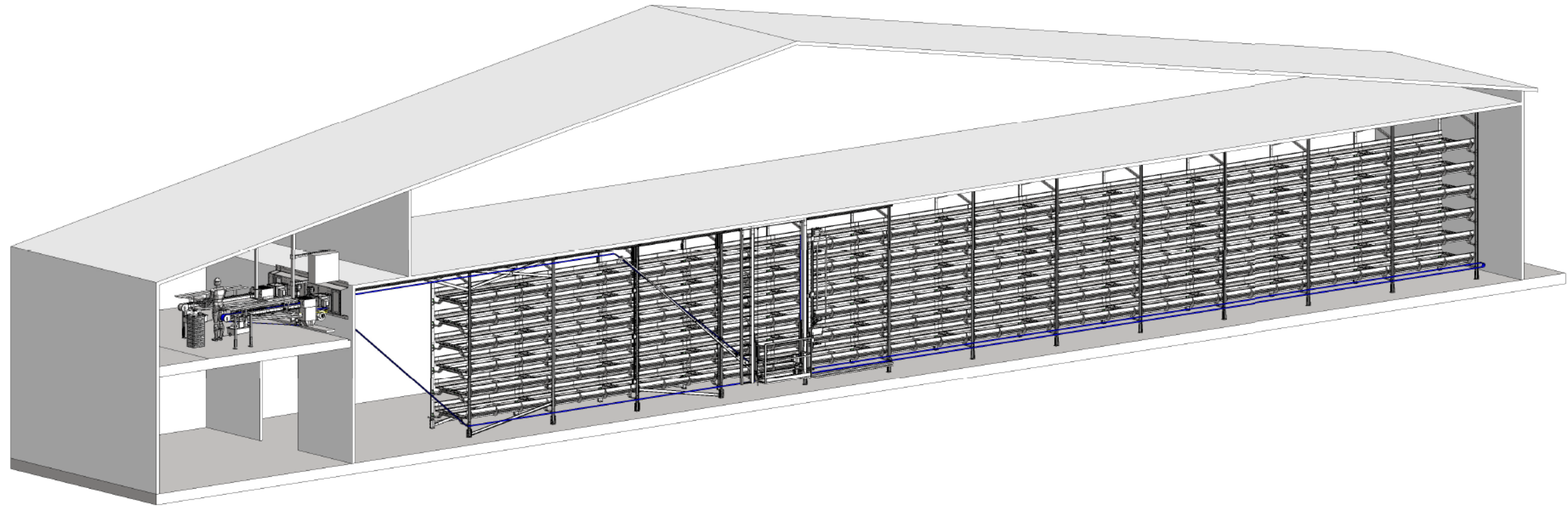
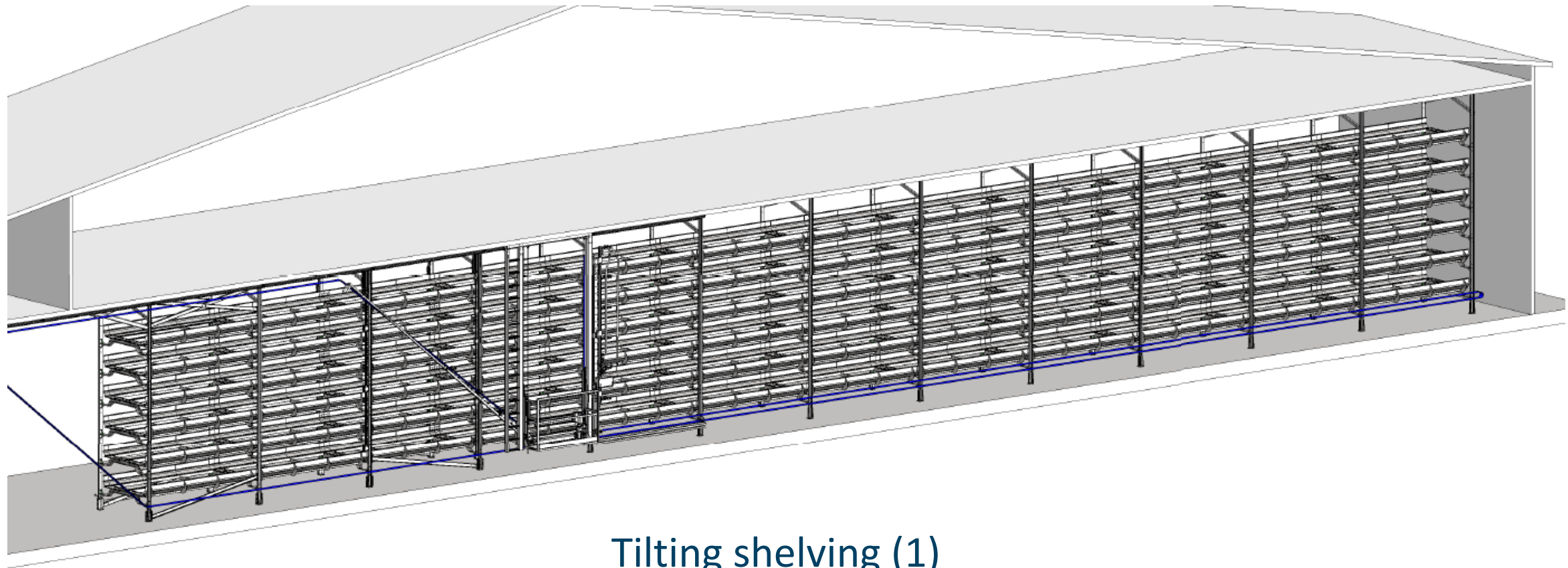


Harvesting and packing automation

June 2, 2022

- Tilting shelving
 - Packing robot
 - Pointing system and scanbox
 - Robot harvesting
-





Tilting shelving (1)

30 gr

Weight per mushroom



834.000

Mushrooms / day

150.000 kg





Mushrooms per week







Advantages at Districhamp

-  Simplicity of the system
 -  Higher productivity (by an average factor of 2,7)
 -  Less logistic movements / activities in the growing room
 -  Clear overview in the growing room
-

At the shelf

2 harvesters

Hand-picking mushrooms

26%
more efficient



At the shelve

2 harvesters

Hand-picking mushrooms

Robotization

Collecting

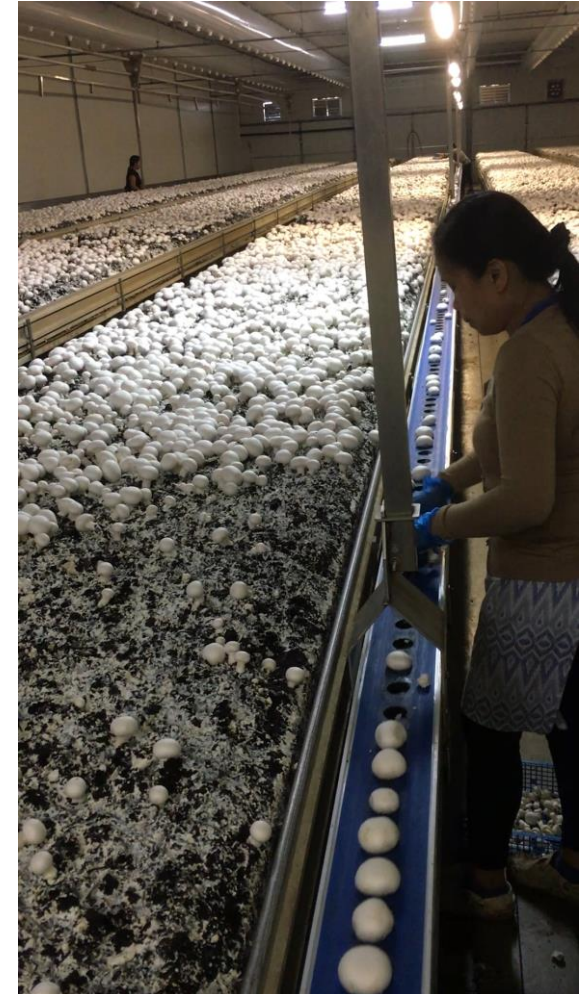
Sorting

Packing

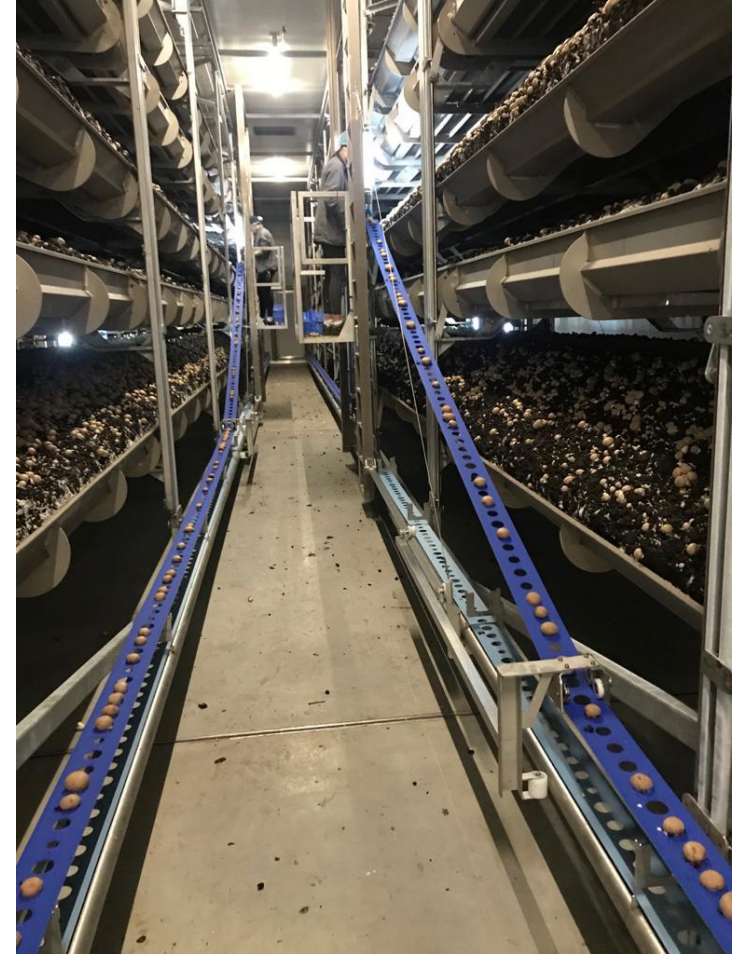
63%
more efficient

But..., what about the physical strain?

- A 1,40 m bed plus conveyor is too wide
- Fixed picking height, what if you're very small / tall?

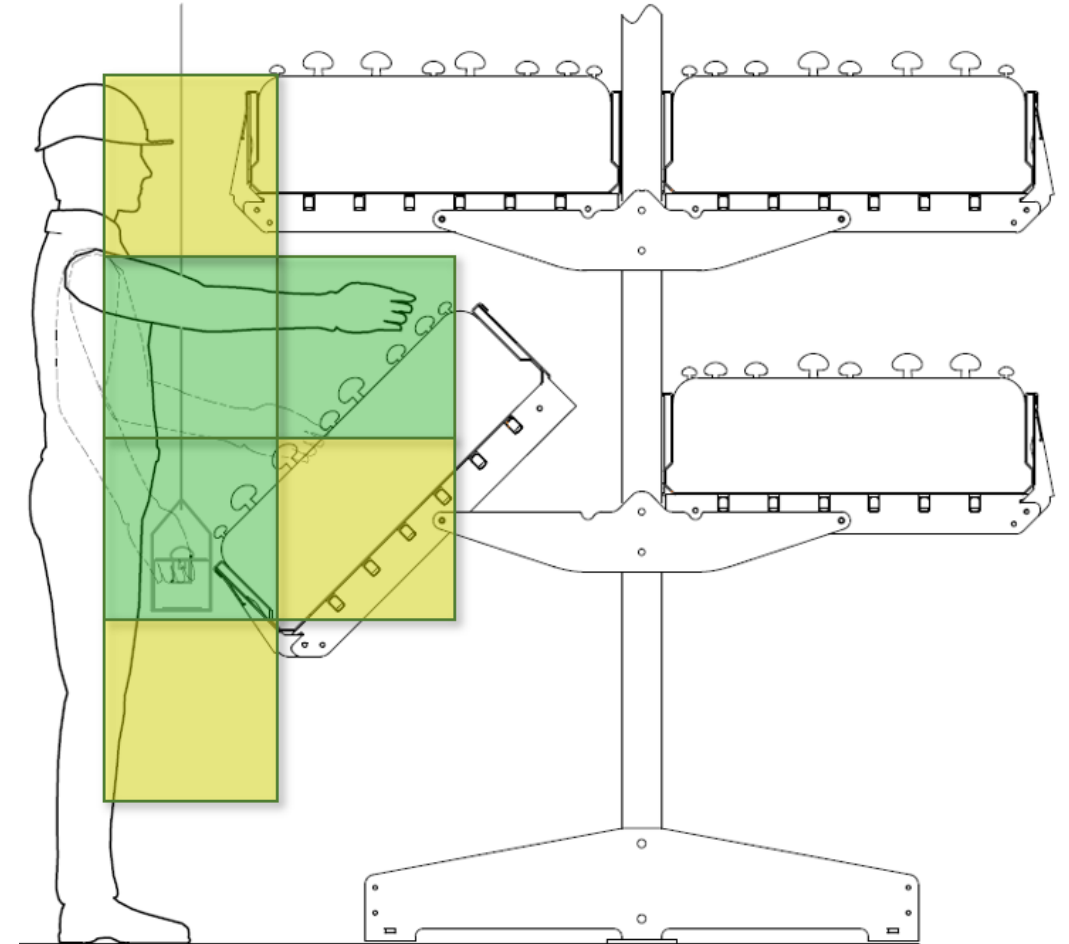


Tilting shelving



A big step ahead in ergonomics

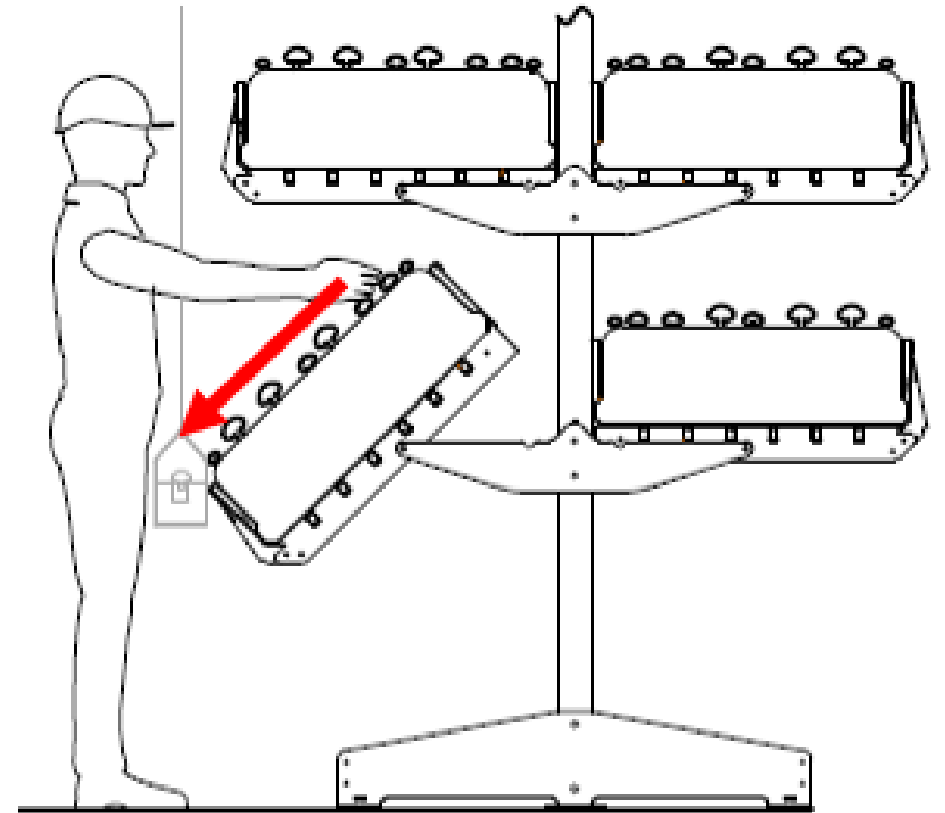
-  Torso = straight back
-  Arms = in natural green zone



And what makes it perfect?

We move the mushroom in accordance
with gravity

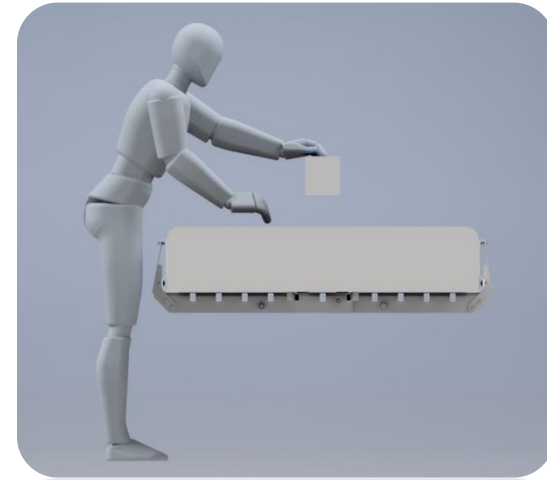
Downwards to our body



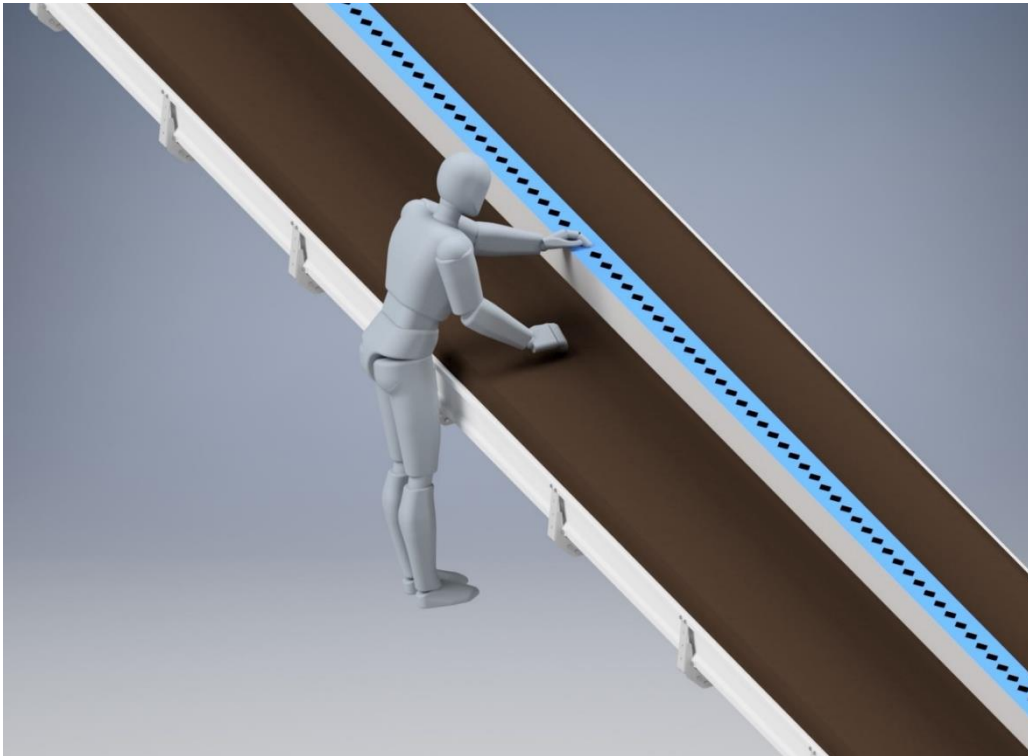
Our experience in harvesting mushrooms

- Districhamp started with a conveyor in the centre
- We tried harvesting in a wheel

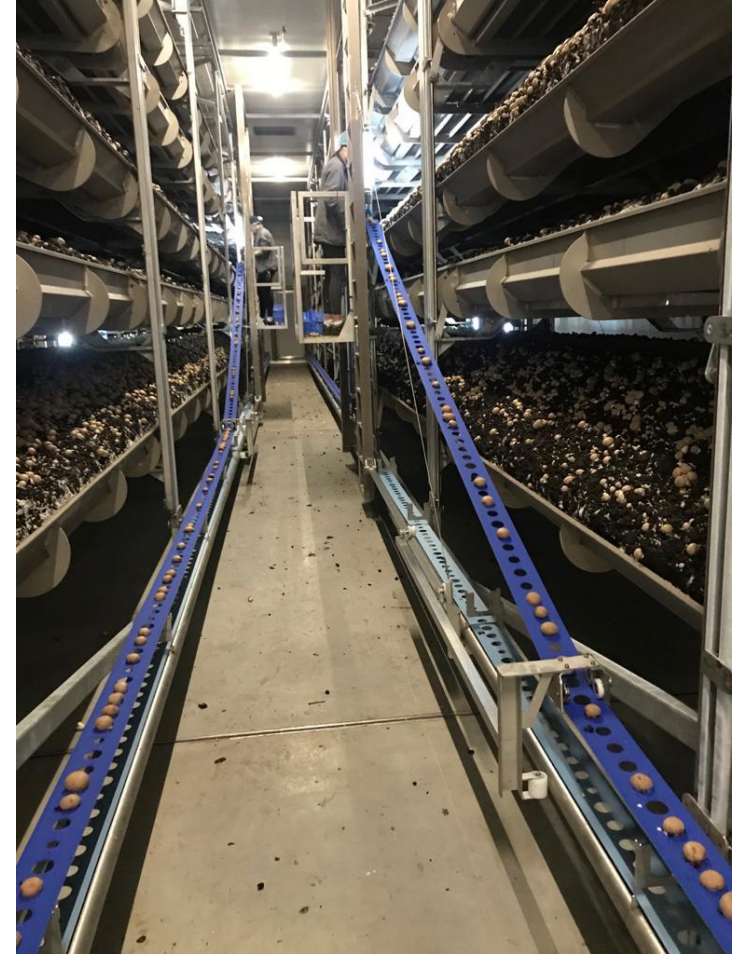
Picker needs to lift
800 kg / day



Imagine the impact on the torso and arms



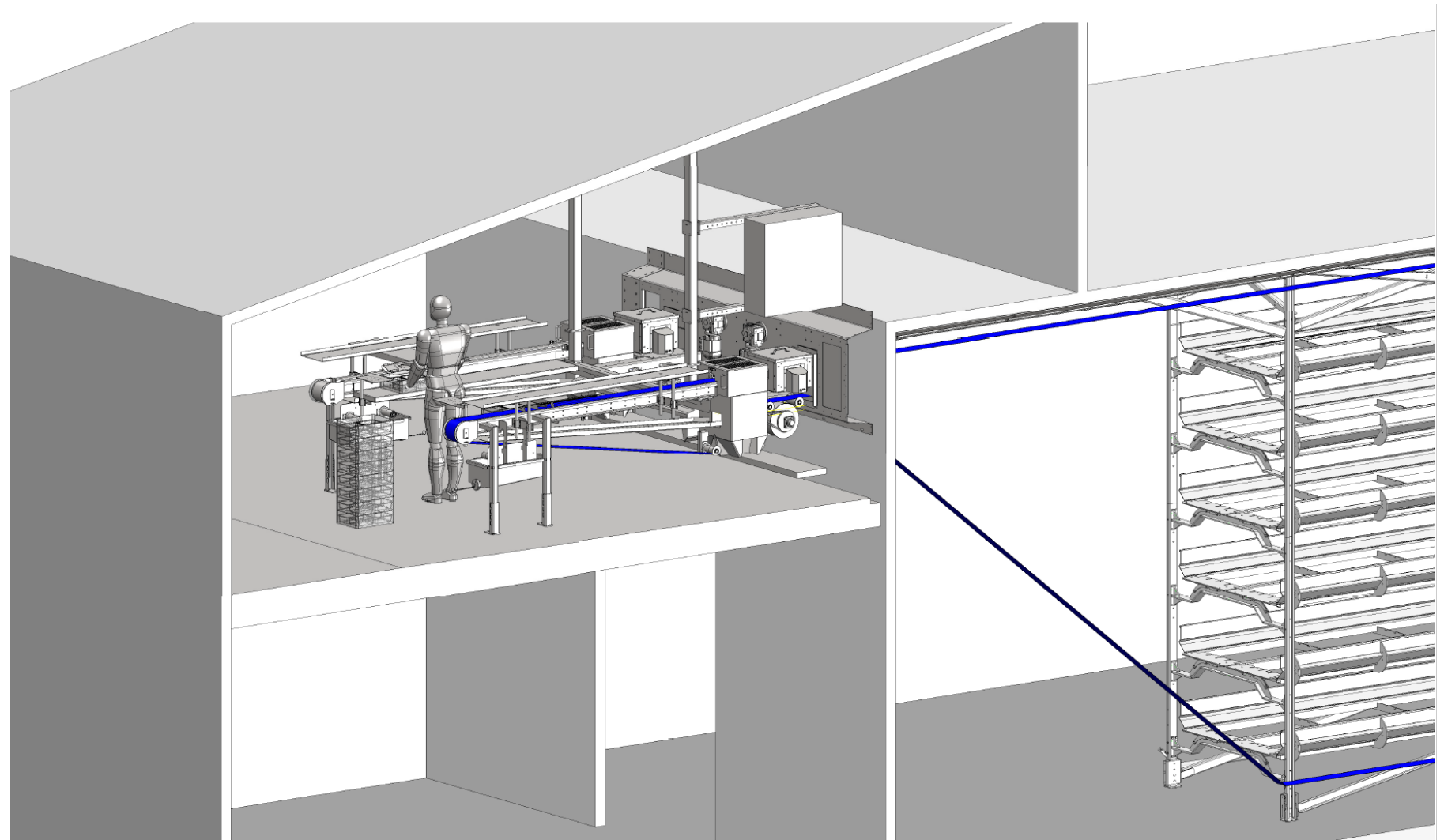
Tilting shelving

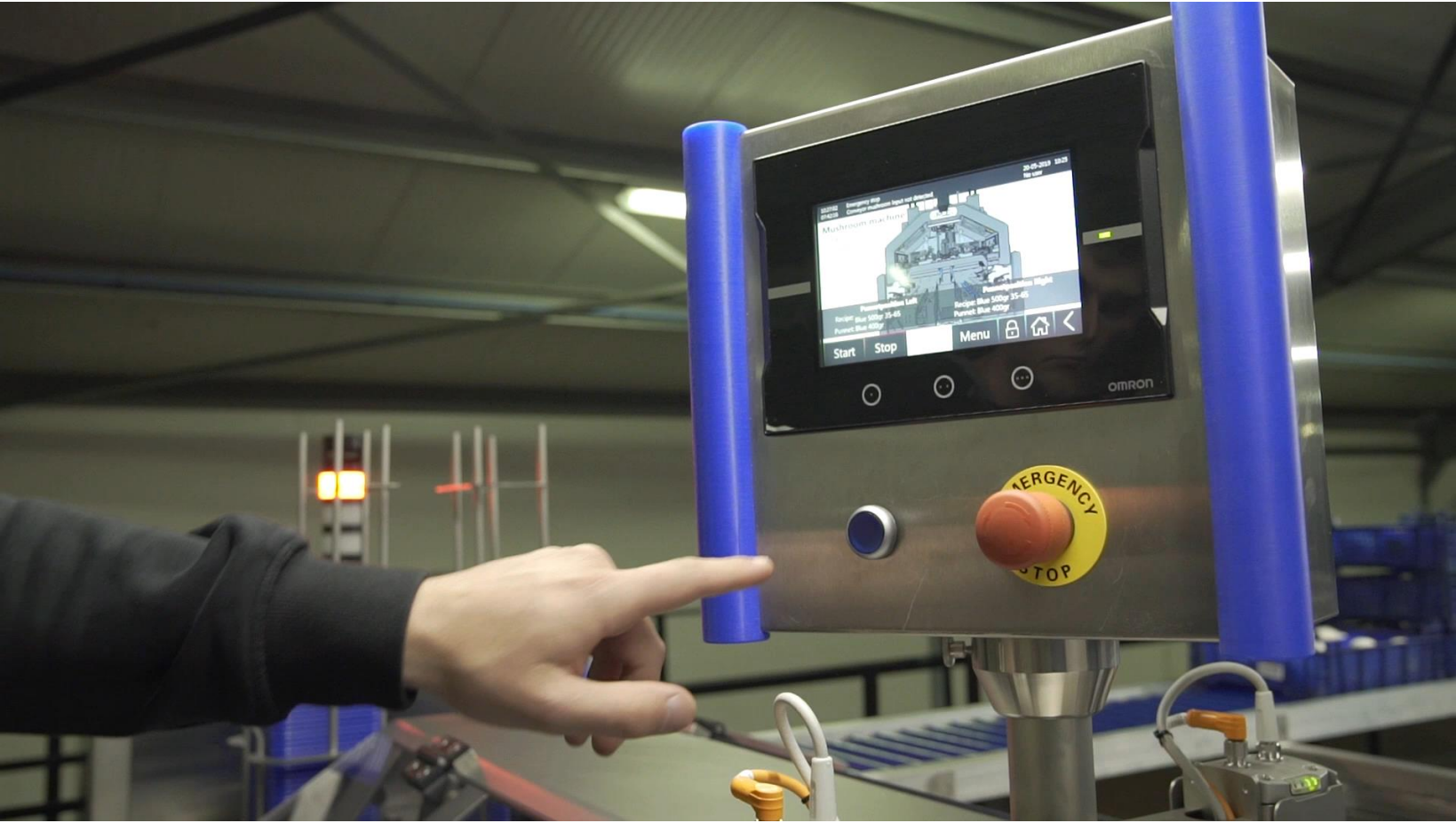


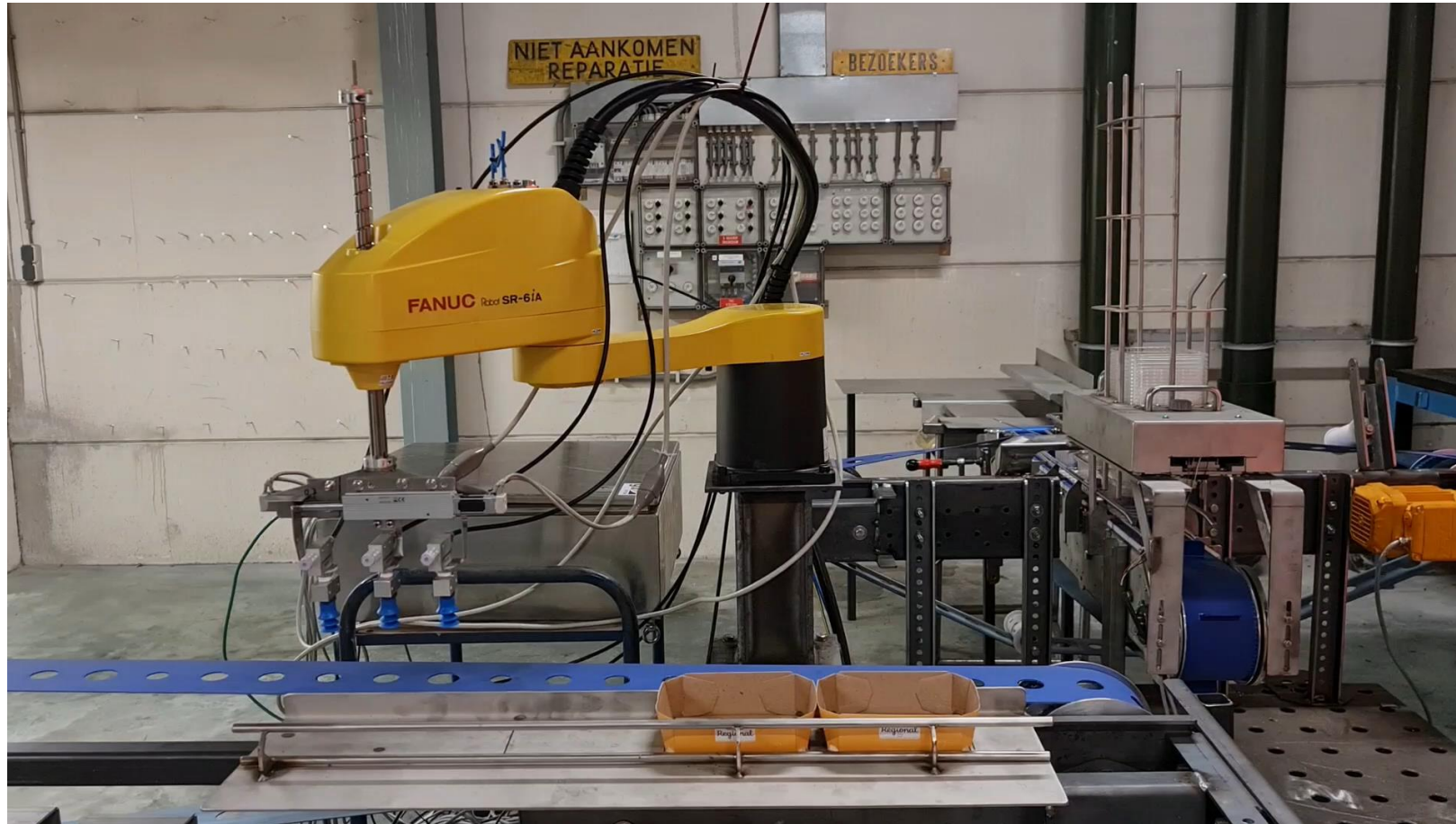


“Two hand picking and
robot handling saves 63%
of picking labour !”

Packing robot(2)







Packing robot









Achievement

Goal

6 mushrooms

Correct weight

1 type of punnet

Multiple types of punnet

1 size of mushrooms

At least 2 sizes of mushrooms

Perfect presentation

Perfect presentation

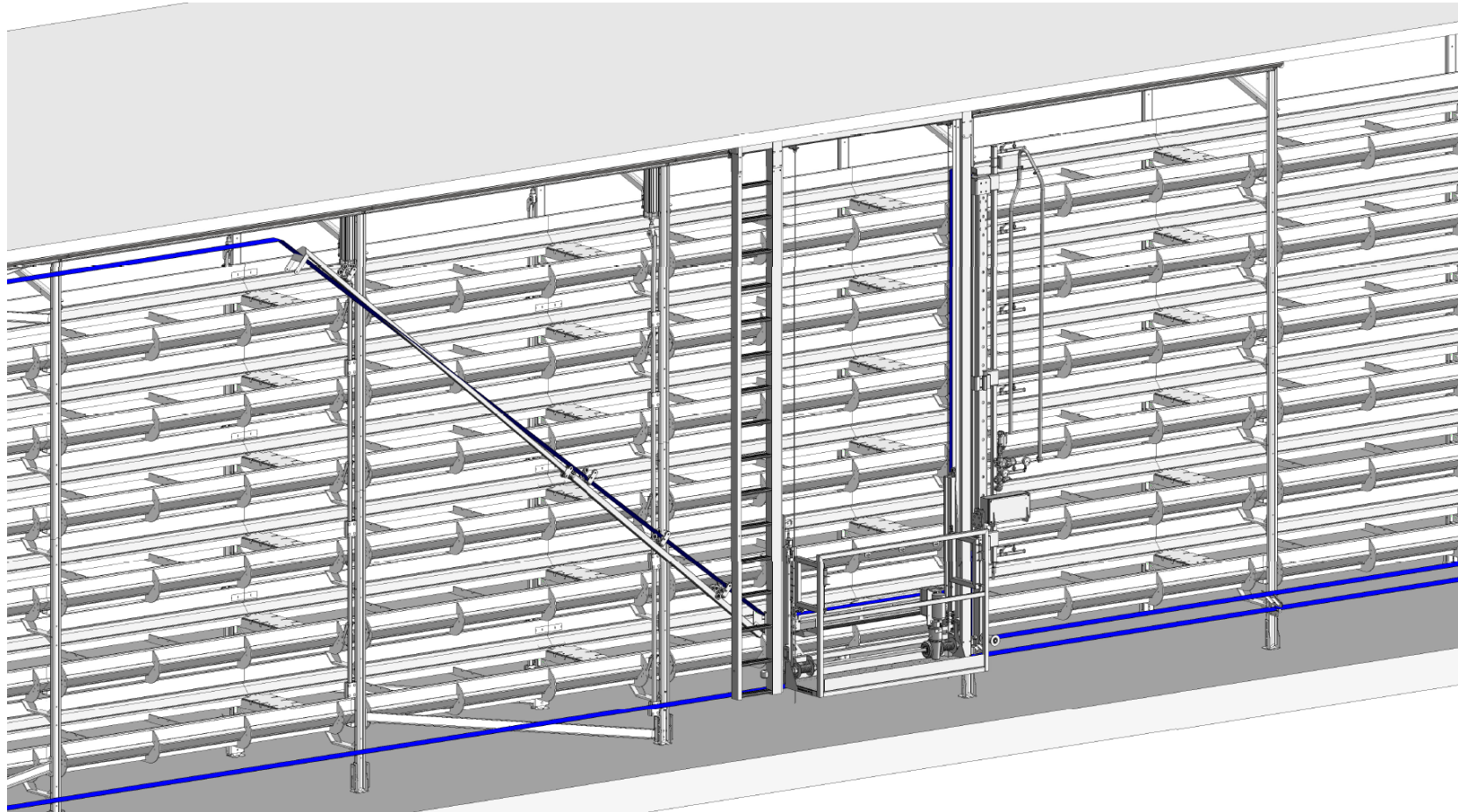
Complicated ??

Not complicated

Low investment

Low investment

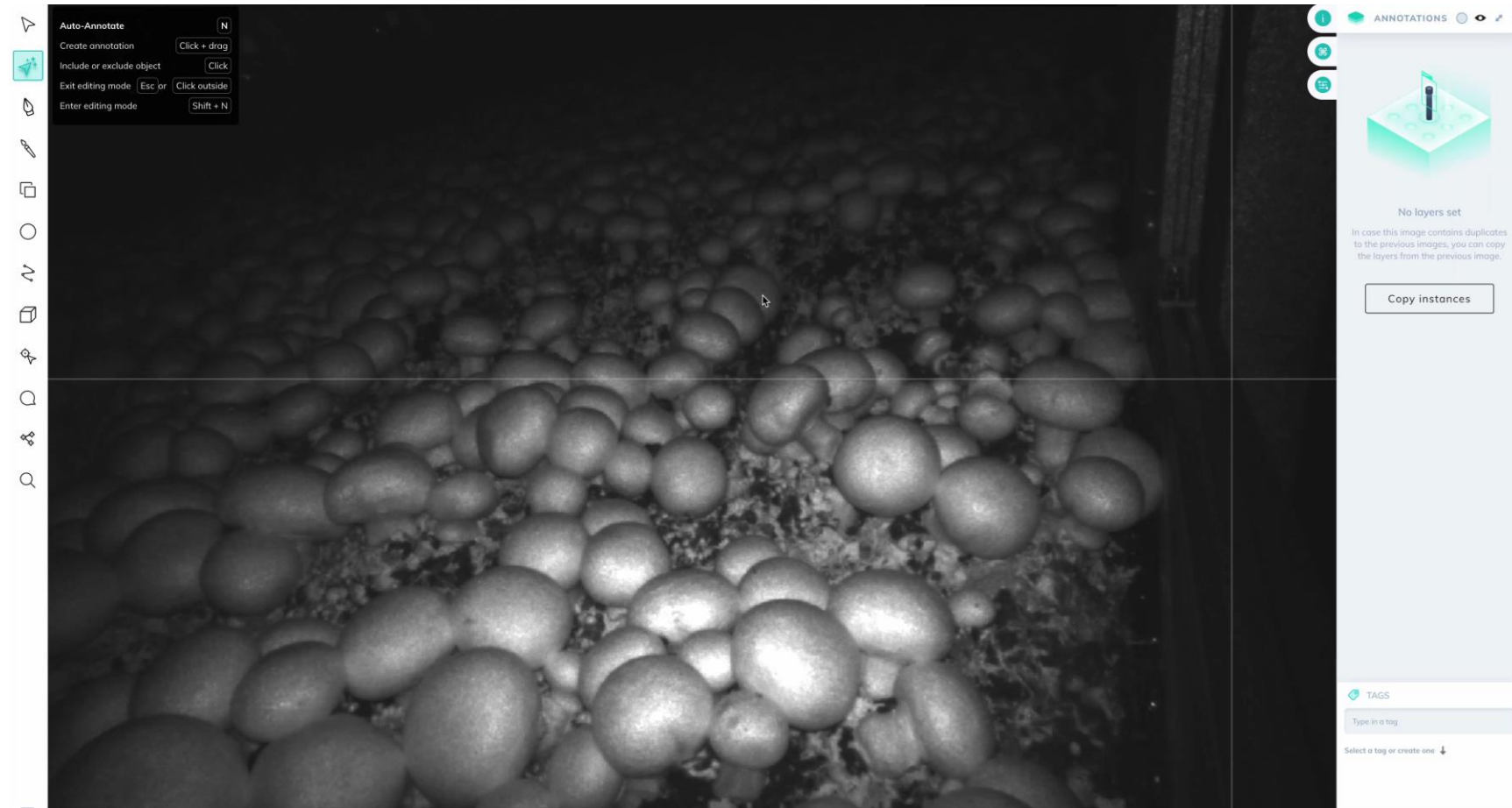




Pointing system and scanbox (3)









Pointing system and scanbox



Pointing system and scanbox

SCANBOX - Remote Desktop Connection

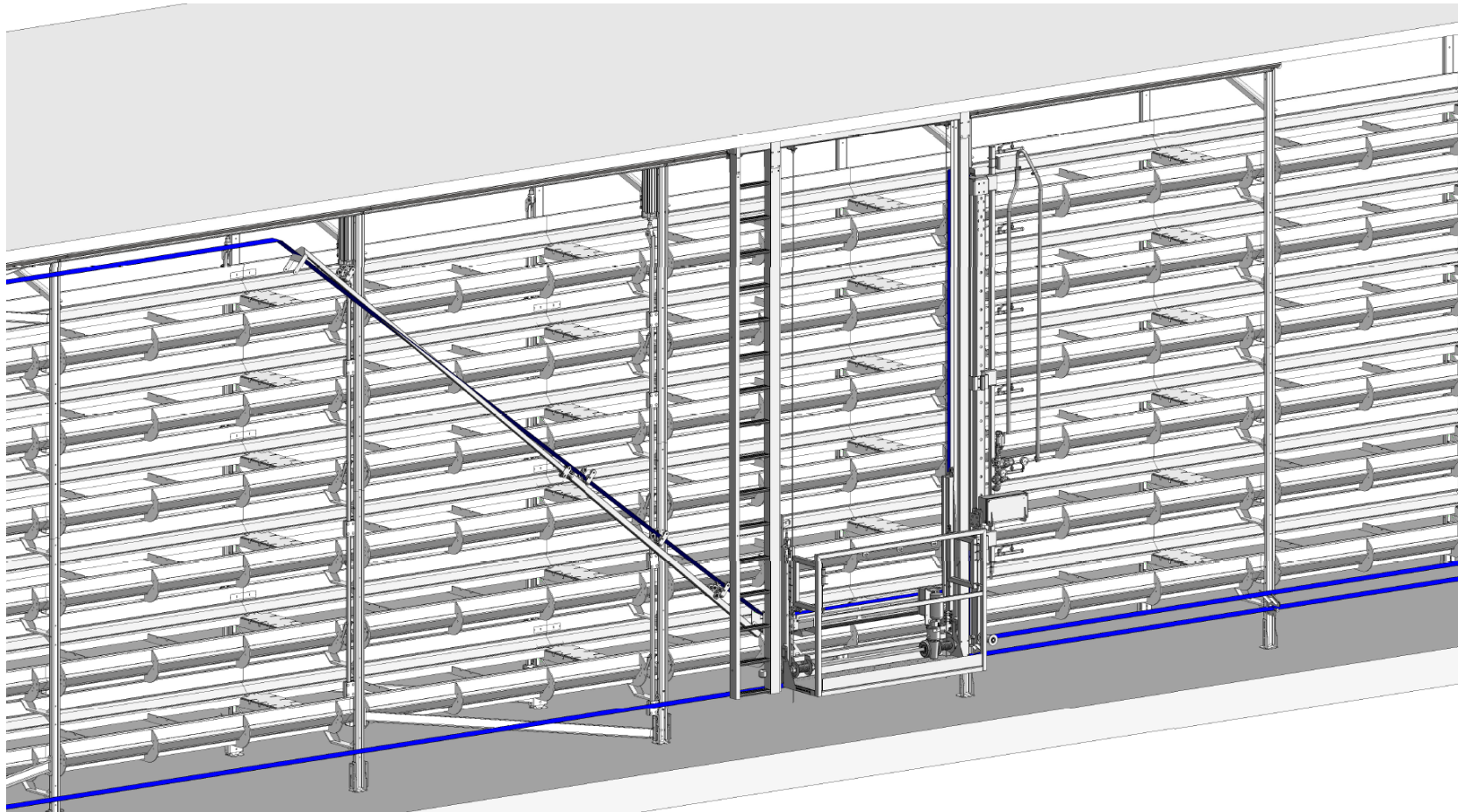
hat diameter (mm)	frequency
25	24
35	28
40	28
45	4
50	12
60	4
80	4
>99	0

Time	Picks per minute
1:11:00 AM	55
1:11:15 AM	60
1:11:30 AM	65
1:11:45 AM	63
1:12:00 AM	62

hat diameter distribution from start
picks per minute from start

status	RUNNING
room id	T13
picker	2 - Jan Jansen
packer	7 - Ivan Grozny
fixed cutter height	9.5
mushroom density	0.70
session time of start	01:11:33
session runtime	00:00:24
total paused time	00:00:00
amount of pauses	0
session picks total	29
session kg total	0.50
picks/min (avg 1 m)	63.2
kg/h (avg 1 m)	68.01

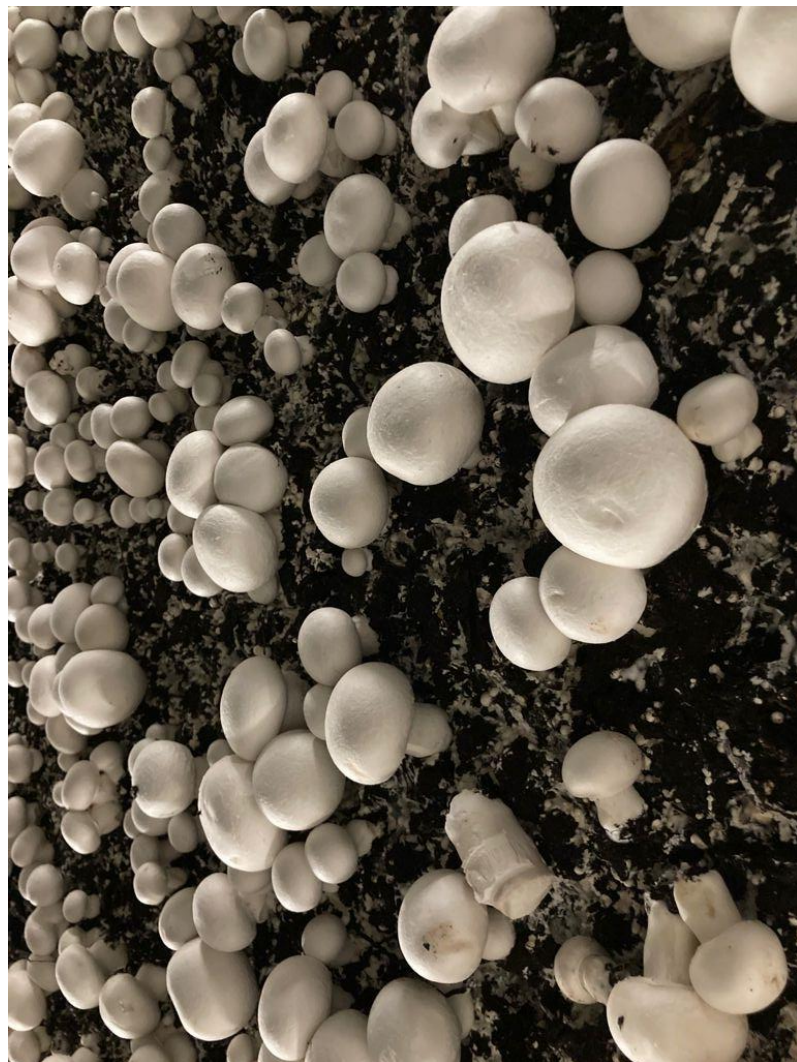
timestamp	01:11:57.630	est. weight (g)	26.6	adv. Hcut (mm)	2.4
		cap size (mm)	45.5	volume (ccm)	37.9

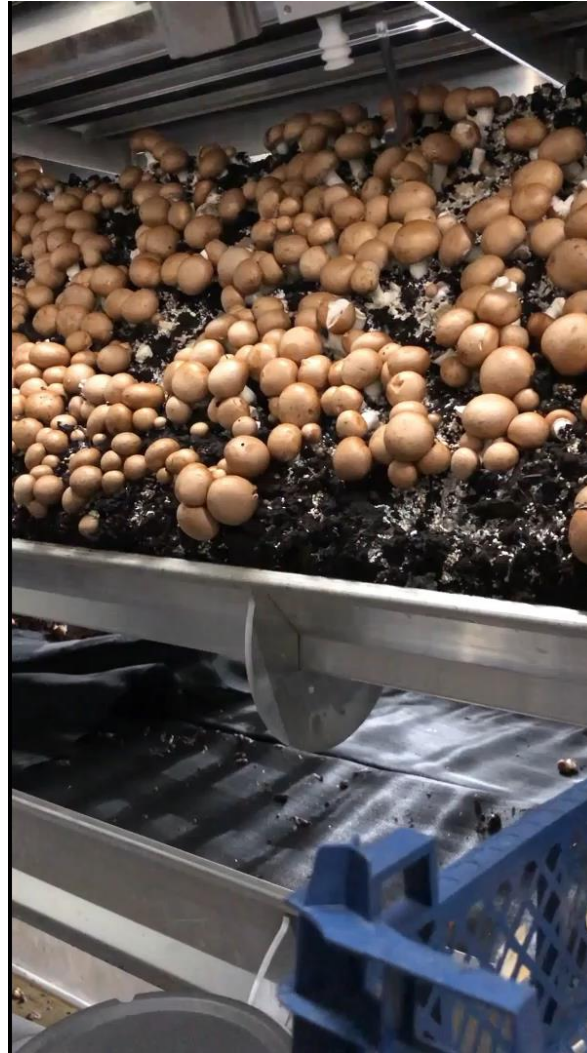


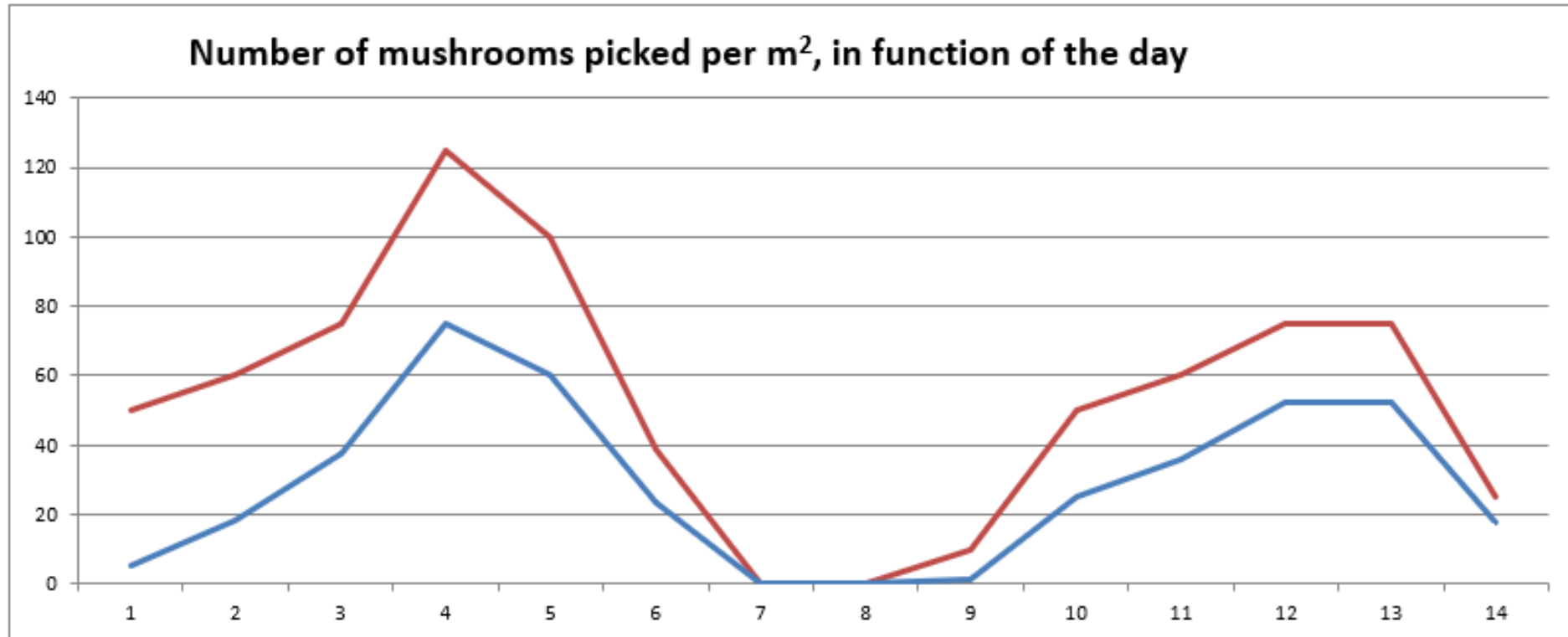
Picking robot (4)











Picking robot

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Total kg harvested per m ²	0,5	1,5	3	6	5	2	0	0	0,5	0,5	1,5	3	3	1
Average weight per mushroom picked (g)	10	25	40	48	50	52	0	0	50	10	25	40	40	40
Average weight per mushroom picked: conversion in kg	0,01	0,025	0,04	0,048	0,050	0,052	0	0	0,05	0,01	0,025	0,04	0,04	0,04
This means, ... mushrooms per m ² :	50	60	75	125	100	38	0	0	10	50	60	75	75	25
Kilogram to harvest on the bed (per m ²):	0,5	1,5	3	6	5	2	0	0	0,5	0,5	1,5	3	3	1
Percentage of mushrooms we can harvest with Agrinium gripper	10%	30%	50%	60%	60%	60%	0%	0%	10%	50%	60%	70%	70%	70%
This means ... mushrooms can be picked with Agrinium gripper per m ² :	5	18	37,5	75	60	23	0	0	1	25	36	52,5	52,5	17,5
Kilogram the Agrinium gripper can take (per m ²):	0,05	0,45	1,5	3,6	3	1,2	0	0	0,05	0,25	0,9	2,1	2,1	0,7

Total in kg per m²:
27,5
With Agrinium:
15,9

Percentage:
57,82%

Thank you for your attention!
