Effects of rice straw mulching on trophic structure and metabolic footprints of the nematode community belowground in an alternative upland-paddy rice system

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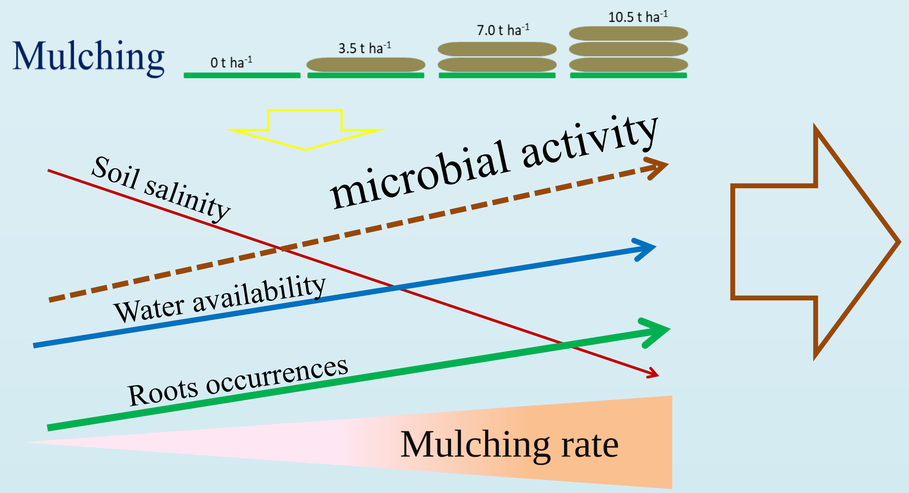
Introduction

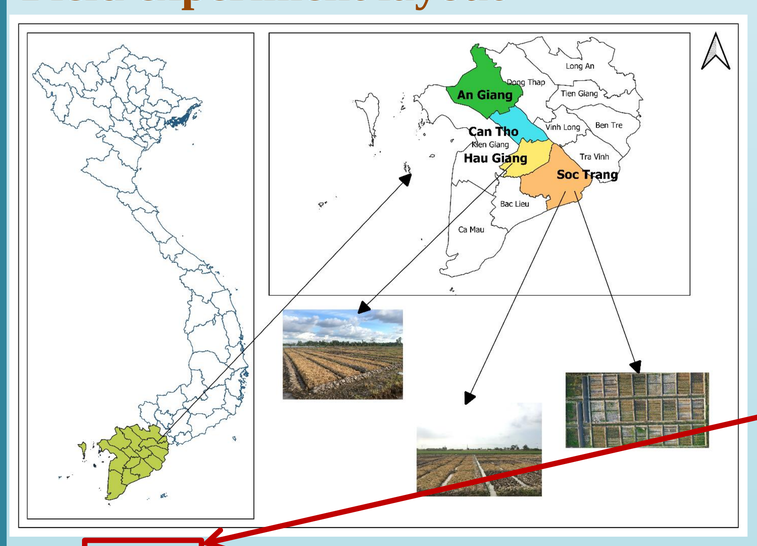
- **Rice** cultivation are facing serious problems in the Vietnamese Mekong Delta region:
  - Soil physics declined: compaction, weak aggregation
  - Fertility degraded
- **Climate changes** cause significant risk: drought, salinity intrusion.
- **Rice straw** is dominant resource, but not well utilization (burning).
- **Agriculture system changes** and well residues management to adapt climate changes to conserve soils and crops are nesscessary concerning.

Hypothesis and objectives



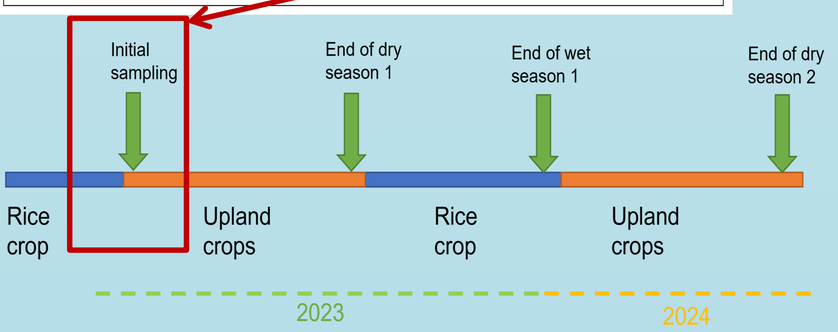
Methodology

Field experiment layout

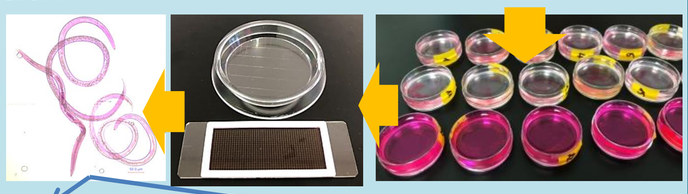


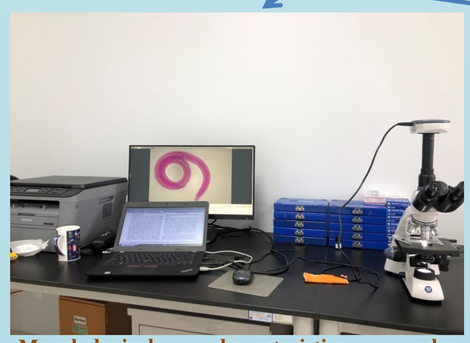
Rice straw

- **Fallow**
- **No mulching (M0)**
- **Mulching (tons/ha)**
  - **3,5 (M1)**
  - **7,0 (M2)**
  - **10.5 (M3)**

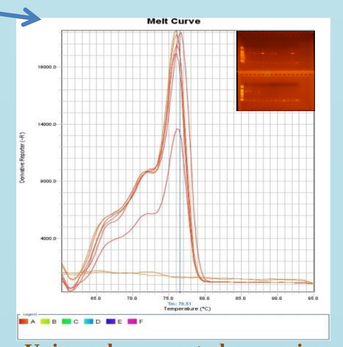


Field sampling to laboratory works





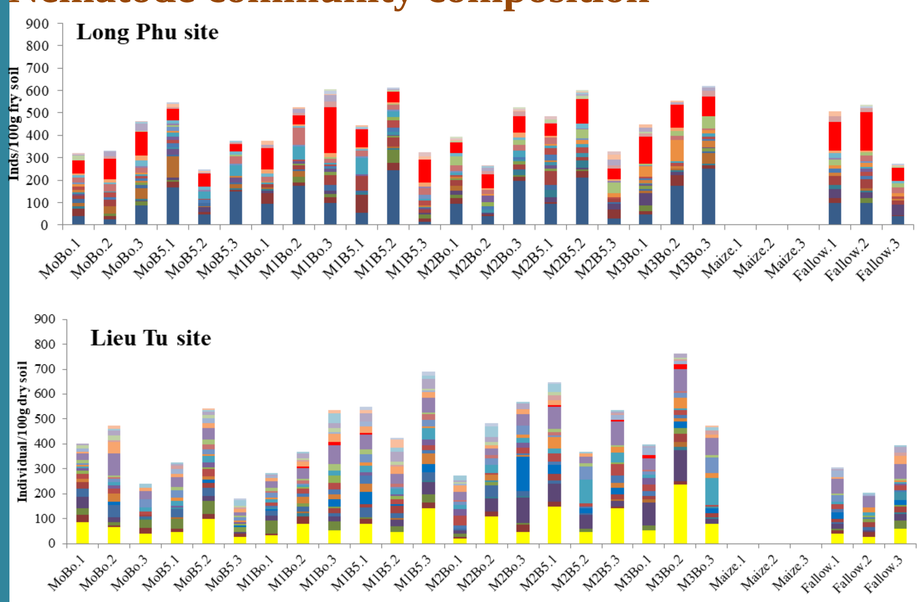
Morphological characteristics under microscope (X40, X100, X400, X1000)

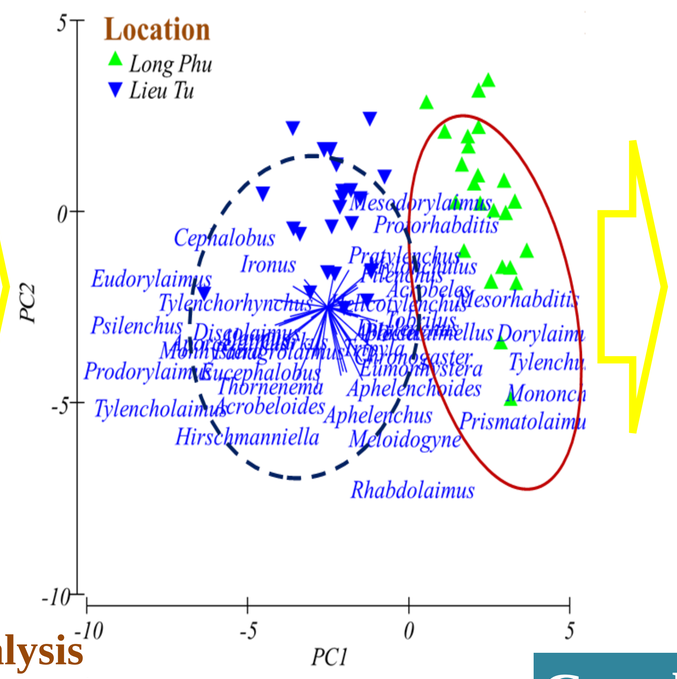


Universal nematodes primer (D2A/D3B of 28S rDNA region)

Results and discussion

Nematode community composition



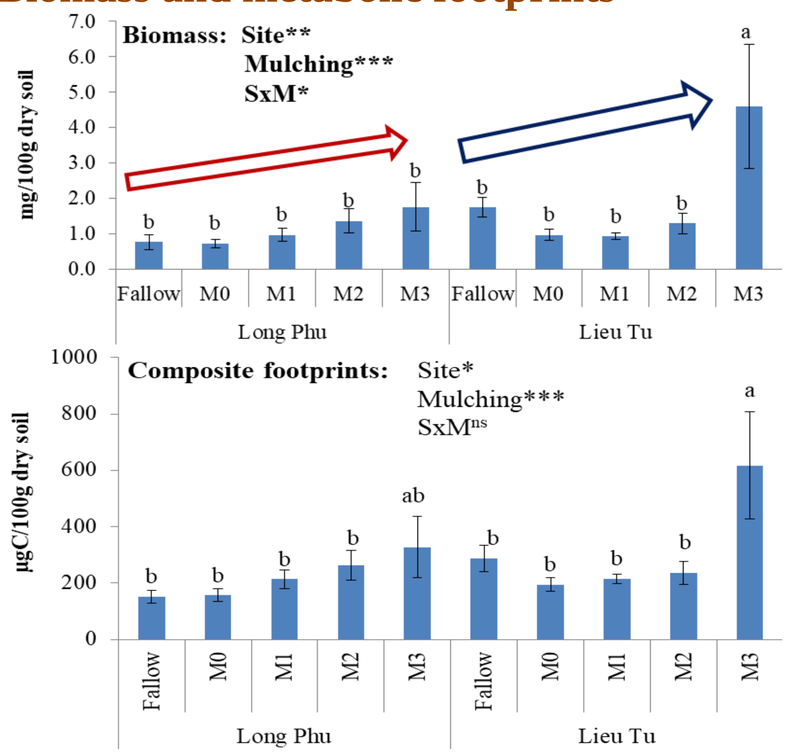


Nematode communities were different between sites

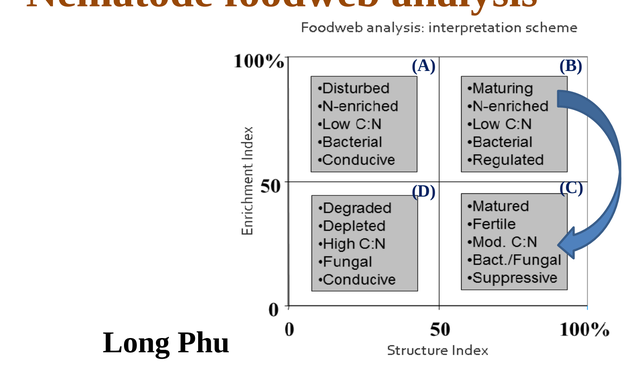
Long Phu: *Alaimus*, *Aporcelaimus*, *Discolaimus*, *Eudorylaimus*, *Ironus*, *Monhystera*, *Prodorylaimus*, *Psilenchus*, and *Tylencholaimus*.

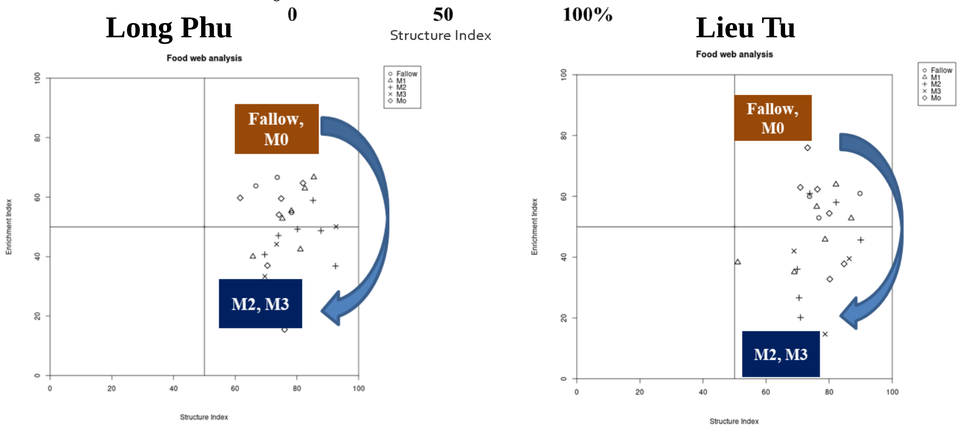
Lieu Tu: *Acrobeles*, *Dorylaimus*, *Eumonhystera*, *Meloidogyne*, *Plectus*, *Protorhabditis*, and *Tobrilus*.

Biomass and metabolic footprints



Nematode foodweb analysis





Conclusions

Mulching at 10.5 tons ha^{-1} increased the total biomass (840-3170 µg 100g^{-1}), composite footprints (175.2-471.8 µgC 100g^{-1}), structure footprint (99.12-357.64 µgC 100g^{-1}), and predator footprint (69.01-276.37 µgC 100g^{-1}), indicating a matured, fertile soils and healthy soils, thus can be proposed for sustainability in agriculture.

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