

Tracking AM fungi with molecular markers

a way to assess survival of commercial
inoculum in a nonsterile soil

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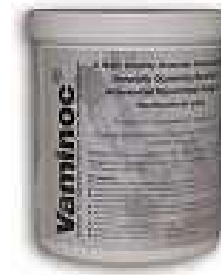
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Mycorrhizal inoculants

- ☐ >30 companies (Gianinazzi & Vosátka, 2004)



- ☐ scientific programmes (MicroMaize, Cost 870)



Mycorrhizal inoculants

Interest in their persistence

- ▣ Consequences for ecosystems? (long-term)
- ▣ **Economic value?** (short-term)

example:

cost of commercial inoculum: ca. CHF 60 per kg

maize: 5 g per seed (MicroMaize Project)

with 10-12 seeds per m²: CHF 3.00-3.60 per m²

costs vs. benefits!

Mycorrhizal inoculants

Evaluation of effectiveness:

- ▣ growth parameters, nutrient content, root colonization
(Mohammad et al., 2003; Wu et al., 2004)
- ▣ Persistence not determinable by morphology!
- ▣ Use of molecular markers
 - Species-specific markers on ribosomal LargeSubUnit (rLSU) (Farmer et al., 2007)
 - strain specific markers on mitochondrial LargeSubUnit (mtLSU) used in this study

Material and Methods

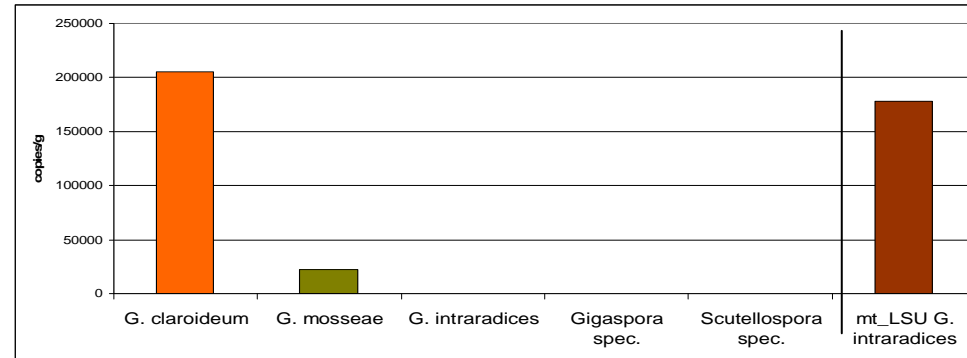
Molecular markers

- ▣ sequences of *Glomus intraradices* mtLSU:
available primers (Croll et al.,2005)
- ▣ TaqMan primers and probes designed for
G. intraradices JJ291
- ▣ cross testing with different strains to verify
specificity

Material and Methods

Soil

- field soil (organic 20 years), Olten
- low available Phosphorus
- tested for indigenous AMF in soil:



Sand substrate

- 80% sand; 20% field soil (conventional), Tännikon, γ -irradiated

Material and Methods

Plants

- maize PR37Y15 pregerminated
- 2 plants per pot

Inoculum

- *Glomus intraradices* JJ291
- cultivated with *Allium porrum* in sand-substrate

Material and Methods

Experimental setup

[g] inoculum	5	10	15	20	25	30	35	40	45	50
	55	60	65	70	75	100	125	150	175	200

+ substrate to make 550g

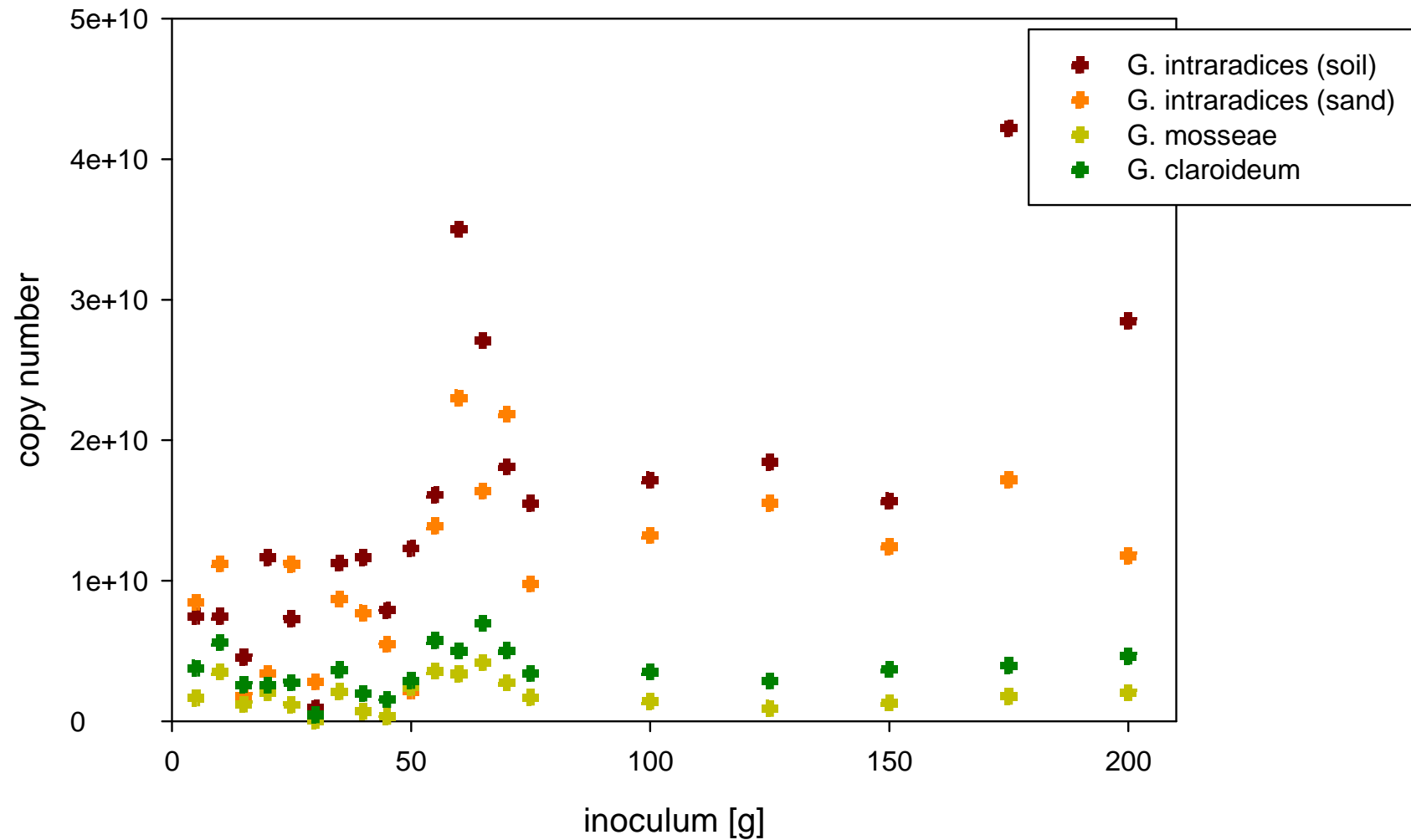
5 weeks in greenhouse (16/22°C),

no fertilization

harvest of roots for DNA-extraction

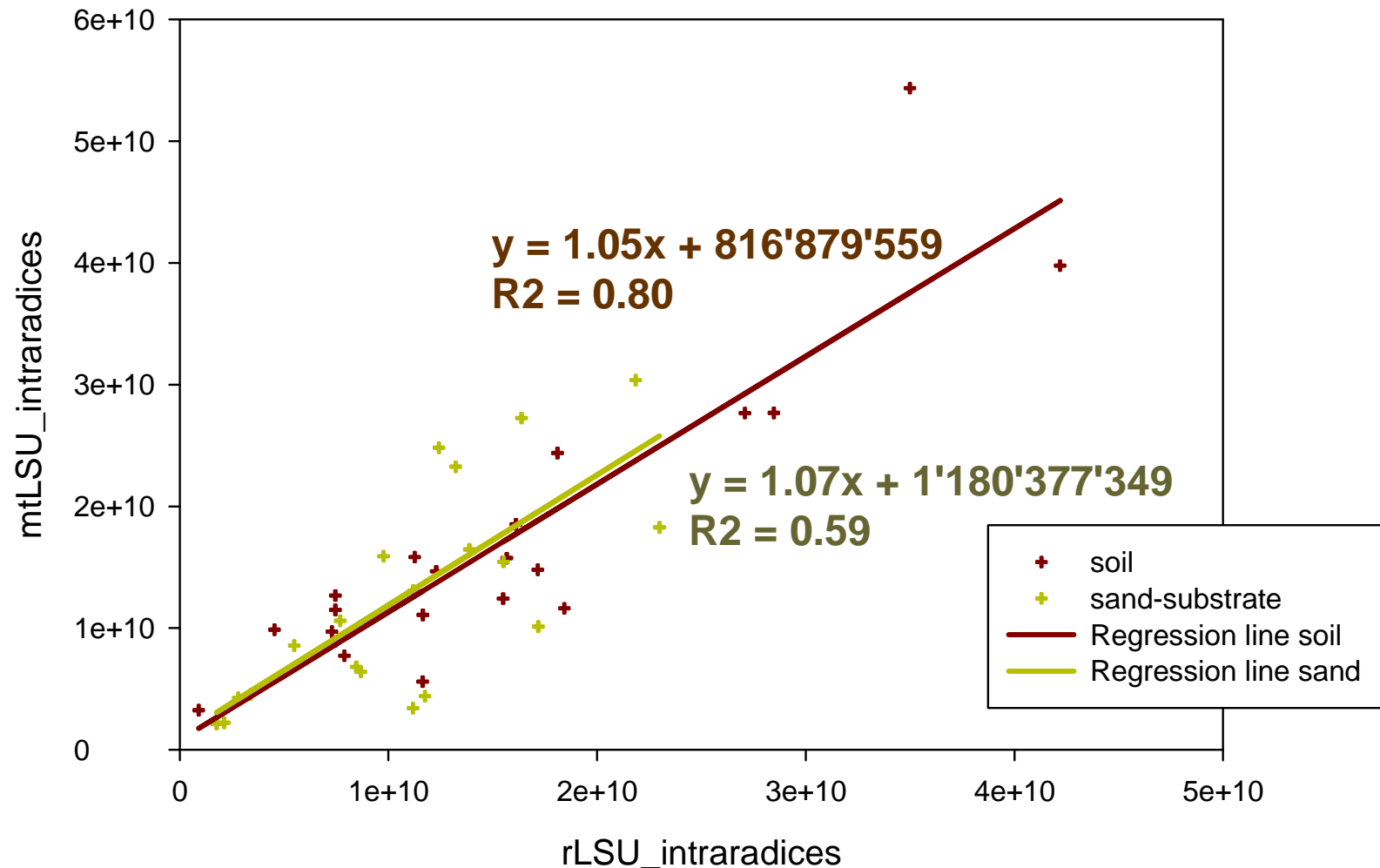
Results and Discussion

rLSU Copy Numbers of different AMF species



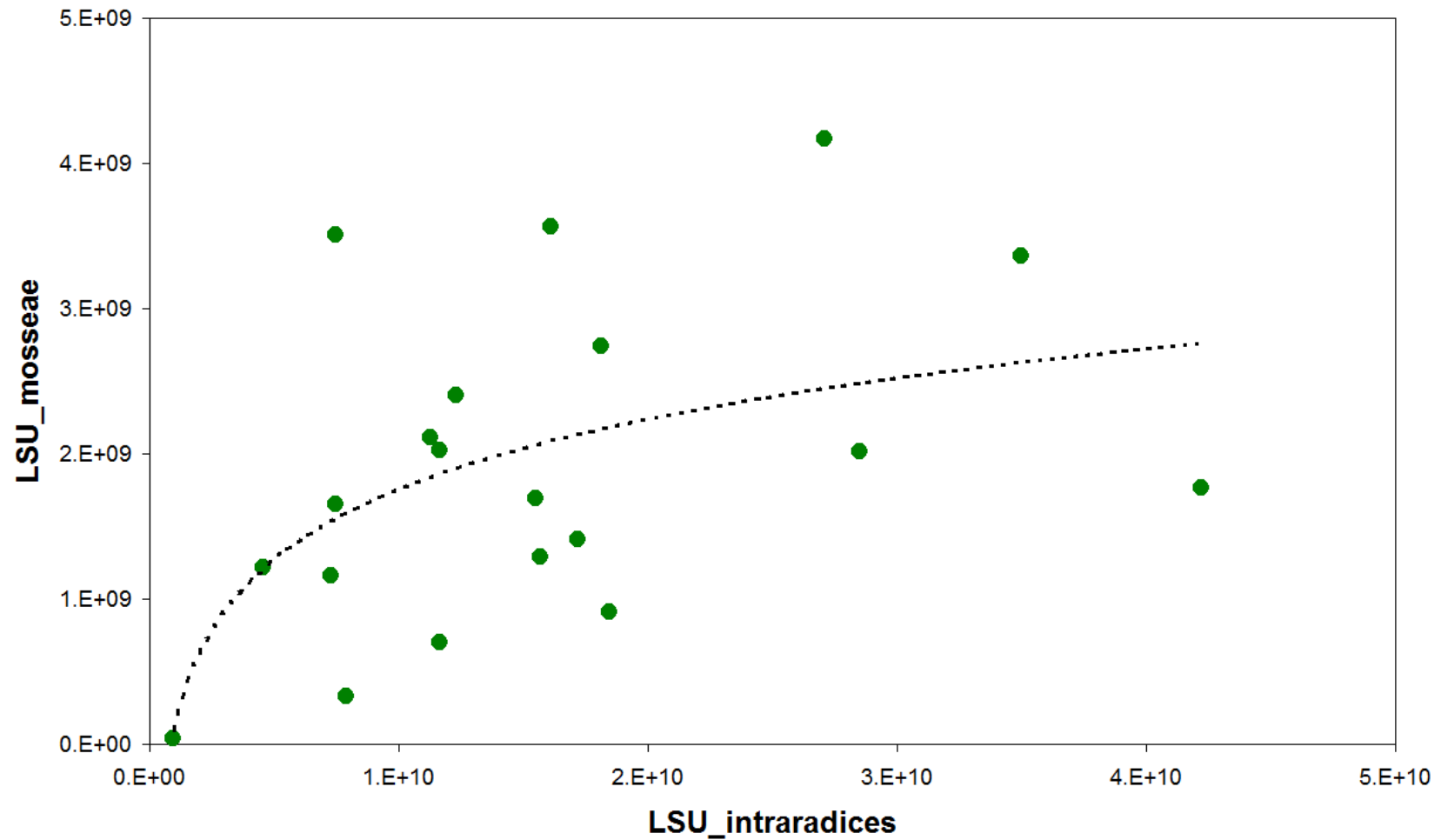
Results and Discussion

Correlation of rLSU and mtLSU copies for *Glomus intraradices*



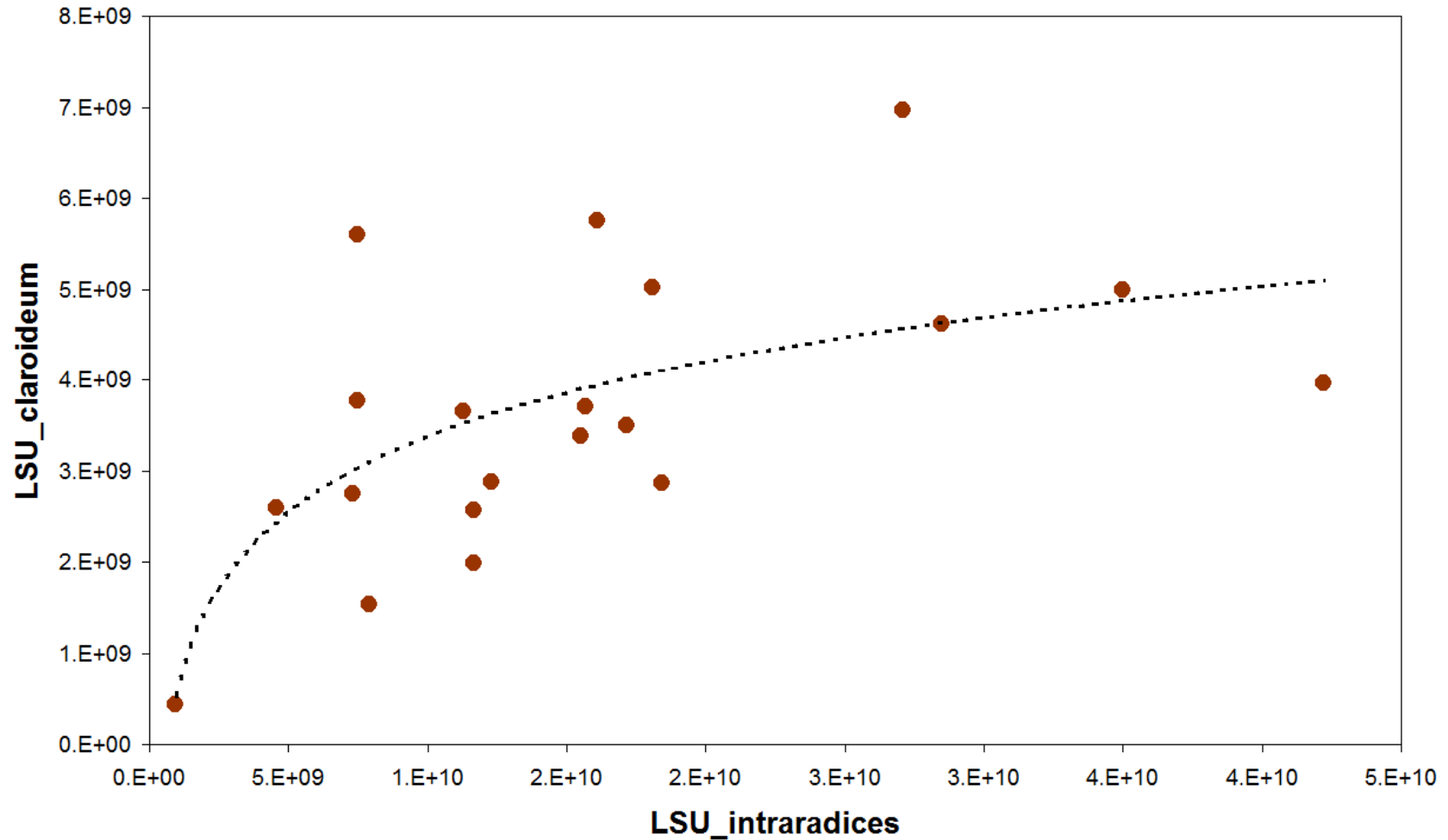
Results and Discussion

Glomus intraradices and *Glomus mosseae*



Results and Discussion

Glomus intraradices and *Glomus claroideum*



Conclusions

- 5g of inoculum per plant may suffice at least in certain soils
- Overall colonization to be complemented
- Different species do not compete, rather they facilitate each other?
- economical benefit still needs to be proven:
benefit for yield, resulting savings high in many soils

Acknowledgement



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