

FARMROID



FarmDroid journey

2018

FarmDroid ApS birth



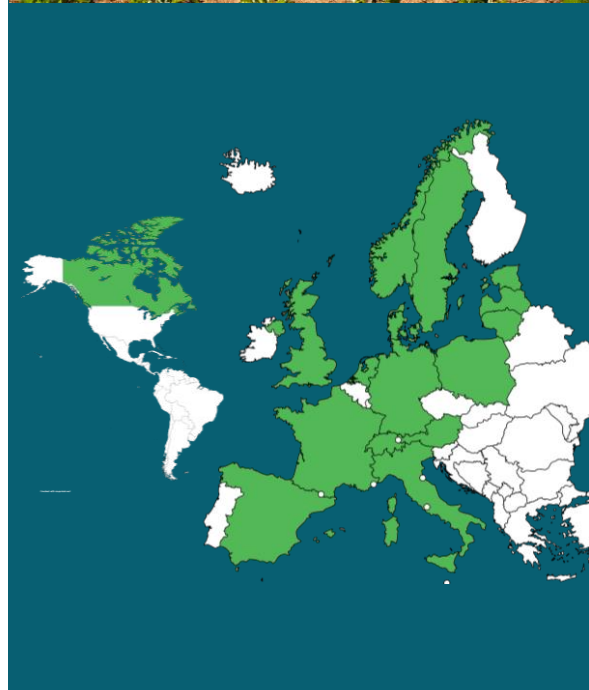
2020

900% revenue Growth
& Profitable



2022

Geographical expansion

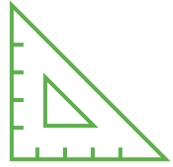


2024

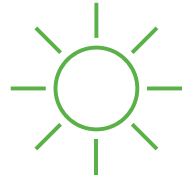
Organic and conventional



FARMDROID



Ultra High Precision



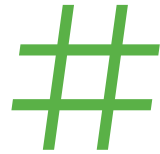
Power source
Solar panels & battery bank



Light weight
900kg



Speed
450 - 950 meters per hour



Row distance
From 25cm



If we can seed it, we can weed it

Single-out



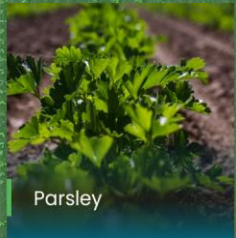
Portions



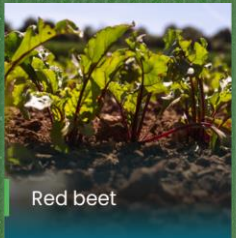
Lines



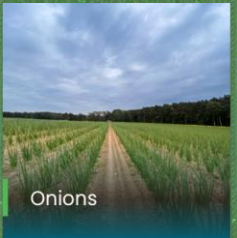
Sugar beets



Parsley



Red beet



Onions



Turnip



Rapeseed



Coriander



Kale



Confetti Flowers



Hemp

How does it work...

Seeding



Weeding

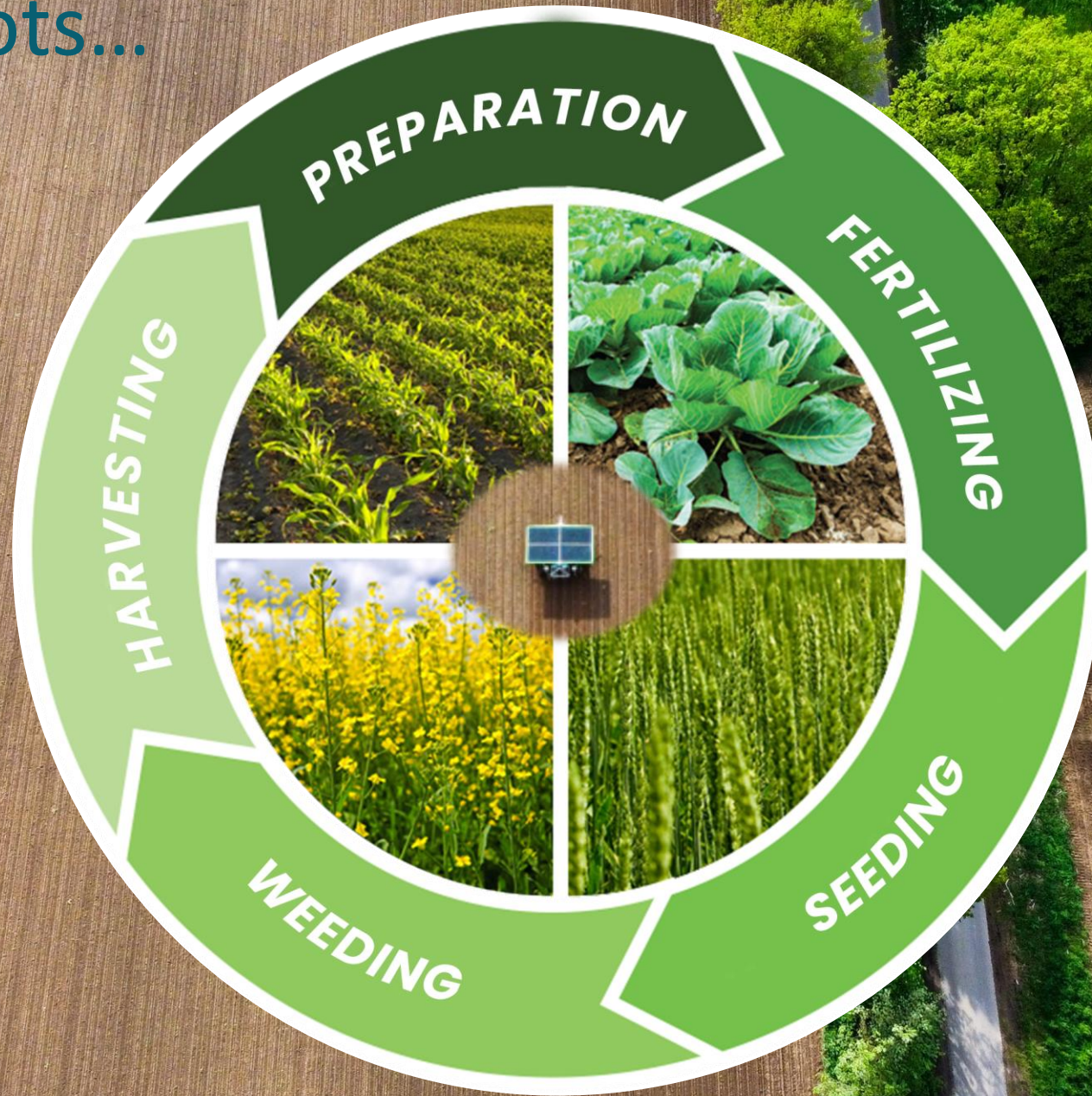


Spraying



Farming robots... Why?

Farming Robots... Why?



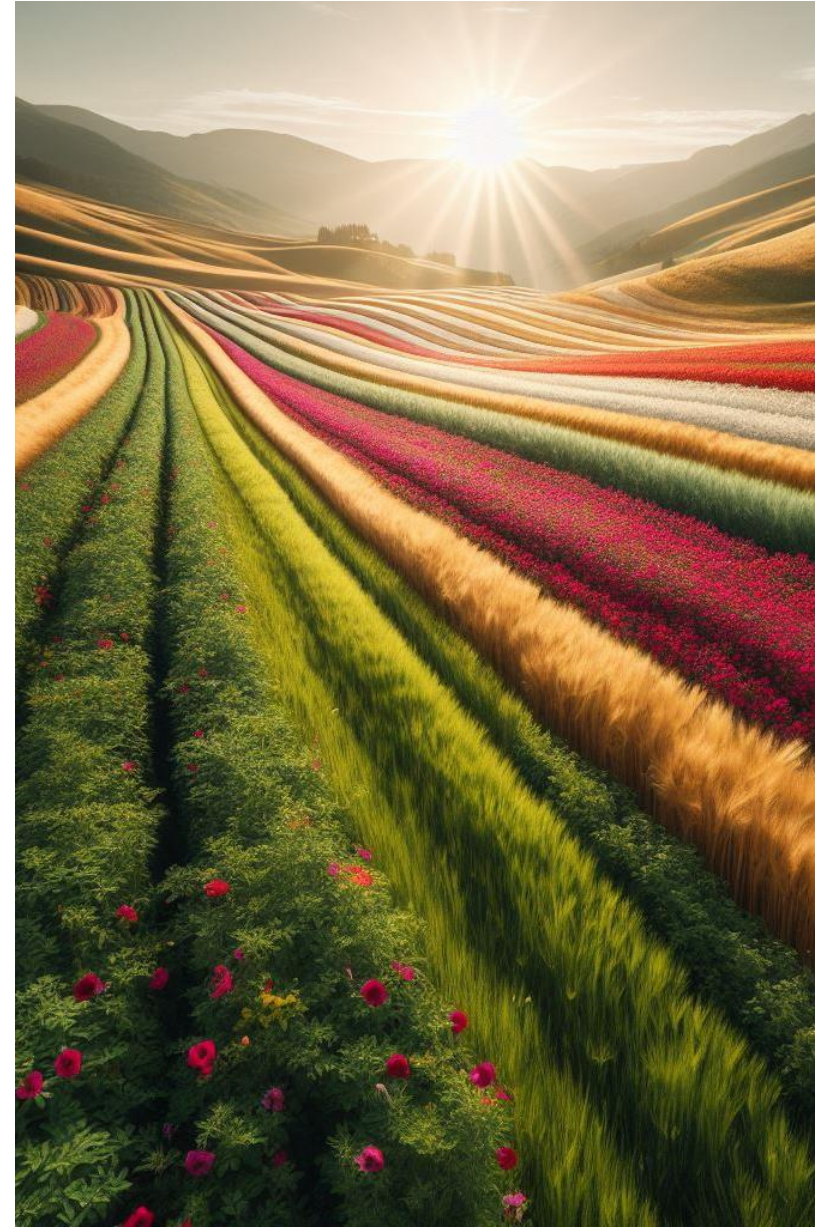
Value creating work



“Sådan sår vi roer i år. 🌱 🍷”



Flexibility





Er de nye eller er de bare ved at være modne?

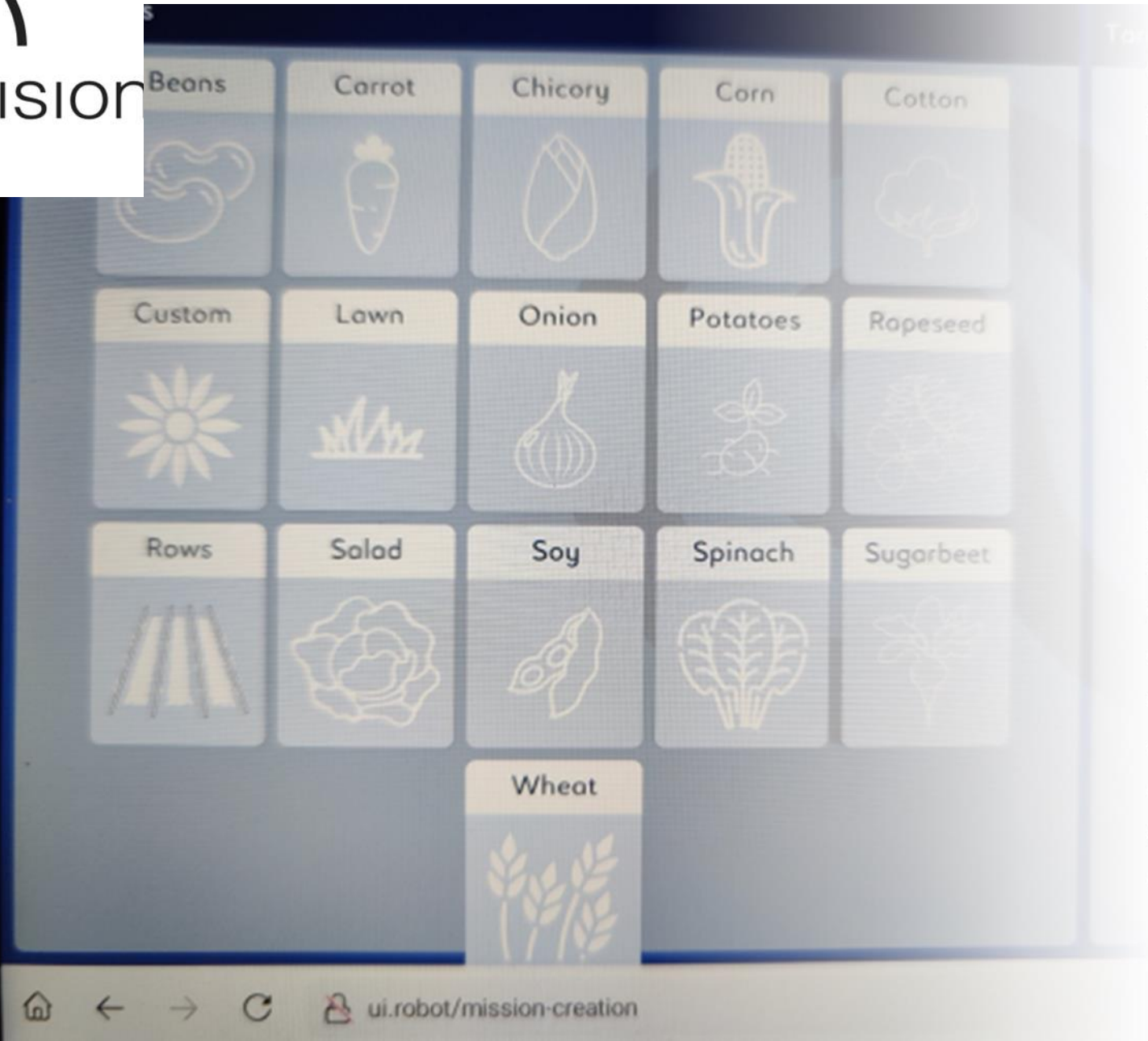
Nye teknologier til ukrudtskontrol





- 2 kameraer pr meter
- 1 kamera måler fart og indstiller bomhøjde
- 1 Kamera genkender planter på form.
- Individuelle dyser med 4 cms afstand
- Aftryk på jord 3 *8 cm.
- Vægt Bag : 1200 kg
- Vægt for : Som vist her 1200 kg væske og 350 kg tank.
- PTO til strøm
- Hydraulisk pumpe





• Afgrøder som vi kan genkende

- Bønner
- Gulerødder
- Chicory salat
- Majs
- Bomuld
- Solsikke
- **Golf/Fodboldbaner**
- Løg
- Kartoffler
- Raps
- **Båndsprøjte**
- Salat
- Soyabønner
- Spinat
- Sukkerroer
- Hvede



- Hver maskinhus, hver sin teknologi.
 - Så hvad står der derinde allerede
- Hver afgrøde har sin egen forretningsplan og kompleksitet
 - Hvilke teknologier skal kombineres
- Hvem kan hjælpe?
 - Hvor mange kan I overskue der hjælper?
 - Alt kan løses, det koster bare
- Hvor går udviklingen hen hvor hurtigt?
 - Hvad definerer hastigheden
 - Lovgivning
 - Nød
- VÆLG en strategi forfølg den og **LYT/spørg ind** til hvad sælger siger
 - Mulighederne er mange, husk der skal være flueben ved de 5 vigtigste punkter I jeres egen Strategi.





Laser i roer og majs

Laser in beets and maize

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Københavns Universitet



Funded by the Horizon 2020 programme of the European Union



UNIVERSITY OF COPENHAGEN



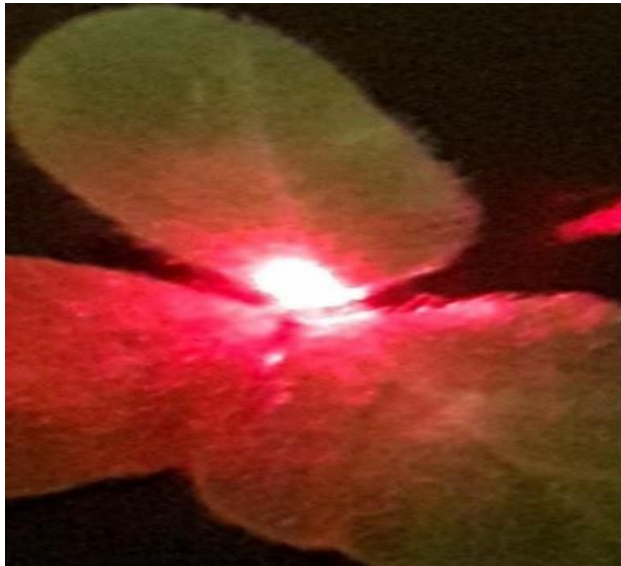
ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

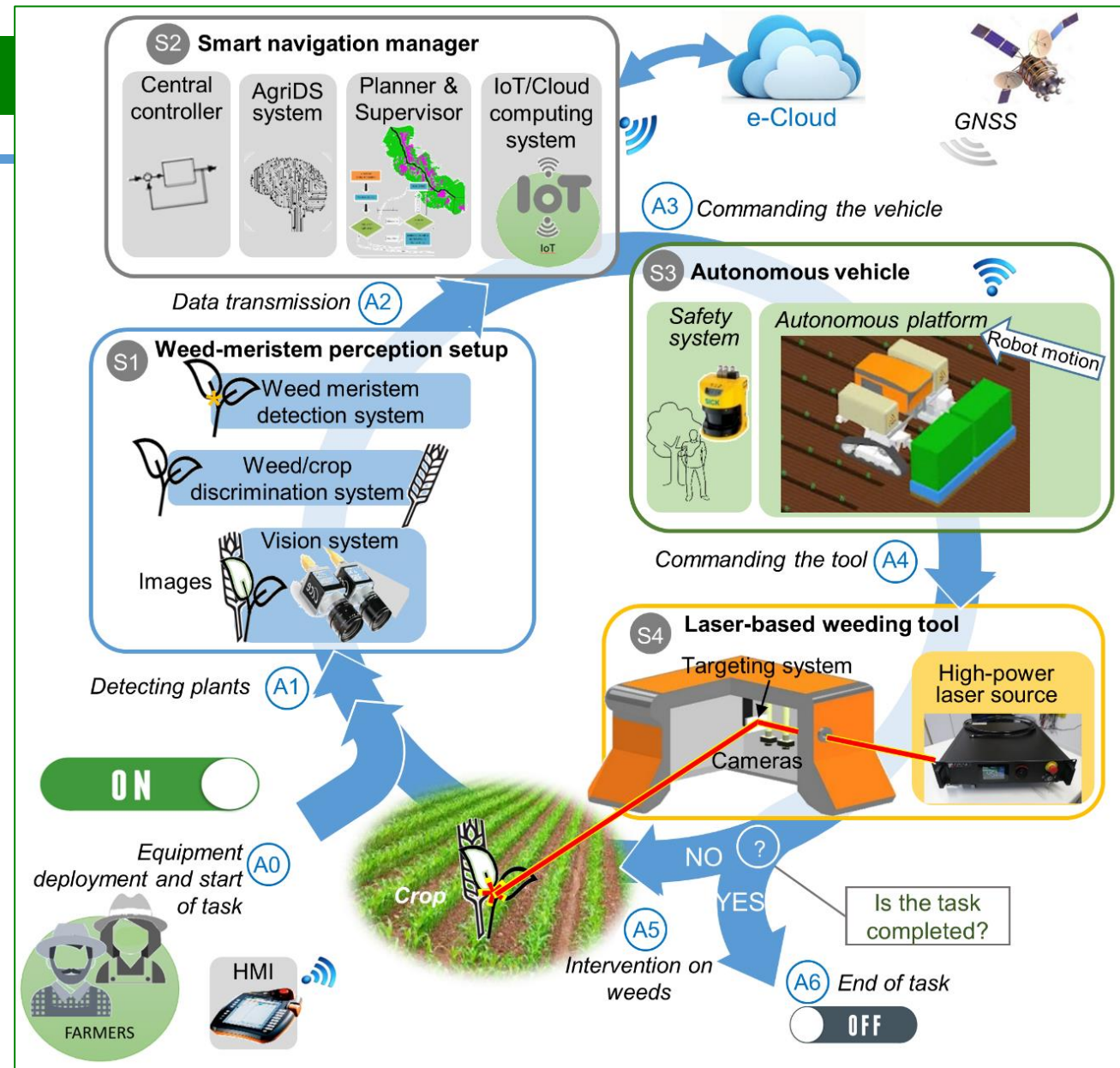


van den Borne aardappelen

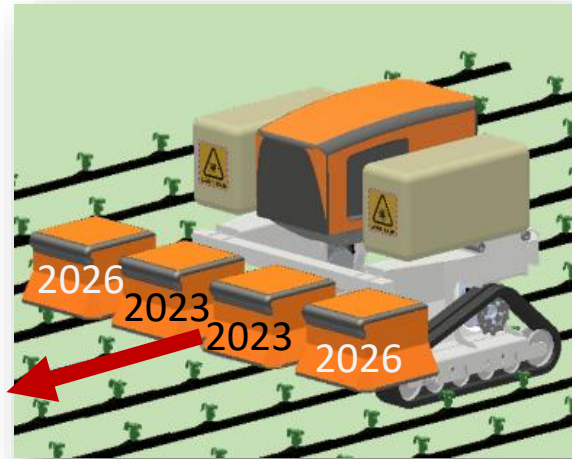
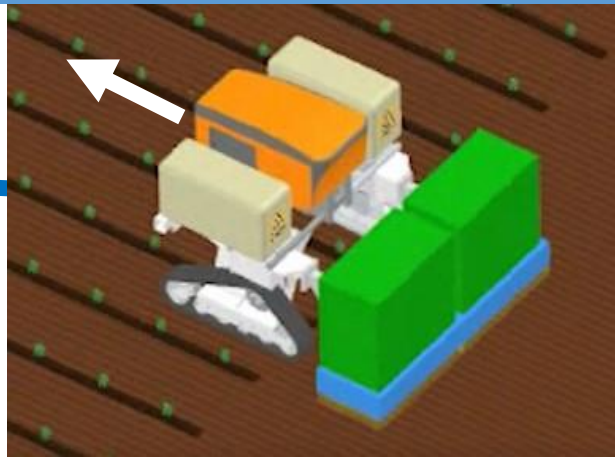


WeLASER aims to merge current technologies to build, assess and push into the market a precision weeding system based on high-power laser sources and autonomous mobile systems with the main objective of eliminating the use of herbicides while improving productivity and competitiveness.

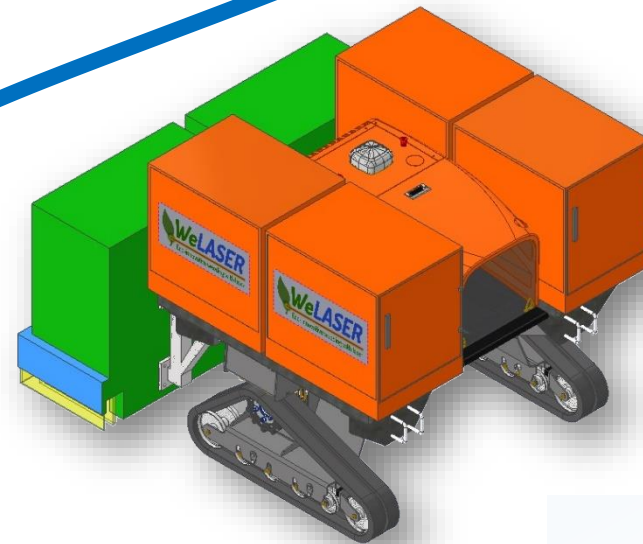




Weight - soil pressure corresponds app. to two persons



4-row solution



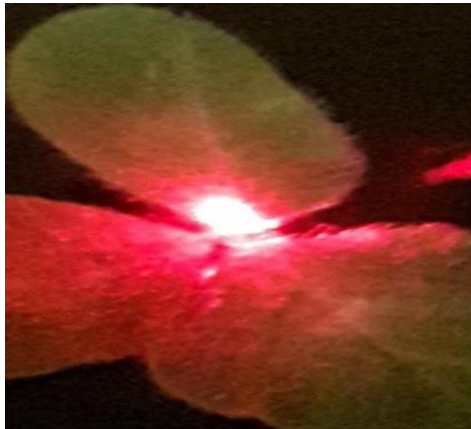
2-row solution

Using a 50 W 2 μm fibre laser beam with a **diameter of 2 mm**:

With 200 weeds m^{-2} the exposed area is

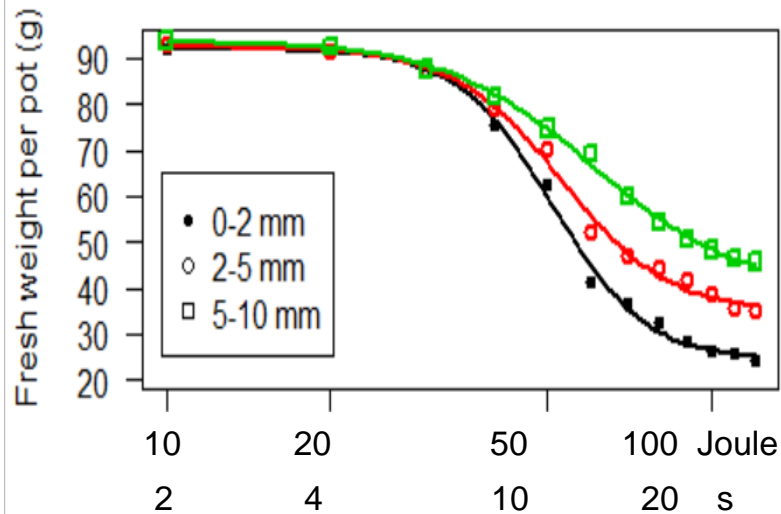
$$0.001^2 \text{ m}^2 \times \frac{22}{7} \times 200 = 0.000629 \text{ m}^2 \sim$$

0.06 % of the area

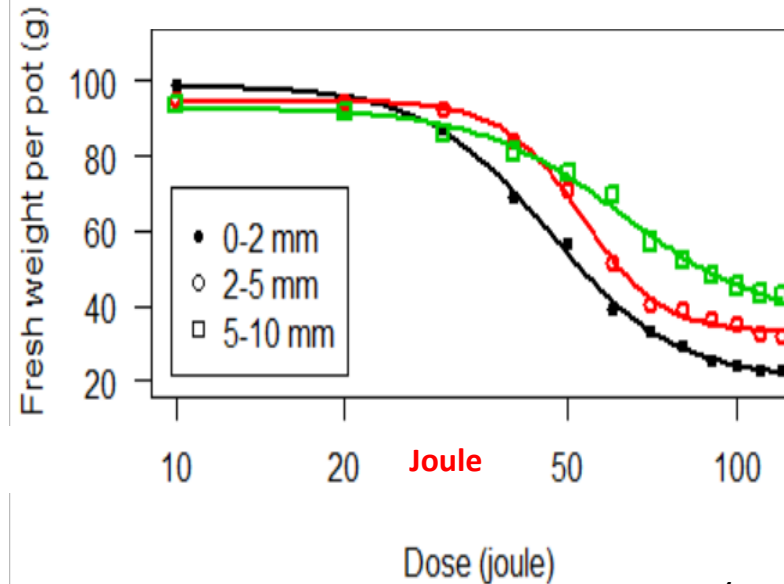


Calculation of the energy = W x Second = Joule

Elymus repens exposed to 1 W laser beams (435 nm) with different internal spot diameters



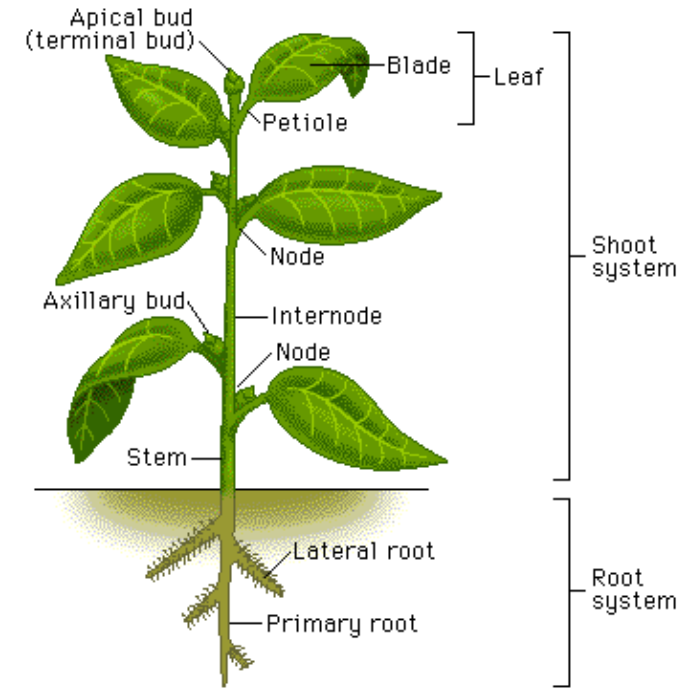
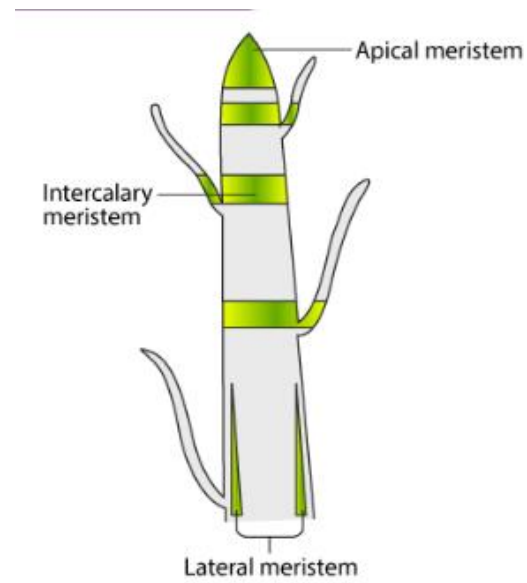
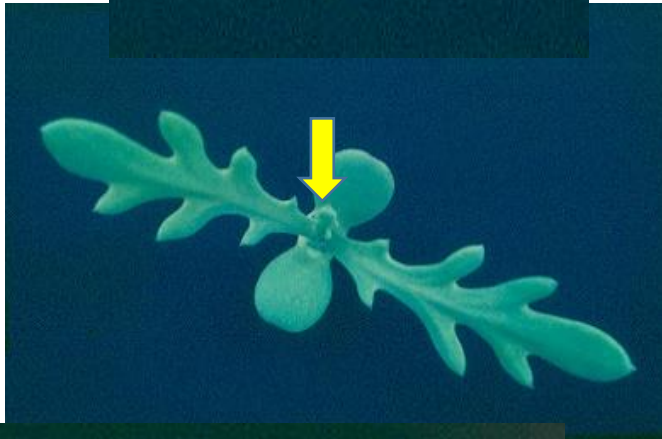
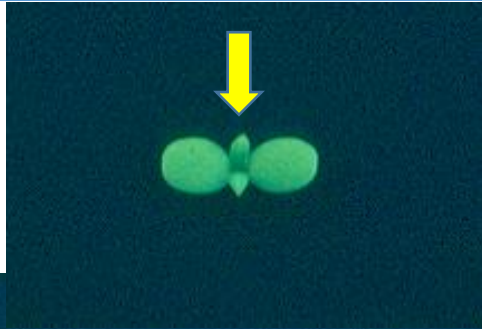
Elymus repens exposed to 5 W laser beams (450 nm) with different internal spot diameters



(From Rakhmatulin and Andreasen, *Agronomy* **2020**, 10(10), 1616)

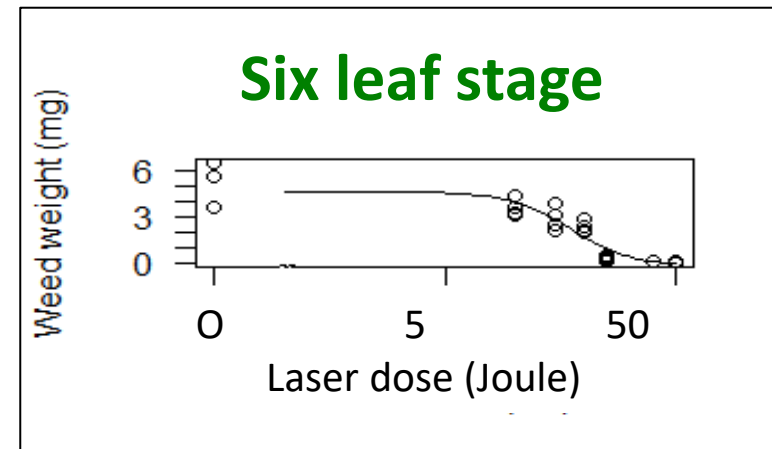
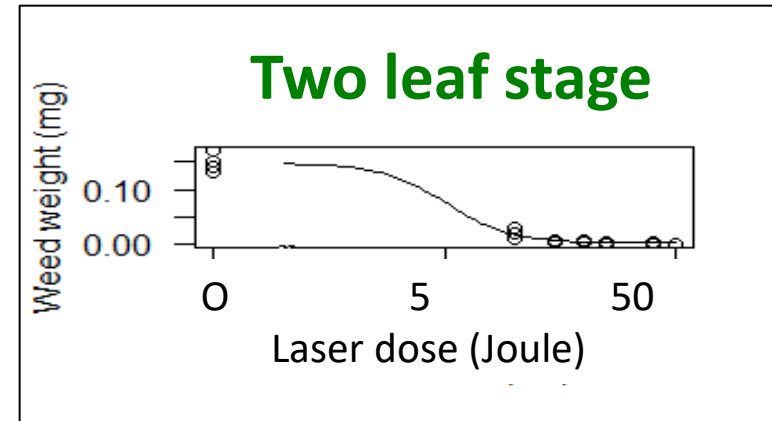


Gul okseøje (*Chrysanthemum segetum*)



Dose-response - Annual weeds (50 W)

Dose-response experiment with the weed *Chenopodium album* (Fat Hen)

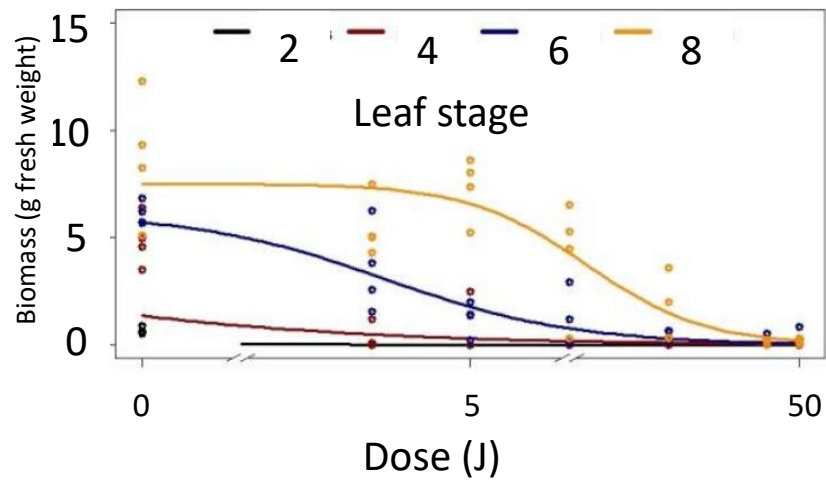


50 J = 157 J/mm²

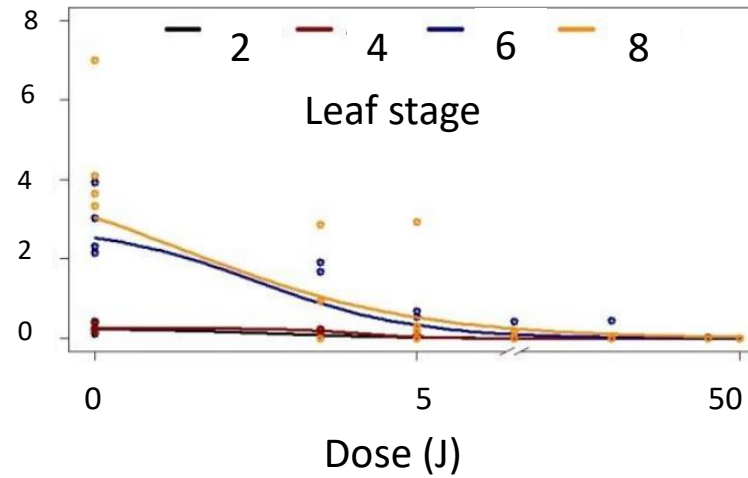
The effect on plants (50 W Laser)



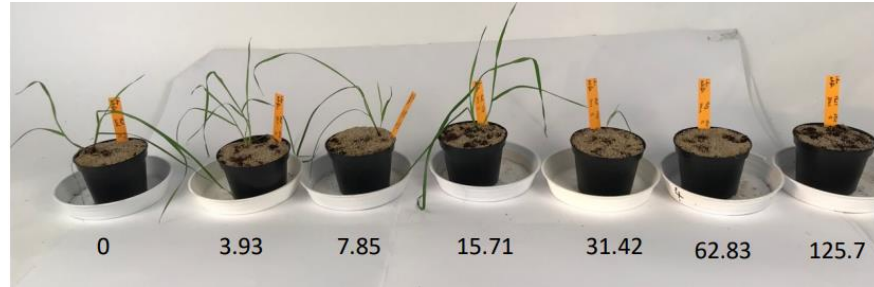
Kornblomst
Centaurea cyanus



Hyrdetaske
Capsella bursa-pastoris



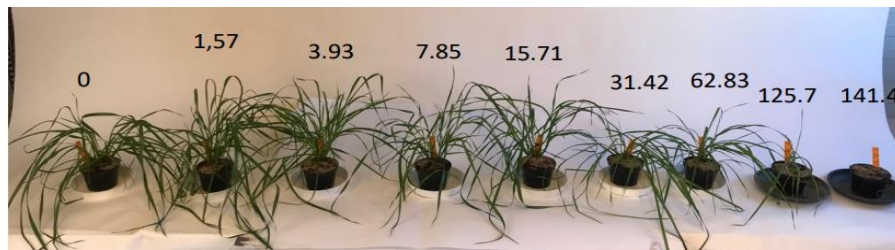
The effect on *Lolium multiflorum* (50 W Laser)



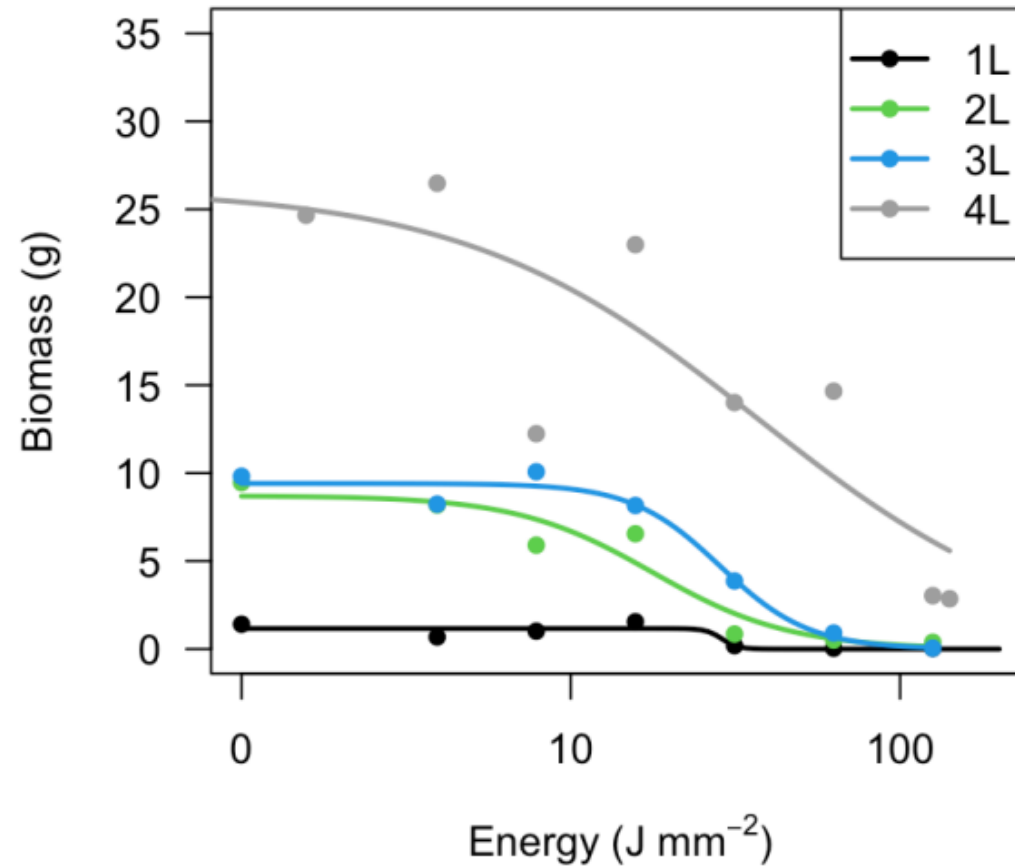
L. multiflorum one leaf stage 21 days after laser treatment.



L. multiflorum two leaf stage 21 days after laser treatment.



L. multiflorum four leaf stage 21 days after laser treatment. The doses are expressed in $J\ mm^{-2}$.



Is it safe for the environment and the user?

- No significant effect on the mortality of soil worms living in 10 g soil*
- Insects are more sensitive to laser than weed seedling*
- Laser can ignite a fire
- Human and larger animal can be blinded and burnt by the laser beam



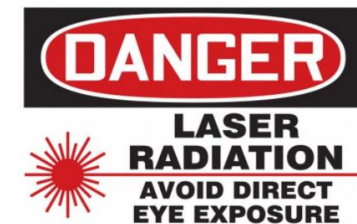
* Andreassen et al. (2023) Side-effects of laser weeding: quantifying off-target risks to earthworms (Enchytraeids) and insects (*Tenebrio molitor* and *Adalia bipunctata*). *Frontiers of Agronomy*, Vol 5

<https://doi.org/10.3389/fagro.2023.1198840>

- **Good effect on small annual plants**
- **Perennial weeds require several treatments**
- **No effect on soil worms in the soil**
- **Insects at all life stages are sensitive to laser irradiation, but as only a very little area is exposed, the risk of hitting the fauna is very small.**
- **Human and larger animal can be blinded and burnt by the laser beam.**



Laser safe goggles



REVIEW article

Front. Agron., 07 March 2022

Sec. Weed Management

Volume 4 - 2022 | <https://doi.org/10.3389/fagro.2022.841086>

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Thank you for your attention!



Please find more information on
<https://welaser-project.eu/>



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