

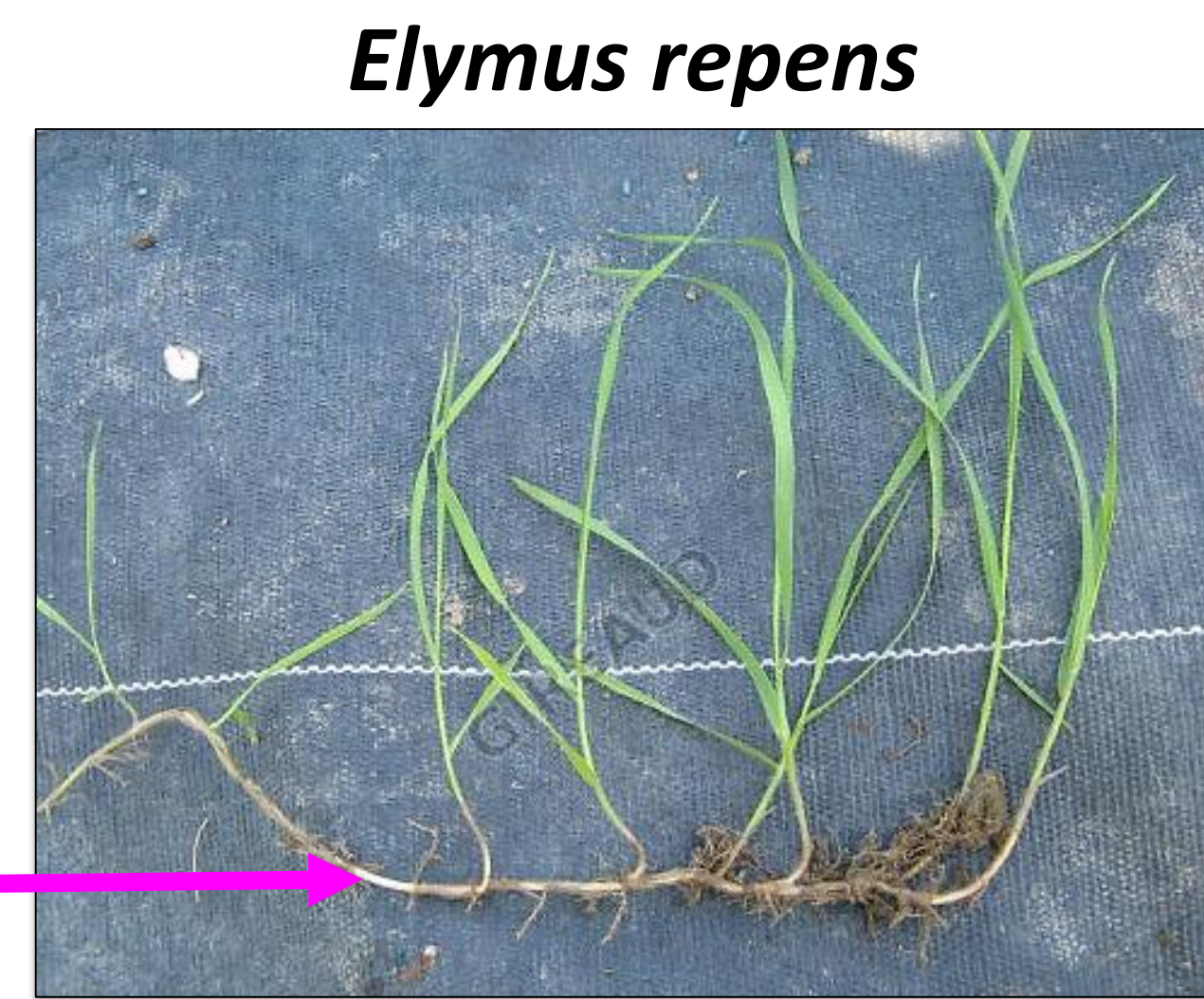
# The effect of fragment weight and bud number on the regrowth of perennial weeds: a study with *Elymus repens*

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## Context and Objectives

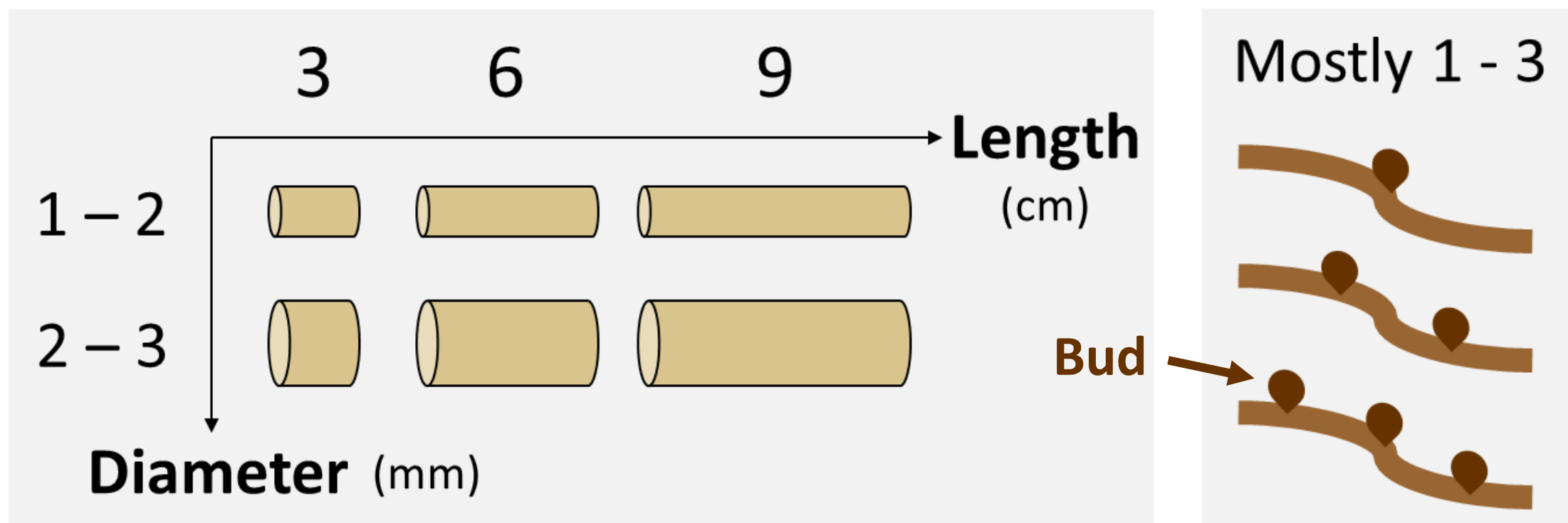
- $\searrow$  Tillage +  $\searrow$  Herbicides =  $\nearrow$  Perennial weeds
  - Produce knowledge on the biology of perennial weeds  $\rightarrow$  solutions to manage them
  - Identify the drivers of the **regrowth capacity from a piece of vegetative organ** = key process
- 2 potential factors
1. The **weight** of the fragment – proxy of the amount of reserves
  2. The **number of shoots growing** on the same fragment



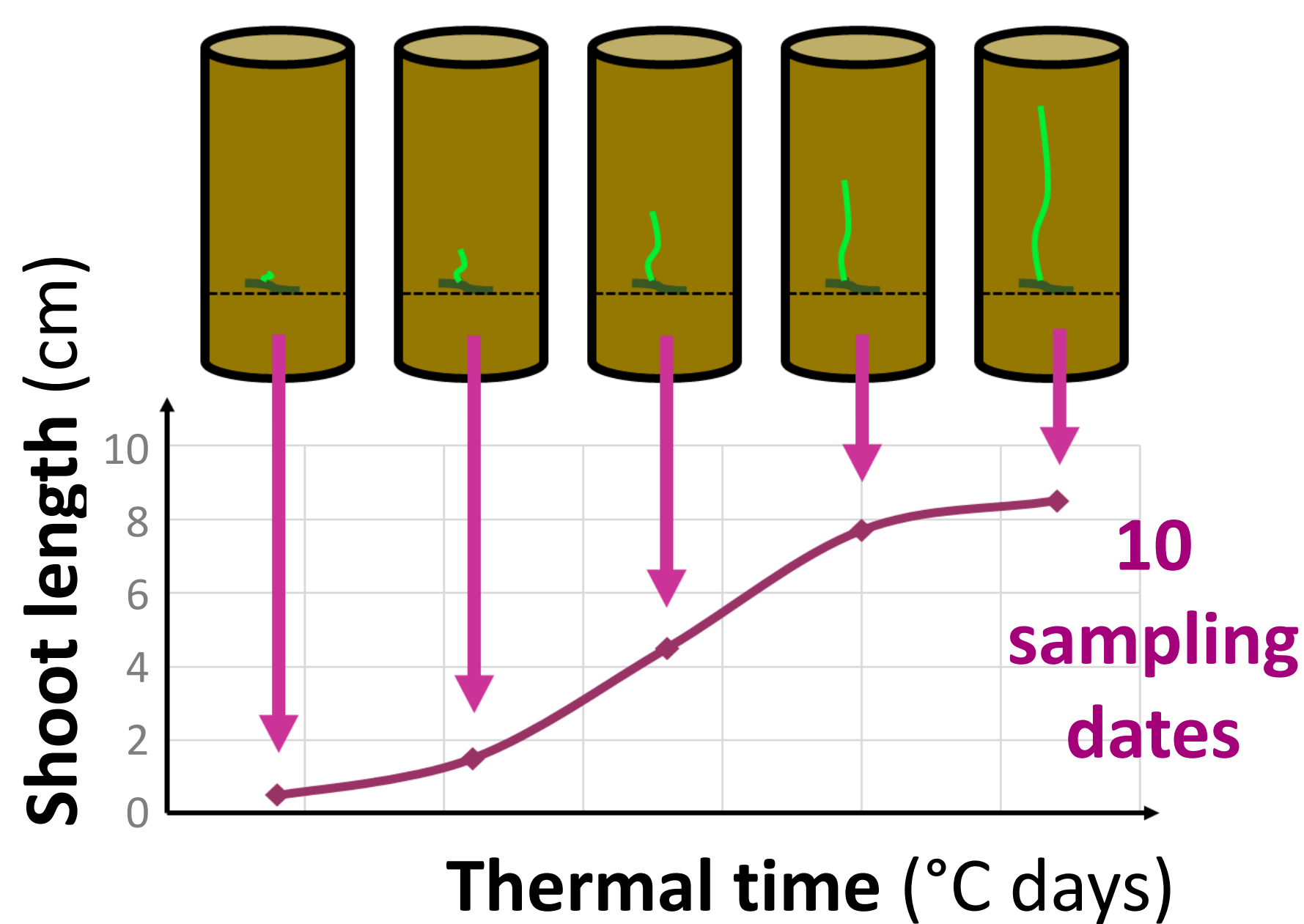
## Material and Methods

1. Dig out *Elymus repens* rhizomes from field
2. Cut them into contrasted fragment types

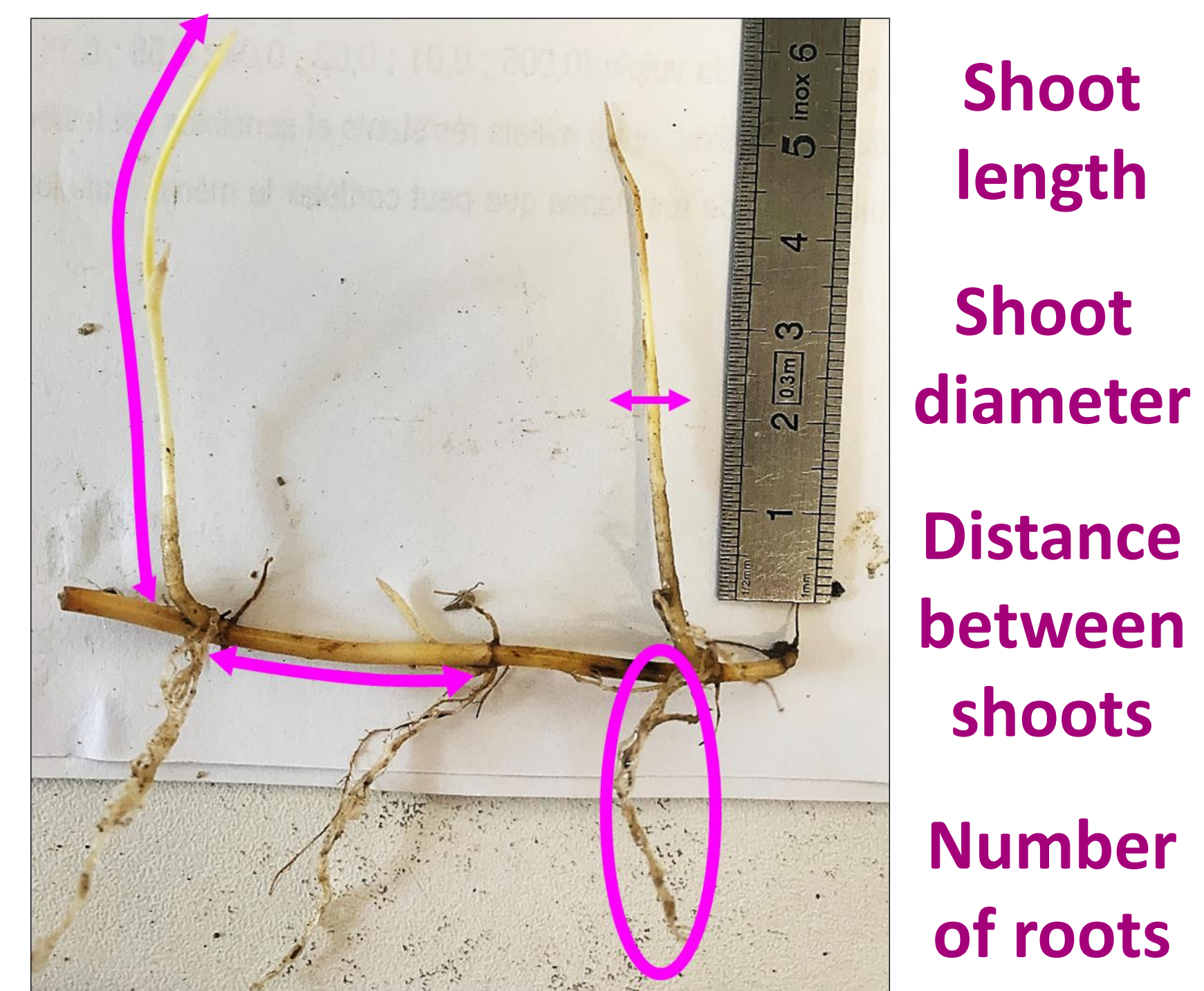
6 size classes x various numbers of buds



3. Bury them in pots in greenhouse and harvest them over time



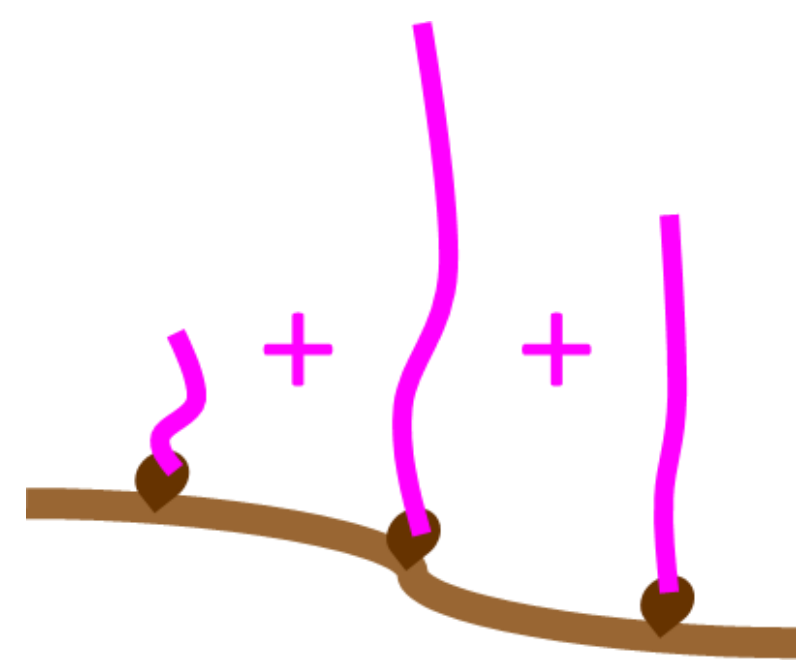
4. Characterize them at each step



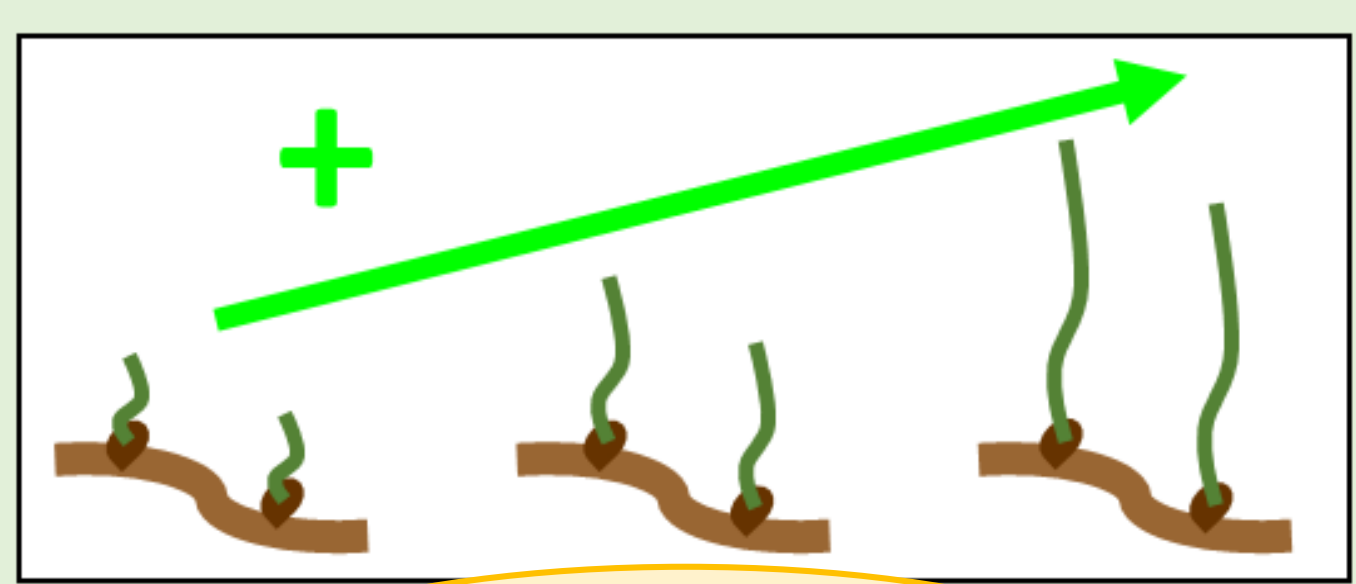
## Results – Analysis of shoot length drivers with linear models

### 1. Cumulated shoot length

Total  $R^2 = 60\%$  Partial  $R^2$

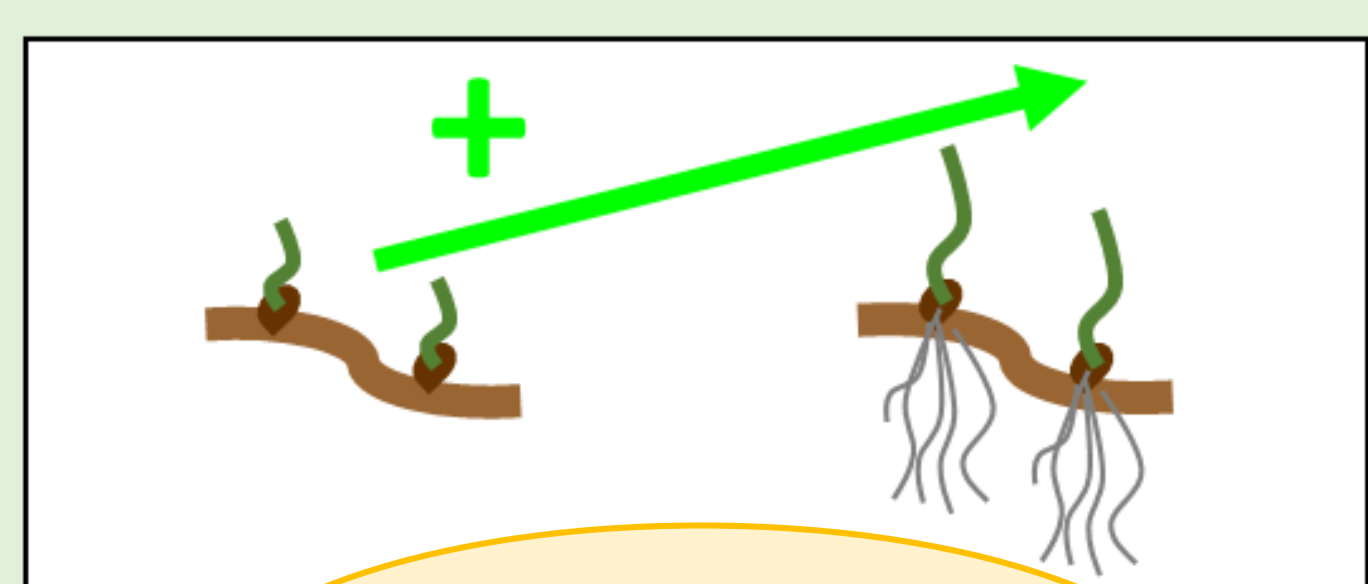


Thermal time (°C days) 4%



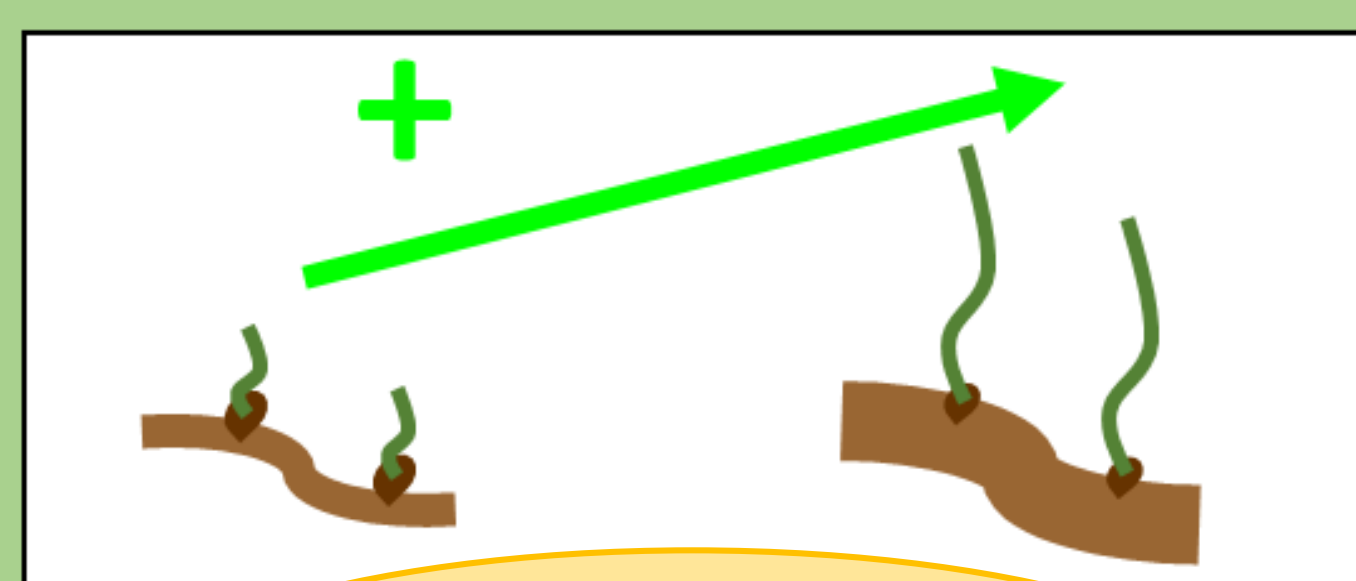
Shoot length increases with temperature

Number of roots 1%



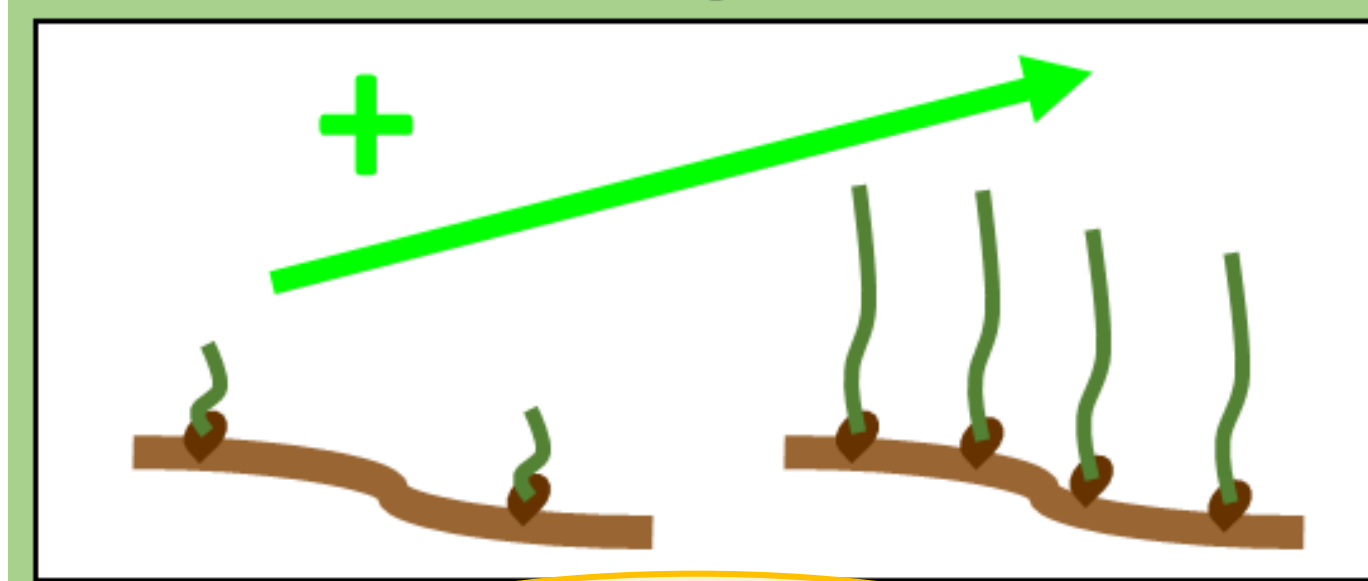
Simultaneous growth of shoots and roots

Fragment weight (g) 43%



The more the reserves the longer the shoots

Shoot density ( $g^{-2}$ ) 12%

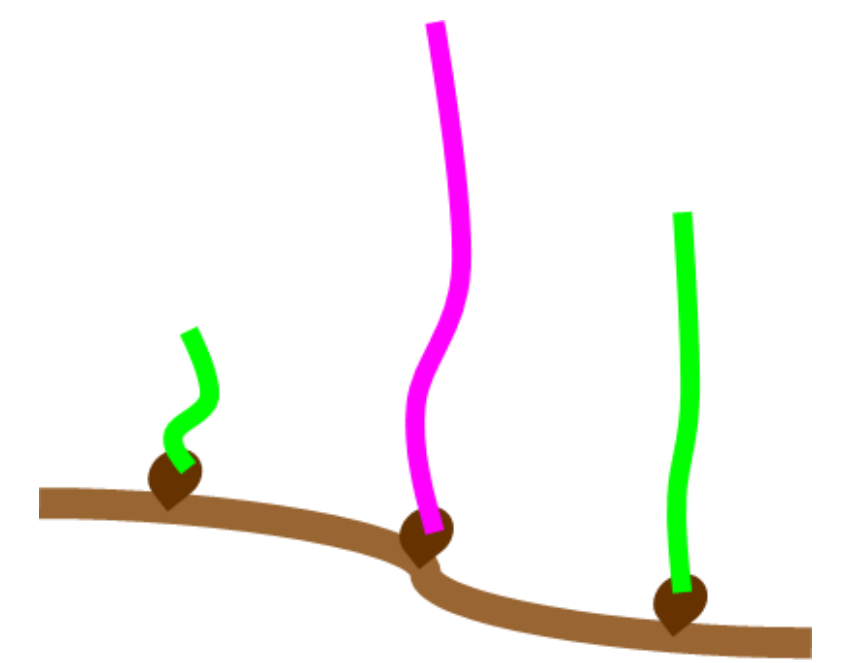


Better use of reserves with more shoots

No effect of bud density

### 2. Individual shoot length

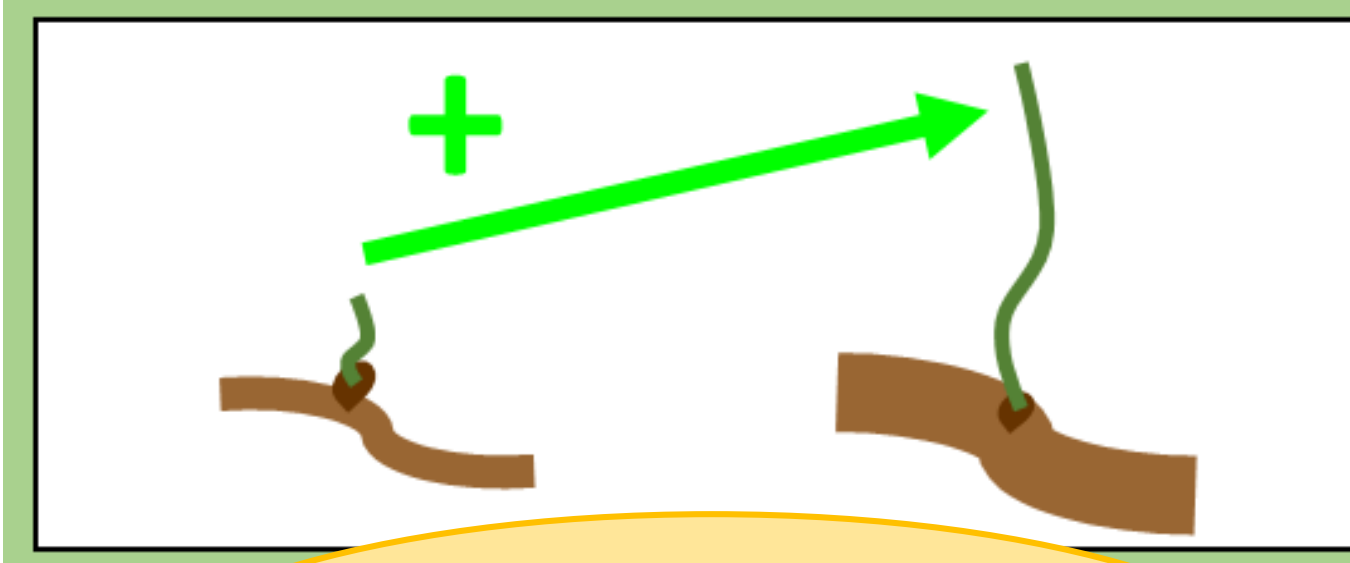
Total  $R^2 = 20\%$



Thermal time (°C days) + Number of roots +

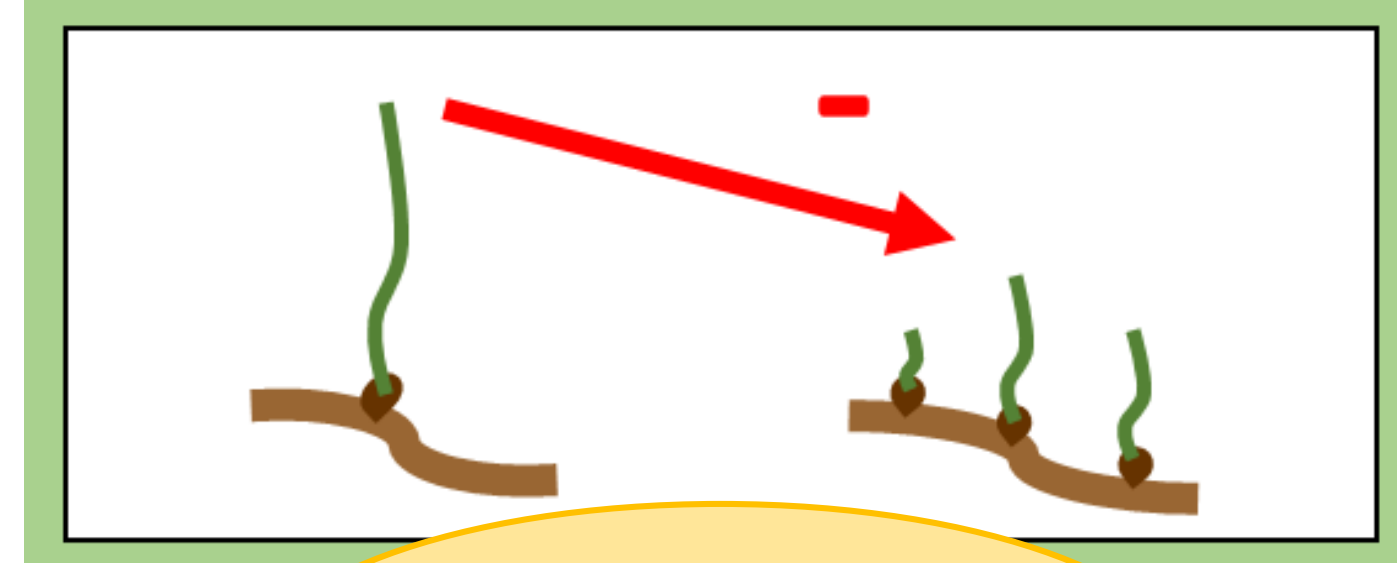
Same conclusions as for cumulated length

Fragment weight



The more the reserves the longer the shoots

Shoot density ( $g^{-2}$ )



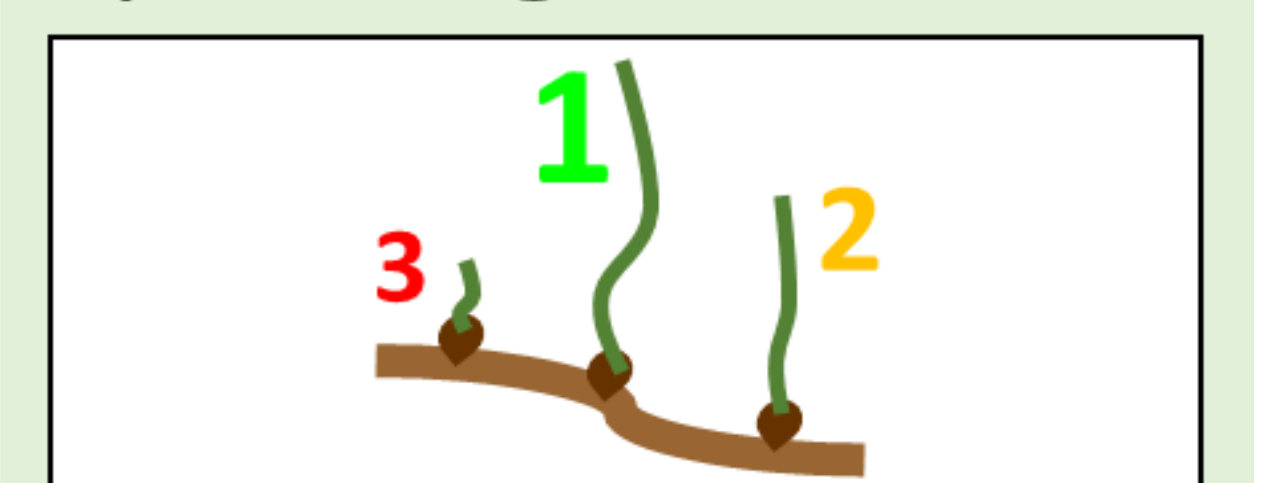
Competition effect between shoots

No effect of :

- bud density
- shoot diameter
- distance between shoots

Reserves may be mobile

Sprouting order



Shoots that start first are dominant

## Conclusion and perspectives

- Main driver of the regrowth capacity = **reserve amount inside the fragment**  $\rightarrow$  field should be tilled when reserves are low
- Data will be used to **model perennials** in the cropping-system model FLORISYS  $\rightarrow$  find sustainable weed management levers