



# The effects of afforestation with larch and birch on soil biota at East Iceland

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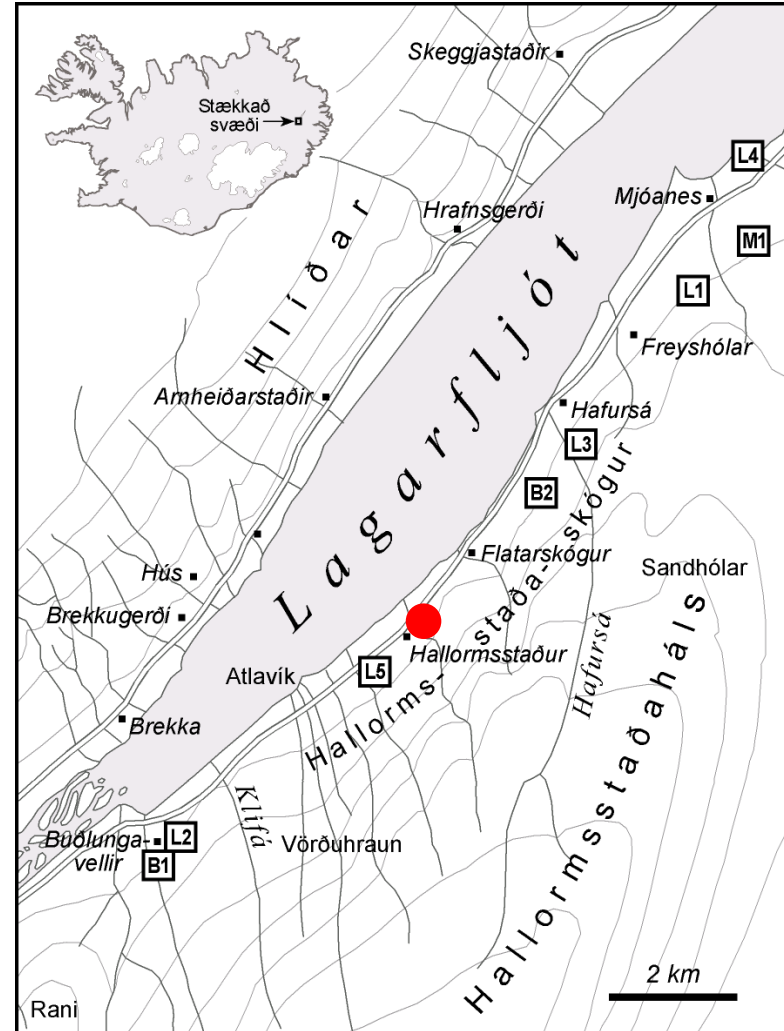
# IceWoods

- Research project 2002-2006
- Study the influence of afforestation on ecosystem
- Biodiversity
  - Changes in communities of arthropods, flora, fungi and birds.
- Ecosystem productivity
  - Changes in productivity and carbon fluxes.
- Soil characteristics
  - Changes in carbon, nitrogen and acidity of the soil.



# IceWoods

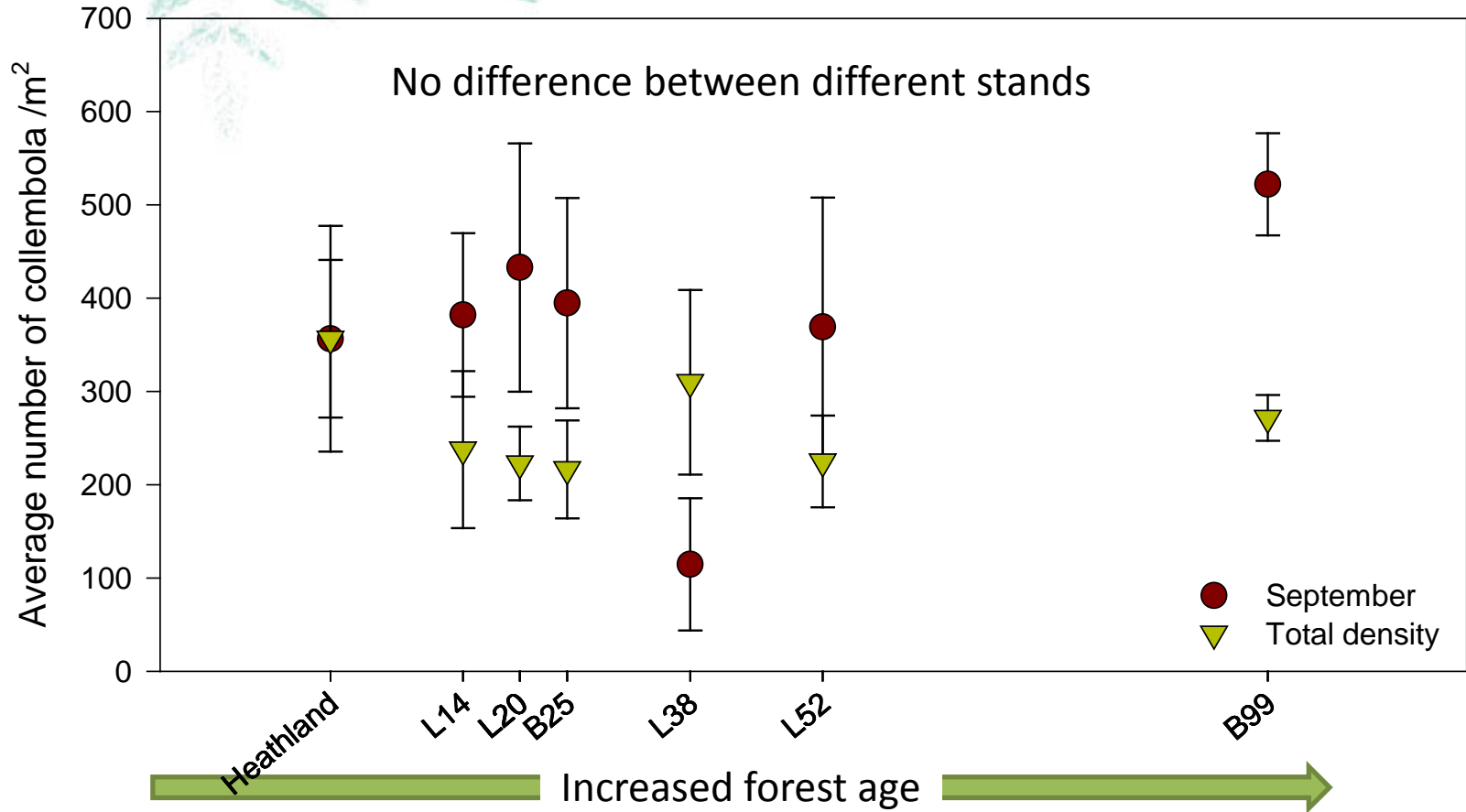
- Forest stands at different age
  - Five larch stands
  - Two birch stands
- Heathland stand for comparison
- 5 plots (50 x 2 m) per stand
- Similar study in West Iceland
  - Pine
  - Spruce
  - Birch



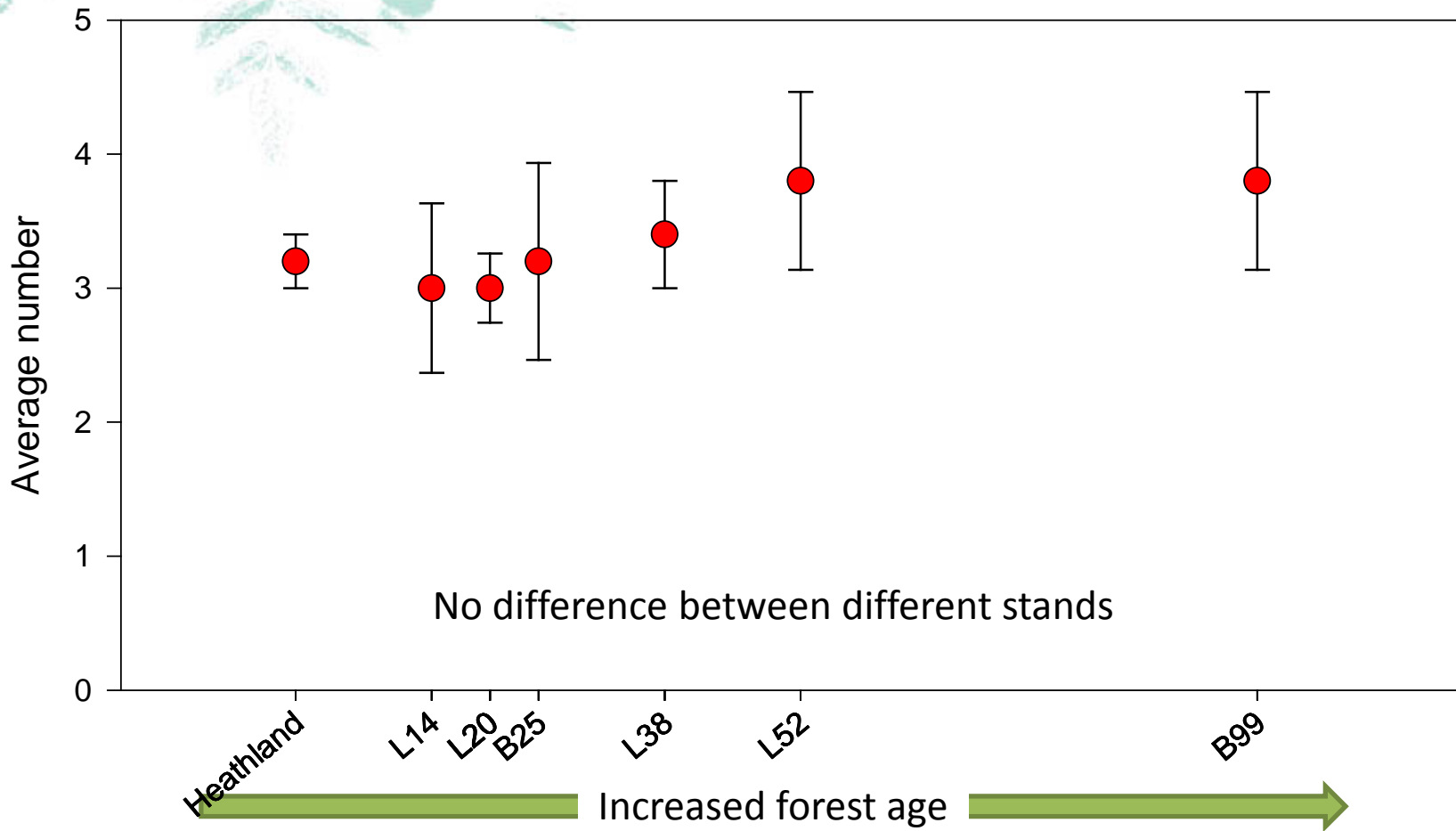
# Soil arthropods

- Soil sampled from top 5 cm 3 times
  - June, July, September 2004
- 2 soil samples at each plot
  - =>10 samples per sampling
- Soil arthropods extracted with high gradient extractor
- Collembola identified to species level

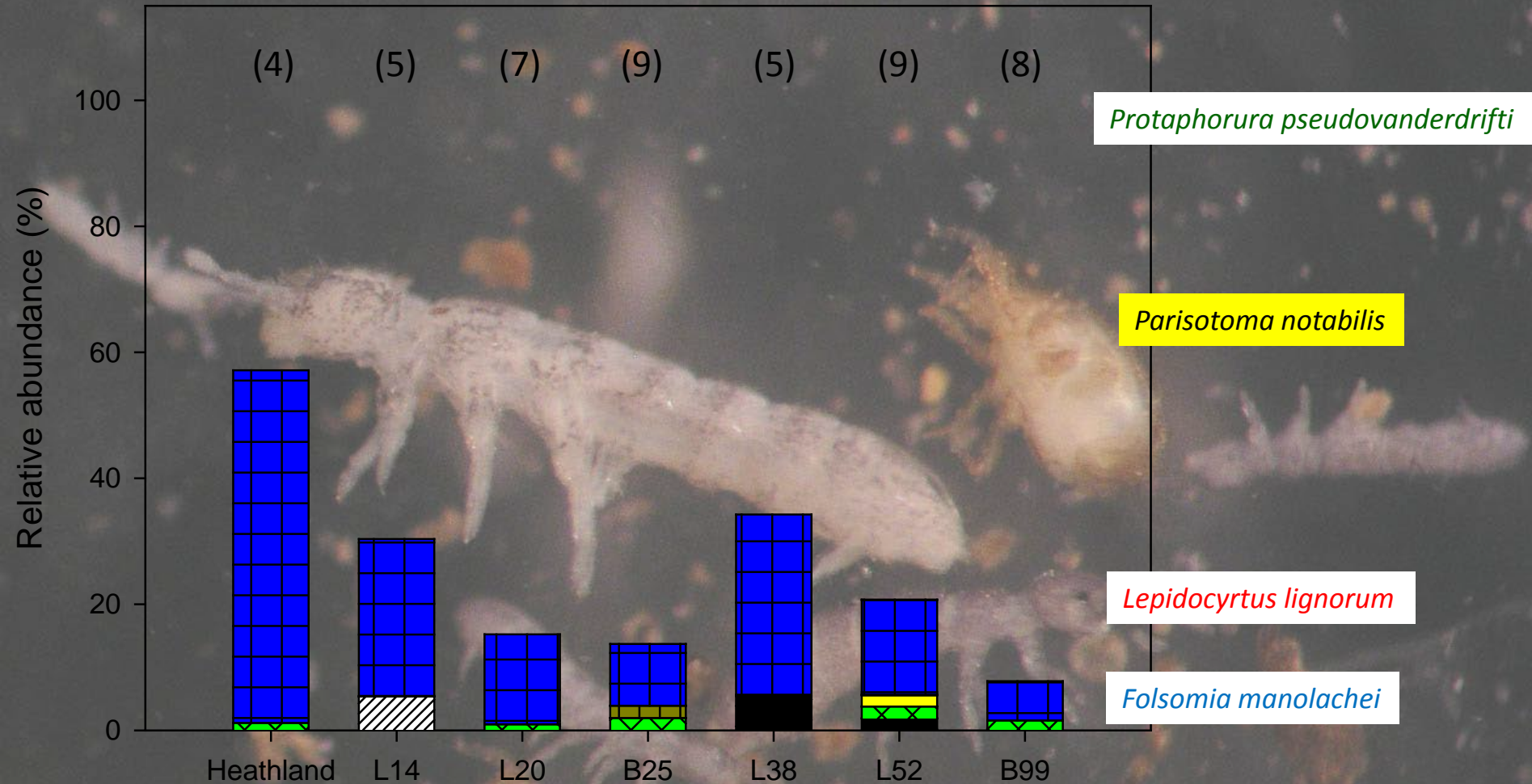
# Density of collembola



# Species diversity of collembola



# Relative species abundance



# Collembola

- Low density (total average 258 ind/m<sup>2</sup>)
  - Oskarsson (1984) found more than 25 thousand ind/m<sup>2</sup>
  - Similar study in West Iceland 1668 ind/m<sup>2</sup>
- Few species (total average 3,3 species)
  - Oskarsson (1984) recorded almost 8 species
  - More than 9 species in West Iceland
- Why the difference?
  - Oskarsson used different sampling method
    - Larger samples (10x10cm)
    - No hammering...





An ash layer in the top-soil may prevent the collembola from thriving

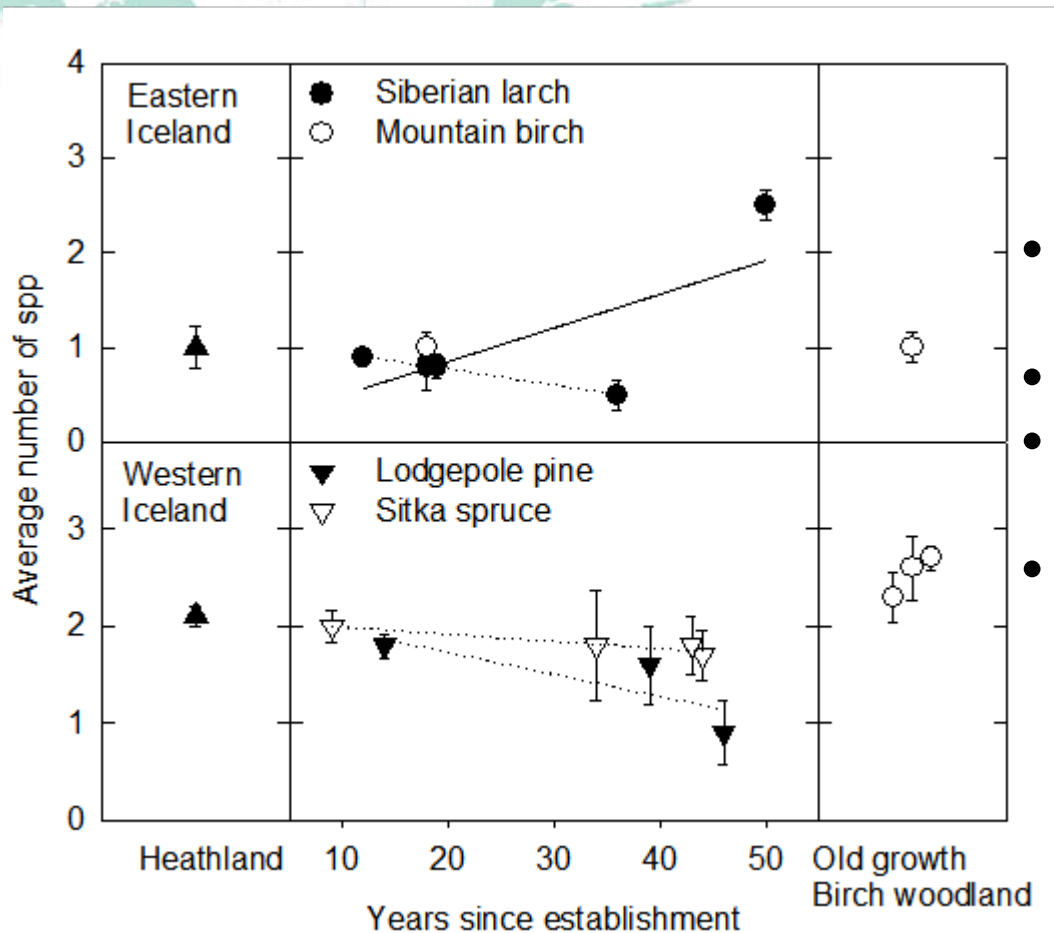


# Earthworms

- 2 sampling in 2003
- 3 samples per plot
  - 33x33cm, 40cm depth
- Earthworms collected from samples on the site and stored in isopropanol
  - Identified
  - Length measurement
  - Dry weight

*Gudleifsson BE and Sigurdsson BD. 2012. Impact of afforestation on earthworm populations in Iceland. Manuscript accepted for Icelandic Agricultural Sciences*

# Earthworm species



- 4 species found in Eastern Iceland vs. 6 species in West Iceland
- *Dendrobena octaedra* dominating
- Afforestation with larch affected species composition
- No difference in population density or biomass between vegetation types

Gudleifsson BE and Sigurdsson BD. 2012. Impact of afforestation on earthworm populations in Iceland. Manuscript accepted for Icelandic Agricultural Sciences

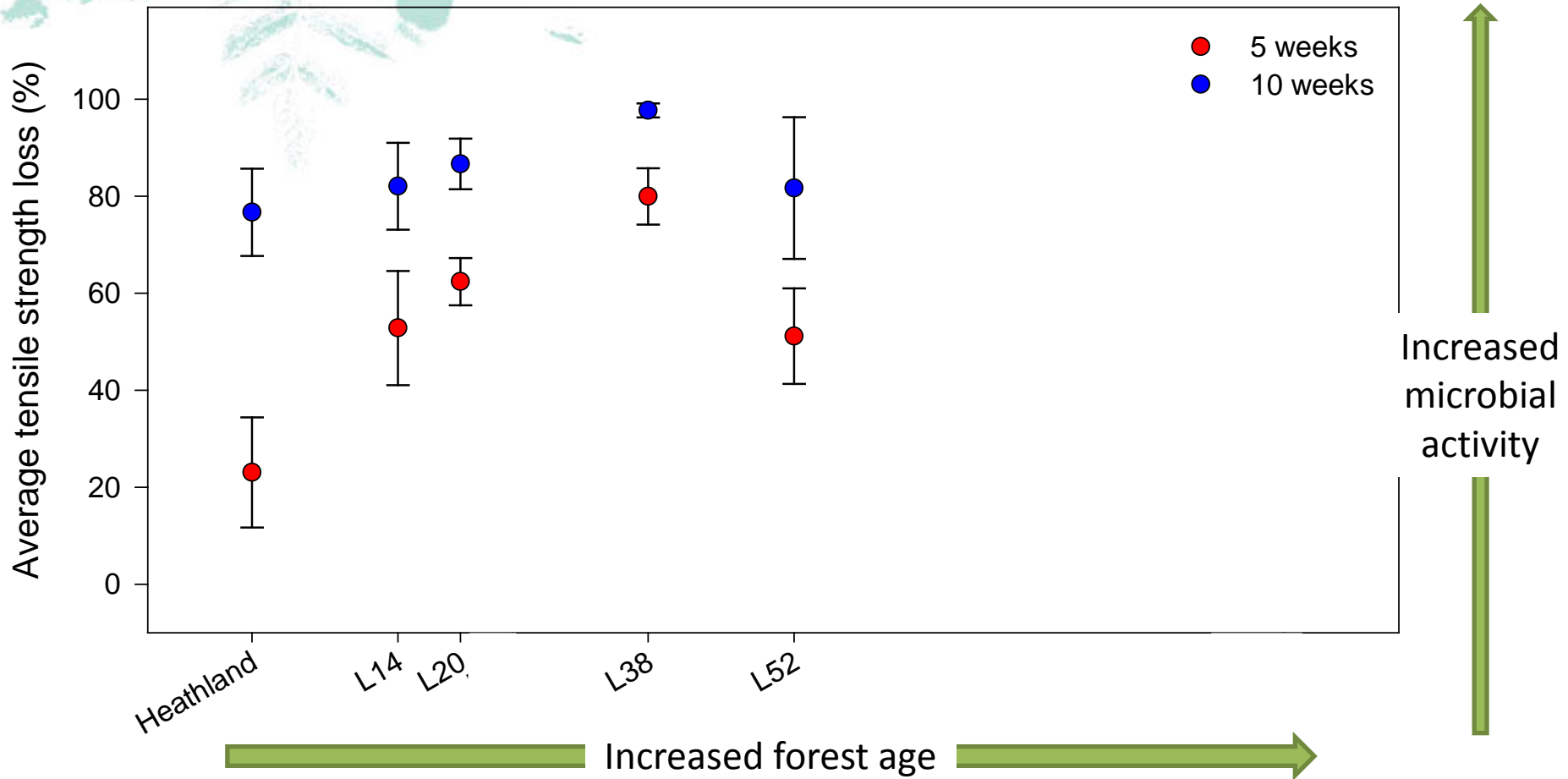
# Activity of soil microbes

- Cotton Strip Assay
- 10 cotton strips inserted vertically into each stand
  - 5 strips for 5 weeks
  - 5 strips for 10 weeks
- Tensile strength determined
- Loss of tensile strength calculated



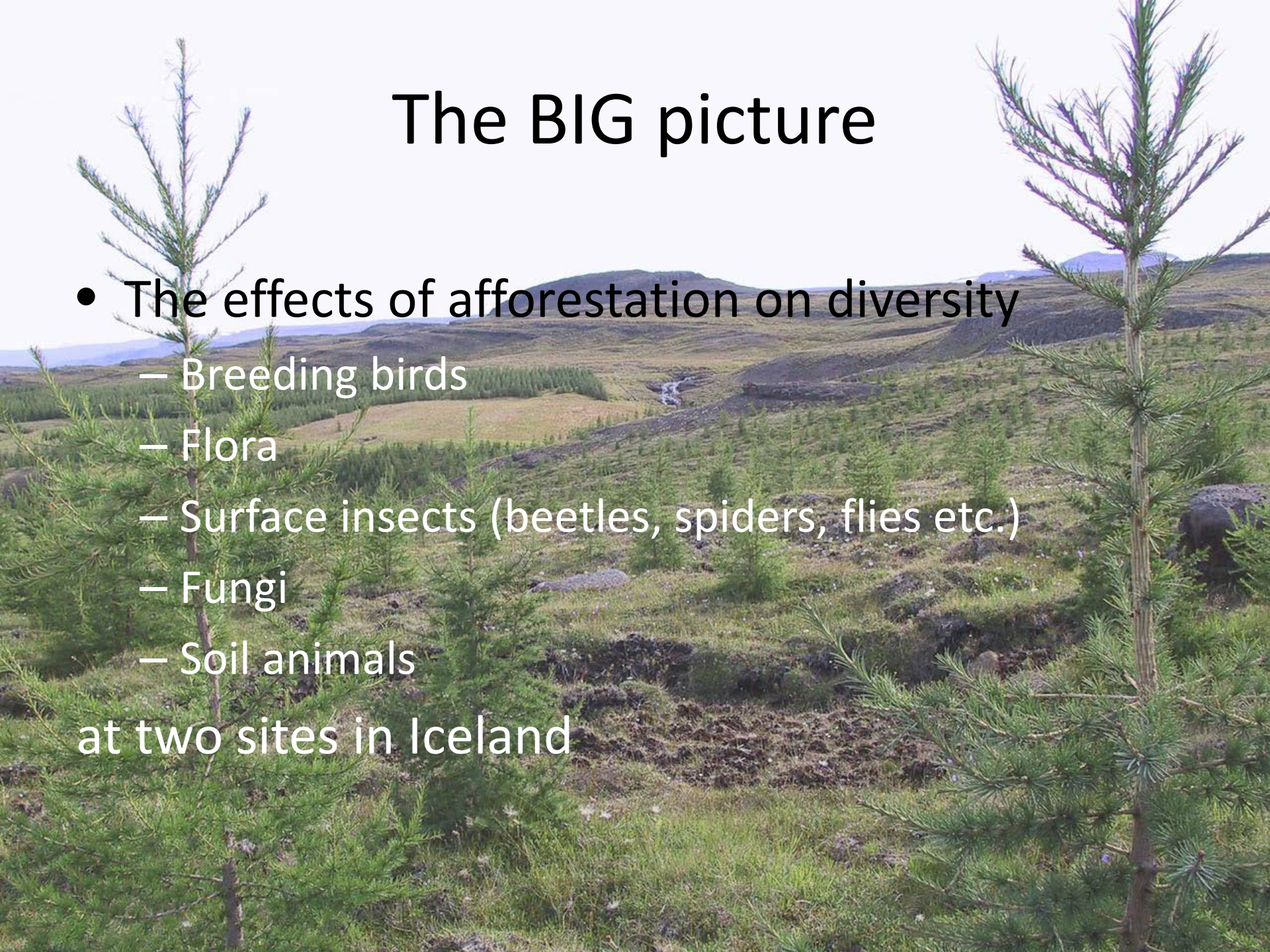
Arneberg, A. 2005. Skogreisningens effekter på nedbrytning og vegetasjon på Island. MSc. thesis. Universitetet for miljø- og biovitenskap, Ås.

# Activity of soil microbes

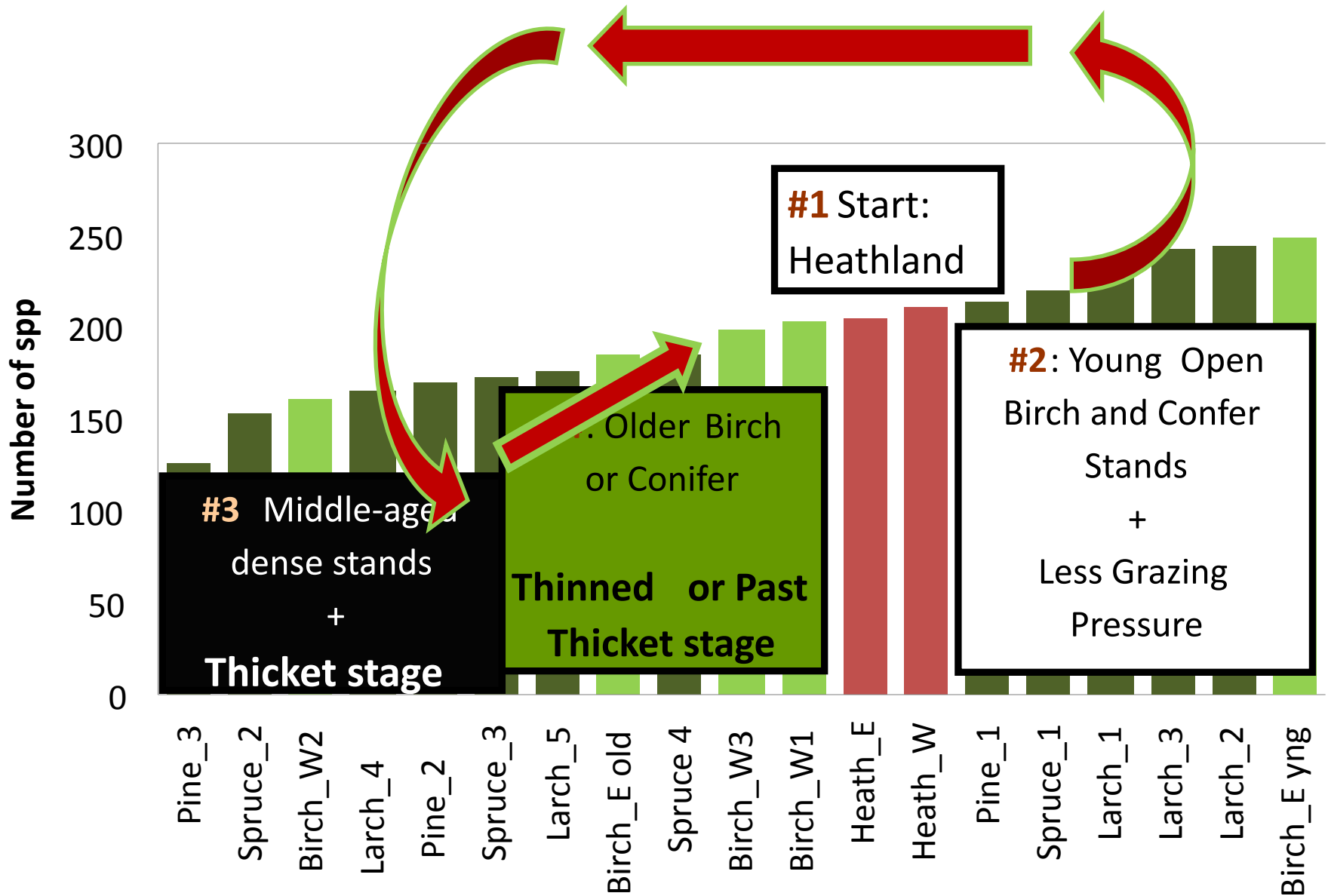


# The BIG picture

- The effects of afforestation on diversity
    - Breeding birds
    - Flora
    - Surface insects (beetles, spiders, flies etc.)
    - Fungi
    - Soil animals
- at two sites in Iceland



# Effects of Afforestation on Total Species Richness



# Thank you for your attention



## IceWood-ers