

FEED SCIENCE · DAIRY · THE GUELPH STUDIES

SMALL CHOP. BIG PROFIT.

The University of Guelph changed one thing in a dairy ration. Not the ingredients. Not the mixer. Just how short the straw was chopped. Then they watched what forty cows did about it.

BY NICK BUTZE · HAYBUSTER INTERNATIONAL



A HayBuster tub grinder at work. The same machine named in the study's methods section.

THE ARGUMENT EVERY FARMER KNOWS

“THE COW WILL SORT IT OUT.”

Every farmer I have ever argued with about chop length has said some version of the same thing. **“The cow will sort it out.”**

She will. That is exactly the problem.

Here is what sorting actually does to you. She eats what she likes and leaves the rest, and the long straw is what she leaves. So the first cow to the bunk gets one ration, and the cow behind her gets what is left of it. Nobody eats the diet you built.

You did not feed your herd one diet. You fed them four.



This is sorting. She eats what she likes and throws the long straw on the floor. The cow behind her gets a different ration.

This is not an opinion. It has been measured, at a university, and the numbers are worth your time.

THE EXPERIMENT

WHAT GUELPH ACTUALLY DID

At the Elora Dairy Research Facility, Professor Trevor DeVries and his group at the University of Guelph wanted to know what happens to a cow when you change one thing in her ration and one thing only: how short you chop the straw.

Not the ingredients. Not the energy density. Not the mixer. Just the chop.

So they took wheat straw and ran it through a tub grinder. And here is the part I did not expect when I first read the paper: the machine is named in the methods. It was a HayBuster tub grinder, out of Jamestown, North Dakota. The same tub grinder we have been building for sixty years is the one the university reached for when they needed to control particle size for a research trial.



The tub. Bales go in continuously. The mill and the screen decide what comes out.

Half the cows got straw chopped through a **2.54 cm screen**. The other half through a **10.16 cm screen**. Everything else identical. Thirty-six percent corn silage, thirty-five percent dry cow pellet, twenty-nine percent wheat straw. Forty cows, enrolled at dry-off about forty-five days before they were due to calve, then followed straight through calving and into lactation.

One machine. Two screens. Forty cows. That is the whole experiment.

LET ME BE STRAIGHT WITH YOU

This study does not prove a HayBuster beats another brand. Guelph was not comparing machines, and I am not going to pretend they were.

What it proves is more useful than that. **Particle size is not a side detail. It is a lever.** Pull it and the cow's intake, her sorting, her metabolic health and her milk all move. And if particle size is a lever, then the only question left is what you are using to pull it.

THE RESULTS**WHAT THE COWS DID****15.6 kg**

Daily dry matter intake on short chop, against 15.0 kg on long chop

99.7%

Sorting index for the longest particles on short chop. 94.2% on long chop. 100% means she ate the ration you built

+0.4 kg

More dry matter per meal, in 0.6 fewer meals a day

↓ BHB

Lower ketosis markers three weeks after calving on the short chop diet



Short-chopped straw. Uniform particle size, clean cut, low dust. This is what the 2.54 cm screen delivers.

The cows on short straw ate more. **15.6 kg of dry matter per day against 15.0 kg** for the long straw group. In a dry cow that is a real difference, and dry cow intake is not a number anyone should shrug at.

But intake is not the interesting one. The interesting one is *consistency*.

In the week before calving, every dairy farmer knows what happens. Intake falls off a cliff. It is normal. It is also the moment your cow is most exposed, and the size of that drop is one of the better predictors we have of whether she is about to get sick.

The short-chop cows held their intake steadier into calving. The long-chop cows dropped faster. The short-chop cows also ate **0.4 kg more per meal**, ate faster, and took **0.6 fewer meals a day** to get it done. Fewer trips to the bunk, more in her each trip.

And they sorted less. Both groups sorted against the long particles, because that is simply what cows do. But the cows on the long chop sorted **to a greater extent**. In the companion study, the sorting index for the longest particles was 94.2 percent on the long chop and 99.7 percent on the short. A hundred percent means she ate the ration you built. 99.7 is about as close to a straight line as this kind of data gets.

Then it showed up in the blood. Three weeks after calving, the long-chop cows had **higher beta-hydroxybutyrate**. Higher BHB means deeper negative energy balance, and that means more ketosis, more metabolic disease, more vet bills, more cows that never quite get going in their lactation.

Their rumens told the same story. Mean rumen pH was not different between the groups. What was different was the *rate of decline*: in the first week after calving, the long-chop cows' rumen pH fell away faster. Their rumens had a harder landing.

The chop length in the dry pen was still being paid for, or paid out on, three weeks into lactation.

THE SECOND STUDY AND THE MILK



She eats what you mixed. That is the whole mechanism.

The DeVries lab ran a second study on the other side of calving. Forty-one multiparous Holstein cows, followed through the first twenty-eight days after calving, on a lactating TMR with nine percent wheat straw. One group's straw through a 2.54 cm screen. The other through 5.08 cm.

The cows on the shorter straw produced milk with less fluctuation day to day. And over those first twenty-eight days, they **tended to produce 75 kg more milk, cumulatively.**

ABOUT THAT WORD "TENDED"

In the statistics, that milk result was a *tendency*, not a hard significant difference. Forty-one cows is a small barn. If I told you short chop *guarantees* 75 kg more milk per cow, I would be lying to you, and the first nutritionist you showed this to would say so.

Here is what I will tell you instead. That milk tendency does not sit on its own. It sits on top of measurably higher intake, measurably less sorting, measurably lower ketosis markers, and a rumen that handled the transition better. Every arrow points the same way. When five independent measurements all lean in one direction, the sixth leaning that way too is not a coincidence.

Straw did not become more nutritious. Straw is straw. What changed is that she ate what you actually mixed for her, in the same amount, every day, and her rumen never had to whipsaw between a fibre day and a grain day.

MORE CHOP. MORE MILK. MORE MONEY.

THE TRAP AT THE END OF THE LEVER WHERE SMALL GOES WRONG

The short-chop diet produced more fines and dust than the long-chop diet. And the cows sorted against them. Also the Guelph finding

That surprised the research team. Cows normally pick out the small particles, because the small ones are usually the tasty ones. Not here. Here the finest fraction was pulverised straw and dust, and the cows wanted nothing to do with it.

Their recommendation was to use a chopping technique that minimises over-processing, so you are not filling the bunk with fines.

So the honest instruction from the research is not “make it smaller.” It is:

MAKE IT SHORT. MAKE IT UNIFORM. DO NOT MAKE IT DUST.

And that is a harder engineering problem than it sounds, which is exactly why it is worth talking about.

Anything can beat a bale to pieces. A flail can. A mixer with knives can, eventually. The difficult thing, the thing that actually separates machines, is delivering a particle that is short *and* uniform *and* not pulverised, load after load, in wet straw and dry straw and the brittle miserable straw you get in a bad year.

That is what a hammer mill running against a screen is for. **The screen is the referee.** Material stays in the mill until it is small enough to pass, and the moment it passes, it is out and gone before it can be ground a second time. Material that is already the right size does not sit in there getting hammered into powder. That is the entire design philosophy, and it is why we tell operators to run a screen about half their target particle size rather than reaching for the smallest screen in the rack and hoping.

It is also why the machine has more than one screen. A 2 to 4 cm feeding chop and a bedding chop under 2 cm are different jobs, and on an H-1135 an operator swaps between them in about ten minutes.



The mill and the rotor. The screen behind them is what turns “chopped” into “chopped to a number.”

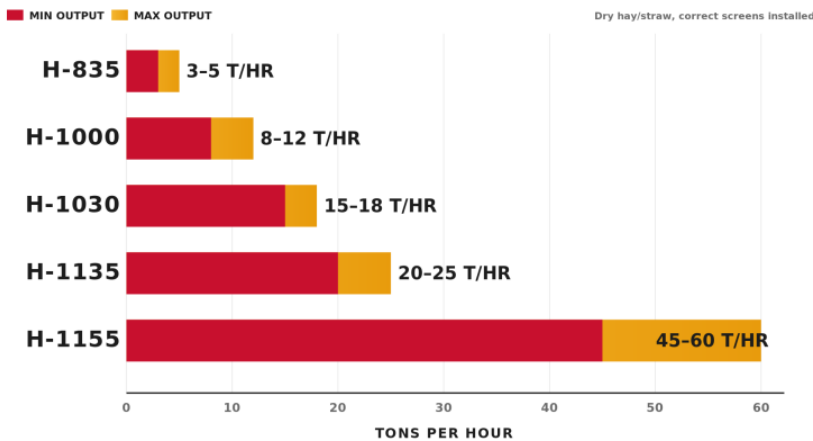
Guelph found the lever. They also found the trap at the end of it. Size matters, and so does the machine you trust to decide it.

SINCE 1966

SIXTY YEARS OF THE SAME ARGUMENT

HAYBUSTER TUB GRINDER OUTPUT

TONS PER HOUR — DRY HAY / STRAW



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Right-size the machine to the herd. Grind three hours every other day, not twelve hours every day.

We have been building tub grinders since 1966. Sixty years, out of Jamestown, North Dakota. In that time the arguments against pre-chopping have not changed much, and neither have the results.

What has changed is that the research caught up. What a HayBuster customer could have told you from the seat of a loader in 1985, the University of Guelph has now measured with rumen boluses, blood samples and a scale under every cow.

She eats more. She eats the ration you actually built, instead of the one she assembled herself. She comes through the worst two weeks of her year in better metabolic shape. And the milk leans your way.

All of it from one decision. How short, and how consistently, you cut her feed.

SIZE MATTERS. BUILT TO GRIND. BUILT TO LAST. SINCE 1966.

SEE THE MACHINE WORK

The H-1030 BIG BITE doing exactly what the research describes, short and even particle length at field pace: [youtube.com/watch?v=nHTetKRsiIY](https://www.youtube.com/watch?v=nHTetKRsiIY)

SOURCES

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GRINDING HAY OR STRAW?

See how we size it: feed chop, bedding, fine grind and coarse cover, all from one machine.

HOW TO CHOOSE THE RIGHT SCREEN

The screen decides the length. The full guide to picking yours, from 1.5 mm to 500 mm.

SEE IT ON YOUR OWN STRAW

We will bring a machine to your yard and run your bales through it. Not a video. Not a brochure. Your straw, your bales, your cows.

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