



***Hermetia illucens* frass and Pita pinta laying hens manure as biofertilizers for Asturian crops: effects on seed germination and growth**

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Florence, 1 September 2024



1. Introduction

Problem:

Crop production demands tons of fertilizers with adverse environmental impacts

Possible Solution:

The use of frass and Pita pinta manure as alternative biofertilizers.



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Aim: Understand the effect of frass and Pita pinta manure on seed germination on 3 crop species by knowing the threshold tolerance for each one.

2. Materials and methods

2.1. Biofertilizers

H. illucens
larvae



Feed

WP3



Pita pinta

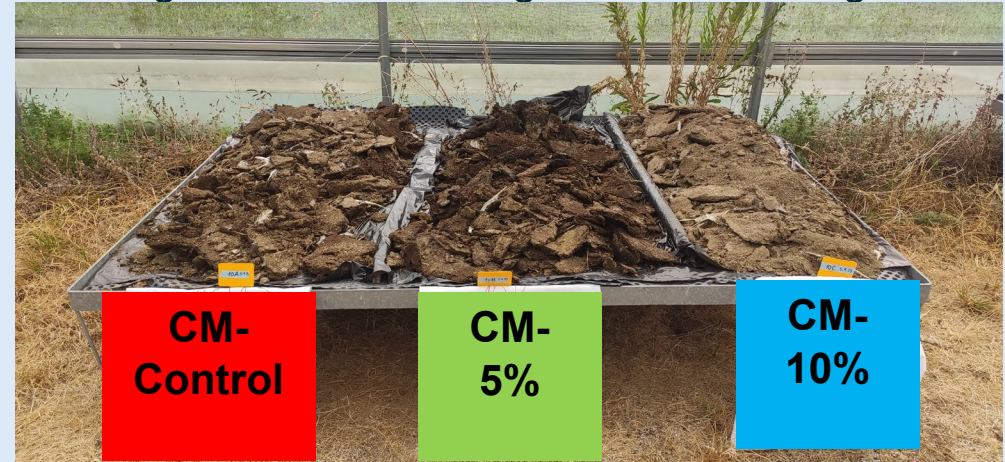
WP4

4
biofertilizers



Frass

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CM-
Control

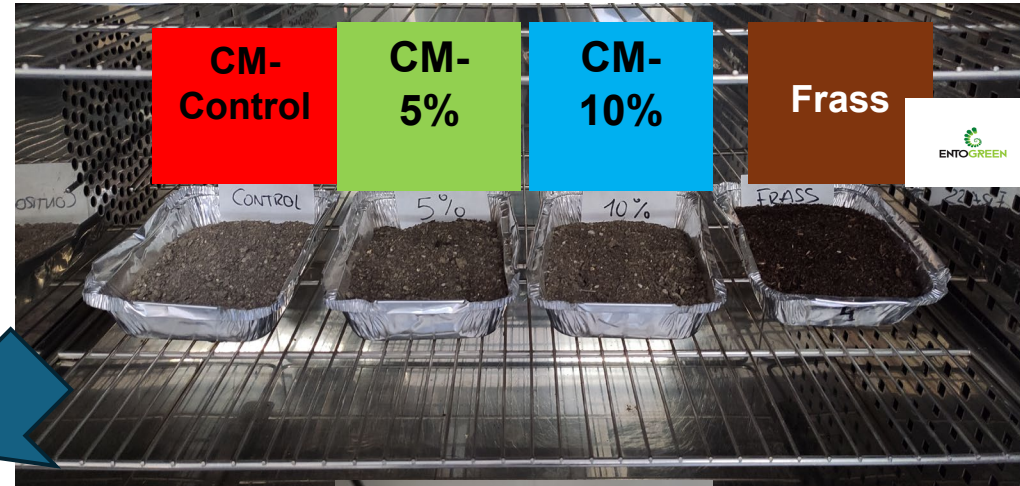
CM-
5%

CM-
10%

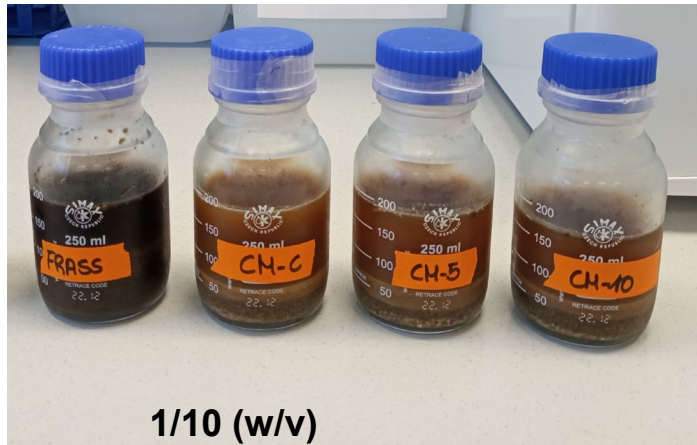
2. Materials and methods

2.2. Liquid extracts 1

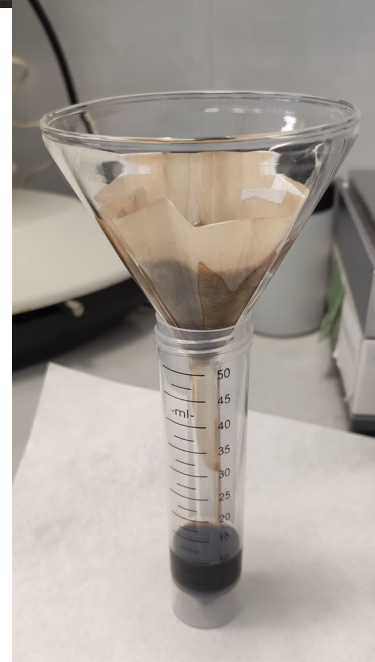
Pretreated 1h at 70°C



2



3



4



2. Materials and methods

2.3. Seedling and incubation

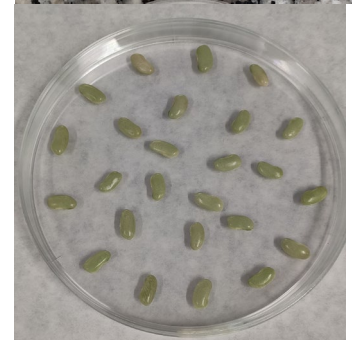
1



25 seeds
7mL

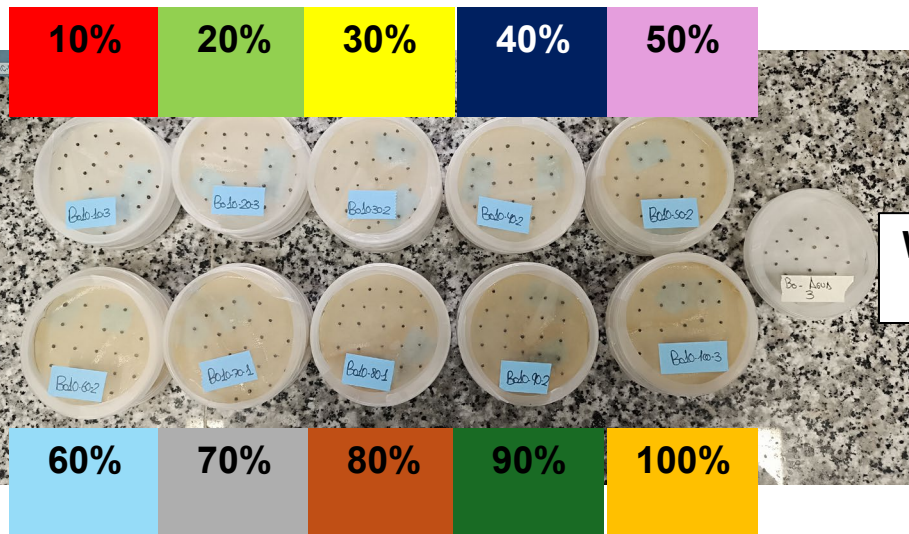
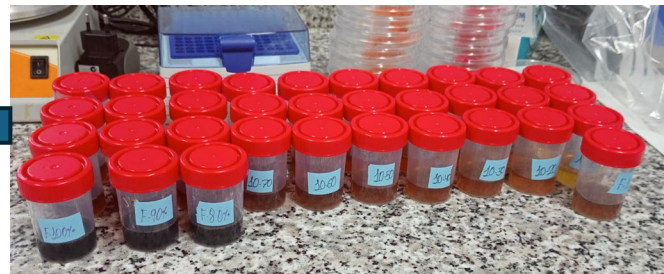


25 seeds
7mL



15 seeds
14mL

2



3

Fitotron



24°C, 70% RH



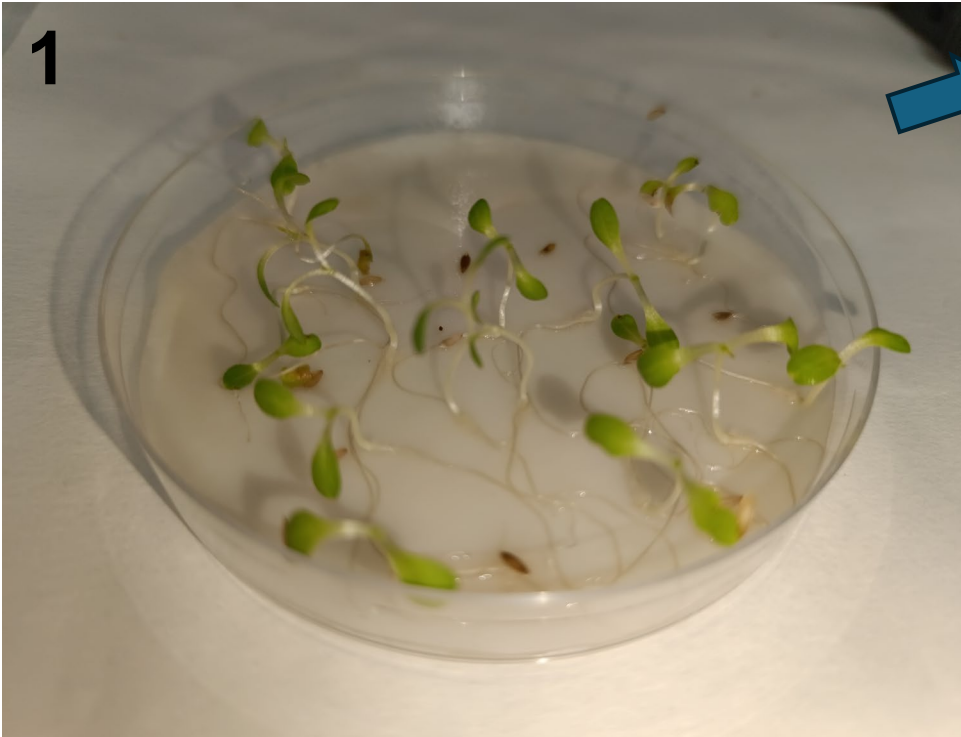
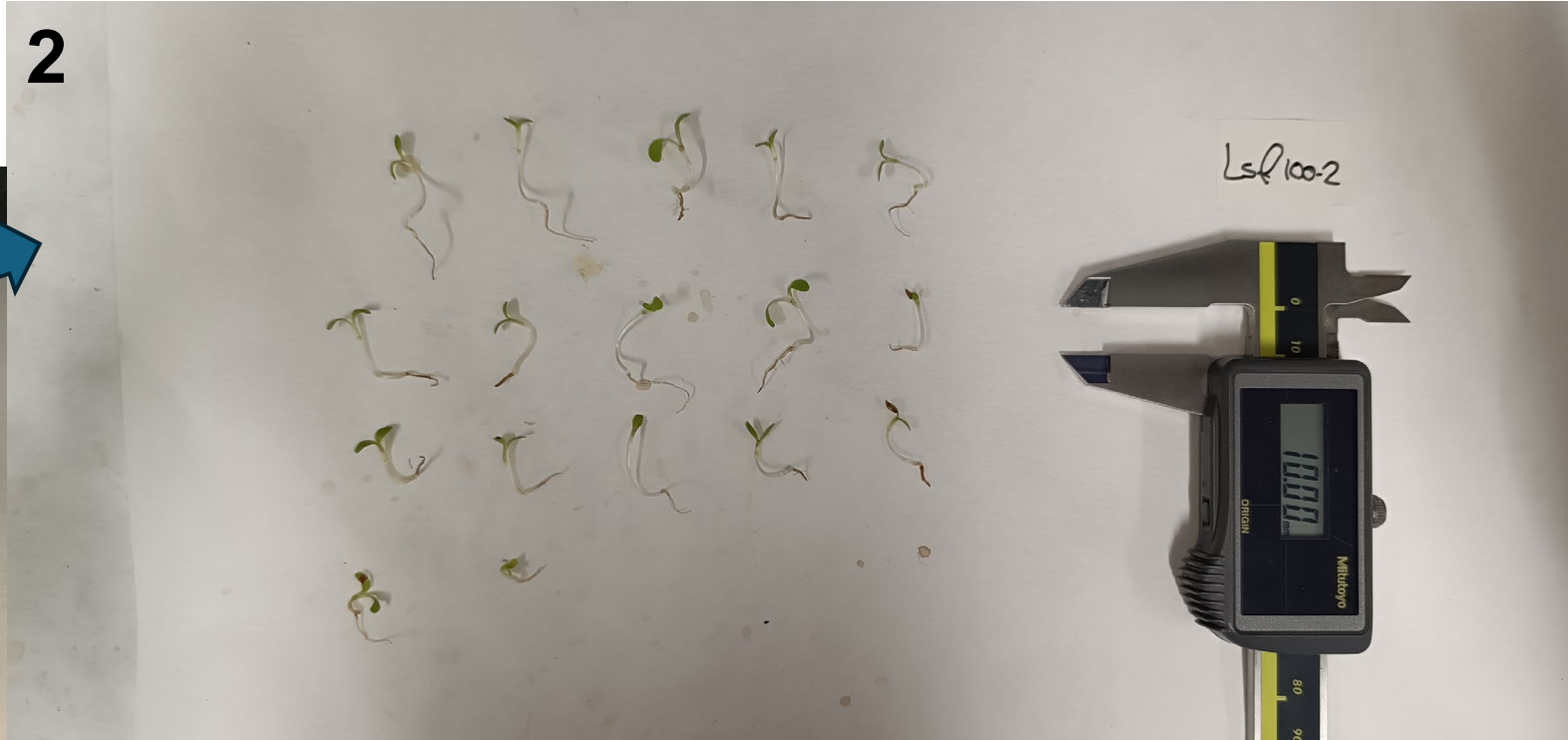
12/12 photoperiod

7 Days



2. Materials and methods

2.4. Measurements

1**2**

2. Total length of each shoot.

**3**

- T_{50}
- Germination Index (GI)
- Seed Vigor Index (SVI)

1. Number of germinated seeds everyday for 7 days

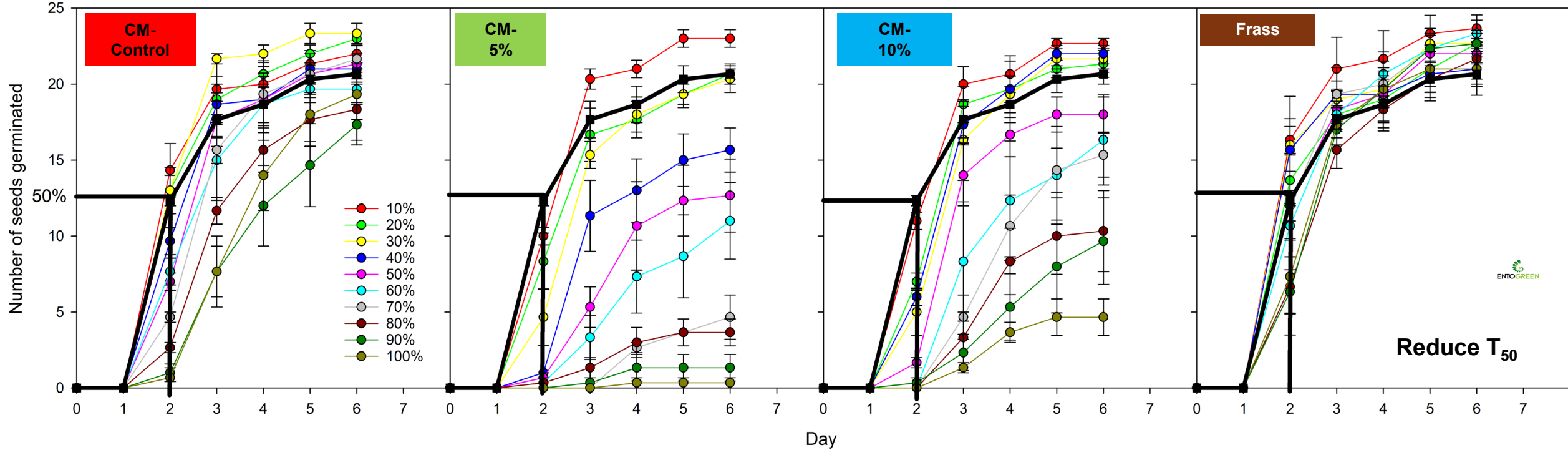
3. Results

3.1. Time 50% (T_{50})

T_{50} = Days to reach the 50% of seeds germinated

Farooq et al. (2005)

Brassica oleracea var. *Viridis*



CONTROL T_{50} *B. oleracea* var. *Viridis* = 2 days

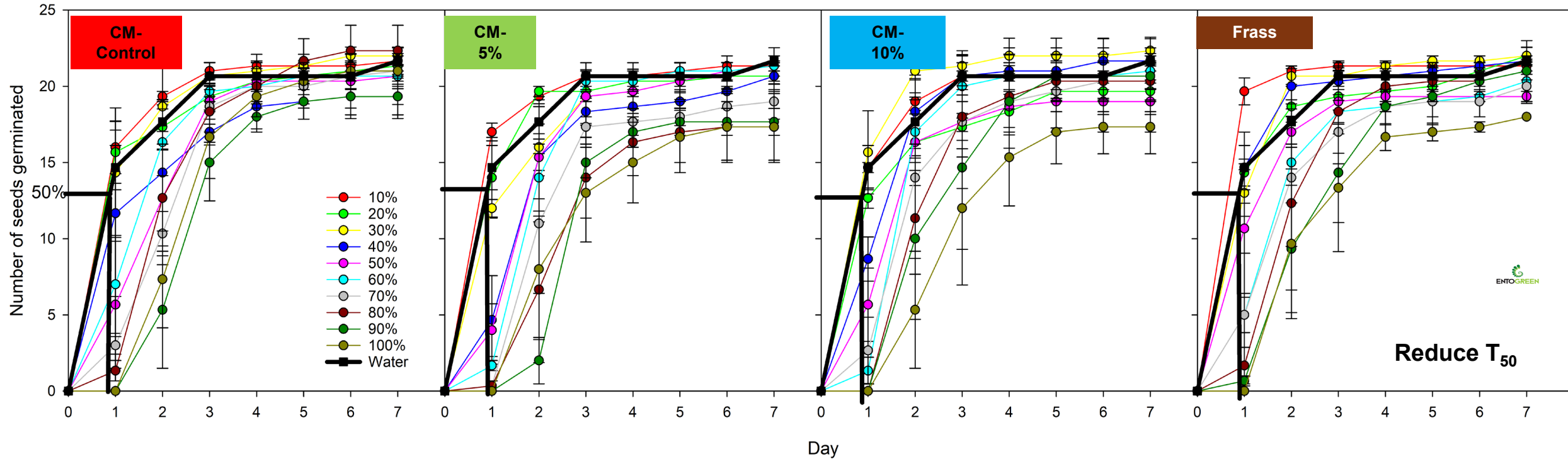
3. Results

3.1. Time 50% (T_{50})

T_{50} = Days to reach the 50% of seeds germinated

Farooq et al. (2005)

Lactuca sativa



CONTROL T_{50} *L. sativa* = 0.83 days

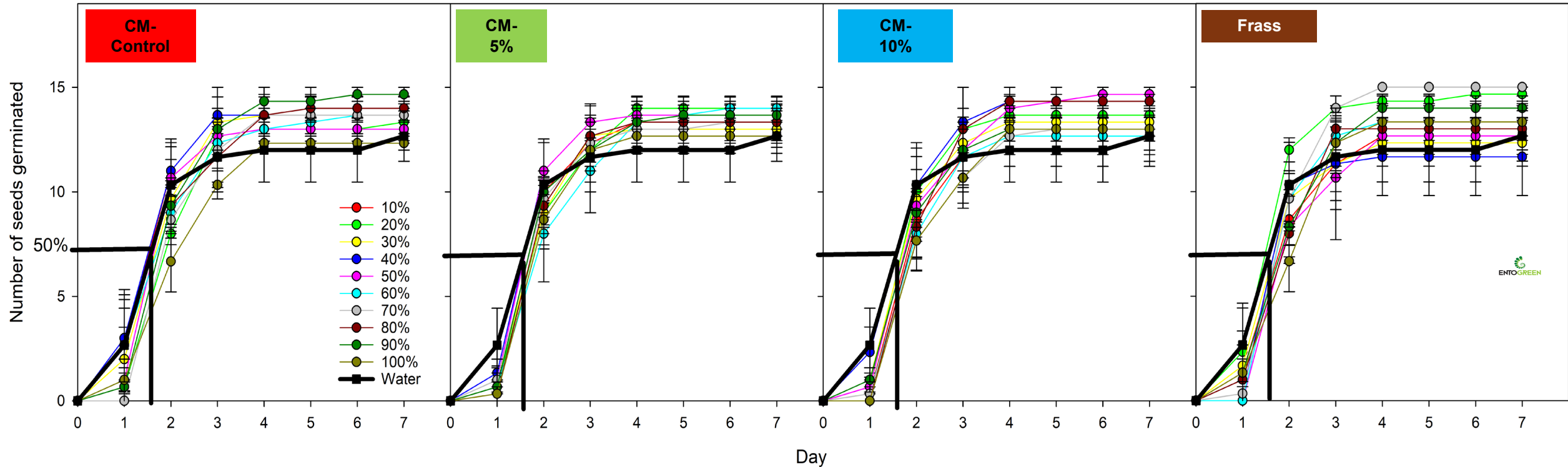
3. Results

3.1. Time 50% (T_{50})

T_{50} = Days to reach the 50% of seeds germinated

Farooq et al. (2005)

Phaseolus vulgaris var. Verdina



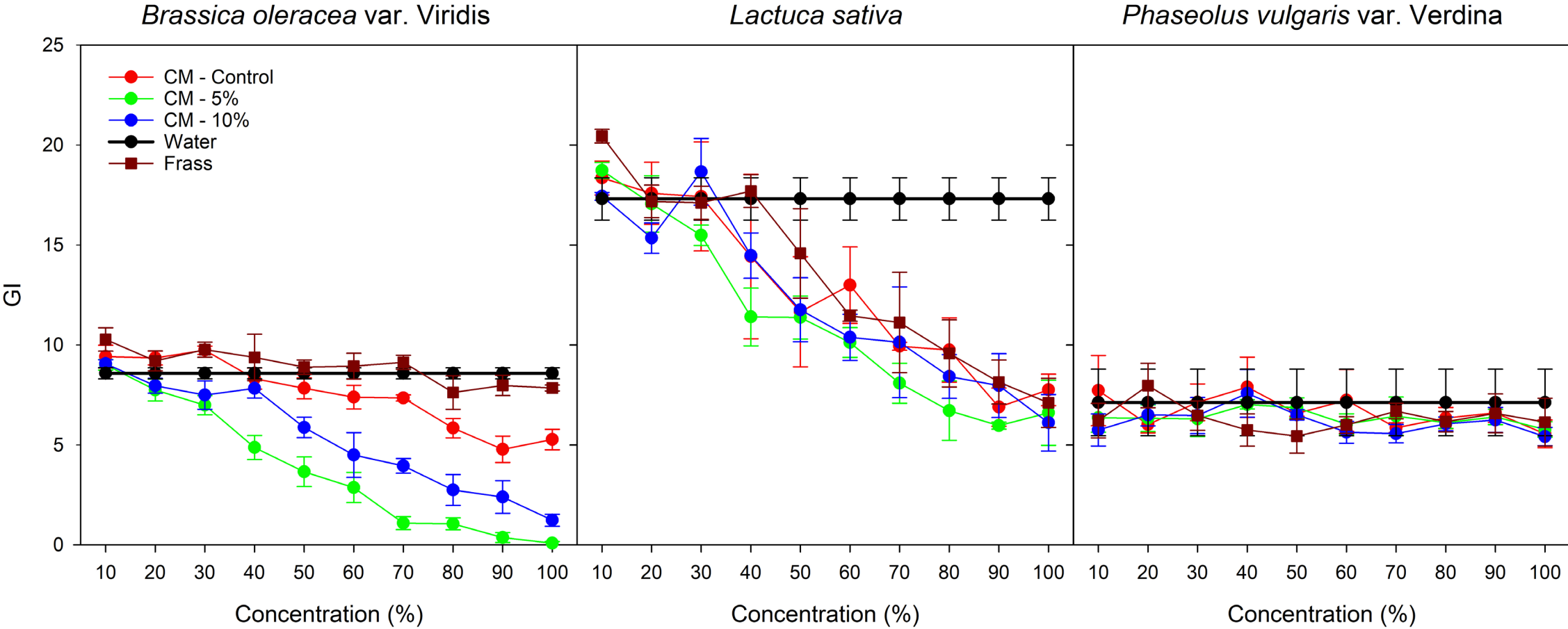
CONTROL T_{50} *P. vulgaris* var. Verdina = 1.66 days

3. Results

3.2. Germination Index (GI)

$$GI = \sum Gt/Dt$$

Gt = number of germinated seeds on day t
 Dt = time corresponding to Gt in days



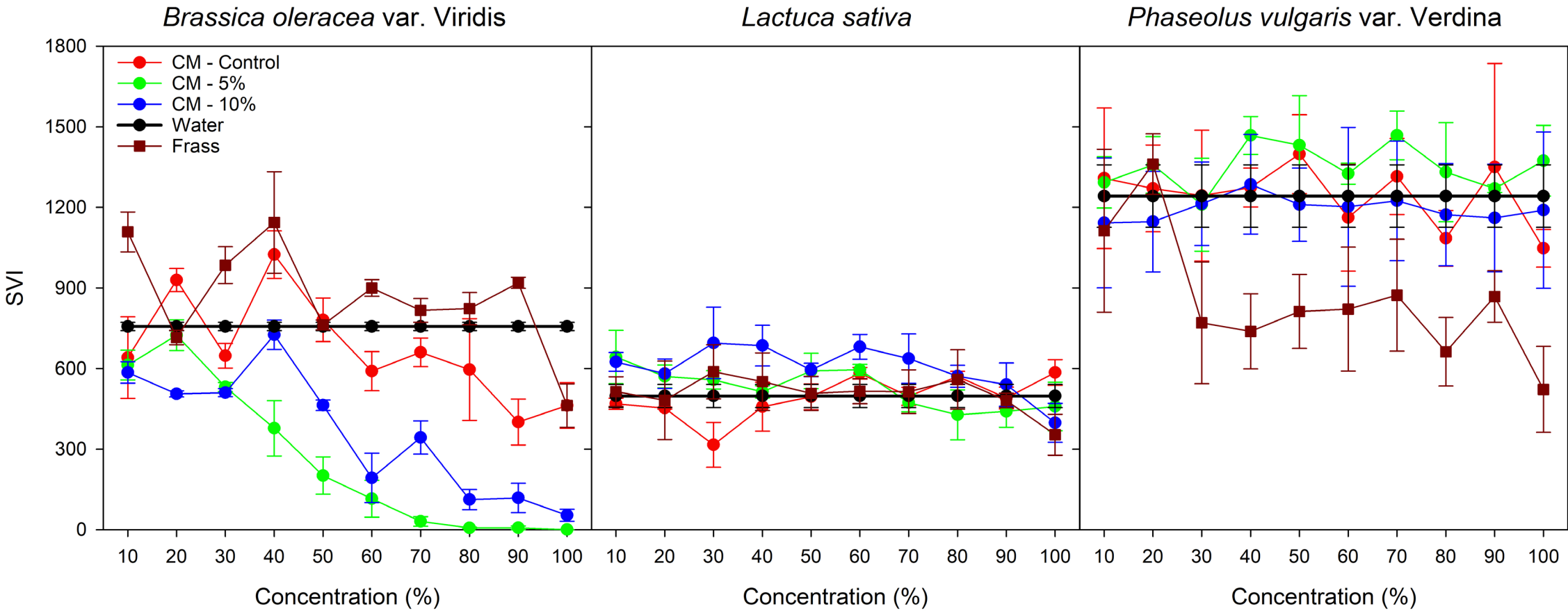
High GI determine earlier germinations
 (Benech Arnold et al., 1991)

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3. Results

3.3. Seed vigor index (SVI)

$$\text{SVI} = \text{Germination Percentage (GP)} \times \text{shoot length}$$



Determines the potential for rapid and uniform emergence of plants

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4. Conclusions

1. **30% is the threshold** concentration for the 4 biofertilizers in the 3 species

2. <i>Brassica oleracea</i> var. Viridis	FRASS was the biofertilizer that presented the highest germination and seed vigor indexes reducing germination time.
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3. <i>Lactuca sativa</i>	The use of FRASS at lower concentrations (10%) and CM-10% reduced germination time, increased germination and seed vigor indexes.
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4. <i>Phaseolus vulgaris</i> var. Verdina	It is the species more resistant to the use of any biofertilizer at any concentrations, being CM-5% the one which increases seed vigor index .
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5. **FRASS**, **CM-C**, **CM-5%** and **CM-10%** act by enhancing different qualities of germination depending on the species.



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Thanks for your attention!



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