

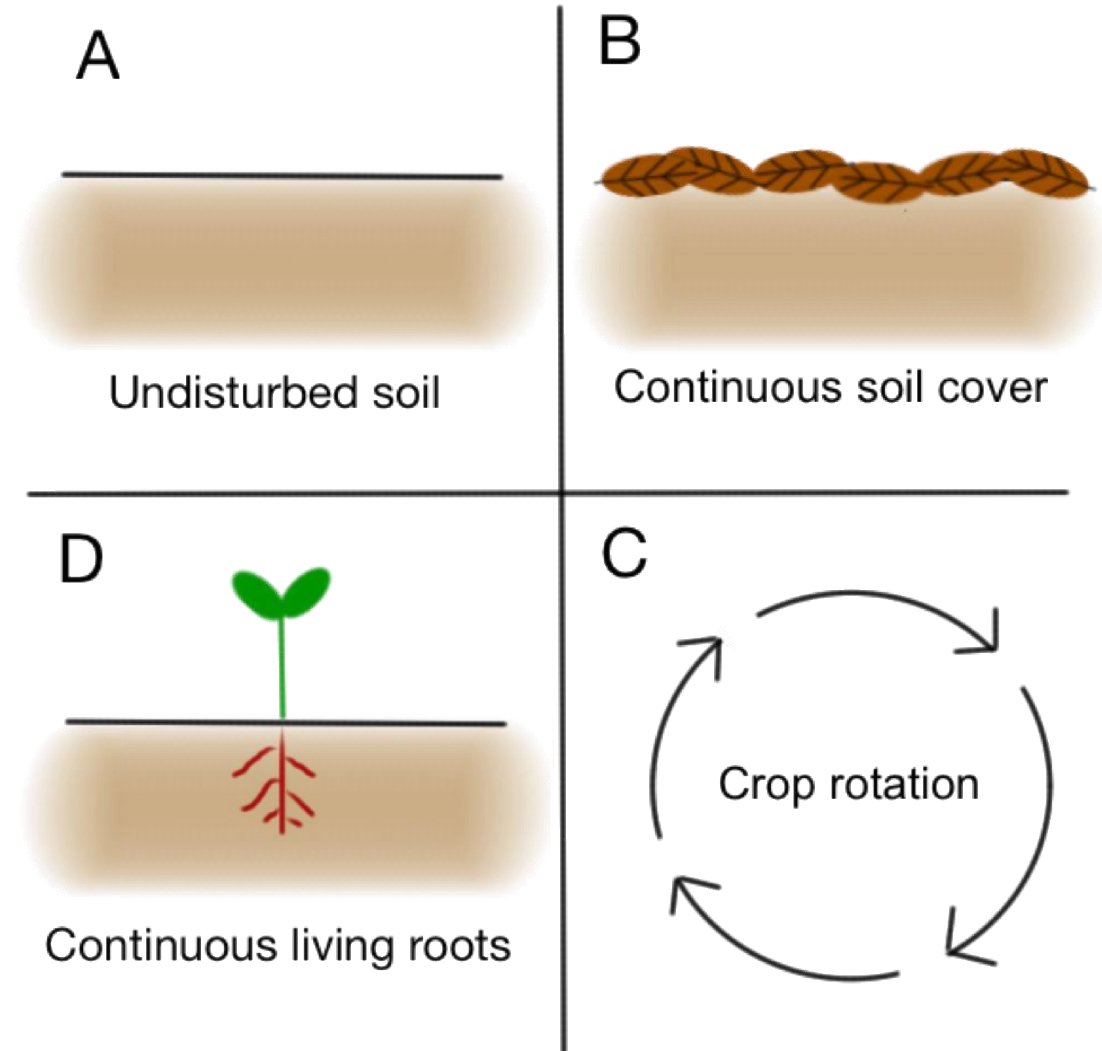
Benefits of Conservation Agriculture on Soil water properties and Entomopathogenic nematodes

Josiah Marquez and Dr. Koon-Hui Wang



Conservation Agriculture

- A. Minimal soil disturbance
- B. Continuous soil cover
- C. Crop rotation
- D. Continuous living roots



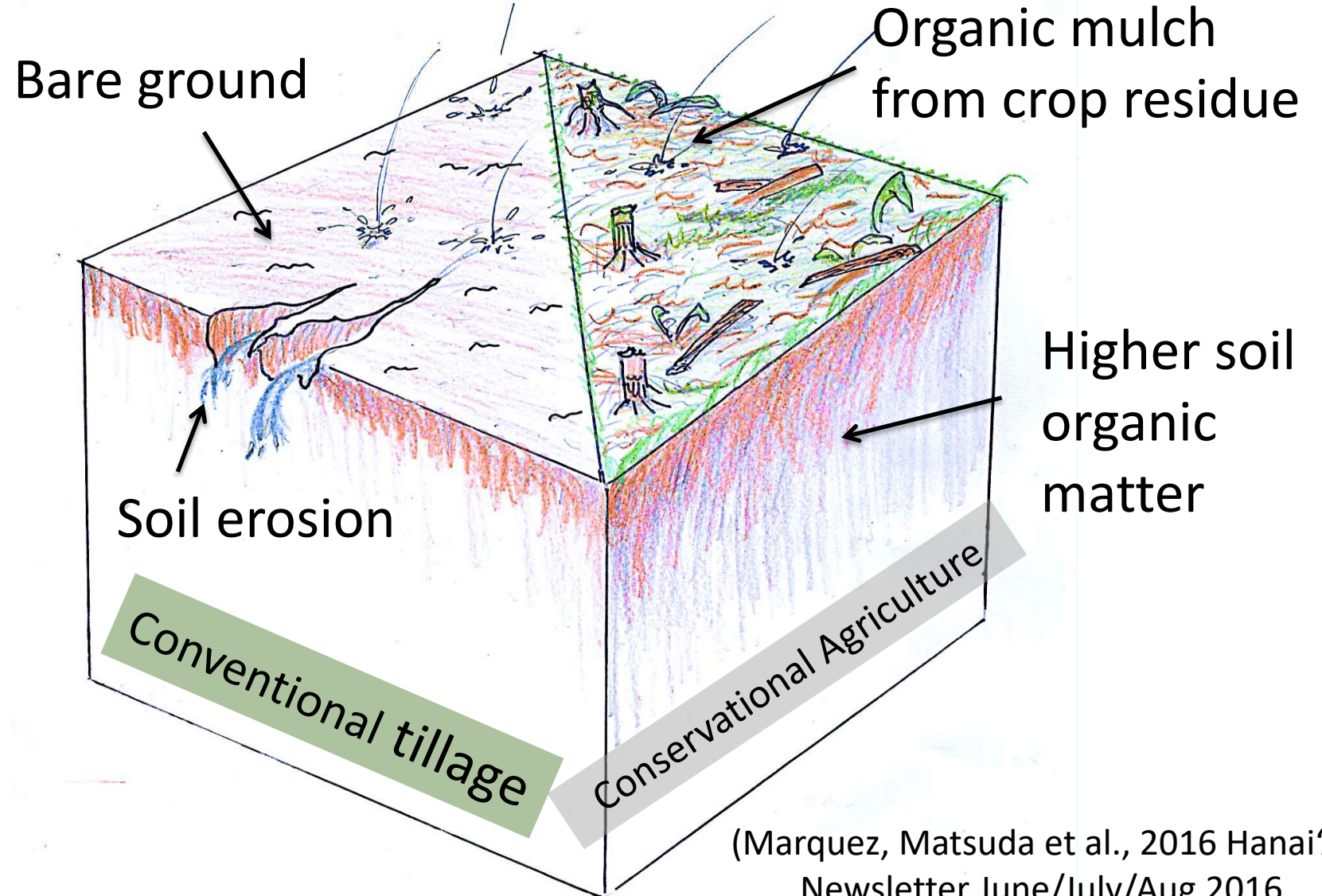
Benefits of Conservation Agriculture

1. Conserving soil water
2. Enhancing natural enemies of pest

**How does conservation agriculture
conserving soil water?**

Conservation Agriculture conserving soil water

1. Soil cover reduce evaporation
2. Higher organic matter increases water retention
3. Reduced top soil erosion



(Marquez, Matsuda et al., 2016 Hanai'Ai Newsletter June/July/Aug 2016)

Conservation Agriculture enhancing **Natural Enemies**

Entomopathogens

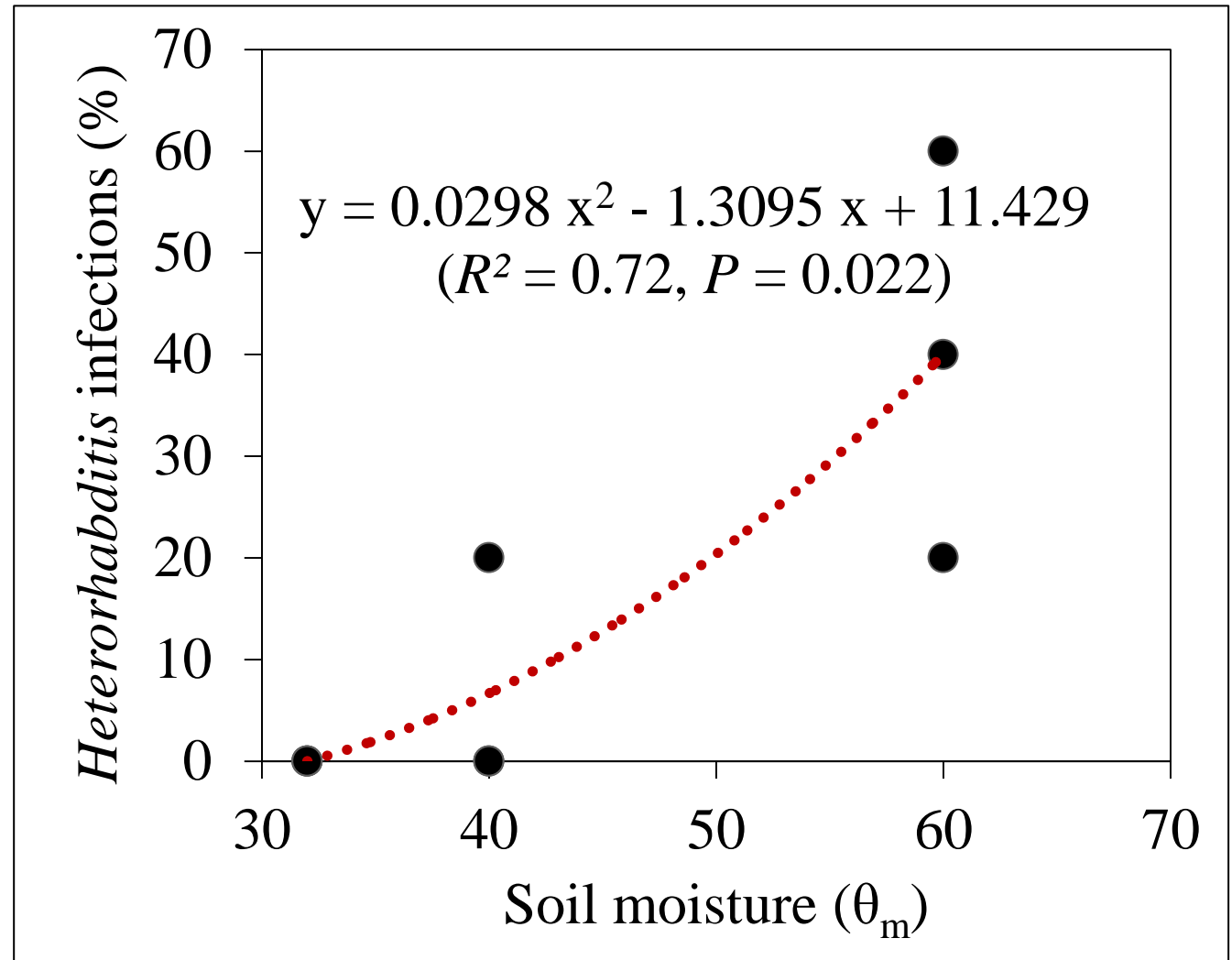
- Fungi
- **Nematodes (EPN)**



**How does conservation agriculture enhance
Entomopathogenic Nematodes?**

Conservation Agriculture enhancing Entomopathogenic Nematodes

Soil moisture
improves infection
rates of EPN



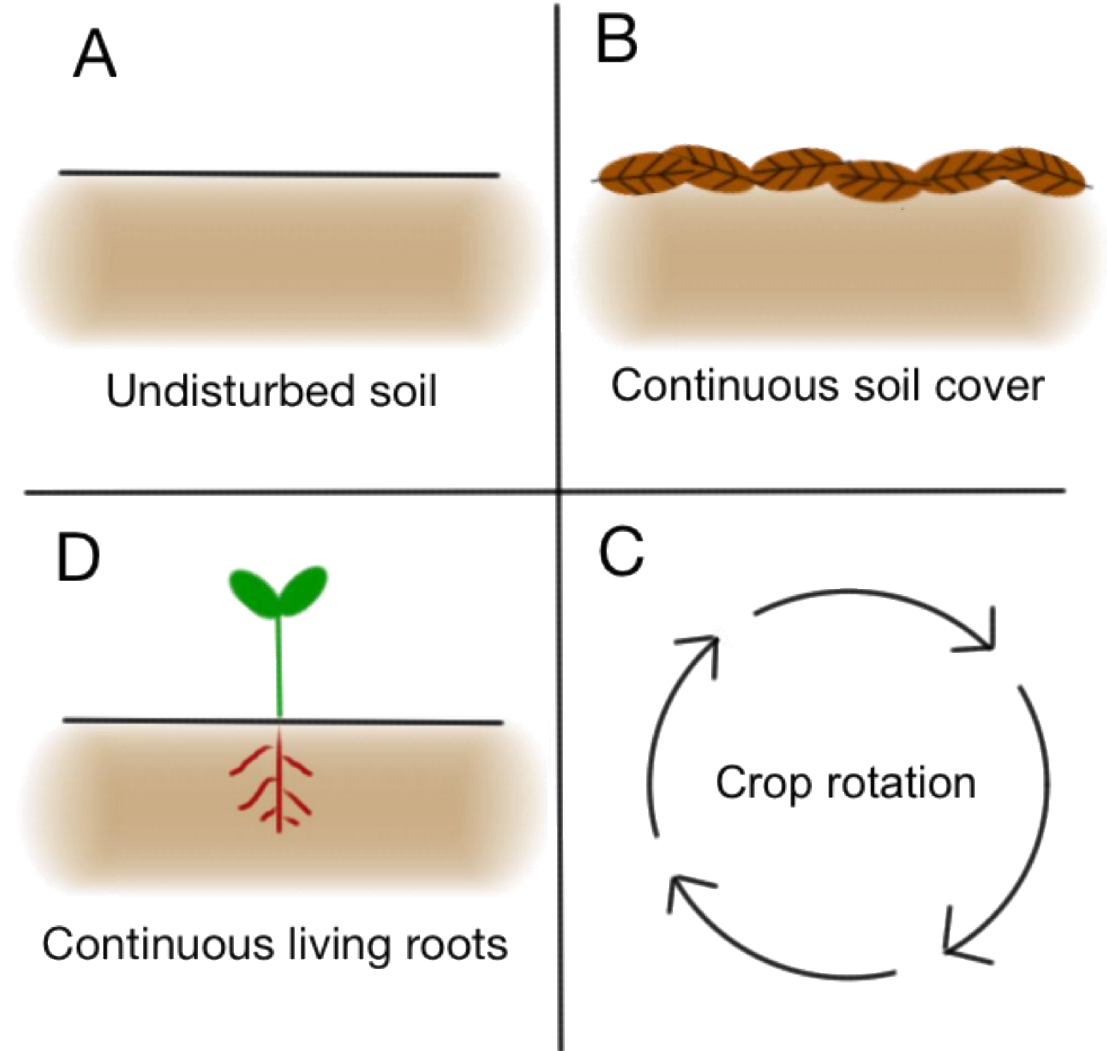
Two Conservation Agriculture Systems

No-till + cover crop

1. Black Oat
2. Oil Radish



High C: N, longer persistence of crop residues



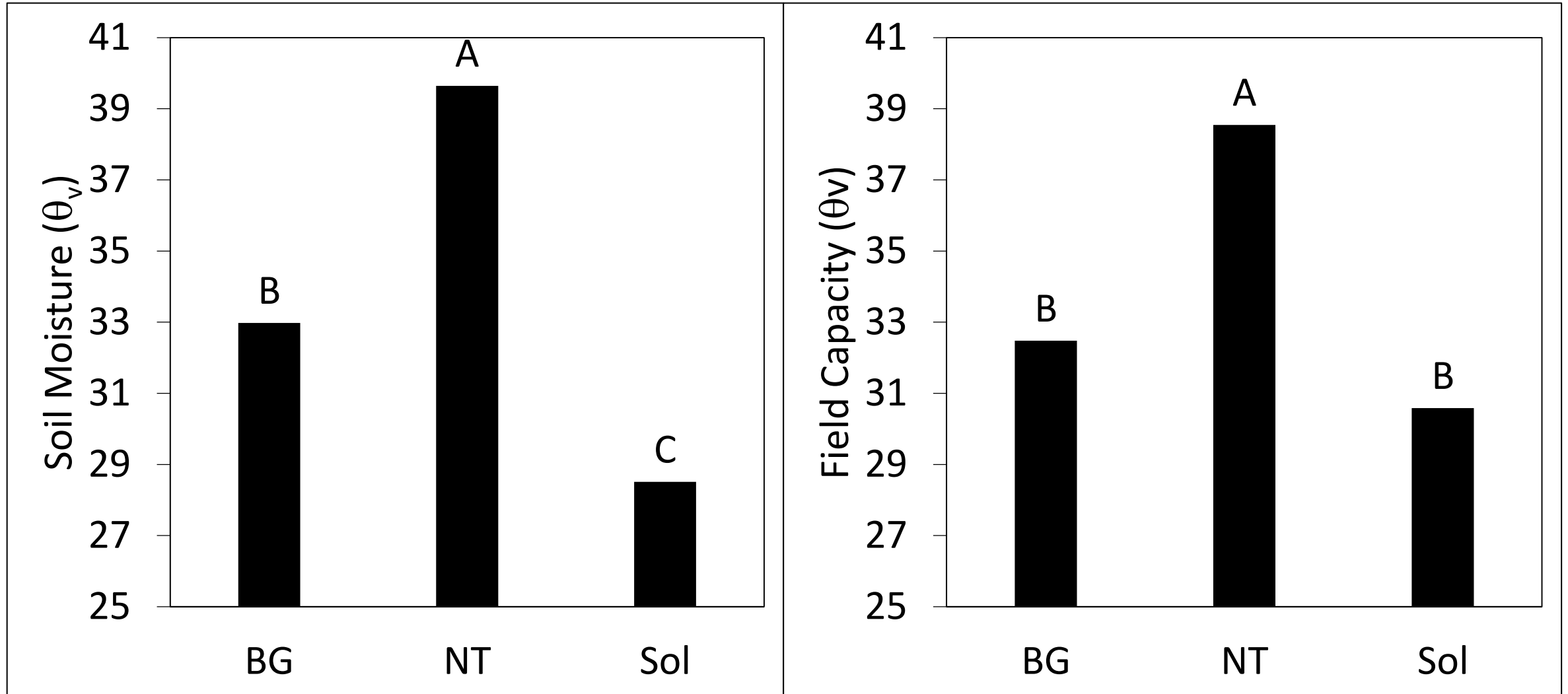
Field Experiment



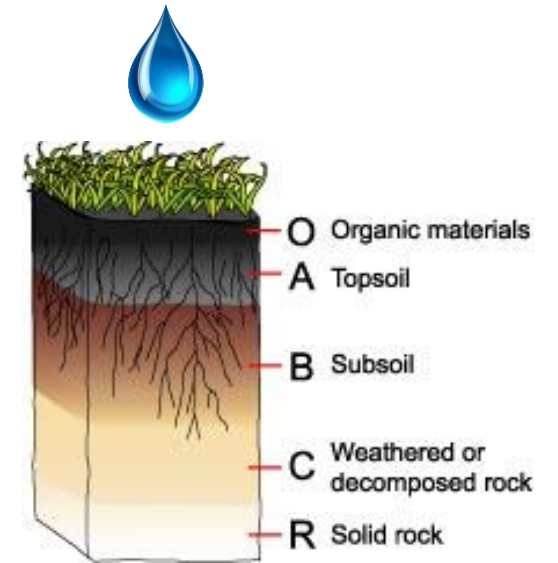
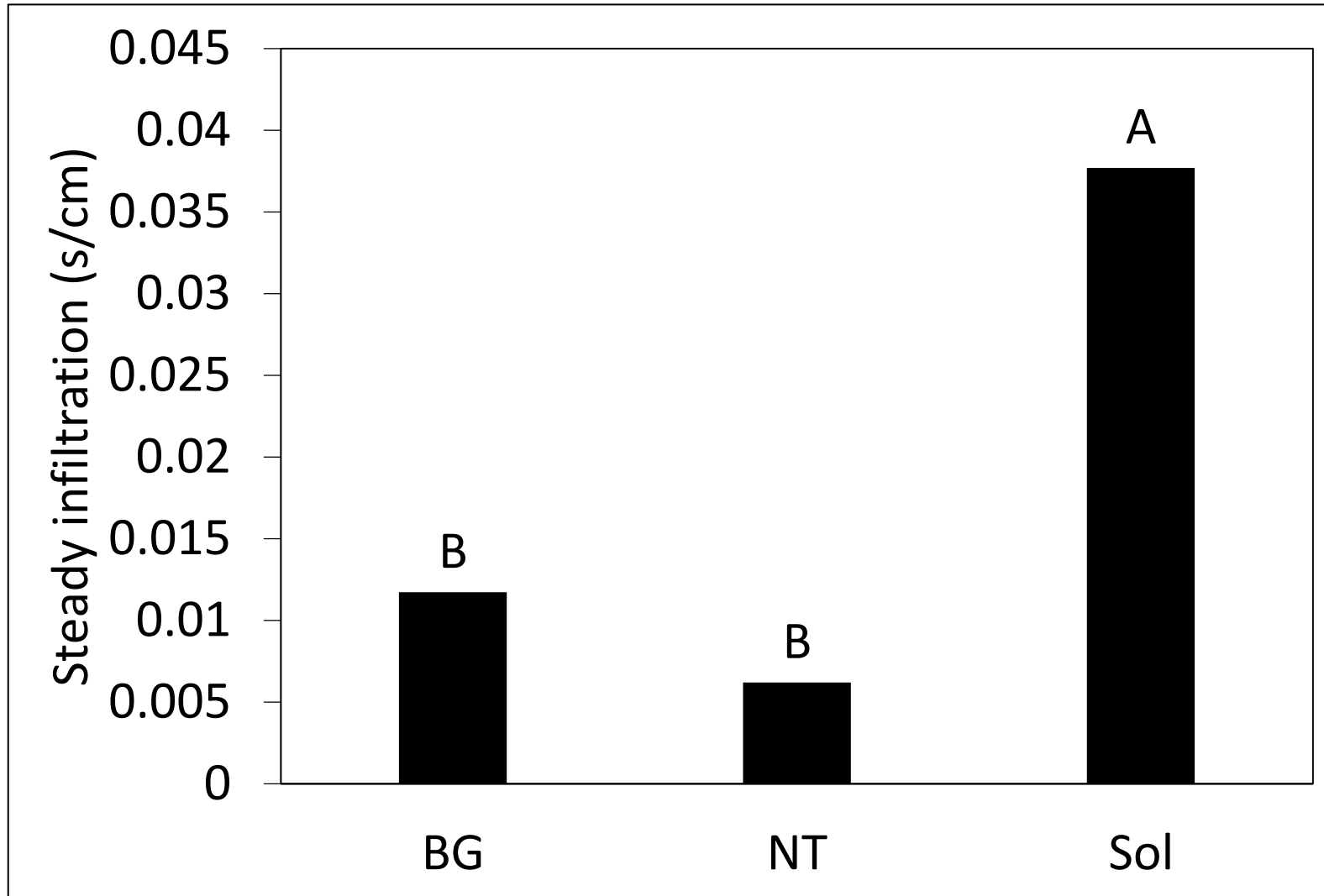
Field treatments:

- A) 7 years no-till (NT); black oat as cover crop for organic mulch
- B) soil solarization (Sol)
- C) Tilled bare ground (BG)

Soil water properties results

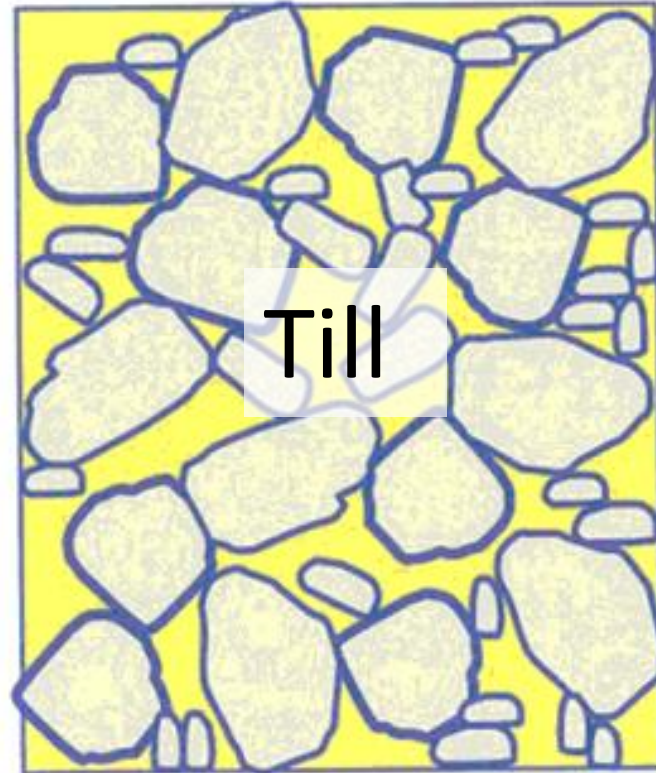


Soil water properties results

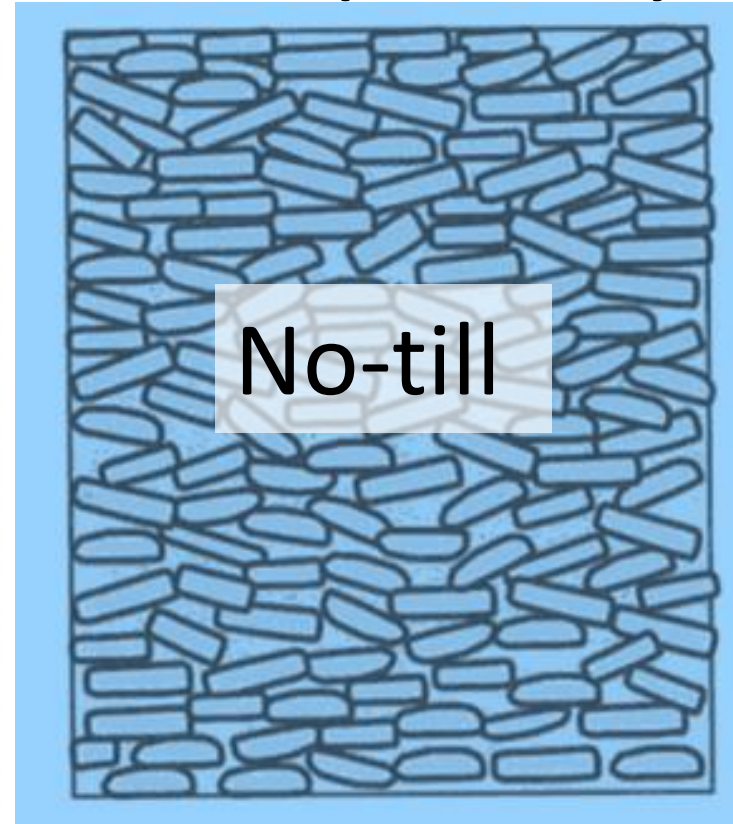


Soil water properties results

Macroporosity



Microporosity



Field capacity

Benefits of Conservation Agriculture

1. Conserving soil water
2. Enhancing natural enemies of pest
 - EPN

How do we detect EPNs?

Larvae Bait Assay



Larvae bait assay using mealworms



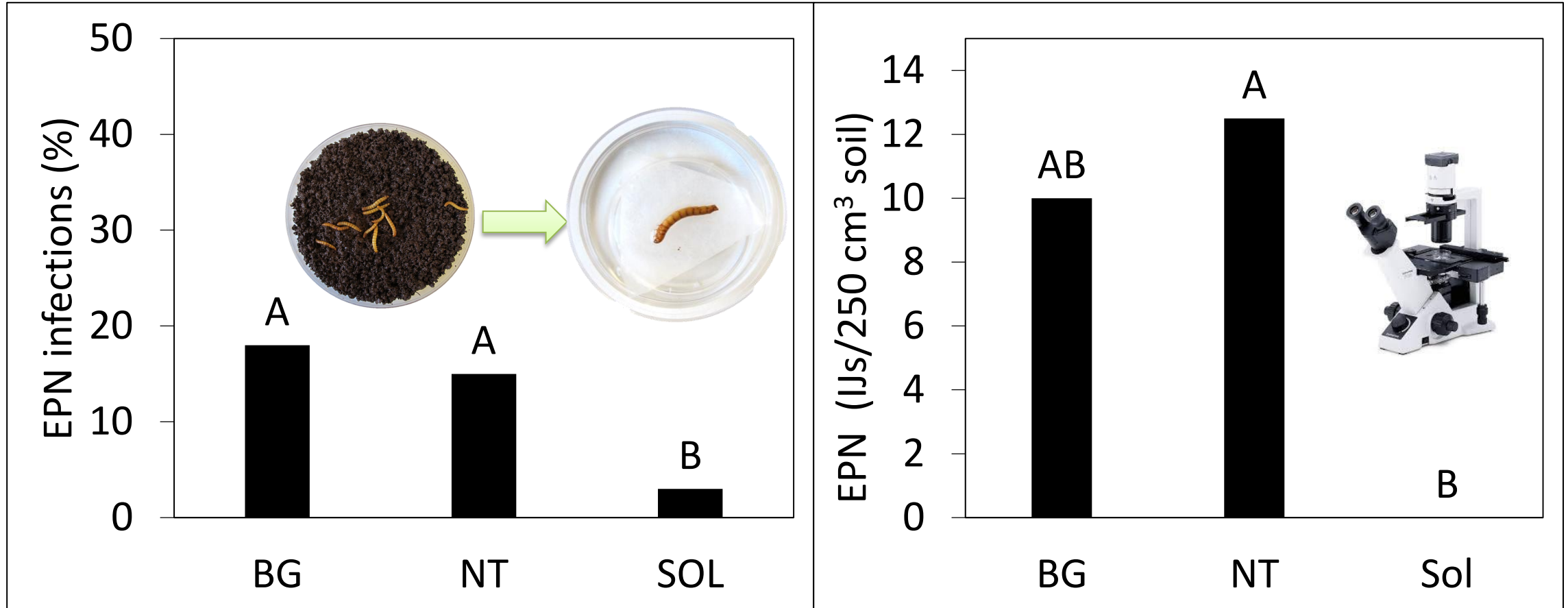
White trap

Larvae Bait Field Cages

50 mesh field cage larvae baits.



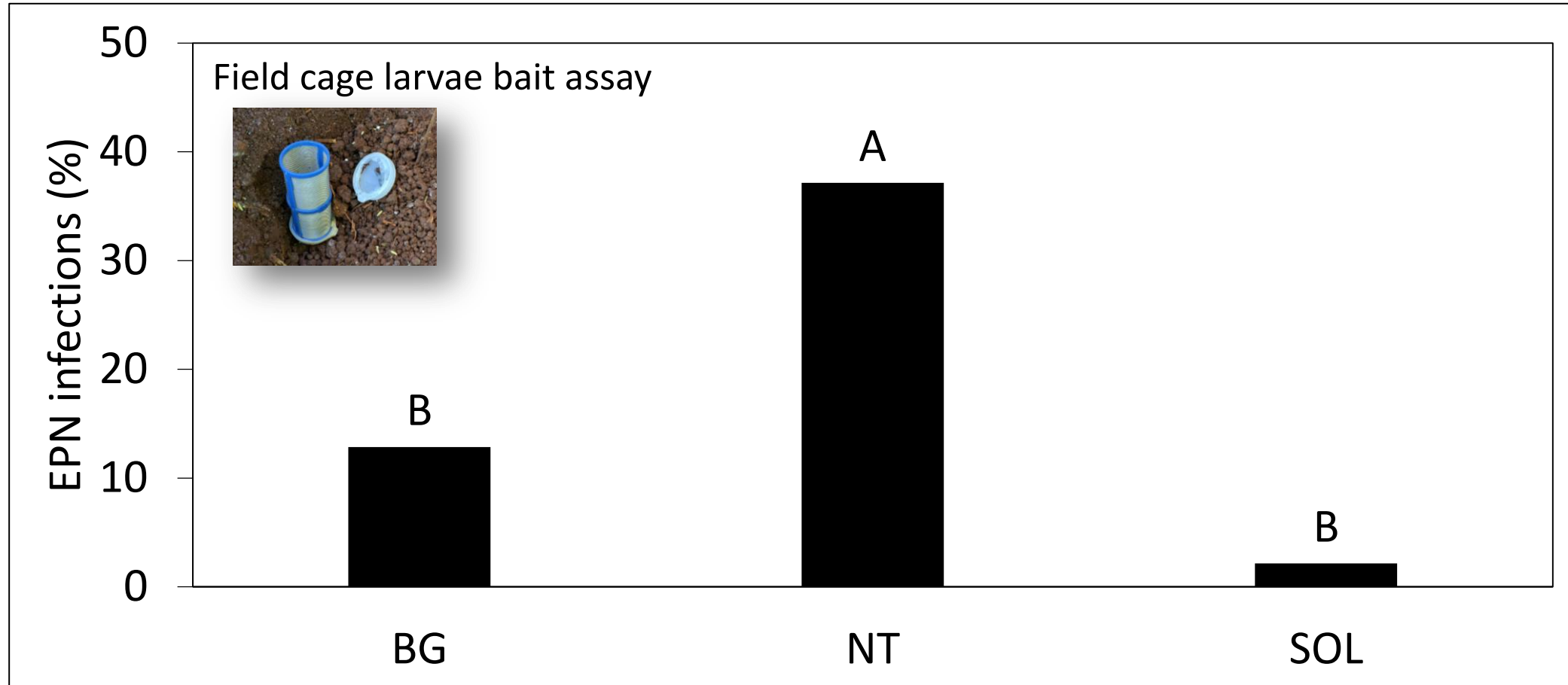
Population densities of EPN



Lab larvae bait assay

Nematode soil extraction

Infectivity of EPN



Higher infection rates of *Heterorabditis* in NT than BG and Sol in field conditions than counted.

Two Conservation Agriculture Systems

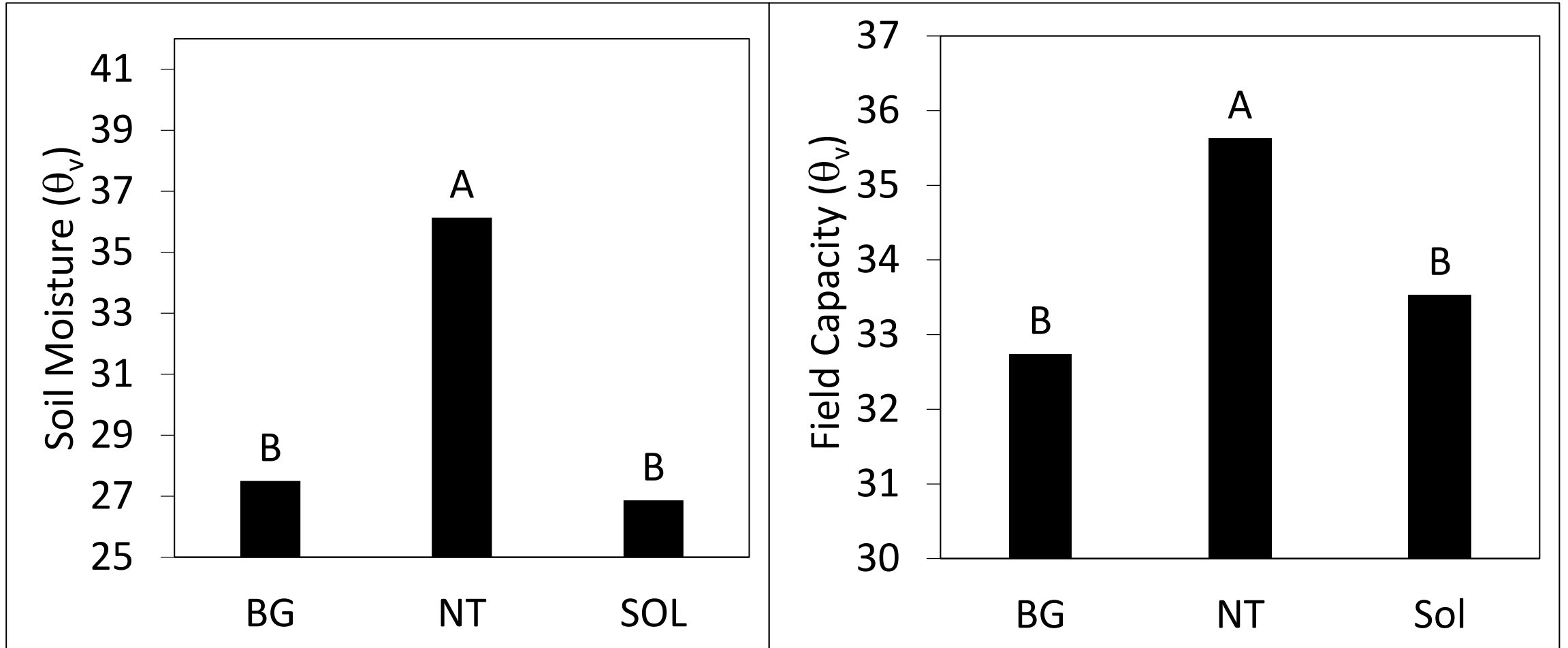
No-till + cover crop

1. Black Oat
2. Oil Radish

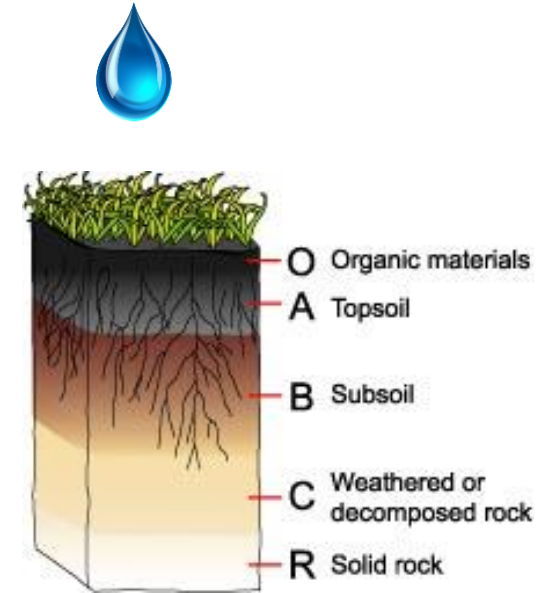
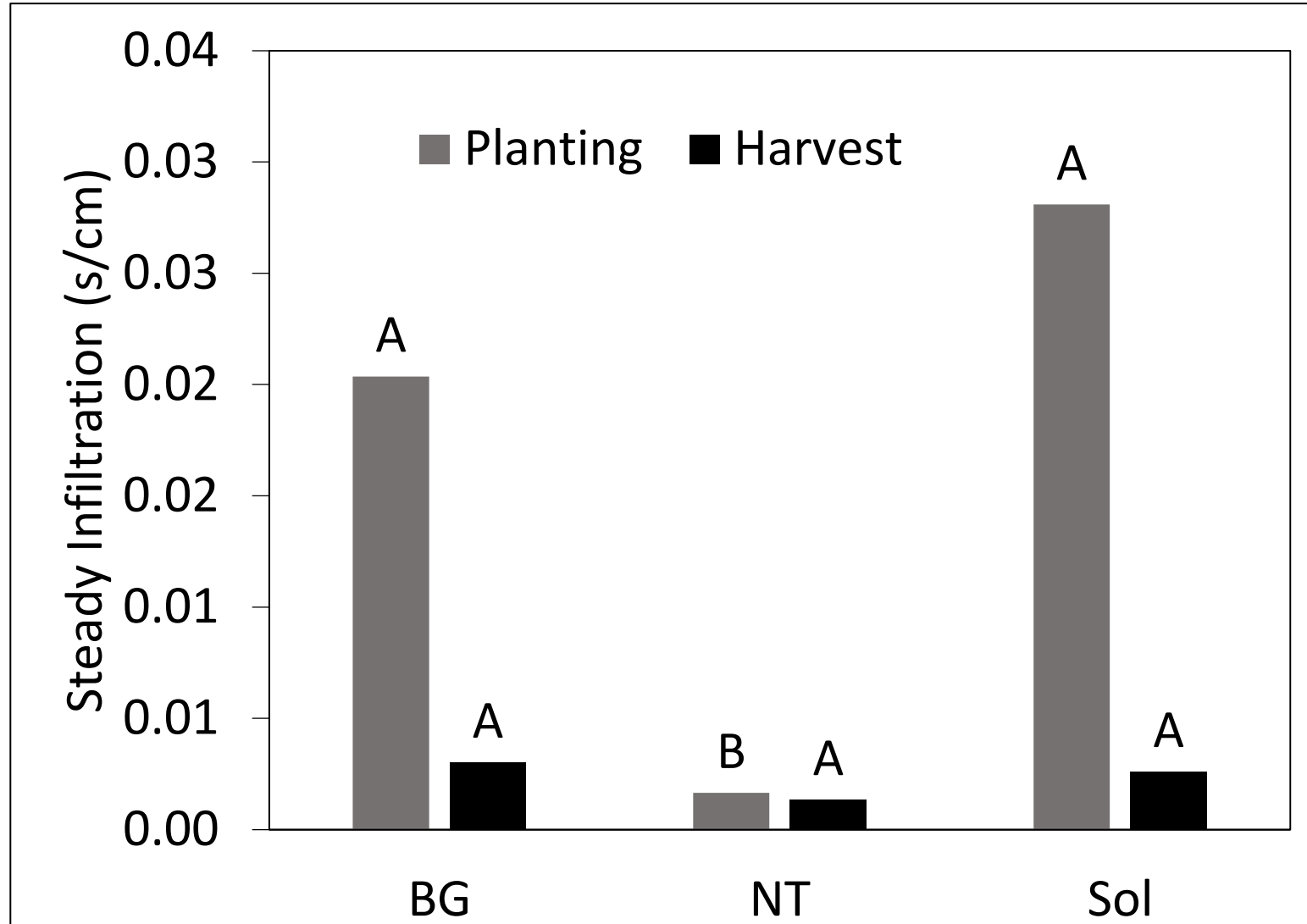


- Low C: N
- Produce secondary metabolites and alternative hosts that attract EPN

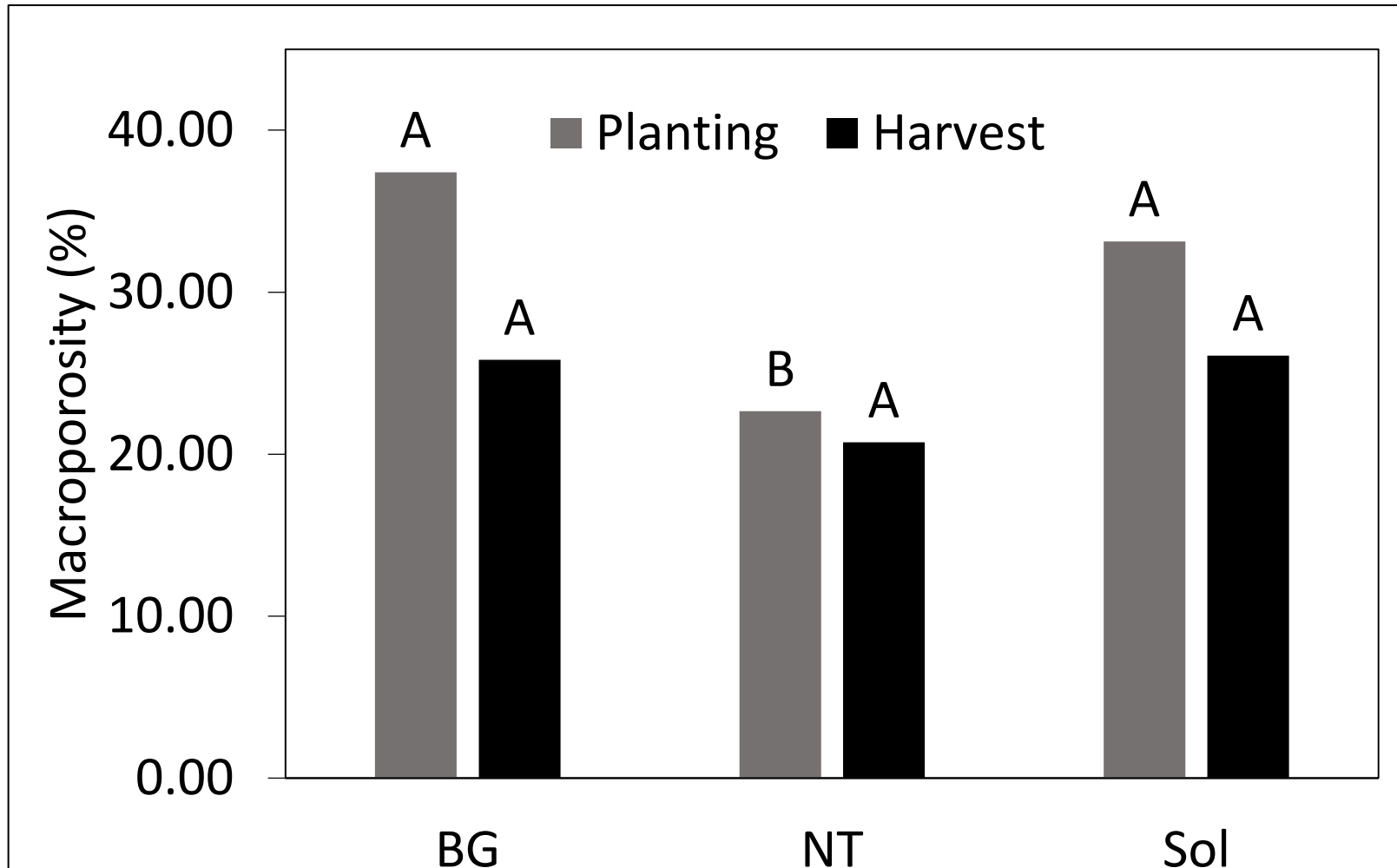
Soil water properties results



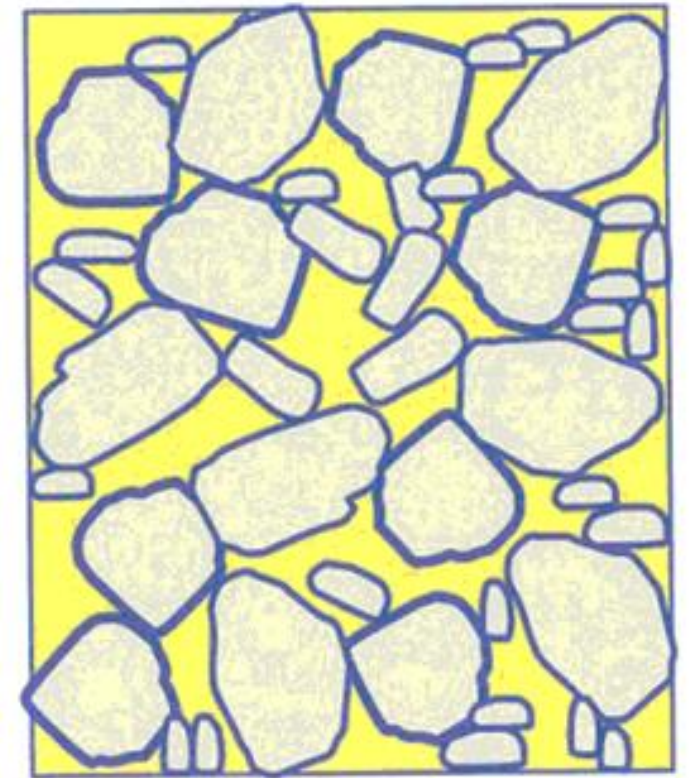
Soil water properties results



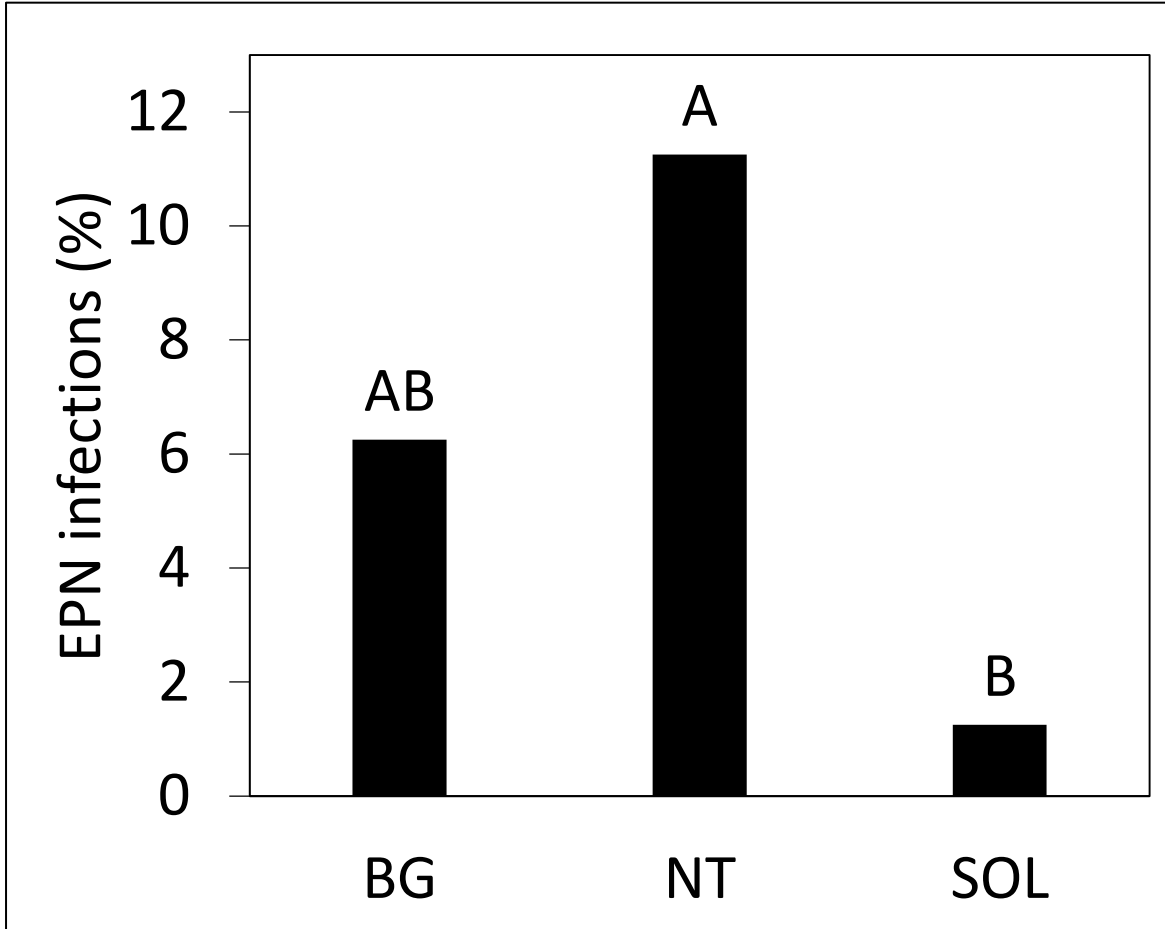
Soil water properties results



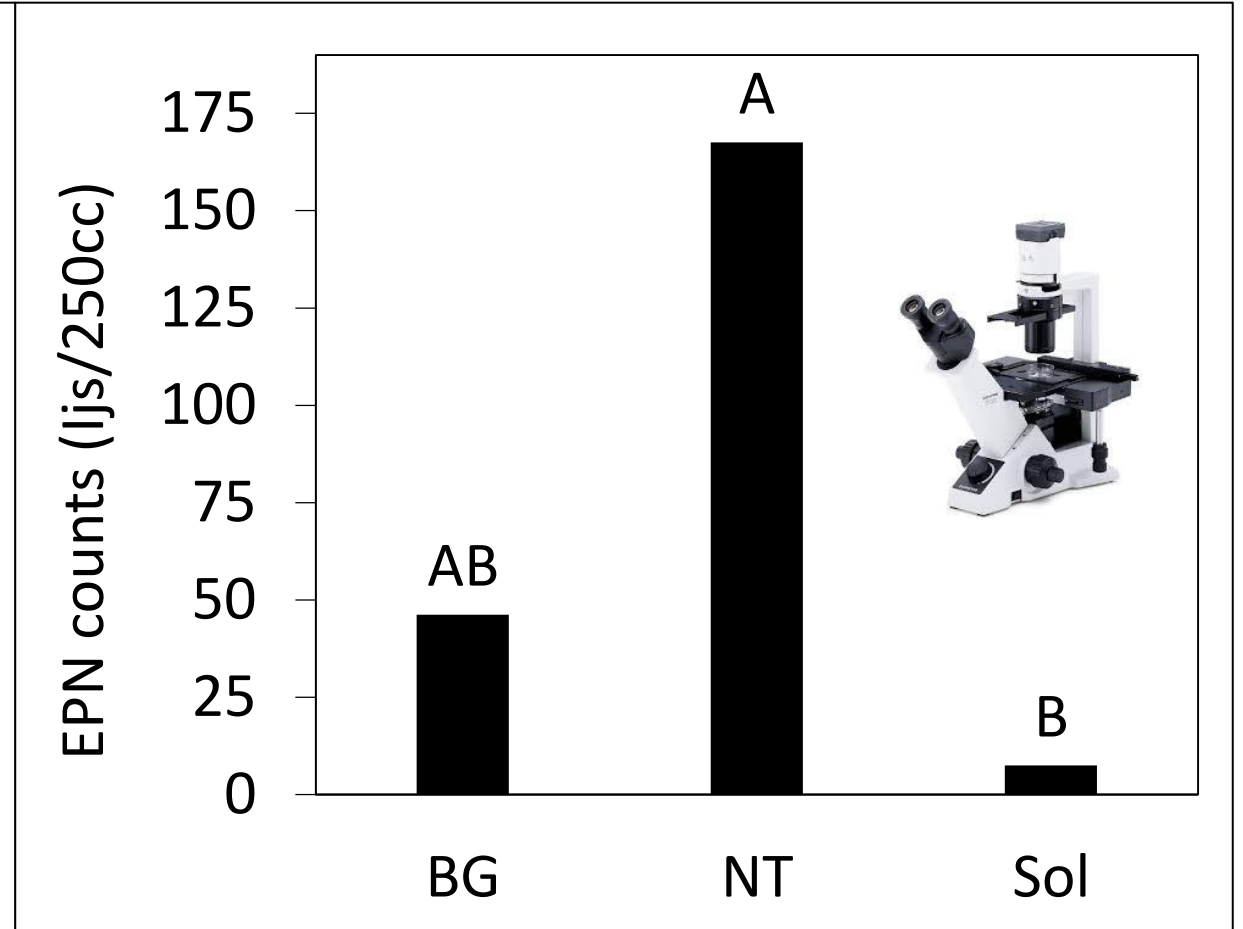
Macroporosity



Population densities of EPN

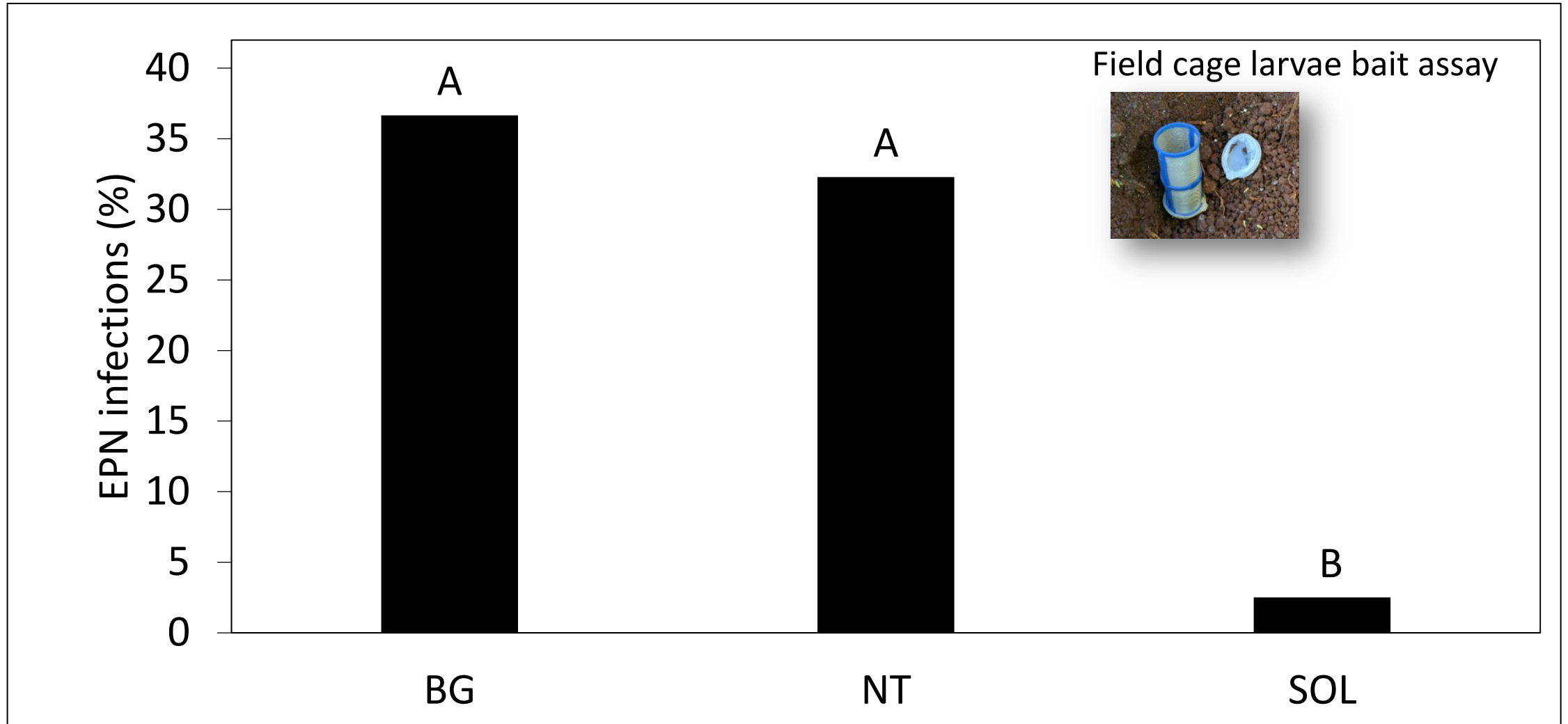


Lab larval bait assay



Nematode soil extraction

Infectivity of EPN



Summary

- Conservation agriculture can conserve soil water and improve natural enemies like entomopathogenic nematodes

Acknowledgement



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