

Praxis • Zukunft • Leben

**dlz**

# primus rind

## Special edition

From the dlz agricultural magazine /  
primus rind issue 11/2010  
PO Box 40 05 80  
80705 Munich  
Tel: +49(0)89-12705-276  
reddlz@dlv.de  
www.dlz-agrarmagazin.de



***Lively and awake with  
grooming brushes***

Submitted by:

**DeLaval International AB**

PO Box 39  
SE-147 21 Tumba  
Sweden  
info@delaval.com  
www.delaval.com

 **DeLaval**

# Lively and awake with grooming brushes

**Practical test.** Does the performance of cow brushes vary? The Sächsische Landesamt für Umwelt, Landwirtschaft und Geologie and dlz looked at these and other questions when comparing eight cattle brushes. Dr. Ilka Steinhöfel presents the results.

**P**ersonal hygiene is important for the comfort of cattle. It has a balancing effect on the herd's social life. Social personal hygiene mainly consists of mutual licking. Furthermore, the animals use firm objects within reach to rub themselves up against. Current housing systems should allow autonomous grooming. In this way, they contribute to the well-being of the animals.

New technical developments have created an array of cow cleaning machines. The selection ranges from simple scratch brushes to various systems with one or two rotating brushes. Among these options, the farmer must find a brush which

- Is easy for the animal to operate
- Reaches as many parts of the animal as possible

- Offers a "cleaning effect"
- Does not harm the animal
- Requires little maintenance
- Operates without disruption
- Keeps its shape
- Consumes little energy
- Requires little space for mounting
- Is good value for money.

Which of the brushes achieves these goals the best? Neutral tests are required



Cow brushes increase cows' comfort and help their well-being.

Photo: Diersing-Espenhorst

in order to find out more. The DLG has tested cleaning machines for cattle for several years. Above all, the technical details were evaluated here. Animal related testing criteria are based on animal observations for the acceptance of the brushes. Injuries, cleanliness and occupational safety were evaluated in the same way.

A test with various cattle brushes from dlz primus rind and the Sächsische Landesamt für Umwelt, Landwirtschaft und Geologie from August 2008 to April 2009 focused on animal behaviour (see “The procedure” box). Brushes from eight companies were considered (see “Technical data” table).

### Good acceptance

The brushes were used by virtually all of the cows in a group. Use on the worst day was 85% and on the best 100% of the animals in a group. The animals went in step to the brush three to six times a day. It was more the group than the type of brush which had an influence on brush activity here. For example, the group of late lactation cows showed more active cleaning behaviour than animals in earlier lactation stages. On average, the cows stayed in front of the brush for a total of ten minutes. Major individual animal differences were found. Simple “cleaning” lasted on average 130 seconds. “Cleaning” counted as the time of body contact with the brush with less than a minute break between contact. The greatest rush for the brushes took place between 4pm and 7pm (See “Cleaning actions” chart).

The longest lasting brush actions were observed at night between 1pm and 4pm. With 30 cows, the brushes were “occupied” on average 4.45 hours a day. Short visits lasting less than ten seconds were mostly recorded as accidental touching when passing or cleaning attempts in-



Photo: Diersing-Espenhorst

errupted early by status disputes. The disputes affected 9% of the number of cleaning actions but only made up 0.3% of the total time spent at the brushes (See “Results overview” table use of the brushes). This is different for cleaning actions lasting more than five minutes. The same number (9%) take up 32% of the total time at the brushes. The cleanliness of the animals depended a lot more on the cleanliness in the group and the dirt conditions than the brushes. There were no injuries. No maintenance work needed to be carried out to the equipment during the tests. The brushes were all failure-free and kept their shape.

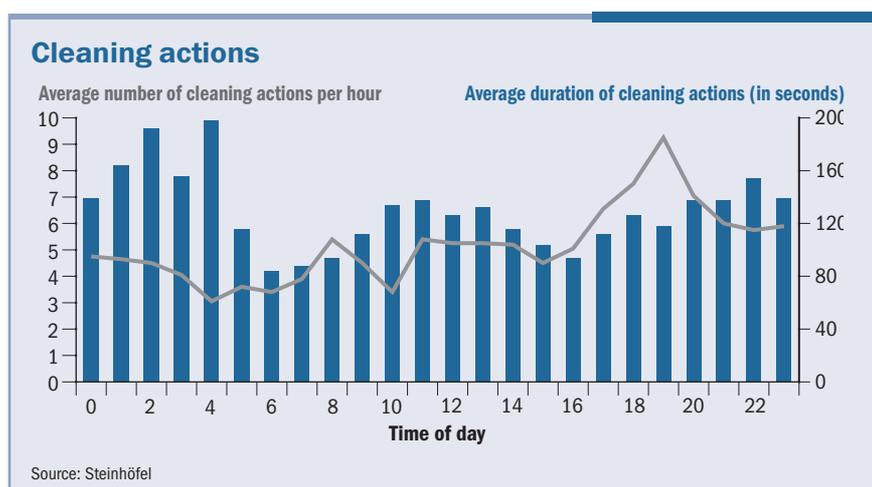
### Switched-on with savvy

First contact with the head occurred depending on the type of brush (61 to

93%). With the two brush systems, the vertical (side) brush was the first point of contact. In the cases of Luna from Lely, the Swinging cow brush from DeLaval and the Cow Cleaner from Kerbl, it was often observed that the cows firstly touched the brushes with their shoulder area. Less often, the cows pushed themselves backwards towards the brushes (less than 5%).

The brushes were not started for all “Cleaning” activities. On average, the cleaning brushes provided 72% of all cleaning actions. Here there were major differences between the system types. While during contact with the swing brushes, the brushes rotated in 83 to 91 in 100 cases, the single brush systems only moved in around two thirds of the cases of brush contact. Ratings of visits lasting ten seconds or longer were evaluated (see “Results overview” table “Cleaning with running brush”).

The time from first body contact until the brush rotation started varied depending on the system. On average, only 11 to 25 seconds passed before the cow set the swing brushes in motion. Here it was enough to tip the brush out of the vertical inactive position in a horizontal direction. Cows mainly did this with their heads, but 36 to 46% percent also did this with other body parts. The cows laboured for between 27 and 52 seconds in order to set the single brush systems in motion. To turn them on they still more often (88 to 92%) used their head or neck. For this, they had to



Source: Steinhöfel

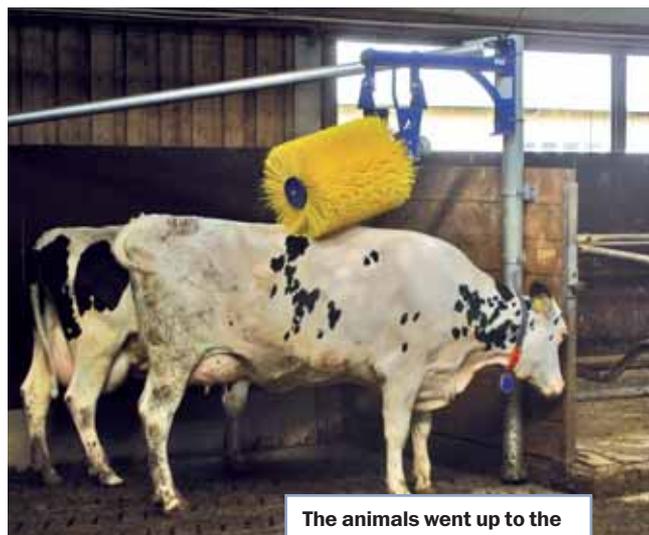
Photo: Diersing-Espenhoist



**All of the brushes tested were used by almost all of the cows in a group.**

vertically lift the brushes up to a switch point. The operating time was firmly set to 60 seconds for all one brush systems. After this time was up, the cows had to restart the brushes. These repeated starts were also mainly carried out by the animals using their head or neck (around 85%).

The two brush systems were also operated after the construction was vertically lifted, indeed just with the movement. While for 19% of the cleaning contact, the two brush system from Schurr did not run, this figure was 33% for the Krazzmaxx from Bass Antriebstechnik. The Krazzmaxx only started after pressure against the upper horizontal brush.



**The animals went up to the brushes on average three to sixth times a day.**

Photo: Steinhöfel

The brush from Schurr could also be occasionally switched on (9%) by intensive rubbing on the side vertical brush. But here too the animals predominantly started the brush (68 or 81%) using the head-neck area. Cows also used their head or neck for three quarters of repeated starts.

**Fixed or flexible**

We positively evaluated an activated brush when the brush was operated for so long as if it were “willingly” held by the cow. Which means that after switching on the brush, the cow can use the rotating tool until its cleaning needs have been satisfied without having to actively restart the brush. The cow leaves the running brush. The result: the equipment

runs for a relatively long time during the cleaning time. If the cow moves away, it should stop as quickly as possible.

If short visits are not considered, 50 and 56% of the cleaning actions from Lely’s Luna and the DeLaval Swinging cow brush can be attributed to this procedure (see “Results Overview” “Stop and go”). After 130 or 88 seconds cleaning action duration and 78 or 85 % brush operating time on average, one can assume that the majority of the cows satisfied their cleaning needs using these brushes. We assumed the opposite if the brushes stopped while the cow was still using the brush. In around half of the cleaning actions, the cow switched on the brush

**Technical Data\***

	Happycow	Cow Cleaner	Heido VPG3	Luna	Pendular cattle brush	Swinging cow brush	Krazzmaxx	2 brush system
<b>Company</b>	Mayer	Kerbl	Heitmann	Lely	Patura	DeLaval	Baß Antriebstechnik	Schurr
<b>Number of brushes</b>	1	1	1	1, swinging	1, swinging	1, swinging	2	2
<b>Set up</b>	horizontal	horizontal	horizontal	horizontal	vertical	vertical	horizontal and vertical	horizontal and vertical
<b>Projection (cm)</b>	120	120	124		125	90	110	110
<b>Weight (kg)</b>	110	105		42	96	35	133	130
<b>Voltage (V)</b>	230	230	230	230	230	230	230	230
<b>Output</b>	Spur wheel worm gear motor	Spur wheel worm gear motor	Spur wheel worm gear motor	Direct	Electric motor	Electric motor	Spur wheel bevel gear with 2 outlets	Electric motor / gear
<b>Engine speed (U / min)</b>	47	46	60	30	60	22	60	60
<b>Power input (kW)</b>	0.37	0.37	0.37	0.18	0.37	0.12	0.37	0.37
<b>Price (Euro, plus VAT)</b>	2,130 (including VAT)	1,550 (including VAT)		999 (+fastening material**)	1,671.43	1,963.50 (including VAT)	2,250 (including VAT)	2,377.62 (including VAT)

\* all information is provided without guarantee and is subject to change, \*\* several options (wall fixing, round or square-end supports, 2", 3", 4" etc.), low cost self assembly carried out by the farmer in general.

once again. The Patura pendular brush turned according to a set time (52 seconds here). If it was pressed out of the idle position for longer than 52 seconds, it autonomously continued on after a short stop which was hardly troublesome for the cow, without the cleaning having to be noticeably interrupted for the cow. In the case of cleaning actions which lasted longer than the operating time of a brush started once, the brushes were moved again in 78 % of cases. The Heido VPG3 from Heitmann was left before the first brush stop in only 15% of the cleaning actions (after 60 seconds operating time). If the cows had managed to move the brush, they visibly enjoyed the time until the end of the rotation. However, only 46% restart the brushing. This argues for the quality of the brush structure, but not for the ease of switching it on.

The two brush systems also moved for as long as the brush was in the lifted position. If the construction fell into the starting position again as in the case of small cows or head or neck brushing on the side brush, individual overtravel time followed. Then the brushes came to a standstill. Here the smaller cows had to move the brushes with their heads again and again. Thus, particular attention had to be given to the individual herd height setting to ensure uninterrupted cleaning. On the basis of the animal behaviour, activating the brush movement on the side brush was more effective, as they could be equally used by all animals.

The advantage of the more cost intensive rotating brushes compared to fixed brushes should have been used as effectively as possible by the cows. For evaluation, we used the proportion of the brush operating time against the total cleaning or contact time. The ease of switching the brush on and the operating time configuration may influence this value (see “Results overview” table “making contact”). Swing brushes were actively brushed in 61 to 76% of the pure contact time. Above all, one system brush systems made up 36 to 57 % here due to the later switching on. Two brush systems achieved 39 to 45%, which can be attributed to the initial high cleaning activity on the side brush but with which the cows were not able to set the brush into motion.

### Various number of starts

The different operating modes do not always just provide an explanation for the observed behaviour. This also complicated the evaluation. In the case of brushes with a flexible operating time this means a brush operation so that the cows can clean themselves without interruption. Lots of actions are registered with only one brush start, a longer brush operating time within the contact time with the cow and more frequent idle time after grooming.

In contrast, if the brushes have a fixed operating time and must then be actively restarted, these are evaluated differently. Because these stop after the



Photo: Werkbild

The cows were at the brush for ten minutes a day on average.

set time while the cow is still at the brush. Only 36 to 53% of the cleaning actions continued after this, in which the animals started the cleaning device once more. Here a relatively high number of actions can be observed with only one brush start, short brush operating times despite long contact times and less frequent idle time. The two brush systems were more difficult to move than the swing brushes. The cows liked to continuously rub their head and neck area on the side brush, whereby the system fell into the idle position. However, the cows quickly started the brushes again if required. This results in a relative high number of repeated starts, particularly for the Kraxzmaxx brush (see “Results overview” table “Repeated actions”). It was operated with a very short overtravel time. Frequent starting of the brush compared to the total operating time could have a long-term negative effect on the service life and the staying power of the technology and energy consumption. This was not however detectable in the investigation.

### One minute is not enough

In most cases, the cows started their grooming with their head or neck. Then they continued further in the direction of the tail. If the brush time is limited, the brush stops if the animal is perhaps there to have the shoulder area brushed. Practiced cows interrupt the grooming, take a step back and start the brush once more. Unpractised cows interrupt the grooming on the inactive brush after a short exposure time.

If one considers the cleaning actions on the Swinging cow brush from DeLaval and from Luna with only one brush start (short visit < 10 secs. not included), on average the cows stood under the rotating brush for 82 or 107

## The procedure

The brushes were installed in four cattle stalls in LVG Köllitsch in four groups (30 places each). They were located in the crossing from the eating to the resting area. The animals were able to move around freely within a radius of at least 3m of the brush. After a 14 day adaptation phase, video recordings were made over four consecutive weekends from Friday 12 o'clock until Monday 12 o'clock. The energy consumption was recorded on a weekly basis and the cleanliness of the cows' coats monitored. After the conclusion of the test phase, the brushes were reassigned for repetition of the process respectively in another group. With the help of the video recordings, all bodily contact with the brushes was individually evaluated. The following were evaluated:

- Handling of the brushes (rating, time until switch-on)
- Use of the rotating brushes (absolute brush



Photo: Steinhöfel

The cow actions at the cattle brushes were recorded and evaluated using cameras.

operating time during cleaning action and in relation to the entire cleaning time)

- Proportion of cleaned body parts and
- Ratio of idle time to brush operating time during cleaning action

## Results in the overview

	Happycow	Cow Cleaner	Heido VPG3	Luna	Pendular cattle brush	Swinging cow brush	Krazzmaxx	2 brush system
<b>Manufacturer</b>	Mayer	Kerbl	Heitmann	Lely	Patura	DeLaval	Baß	Schurr
<b>Use of the brushes</b>								
Time spent at brushes / day for 30 cows (hrs)	3.0	4.5	5.1	5.5	4.1	4.8	6.1	4.8
Number of cleaning actions per day for 30 cows	82	171	103	136	113	148	163	130
Mean duration for cleaning actions (secs)	132	94	177	145	131	118	135	133
Proportion in category < 10 secs (%)	3.9	15.0	6.3	12.9	6.0	14.0	7.6	3.8
10-60 secs	23.6	30.0	23.8	24.0	29.6	27.6	29.8	31.2
> 60-300 secs	66.6	51.0	52.4	51.3	54.6	48.8	51.3	56.9
> 300 secs	6.0	4.0	17.5	11.8	9.8	9.6	11.3	8.1
<b>Cleaning with running brushes</b>								
Cleaning with running brushes (%)*	59.4	73.0	61.0	86.0	84.2	93.6	68.5	82.8
Number of cleaning actions with running brush per day *	46	106	59	103	90	120	103	104
<b>Evaluation**</b>	<b>5</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>
Time until start (secs)	45.6	25.3	52.4	24.9	23.6	11.1	35.5	26.5
<b>Evaluation**</b>	<b>4</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>Stop and go</b>								
Brushes <u>not started</u> (%)	42.3	37.1	42.8	14.4	17.0	9.2	33.1	18.8
From the cleaning actions (>9 secs duration) with running brushes:								
First brush stop before end of grooming (%)	78.9	70.7	86.9	50.3	75.7	44.5	86.9	75.8
Of which <u>restarted</u> (%)	35.8	53.3	45.9	51.5	78.4	59.0	58.4	54.8
Brushes only <u>started once</u> , cow leaves running brush (%)	21.1	29.3	13.1	49.7	24.3	55.5	13.1	24.2
Duration of cleaning action (secs)	85	56	52	130	40	88	78	65
Mean proportion of the brush operating time within a cleaning action (%)	51.2	66.7	61.6	78.3	60.1	84.6	50.3	65.1
<b>Making contact</b>								
Mean duration of cleaning actions, when brushes started (secs)	163	130	241	162	147	128	173	151
Mean proportion of the brush operating time within the total contact time (%)	50.8	62.5	47.2	67.1	66.1	76.5	42.8	51.8
<b>Evaluation**</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>3</b>
Mean brush operating time within a cleaning action (secs)	70	75	88	115	90	97	68	68
<b>Evaluation**</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>
<b>Repeated perpetrators</b>								
Mean number of repeated brush starts per action with rotating brush	0.4	0.5	0.7	0.3	1.1	0.3	1.2	0.7
Number of starts/ 60 seconds operating time	1.0	1.0	1.0	0.6	1.1	0.6	1.8	1.3
<b>Evaluation**</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>Proportion of brushed body parts<sup>1)</sup></b>								
Head	52.2	57.3	52.0	54.8	59.7	57.3	44.7	66.5
Neck	35.1	39.2	41.6	41.1	59.1	48.1	32.5	50.8
Shoulder	18.5	35.4	32.3	45.6	50.9	57.3	33.4	51.6
Torso	6.73	16.3	22.3	44.1	37.1	57.3	27.2	41.2
Hind quarters	6.49	15.2	21.6	51.0	23.0	48.8	27.5	37.7
Tail	4.81	6.88	12.6	22.8	14.8	23.9	16.6	18.5
<b>Evaluation**</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>Short idle time</b>								
Proportion of cleaning actions with idle time in actions with running brush (%)	30.0	43.0	22.7	62.7	58.9	65.0	26.2	36.0
Proportion of idle time of total brush operating time (%)	9.7	11.7	6.1	9.9	14.8	13.8	3.8	6.7
Idle time per day (minutes)	6.2	16.4	4.9	21.3	23.4	32.9	4.6	8.4
<b>Evaluation**</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>2</b>
<b>Foray with idle time</b>								
Cleaning actions with < 10 secs contact time (%)	3.8	15.0	6.3	12.9	6.0	14.0	7.6	3.8
Of which brush operation (%)	18.8	4.2	5.9	64.7	47.4	53.7	43.5	30.0
Proportion of "disputer" idle time against total brush operating time (%)	0.4	0.7	0.4	2.3	1.5	2.6	1.0	0.4
<b>Evaluation**</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Total evaluation**</b>								
Switch on rating	5	3	5	2	2	1	3	2
Time until start (secs)	4	2	5	2	2	1	3	2
Proportion brush operating time against total contact time	3	2	4	2	2	1	4	3
Duration of brush operation time during cleaning action	3	3	2	1	2	2	3	3
Number of starts / 60 secs brush operation	2	2	2	1	2	1	3	2
Body parts	5	4	3	1	2	1	3	2
Idle time	2	3	2	2	3	3	1	2
"Disputers"	1	1	1	3	2	3	2	1
<b>Overall evaluation</b>	<b>3.1</b>	<b>2.5</b>	<b>3.0</b>	<b>1.8</b>	<b>2.1</b>	<b>1.6</b>	<b>2.8</b>	<b>2.1</b>

\* without short visits; \*\*Marked on a scale of 1-6 with 1 being the best and 6 the worst rating; <sup>1)</sup> on running brush compared to the total number of cleaning contacts; source: Steinhöfel

## The revolution in cow comfort

DeLaval swinging cow brush SCB



Grooming starts with the head or neck in most cases.

Photo: Steinhöfel

seconds without interruption. The “once starting” other brushes did not get beyond an average effective operating time (within one cleaning contact period) of 39 to 50 seconds.

The pendular brush from Patura is to be separately considered here again due to its special functionality. If one also includes the cleaning actions with several starts in the examination, the mean time of the used brush rotation increases further to 132 or 108 seconds and for the Luna from Lely and the Swinging cow brush from DeLaval. There were cows which enjoyed the rotating brushes against their bodies for up to 12 minutes within a passage. The longest continuous brush operating time after start up was observed with the Swinging cow brush from DeLaval (12.7 minutes). The brush was used by four cows in total during this time.

If the cow can freely decide on the brush running time, the back and hind quarter in addition to the head and neck area are also extensively groomed. This also confirms the analysis of the brushed body areas (see “Results overview” “Proportion of brushed party parts”). The brushes from DeLaval and Luna mastered brushing from head to tail

The brushes were occupied by around 30 cows per day for 4.45 hours.

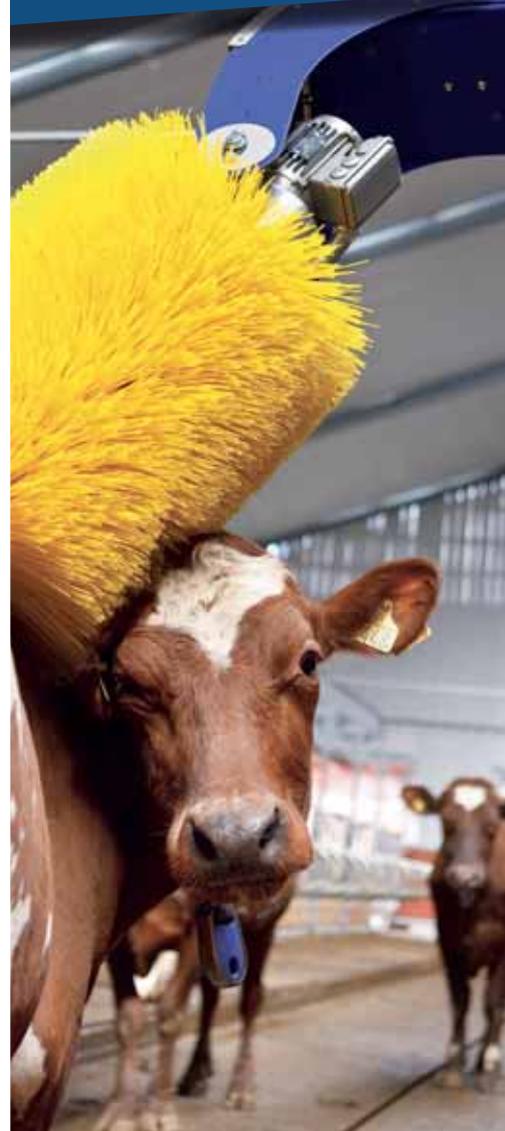


Photo: Steinhöfel

the best. With over 20% of the cleaning contact, the rotating brush also reached the tail area. In about half of the cleaning contact, the animals also brushed their shoulders, the torso and hind quarters. The brush from DeLaval “spun around” by itself over the cows’ backs. Under the Luna, the cows decided which body part and how long and how intensively they would be brushed. This brush reached the area of the sacrum particularly frequently. In contrast to this, in the case of the brushes from Kerbl and Mayer, it was observed that cleaning was often cut short shortly after the brush reached the back or sacrum. The two brush systems are also suitable for use on the cow’s entire body. Admittedly, the cleaning intensity with these systems is clearly decreasing according to distance from the head area. But the system from Schurr still achieves values of 40% for the torso and hind quarters and 18% for the tail area. The side brush is used intensively for the head and neck area and hardly at all for other body areas. When the brush turned, contact with the shoulder or torso was only observed in 40 to 50% of applications. The running side brush only reached the flank in 10 to 20% of the cleaning actions. This corresponded to – based on the total number of brush visits studied – four to six percent. The side brush predominantly represented the first contact point with the head or neck of the cow. They often rubbed themselves very intensively against these brushes. Switching on and maintaining the brush rotation via the side brush is very much recommended. In this way, the service efficiency of this system may be significantly increased.

### Some idle time

Should the brush turn for as long as it is kept on standby by the cow, this causes more frequent idle time after the cow has finished cleaning (see “Results overview” table “Short idle time”). Idle time was found most often when swinging brushes were operated. In the case of these brushes, the proportion of idle time against the total operation time of the brushes was the highest with 10 to 15%. This corresponded to a maximum of 33 minutes per day in this investigation. If brushes were started by so-called “disputers”, the idle time can be significantly greater (see “Results overview” table, “Foray with idle time”). This is seen above all in the case of the swing brushes. The Luna was started up in the case of 65% of the “disputers”, which caused around one fifth of the total idle time of



### We have taken the number one cow brush to the next level.

- Improved grooming angles due to two separated pivot points
- Unique safety mechanism for higher cow and user safety
- Proven increase of milk production and reduction of clinical mastitis\*
- Decreased energy consumption by 26%

Let your cows benefit from our improvements.

Your solution – every day  
www.delaval.com



\* Source: Cornell University (Schukken, Young) August 2009



The largest contingent of cows dominated the brushes between 4 pm and 7 pm.

Photos: Werkbild, Steinhöfel

## Overall evaluation

The results of the video recordings were used to evaluate the brushes. The overall evaluation (see “Overall results” table) using a scale of 1 to 6 (with 1 being the best mark and 6 the worst) provides a quick overview. Equally good or bad marks for an evaluation parameter may however have various causes as we tried to find a scale for different technical solutions. Simple switching on and a flexible operating time made effective use of the cleaning machines by the cows and were awarded by good marks in our test. The same applies for fewer brush starts with a longer operating time and less frequent operating times, as well as when passing by causes a short idle time and as much as possible, the cow’s entire body benefits from the rotating brush. An average mark was calculated in which every partial grade was incorporated using a simple value. The prize winner based on very good service efficiency for the cow’s entire body, the high switch-on

this brush. This figure was even 25% in the case of Krazzmazx with its very low idle time. In the case of all single brush and two brush systems from Schurr, less than 7% of the idle time was occupied by the “disputers”. Based on the total brush operating time, a maximum of 2.6% of the idle time could be traced back to these short visits.

quota and despite the still arguable idle time were the light weight brushes from DeLaval and Lely. Happycow, Heido and Krazzmazx in particular showed switch-on delays. As a result of this, there was also a lower brush operating time proportion during contact. But Heido operated constantly and reached all body parts with satisfactory success. The two brush system from Schurr and the Patura pendular brush ended up with a solid, balanced result in all parameters.

de ■

## Dr. Ilka Steinhöfel



Employed at the  
Sächsisches Landesamt für  
Umwelt, Landwirtschaft und  
Geologie in Köllitsch.

## Comments

### Lely

“Whether robots or somewhat simplified products at first glance: Lely also strives to offer the best for both man and animals. This also applies to cow comfort and our customers’ wallets. The simple but robust and sustainable construction of the Luna cow cleaning brush, linked with the option of simple and cost saving self-assembly also ensure the social well-being of the Lely customers. The low price combined with the excellent test results reflect a good price-performance-relationship.”

### PATURA

“On the basis of our many years of experience, we would also like to address the following points: the Patura pendular brush is significantly longer and heavier compared to other swinging cattle brushes. Thus the mid and lower body regions can clearly be reached more easily. A greater cleaning effect per time interval can be assumed due to the large surface area and the tallied brush shape.”

### Baß-Antriebstechnik

“We have studied the practical test intensively and have come to the conclusion that the stopping of seconds does not reveal the effectiveness of the brushes. The two brush machines can not be compared to the single brush machines and swing brushes with regards to cleaning effect

and accessibility to many body parts.

Furthermore, the cleaning effect on dandruff and hair on the floor is recognisable. Remarkably, this was not considered in the test. In terms of accessibility to body parts, it should be pointed out that with the up and down movements of the Krazzmazx, the brushes also make a 5° swinging movement.

For us it is incomprehensible why the cleaning intensity to the head area should decrease significantly with a two brush system. We also find the fact that there is a difference between the two brush machines in the evaluation of the machines “cleaning with running brush” inexplicable. If it is determined that there is a horizontal brush which has a greater cleaning duration by far then this results from the animal recognising that it tickles more than it cleans and therefore stays longer.

The “making contact” point also illustrates this and was not recognised in the investigation. The two brush machine achieved a much better cleaning result with 68 seconds respectively. As the cow does not benefit from this effect with other machines, it brushes itself longer here. With the fixed two brush machines the animal can decide itself how intensively it would like to be brushed. On applying pressure against the brush, it does not evade, which is the case for the pendular system. Furthermore, the electric switch-on settings are often a question of opinion. The manufacturer wanted to achieve two things with the electric controls: the animal switches on the machine by lifting

the brush which then runs as long as the animal stands beneath it.”

### DeLaval

“With the dlz-primus-rind-Test, we finally have a long-term practical test which compares the different brush systems available on the market in a neutral way. Of course, DeLaval is very pleased to be ahead of the competition with the Swinging cow brush, but this does after all show that the cow brush has been developed in the right way to ensure the well-being of cows and is correspondingly approved by cows. This statement is supported by the DLG Signum test passed by the Swinging cow brush which highly focuses on technical details.

In 2009, Cornell University in the USA carried out a study with DeLaval which shows that cows which brush themselves with the Swinging cow brush by DeLaval are in better health, and have increased blood circulation. In the group of cows in the second lactation stage, milk production was found to be 1 kg greater each day than the comparative group without the brushes. At the same time, the number of clinical mastitis cases fell by 34%.

With the publication of the practical tests by dlz primus rind which focus on animal related criteria, the farmer now has a very good, practical basis for making his buying decisions.”