

The Influence of Soil Type and Nitrogen Rates on Glucosinolate and Oil Production in *Brassica carinata*

Theodor L. Stansly

Master Student at the University of Florida

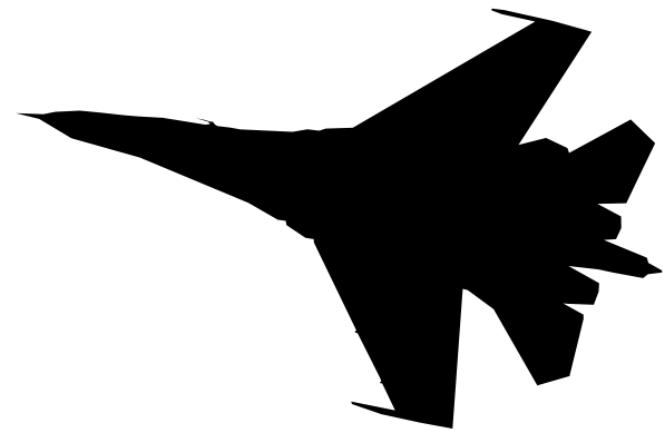
North Florida Research and Education Center (IFAS) - Quincy, FL USA

Email: tstansly@ufl.edu

Tel: (863) 517-0781

The Benefits of *Brassica carinata*

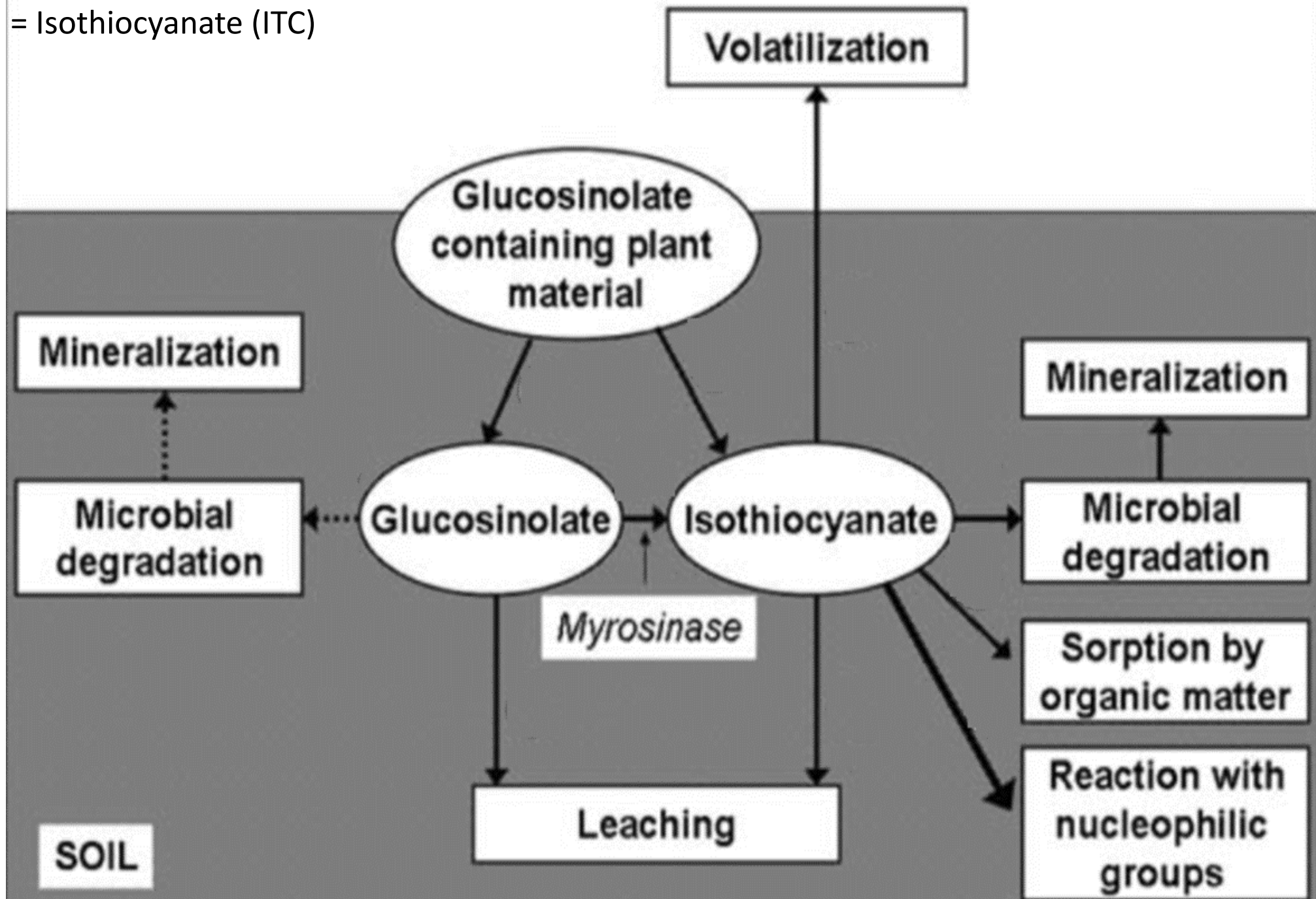
- Ideal oil profile for the biojet and biodiesel industry
- Resilient crop with a robust root system (drought tolerance)
- Cover crop and a biofumigant agent
- High quality protein in seed meal



What are Glucosinolates (GLS)?

- Over 120 described that are activated by an enzyme into mustard oil (i.e. isothiocyanate) (Fahey et al., 2001)
- Over 90% mortality on parasitic nematodes in soil using tissue from wild mustard (Potter, 1998; Berhow et al., 2010)
- Content and composition vary with plant species and stage of growth, agronomic practices and climatic conditions (Fahey et al., 2001; Tripathi and Mishra, 2006)
- Persistence in soil depend on physical, chemical, and biological characteristics (i.e. microbial diversity)

Mustard oil = Isothiocyanate (ITC)



S
t
a
b
i
l
i
t
y

Aliphatic GLS



Aliphatic and Indole GLS



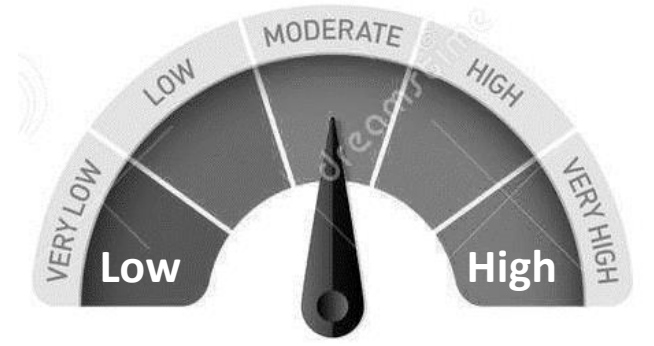
*



Aliphatic, Indole, and Aromatic GLS



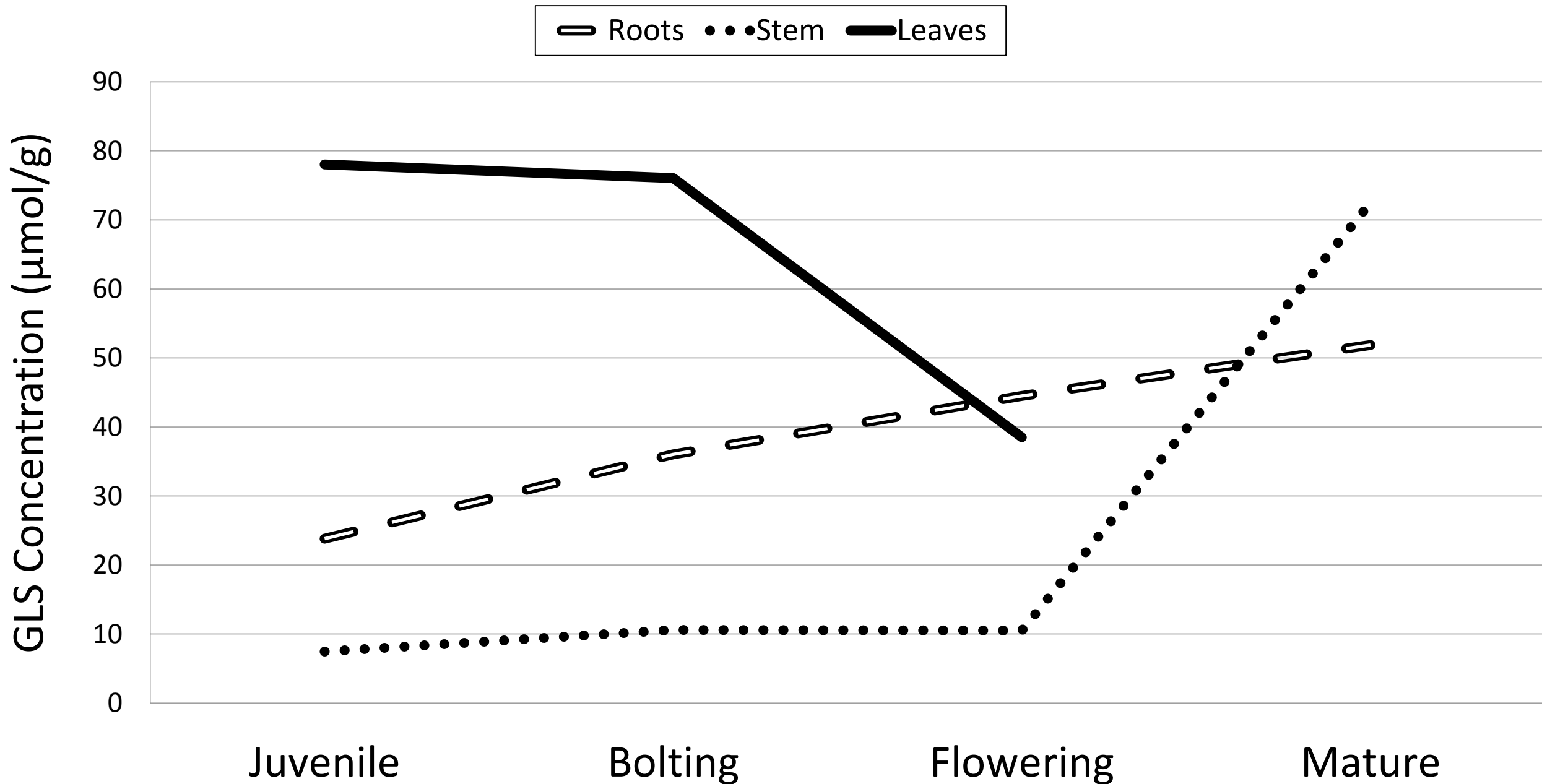
Types and concentrations of GLS found in the parts of various *Brassica* species



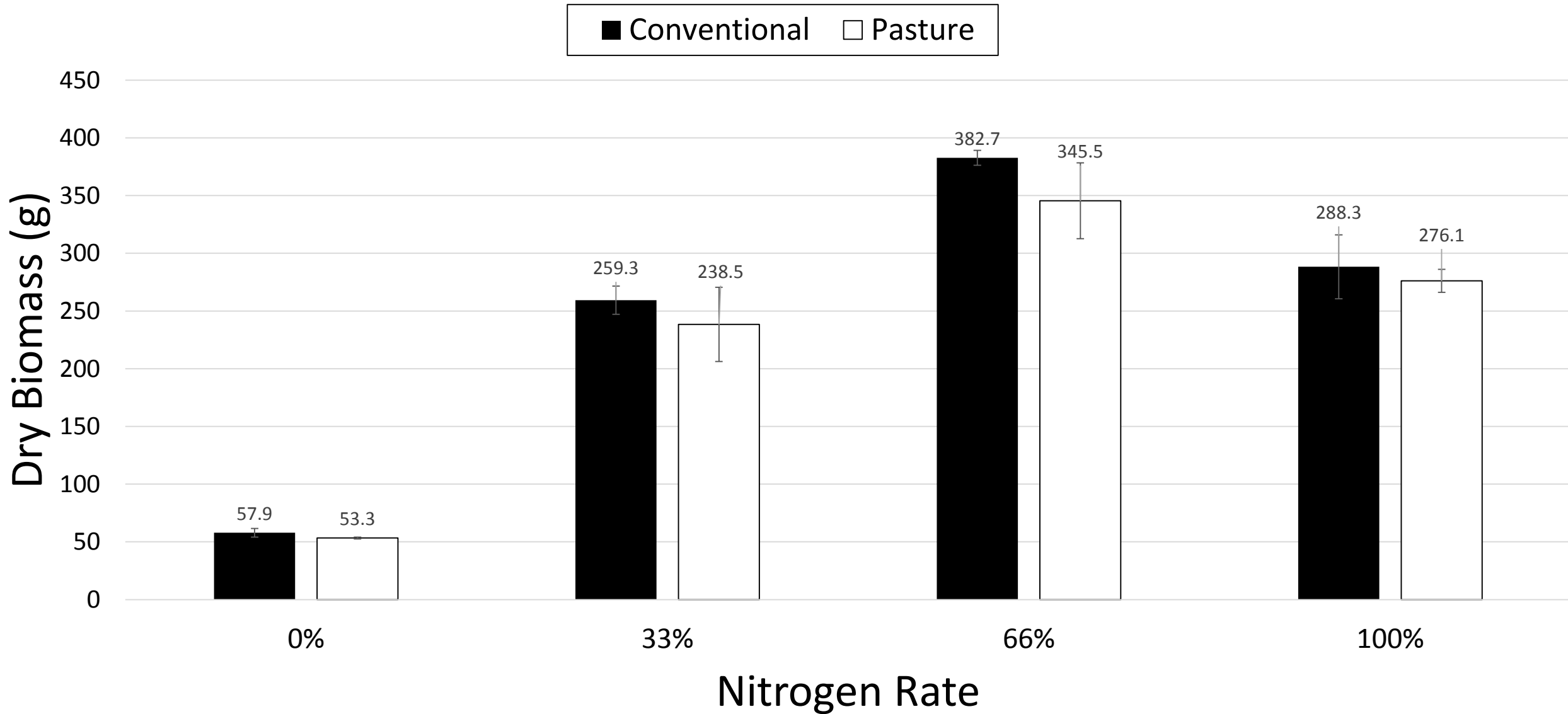
Level of GLS concentration

* Leaves start off with high concentrations of GLS then reduce to low as they mature

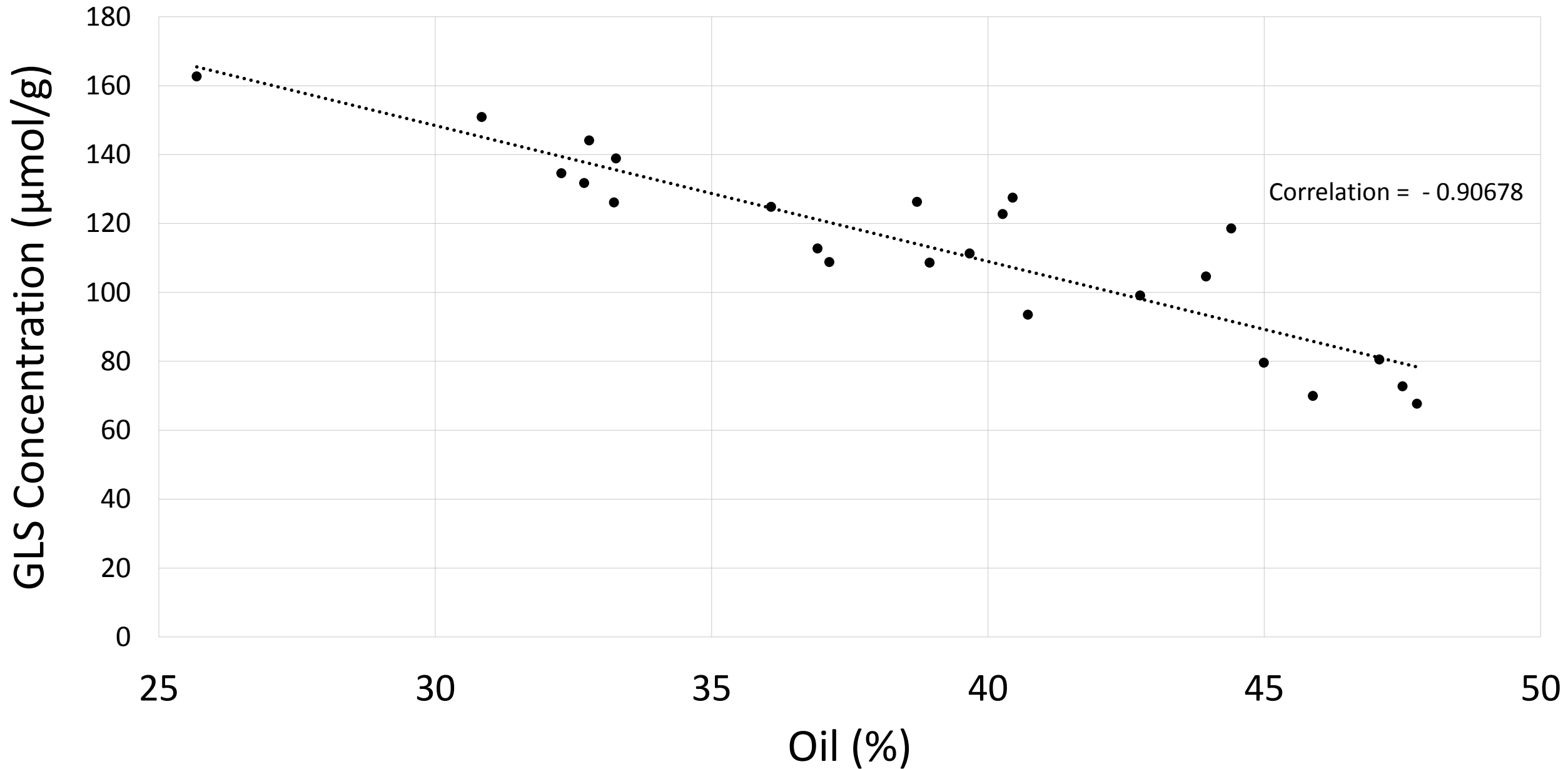
Total GLS Concentration vs Stages of Development



The Effect of Nitrogen Rates and Soil Type on Plant Biomass

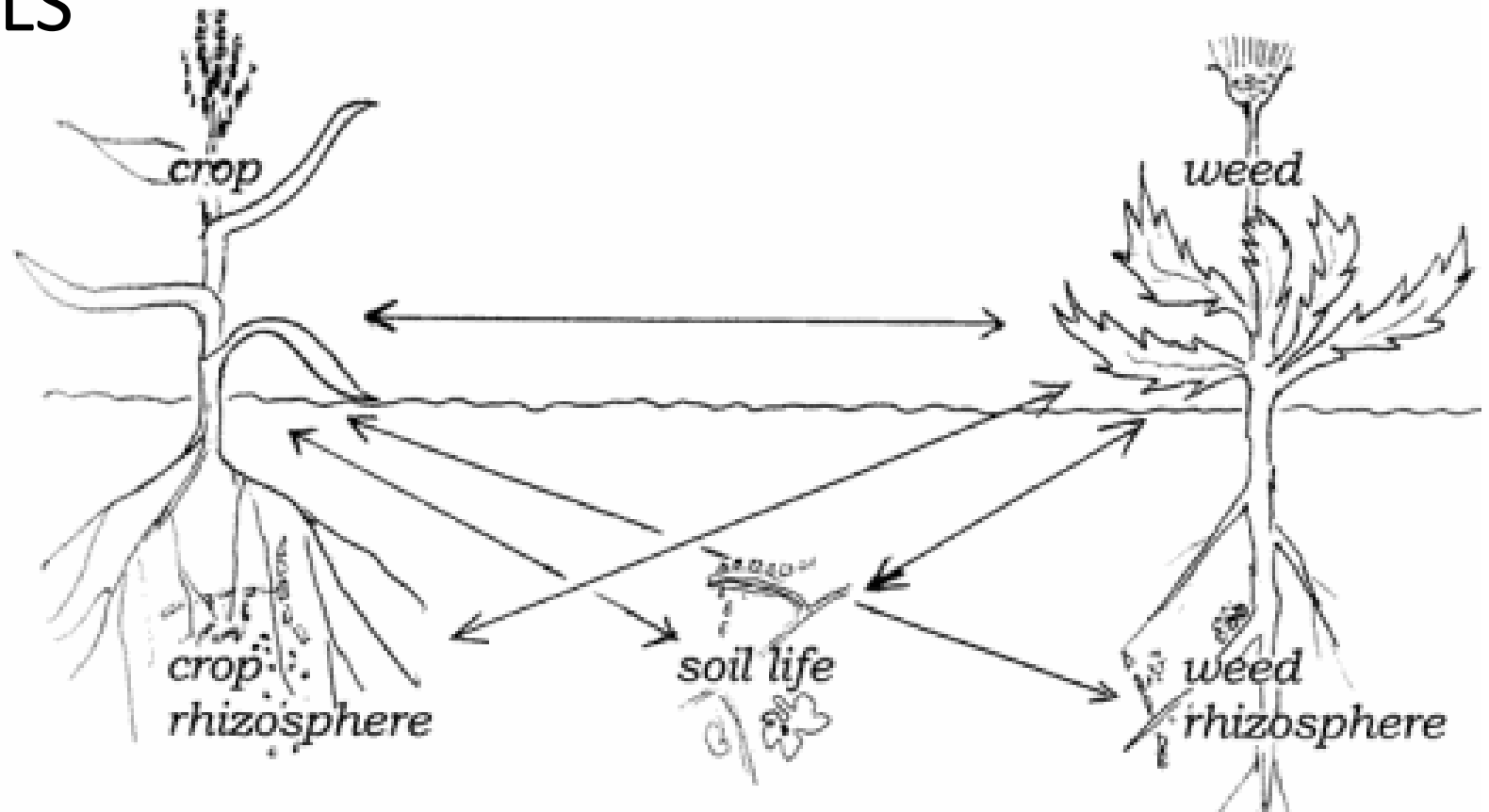


GLS vs Oil Concentrations in seeds



Breeding Efforts

- Location-specific GLS modification
- Soil persistence studies
- Pest resistance varieties



The Diamondback Moth (*Plutella xylostella*)

- Different GLS involved in host recognition cues for oviposition (laying eggs) (Sun et al., 2009)
- Aromatic GLS triggered by the DBM-resistant variety, but resistance from saponins (Liu et al., 2016)
- Other compounds attract DBM, not just GLS (Loon et al., 2002)

