Vegetation dynamics in forests fertilized with wood ash and mineral fertilizers

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Guna Petaja, Latvian State Forest Research Institute "Silava"
e-mail: guna petaja@silava.lv

LSFRI "Silava"
Riga street 111
Salaspils LV-2169, Latvija
Phone: 7942555, e-mail:
inst@silava.lv
www.silava.lv

Background

Changes in

- soil nutrient content
- soil pH
- light availability

after addition of fertilizers may affect ground vegetation.

Background

The potential impact:
the abundance and/or frequency of
- herbaceous plants increases
- dwarf shrubs decreses
- *Cladina lichens* decreases
- mosses - *Pleurozium schreberi* increases,
  - *Dicranum polysetum* and *Ptilium crista-castrensis* – decreases

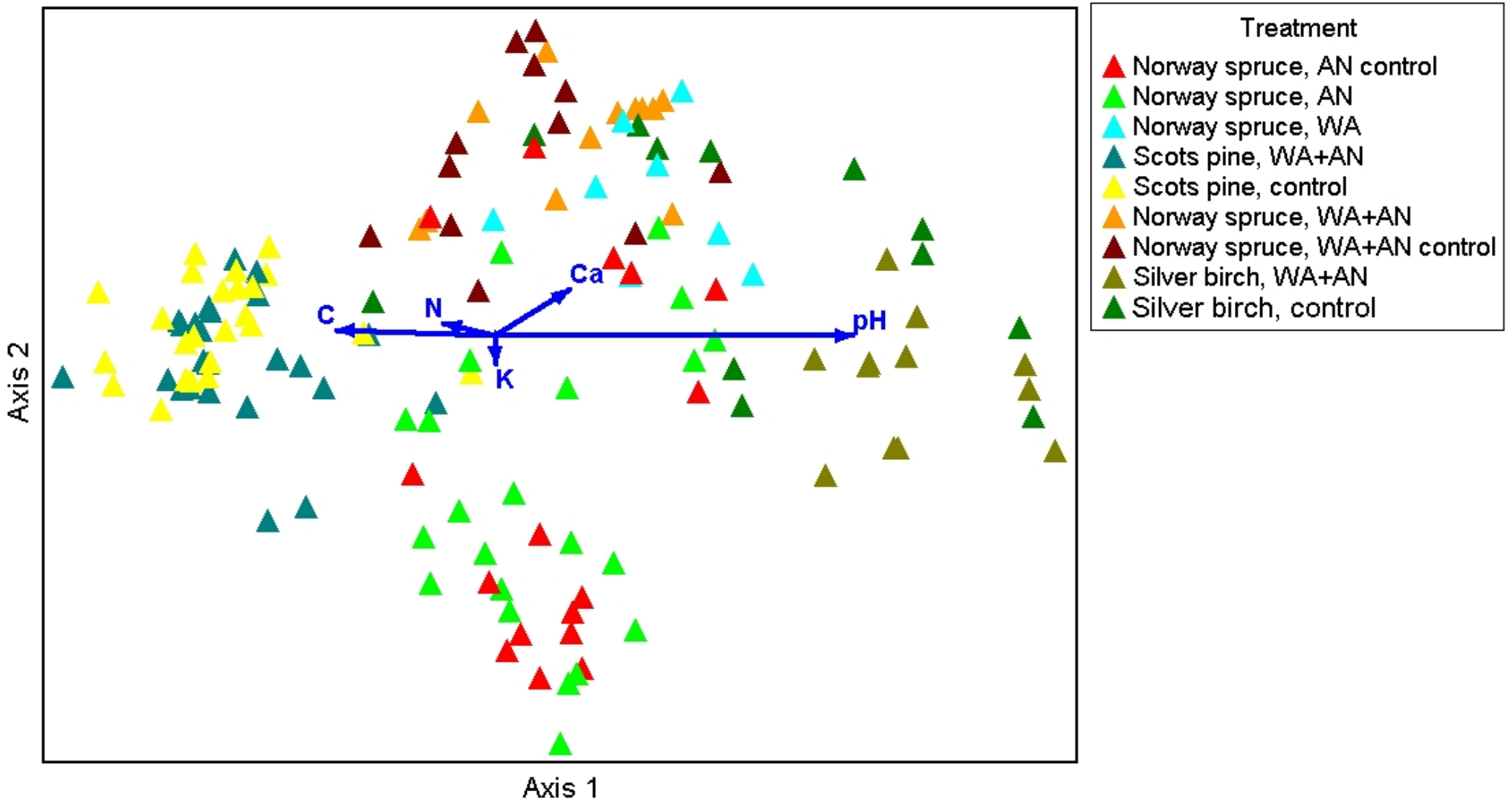
loose, unprocessed ash damages plant tissue

Application of fertilizers

- The average dosage of wood ash: 2 - 4 t ha^{-1} (Ca 200 - 400 kg ha^{-1}, K 30 - 65 kg ha^{-1} ,P 10 - 20 kg ha^{-1})

- 0.44 t ha^{-1} NH_4NO_3

Forests on drained mineral soils, species composition

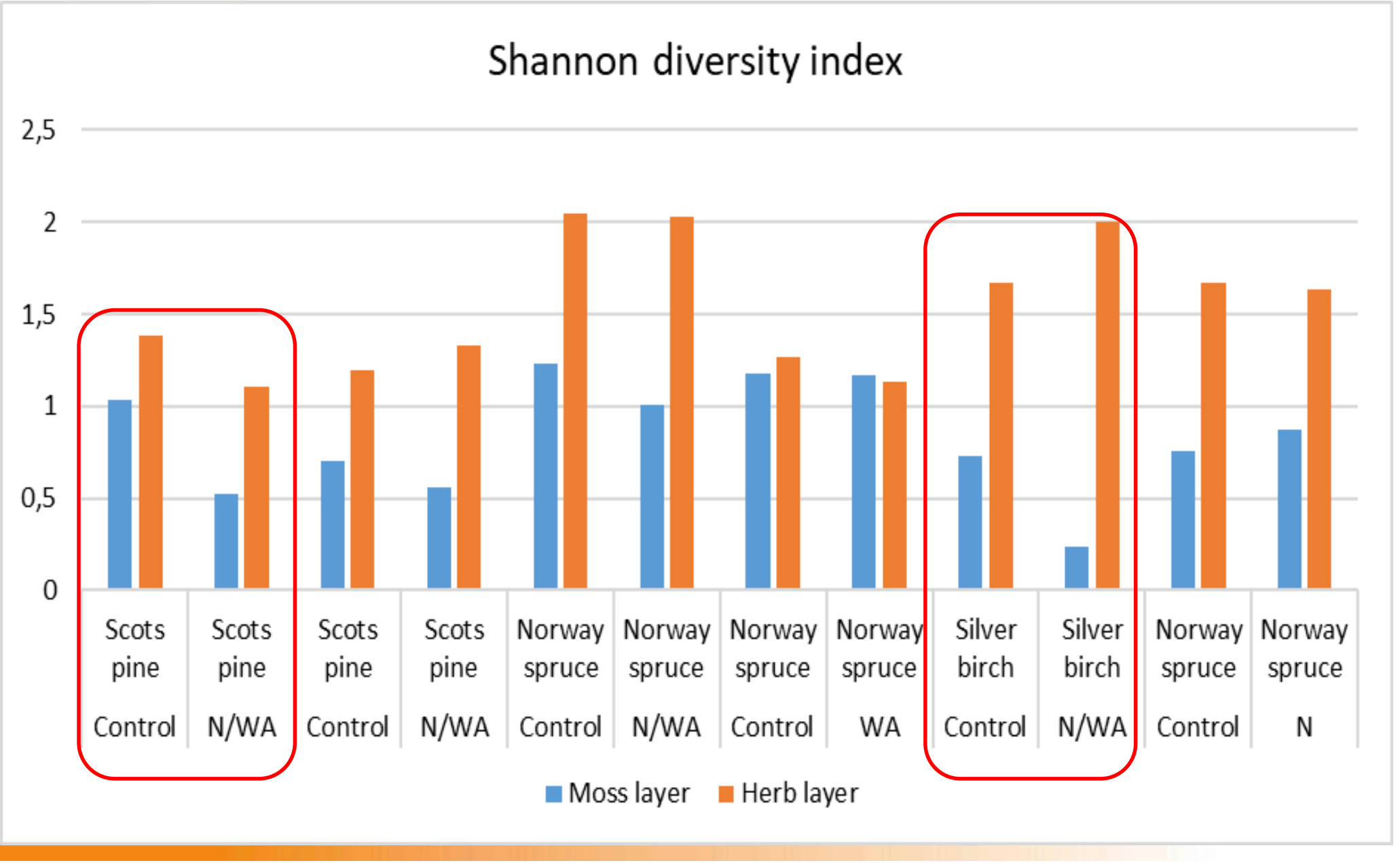


Forests on drained mineral soils, species composition, abundance

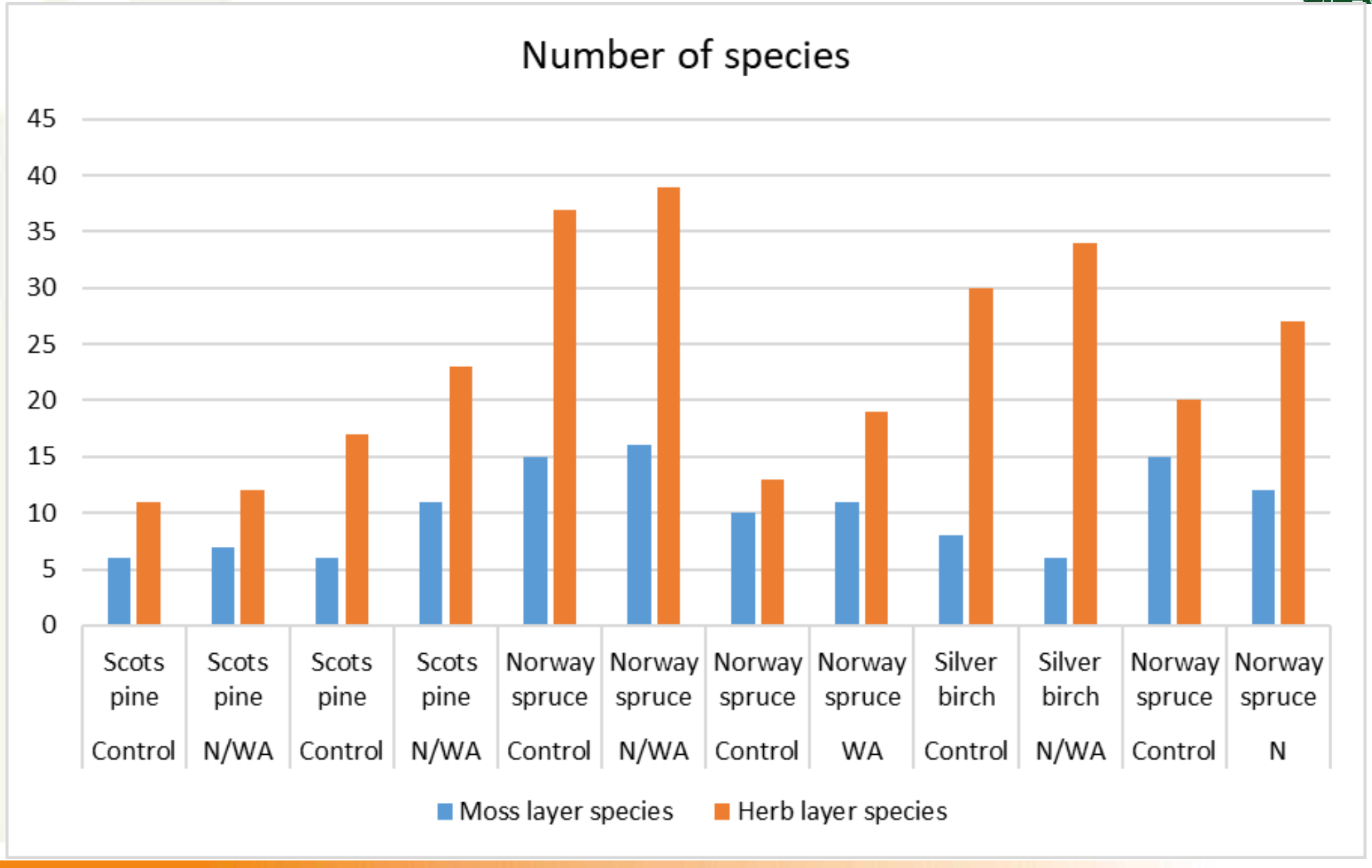
Increased abundance of *Rubus idaeus, Fragaria vesca*

Appearance of nitrophilic species *Lycopus europaeus* in treatment plots of the birch stand

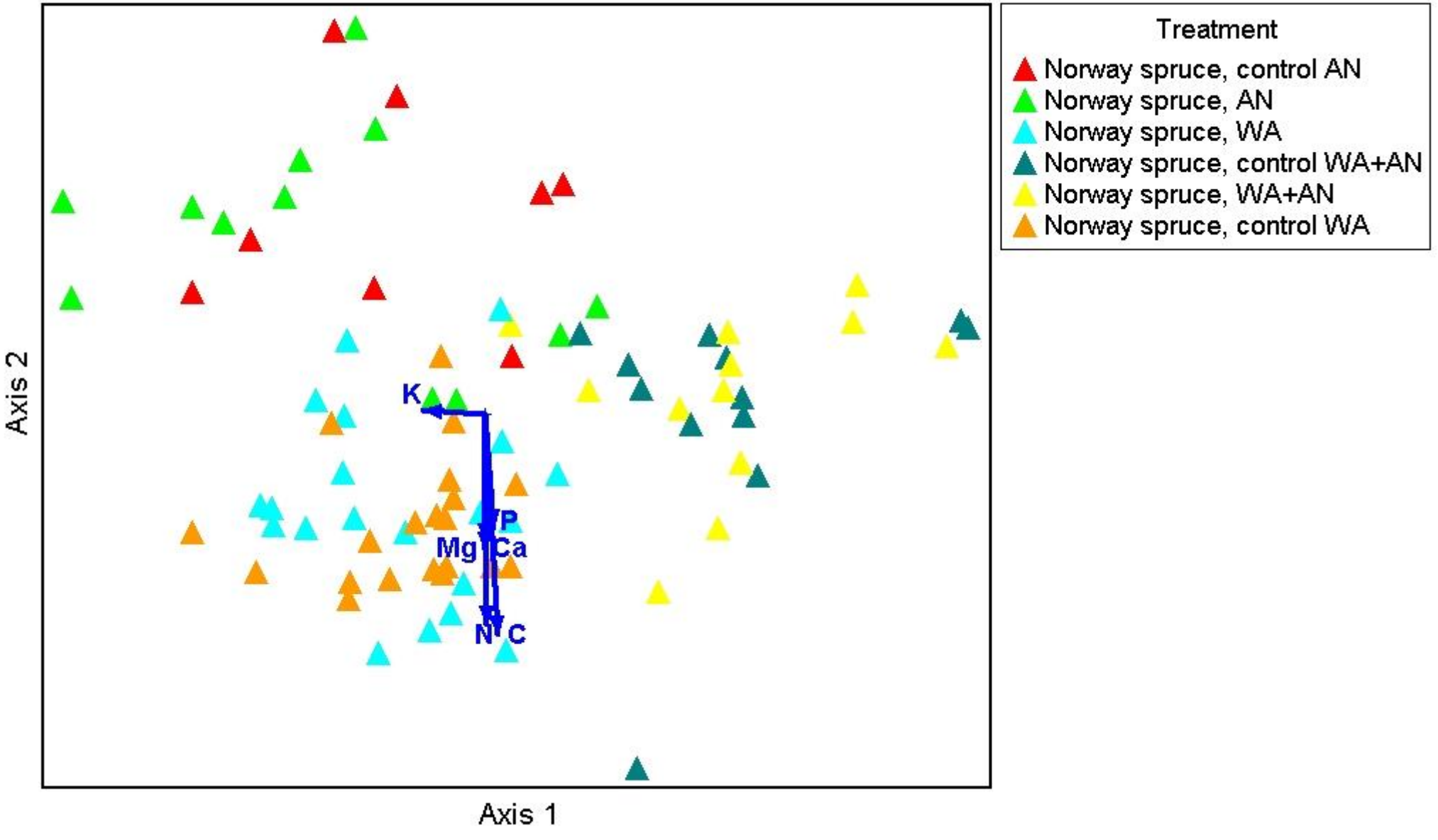
Forests on drained mineral soils, species diversity



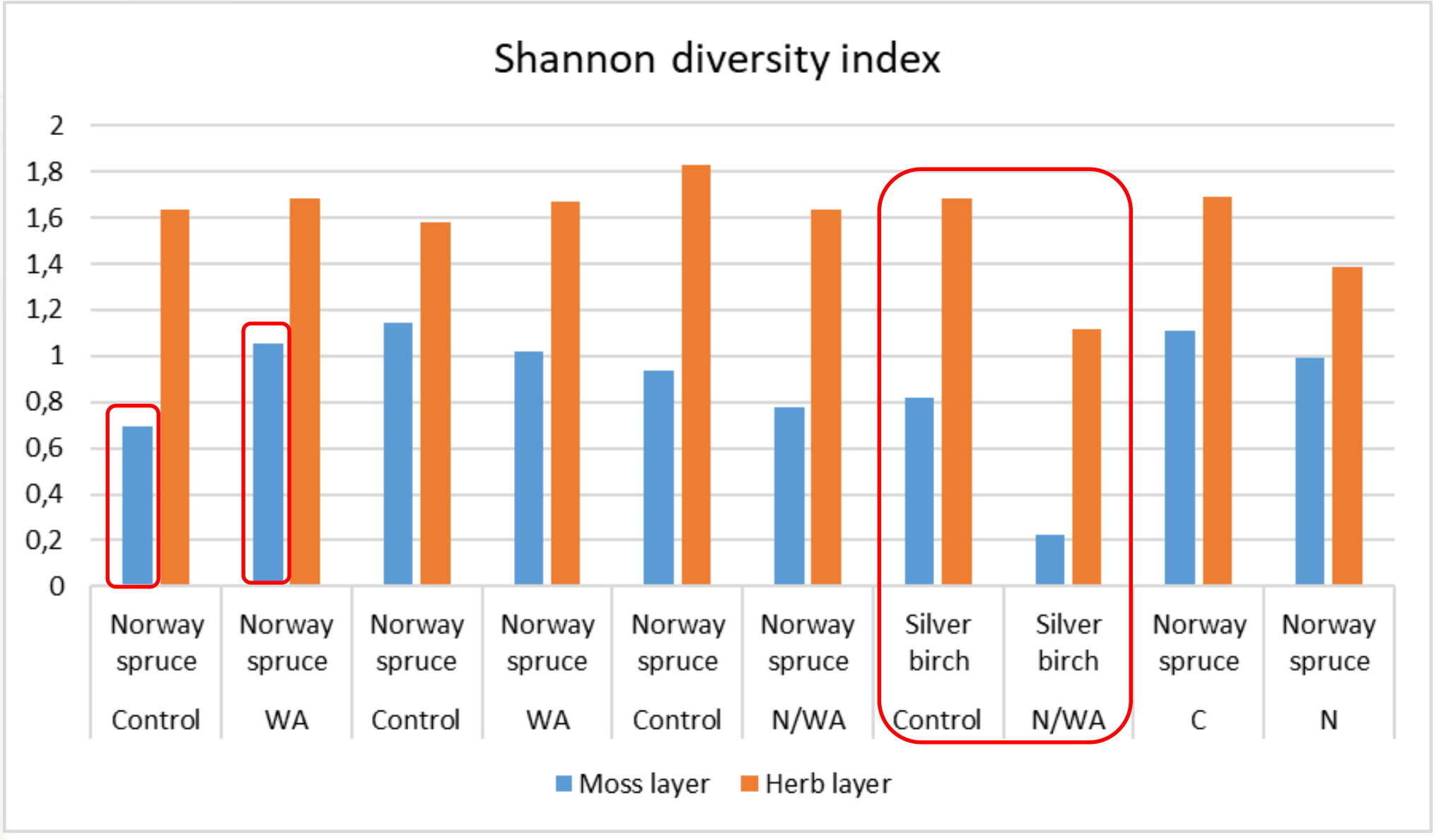
Forests on drained mineral soils, species richness



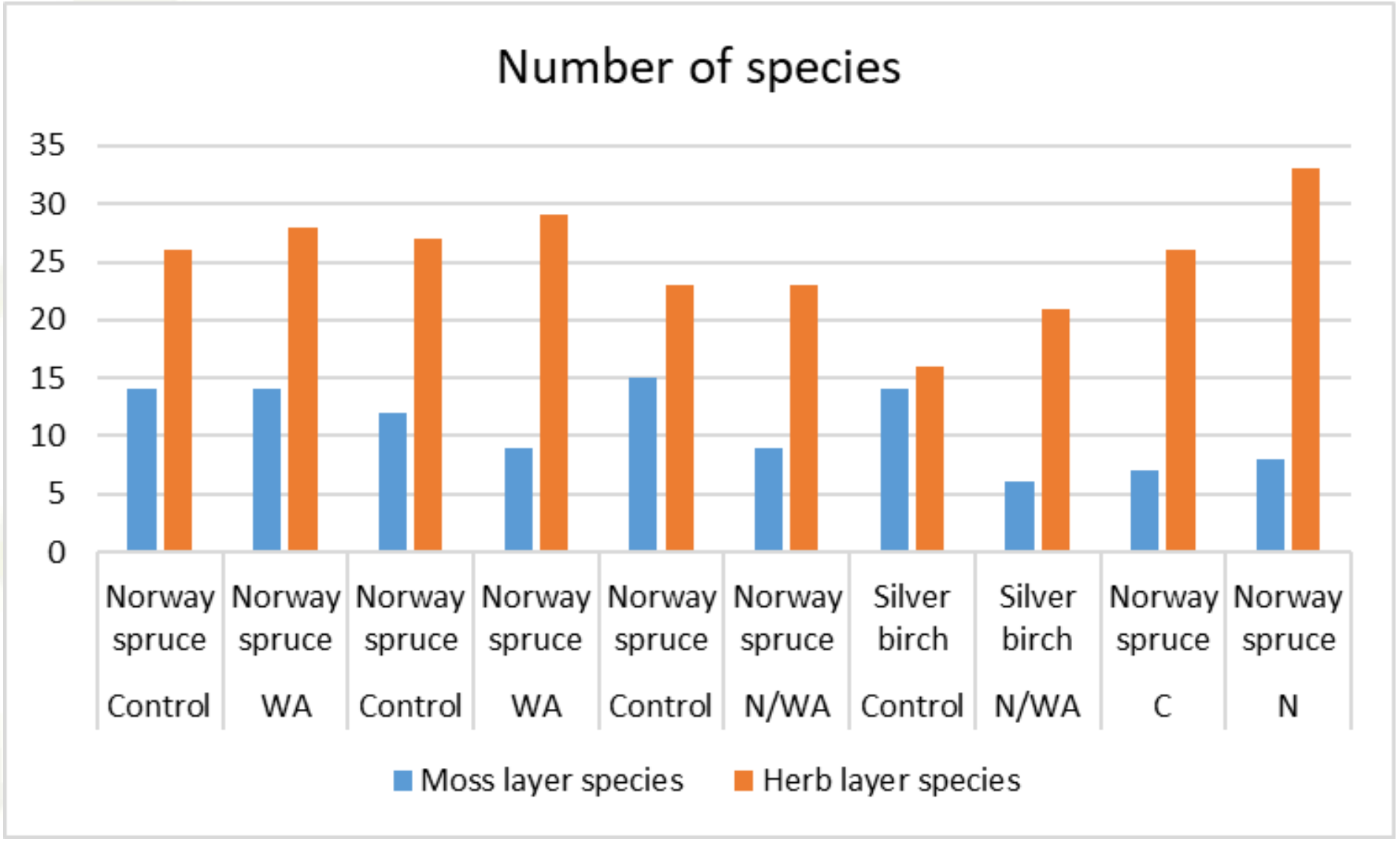
Forests on drained organic soils, species composition



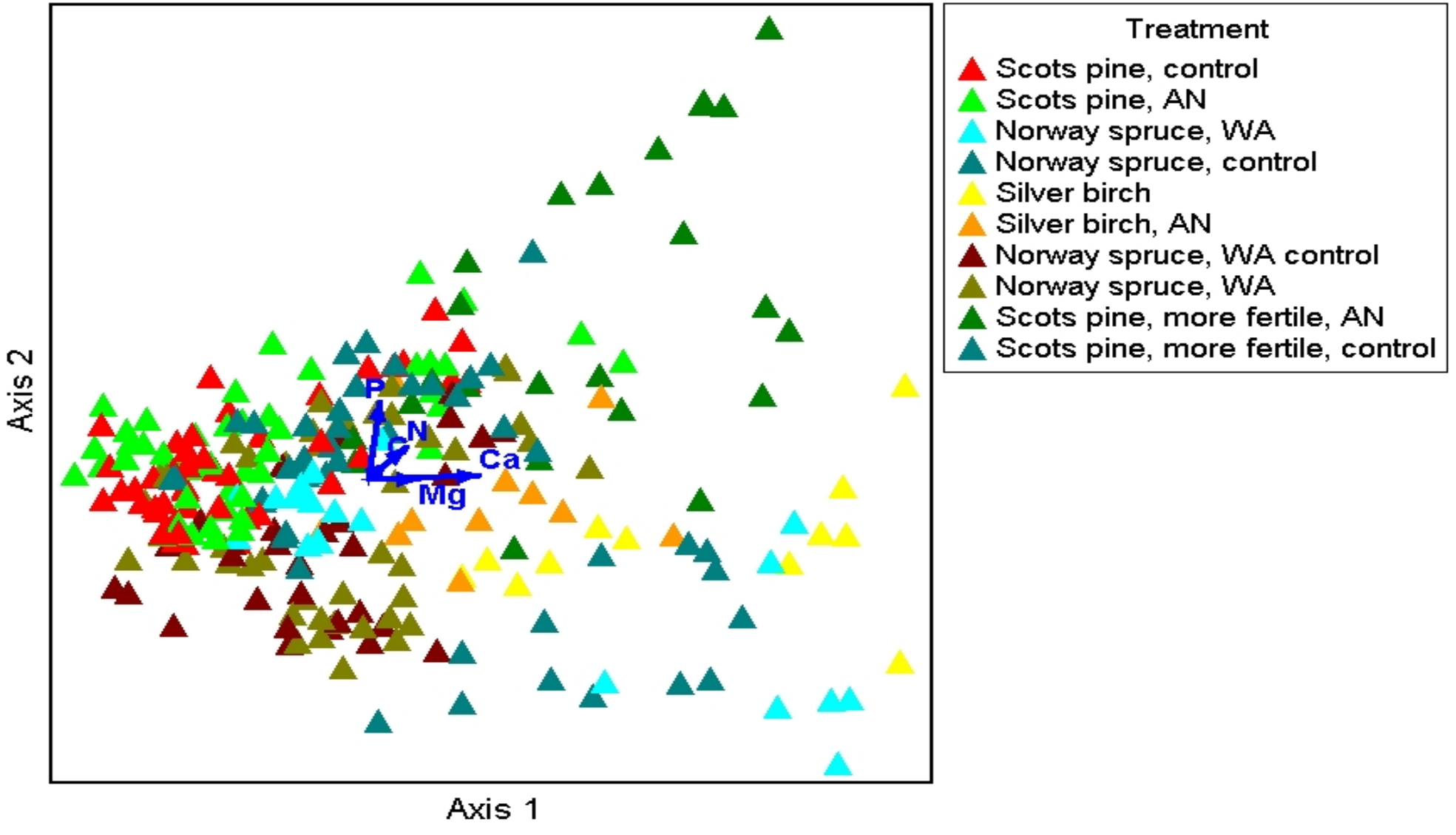
Forests on drained organic soils, species diversity



Forests on drained organic soils, species richness



Upland forests, mesic site types, species composition

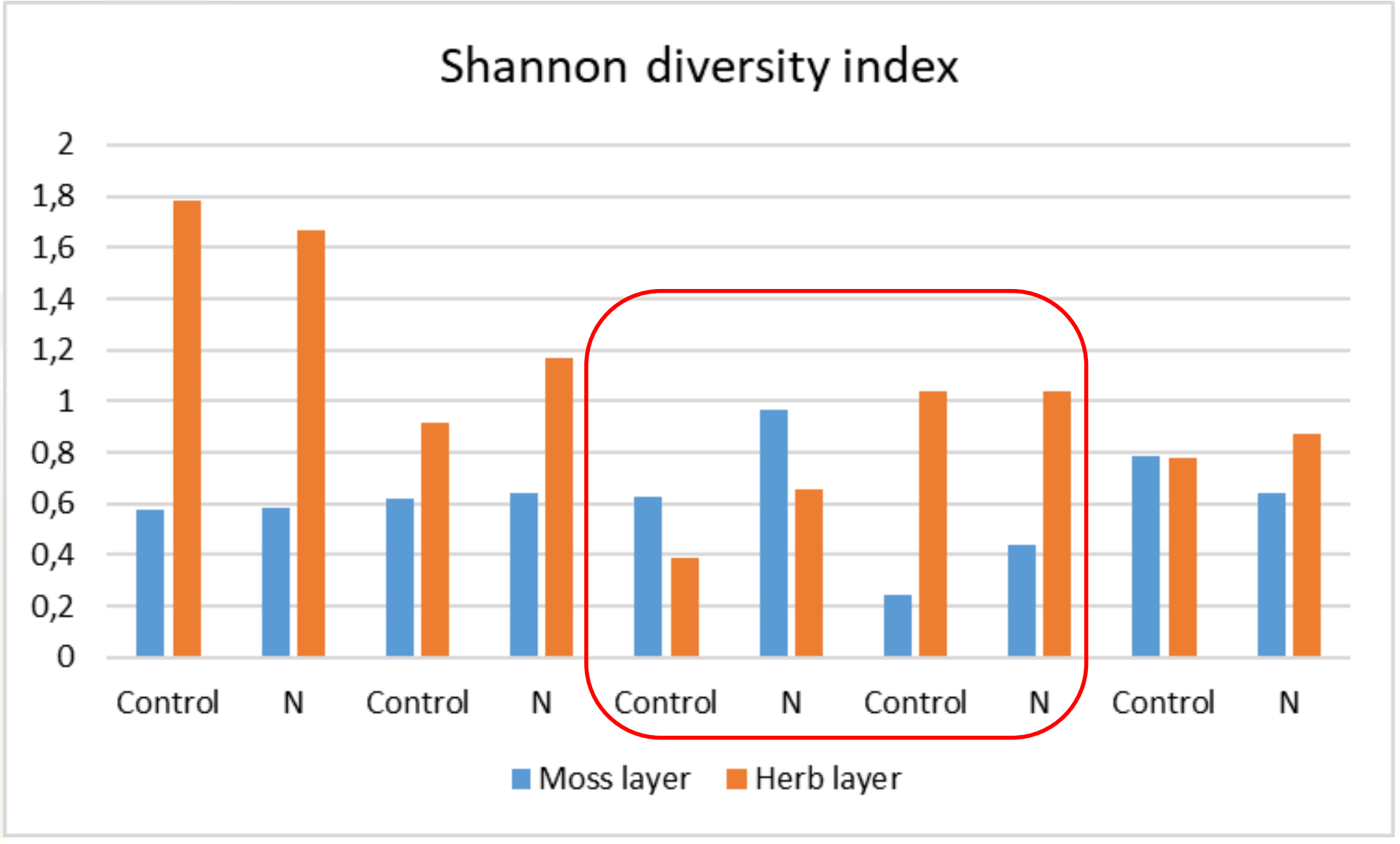


Upland forests, species composition, abundance

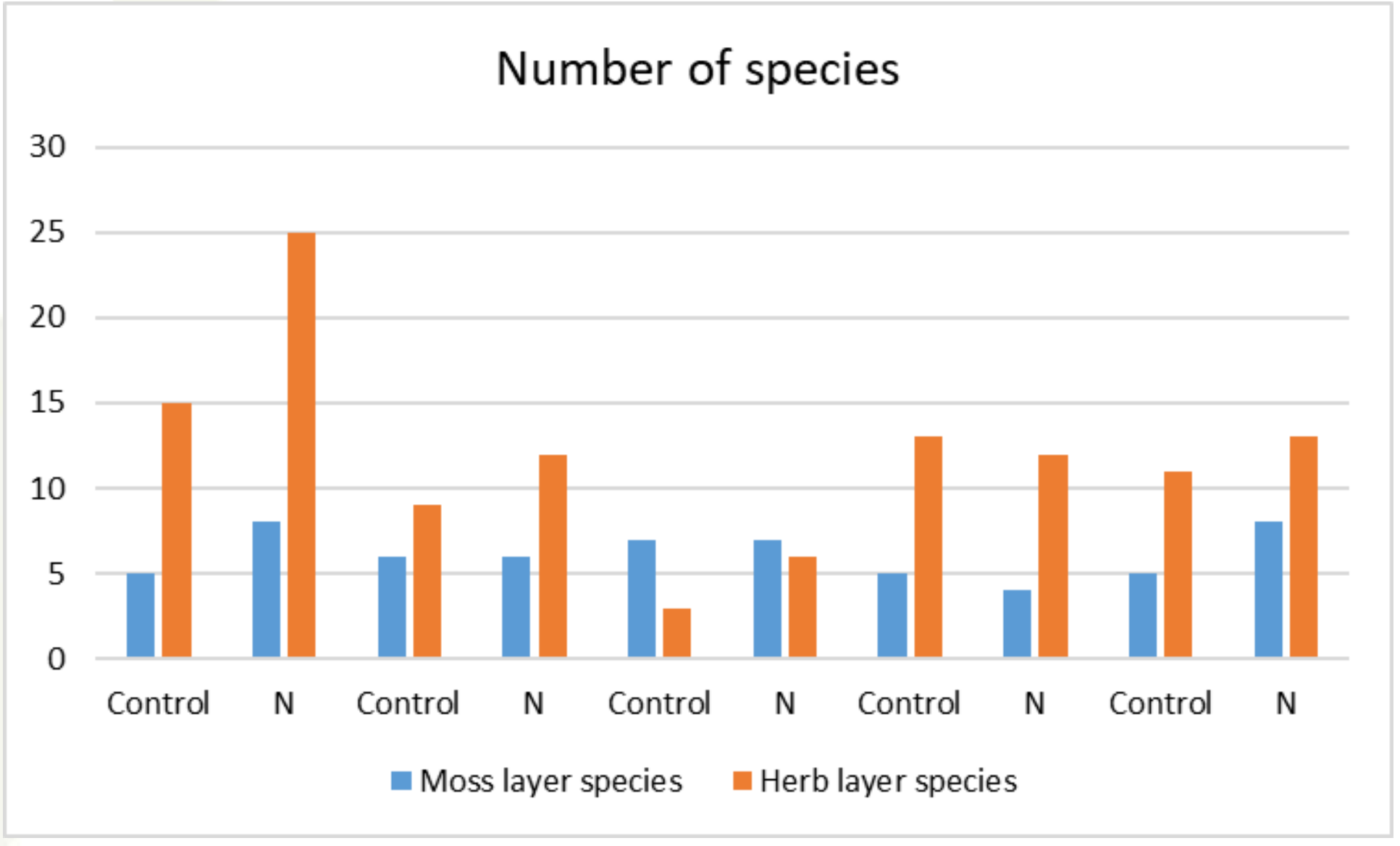
Slightly lower abundance of blueberry and lingonberry in Scots pine stand (more fertile site type)

Appearance of nitrophilic species *Stellaria media, Mycelis muralis, Impatiens parviflora*

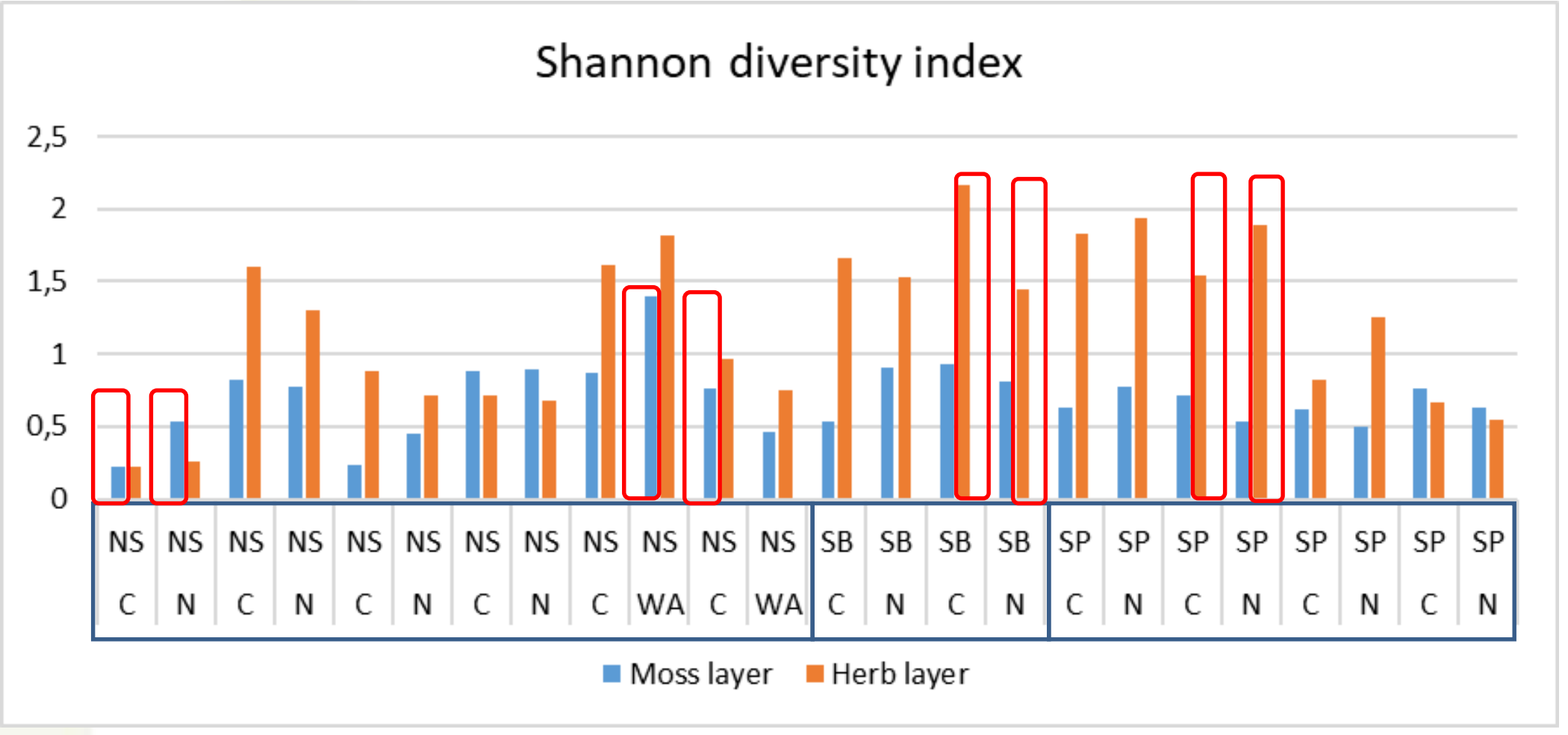
Upland forests, less fertile site type (*Myrtillosa*), speces diversity



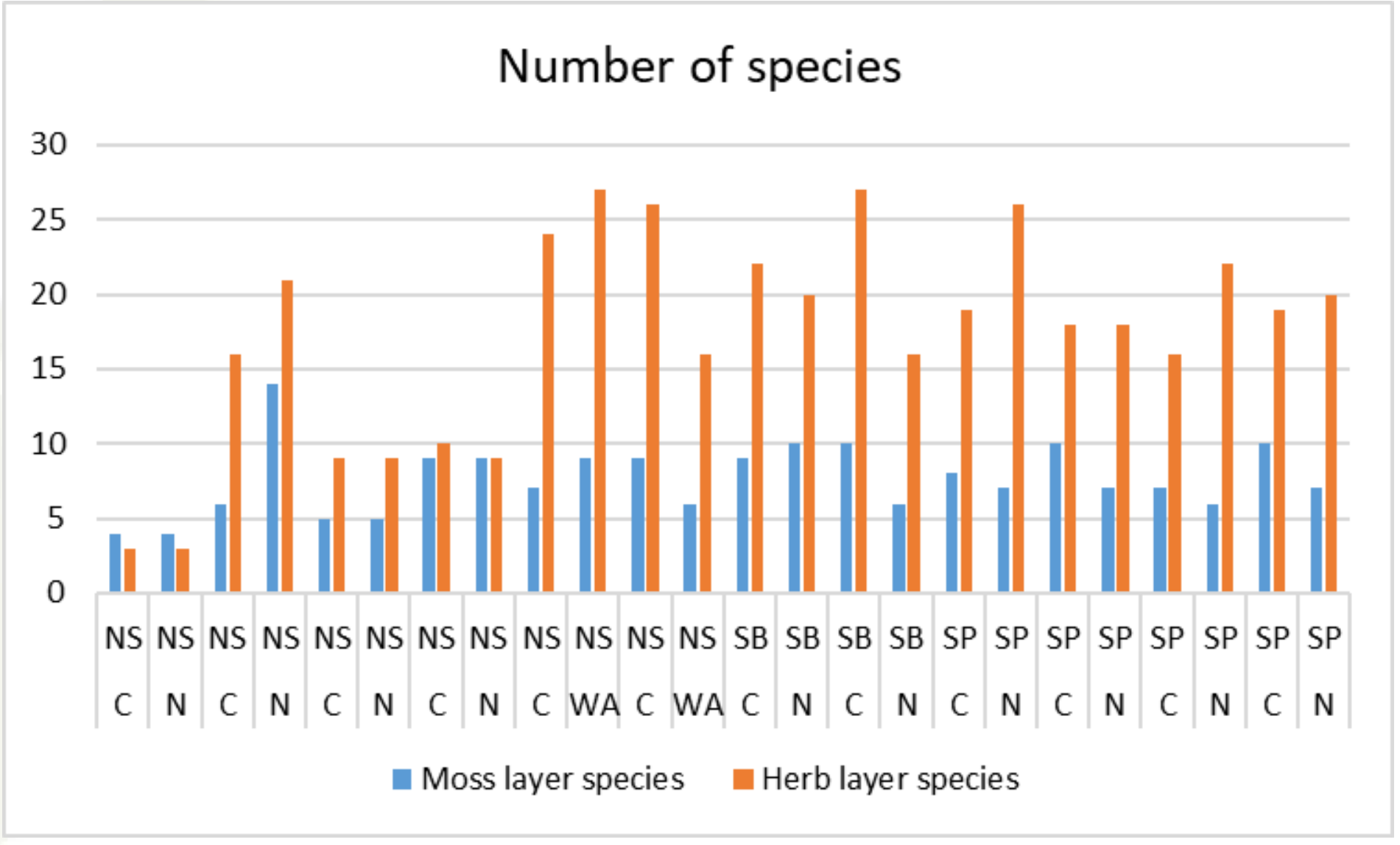
Species richness, less fertile site type (*Myrtillosa*), species richness



Upland forests, slightly more fertile site type (*Hylocomiosa*), species diversity



Upland forests, slightly more fertile site type (Hylocomiosa), species richness



Conclusions

- Species composition still corresponds to the respective site types in plots treated with fertilizers
- Some nitrophilic species appears/increases in abundance
- Changes in species diversity are mostly insignificant
- In most of cases species richness in the herb layer is increasing

Thank you!

The research was conducted within the scope of the Joint Stock Company ‘Latvia’s State Forests’ research project ‘Research program on forest fertilization’ (2016- 2021)