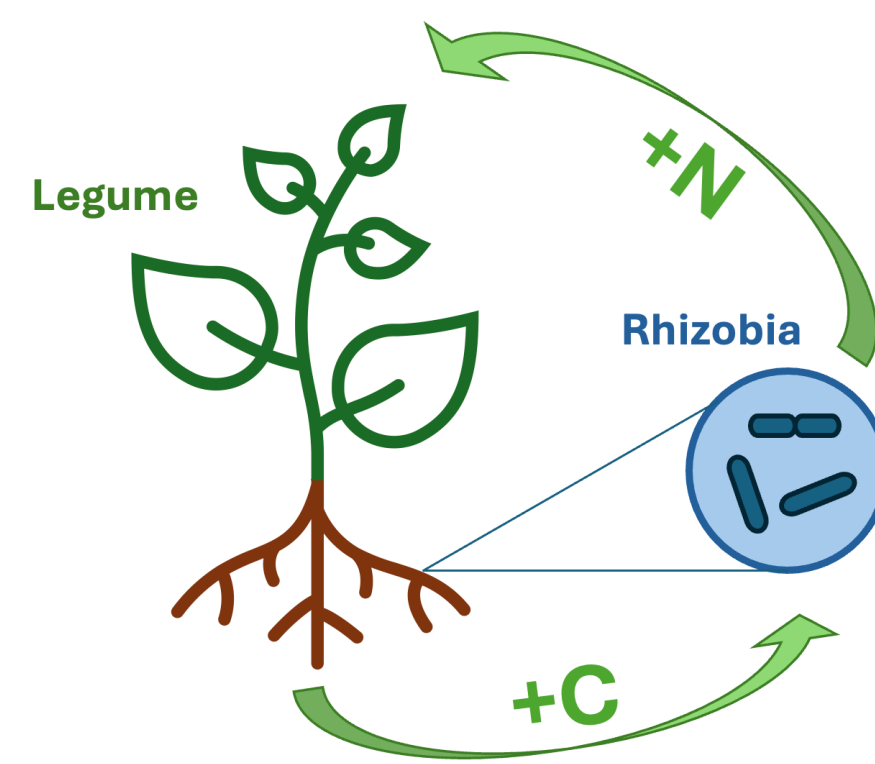


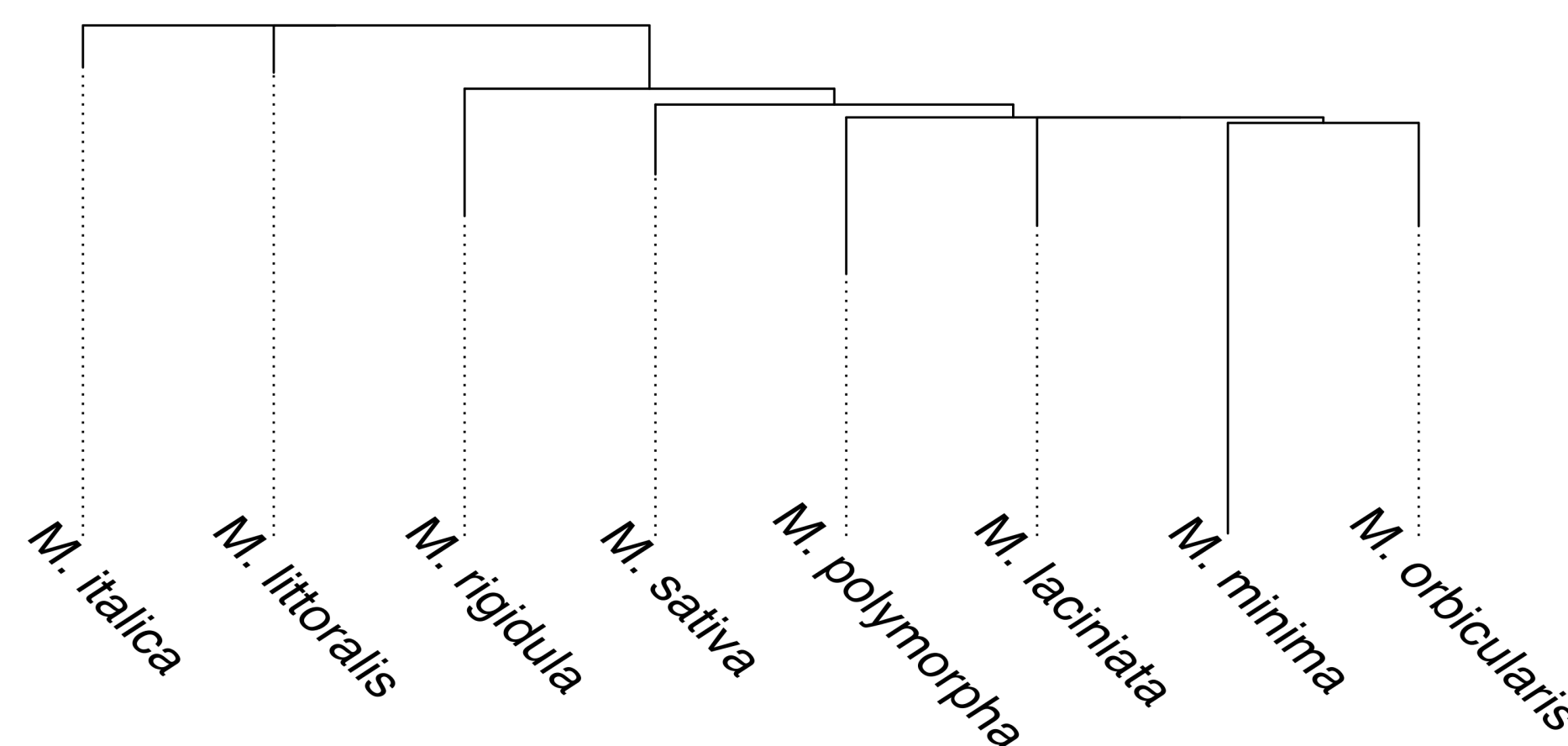
Abstract

- Rhizobia fix nitrogen
- Legume provides carbon
- Rhizobia-*Medicago* system is a well studied mutualism
- Response traits to mutualism (biomass and nodulation) vary between *Medicago* genotypes and species
- Variation could result from adaptation of *Medicago* species to particular rhizobia strains
- **Differences in *Medicago* response to a rhizobia species may result from phylogenetic distance from the *Medicago* species the rhizobia was isolated from**
- Study included 9 *Medicago* species and 2 rhizobia species
- **No phylogenetic signal in response traits across genus**
- Generalized ability of most *Medicago* plants to form mutualism with most *Ensifer* (rhizobia) species
- May highlight conservation of mutualism genes across *Medicago* genus, as well as plasticity of this mutualism



Background

Figure 1: Phylogenetic tree of *Medicago* species used in experiment



- Mutualism response traits: nodules (rhizobia colonization) and above ground biomass (legume benefit)
- Phylogenetic signal compares:
 - Response trait difference
 - Phylogenetic distance
- **If trait variation is only a result of phylogenetic distance, there will be a strong phylogenetic signal**

Results

Figure 2: Rhizobia colonization levels vary across the *Medicago* genus

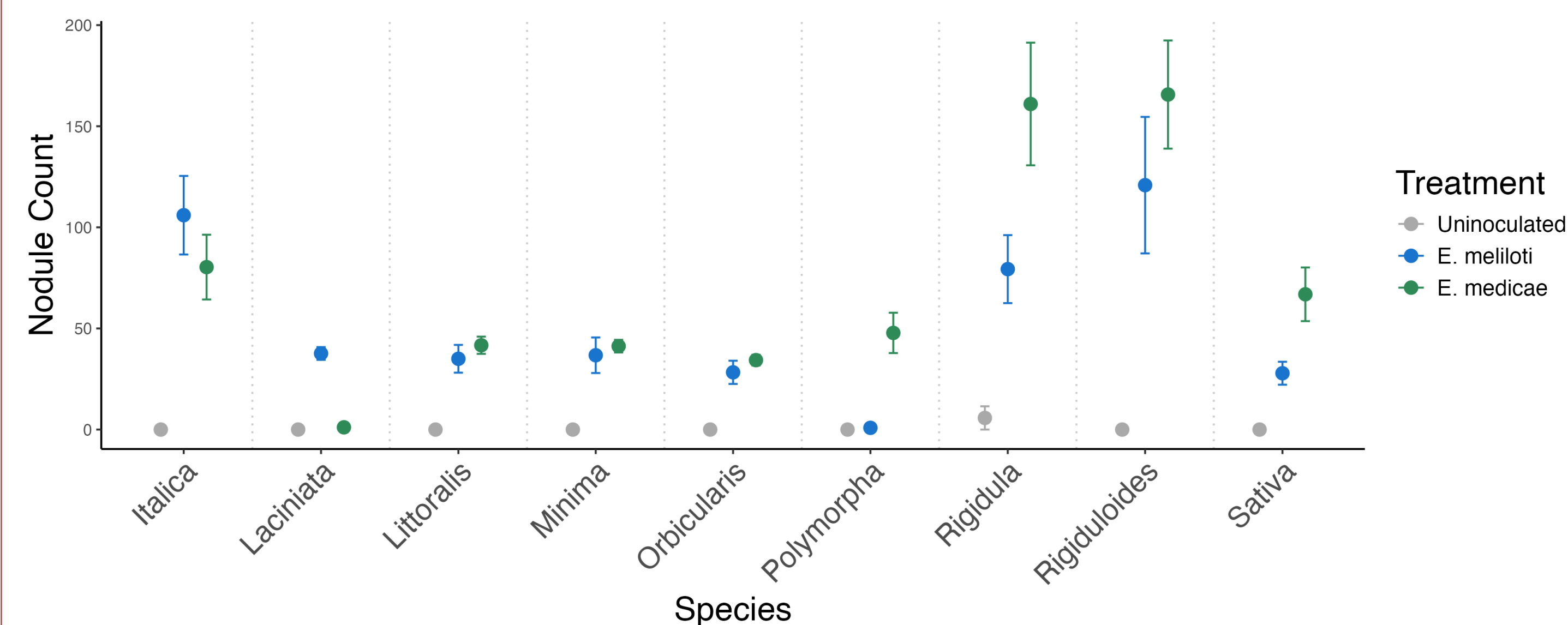


Figure 3: Biomass benefit per nodule varies across the *Medicago* genus

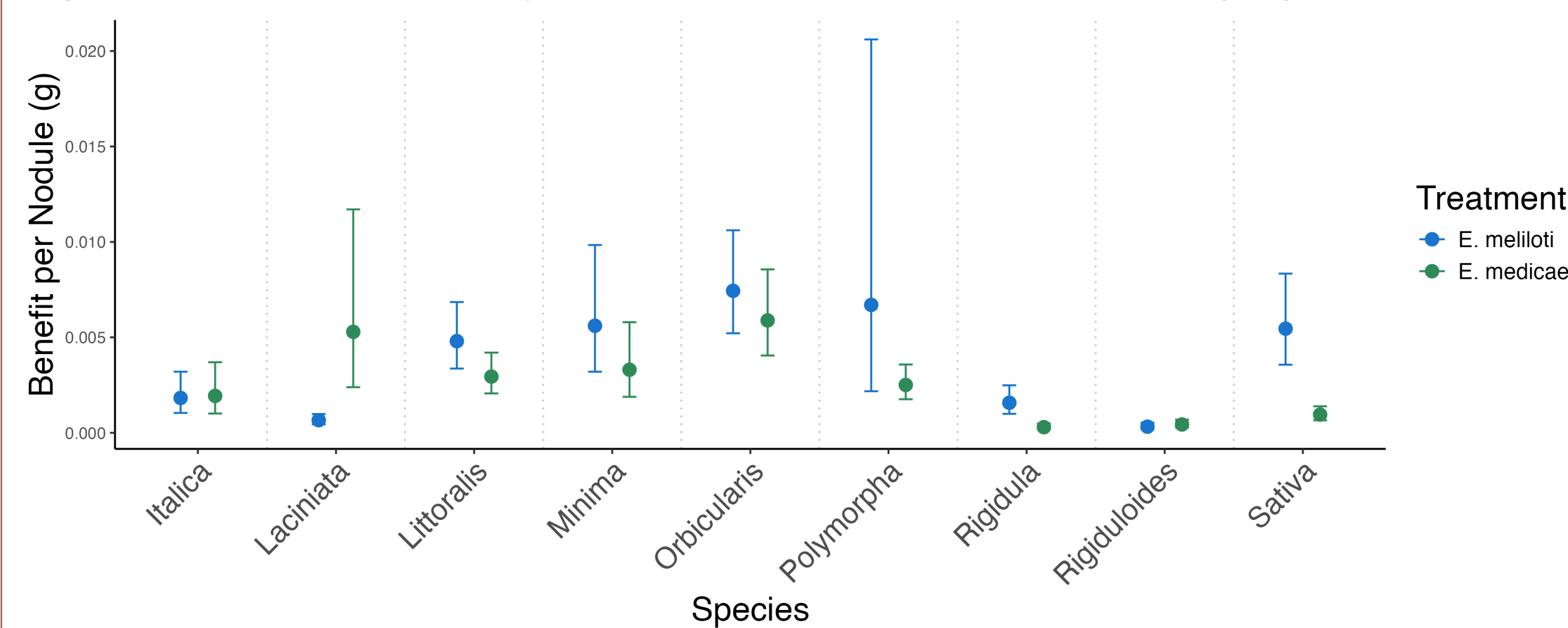
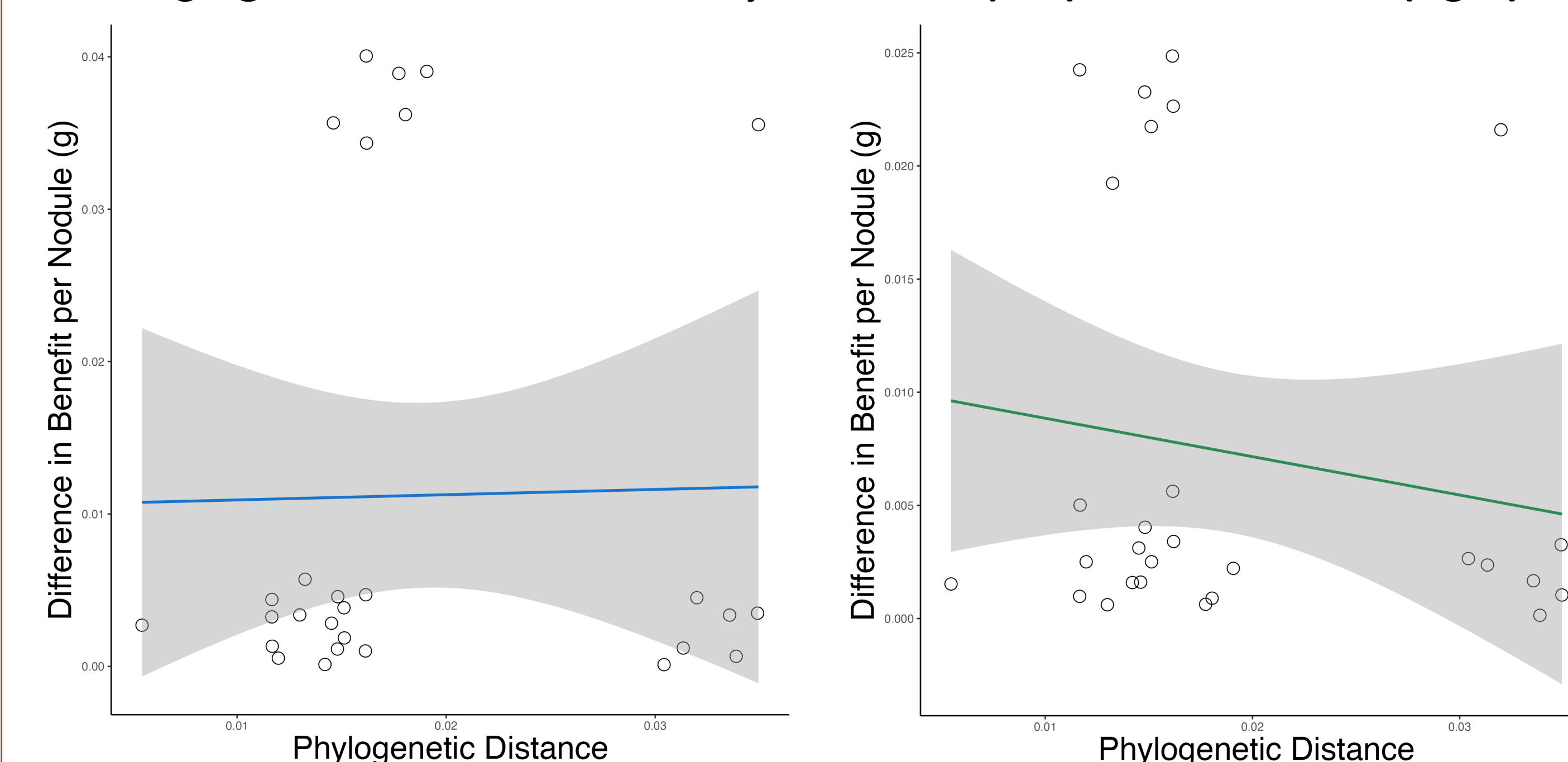
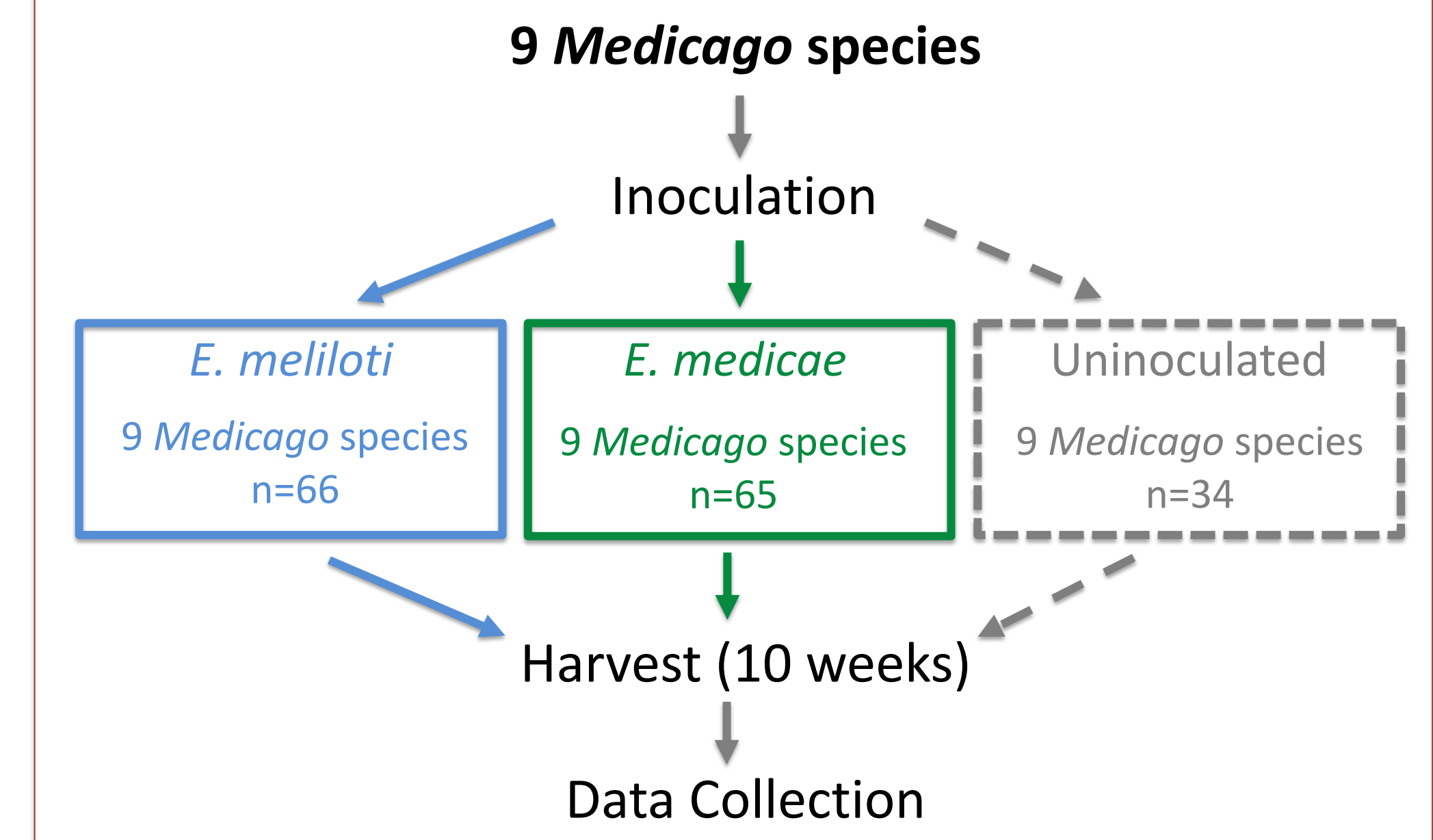


Figure 4: No phylogenetic signal for biomass benefit per nodule across the *Medicago* genus with colonization by *E. meliloti* (left) and *E. medicae* (right)



Methods



Conclusions

- **Large variation in response to rhizobia treatments**
 - Some specificity (*M. laciniata*, *M. polymorpha*)
 - Some cheaters (*E. meliloti* with *M. laciniata*)
- **No phylogenetic signal in mutualism response variables**
 - May reveal a generalist approach to rhizobia-legume mutualism
 - Most *Medicago* plants can form a symbiosis with most *Ensifer* species
 - Genes mediating symbiosis may be well conserved across the *Medicago* genus

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