Sugar Research Australia

Information Sheet

IS13021

Calibrating your fertiliser box

Accuracy in fertiliser application rates is important and equipment should be calibrated regularly. A calibration should be taken at the start of each season every year as a minimum. Since fertiliser flow rates differ between products and sometimes from batch to batch, a calibration should be carried out when different fertilisers are used.

Important note: 1 bag refers to a weight of 50 kg.

Equipment needed

- Measuring tape or measuring wheel.
- Kitchen type scales.
- Plastic bucket or containers.

Checking your fertiliser box output

1. Find your row spacing in the table below.
2. Measure out the distance corresponding to your row spacing in the block to be fertilised.
3. Travel this distance as if you were fertilising, collecting the fertiliser applied to one row of cane in a bucket/container.
4. Weigh the fertiliser in kg.
5. The weight you get in kg is equal to the number of 50 kg bags applied/acre.
6. Convert bags/acre to kg/ha by multiplying the output by 125.

Row spacing Imperial (ft, in)	Row spacing Metric (m)	Measure this distance Meters (m)
4’6”	1.37	59
4’8”	1.42	57
4’10”	1.47	55
5’0”	1.52	53
5’2”	1.57	51
5’3”	1.60	51
5’4”	1.63	50
6’0”	1.83	45
6’6”	1.98	40

Example

1. Current row spacing = 1.52 m.
2. Need to measure and collect fertiliser applied to one cane row over 53 m.
3. The amount of fertiliser collected is 5.8 kg.
4. Therefore the number of 50 kg bags applied per acre is 5.8 bags/acre.
5. To convert bags/acre to kg/ha multiply by 125. Therefore 5.8 bags/acre x 125 = 725 kg/ha.

Adjusting fertiliser box output

After calibrating your fertiliser box you may find that you will need to increase or decrease the amount of fertiliser applied. To apply your desired rate of fertiliser, use the guidelines below.

To increase fertiliser application rate:

- Increase **driving** cog size **or**
- Decrease **driven** cog size

To decrease fertiliser application rate:

- Decrease **driving** cog size **or**
- Increase **driven** cog size

To increase or decrease cog sizes you will have to use one of the formulas below to calculate the required number of teeth on a driving or driven cog that will give apply your desired fertiliser rate.

Changing Driving Cog

$$\text{Number of teeth required} = \frac{\text{Number of teeth on existing cog x required application rate}}{\text{Present application rate}}$$

Changing Driven Cog

$$\text{Number of teeth required} = \frac{\text{Number of teeth on existing cog x present application rate}}{\text{Required application rate}}$$

Example

There is a 16 tooth cog on the tractor (driving cog) and an 8 tooth cog on a fertiliser box (driven cog). Currently 370 kg/ha of fertiliser is applied. If 500 kg/ha of fertiliser needs to be applied, what size driving or driven cog is needed?

New **driving** cog size = $\frac{16 \times 500}{370}$ = 21.6 (use a 22 tooth cog)

New **driven** cog size = $\frac{8 \times 370}{500}$ = 5.9 (use a 6 tooth cog)

Note: Either **(not both)** of these cog changes will give the required application rate.

If you don't have the correct size cog, don't despair. There is another way!

Changing both driving and driven cogs using ratios

1. Check the current cogs. Count the number of teeth on the driving cog (tractor/crumble roller) and driven cog (fertiliser box).

2. Determine the Current ratio =

   $$\frac{\text{Number of driving teeth}}{\text{Number of driven teeth}}$$

3. Collect and weigh output =

   Existing rate (g/100m or bags/acre)

   a. For insecticide granules collect output over 100 m and weigh (g).

   b. For fertiliser collect output over the distance (m) specified by the current row spacing (m) and weigh (kg). Refer to table overleaf for required collection distances.

Checking your Fertiliser Box Output

Row spacing Imperial (ft, in)	Row spacing Metric (m)	Measure this distance Meters (m)
5'0"	1.52	53
5'2"	1.57	51
5'3"	1.60	50
6'0"	1.83	44

4. Calculate the ratio required to apply the desired application rate.

   Ratio required =

   $$\frac{\text{Current ratio} \times \text{required rate (g/100 m or bags/acre)}}{\text{Existing rate (g/100m or bags/acre)}}$$

5. Locate this ratio on the accompanying table. There will be a number of possible driving/driven cog combinations that will apply the desired ratio. Choose the combination that is most suitable, given the cogs available.

6. Fit the new cogs and recheck output as per instructions in step 3.

For further information contact your local adviser.

Driving and driven ratios for calibrations

Driving teeth

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
10	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
11	0.909	1.0	1.091	1.182	1.273	1.364	1.455	1.545	1.636	1.727	1.818	1.909	2.0	2.091	2.182	2.273	2.364	2.455	2.545	2.636	2.727
12	0.833	0.917	1.0	1.083	1.167	1.25	1.333	1.417	1.5	1.583	1.667	1.75	1.833	1.917	2.0	2.083	2.167	2.25	2.33	2.417	2.5
13	0.769	0.846	0.923	1.0	1.077	1.154	1.231	1.308	1.385	1.462	1.538	1.615	1.692	1.769	1.846	1.923	2.0	2.077	2.154	2.231	2.308
14	0.714	0.786	0.857	0.929	1.0	1.071	1.143	1.214	1.286	1.357	1.429	1.5	1.571	1.643	1.714	1.786	1.857	1.929	2.0	2.071	2.143
15	0.667	0.733	0.8	0.867	0.933	1.0	1.067	1.133	1.2	1.267	1.333	1.4	1.467	1.533	1.6	1.667	1.733	1.8	1.867	1.933	2.0
16	0.625	0.688	0.75	0.813	0.875	0.938	1.0	1.063	1.125	1.188	1.25	1.313	1.375	1.438	1.5	1.563	1.625	1.688	1.75	1.813	1.875
17	0.588	0.647	0.706	0.765	0.824	0.882	0.941	1.0	1.059	1.118	1.176	1.235	1.294	1.353	1.412	1.471	1.529	1.588	1.647	1.706	1.765
18	0.556	0.611	0.667	0.722	0.788	0.833	0.889	0.944	1.0	1.056	1.111	1.167	1.222	1.278	1.333	1.389	1.444	1.5	1.556	1.611	1.667
19	0.526	0.579	0.632	0.684	0.737	0.789	0.842	0.895	0.947	1.0	1.053	1.105	1.158	1.211	1.263	1.316	1.368	1.421	1.474	1.526	1.579
20	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.850	0.9	0.95	1.0	1.05	1.1	1.15	1.2	1.25	1.3	1.35	1.4	1.45	1.5
21	0.476	0.524	0.571	0.619	0.667	0.714	0.762	0.81	0.857	0.905	0.952	1.0	1.048	1.095	1.143	1.190	1.238	1.286	1.333	1.381	1.429
22	0.455	0.5	0.545	0.519	0.636	0.682	0.727	0.773	0.818	0.864	0.909	0.955	1.0	1.045	1.091	1.136	1.182	1.227	1.273	1.318	1.364
23	0.435	0.478	0.522	0.565	0.609	0.652	0.696	0.739	0.783	0.826	0.87	0.913	0.957	1.0	1.043	1.087	1.130	1.174	1.217	1.261	1.304
24	0.417	0.458	0.5	0.542	0.583	0.625	0.667	0.708	0.75	0.792	0.833	0.875	0.917	0.958	1.0	1.042	1.083	1.125	1.167	1.208	1.25
25	0.4	0.44	0.48	0.52	0.56	0.6	0.64	0.68	0.72	0.76	0.8	0.84	0.88	0.92	0.96	1.0	1.04	1.08	1.12	1.16	1.2
26	0.385	0.423	0.462	0.5	0.538	0.577	0.615	0.654	0.692	0.731	0.769	0.808	0.846	0.885	0.923	0.962	1.0	1.038	1.077	1.115	1.154
27	0.37	0.407	0.444	0.481	0.519	0.556	0.593	0.63	0.667	0.704	0.741	0.778	0.815	0.852	0.889	0.926	0.963	1.0	1.037	1.074	1.111
28	0.357	0.393	0.429	0.464	0.5	0.536	0.571	0.607	0.643	0.679	0.714	0.75	0.786	0.821	0.857	0.893	0.929	0.964	1.0	1.036	1.071
29	0.345	0.379	0.414	0.448	0.483	0.517	0.552	0.586	0.621	0.655	0.69	0.724	0.759	0.793	0.828	0.862	0.897	0.931	0.966	1.0	1.034
30	0.333	0.367	0.4	0.433	0.467	0.5	0.533	0.567	0.6	0.633	0.667	0.7	0.733	0.767	0.8	0.833	0.867	0.9	0.933	0.967	1.0