DLG Test Report 7267

Monosem

Row unit ValoTerra Ultimate

with ASG (Active Seed Guidance)

Quality of work in corn,
Corn growth evenness at early stage

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Overview

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A test mark “DLG-APPROVED for individual criteria“ is awarded for agricultural products which have successfully fulfilled a scope-reduced usability testing conducted by DLG according to independent and recognised evaluation criteria. The test is intended to highlight particular innovations and key criteria of the test object. The test may contain criteria from the DLG test scope for overall tests, or focus on other value-determining characteristics and properties of the test subject. The minimum requirements, test conditions and procedures as well as the evaluation bases of the test results will be specified in consultation with an expert group of DLG. They correspond to the recognised rules of technology, as well as scientific and agricultural knowledge and requirements. The successful testing is concluded with the publication of a test report, as well as the awarding of the test mark which is valid for five years from the date of awarding.

In 2022, the row unit Monosem ValoTerra Ultimate with ASG was submitted to a DLG partial test which assessed “Quality of work in corn”. The test consisted of a lab test and a field test. In each of these two test versions the row unit planted three corn varieties. Here, the row unit was installed on an 8-row precision planter Monosem ValoTerra Ultimate with Fertismart fertiliser metering system for combi planting.

The lab test tested the distribution of plants along the rows (accuracy of seed placement and distribution). These tests were carried out on the stationary row unit while simulating forward speeds between 8 km/h and 16 km/h.

The field test was carried out on 22 April 2022. The field was flat and the forward speeds ranged between 8 km/h and 16 km/h. The seedbed was described as fine tilth. The distribution of plants along the rows (accuracy of eventual crop spacing, accuracy of seed distribution) and spacings between the emerged plants were evaluated on 16 May 2022 using the DLG-owned mobile spacing meter. Afterwards, these measurements were evaluated statistically.

The partial test on “Corn growth evenness at early stage” was carried out in the same test field. On 17 May 2022, the testers measured the growth height of 100 plants (EC13 3-leaf stage). Based on these measurements the coefficient of variation was then computed and assessed.

Other criteria were not tested.

Assessment in brief

The lab test

The standard deviations that were computed from the seed spacing measurements at the lab were assessed as “very good”.

The percentages of doubles and gaps were found to be “very low” and “low”.

The field test

Accuracy of eventual crop spacing and the field emergence rate were assessed as ‘very good’ in all test variants. The field emergence rates ranged between 90.1 % and 96.9 %. The percentages of target spacings were between 88.8 % and 96.6 %. The percentages of doubles were between 0.1 % and 0.9 %. The percentages of gaps were between 3.2 % and 10.9 %. The evenness of corn growth was measured in stage EC 13.
In this evaluation, the corn stands were assessed as “uniform” in six out of nine test versions and as “not uniform” in three out of nine test versions. These gaps and the partly inhomogeneous plant growth are due to the cold soil temperatures at the time of sowing.

The row unit Monosem ValoTerra Ultimate with ASG performed impressively in all the tested aspects that were defined as test criteria in the underlying DLG test framework. Based on these results, the row unit was awarded the DLG-APPROVED quality mark in the test modules “Quality of work in corn” and “Corn growth evenness at early stage” at work rates of up to 16 km/h.

Table 1:
Overview of results

DLG QUALITY PROFILE		Assessment*
Test criterion “Quality of work”		
Lab test	Plant distribution along the rows	✓
Field test	Plant distribution along the rows	✓
	Field emergence	✓
	Corn growth evenness at early stage	✓

* Evaluation range: requirements fulfilled (✓) / requirements not fulfilled (✗)

The product

Manufacturer and applicant

Monosem
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France

Product:
Row unit Monosem ValoTerra Ultimate with ASG (Active Seed Guidance)

Description and technical data

The tested row unit was mounted on a 8-row precision planter Monosem ValoTerra Ultimate with ASG (Active Seed Guidance) and Fertismart fertilizer metering system for combi planting. According to the manufacturer, the row unit is suitable for planting seeds into ploughed and min-till soils.

Row unit Monosem ValoTerra Ultimate with ASG

The row unit is lined up on a box-section tube and is mounted in parallel linkages. Each row unit has a 70-litre seed box and a 20-litre microgranule box.
The granules are planted at a deeper level than the seeds by double-disc coulters that run ahead of the row units. The row units are double-disc coulters that cut the seed slots. Their discs have a furrow former arranged between them which consolidates and levels the soil in the seed slot in preparation of precision planting. The furrow former is followed by a brush belt that delivers the seeds from the singling unit into the slot. As the seeds drop off this belt, they are pressed into the slot by a press wheel. The press wheel is followed by two firming rollers that cover the slot, completing the seed placement.

The work depth of each row unit is controlled by two gauge wheels. Seed depth, firming roller pressure and the ground pressure of the entire row unit are controlled manually from specific levers and without tools. The pressure of the press wheel is also adjustable by a lever.

Fig. 2:
In the DLG test used precision planter Monosem ValoTerra Ultimate with Fertismart mineral fertiliser system in working position

The seed singling system is based on the vacuum principle, which means a vacuum sucks the seeds into the holes in the electric singling disc where they remain for three quarters of a turn until the vacuum is cut when the hole is covered by a part of the disc casing. The seed drops from the hole and into a separate cell of the feeding wheel. Each of these cells has a flap which presses the seed into the brush belt that takes the seed to the slot and places it behind the furrow former.

Target spacings, doubles and gaps are displayed to the operator in percentage rates on the display screen. In addition, the screen reads out the coefficient of variation which is constantly being updated.

The operator enters either the target spacing or the target number of plants per hectare to the terminal.

In general, the work rate of the seed singling unit is adapted automatically to the current forward speed of the tractor. The necessary data are supplied to the unit through the ISOBUS after it is collected by a GPS receiver or a radar speed sensor.

Fig. 3:
John Deere 4640 operating terminal used in the DLG test

Monosem offers a choice of two seed singling discs:

– DV 3250 (5 mm holes)
– DV 3255 (5.5 mm holes)

The Monosem planter can be specified with an automatic and GPS-based shut-off system that closes individual row units: When the tractor planter combination is approaching a skewed headland, the seed singling units and the fertilizer and microgranule metering system switch off automatically one after the other.

The dual-function blower which is driven mechanically by the tractor pto at up to 540 rpm generates the vacuum for the seed singling units. A generator that is mounted behind the blower generates the energy that is required by the three motors on each row unit (driving the singling disc, the microgranule metering unit and the brush belt) and further motors for the fertilizer metering system.

As another option the precision planter can also be use application maps for planting seeds, granules and micro granules.

The method

The DLG test on “Quality of work in corn” is carried out by testing row units of precision planter at the lab (lab test) and in the field (field test).

The lab test

The lab test measures the accuracy of placement and distribution of seeds in direction of travel at various forward speeds that are simulated on the stationary machine. The results are assessed using the DLG test framework for precision planters.

Accuracy of corn seed placement and distribution

To determine the accuracy of seed placement and distribution the testers install optical sensors to the seed outlet on the row unit. This sensor technology measures the spacing between the individual seeds. Each test series consists of four test runs.

In each of these runs, 250 seed spacings are created, which results in a total of 1,000 spacings per test series.

These 1,000 spacings and measurements are used to determine the accuracy of seed placement. This is done by computing the standard deviation (after correcting the doubles and missed areas). The result is assessed according to the current DLG test framework for precision planters. The standard deviation expresses the level of consistency of actual seed spacings. A smaller standard deviation figure means that the seeds are spaced more uniformly within the row.

Furthermore, the testers also use these 1,000 measurements to determine and assess the accuracy of distribution (percentages of target spacings, doubles and gaps).

In the lab test, all settings of the row unit are logged (such as under/overpressure, metering disc fitted, stripper position).

The field test

Accuracy of eventual crop spacing, seed distribution and field emergence

The DLG test on "quality of work in corn" requires the planting of at least three different corn varieties of different kernel forms at various ground speeds. It is good practice to carry out the test in two different fields. Before and during the test the field history (previous crop, previous tillage scheme), the conditions at the time of planting and the ground speeds are documented. The individual plots are marked out indicating the individual seed varieties sown here and a detailed test plan is drawn up.

The varieties sown are specified by variety, kernel type, breeder and thousand grain weight.

Soil samples are taken on the day the sowing takes place to determine the moisture levels in the seed placement layer and give an account of the test conditions. The soil moisture is determined to DIN 18121 standards.

The ability to germinate is determined in a lab test.

Then, 2 to 4 weeks after planting, the spacings between the young plants are measured using a mobile distance meter. To do this, 4 by 250 crop spacings are measured in each seed row and each test version (= 1,000 spacings). A test version is defined as the planting of one corn variety at a specific forward speed.

The spacings measured are then used to compute the accuracy of eventual crop spacing and distribution and field emergence. As a next step, the accuracy of eventual crop spacing and field emergence are referenced to the DLG test framework and given an assessment. The number of target spacings, doubles and missed areas are not assessed in the field test, because missed areas might be attributed to birds or the quality of seed bed preparation.

Corn growth evenness at early stage

In this test, the testers measured the growth height of 100 plants (EC13 3-leaf stage). Then the coefficient of variation was computed from these measurements and assessed in line with the DLG test framework for precision planters. These provides the following scores: very uniform, uniform, not uniform.

Table 2:
Accuracy of seed distribution

Accuracy of seed distribution	
Percentage of doubles [%]	< 0.5 times the actual spacing
Percentage of target spacings [%]	> 0.5 to < 1.5 times the spacing of the actual spacing
Percentage of missed areas [%]	> 1.5 times the spacing of the actual spacing
– one miss [%]	> 1.5 to < 2.5 times the spacing of the actual spacing
– two misses [%]	> 2.5 to < 3.5 times the spacing of the actual spacing
– three misses [%]	> 3.5 to < 4.5 times the spacing of the actual spacing
– four misses [%]	> 4.5 times the spacing of the actual spacing

Detailed account of the test results

The following discusses the results of the lab test and the field test including the assessments.

The lab test

Accuracy of seed placement and distribution

The DLG lab test determined the placement and distribution accuracy of the following three corn varieties:

– Es Bond from Lidea (small round kernels; 252 g thousand grain weight)

– Es Traveler from Lidea (large round kernels; 352 g thousand grain weight)

– Es Myfriend from Lidea (tooth shaped kernels; 350 g thousand grain weight)

The test on placement and distribution accuracy was carried out by simulating the following forward speeds: 8 km/h, 12 km/h and 16 km/h. The target seed spacing was 14 cm. This was entered to the machine terminal (14 cm is the equivalent of 75 cm row spacings and 95,240 plants per hectare).

Table 3 shows the measurements on accuracy of seed placement and accuracy of distribution. The standard deviation, which expresses the level of consistency in actual seed spacing, ranges between 4.58 mm and 9.43 mm. The accuracy of seed placement at all forward speeds (8, 12, 16 km/h) was assessed as “very good” for all these varieties.

Table 3:
The results on accuracy of seed placement and distribution (lab test)

Corn variety and forward speed	Singling disc	SD* [mm]	SD assessment*	Doubles [%]	Assessment of doubles	Target spacings [%]	Gaps (one miss) [%]	Gaps (two misses) [%]	Gaps (three misses) [%]	Gaps (four misses) [%]	Assessment of gaps	Target spacing [mm]	Actual spacing [mm]
Es Bond, 8 km/h	DV 3250	5.66	very good	0.3	very low	99.3	0.4	0.0	0.0	0.0	very low	140	138.68
Es Bond, 12 km/h	DV 3250	6.19	very good	0.2	very low	99.5	0.3	0.0	0.0	0.0	very low	140	139.67
Es Bond, 16 km/h	DV 3250	6.95	very good	0.5	very low	99.2	0.3	0.0	0.0	0.0	very low	140	139.87
Es Traveler, 8 km/h	DV 3255	4.58	very good	0.1	very low	99.9	0.0	0.0	0.0	0.0	very low	140	138.77
Es Traveler, 12 km/h	DV 3255	5.15	very good	0.4	very low	99.5	0.1	0.0	0.0	0.0	very low	140	139.53
Es Traveler, 16 km/h	DV 3255	5.69	very good	0.4	very low	99.5	0.1	0.0	0.0	0.0	very low	140	139.86
Es Myfriend, 8 km/h	DV 3250	6.74	very good	0.9	low	98.5	0.6	0.0	0.0	0.0	low	140	138.64
Es Myfriend, 12 km/h	DV 3255	7.06	very good	0.5	very low	99.0	0.5	0.0	0.0	0.0	very low	140	139.66
Es Myfriend, 16 km/h	DV 3255	9.43	very good	0.6	low	99.0	0.4	0.0	0.0	0.0	very low	140	139.92

Assessment of standard deviations in the lab test:
≤ 10 mm = very good / > 10 bis 15 mm = good / > 15 bis 20 mm = satisfactory / > 20 bis 25 mm = less satisfactory / > 25 mm = not sufficient

Assessment of doubles and gaps:
≤ 0,5 % = very low / > 0,5 bis 2,5 % = low / > 2,5 bis 5 % = tolerable / > 5 bis 7,5 % = high / > 7,5 % = very high

* = Standard deviation (SD)

The tests with Es Traveler were carried out with the vacuum set to 66 mbar.
The tests with Es Bond and Es Myfriend were carried out at a vacuum of 65 mbar.
The seed shutter was in position 3 in all these tests.

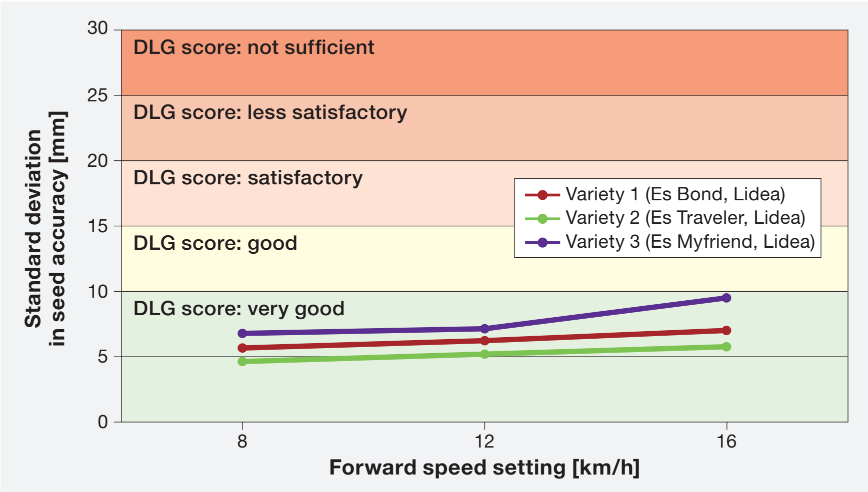

Fig. 4:
Lab tests – standard deviation in all three corn varieties relative to forward speed

Figure 4 shows the computed standard deviations as determined for the various forward speeds. The diagram shows that the following tendency was found in all three varieties: the standard deviation increases when forward speed increases. This means that the seed spacings become less uniform. Planting the variety Es Traveler (large, round seeds), the standard deviation was found to be not as high than in Es Myfriend (tooth-shaped seeds), which translates into more uniform spacings.

Table 3 shows the percentages for target spacings, doubles and gaps. In all tests the percentage of doubles was between 0.1 % (very low) and 0.9 % (low). In all tests the percentage of gaps was between 0 % and 0.6 % (low). The percentages of gaps in Es Traveler (big, round seeds) were lower than in the other two varieties. The percentages of target spacings were between 98.5 % and 99.9 %. This applies to all lab test runs at all forward speeds and all varieties.

The measured seed spacings corresponded very well with the value set on the operating terminal.

The field test

Accuracy of eventual crop spacing, seed distribution and field emergence

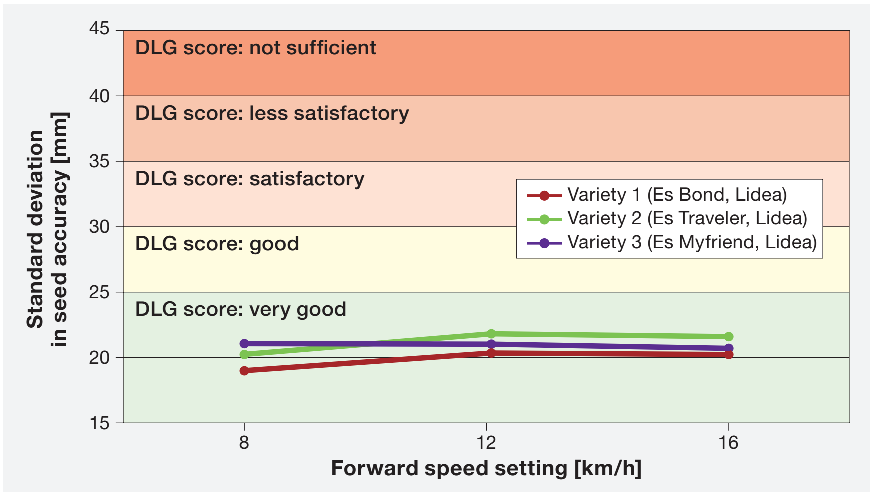

Fig. 5:
Field test – standard deviation in eventual crop spacing in all varieties relative to the set forward speed

The soil in the test field was loamy sand (35-40 soil value points). After a crop of winter barley was harvested on 20 July 2021 (yielding 69.6 dt/ha*, the straw being harvested), a mix of yellow mustard was sown on 24 August 2021. This cover crop was mulched in spring 2022. After applying 20 m³/ha of cattle manure on 19 April 2022, the field was disced at a shallow depth of 6 cm to 8 cm. Two days before the corn was planted, cattle slurry was applied at a rate of 30 m³/ha, followed by a 15 cm deep cultivation pass. The seedbed was described as fine tilth (fig. 6).

On 22 April 2022, the following three corn varieties were planted together with 100 kg/ha DAP fertilizer (10 °C soil temperature; 18 % soil moisture):

– Es Bond (Lidea), thousand grain weight: 252 g, germination capacity: 94 %**
– Es Traveler (Lidea), thousand grain weight: 352 g, germination capacity: 97 %**
– Es Myfriend (Lidea), thousand grain weight: 350 g, germination capacity: 98 %**

* 1 dt is the equivalent to 100 kg
** The germination capacity as indicated above is the mean value averaged from two lab analyses and the percentage claimed by the manufacturer.

The germination capacity as indicated above is the mean value averaged from two lab analyses and the percentage claimed by the manufacturer.

The varieties were sown at the following forward speeds: 8 km/h, 12 km/h and 16 km/h. Afterwards, the testers randomly sampled the seed rows to verify the accuracy of seed placement. Figure 7 shows a patch of exposed Es Traveler seeds after they were planted at a forward speed of 16 km/h.

During the three weeks before the seeding there was 42.5 mm rainfall. Another 27.1 mm of rain fell between 22 April 2022 (the date of planting) and 16 May (the date on which the crop spacings were evaluated). At the time of seeding, the soil moisture at seed depth level was 18 %.

The spacings between the emerged plants were measured on 16 May 2022. These results are shown in table 4.

The field emergence rates were always assessed as "very good" in all test variants and ranged between 90.1 % and 96.9 %. The accuracy of eventual crop spacing was also assessed as "very good" in all test variations.

Fig. 6
The seedbed quality at the time of seeding

All standard deviations in the eventual crop spacings in the field relative to the planter's forward speed are shown in figure 5. This graph shows that the field results are identical with the lab results: At 8 km/h, 12 km/h and 16 km/h, the accuracy of eventual crop spacing is assessed as "very good" without exception.

The percentages of target spacings were 88.8 % and 96.6 % in the test. (The percentages of doubles and gaps in the field are not assessed in a DLG field test.) The percentages of doubles in this test were between 0.1 % and 0.9 %. The percentages of gaps were 3.2 % and 10.9 % across all test runs (table 4). In all three corn varieties the percentages of gaps increased when the forward speed increased.

Fig. 7:
Uncovered Es Traveler seeds planted at 16 km/h

Fig. 8:
Young Bond plants planted at 16 km/h on 17 May 2022

The evaluation of the crop spacings on 16 May 2022 revealed 45 gaps in the test field. These 45 gaps were uniformly distributed across all 9 test versions. In 37 from 45 gaps it was found that the seeds had been placed as targeted (82 %), which means an accurate job by the Monosem row unit. The seeds that did not emerge and were exposed later on had not germinated or had stopped growing after germination. This said, no seeds were found in another eight gaps (out of 45 gaps) in the seed rows. This equals to 18 %.

Figure 8 shows the young plants on 17 May 2022 (Es Bond sown at 16 km/h).

Table 4:
The test results on accuracy of eventual crop spacing, distribution and emergence (field test)

Corn variety and forward speed	Singling disc	SD* [mm]	SD assessment*	Doubles [%]	Target spacings [%]	Gaps (one miss) [%]	Gaps (two misses) [%]	Gaps (three misses) [%]	Gaps (four misses) [%]	Target spacing [mm]	Actual spacing [mm]	Field emergence [%]	Assessment of field emergence
Es Bond, 8 km/h	DV 3250	18.87	very good	0.1	92.9	6.4	0.6	0.0	0.0	140	134.25	93.3	very good
Es Bond, 12 km/h	DV 3250	20.24	very good	0.4	90.0	8.3	1.1	0.2	0.0	140	135.21	90.4	very good
Es Bond, 16 km/h	DV 3250	20.21	very good	0.3	89.5	9.2	0.9	0.1	0.0	140	135.32	90.8	very good
Es Traveler, 8 km/h	DV 3255	20.19	very good	0.3	92.6	6.8	0.3	0.0	0.0	140	135.43	93.6	very good
Es Traveler, 12 km/h	DV 3255	21.74	very good	0.3	90.7	8.4	0.6	0.0	0.0	140	136.06	91.6	very good
Es Traveler, 16 km/h	DV 3255	21.56	very good	0.3	88.8	9.7	1.0	0.2	0.0	140	136.08	90.1	very good
Es Myfriend, 8 km/h	DV 3250	20.90	very good	0.2	96.6	3.1	0.1	0.0	0.0	140	134.11	96.9	very good
Es Myfriend, 12 km/h	DV 3255	20.90	very good	0.9	94.3	4.7	0.1	0.0	0.0	140	134.70	95.6	very good
Es Myfriend, 16 km/h	DV 3255	20.56	very good	0.6	93.5	5.6	0.3	0.0	0.0	140	133.60	94.4	very good

Assessment of the standard deviations in the field:
≤ 25 mm = very good / > 25-30mm = good / > 30-35 mm = satisfactory / > 35-40 mm = less satisfactory / > 40 mm = not sufficient
Assessment of field emergence in corn:
≥ 90 % = very good / 89-85 % = good / 84-80 % = satisfactory / 79-75 % = less satisfactory / < 75 % = not sufficient

* = Standard deviation (SD)

The tests with Es Traveler were carried out with the vacuum set to 66 mbar.
The tests with Es Bond and Es Myfriend were carried out at a vacuum of 65 mbar.
The seed shutter was in position 3 in all these tests.

Table 5 shows the results from the test module “Corn growth evenness at early stage”: minimum and maximum growth heights and the computed coefficient of variation based on the growth height of 100 plants. The consistency of growth height is assessed in the right column. The assessment is “uniform” in six out of nine seeding variations and “not uniform” in three out of nine variations.

The gaps discussed above and the occurrence of a “not uniform” growth height may be attributed to the early planting date and cold soil temperatures (10 °C at planting depth) which weakened seed viability and encourages infestation with pests. When evaluating these results, it is also necessary to look at the low and very low gap percentages of the lab test (0.6 % being the lowest percentage).

Table 5:
Uniform early growth heights

Corn variety and forward speed	Minimum growth height [cm]	Maximum growth height [cm]	Coefficient of variation [%]	Assessing uniform growth height of the stand
Es Bond, 8 km/h	11	30	17.5	not uniform
Es Bond, 12 km/h	16	29	11.4	uniform
Es Bond, 16 km/h	8	30	19.5	not uniform
Es Traveler, 8 km/h	8	30	16.8	not uniform
Es Traveler, 12 km/h	10	28	14.7	uniform
Es Traveler, 16 km/h	15	32	13.0	uniform
Es Myfriend, 8 km/h	16	32	12.6	uniform
Es Myfriend, 12 km/h	15	31	12.5	uniform
Es Myfriend, 16 km/h	16	32	11.1	uniform

Assessing the coefficient of variation on uniform growth height:
≤ 7.5 % = very uniform / > 7.5 % to ≤ 15.0 % = uniform / > 15.0 % = not uniform

Summary

In the field test, the row unit Monosem ValoTerra Ultimate with ASG achieved a “very good” accuracy in eventual crop spacing up to 16 km/h. Field emergence was also assessed as “very good” in all test variants. Emergence rates were between 90.1 % and 96.9 %. The percentages of target spacings were between 88.8 % and 96.6 %. The percentages of doubles were between 0.1 % and 0.9 %. The percentages of gaps were between 3.2 % and 10.9 %. The corn growth evenness was measured in stage EC 13. In this evaluation, the corn stands were assessed as “uniform” in six out of nine test versions and as “not uniform” in three out of nine test versions. The gaps and those plants that did not show a uniform growth height were mainly attributed to the cold soil temperature at the time of planting.

In the lab tests, the percentages of doubles and gaps in seven out of nine tests were found to be “very small”. The number of gaps was assessed as “very low” in eight out of nine tests.

Based on these test results, the row unit Monosem ValoTerra Ultimate with ASG is awarded the DLG-APPROVED quality mark 2022 in the test modules “Quality of work in corn” and “Corn growth evenness at early stage” for work rates of up to 16 km/h.

Further information

Testing agency

DLG TestService GmbH,
Gross-Umstadt location, Germany

The tests are conducted on behalf of DLG e.V.

DLG test framework

Precision planters (date of issue 12/2020)

Department

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Photos and graphics

DLG and Monosem

* Author

DLG – the open network and professional voice

Founded in 1885 by the German engineer Max Eyth, DLG (Deutsche Landwirtschafts-Gesellschaft – German Agricultural Society) is an expert organisation in the fields of agriculture, agribusiness and the food sector. Its mission is to promote progress through the transfer of knowledge, quality standards and technology. As such, DLG is an open network and acts as the professional voice of the agricultural, agribusiness and food sectors.

As one of the leading organisations in the agricultural and food market, DLG organises international trade fairs and events in the specialist areas of crop production, animal husbandry, machinery and equipment for farming and forestry work as well as energy supply and food technology. DLG's quality tests for food, agricultural equipment and farm inputs are highly acclaimed around the world.

For more than 130 years, our mission has also been to promote dialogue between academia, farmers and the general public across disciplines and national borders. As an open and independent organisation, our network of experts collaborate with farmers, academics, consultants, policymakers and specialists in administration in the development of future-proof solutions for the challenges facing the agriculture and the food industry.

Leaders in the testing of agricultural equipment and input products

The DLG Test Center Technology and Farm Inputs and its test methods, test profiles and quality seals hold a leading position in testing and certifying equipment and inputs for the agricultural industry. Our test methods and test profiles are developed by an independent and impartial commission to simulate in-field applications of the products. All tests are carried out using state-of-the-art measuring and test methods applying also international standards.

Internal test code DLG: 2205-0007

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