DLG Test Report 6794

Amazonen-Werke H. Dreyer GmbH & Co. KG

Amazone Cataya 3000 Super mechanical drill

Work quality, handling, operation, service and maintenance, work safety

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Overview

The ‘DLG APPROVED quality mark on Individual Test Criteria’ is awarded to technical products that have passed successfully a less comprehensive DLG usability test according to independent and approved evaluation criteria. The purpose of the test is to highlight the test object’s specific innovations and key criteria. The test is carried out both, according to criteria that are laid down in the ‘DLG Full Test’ framework for technical products or may focus on other value determining features and properties of the test object. A DLG group of experts defines the minimum standards, the test conditions and test procedures to be applied and the valuation basis of the test results. These parameters reflect the acknowledged state of the art as well as scientific findings and agricultural insights and requirements. The successful examination concludes with the publishing of a test report and the award of the test mark which is valid for five years from the date of award.

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AMAZONEN-WERKE
CATAYA 3000 SUPER
- ✓ **Work quality**
- ✓ **Handling, operation, service and maintenance**
- ✓ **Work safety**

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The DLG test “work quality” was carried out with the Cataya 3000 Super mechanical seed drill on a test stand (lab test) and in the field (field test). During the DLG test the test candidate was mounted to an Amazone KX 3001 rotary cultivator. At the lab test with the stationary seed drill the metering accuracy* and the lateral distribution with rape, barley and wheat were determined and evaluated. For the field test, the rape was sown on 23rd August, 2017. The seedbed was described as finely crumbled. The work quality was assessed on 21st September, 2017. The wheat was sown in rather wet conditions on 16th October, 2017 and the work quality was assessed four weeks later.

In addition the test modules “handling, operation, service and maintenance” and the “compliance with work safety standards” were checked.

No further criteria were tested in this test.

* The term “Metering accuracy” corresponds to the term “Seed rate reliability”, which was used in the older DLG test reports.

Assessment – Brief Summary

During the assessment, the Amazone Cataya 3000 Super mechanical seed drill was impressive at the test criteria specified by the DLG test framework. Due to the results achieved the Amazone Cataya 3000 Super mechanical seed drill is awarded the DLG APPROVED quality mark for the test modules “work quality”, “handling, operation and maintenance” and the compliance with work safety standards.

Table 1:
Lab test results (metering accuracy and lateral distribution)

Test	Assessment
Metering accuracy at wheat	Deviation of actual rate from target rate: very good
Metering accuracy at barley	Deviation of actual rate from target rate: very good
Metering accuracy at rape seed	Deviation of actual rate from target rate: very good
Lateral distribution at wheat	very good on level ground and on the slope
Lateral distribution at barley	very good on level ground
Lateral distribution at rape seed	very good on level ground

Table 2:
Field test results at rape and wheat

Test	Assessment
Metering accuracy at sowing rape	Actual rate deviation from target rate: very good (0.0%)
Field emergence at rape	very good (94.6%)
Distribution of plants along the row – rape	very good (factor of variation: 0.8)
Metering accuracy at wheat	Actual rate deviation from target rate: very good (1.2%)
Field emergence at wheat	good and very good (87.6 and 90.6%)
Distribution of plants along the row – wheat	good (factor of variation: 0.9 and 1.0)
Sowing depth of wheat seed	Nominal depth: 2-3 cm Actual depth measured (by measuring the hypocotyl length): 1.6 to 4.2 cm Average depth: 3.0 cm, standard deviation: 0.5 cm* Nominal depth: 3-4 cm Actual depth measured (by measuring the hypocotyl length): 2.1 to 6.0 cm Average depth: 3.8 cm, standard deviation: 0.9 cm*

Table 3:
Results of the test module on handling, operation and maintenance

Test criterion	Assessment
Setting the sowing depth	satisfactory
Access at the calibration procedure	good
Storage holders for the hydraulic hoses	good
Light kit	good
Coulter pressure adjustment	very good to satisfactory (depending on specification)

* The smaller the standard deviation, the more consistent is the seed depth.

The Product

Manufacturer and Applicant

Amazonen-Werke H. Dreyer GmbH & Co. KG,
Am Amazonenwerk 9-13, 49205 Hasbergen,
Germany

The product:
Mechanical drill
Amazone Cataya 3000 Super

Description and Technical Data

The mechanical Amazone Cataya 3000 Super drill which was tested in this DLG test was mounted on an Amazone KX 3001 rotary cultivator. The test candidate features a working width of three metres and 20 sowing coulters (row spacing: 15 cm).

The coulters are arranged in two rows. The inter-row spacing is 19.5 cm. Each disc on the 'TwinTec' double-disc coulter measures 34 cm in diameter (Figure 2). The press rollers that run behind the coulters measure 33 cm in diameter and 5 cm in width. Amazone also offers 6.5 cm press rollers. The seed drill, subject to the DLG test had been equipped with a so-called Exact following harrow.

Linkage of the sowing combination to the tractor via the three point linkage (Cat. II or III). Three hydraulic lines require connecting to the tractor (one double-acting control valve for the hydraulic harrow lift (option) and one single-acting control valve for the bout markers or tramlining). A power-supply cable is provided for the lighting (road transport). Furthermore the ISOBUS cable needs connecting to the tractor. The test machine was operated from the cab-based 10-inch John Deere 4600 CommandCenter terminal.

Figure 2:
The TwinTeC double-disc coulter with hard metal inner scraper and depth guidance roller

Figure 3:
The Precis metering system with fine seed wheel (orange) and normal seed wheel (green) with related shutter slides

At the Precis metering system a fine seed wheel and a normal seed wheel are fitted to the lower part of the seed hopper. Via the manual opening and closing of the shutter slides the seed is delivered to the relevant metering wheels (Figure 3). Two electric motors control the rev. speed of the metering wheels and thus the seed rate to be sown, in relation to the forward speed, enabling the on/off-switching of each individual machine side. When combined with an automatic part-width section control system, this feature allows to shut off specific sections on awkward headlands or in wedged patches, in which case a sensor on the top link detects the machine's positioning signal. If specified, the signal can also be received through the ISOBUS line.

The forward speed was recorded by a radar sensor which is mounted at the rear of the machine and above the harrow. If tractor and machine are specified with ISOBUS, the signal can also be received through the ISOBUS interface.

Setting the machine via SmartCenter

All the machine settings are actuated via the so-called SmartCenter (Figure 4), allowing to carry out the calibration procedure, the setting of the seed placement depth and the coulter pressure adjustment. All these adjustments are being carried out by the operator at one central position. A foldable bucket and suspended scales are supplied with the machine and are stored in a storage compartment in the SmartCenter. The top SmartCenter compartment also houses the so-called TwinTerminal where operators enter the calibrated seed rate, for example. This means they do not have to enter the tractor during the calibration procedure. The split calibration tray and the setting functions for the calibration flaps and the bottom flaps are also stored in the SmartCenter.

Seed depth and coulter pressure are set in the bottom part of the SmartCenter, for which the operator uses the universal tool that is supplied with the machine. These settings are all done from outside the machine.

In addition the seed drill is equipped with a water canister (hopper volume 5 litres) with water tap and soap dispenser, so that the operator can wash his hands, for instance after the calibration procedure.

The seed hopper has a volume of 830 litres and can be increased by another 440 litres by using an extension As standard an agitator shaft (can be shut off) is installed in the seed hopper. The walls have six inspection windows to check the filling level. A base specification machine comprises one adjustable low level alarm and a second alarm is available as an option. The test candidate had interior LED lights which are switched off when the road lights come on. Two LED work lights are also available as an option. These are switched on/off from the operator terminal.

For soil tillage the sowing combination was equipped with the 3001 Amazone rotary cultivator. On its three metres working width ten rotors are arranged. The rotary cultivator utilised in this DLG test was equipped with a 60 cm diameter Matrix tyre wedge ring roller. The distance between the wedge rings was 15 cm. The depth setting of the soil tillage implement is carried out via the so-called eccentric pin. As option a hydraulic working depth adjustment is also available. To match the rotor rev. speed the rotary cultivator is equipped with an exchange gear wheel gearbox. At the right and left hand side of the rotary cultivator each one sprung loaded side plate is fitted. These can be adjusted with the universal tool supplied.

The levelling board between rotary cultivator and following roller can be also adjusted via this universal tool centrally from the left hand side. A scale is available for the reproducibility of the setting. The levelling board is guided via the roller, and negotiates obstacles in upwards direction.

The two bout markers are also mounted to the rotary cultivator. Each marker is provided with a shear bolt and provides storage for three spare shear bolts. The markers are also set up with the universal tool supplied.

Figure 4:
The SmartCenter on the 'Amazone Cataya 3000 Super drill

The Method

At a DLG test “Work quality” the seed drills are tested in the laboratory (lab test) and in the field (field test).

The lab test

At a lab test with a stationary machine the metering accuracy and the seed distribution transverse to the direction of travel (so-called lateral distribution) with rape, barley and wheat are determined at two different forward speeds. The parameters are tested in rape seed and barley with the drill in a level position whereas an additional test run is carried out in wheat which simulates slope operation.

Metering accuracy in the lab test

The metering accuracy test parameter determines whether the seed rate delivered by the drill (actual rate) is identical with the pre-set seed rate (the nominal rate). The percentage of deviation of the actual rate from the nominal rate is then evaluated according to the DLG test frame work (table 4).

The term “metering accuracy” complies with the term “consistency of application” which was used in former DLG test reports.

According to the DLG test framework sowing on one hectare is simulated whereas for barley and wheat on 1/10 hectare. For this a lower and a higher forward speed is set. The choice of forward speeds is oriented to the recommendations of the manufacturer.

During the entire lab test the settings of the seed drill are documented (e.g. the rev. speed of the metering units).

Lab test – seed distribution transverse to the direction of travel

The lateral distribution of rape, barley and wheat is determined on the stationary drill and with the drill raised.

The distribution in rape and barley is measured on level ground whereas an extra slope simulation is included in the test drilling wheat.

The seed delivered is collected in a tray underneath each coulter and weighed. From the seed rates collected the coefficient of variation (CoV) is calculated. The smaller the coefficient of variation the more uniform is the seed rate across the working width. The calculated coefficient of variation is then evaluated according to the DLG test frame work (table 5).

The field test

For a DLG test at least rape and wheat have to be sown. During the test the history of the field (previous crop, previous soil tillage), the conditions at the time of drilling and the forward speeds are documented.

The varieties sown are specified by variety, grower and Thousand Grain Mass. The ability to germinate is determined in a lab analysis.

To specify the test conditions, soil samples are taken on the day of sowing to determine the soil moisture at the seed horizon. The soil moisture is determined according to DIN 18121 standards.

During sowing the metering accuracy is checked on every plot and the sowing depth of the seed is determined on a random basis at two sowing depths (2 to 3 cm and 3 to 4 cm) (incl. prevailing crop residues on the surface).

Table 4:
Assessing the metering accuracy (percentage of deviation between actual rate and target rate)

Deviation from the nominal rate [%]	Assessment on metering accuracy
up to 2.5	very good
up to 5	good
> 5 to 10	satisfactory
> 10	not sufficient

Table 5:
Assessment lateral distribution of the seed using the coefficient of variation

Coefficient of variation at wheat, peas and grass [%]	Coefficient of variation at rape seed [%]	DLG score
< 2.0	< 2.9	very good
2.0 to 3.2	2.9 to 4.7	good
3.3 to 4.5	4.8 to 6.6	satisfactory
4.6 to 6.3	6.7 to 9.4	sufficient
> 6.3	> 9.4	not sufficient

Field test – field emergence

The field emergence is evaluated three to five weeks after the crop was sown. For this, the plants are counted on several representative places in the field (each on one square metre). Then the field emergence is evaluated according to the DLG test framework (table 6), considering the germination capability determined in the laboratory.

Field test – Distribution of plants in direction of travel (along the rows)

The distribution of plants in direction of travel (along the rows) is determined three to five weeks after sowing. This is done by placing a measuring tape along a seed row that is representative for the operational performance of the machine. Then the wheat plants that have emerged within the individual 5 cm sections on the metering tape (0-5 cm, 5-10 cm, 10-15 cm) are counted over a distance of 15 metres.

The assessment of seed placement along the rows in rape is carried out for a distance of 30m and by counting the plants within the individual 15 cm sections (0-15 cm, 15-30 cm, 30-45 cm etc.).

From the values of the plants counted in the individual sections the factor of variation (dispersion index) is calculated allowing an approved statement on the consistency of the plants in the row (table 7).

Table 6:
Assessment of field emergence

Field emergence [%]	DLG score
> 90	very good
> 80 to 90	good
> 70 to 80	satisfactory
> 60 to 70	sufficient
< 60	not sufficient

Table 7:
Assessment of distribution along rows

Factor of variation in wheat and rape seed	DLG score
< 0.9	very good
≥ 0.9 to 1.1	good
≥ 1.1 to 1.3	satisfactory
≥ 1.3 to 1.5	sufficient
> 1.5	**not sufficient**

Field test – depth placement of the seed

At wheat the sowing depth of the seed is determined on a random basis at two placement depths (2 to 3 cm and 3 to 4 cm. For this three to five weeks prior to sowing 100 consecutive plants are uncovered and their part of the hypocotyl is measured which is underneath the soil surface (shoot section between roots and soil surface). From these 100 measured values the standard deviation is calculated and mentioned in the test report.

Handling, operation and maintenance

In this test module different setting possibilities of the seed drill are evaluated (e.g. setting of the sowing depth and coulter pressure).

Furthermore, the service and maintenance steps listed below are carried out by expert operators and the time required is determined:

- Period to grease all grease nipples incl. PTO shaft
- Period to convert the seed drill from the transport to the operational position
- Period to change from fine seeds to cereals?
- Period to adjust the desired seed rate
- Period to remove a seed residue of 5 kg from the seed hopper

Verifying the machine's compliance with work safety standards

This audit is conducted by the German Test and Certifying Center for Agricultural and Forestry Machinery (DPLF), which examines the machine for its compliance with relevant work safety standards and requirements.

The Test Results in Detail

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

Lab test – metering accuracy and lateral distribution at rape, barley, and wheat

For the lab tests (determination of metering accuracy and lateral distribution) the speeds of 8 km and 12 km/h have been adjusted at the seed drill. For the lab test, the seed drill was driven by a Steyr tractor CVT 6220). The following three seed types were utilised:

- Rape variety: Ability from Rapool (4.4 g TGW)
- Barley variety: Vespa from Hauptsaaten (54.1 g TGW)
- Wheat variety: Cornetto from Geno-Saaten (49.5 g TGW)

Table 8:
Metering accuracy on the test stand
(relative to ground speed, hopper filling level and machine tilt)

Seed	Forward speed [km/h]	Filling level [kg]	Area drilled [ha]	Machine position and tilt	Calibrated (target) seed rate [kg/ha]	Actual seed rate [kg/ha]	Deviation [%]	Assessment of the deviation
Wheat	8	100	1/10	level ground	156.0	152.2	-0.5	very good
Wheat	12	100	1/10	level ground	156.0	152.0	-0.7	very good
Wheat	8	300	1/10	level ground	156.0	152.7	-0.2	very good
Wheat	12	300	1/10	level ground	156.0	152.4	-0.4	very good
Wheat	8	100	1/10	20 % to the right	156.0	152.3	-0.5	very good
Wheat	12	100	1/10	20 % to the right	156.0	151.9	-0.7	very good
Wheat	8	300	1/10	20 % to the right	156.0	152.5	-0.3	very good
Wheat	12	300	1/10	20 % to the right	156.0	152.4	-0.4	very good
Wheat	8	100	1/10	20 % to the left	156.0	152.2	-0.5	very good
Wheat	12	100	1/10	20 % to the left	156.0	151.8	-0.8	very good
Wheat	8	300	1/10	20 % to the left	156.0	152.5	-0.3	very good
Wheat	12	300	1/10	20 % to the left	156.0	152.2	-0.5	very good
Wheat	8	100	1/10	20 % forward	156.0	149.8	-2.1	very good
Wheat	12	100	1/10	20 % forward	156.0	149.4	-2.4	very good
Wheat	8	300	1/10	20 % forward	156.0	150.2	-1.8	very good
Wheat	12	300	1/10	20 % forward	156.0	150.1	-1.9	very good
Wheat	8	100	1/10	20 % backward	156.0	153.9	0.6	very good
Wheat	12	100	1/10	20 % backward	156.0	153.5	0.3	very good
Wheat	8	300	1/10	20 % backward	156.0	154.0	0.7	very good
Wheat	12	300	1/10	20 % backward	156.0	154.2	0.8	very good
Barley	8	100	1/10	level ground	156.0	155.9	-0.1	very good
Barley	12	100	1/10	level ground	156.0	155.2	-0.5	very good
Rape	8	10	1	level ground	2.6	2.59	-0.4	very good
Rape	12	10	1	level ground	2.6	2.59	-0.4	very good

In all wheat drilling tests the deviation between the actual seed rate and the calibrated seed rate never exceeded -2.4 %. This percentage scores a ‘very good’ according to the DLG test matrix (table 8) irrespective of the filling level, work rate and machine tilt.

At barley, the deviating percentage of the actual rate from the calibrated rate was -0.1 % and -0.5 % in both tests. The tests at rape seed produced a deviation of -0.4 %. All tests at barley and rape were carried out on level ground and scored a ‘very good’ to the DLG matrix (table 8).

All lateral distribution tests with wheat (on level ground and on slopes) resulted in ‘very good’ (table 9).

At barley and rape seed, the results in lateral distribution also scored a ‘very good’ (table 9).

Table 9:
Seed distribution across the direction of travel on the test stand

Seed	Forward speed [km/h]	Filling level [kg]	Area drilled [ha]	Machine position and tilt	Calibrated (target) seed rate [kg/ha]	Coefficient of variation (CoV**) [%]	Assessment of the coefficient of variation
Wheat	8	100	1/10	level ground	153.0	1.3	very good
Wheat	12	100	1/10	level ground	153.0	1.3	very good
Wheat	8	100	1/10	20 % to the right	153.0	1.3	very good
Wheat	12	100	1/10	20 % to the right	153.0	1.2	very good
Wheat	8	100	1/10	20 % to the left	153.0	1.2	very good
Wheat	12	100	1/10	20 % to the left	153.0	1.1	very good
Wheat	8	100	1/10	20 % forward	153.0	1.1	very good
Wheat	12	100	1/10	20 % forward	153.0	1.2	very good
Wheat	8	100	1/10	20 % backward	153.0	1.3	very good
Wheat	12	100	1/10	20 % backward	153.0	1.3	very good
Barley	8	100	1/10	level ground	156.0	1.6	very good
Barley	12	100	1/10	level ground	156.0	1.6	very good
Rape	8	10	1	level ground	2.6	2.2	very good
Rape	12	10	1	level ground	2.6	2.1	very good

** The coefficient of variation (CoV) indicates how much the rate that is actually applied by the individual coulters deviates from the average seed rate. The smaller the coefficient of variation, the more uniform is the distribution of the seeds across the direction of travel.

Field test in winter rape

The test field is characterised by sandy loam (average soil rating 45, slightly inclined).

After barley had been harvested at the beginning of July, 2017 (straw was removed) a total herbicide was applied at the beginning of August. On 21st August, 2017 the field was operated at a depth of twelve centimetres with a cultivator (equipped with tine shares). On 22nd August, 2017 the field was again operated at a depth of eighteen centimetres with the cultivator (also equipped with tine shares). On 23rd August barley was sown. The seedbed was described as fine tilth.

During sowing on 23rd August, 2017 the Amazone Cataya 3000 Super seed drill was pulled by a John Deere 6155R. The forward speed was 8km/h. The Exact harrow on the drill was raised.

The winter rape variety sown was Asterion from Limagrain (5.4 g TGM, the ability to germinate as determined by LUFA in a lab analysis was 94 %).

The soil samples that were taken across the field from the sowing horizon of the seed contained a moisture content between 19 % and 21 %.

During the sowing procedure the rape grains were uncovered at a random basis and the sowing depth was measured. This was 2-3 cm. All rape seeds were covered with a sufficient amount of soil.

Figure 5 shows a drilled plot immediately after the drilling pass.

Rainfalls during the months of August, September and October are plotted in figure 6.

Figure 7 shows the growth stage in rape on 11th October, 2017.

Table 10 shows the field test results at winter wheat.

Figure 5:
This is how the field looked after drilling rape on 23 August 2017

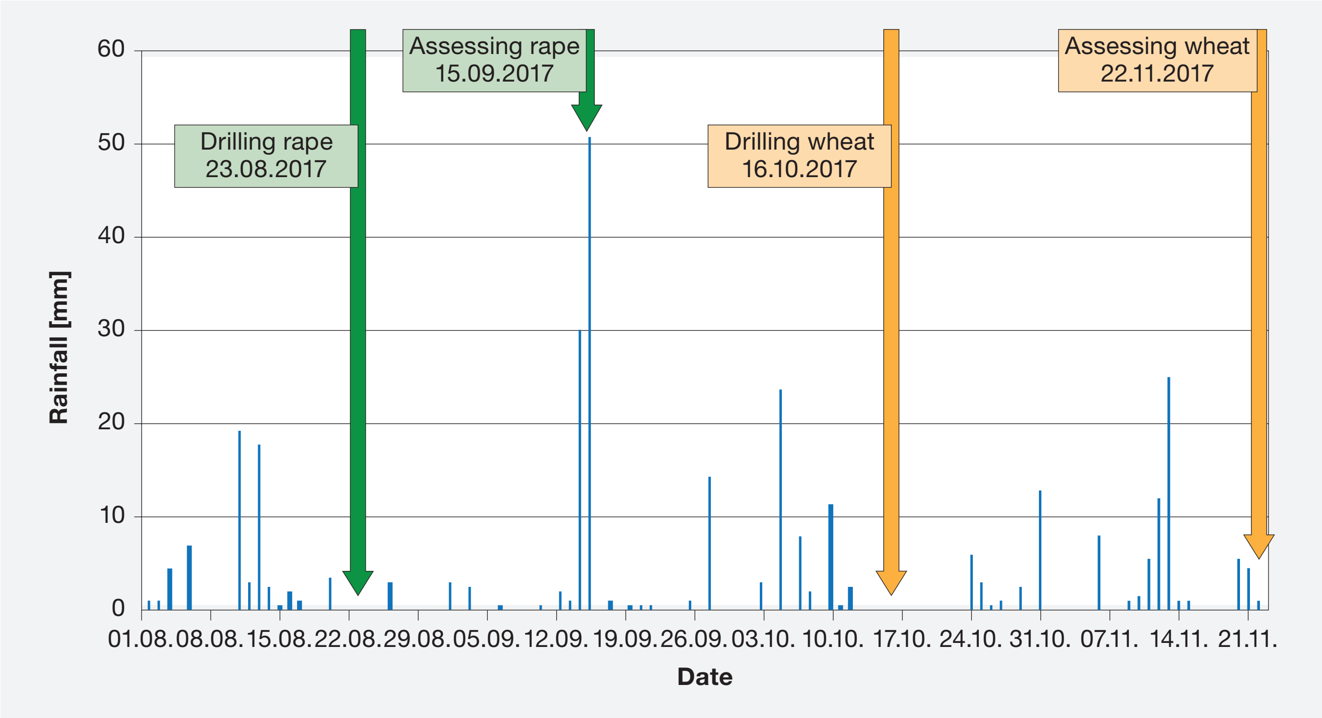

Figure 6:
Rainfall levels in the area between 1 August 2017 and 22 November 2017

Figure 7:
Growth stage of rape plants on 11 October 2017

Table 10:
Field results at winter rape

Test parameter	Result
Metering accuracy at rape seed	The deviation of the actual seed rate from the calibrated seed rate is assessed as very good (0.0 %)
Field emergence	very good (94.6 %)
Plant distribution along the rows	very good (factor of variation: 0.8)

Field test at winter wheat

The test field is characterised by the two soil types loamy sand and sandy loam (35 to 40 value points) and slightly inclined.

After the previous rape was harvested on 25th July, 2017, a total herbicide was applied on 9th August, 2017. In late August the field received a 5 cm deep cultivation pass, which was followed by a deeper cultivator pass (approx. 25 cm) on 12 September 2017. Then on 15 October 2017, the field received another shallow pass.

During the sowing operation on 16th October, 2017 the Amazone Caraya 3000 Super seed drill was pulled by a John Deere 6155R. For the sowing operation a forward speed of 8 km/h was chosen. The Exact harrow was not used in the drilling pass.

The winter wheat variety was Apostel by IG Pflanzenzucht (46.7 g TGW, 97 % ability of germination as per LUFA lab analysis). The soil samples that were taken across the field from the seed layer revealed a moisture content of between 20 % and 22 %.

During the sowing procedure two different grain sowing depth were consecutively adjusted at the seed drill (2 to 3 cm and 3 to 4 c m). Then the wheat seed was uncovered at a random basis and the placement depth was checked. The seed was placed in both desired placement horizons and the seed was covered with sufficient soil. Figure 8 shows the drilled plot directly after the pass with the seed drill.

Between sowing on 16th October, 2017 and the scores on 22nd November, 2017 (determination of field emergence, plant distribution along the row and depth placement) the rainfall amounted to 92 mm (Figure 6, page 11).

Figure 9 shows the growth stage in wheat on 22nd November, 2017. Table 11 shows the test results at winter wheat.

During the sowing procedure of wheat two different grain placement depths were adjusted successively on the seed drill (2 to 3 cm and 3 to 4 cm). Then at the scores on 22nd November, 2017 the depth placement of 100 consecutive seed grains were determined at a random basis. For this the length of the hypocotyl section of every plant underneath the soil surface the was measured. Figure 10 shows the measured values in a frequency chart. The hypocotyls of the plants sown at the set depth of 2-3 cm were 1.6-4.2 cm long (mean length: 3.0 cm, standard deviation: 0.5 cm). The hypocotyls of the plants sown at the set depth of 3-4 cm were 2.1-6.0 cm long (mean length: 3.8 cm, standard deviation: 0.9 cm). The smaller the standard deviation the more consistent is the seed depth.

Figure 8:
The wheat field immediately after drilling on 16 October 2017

Figure 9:
Growth stage of wheat plants on 22 November 2017 (320 seeds/m^2)

Table 11:
Field results at winter wheat

Test parameter	Result
Metering accuracy at sowing	The deviation of the actual seed rate from the calibrated seed rate is assessed as very good (1.2 %)
Field emergence	at a seed rate of 200 seeds/m^2: good (87.6 %) at a seed rate of 320 seeds/m^2: very good (90.6 %)
Plant distribution along the rows	at a seed rate of 200 seeds/m^2: good (factor of variation: 0.9) at a seed rate of 320 seeds/m^2: good (factor of variation: 1.0)
Seed depth (Hypocotyl length)	Target depth: 2-3 cm Actual depth (determined by measuring the hypocotyl length): 1.6-4.2 cm Average depth: 3.0, Standard deviation: 0.5 cm* Target depth: 3-4 cm Actual depth (determined by measuring the hypocotyl length): 2.1-6.0 cm Average depth: 3.8 cm, standard deviation: 0.9 cm*

* The smaller the standard deviation, the more uniform is the seed depth.

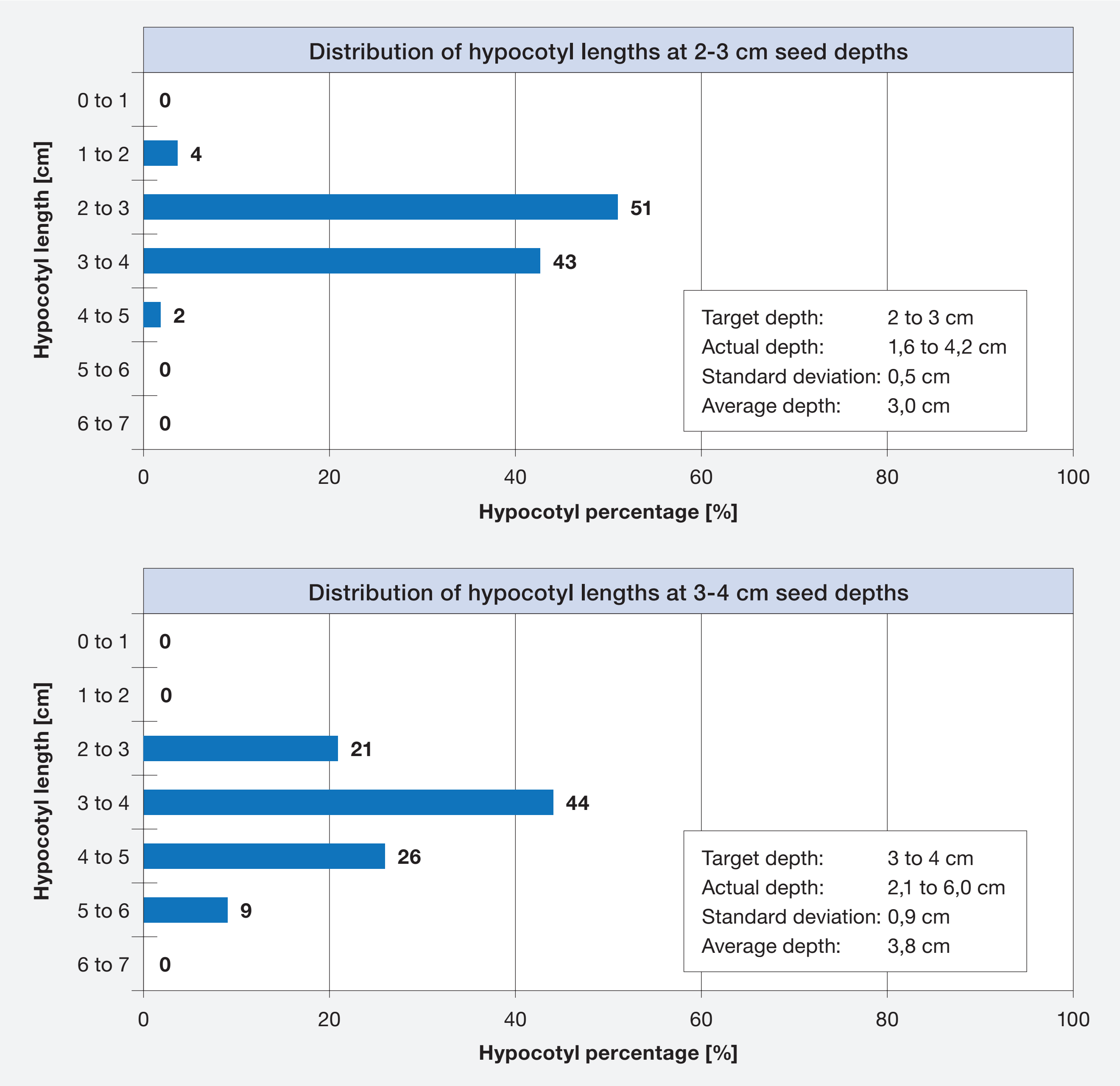

Figure 10:
Distribution of hypocotyl lengths at two different seed depths

Handling, operation, service and maintenance

Table 12 shows an overview of the results on machine handling.

The time that is used for the individual service and maintenance steps and the steps of operation were determined at the DLG Test Center for Technology and Farm Inputs in September 2017. The results are grouped in table 13.

Table 12:
Assessment of handling

Test criterion	DLG score	Comments
Setting the seed depth	satisfactory	The adjuster is located in well accessible position and is operated with the universal tool supplied. The operator does not have to climb into the machine. An easy-to-read scale shows the current position and ensures consistent settings.
Calibration testing	good	All necessary steps for calibration testing are carried out from the SmartCenter on the left machine side. The operator does not have to climb into the machine. The calibrated seeds are collected in the foldable bucket and weighed by the suspended scales supplied with the machine. The calibration result is then entered to the TwinTerminal inside the SmartCenter.
Storage for the hydraulic hoses	good	The hydraulic lines can be marked and neatly stored in a holder. Each hose is colour coded. The code marks the individual function.
Light kit	good	The light kit is permanently installed. It is not removed for field work. When removing the drill from the rotary cultivator, the drill's light kit can be connected on the rotary cultivator.
Setting the coulter pressure	satisfactory	The adjuster is easily accessible and operated with the universal tool supplied. The operator does not have to climb into the machine. An easy-to-read scale shows the current adjuster position and ensures consistent settings. As an option, the adjustment can be made hydraulically from the cab. This level of specification is assessed as 'very good'. The test drill did not have this specification.
Light kit	good	The light kit is permanently installed. It is not removed for field work. When removing the drill from the rotary cultivator, the drill's light kit can be connected on the rotary cultivator.
Setting the coulter pressure	satisfactory	The adjuster is easily accessible and operated with the universal tool supplied. The operator does not have to climb into the machine. An easy-to-read scale shows the current adjuster position and ensures consistent settings. As an option, the adjustment can be made hydraulically from the cab. This level of specification is assessed as **'very good'**. The test drill did not have this specification.

Table 13:
Clocking the time during operating and servicing

Activity		Testperson [min:s] 1	2	3	4	Averaged result	Required tool
Servicing all grease points	25-hour service (2 nipples)	0:22	0:16	0:17	0:21	0:19	Grease gun, screw driver
	50-hour service (3 nipples)	2:22	1:38	1:22	2:13	1:54	
	500-hour service (13 nipples)	3:49	2:54	2:31	3:40	3:14	
Changeover from work to transport position	Release bout markers	0:18	0:15	0:18	0:18	0:17	Universal tool supplied
	Move the traffic safety board of the harrow in its parking position and extend the tine bar to full working width	1:54	1:16	1:21	1:52	1:36	
	Move tramline markers into work position	0:21	0:19	0:16	0:21	0:19	
	Time needed when all three steps are carried out one after the other	1:58	1:38	1:27	1:48	1:43	
Conversion from fine seeds to cereals	Take the universal tool, activate the agitator, close 20 shutter slides on the metering system above the fine seed wheels, close 20 shutter slides above the normal seed wheels	2:06	1:42	1:40	2:14	1:56	Universal tool supplied
Setting the seed rate	Activation of TwinTerminal in the tractor cab and carrying out the calibration procedure at the SmartCenter	4:46	2:47	3:11	4:04	3:42	supplied folding bucket and suspended scales
Removal of 5 kg residual seed from the seed hopper	The seed is delivered from the hopper into the calibration trays	2:13	1:53	1:23	1:55	1:51	– –

Compliance with work safety standards

The drill was audited by the German Test and Certifying Center for Agricultural and Forestry Machinery (DPLF) in accordance with the 2006/42/EC Machinery Directive.

The machine was examined by also applying the standards as defined by DIN EN ISO 4254-1:2011 (Agricultural machinery – Safety – Part 1: General requirements), DIN EN ISO 4254-5:2011 (Agricultural machinery – Safety– Part 5: Power-driven soil-working machines) and DIN EN 14018:2010 (Farm and forestry machinery and drills).

The drill was found to comply with all standards that define the safety distances to rotating and moving parts.

Easy-to-read warning decals are attached where ever this is necessary. The manual gives comprehensive instructions and information on all aspects on the safe use of the machine.

The assessment by DPLF suggests that there are no concerns with respect to the safe use of the machine.

The kerb weight of cultivator drill Amazone Cataya 3000 Super that was used in the DLG test was 3,160 kg. The lowest available kerb weight for this model is 2,730 kg and refers to a different specification (manufacturer information).

The dimensions of the test machine were taken during the DLG test. These are listed in table 14.

Table 14:
Test machine dimensions

Unit	Measurement [m]
Drill length (incl. press roller)	2.64
Drill length (incl. Exact harrow)	3.48
Drill height (without bout markers)	2.06
Width in transport position	3.00

Summary

The mechanical drill Amazone Cataya 3000 Super achieved ‘very good’ results in all lab tests (metering accuracy and seed distribution across the direction of travel).

The field test results in winter rape and winter wheat were ‘very good’ and ‘good’.

The test results on handling operation, service and maintenance ranged from ‘very good’ to ‘satisfactory’.

The audit which tested the machine’s compliance with work safety standards found no shortcomings in terms of work safety. The assessment by DPLF suggests that there are no concerns with respect to work safety.

The Amazone Cataya 3000 Super mechanical drill is awarded the DLG APPROVED quality mark 2017 after passing the test modules on work quality, handling, operation, service and maintenance, and compliance with work safety standards.

More information

The DLG committee on crop production technology researches extensively on tillage and drilling equipment. Papers prepared by volunteer experts are available as pdf files free of charge at: **www.dlg.org/technik_pflanzenproduktion.html**

Test performed by

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DLG test scope

Drilling technology(current as of 04/2017)

Department

Field Operations

Head of Department

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Test engineer(s)

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The DLG

In addition to being the executing body of well-known tests for agricultural engineering, farm inputs and foods, the DLG is also an open forum for the exchange of knowledge and opinions in the agricultural and food industry.

Some 180 full-time employees and more than 3,000 volunteer experts are developing solutions to current problems. The more than 80 committees, working groups and committees thereby form the basis of expertise and continuity for the professional work. At the DLG, a great deal of specialist information for agriculture is created in the form of information leaflets and working papers, as well as articles in journals and books.

DLG organises the world's leading professional exhibitions for the agriculture and food sector. This contributes to the transparent presentation of modern products, processes and services to the public. Secure the competitive edge as well as other benefits, and contribute to the expert knowledge base of the agricultural industry. Further information can be obtained under www.dlg.org/mitgliedschaft.

The DLG Test Center Technology and Farm Inputs

The DLG Test Centre Technology and Farm Inputs in Groß-Umstadt is the benchmark for tested agricultural products and farm inputs, as well as a leading testing and certification service provider for independent technology tests. The DLG test engineers precisely examine product developments and innovations by utilizing state-of-the-art measurement technology and testing methods gained from practice.

As an accredited and EU registered testing laboratory the DLG Test Center Technology and Farm Inputs offers farmers and practitioners vital information and decision support for the investment planning for agricultural technology and farm inputs through recognized technology tests and DLG testing.

Internal DLG test number: 17-439; Amazone item number: MI6657

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