

Exploring the Impact of Iron Nanoparticles on Seed Germination and Seedling Growth in Horticultural Crops

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ABSTRACT

The agronomic experiment set-up within the Golden Standard Task of the WP Agritech, was planned to evaluate the effect of Nanoparticles (NPs) application on different stages of four horticultural crops (Eggplant, Pepper, Chili pepper, and Tomato), selected for their significant importance in terms of cultivation area and widespread distribution in Sicily, compared to conventional crop management.

Protocols adopted by plant nurseries was applied for emergence experiments in order to test NPs in *close to market* (horticultural growers) conditions.

Seeds germination

Lab experiments in Petri dishes and filter paper

Seedlings emergence

Lab experiments on peat substrate

MATERIAL AND METHODS

Treatments

- Nanofertilisers based on Iron (II, III) oxide nanoparticles covered with cyclodextrin (NanoFe)
- Cyclodextrin aqueous dispersion
- Standard growing conditions in water

Genotypes

- 4 horticultural crops: Eggplant, Pepper, Chili pepper, Tomato
- 2 cultivars per species

Germination tests

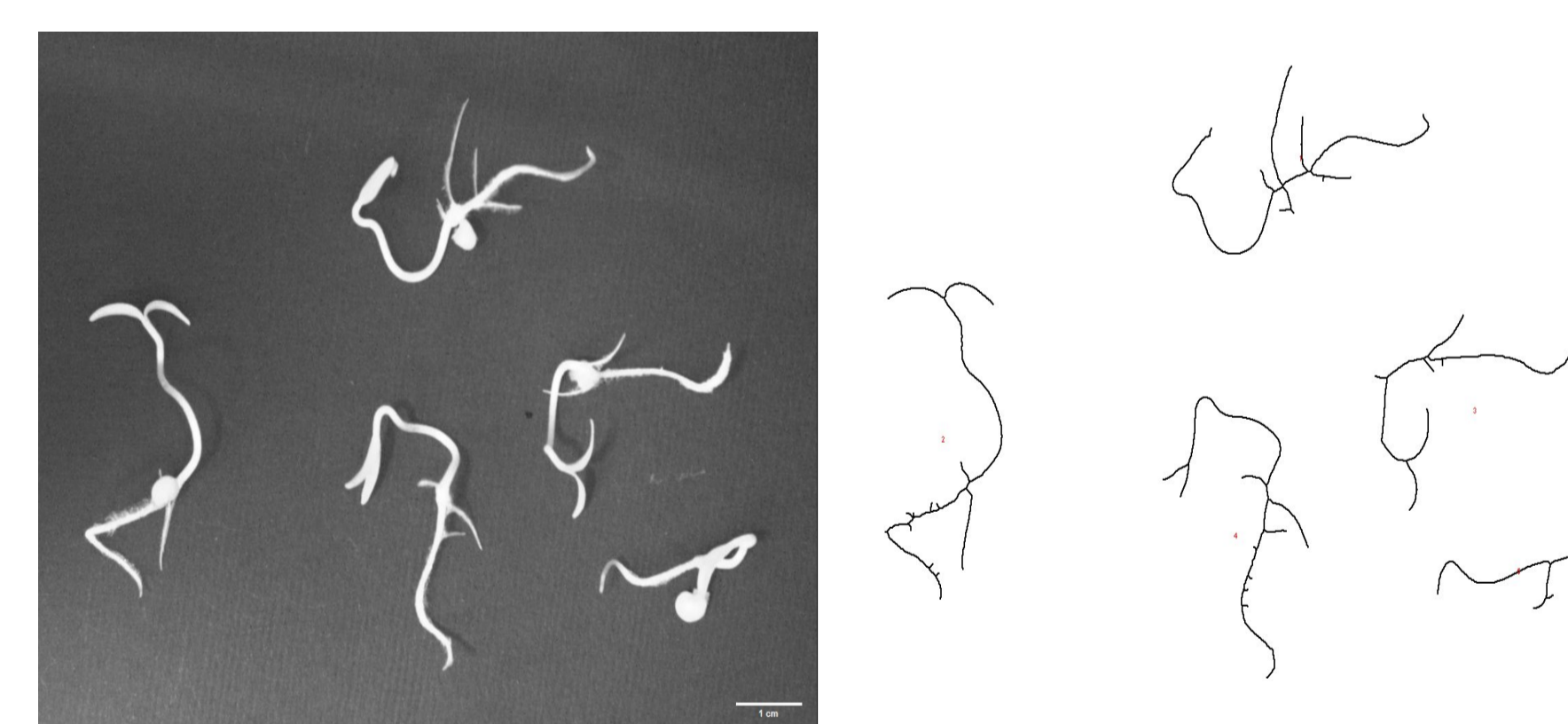
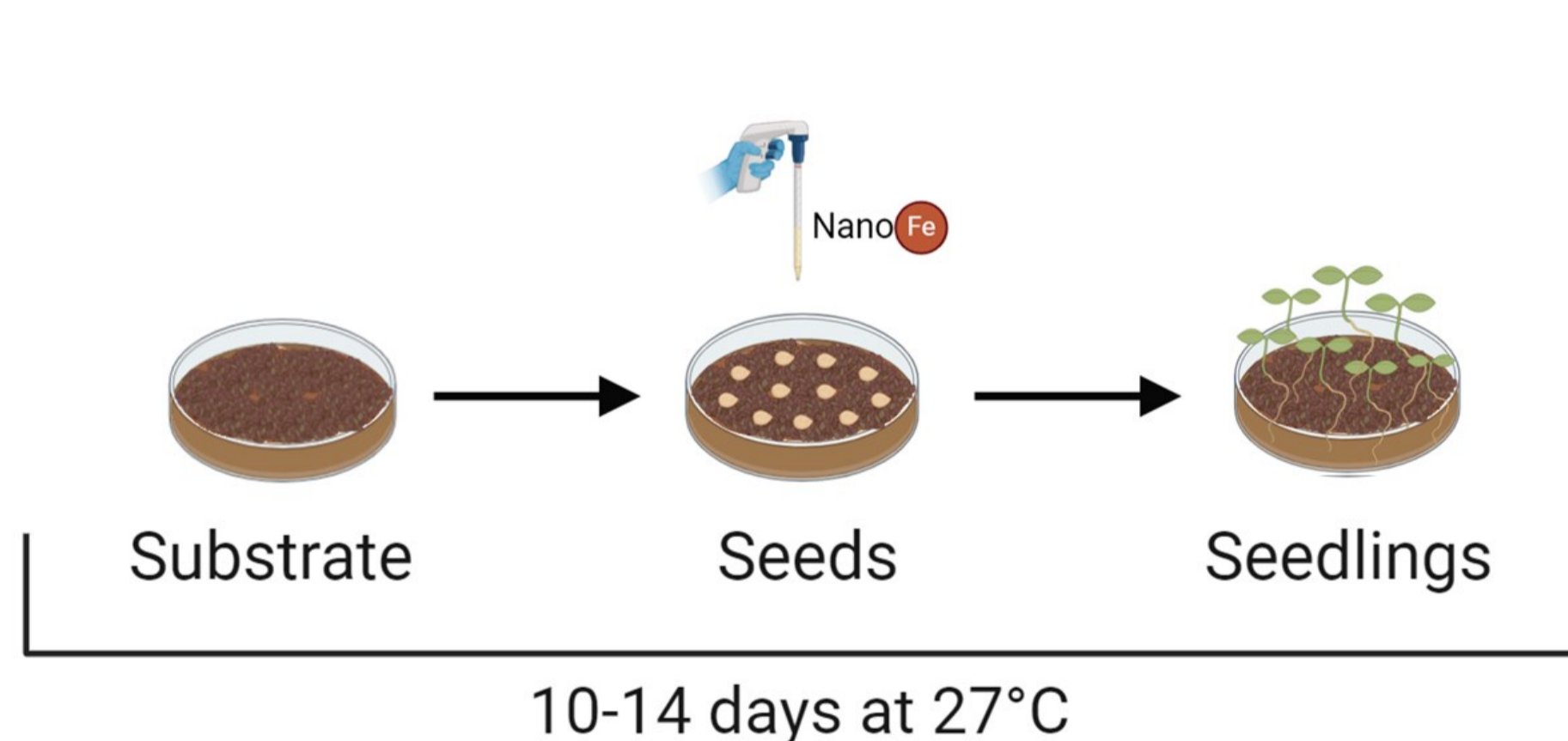
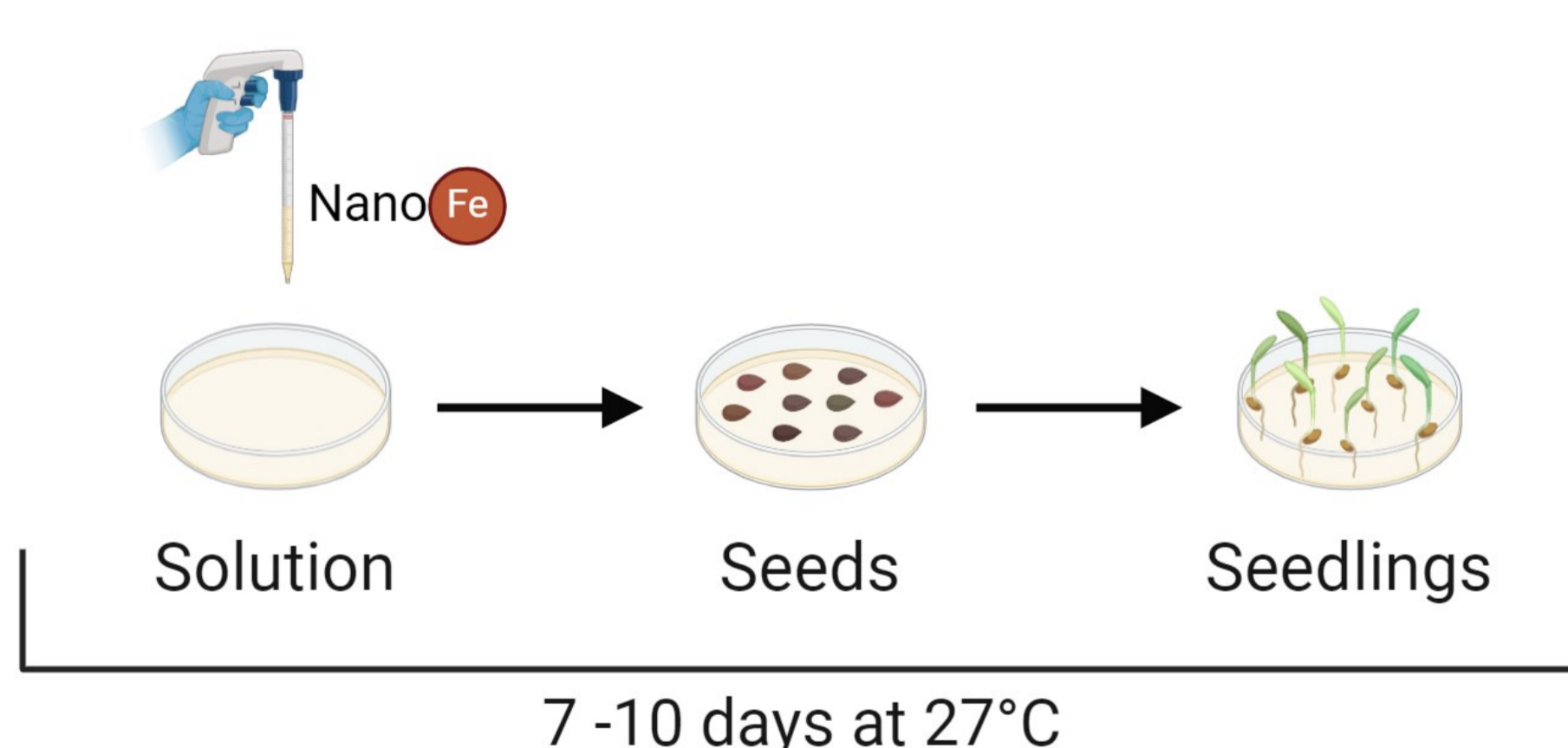
- n. of seeds germinated (Germinability)
- rate of germination (Speed)
- homogeneity of germination (Synchronicity)

Emergence tests in peat substrate

- n. of seedlings emerged (Emergence)
- rate of emergence (Speed)
- homogeneity of emergence (Synchronicity)

Seedling growth tests

- root and shoot dimensions (measured using segmented line tool of ImageJ freeware software)



RESULTS

Effects of Nanofertilizers Fe nanoparticles on the studied variables

Crop	Genotype	Germination	Emergence	Seedling growth
Tomato	Cesarino	no effects	no effects	Longer seedlings
	Genovese	no effects	no effects	no effects
Eggplant	Durona	no effects	no effects	no effects
	Seta	Synchronicity	Speed	no effects
Pepper	Friggitello	no effects	Speed	Shorter seedlings
	Busillis	Germinability Speed Synchronicity	Speed	no effects
Chili pepper	Tondo	no effects	no effects	no effects
	Lungo	no effects	no effects	no effects

