WOKAS™
MADE IN NATURE

PIECZARKALIA 2026

25.09.2026
Zamek Janów Podlaski

Archie Cullen-Galbraith

Chief of Staff 4AG Robotics

THE FUTURE OF MUSHROOM HARVESTING

Robots Picking Mushrooms

Lessons from the field, and where automation goes next.

4AG Robotics

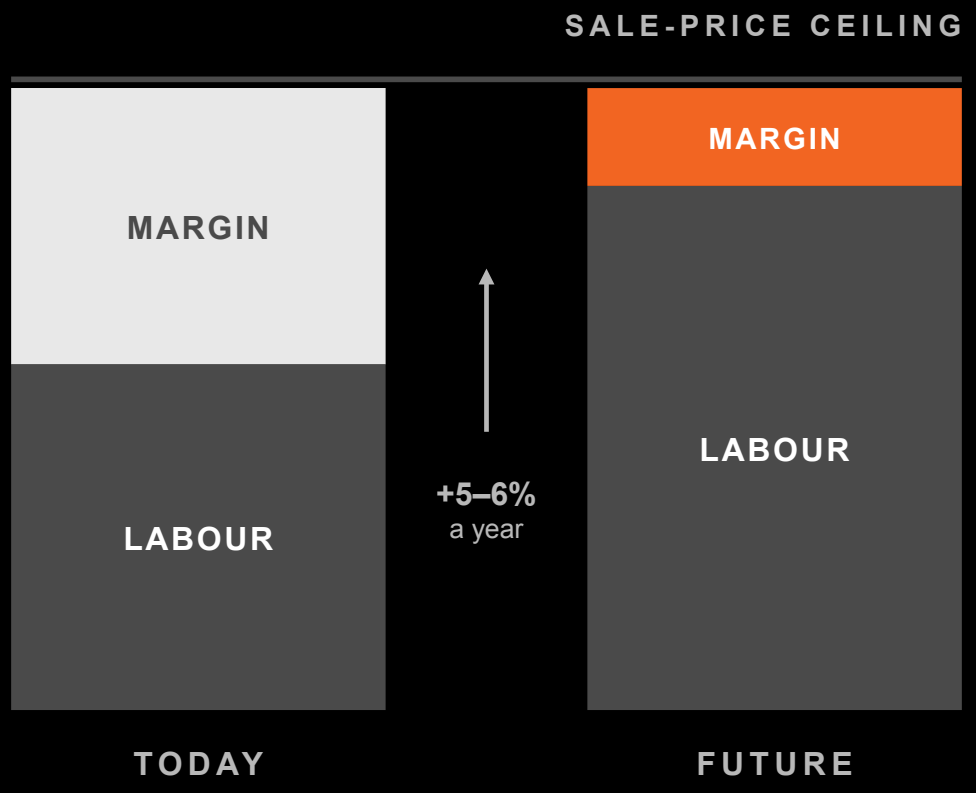
4AG ROBOTICS

THE GROWER'S SQUEEZE

Margin is squeezed from both sides.

Labour is the biggest controllable cost in the growing room — and it climbs every year while pickers get harder to find. The sale price won't follow: it's capped by the retailers.

Costs rise into a fixed ceiling. The margin in between is what gives.



PROVEN END-TO-END ROBOTIC HARVESTING

With the HX800 4AG has proven a robot can pick an entire 1st and 2nd flush. We have handled everything from early separation to final day clear off, whilst taking the first steps towards true harvest intelligence.

FIRST & ONLY

robot in the world to harvest a full mushroom flush, end to end.

~20 million mushrooms picked

19 kg/m²

1ST-FLUSH YIELD

12 kg/m²

2ND-FLUSH YIELD

4AG ROBOTICS

WHAT WE LEARNED IN THE FIELD

One machine to do it all was difficult to scale.

What we learned on farm: complexity compounds. Every subsystem is another thing to break mid-flush, and the farm has to rebuild its operational flow around the machine. Complexity prevents handover.

Overcomplicating is the enemy of reliability.

WHAT IT TAUGHT US TO BUILD

01

Simple enough to own

A decoupled picking robot is simpler, more reliable and far easier to hand over — your team runs it, with no permanent 4AG service crew.

02

Pick speed is essential

Robots that can always meet the changing pick rate needed across the flush will be able to meet and surpass human-equivalent yield.

03

As flexible as your pickers

Light robots move between racks and rooms to follow capacity through the flush, exactly the way people do.

4AG ROBOTICS

THE NEW DIRECTION

Decoupled by design

One harvest, split into three jobs, each placed where it works best.

Pick

IN THE ROOM

On the rack, inside the growing room. The hardest, highest-value job and the one worth automating first.

→

Transport

OUT OF THE ROOM

Mushrooms leave on the blue belt, driven by shared 4AG infrastructure without human effort.

→

Pack

OUTSIDE THE ROOM

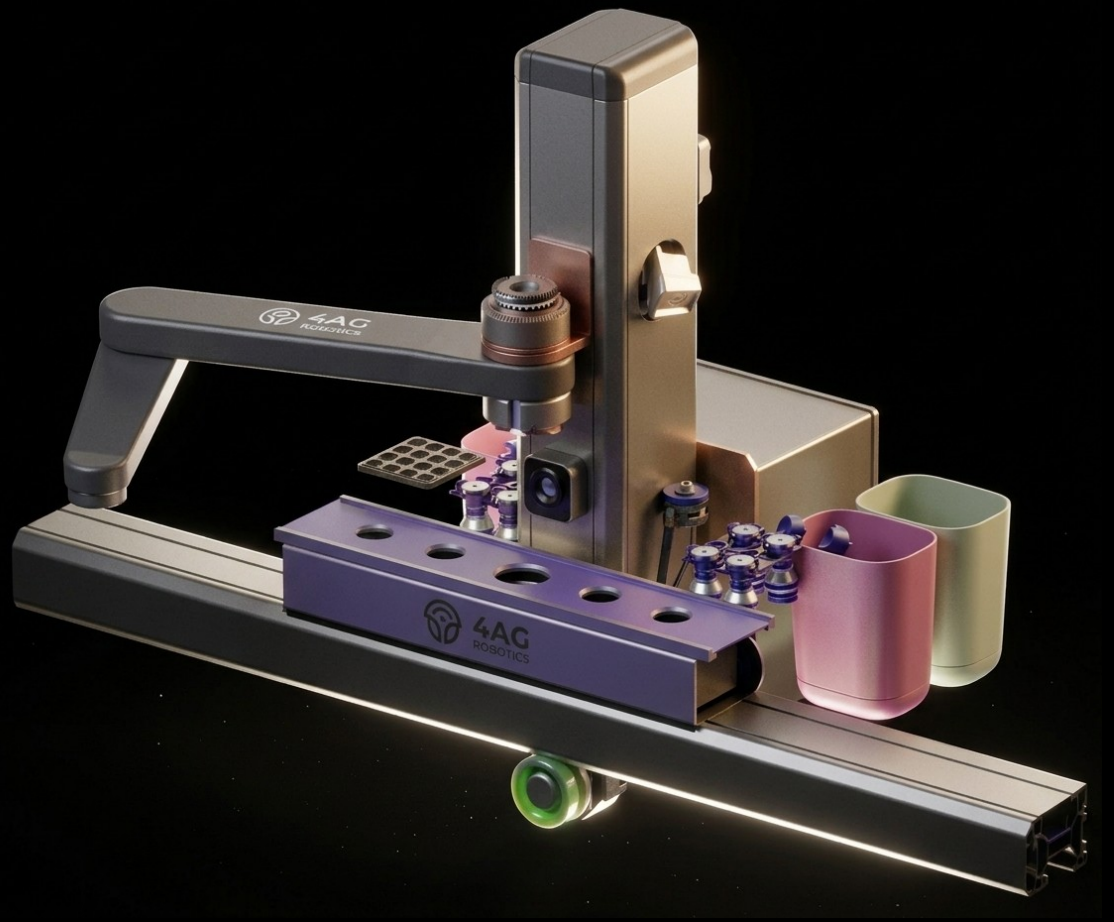
Trim, sort and pack in the open, where automation is simpler and cheaper to run.

UNIFIED DATA BACKBONE — every step recorded and connected

THE HARDWARE

A robot with one job.

- **Light & mobile** 30–50 kg — lifts off the rail by hand and moves between rooms to follow capacity.
- **Simple & reliable** Far fewer subsystems, so far less to break mid-flush. Your team runs it, no permanent 4AG crew.
- **Fault tolerant** If a robot goes down, swap it out in minutes without losing the flush.



4AG ROBOTICS

ON YOUR FARM

What the solution looks like

A full room in operation — several pick-only robots working the racks in parallel, each picking straight onto the shared belts that move the crop out.

~70 picks/min

CAPACITY PER BELT

Multiple pick-only robots picking onto a single shared belt.

4AG ROBOTICS

THE ECONOMICS

Built for payback.

A simpler, lighter robot changes the whole economic picture.

€60,000
PER PICKING ROBOT

3–5 years
AVERAGE PAYBACK

~55% lower cost per robot than a conventional all-in-one approach

~60% lower annual running and servicing cost

Measured against the picking labour it replaces.

Now the second prize.

GROWING

Measured & controlled

- Climate & CO_2
- Humidity & watering
- Substrate & casing
- Every input logged, every batch comparable

HARVESTING

Still a black box

- What got picked — unrecorded
- At what size, rate, quality — inconsistent
- Picker-to-picker variation — difficult to track
- What you can't measure, you can't improve

Put a robot on the rack, and the blind half of the farm finally starts to talk.

4AG ROBOTICS

CLOSING THE DATA CYCLE

Every pick becomes a data point.

A robot that picks doesn't just replace hands. It instruments the harvest — making the whole growing-to-harvest system **observable, and therefore optimisable**.

4AG ROBOTICS

WHAT THE DATA CLOSES

Three loops the data closes

1

Forward — yield & planning

Size, position, timing and rate on every pick. Real-time size mix and pick rate sharpen forecasting, so you plan crews and packing against reality, not gut feel.

2

Back to growing — uniformity

A map of what's cropping where is a map of how evenly the room performs — feeding watering, climate and casing decisions. Harvest data becomes a growing-control input.

3

Quality — a planned output

Machine size-selection is consistent and recorded, so your grade mix becomes a controllable, planned outcome rather than a picker-dependent variable.

4AG ROBOTICS

DATA & AI — THE UPSIDE

Where the next gains come from

Once the harvest is data, the AI layer starts compounding yield on top of the labour you've already replaced.

Remove human variation

Every robot as consistent as your best picker — every flush, every room.

Bed normalisation

Over-pin the bed and let robots normalise it to the optimal state for yield.

Graze harvesting

Continuous, AI-timed picking that takes each mushroom at its best moment.

Tie in to growing

Feed harvest data back into climate and watering to lift yield at the source.

10 - 30%

PROJECTED YIELD UPSIDE

as the intelligence layer matures — on top of the labour already replaced.

4AG ROBOTICS

IN SUMMARY

The future of mushroom farming = Automation

THE THREAT

Reliance on human labour

Rising labour costs make dependence on manual picking the single biggest threat to farm margin.

→

THE ANSWER

Decoupled picking & packaging

Separate the pick from the pack and you can fully automate inside the growing room true end-to-end automation.

→

THE NEXT ERA

A complete data cycle

Standardised, farm-wide iterative improvement in picking strategy and in growing strategy alike.

+44 (7) 453 802 974
+44 2080 442 926
archie.galbraith@4ag.ai
4ag.ai

Next steps for your farm

Please reach out if you would like to talk further about end-to-end automation and future proof your farm.

WOKAS™
MADE IN NATURE

ZAMEK

JANÓW PODLASKI