated for a target average tuber size of 58.5mm will reduce the proportion of large tubers but use of lower seed rates could be considered if this is not important as ware yield may be unchanged. Where the average tuber size = 58.5mm, c. 5% of yield can be expected to be below 40mm and little yield above 80mm is likely. (Coefficient of variation assumed to be c. 0.20). 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](http://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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