



Invasion by *Lonicera japonica* Impacts Species Turnover in a Successional System

Kathryn A. Yurkonis & Scott J. Meiners

Eastern Illinois University, Charleston, IL 61920



Does *Lonicera japonica* invasion impact community dynamics?

Introduction

Community diversity often decreases with exotic species invasion, however, the mechanisms of this reduction are poorly understood.

Diversity results from a balance between species colonization and extinction within communities.

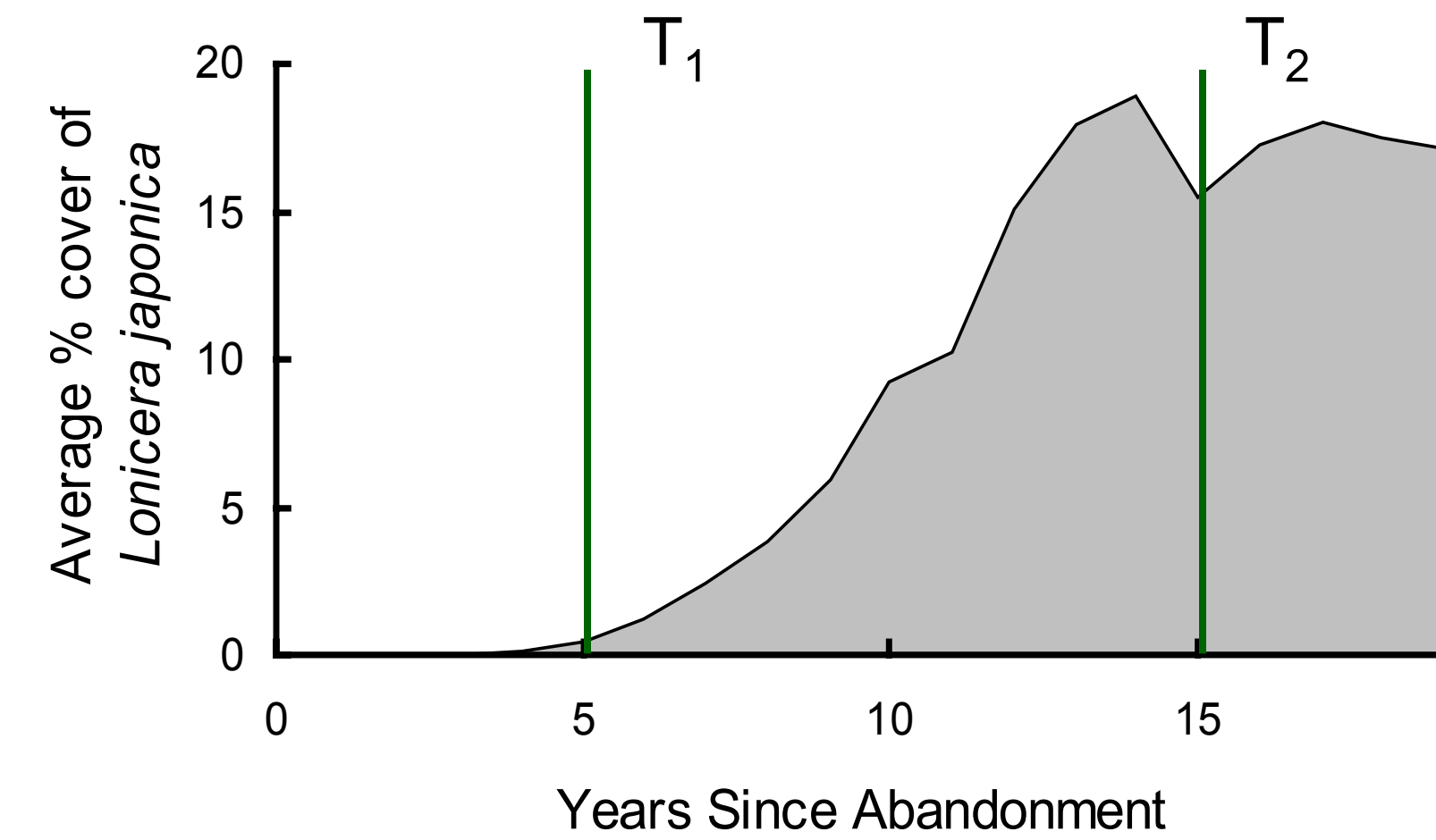
To change species richness an invader must alter the balance between colonization and extinction rates within a community.

We used data from a long term succession study to evaluate the impact of *Lonicera japonica* invasion on community dynamics at 3 levels:

1. **Species richness**
2. **Species turnover**
3. **Individual species colonization**

Methods

We used permanent plot data (BSS) to examine changes from the beginning (T_1) to peak (T_2) of *Lonicera japonica* invasion.

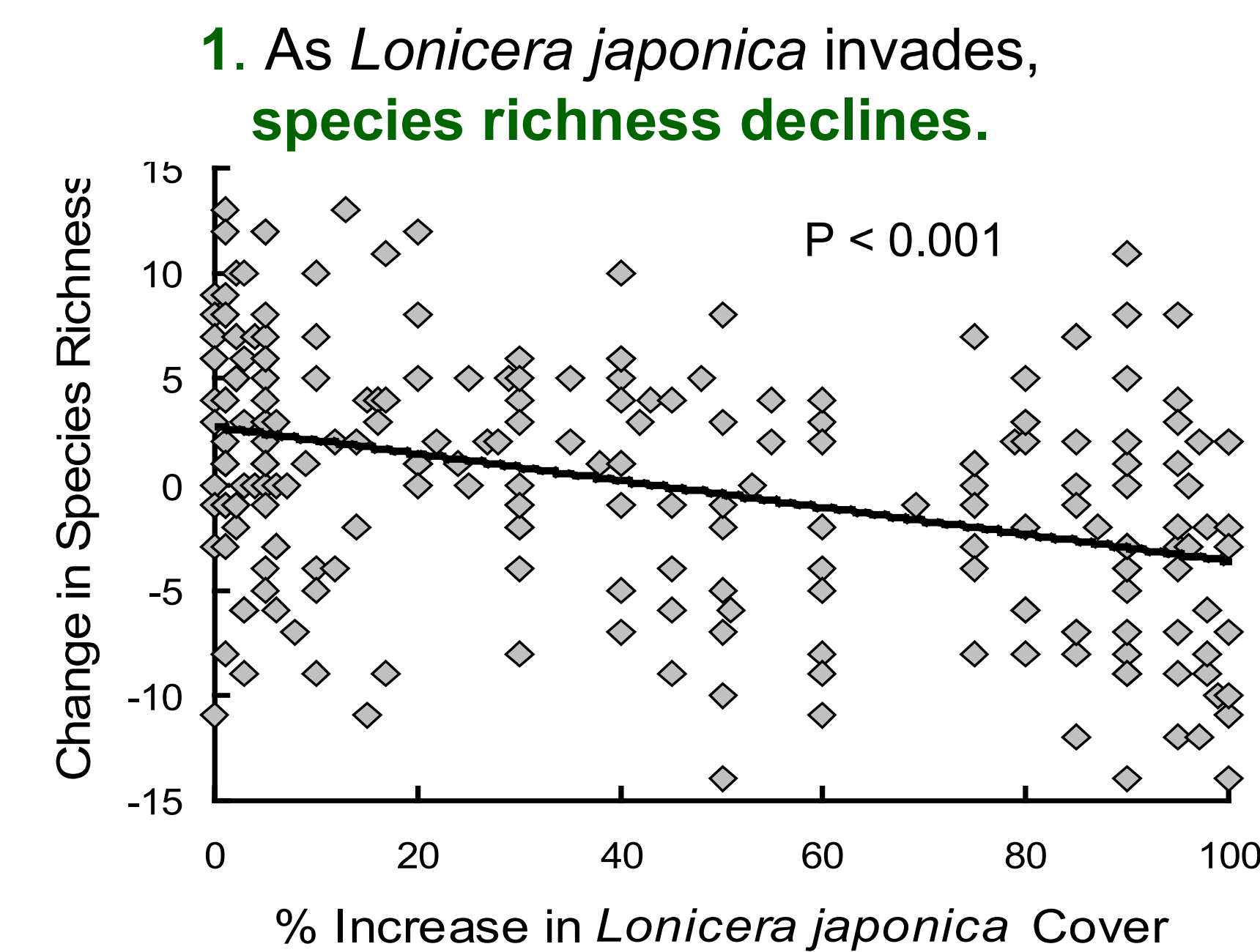


For each plot we quantified:

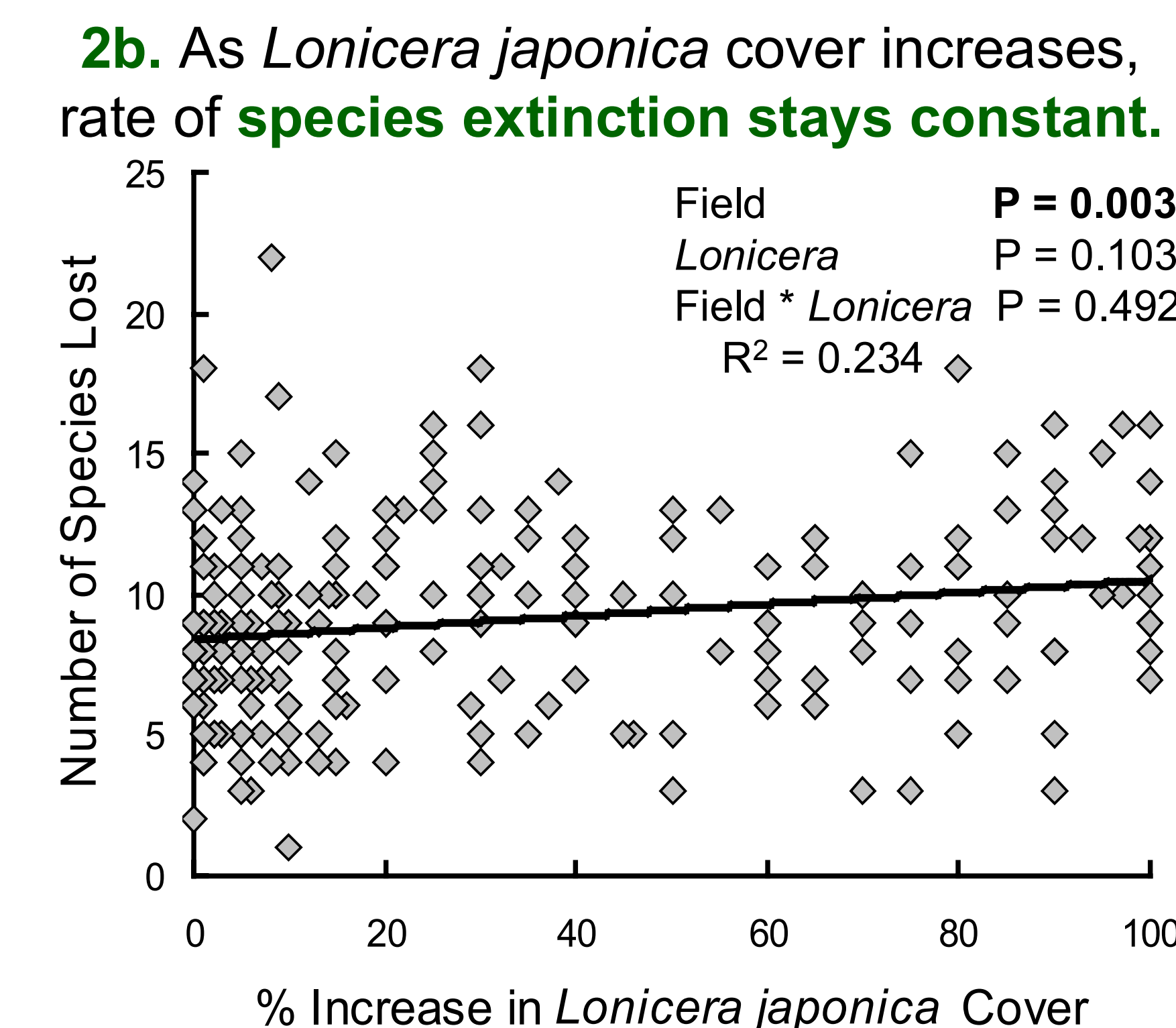
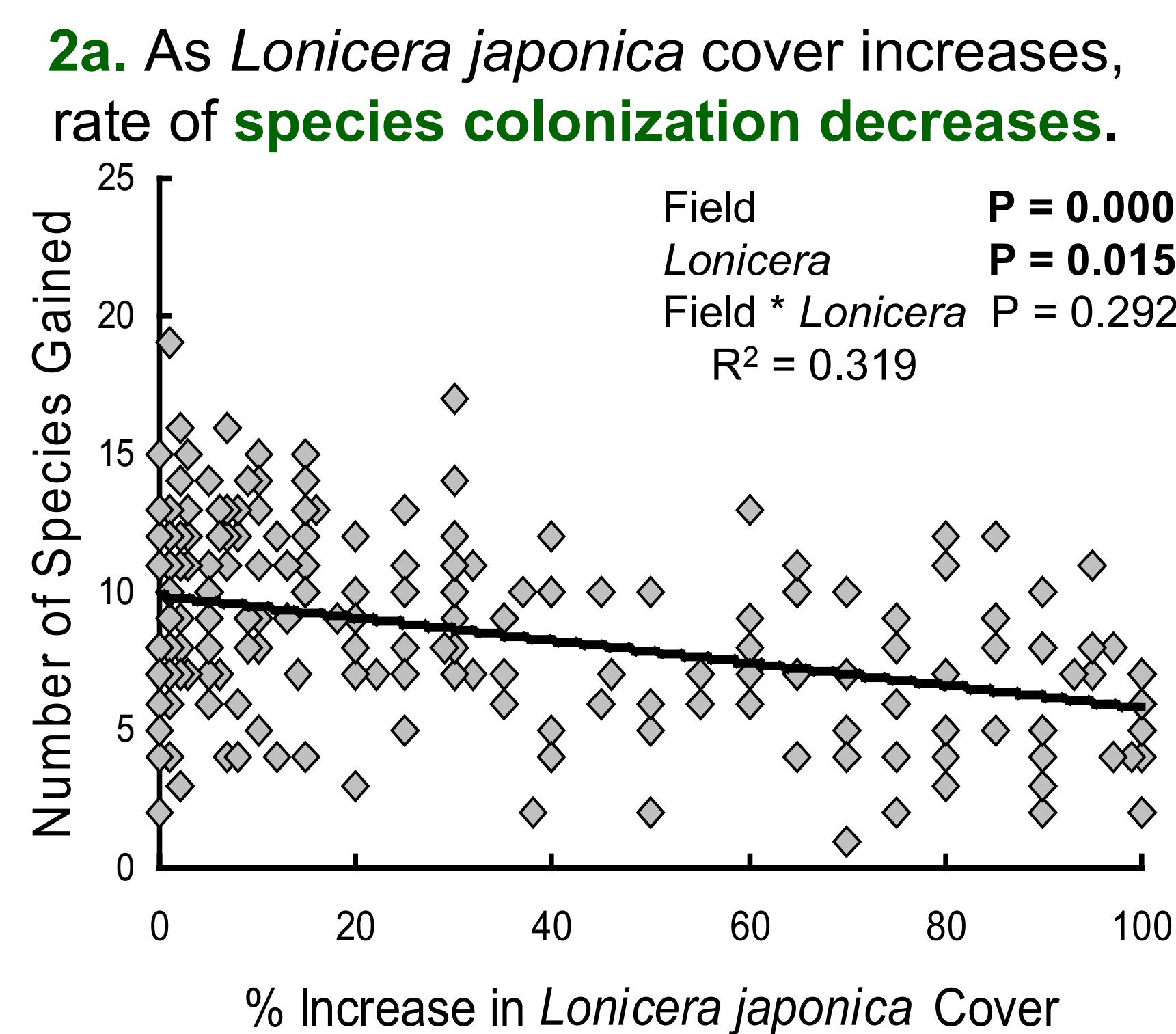
- A. Change in *Lonicera japonica* cover
- B. Change in species richness
- C. Number of local species gained-species colonization
- D. Number of local species lost-species extinction
- E. Colonization dynamics of common invaders



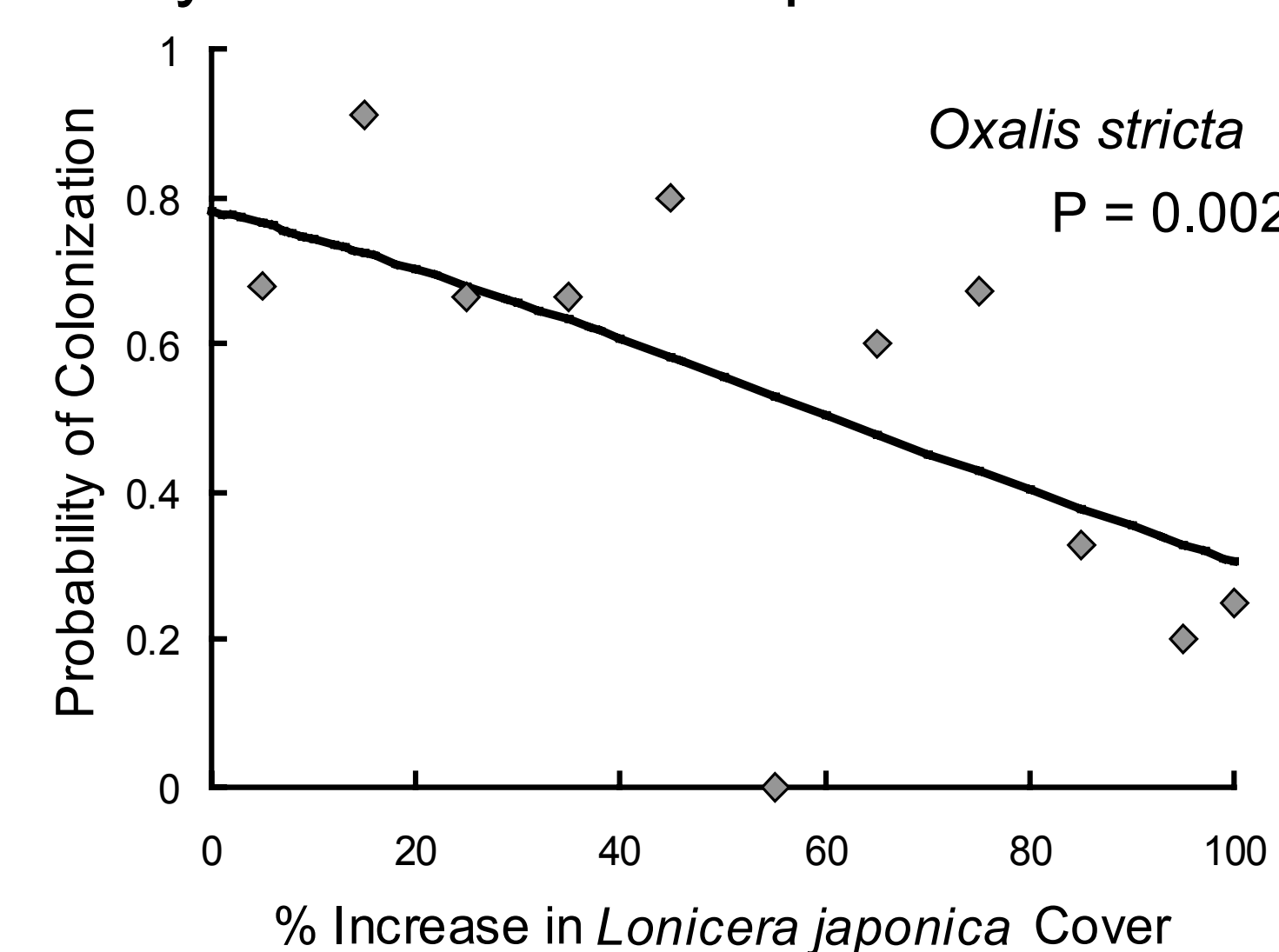
BSS successional field ten years after abandonment



Lonicera japonica entwining *Solidago rugosa*

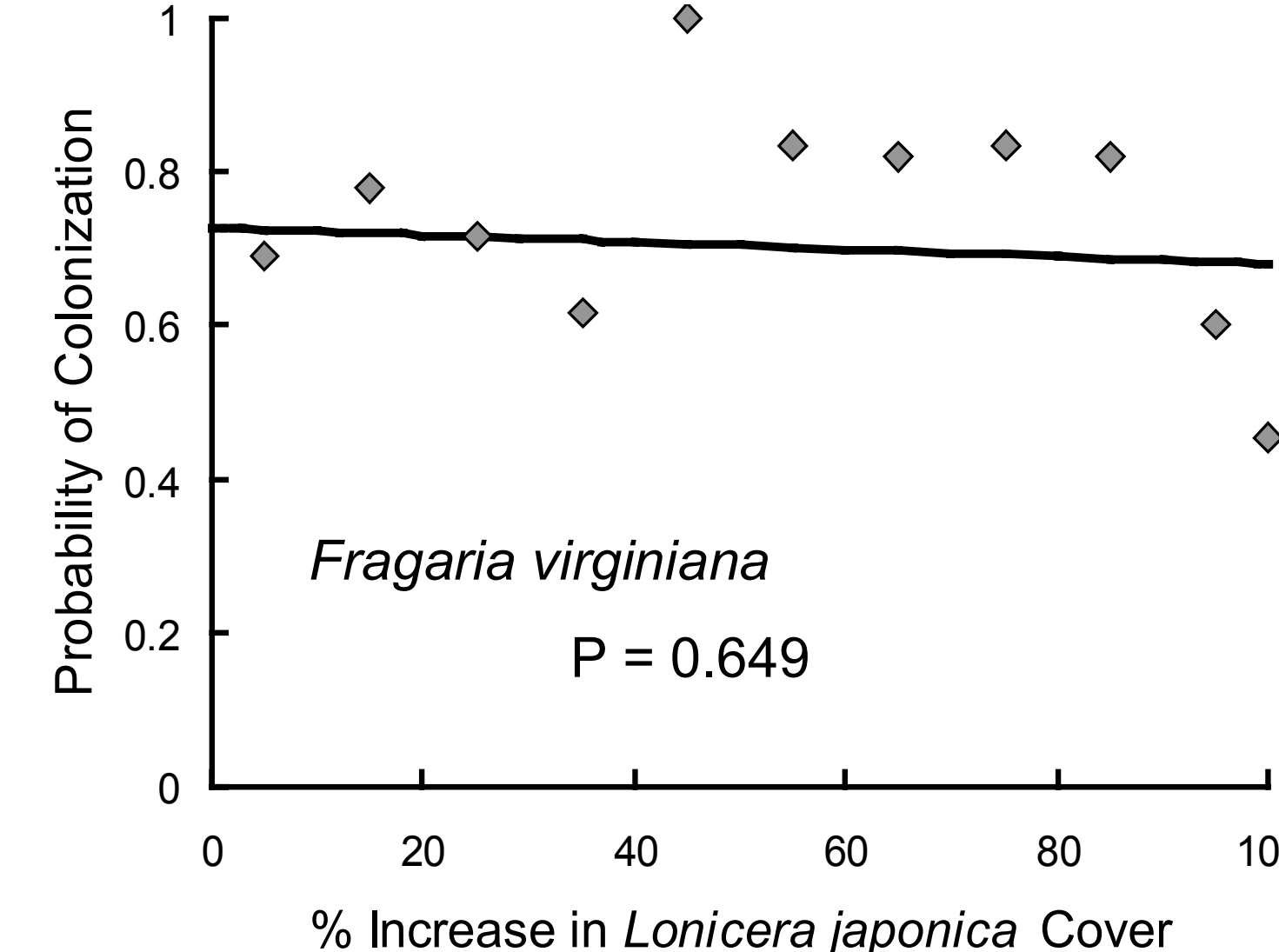


3a. *Lonicera japonica* invasion **decreases** the probability of select native species colonization.



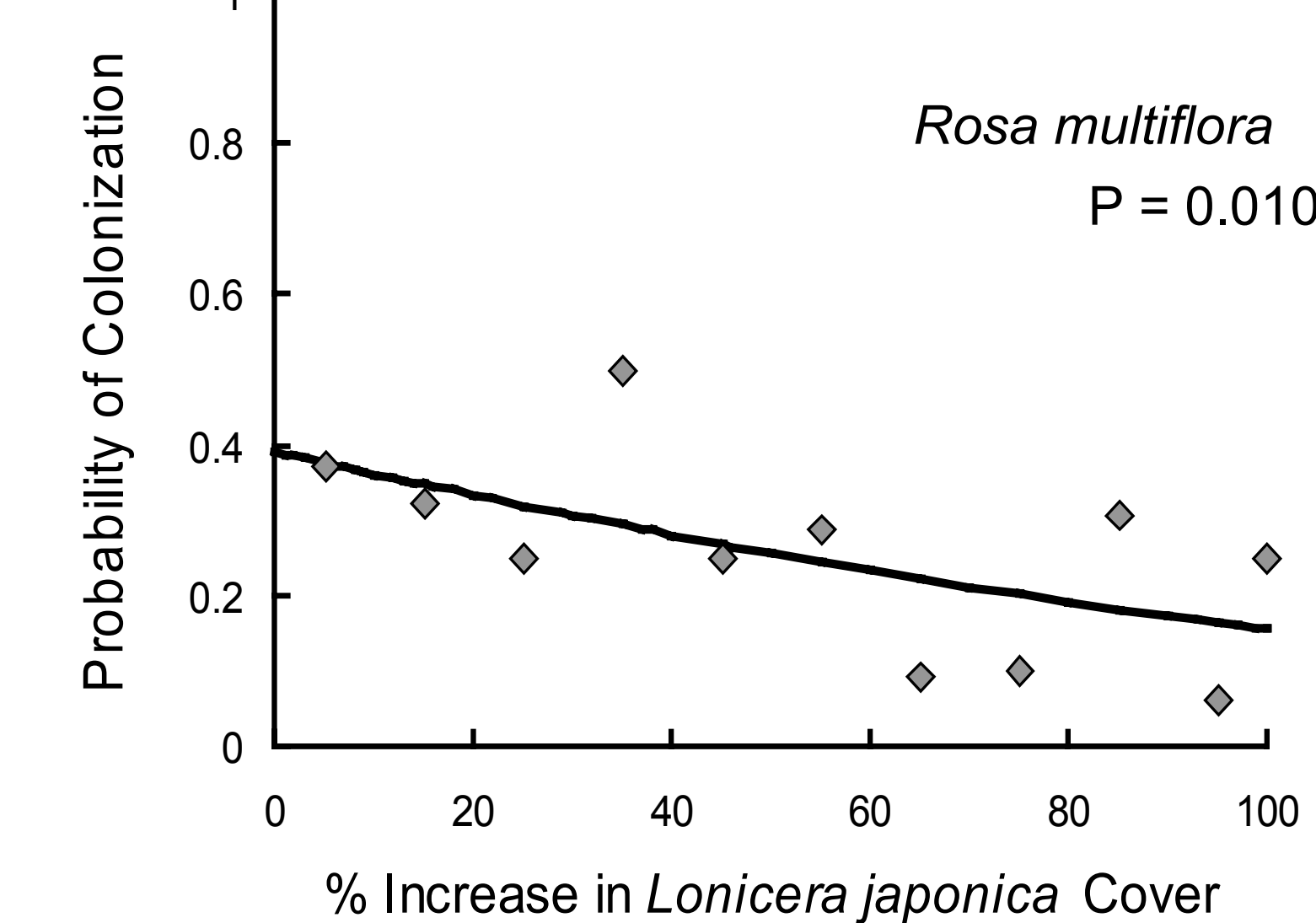
Additional species negatively affected by *Lonicera* invasion include: *Achillea millefolium***, *Solidago rugosa***, *Aster pilosus** and *Euthamia graminifolia**. ** P < 0.01 * P < 0.05

3b. In some cases, *Lonicera japonica* has **no impact** on native colonizing species.



Additional common colonizing species not affected by *Lonicera* invasion include *Solidago juncea*, *Parthenocissus quinquefolia* and *Toxicodendron radicans*.

3c. *Lonicera japonica* shows **mixed impacts** on other invading exotic species.



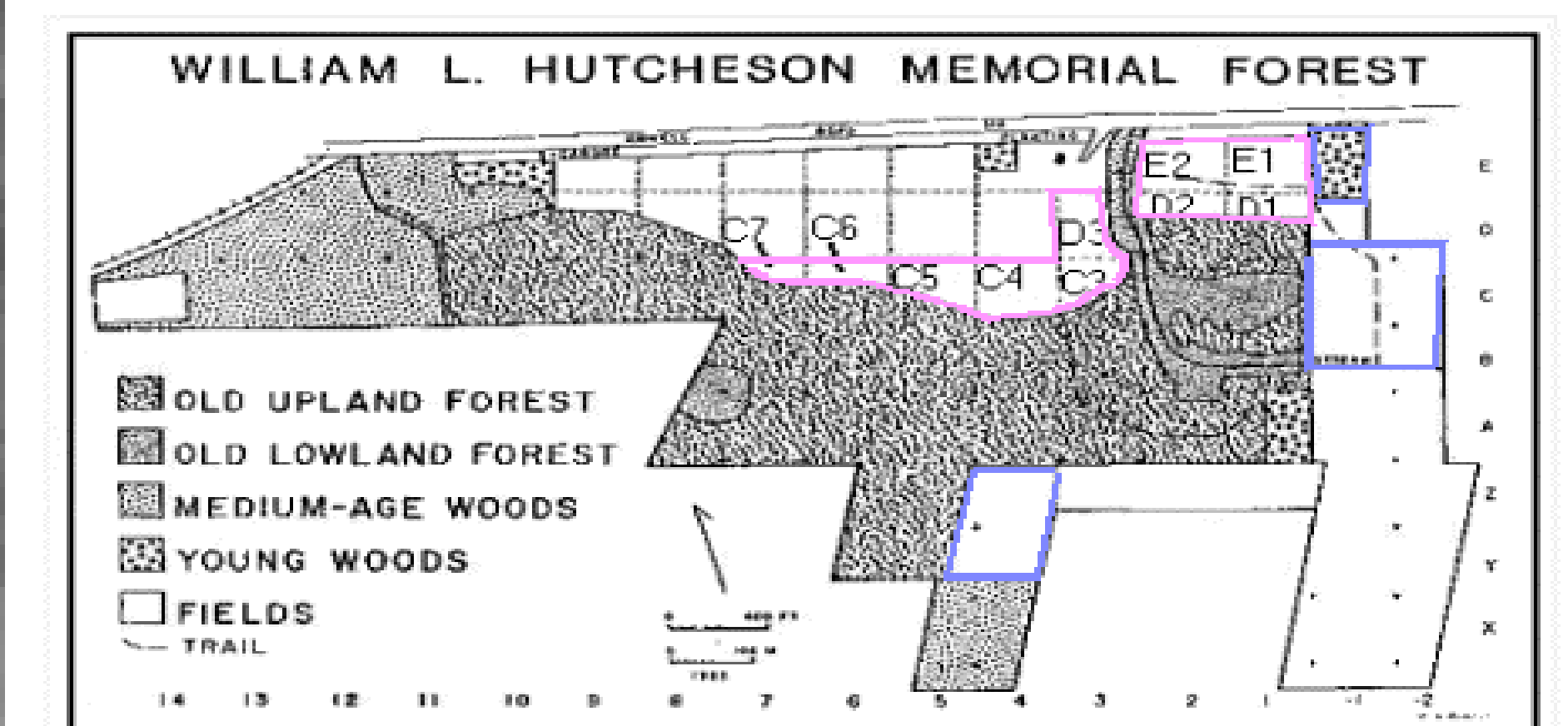
While *Lonicera* invasion inhibits *Rosa multiflora* invasion, *Lonicera* shows no impact on the exotic invaders *Poa compressa*, *Daucus carota* and *Hieracium caespitosum*.

Conclusions

1. Invasion of *Lonicera japonica* causes a decline in species richness.
2. *Lonicera* invasion inhibits species colonization without impacting species extinction rates.
3. *Lonicera* differentially impacts common colonizing species.

These findings contradict the traditional competitive exclusion view where species extinctions are the primary mechanism for declines in species richness.

Instead, these data suggest that preemptive competition by exotic species reduces local colonization rates causing declines in species richness.



Buell-Small Succession Study (BSS)

The long term study includes ten fields abandoned from agriculture beginning in 1958.

Vegetation dynamics have been followed in 48 permanently marked 0.5 x 2.0 m plots in each field.

For more information visit: www.ecostudies.org/bss



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