Impacts of Landscape Treatments on Plant Species Richness within Road Corridors and Adjacent Ecosystems

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SIMBIOSYS FINAL CONFERENCE
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UCD DUBLIN
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Road Verges: 3 Research Areas

1. Species richness:
   (a) Road Verge vs. Adjacent Land.
   (b) Pre-guidelines vs. Post-guidelines
2. Contribution of Soil Seed Bank
3. Nutrient status of Soil in Road Schemes

Preliminary Conclusions

Research in Context - Background

- 2006 NRA Produced Guidelines
- Landscaping of Verge area:

  Move away from a high input/horticultural approach to one following an *Ecological Landscape Design* approach.
- Opportunity in 2009 to study Pre- and Post-guidelines sites.

Research in Context - How slopes were landscaped

Traditionally, this involved:

- finishing engineering aspects
- covering with topsoil
- treating with herbicide
- applying fertilizer
- planting….


image: Lego


Glenealy Landscaping

Ecowitch

A.C.E.S.

New Approach

- Use subsoil (soil slopes) or NO soil (rock/scree)
- Avoid Herbicides and fertilizer
- Create *Open Habitat Mosaics* (OHM) incorporating native species of local provenance: Soil Slopes.

  Allow *Natural Recolonisation* (NR): Rock/scree Slopes.


Soil Slope (OHM)


Rock/scree Slope (NR)

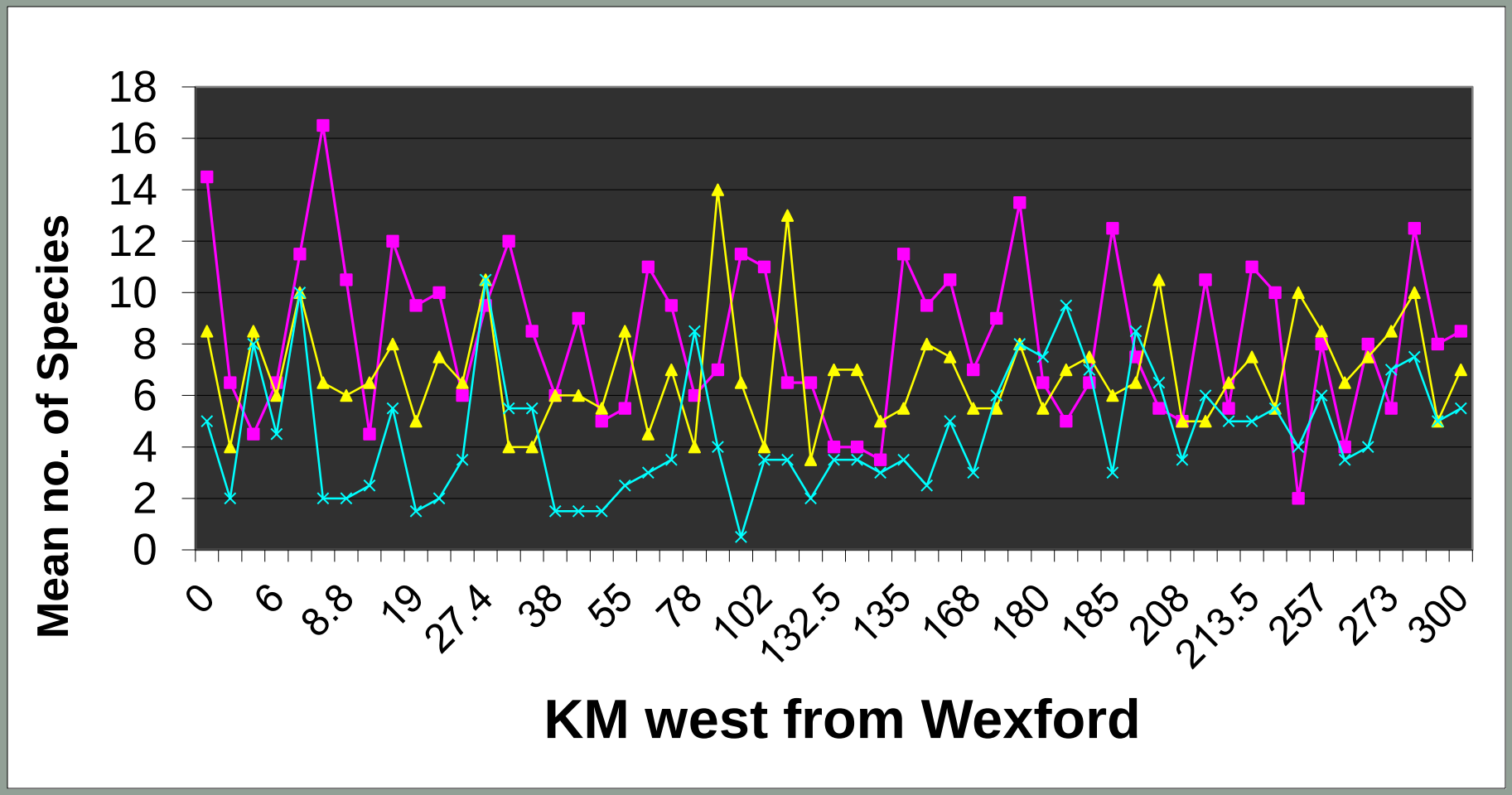
Species Richness:
Road Verge vs. Adjacent Land Use

Road Verges

Adjacent Fields

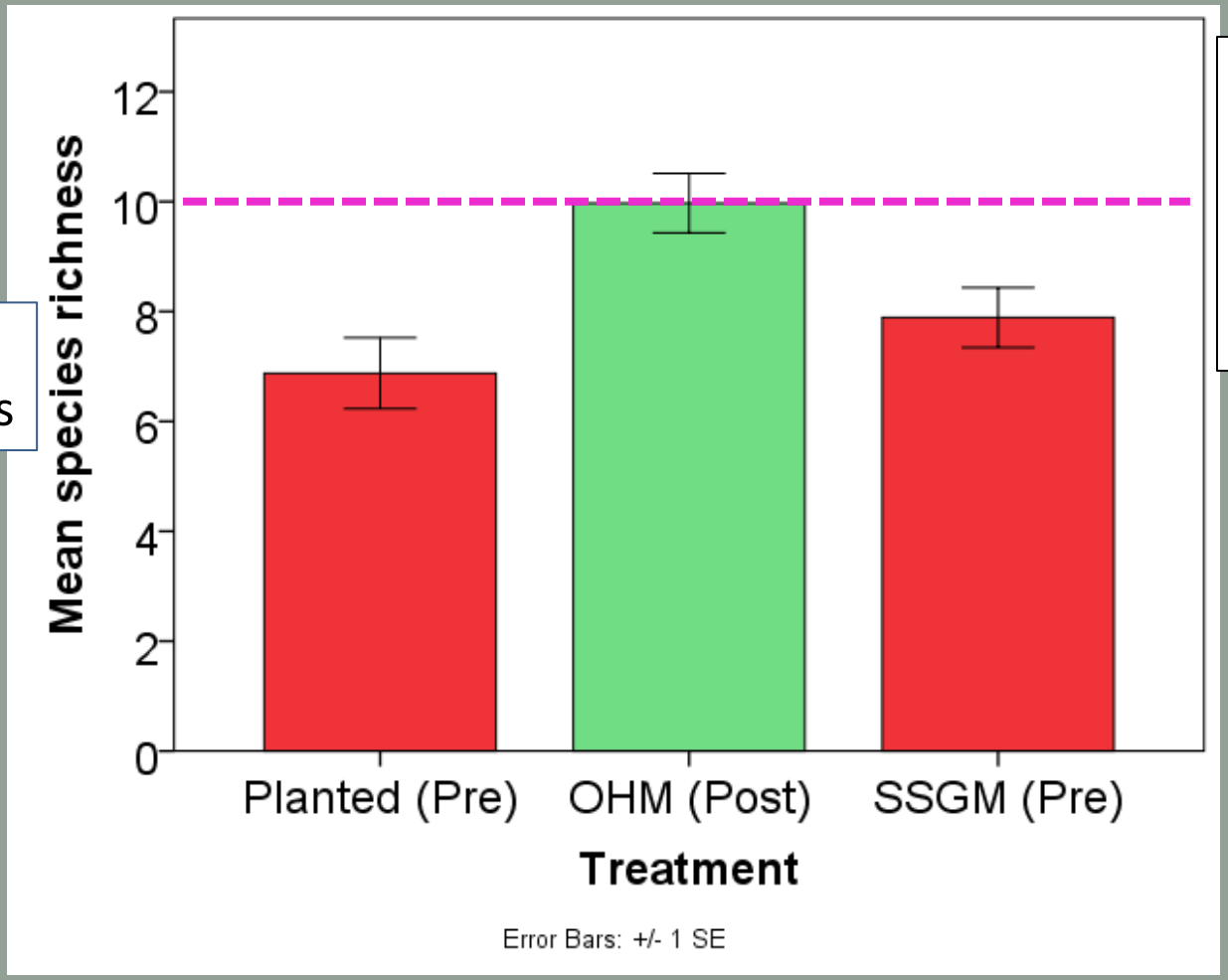
Reference Points along Transect

Species Richness: All Road Sites



Species Richness on Road Verges:
Soil Slopes – All Species – Comparison of Treatments

Including all species

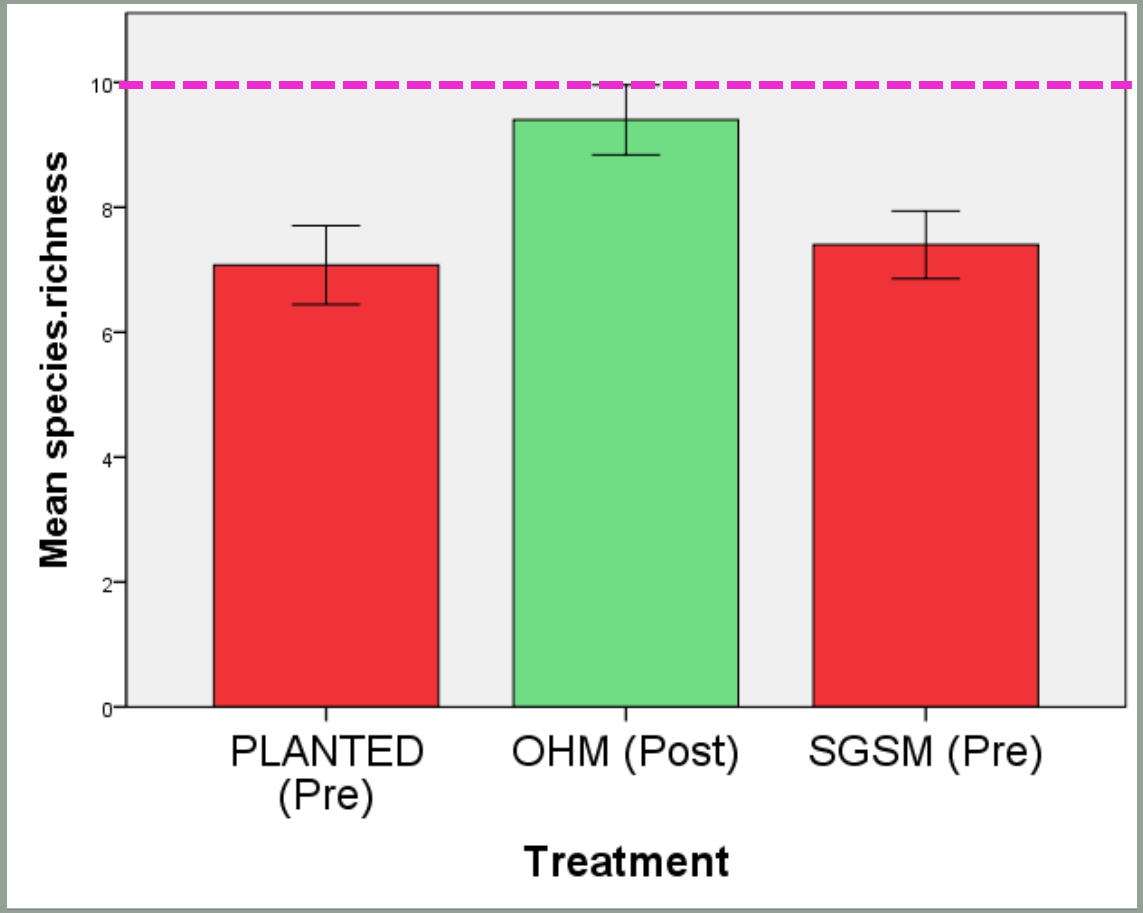


Mean species richness in semi-natural grasslands

Treatments are different (P> 0.05)

Species Richness on Road Verges:
Soil Slopes (II) - Comparison of Treatments

Native species only

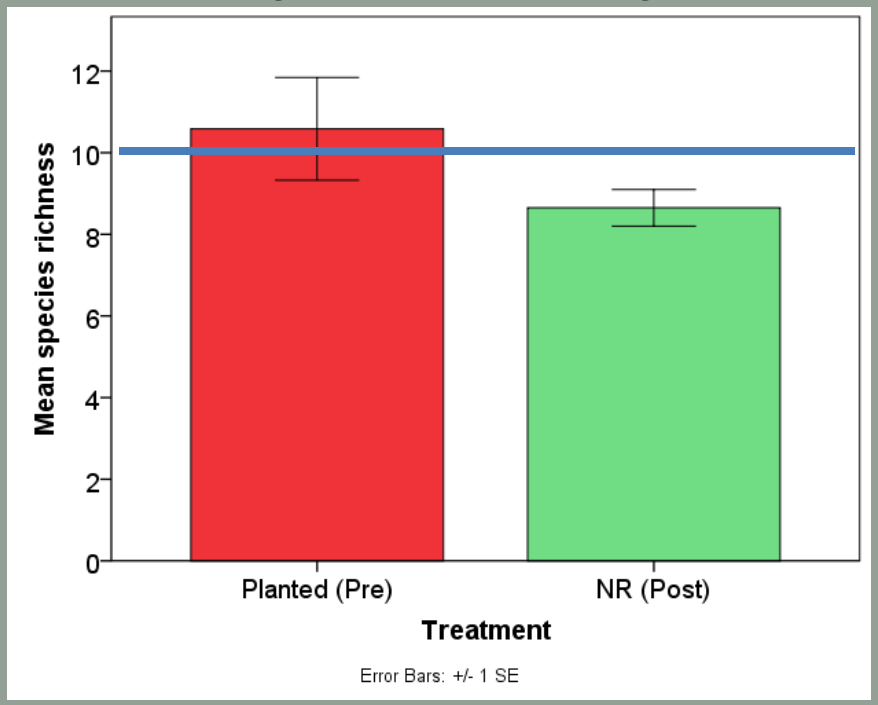


Mean species richness in semi-natural grasslands

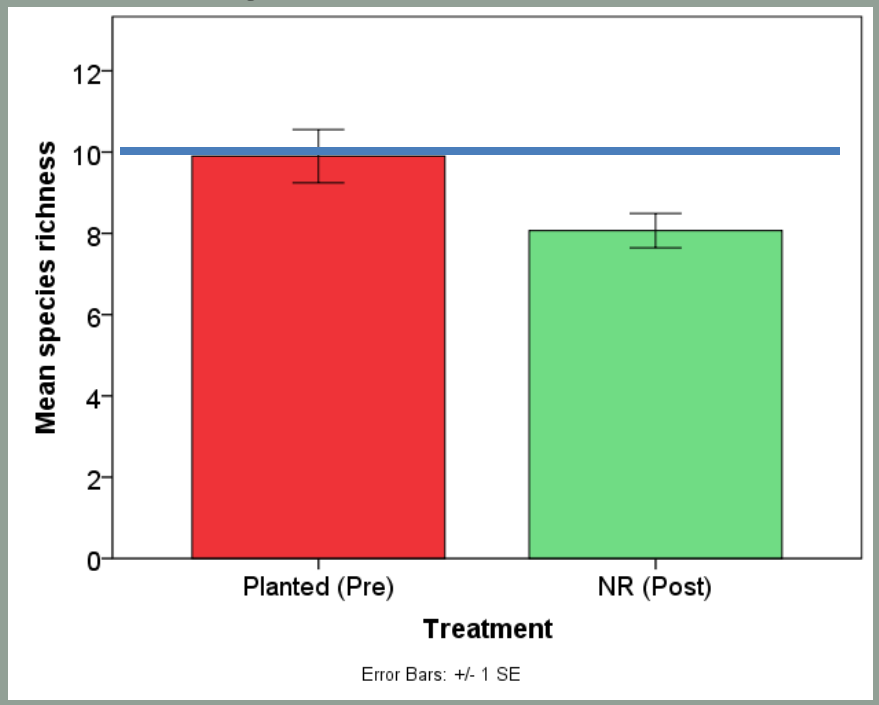
Post Treatments are different to Both Pre treatments (P> 0.05)

Species Richness Road Verges Rock/scree (native species)

Early Summer only



Early & Late Summer



Treatments are not sig. different ($P < 0.05$)

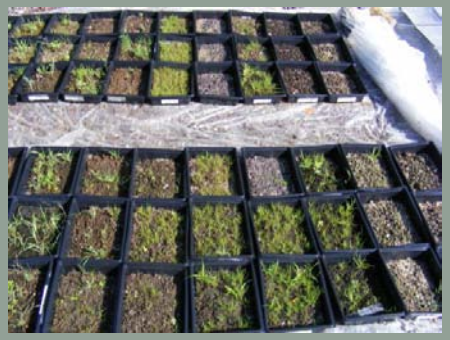
Below-ground plant community: the contribution of the Soil Seed Bank

2010: Soil collected spring following plant survey.

Outdoor germination

Below-ground Plant Community

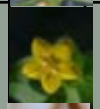
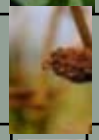
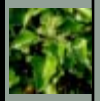
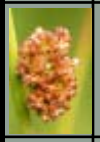
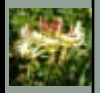
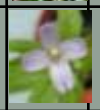
- Plants were removed upon germination and identification



- ..or potted on until they could be identified
- 2 seasons – original seed trays overwintered outside allowing a 2nd chilling period.

Species recorded Rock face Glebe Co. Kerry (NR):

2009: Quadrats (Q); 2010: Soil Seed Bank Trial (SSB)

Species	Q	SSB	Species	Q	SSB	Species	Q	SSB
 *Aegopodium podagria.*	√		 *Geranium robertianum.*	√	√	 *Epilobium parviflorum*		√
 *Angelica sylvestris*	√		 *Lythrum salicaria*	√	√	 *Hypericum humifusum*		√
 *Athyrium filix lemina*	√		 *Rubus fruticosa*	√	√	 *Juncus effusus*		√
 *Elytrigia repens*	√		 *Teucrium scorodonia*	√	√	 *Plantago major*		√
 *Hedera*	√		 *Ulex europaeus*	√	√	 *Poa pratensis*		√
 *Juncus conglomeratus*	√		 *Cardamine flexuosa*		√	 *Scirpus setaceus*		√
 *Lonicera periclymenum*	√		 *Carex pendula*		√	 *Veronica persica*		√
 *Rubus idaeus*	√		 *Epilobium ciliatum*		√	 *Viola riviniana*		√

Species Richness: Q = 8; Both = 5; SSB = 11; TOT = 24

Soil Fertility

Grasslands with higher numbers of native plant species require LOW soil fertility.

Preliminary Conclusions

- Higher mean species richness in Road Verge than either Margin or Centre of the adjacent field.
- Seed bank data important – particularly to NR.
- Topsoil nutrient status should be determined:
  (low nutrient status may ⇩ costs/effort involved in its alternative disposal/incorporation)
- If POST-GUIDELINES treatments are producing results ≥ PRE-G then *POST* is to be adopted as the more sustainable approach.

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SIMBIOSYS

Sectoral Impacts on Biodiversity and Ecosystem Services

ERI

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