

Reprint from the  
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Issue 10/2009  
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## Danish Precision

Special Issue



Presented by:

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# Danish Precision

**dlz Long-term test** The fact that Bogballe builds good spreaders is well-known. Now with a new terminal and even more exact weighing technique the Danes will add one more with the M-line. To test if the new M2W base with 2350 litres capacity can deliver it's promises, it will be tried on approx. 600 ha spread area.

**B**ogballe is a small, specialist manufacturer of fertiliser spreaders from Denmark. The company was founded 75 years ago by the farmer Anders Peter Laursen in Bogballe and is still family owned. In Germany the market share is still far behind the local manufacturers Amazone and Rauch. But the technical features are not behind the others, on the contrary: Bogballe was the first manufacturer of spreaders with weighing technique, which is a trend that has widely caught on. Also interesting are the high manufacturing standards used in Denmark. Processing is strongly emphasised. Stainless steel is used for parts in hard environment, and each steel part is ground before processing. In this way the surfaces are roughened and the edges smoothed. Advantage: The powder paint sticks better, especially on the edges. And protection against rust is always a must for fertiliser spreaders.

## Different rotation direction

Another characteristic of the Bogballe spreader is certainly the direction of rotation of the spreading discs. The Danish machine has the spreading discs turning inwards (In-Center) and not outwards (Off-Center), like for example the Rauch or Amazone. This has as consequence: The spread pattern always overlaps 4 times, when spreading on the field. Bogballe promises that this way offers a better distribution precision and talks about a "fault forgiving system". (See the graphics "4-double overlap"). Opposite to the competitors, the right disc does not spread only to the right and only a little to the left, but completely from right to the left. Theoretically this is sound. When the fertiliser falls 4 times instead of 2 times on the same surface, the part quantities spread are only half as big. Possible spreading faults will this way be of no importance. The distribution behind the spreader is more flat but more wide and provides a good spread pattern.

We could convince ourselves about that, both in the field and in the test hall. The precision is stated by the coefficient of variation (CV): Good is a value lower than 10 percent. The figure tells how the value fluctuates around the middle value. At a CV of below five percent the spreading precision across the driving direction is characterised as very good. If the CV is between 10 and 15 percent the precision is satisfactory.

## Headland spreading

The large overlap between two working widths in field is wise and good, but not wanted along the border. Here the fertili-





The operation with Calibrator Zurf is simple. The data can be exchanged between PC and the Zurf Terminal using the USB stick.

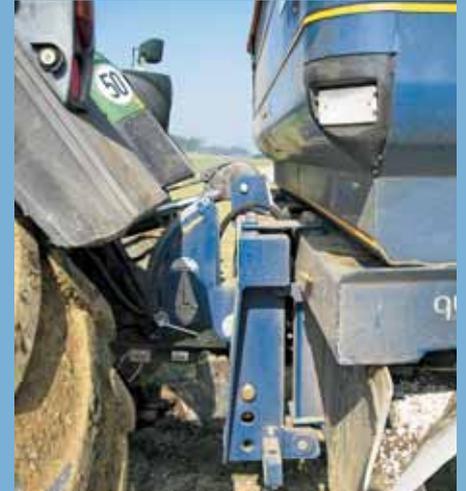
ser will fly over the border to the neighbour or even worse – in the waterways. That means that you need a system for headland spreading. Competitors make

for instance headland spreading to border by placing lamella or deflectors in the fertiliser stream, which limits the fertiliser to fly only to the border. Bogballe changes the driving direction of the spreading discs, thus exploiting the back of the vanes. From the special design of the vanes and the lower revolution speed, the fertiliser does not fly that wide and makes the required spread pattern with steep falling quantity at the border. At the same time the change of the spreading direction (from inwards to outwards) offers the possibility to spread the fertiliser from the border with one disc shut off, which is a system like the one offered by the competitors. The spread pattern from the discs turning outwards gives a steep falling quantity behind the spreader and spreads approx. to the outside of the tractor.

### Test spreader

We had a M2Wbase with 2350 l capacity in Test. The M-line spreader is available in a width of 2,40 m and a hopper height of 1,24 m (base) and also in a Plus variant with a 2,90 m wide and 1,40 m height. The M-line spreader is available with a capacity from 1250 to 4050 litres depending on type and height of the modules. Our spreader had a width of 2,40 m, good if you are driving on a lot on narrow roads, in small villages or wherever you have narrow passages.

Without modules the M2W base capacity is 1250 l. We had fitted two 18 cm high modules. Maximum capacity is possible by fitting an additional 11 cm

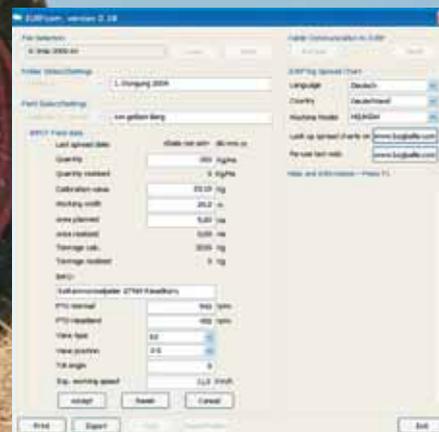


The spreader is hanging in a weighing frame. Intelligent Control makes spreading on slopes even more exact.

high module, when you can load up to 2675 l of fertiliser. Our test machine had a net weight of 548 kg. That means that a base machine with an allowed total weight of 3000 kg carry almost 2,5 tons of fertiliser.

### Calibrator Zurf with weighing system

The W in the name stands for the weighing technique. We were very satisfied with the weighing technique. When you have a bulk fertiliser in the barn you would normally only know afterwards, if it was all ok. This way you have always an



The program Zurf.com makes setting possible on the PC. The necessary fertiliser data is supplied from the internet. It works easily and without problems.



Bogballe is testing not only its spreaders but also a lot of fertilizers. Therefore there is for almost every fertiliser a spread chart and the appropriate calibration value.

exact overview of how much fertiliser is spread where. Also the hectare counter turns out almost exact in the new terminal.

These spreaders are now equipped with the new terminal Calibrator Zurf. Now you can transfer the data that are saved by the weighing system to your PC. The new terminal Calibrator Zurf also works without weighing technique but only if included you will get its full potential. Bogballe uses only one load cell. Therefore the hopper hangs in an extra frame that works in a parallelogram.

The load cell stands 6000 kg, enough for also violent influence when driving through a pothole or on bad trails. We had no problems with the weighing technique. Due to the frame the centre of gravity will be displaced only 4 cm backwards. At the top the frame is fixed by two spring plates and at the foot by two joints with needle bearings. New is also the sensor "Intelligent Control" which controls the measuring values of the weight and discards "incorrect" measuring values, for instance on slopes. The weighing system is this way working even more exact.



The agitator goes easy on the fertiliser. The small outlet is for small grains and slug pellets.

### Easy to use

The operation of the spreader is very easy with the Zurf Calibrator: Find and mount the vanes for the requested working width. For late application you can

### Technical Data

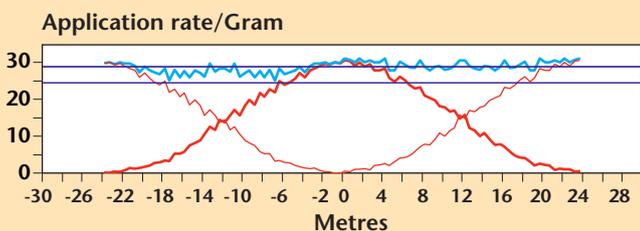
#### Dimensions / Weight

Capacity	1250 + 1100 l
Spread width (depending on vane type)	12-42 m
Width (base = narrow hopper)	240 cm
Load height (without back gate)	98 cm
Load opening (width x length)	238 x 121 cm
Net weight (M2W)	548 kg
Max. load	3000 kg
Total weight	ca. 3500 kg
Application rate (from/to)	0,5/ca. 1500 kg/ha

#### RPM

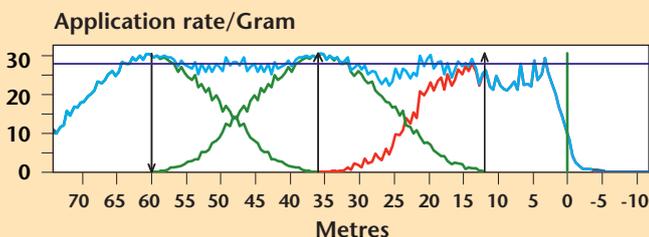
PTO speed	540 RPM
Disc speed	750 RPM

### 1 Normal spreading in the test hall



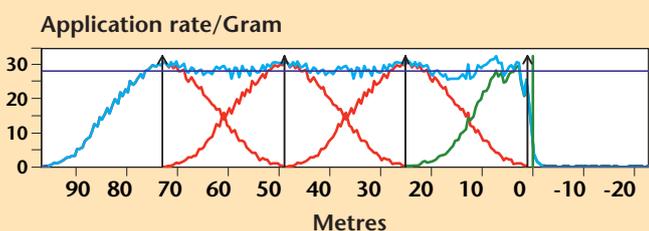
The picture shows the result of normal spreading of ammonium sulphate at a working width of 24 metres and an application rate of 288 kg. The VC is 5,1 percent, almost very good.

### 2 Headland spreading to the border



When spreading to the border (crop optimized version) only very little fertiliser is flying over the border (0,11 percent). That is a very good value. You see the steep falling curve.

### 3 Headland spreading from the border



When spreading from the border almost no fertiliser is flying outside the border and the field will be spread inwards from the border. The curve is even more steep. The result is very good.

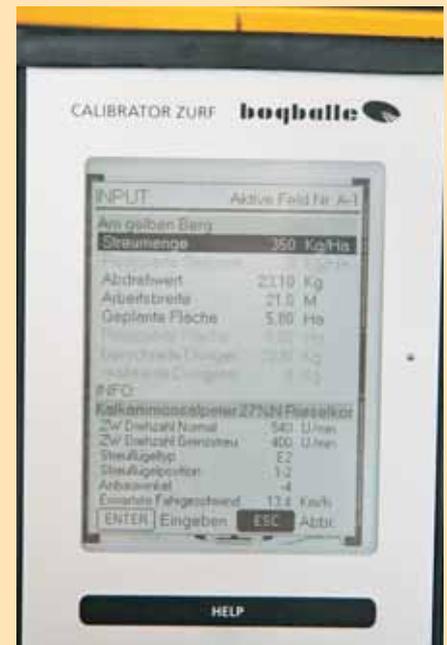
place the lifting arms in a lower position. Then tilt the spreader about 2 degrees compared to spread chart or computer. That is easy to adjust by the bubble level on the frame. The angle will change somewhat according to load and softness of the tyres. But in our test it did not make much influence to the spread width; we had when spreading and also later when growing seen no big difference. Here is a hydraulic top link good, in that way you can adjust tilt angle and working height in the field, which is not possible with a normal top link. In principle it is then enough to set the requested application rate and the working width. The rest will be done by the electronics. Here you can from the beginning get a small inaccuracy. But already after 25 kg the weighing system has adjusted itself. The one who makes an input of the calibration value for the fertiliser in question will spread precisely from the beginning. By the weighing technique the computer compares 10 times per second the expected application rate with the real application rate and adjusts automatically the outlets. The



For calibration and emptying of rest quantities there is an opening and a guide plate in the spreading disc.

## Calibrator Zurf

The nice shaped terminal makes the job with the spreader very simple. Zurf stands for the connection to the PC and to the internet. Therefore spread charts are no more necessary. Just find by the PC the fertiliser from the comprehensive internet based data bank, state the required application rate and speed, and all values for the spreader such as tilt angle, vanes and calibration value are set. These data will be transferred to the Zurf by a USB-Stick and you can start spreading. This way you can start spreading with a very high exactness. If you only enter application rate and speed, the Calibrator works with the last calibration value and adjusts the spreader by the expected/real application rate setting of the weight. Also the headland spreading can easily be set on the terminal. Nice is also the installed help function, which explains very well.



Simple and logic operation characterises the Zurf. The most important information is visible, the application rate and also spreading on non-rectangular fields can easily be changed.

new terminal can now also exchange data between terminal and PC by means of a USB stick. It is moreover possible to make fertiliser folders on the PC. Then you must make an input in Zurfcom for all fields. Now you can for instance ma-

ke a folder for the first application. In the program you can make 4 folders with each 100 fields. When connected to the Internet the program will after input of fertiliser type and application rate search all necessary settings for the spreader. All necessary settings will now automatically be transferred to the terminal. In the field you must now just choose the required folder for the job, choose the field, set the correct tilt on the spreader and you can go spreading. If the spreader is used in a community or if you want to use more fields, it is possible to make more folders on the PC and to transfer them to the Calibrator. In this way the number of fields is in practice unlimited. A very nice feature but a pity that it is not compatible with any card index system. The data can only be exported as for instance an Excel-table. This way the data can be used as input but not as output from the card index. So you will not be spared to create all data by hand. The terminal itself is not ISO-bus compatible but can by a serial plug be connected to all common systems for transfer of the necessary data.

Then you can choose from the menu if you want to spread from the border or to the border. Finally you start again the PTO shaft and start spreading with the required reduced revolution speed. The best spread pattern is achieved when you spread at first around the field and then along the tramlines. Headland spreading from the border is always done counter clockwise, because the right side is closed. If possible, it is better to spread to the border, because here both discs are running so that the hopper is regularly emptied. If you spread from the border, the left side of the hopper is sooner empty than the right side. So it might happen that you must stop spread-

dlz - Test mirror	
Criterion	Judgement
<b>Operation/function</b>	
Mounting on the tractor	+
Setting of application rate	++
Calibration	++
Exchange of vanes	+
Setting for headland spreading	++
Function weighing system	++
Emptying rest quantities	○
Filling (240-cm-hopper)	+
Setting of spreading values	+
Agitator	++
Spread chart	+
<b>Suitability/spread pattern in practice</b>	
CAN normal 21 m	++
CAN headland spreading to border	+
CAN headland spreading from border	+
NPK (800 kg) 21 m	++
NPK (250 kg) 21 m	++
Ammonium Sulphate (250 kg) 21 m	+
<b>Maintenance</b>	
Cleaning	○
Greasing	+

++ = very good, + = good, ○ = average, - = bad, -- = very bad

## Headland spreading from the cabin

In practice the procedure is as follows: Stop the PTO shaft, press the button on the Calibrator for headland spreading.

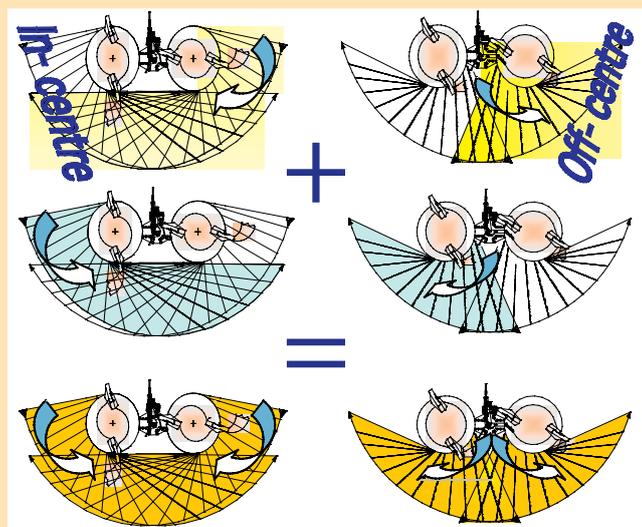


Photos by Feuerborn, Mummé, Bogballe

The vanes can easily be exchanged, even if not without tools. The spread pattern, also for headland spreading, is first class.



## 4-double overlap



There are 2 spreading systems at 2-disc spreaders:

At Off-Center spreaders the discs turn outwards, at In-Center spreaders inwards. The graphics show how the spread patterns overlap from the right and the left disc. At the In-Center operation, such as used by Bogballe, each disc will spread full width with 4-double overlap when spreading as result.

ding with 200 to 300 kg of fertiliser in the hopper. And if you are just about to spread the last tramline, it might be annoying. The fully automatic calibration will stop at a rest quantity of 200 kg and continue at the last measured value. Emptying of the spreader works, but somebody must go down in the spreader in order to remove fertiliser. The rear guard invites for stepping up, but is not meant for that. But when putting stress on this guard, it will slide downwards

out, so that nobody can stand on it. We recommend the ladder which is supplied as option. If you want to spread more or less in the field, you can without problems make the application rate change. Just press plus or minus. With which percent you reduce the application rate at one push can be set in the terminal. If you stop the spreader and start again, the originally set application rate is back again. When spreading on corners or non-rectangular fields you reduce the

## Bogballe makes up it's mind ...

... about the point ISOBUS

The Calibrator ZURF was especially developed in order to make an optional functionality and operation of each single machine function. The ISOBUS compatibility and therefore the ISOBUS terminal is an alternative for the operation of the machine. The Calibrator ZURF can communicate with an ISO terminal for instance when processing input of application rates. Also Bogballe will at Agritechnica 2009 show an ISO-solution, but still the Calibrator ZURF is the best terminal for a fertiliser spreader.

## This is what dlz readers say about Bogballe spreaders

We had also spreaders from Rauch and Amazone for choice. Because of the spread pattern and the 4-double overlap we bought a M2W Bogballe. Another reason for buying was that everything on the spreader is electrically changeable. Moreover there was no big price difference as compared to the competitors and the spreader has a USB stick on the terminal for transfer in the card index system. The specifications are very extensive and very good for the documentation. The terminal Zurf is easy to operate: The menus are very understandable and the display legible. The memory holds 99x4 fields and is very big. The weighing system makes the operation much easier and if driving correctly it is possible to make the spreader totally empty. Fitting on our Fendt tool carrier works better than on our Fendt Vario 716. We would buy the spreader again. Maybe we will buy an extra module in order to increase the capacity.

Raimund Högen, 92685 Floß



We run 400 hectares of arable land. With our M3Wplus spreader and a 3300 litres hopper we have until now spread 1000 hectares, hereof 600 hectares calcium ammonium nitrate and 200 hectares urea. The basic frame is processed and painted very well. The agitator works well. Due to the electric operation no hydraulic connections are necessary. As only the tilt angle is different, the setting is very easy. Also setting of the application rate succeeds simply and exactly on the terminal. The weighing system works well and without problems. Headland spreading is working exactly. That is for us a special plus point at the spreader. The window in the hopper is too small and not waterproof. At a load of 3 tons it is necessary to have ballast on the front axle.

Manfred Huber, 86551 Aichach

spread width on the terminal. But in reality you reduce the application rate. At the beginning it sounds strange but if you spread yourself, you will see it is working, because the general overlap between the tramlines will equalize the reduction of the application rate. The method was confirmed in the field, where there was no sign of too high or too small fertiliser application. If you spread small quantities of fertiliser and you do not drive fast enough, then the terminal will tell you. And it is the same if you spread big quantities. Here you have the possibility to change the size of the outlet by 40 percent up or down. Just change the mechanical setting and tell the terminal that you made the change.

## Result

The M2W spreader with the new Calibrator Zurf is simple to operate and has a good spread pattern. It is a pity that the terminal is not ISOBUS-compatible and that the data can only be exported to a card index programme. The setting of the spreader and the fertiliser planning, when the fields have once been created, is very simple, also due to the integrated spread charts from the Internet. The calibration – a job that almost no farmer does – can be left out, because the weighing technique will very fast lead to the optimum. By means of the new function "intelligent control" the spreading exactness particularly on slopes becomes even better. In the test hall and also in the field we were very satisfied with the spread pattern. The processing is very good, also the paint is convincing. All in all the M2W is a spreader which is exact and easy to operate. (sm/fe)

dlz