Practical test: Amazone, Bogballe, Rauch, Sulky and Vicon spreaders

Dishing the ‘fert’

The spreader topic is a big one. Which is why we split this test up into a two-parter: This month we look at how accurate the machines are at spreading various types of fertiliser; whereas next month we assess how convenient the models are to work with in the field.

Now for those introductions. When setting up the test, we asked the manufacturers to supply machines with 1,500-litre hoppers and capable of a 24m working width. And this is what arrived:
- Amazone ZA-M maxiS,
- Bogballe EX trend,
- Rauch Axera M,
- Sulky DPX expert,
- Vicon RS-XL.

Here we should point out that our spreader test was carried out on the Continent, so not all of the names will be familiar to UK farmers. The Bogballe EX trend, for example, is sold in the UK as a KRM, while the Rauch Axera M is badged and sold as a Kuhn. The other three are ‘as is’, the Amazone and Vicon coming in via their own UK distribution companies and the Sulky through independent importer Huntingdon-based Reco.

Interestingly, even though all of the machines are capable of spreading to 24m as requested, individual max widths do differ — and substantially. Amazone and Bogballe/KRM claim a max work width of 36m for their machines, while the Rauch/Kuhn and Vicon machines are said to be capable of a 42m throw. The Sulky DPX, in contrast, is a more modest 28m machine. This all needs to be taken into account, because longer throw designs are likely to be less ‘stretched’ down at the narrower 24m width; refer to ‘Manufacturer comments’ box.

Turning to the tests themselves, these were carried out in Horsens, Denmark, in full co-operation with the DLG (see ‘How the tests were carried out’ box). All machines had to spread the following fertilisers — sulphate of ammonia (26% N, 13% S), nitrate of potash (60% K₂O) and urea (46% N) — at these application rates (200, 350 and 150kg/ha) and to identical widths (24m). The test data are shown in the graphs and tables over the following
How the tests were carried out

The spreader tests were carried out by Profi staff, with the DLG, at the ‘Forskningscenter Bygholm’ research centre, Danish Institute of Agricultural Sciences (DIAS). All measurements were taken in the research centre’s 80m x 60m test hall, where the temperature is maintained at a constant 12°C and humidity at 50%.

As for the test kit, this comprises 448 floor-mounted funnels, 25cm wide and 50cm long, positioned in two rows. The funnels collect the fertiliser as the spreader passes over, and the gathered product is then weighed automatically.

For our test, the results were then processed and set out graphically on a computer screen. The graph reflected the average result from four spreading passes. The travel speed during the test pass was 8.3km/hr, pto speed 540rpm. Referring to the table on the next page, each machine was initially set up according to its spreading chart. After these results had been recorded, testers then attempted to better them by using the various operator’s manuals to adjust the machine settings.

Fertilisers used were sulphate of ammonia (26% N and 13% S) from BASF, muriate of potash from K and S, and urea from Hydro Agri.

Manufacturer comments

Amazone: We have recently launched a new ZA-M range, which takes the maximum work width to 48m.

Bogballe: The main benefit of the spreading vanes on the EX trend is that they don’t require time-consuming adjustment.

Rauch: Our top test results show why we conduct 3,000 tests every year to update our spreading charts. These are available on our website.

Sulky: We just launched a new DFX expert model that spreads up to 36m rather than the tested unit’s 28m. Importer comment: Reco has worked independently with Sulky to come up with a UK-specific list of setting charts. These charts were not supplied with the continental-spec test machine.

Vicon: Our machine was tested by DLG back in 1999, when it gave top results (CoVs of 2.8% to 11.2%) and the correct charts were available. A programme of testing is now underway to extend the range of fertiliser products covered in the charts.

Assessments in comparison

How Profi rated the spreading accuracy of five broadcasters

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Amazone ZA-M maxiS</th>
<th>Bogballe/KRM EX trend</th>
<th>Rauch/Kuhn Axera M</th>
<th>Sulky DFX expert</th>
<th>Vicon RS-XL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphate of ammonia (200kg/ha)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Late-crop spreading (200kg/ha)</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Muriate of potash (350kg/ha)</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urea (150kg/ha)</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

Grading system: ++ = very good; + = good; 0 = satisfactory; – = needs improvement; –– = needs significant improvement

1) Because the test fertiliser was not listed in the spreading chart, the testers took the nearest equivalent setting; Vicon’s fertiliser grading box was used to set the RS-XL. 2) After spreading one pass according to chart settings, each machine was then adjusted a maximum of two times.
The remaining two units, Sulky and Vicon, returned CoV figures of 17% and 20%, which clearly do not hit the 15% European standard (EN 13739). This can probably be put down to the fact that our particular fertiliser did not match anything on the Sulky or Vicon spreading chart, so we had to rely on a comparable product setting. Vicon, to its credit, does provide a grading box to match fertiliser products, but clearly the result achieved from this box failed to give the correct setting.

After this first pass, we adjusted the spreaders' settings using collector trays – supplied as standard spec by Sulky. This resulted in dramatic improvements, especially from the Vicon and Sulky models, on which we changed the point where the fertiliser dropped on to the pair of discs. We also upped the Amazone and Bogballe/KRM results, on the green machine by altering the vane position (CoV from 9% to 6%) and on the blue Bogballe by tilting the machine forward by 2° (CoV from 8% to 5%). The Rauch/Kuhn Axera M was the only machine to notch its best CoV by just following its chart settings.

Next up, we looked at the late-crop application job. With the spreading discs set to work down at 20-40cm above the floor – this simulates a smaller distance between the disc and the crop top – we asked all of the machines to put on the same fertiliser product as before. Or in other words, the BASF sulphate of ammonia at a rate of 200kg/ha.

Perhaps not surprisingly, when set according to the spreading charts, results were similar to those of the first test. Topping the heap were Bogballe and Kuhn models, which returned CoVs of 6% and just under 8%. After a further adjustment we were then able to bring these test figures down even more, to CoVs of 4.5% and slightly under 6%. The Amazone ZA-M model's 13% stat was fine, but we were not able to drop it down any further.

Again, it was the Sulky and Vicon that struggled with our fertiliser, recording CoVs of 16% and more than 30% respectively when set to their charts. Clearly, with a return of 30%, the charts' settings must have been wrong for the fertiliser, and this highlights the bigger problem when a particular fertiliser doesn't match what's shown in 'the book'.

After adjusting both the machines a couple of times, we got the Sulky down to a good sub-9%, but didn't manage the same reduction on the Vicon (16.9%).

Next task on the profi test list was to apply the muriate of potash at 350kg/ha. Best results here came...
Spread pattern – 200kg/ha of sulphate of ammonia

Using the machine chart settings, the Amazon, Boghalle and Rauch/Kuhn machines achieved CoVs of less than 10% straightaway, the Rauch getting as low as 7%. Altering the main settings of the Amazon and Boghalle brought them down from 9% to 7% and down from 8% to 5%, respectively. In contrast, the Sulky and Vicon machines produced 17% and 20% CoVs when operated according to chart settings. After adjustments were made, these figures dropped dramatically – to 9% and 11%, respectively.

Spread pattern – 200kg/ha, late-crop, sulph. of ammonia

On ‘late’ work, only the Boghalle and the Rauch spreaders came into under the 10% CoV benchmark. Tweaking their settings took them to an excellent 5% and 6% level. The Amazon produced an acceptable 13% from its chart. Sulky, again, managed a big improvement in CoV – from 15% to 8% – after the fertiliser/disk drop-on point had been altered. Vicon was the only machine not to sneak in beneath the 15% threshold, although the RS-XL unit did succeed in bringing its initial high 30% test figure down to about 17%.

Boghalle/KRM EX trend: The test results speak for themselves. The EX trend’s CoV figure never touched the 10% benchmark.

from Boghalle/KRM and the Rauch/Kuhn, both managing CoVs of 8.6%. Adjusting the Boghalle dropped its result to an impressive 6%.

Chart settings brought acceptable stats (10% and 11%) from Amazone and Sulky, whereas the Vicon only notched 22% when set according to its potash 60 chart. But then here's the rub. After altering the fertiliser-on-disc drop point, the Vicon took its result from a disappointing 22% to an excellent 6.3%, which worked out as the second best muriate test.

Rauch/Kuhn Axera: Along with the EX trend, the Axera M model was the most consistent performer of the five machines on trial in this test.

Final product to be put through our five machines was urea, a tough challenge for any wide-spreading broadcaster. With a target rate of 150kg/ha, again it was Boghalle/KRM and Rauch/Kuhn that gave the lowest CoVs (9% and 8%). Further tweaks – tilting the EX trend and

altering the drop-on point on the Axera – brought reductions, down to a very good 4.6% and less than 6% respectively. Adjusting the vane position also helped the performance of Amazone’s 2A-M, taking its urea CoV from 12% to a good 9% level.

With a max spread width of 28m it was always a possibility that the Sulky DFX would have issues distributing the urea to 24m – hence the 26% first-off result. However, to be fair to the French spreader, our second adjustment of the fertiliser ‘drop’ point saw its CoV plummet down to an excellent 9% recording.

A similar adjustment on the Vicon RS-XL spreader brought down its test figure from 14% to an equally creditable 8%.
Summary: Spreading all the tested fertilisers to 24m, Bogballe/KRM and Rauch/Kuhn Axera M models gave the best results, with CoVs of 6% to 9% at the first attempt – in other words, off the spreader chart setting. The Amazone ZA-M maxiS came in marginally behind the top pair, with CoVs of 9-12%.

When set to their spreading charts, the Sulky DPX expert and Vicon BS-XL came off less well with our test fertilisers, though the Sulky did put in a strong 11% performance with the muriate. The Vicon again proved capable of sub-11% readings when adjustments were made.

Perhaps one of the more important messages to come out of this test is the need to have comprehensive spreading charts that cover a wide range of fertilisers. It is the charts, after all, that most farm operators rely on. Where feasible, however, it’s still best to test and adjust the machine for each fertiliser sample, as this is the practice that invariably achieves the optimum result.

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