

Rubus in Northwest-Europe

biodiversity at its best!



Rense Haveman

Rubus in Northwest-Europe

Outline

- Diversity in NW-Europe and worldwide
- Evolutionary history of European brambles
- Phytogeographical aspects
- Ecological and nature conservation aspects
- Short recap

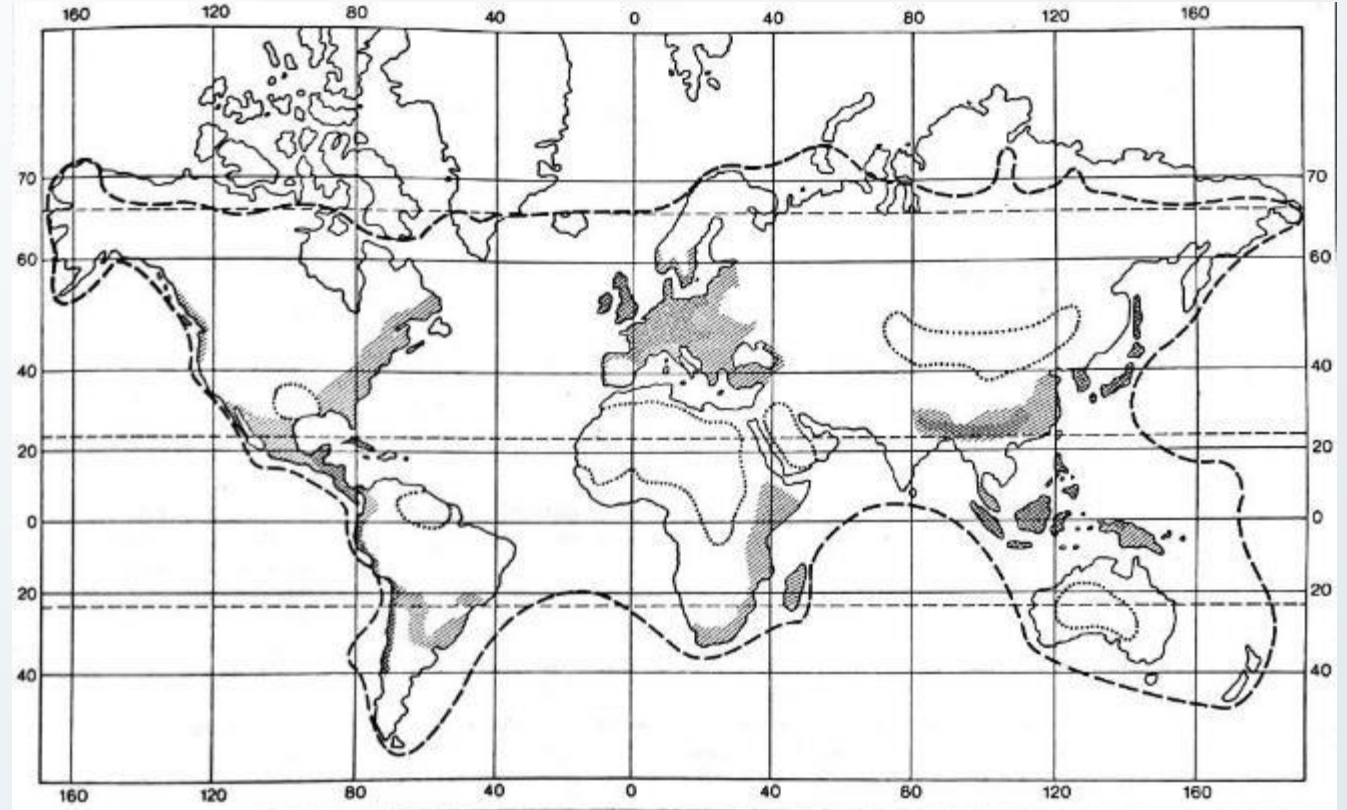


***Rubus* in Northwest-Europe**

Diversity in NW-Europe and worldwide

Rubus in Northwest-Europe

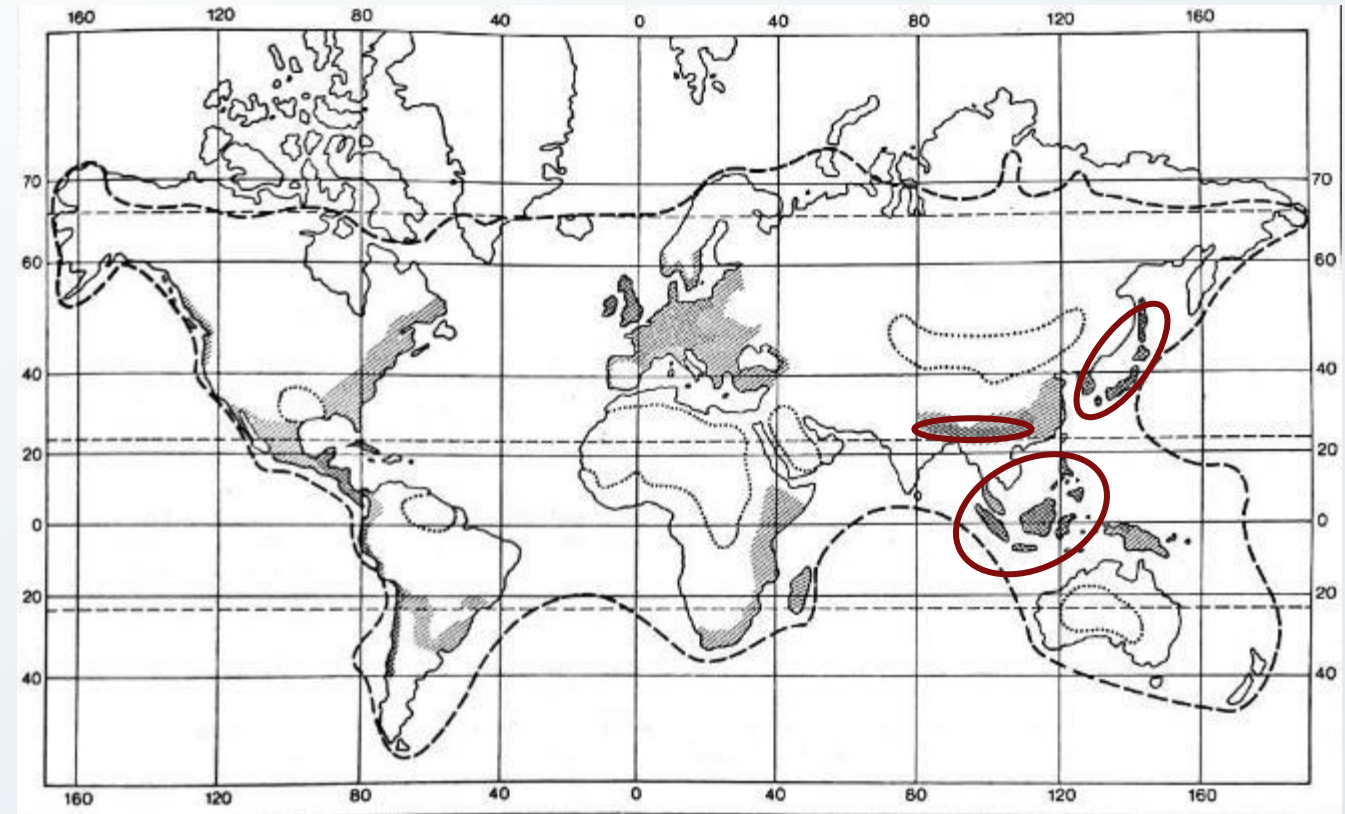
Diversity in NW-Europe and worldwide



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

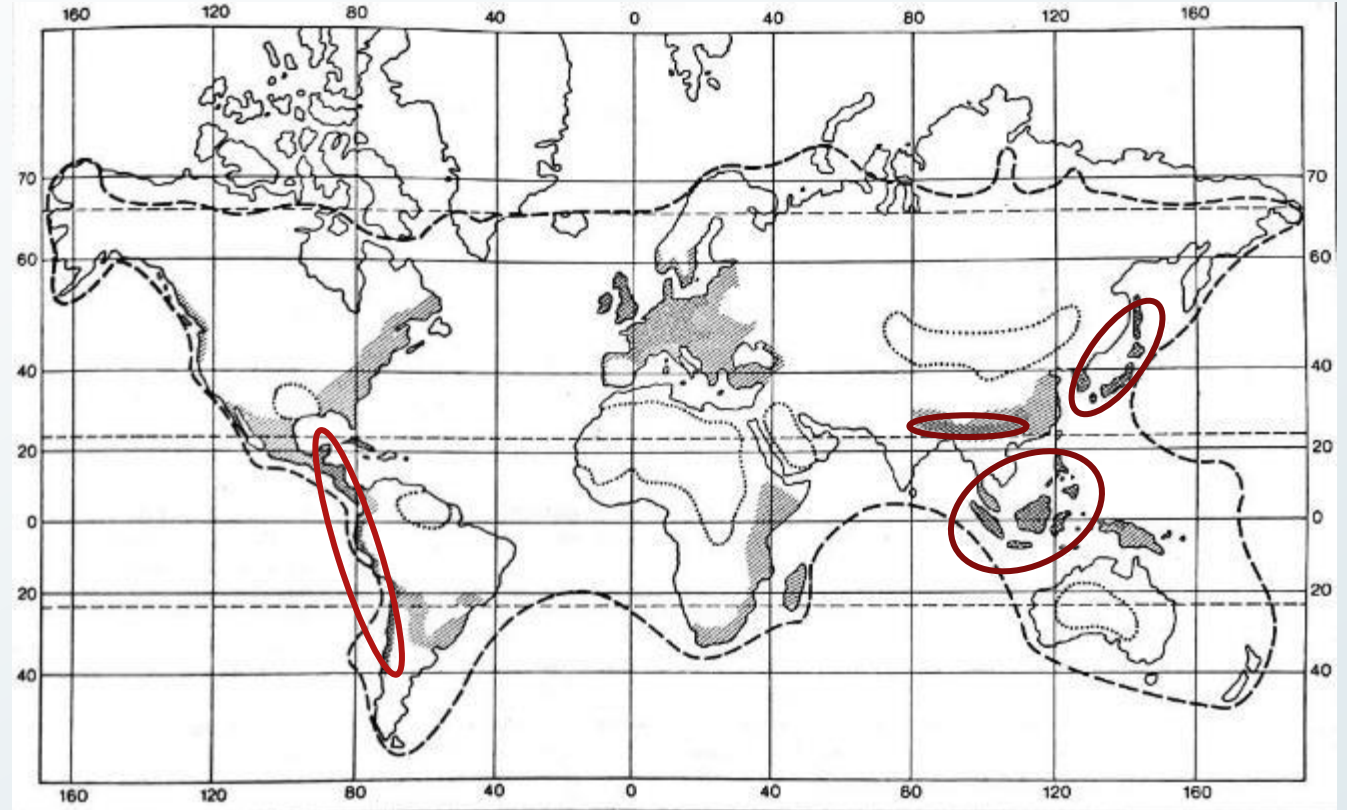
- Asia: SE-Asia, esp. China



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

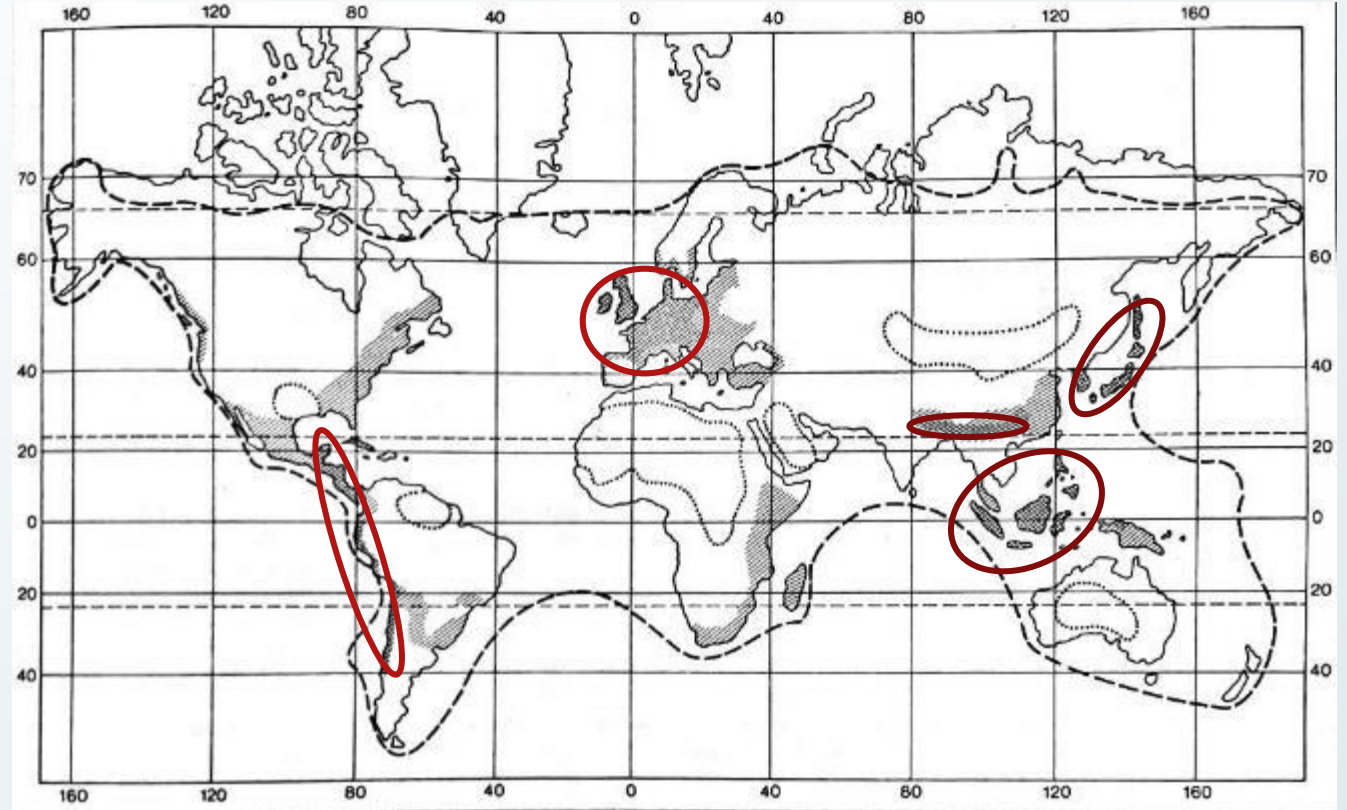
- Asia: SE-Asia, esp. China
- America's: Andes-region



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

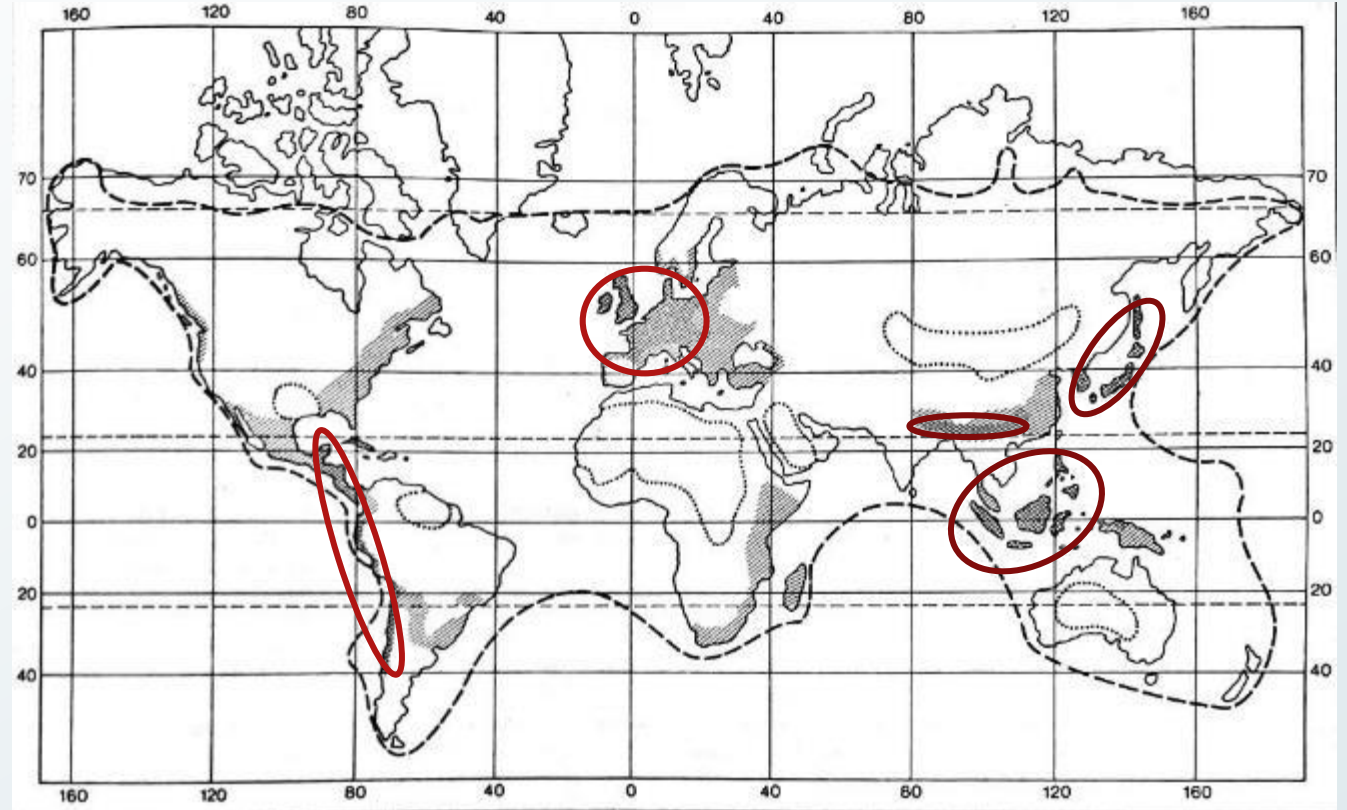
- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts
- 300-400 sexual species
- In Europe > 1000 asexual species

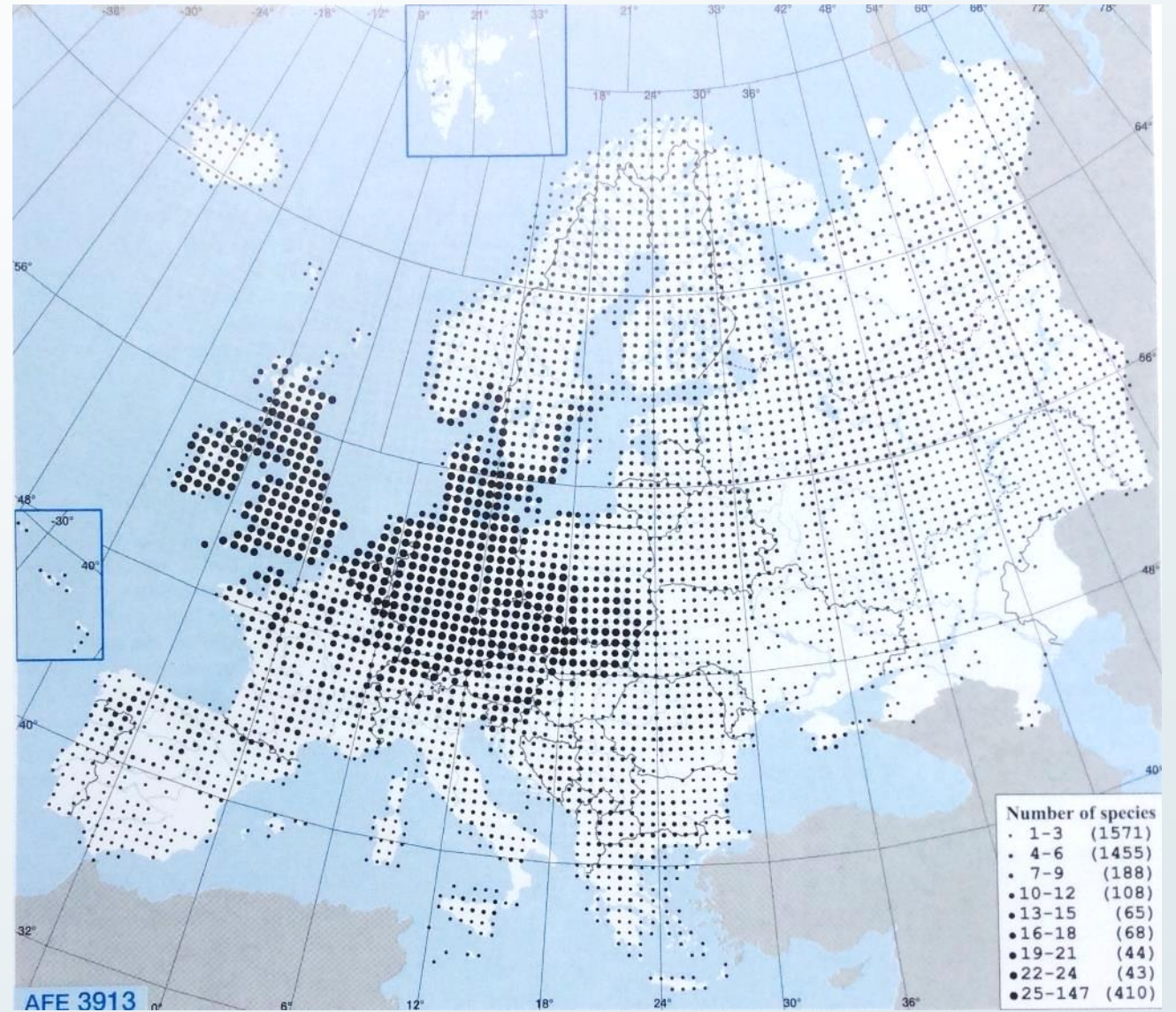


Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts

- 300-400 sexual species
- In Europe > 1000 asexual species



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts

- 300-400 sexual species
- In Europe > 1000 asexual species



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts

- 300-400 sexual species
- In Europe > 1000 asexual species



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts

- 300-400 sexual species
- In Europe > 1000 asexual species

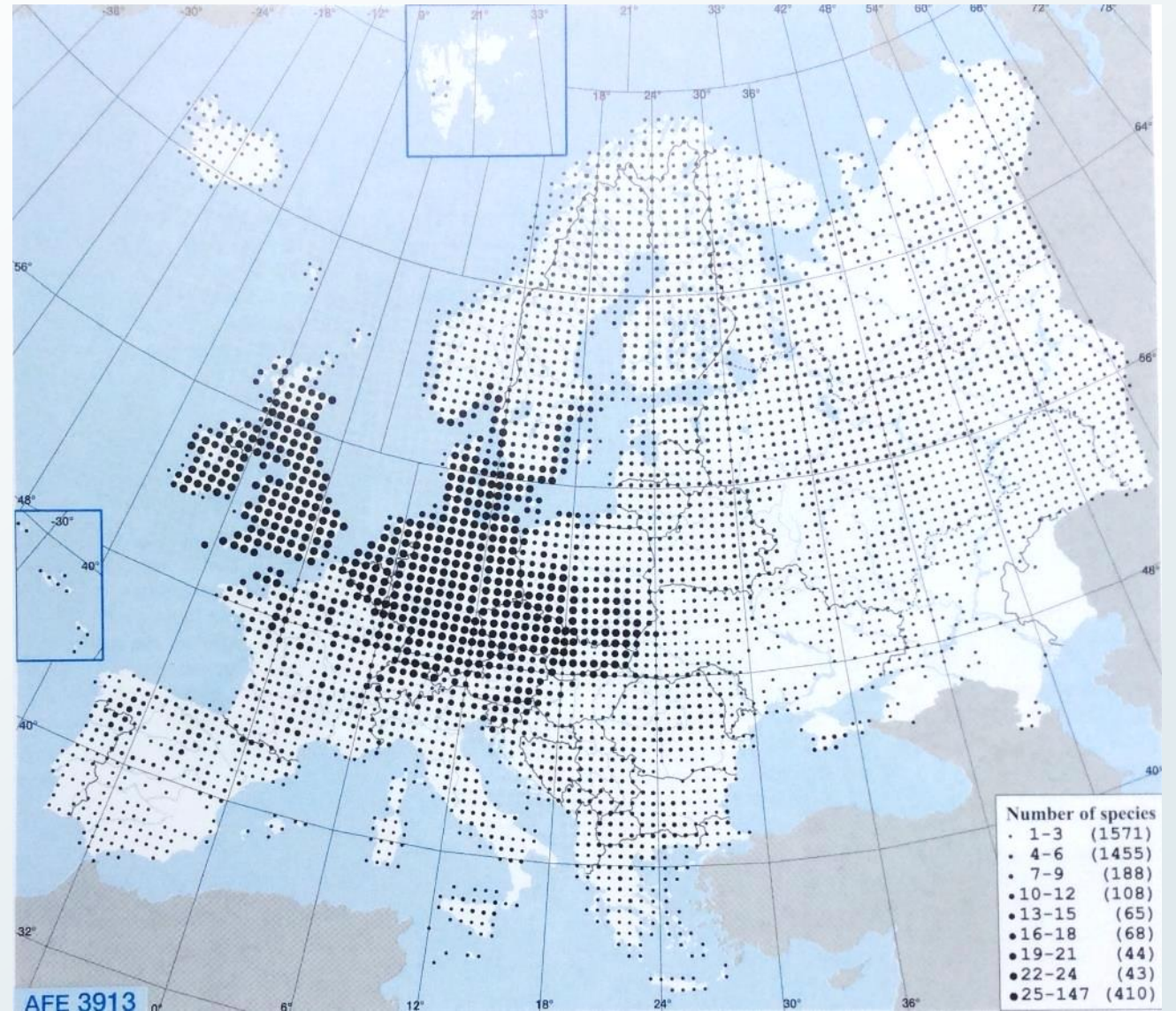


Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts

- 300-400 sexual species
- In Europe > 1000 asexual species



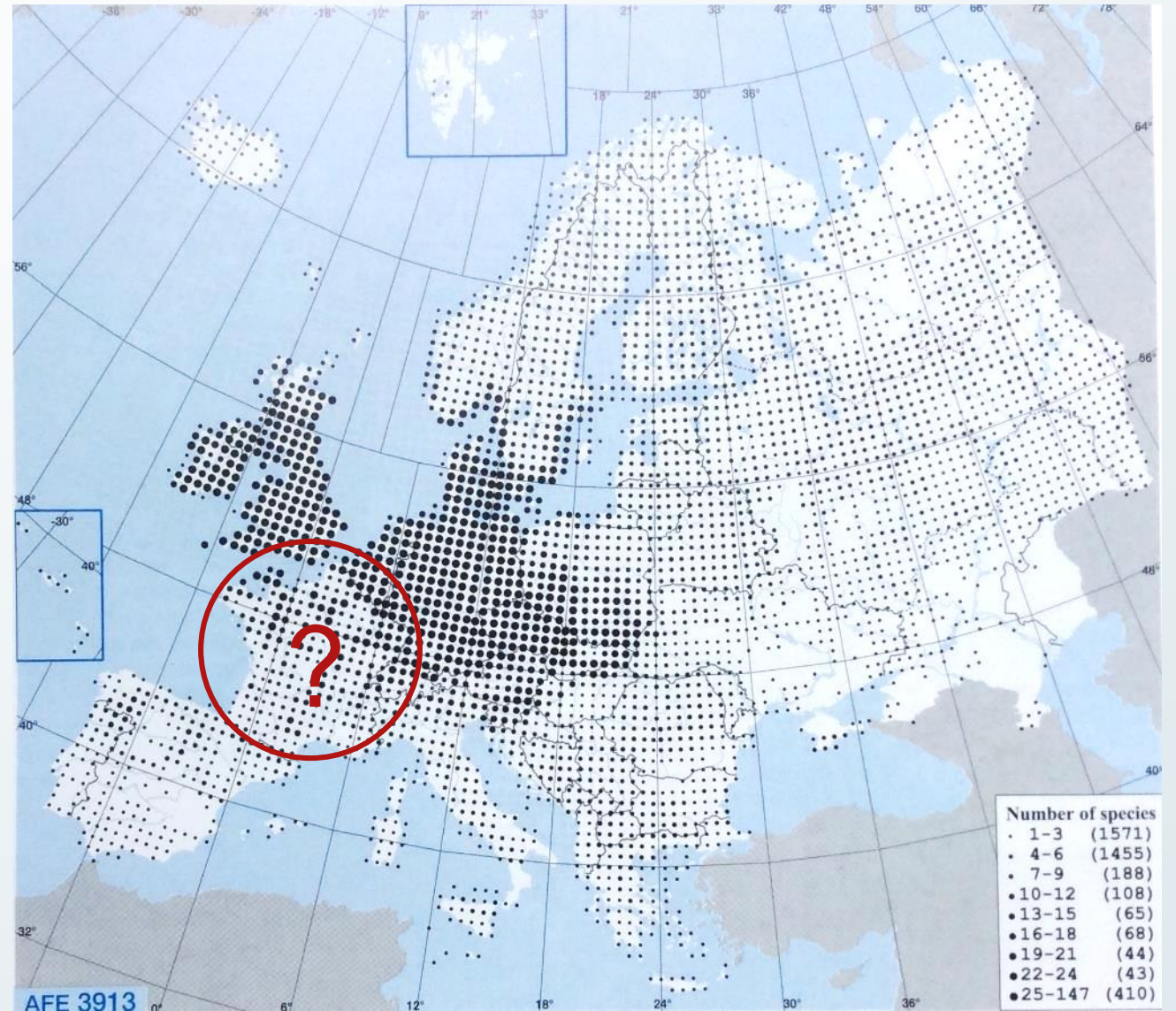
Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Asia: SE-Asia, esp. China
- America's: Andes-region
- Europe: subatlantic temperate parts

- 300-400 sexual species
- In Europe > 1000 asexual species

- Badly known regions: esp. France and Belgium!



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Prof. Heinrich Weber (with prof. Anne Troelstra)



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Prof. Heinrich Weber (with prof. Anne Troelstra)
- Prof. Bram van de Beek (with Rienk-Jan Bijlsma and Hendrik de Vriese)



Rubus in Northwest-Europe

Diversity in NW-Europe and worldwide

- Prof. Heinrich Weber (with prof. Anne Troelstra)
- Prof. Bram van de Beek (with Rienk-Jan Bijlsma and Hendrik de Vriese)
- David Mercier



Rubus in Northwest-Europe

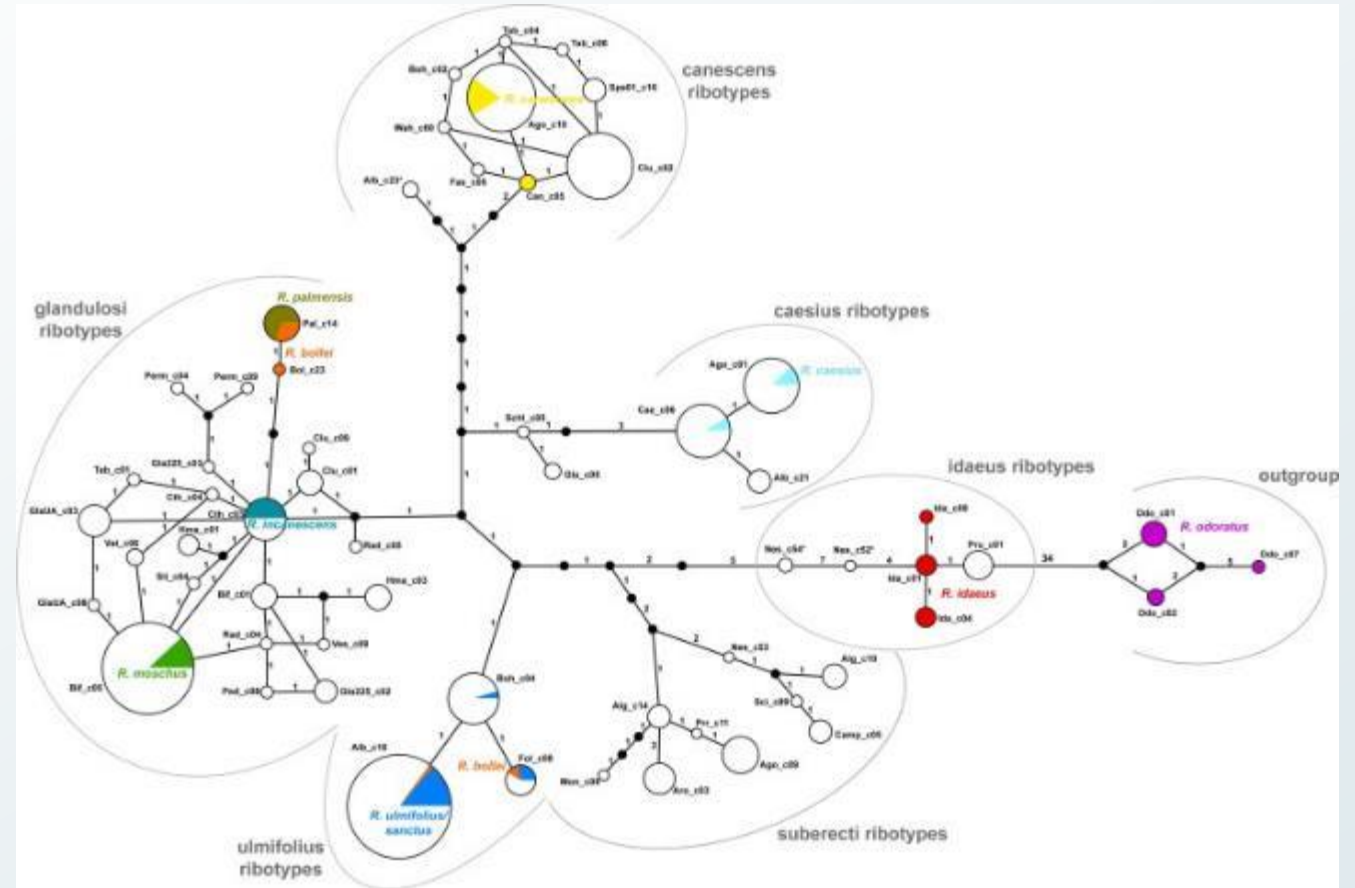
Evolutionary history

Rubus in Northwest-Europe

Evolutionary history

- Only 6 ancestors
 - *Rubus ulmifolius*
 - *Rubus canescens*
 - *Rubus caesius*
 - *Rubus idaeus*
 - *Rubus* 'proto-glandulosus'
 - *Rubus* 'proto-suberectus'

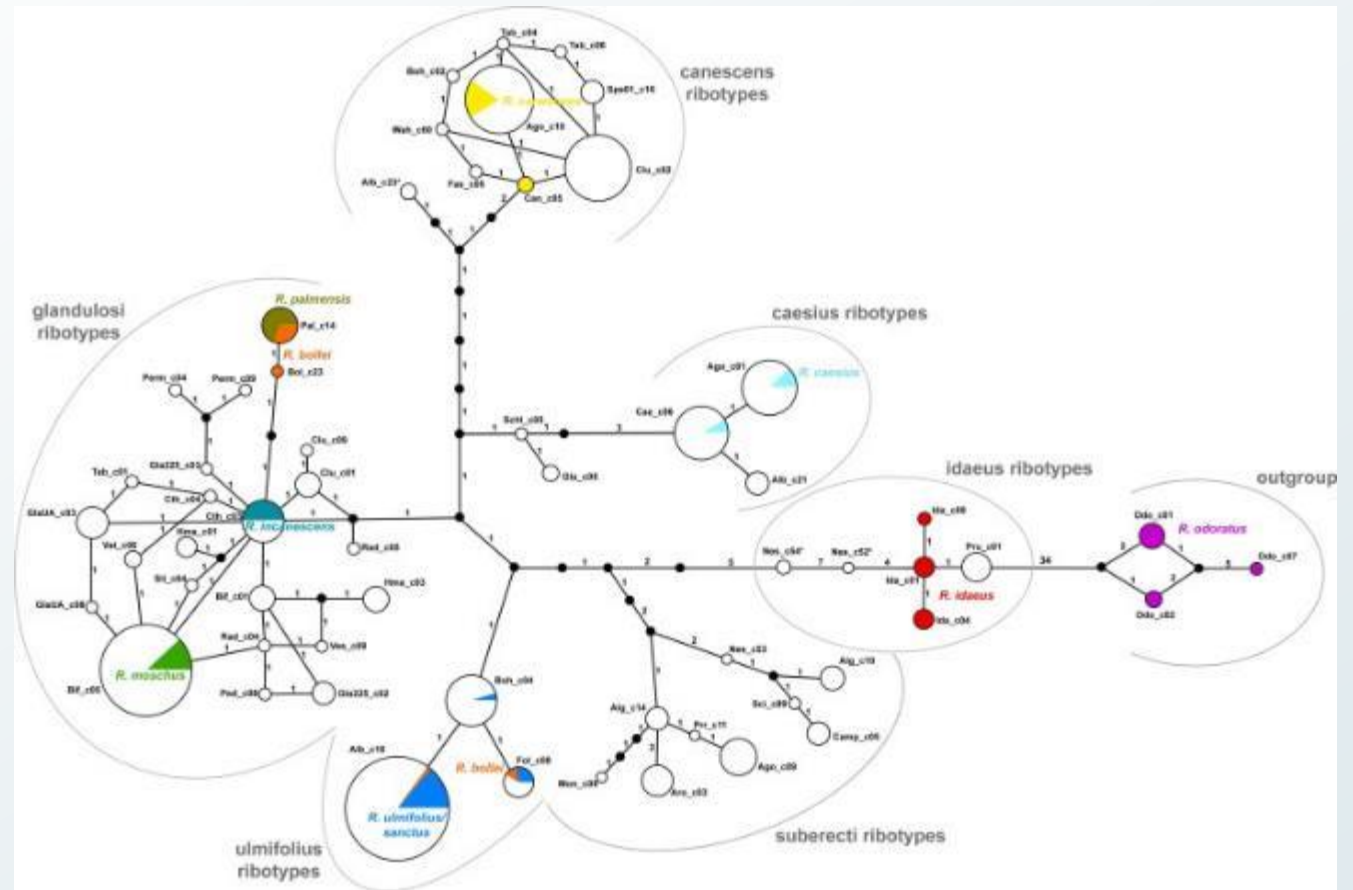
Michael Sochor et al. 2015, How just a few makes a lot: Speciation via reticulation and apomixis on example of European brambles (*Rubus* subgen. *Rubus*, Rosaceae). Mol. Phylogen. Evol. 89.



Rubus in Northwest-Europe

Evolutionary history

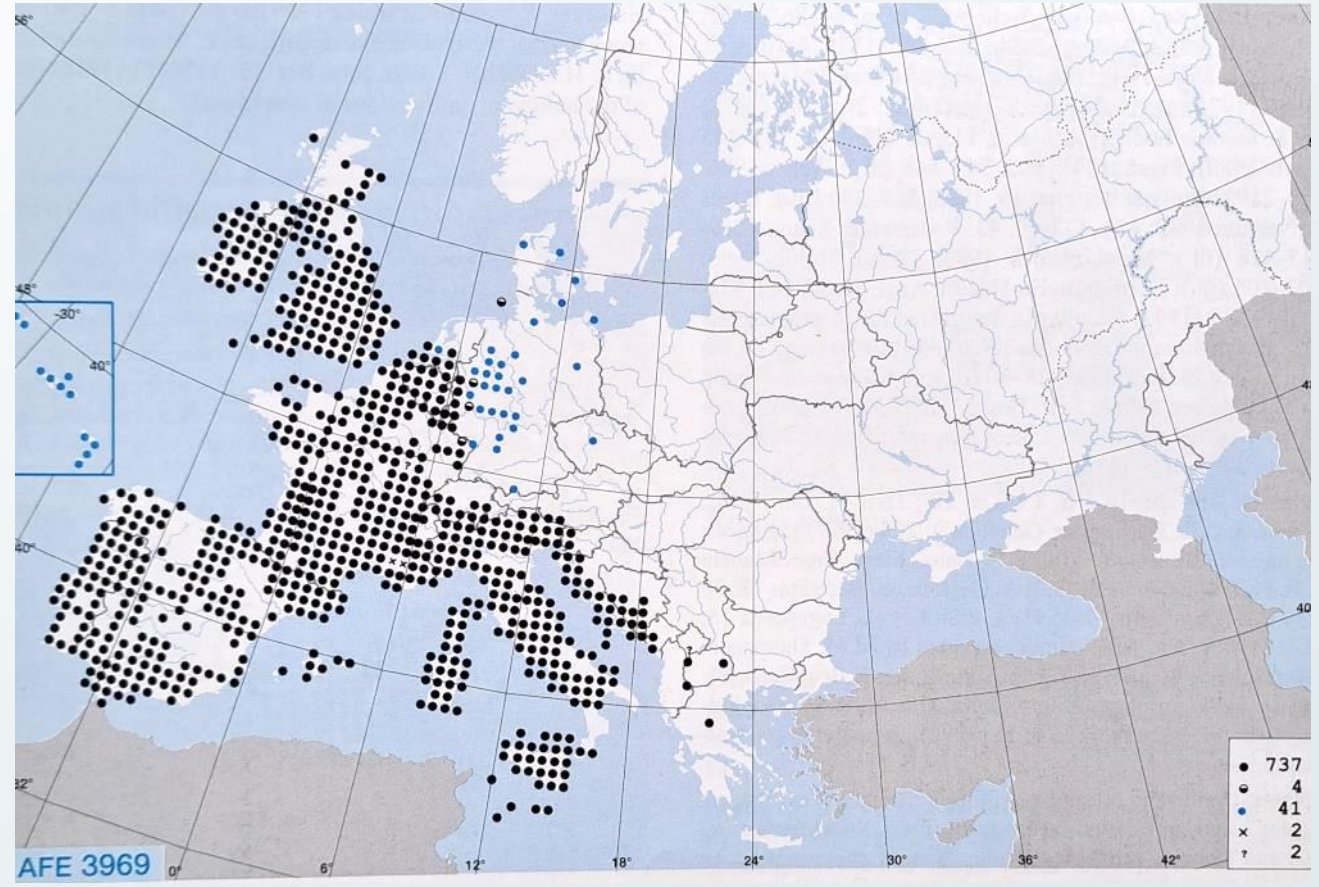
- Only 6 ancestors
- After the retreat of the ice-caps at the end of the Pleistocene migration to the north
- Hybridisation
- Stabilisation of polyploids by apomixis
 - Both diplospory and apospory
 - Asexual reproduction through seed
 - → only the female characters are passed along to the F1-generation
- Retained sexuality, mainly in tetraploids
 - *Glandulosi!*



Rubus in Northwest-Europe

Phytogeographical aspects

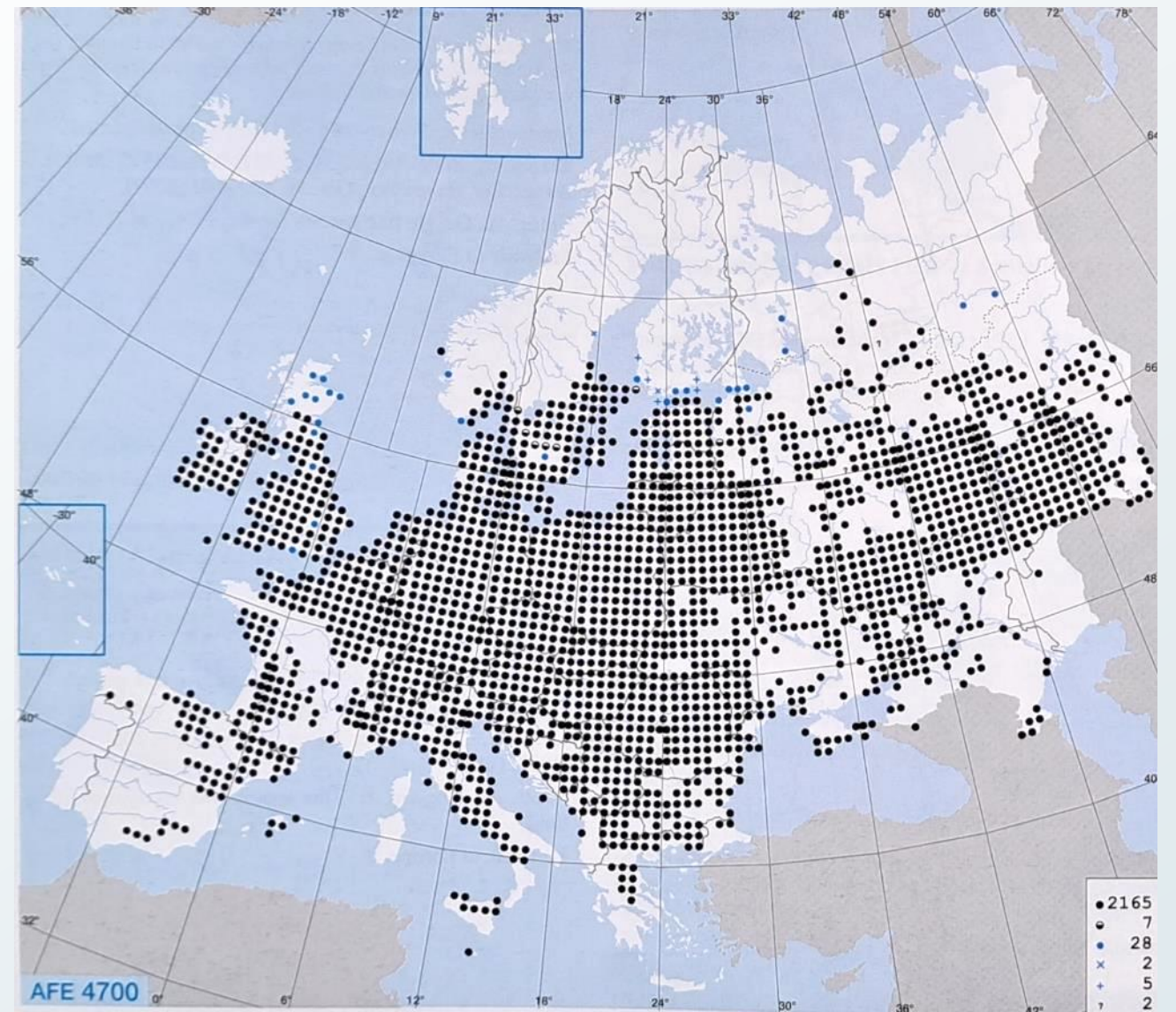
- Sexual species with large distribution area
 - *Rubus ulmifolius*



Rubus in Northwest-Europe

Phytogeographical aspects

- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*



Rubus in Northwest-Europe

Phytogeographical aspects

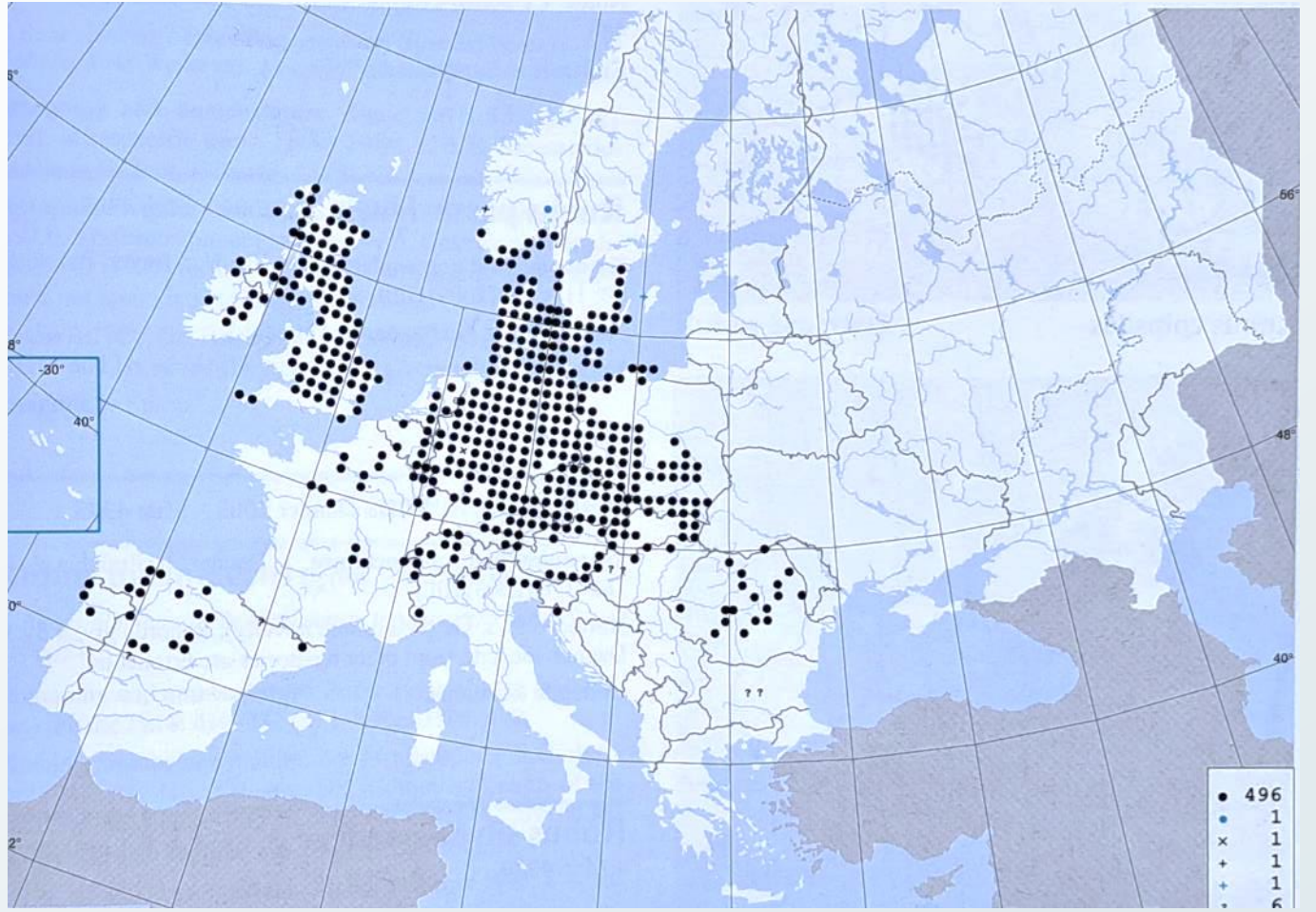
- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*
- Apomict species with large distribution area
 - *Rubus nessensis*



Rubus in Northwest-Europe

Phytogeographical aspects

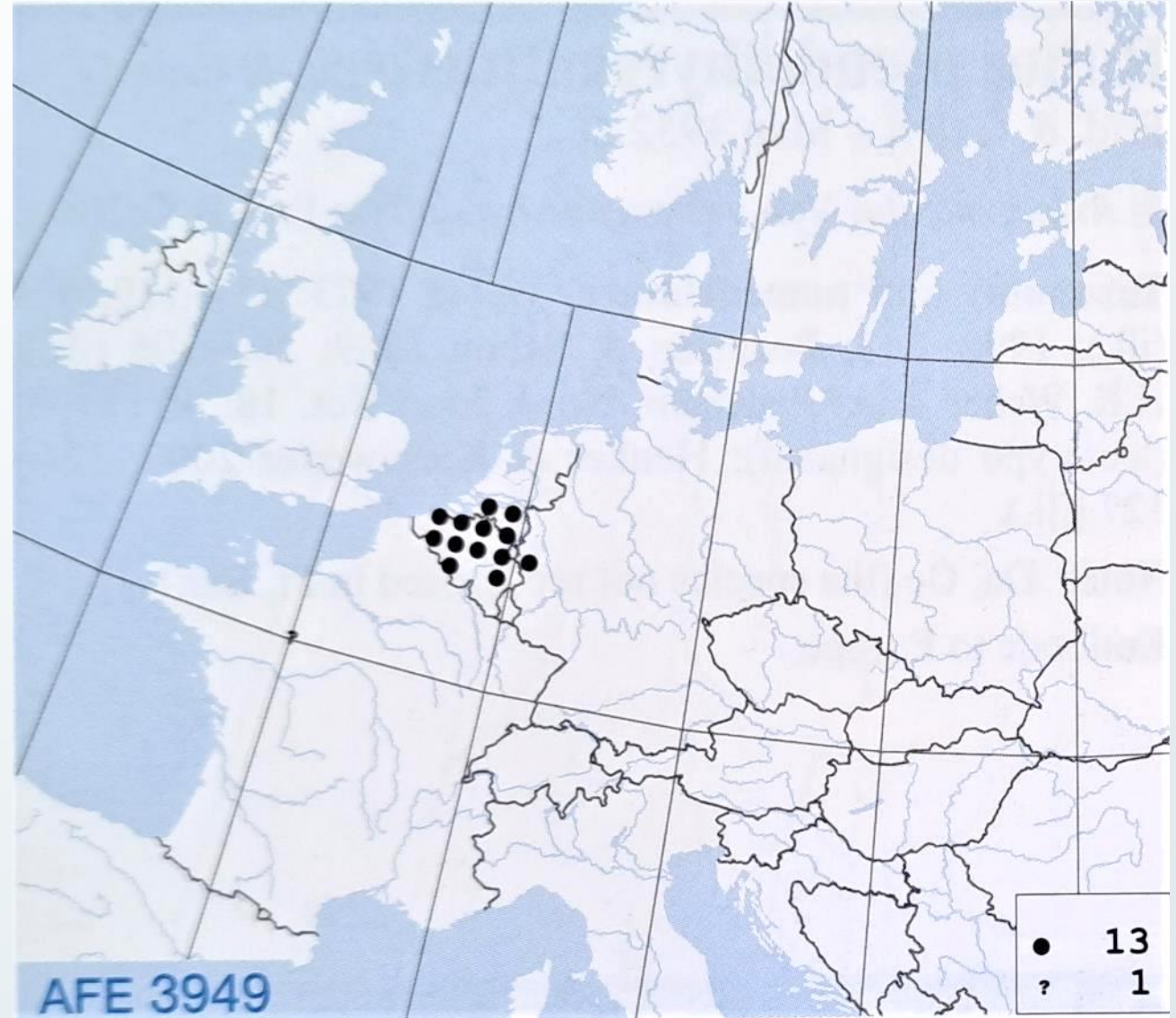
- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*
- Apomict species with large distribution area
 - *Rubus nessensis*
 - *Rubus radula*



***Rubus* in Northwest-Europe**

Phytogeographical aspects

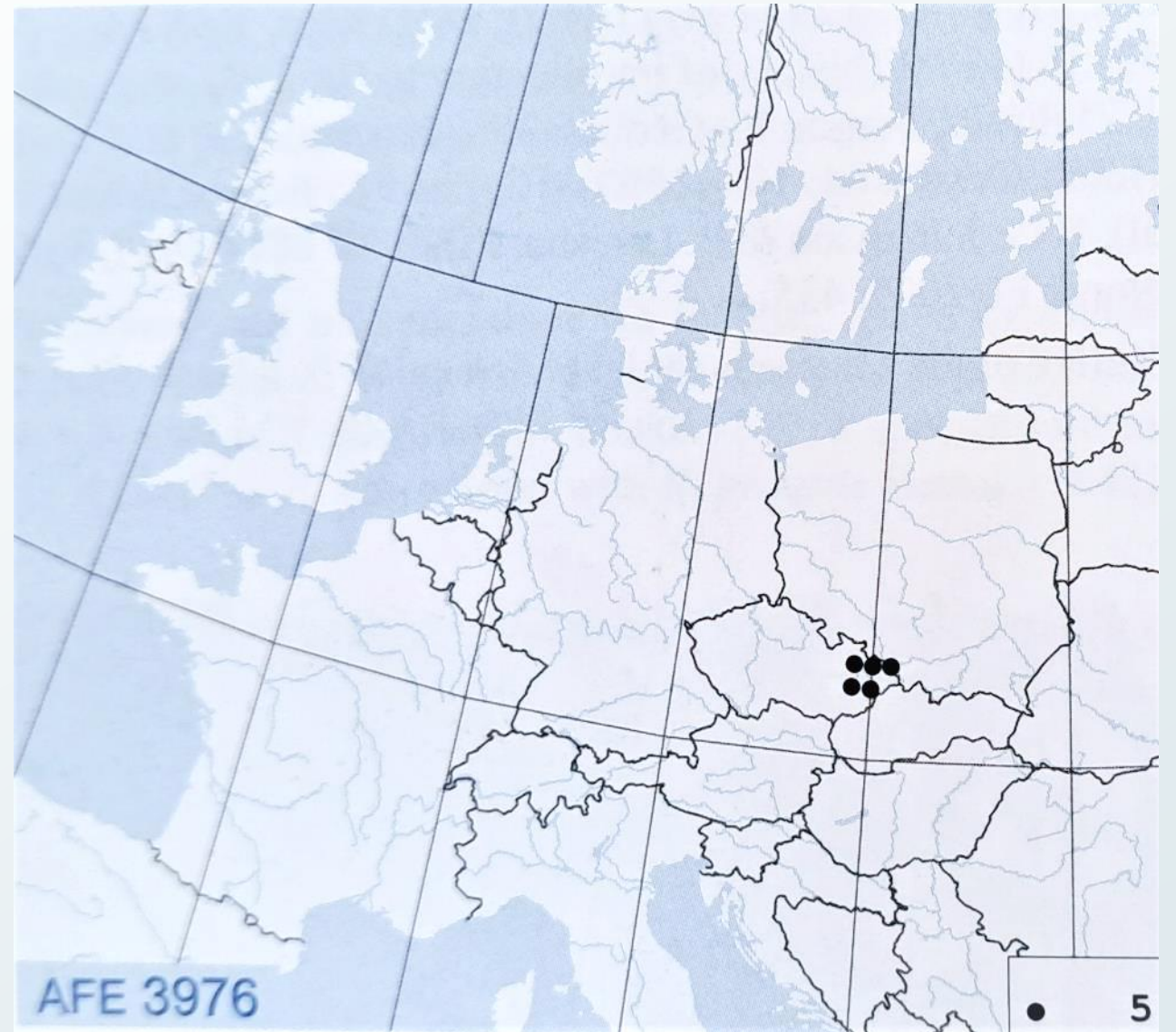
- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*
- Apomict species with large distribution area
 - *Rubus nessensis*
 - *Rubus radula*
- Species with small distribution area
 - ***Rubus libertianus***



Rubus in Northwest-Europe

Phytogeographical aspects

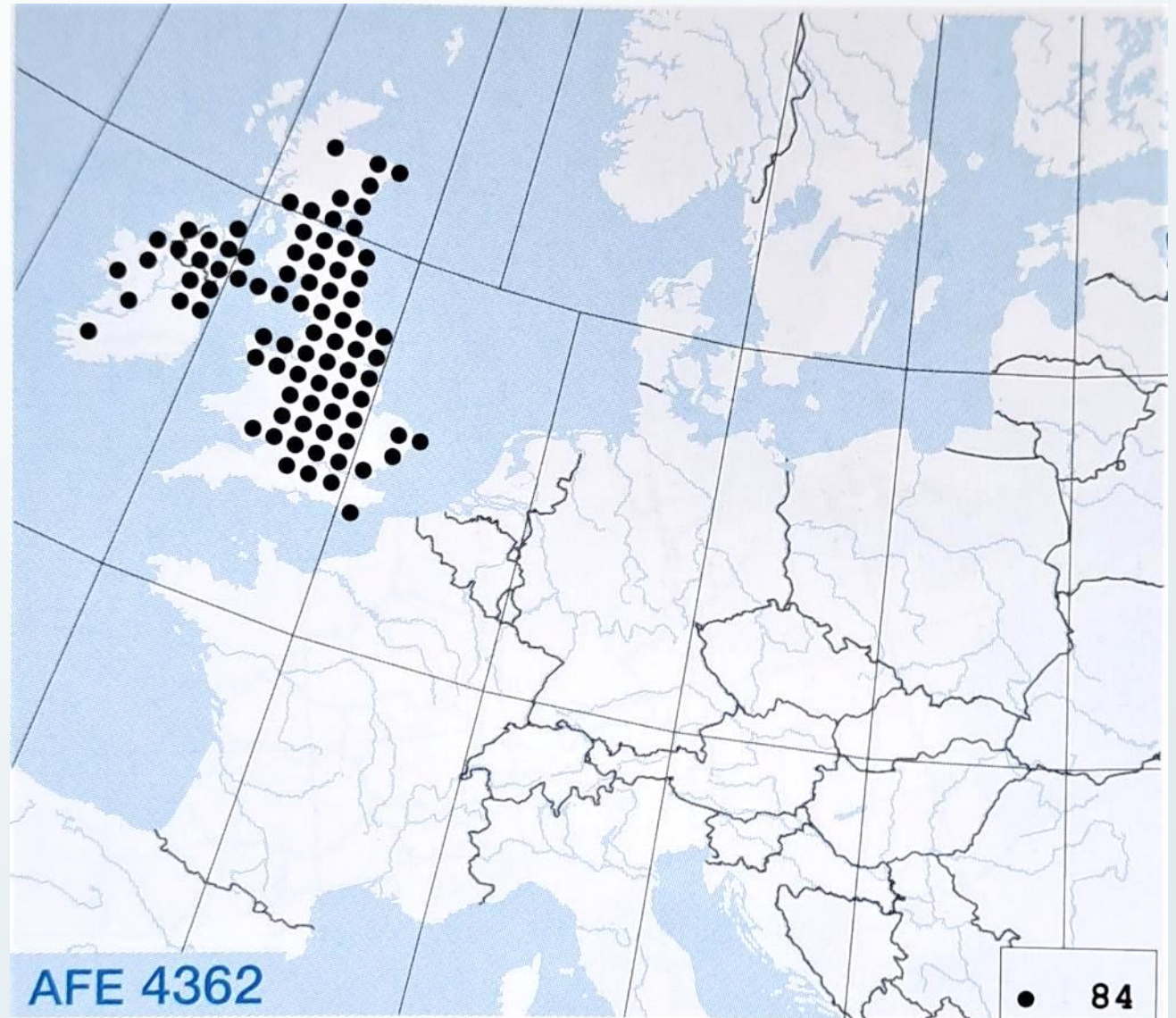
- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*
- Apomict species with large distribution area
 - *Rubus nessensis*
 - *Rubus radula*
- Species with small distribution area
 - *Rubus libertianus*
 - *Rubus portae-moravicae*



Rubus in Northwest-Europe

Phytogeographical aspects

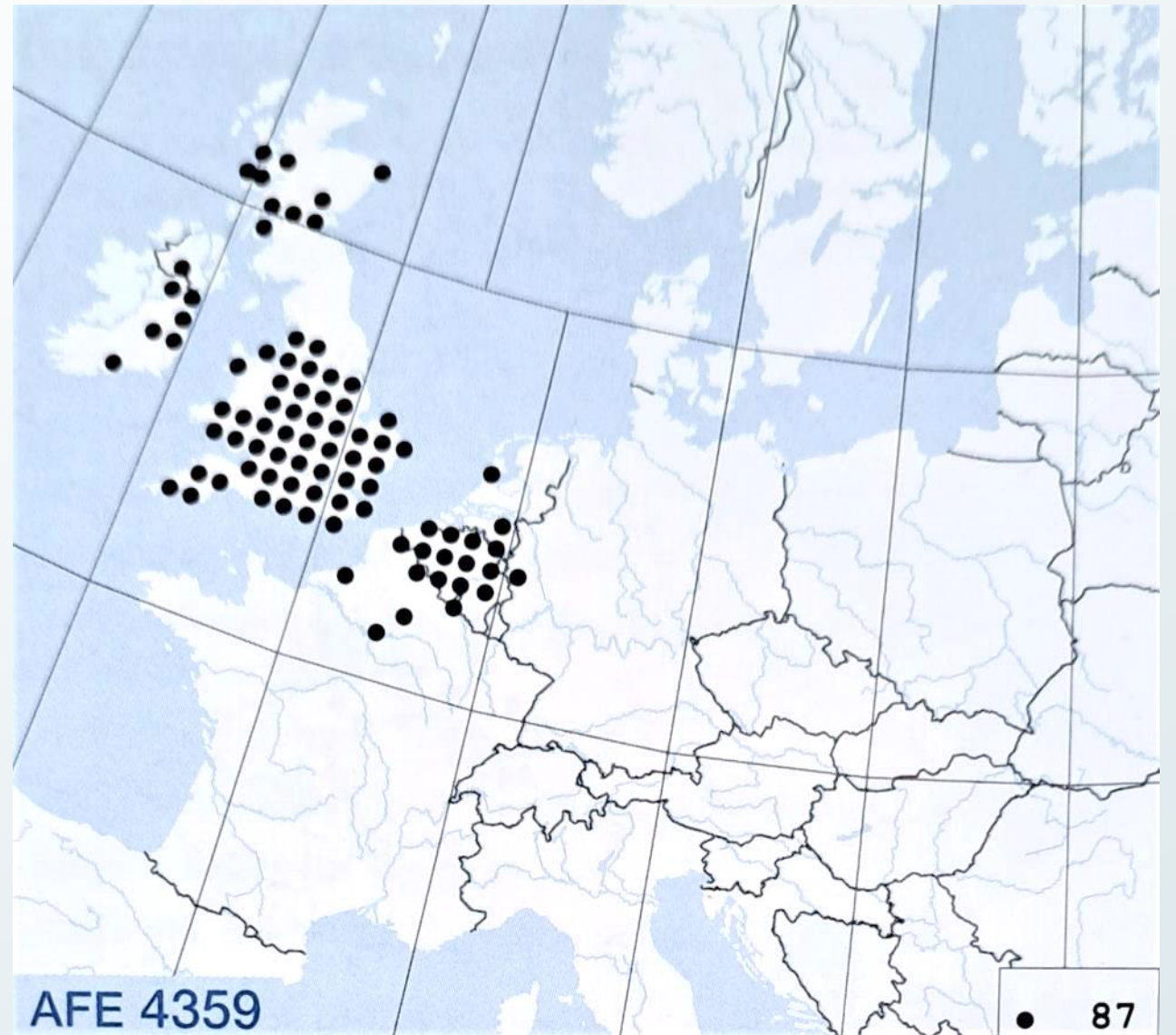
- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*
- Apomict species with large distribution area
 - *Rubus nessensis*
 - *Rubus radula*
- Species with small distribution area
 - *Rubus libertianus*
 - *Rubus portae-moravicae*
 - *Rubus echinatoides*



***Rubus* in Northwest-Europe**

Phytogeographical aspects

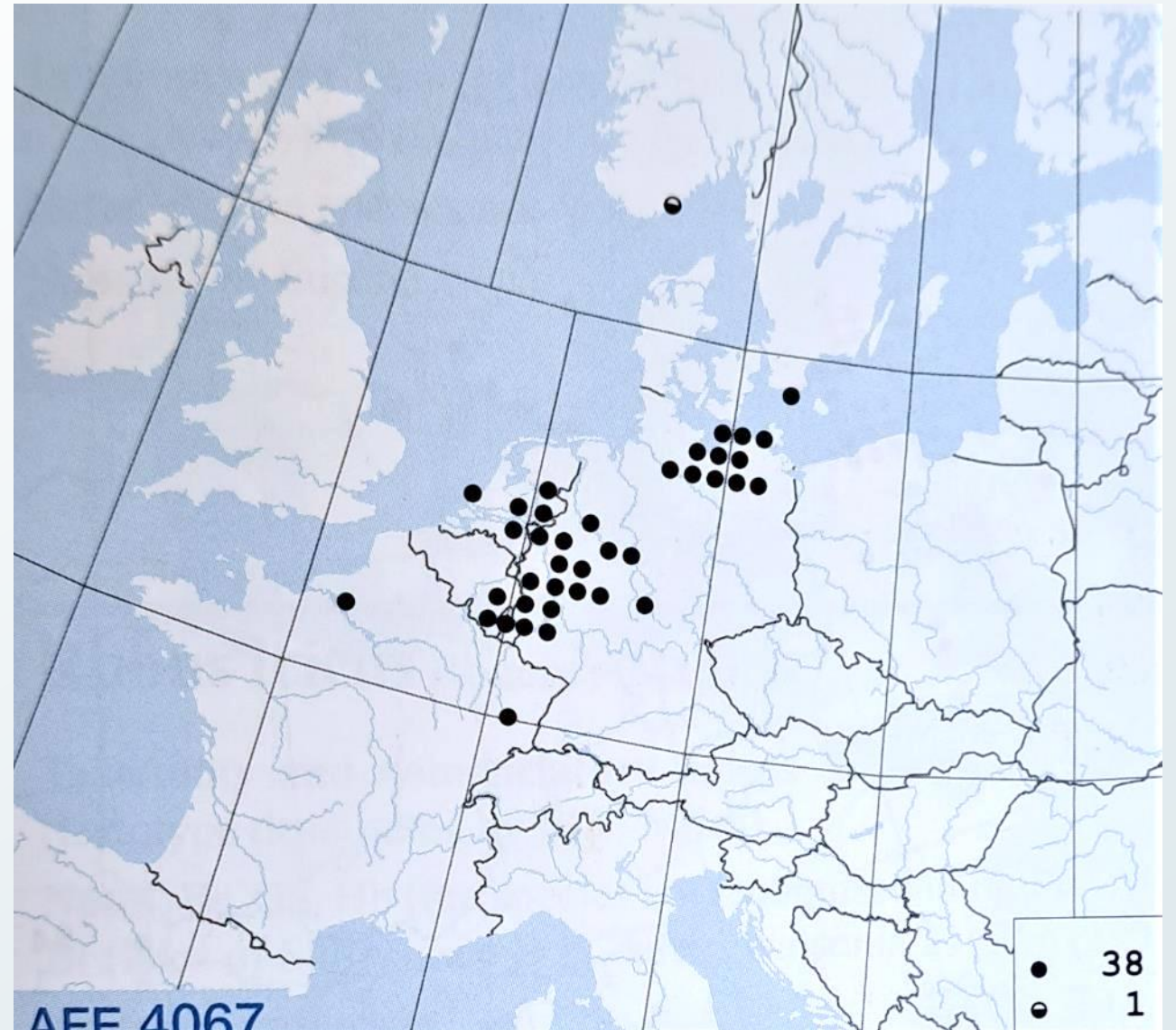
- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*
- Apomict species with large distribution area
 - *Rubus nessensis*
 - *Rubus radula*
- Species with small distribution area
 - *Rubus libertianus*
 - *Rubus portae-moravicae*
 - *Rubus echinatoides*
 - *Rubus rufescens*



Rubus in Northwest-Europe

Phytogeographical aspects

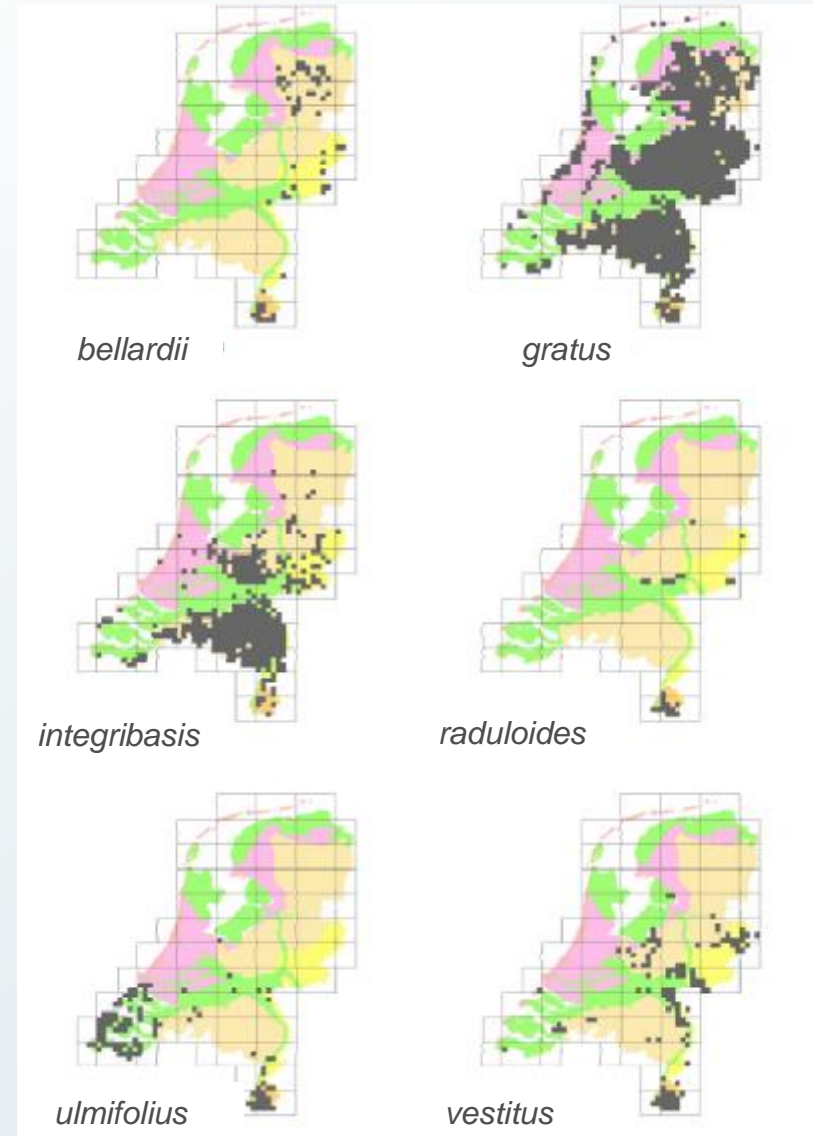
- Sexual species with large distribution area
 - *Rubus ulmifolius*
 - *Rubus caesius*
- Apomict species with large distribution area
 - *Rubus nessensis*
 - *Rubus radula*
- Species with small distribution area
 - *Rubus libertianus*
 - *Rubus portae-moravicae*
 - *Rubus echinatoides*
 - *Rubus rufescens*
 - *Rubus stereacanthos*



Rubus in Northwest-Europe

Phytogeographical aspects

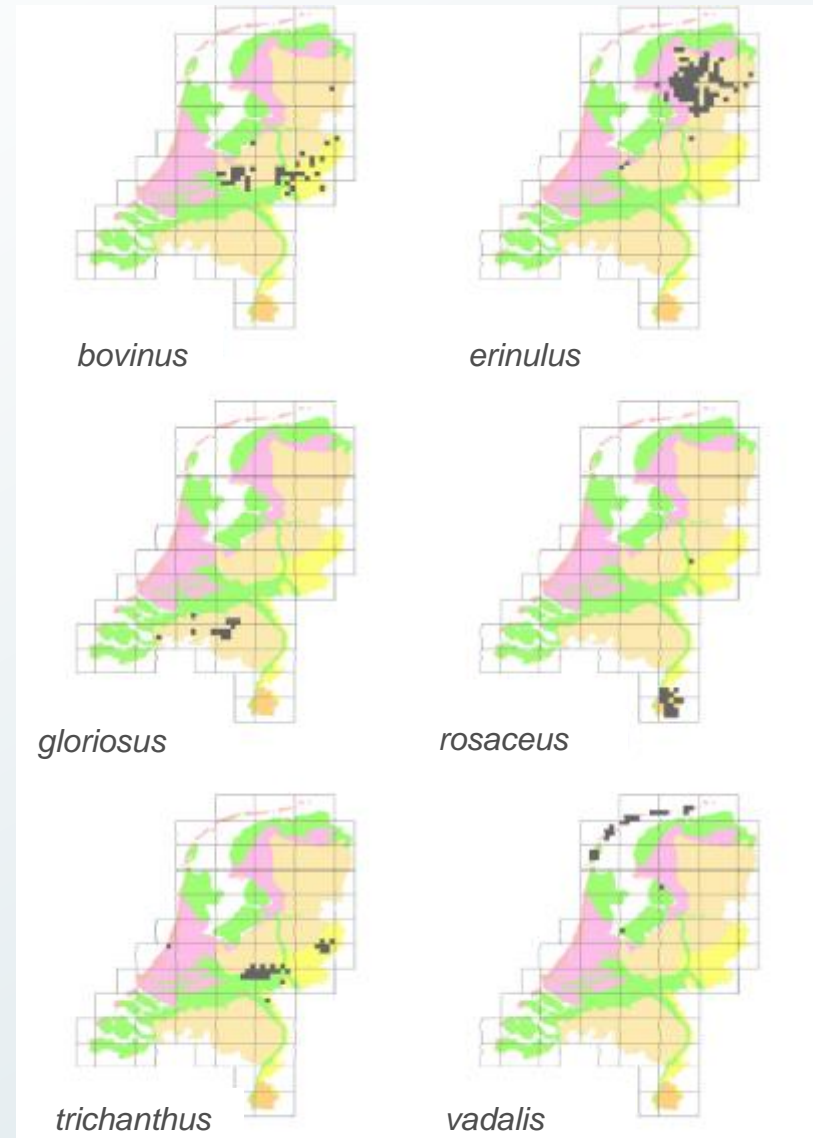
- Some examples from the Netherlands → species with large distribution areas



Rubus in Northwest-Europe

Phytogeographical aspects

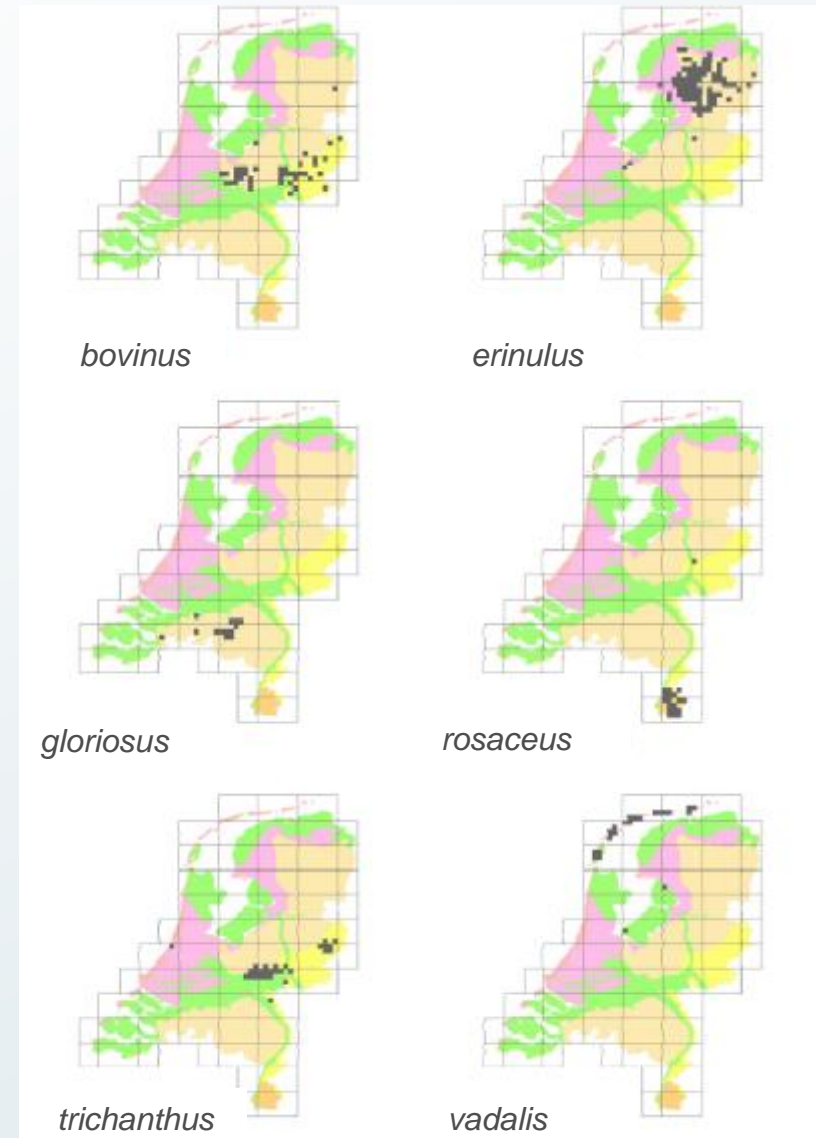
- Some examples from the Netherlands → species with small distribution areas



Rubus in Northwest-Europe

Phytogeographical aspects

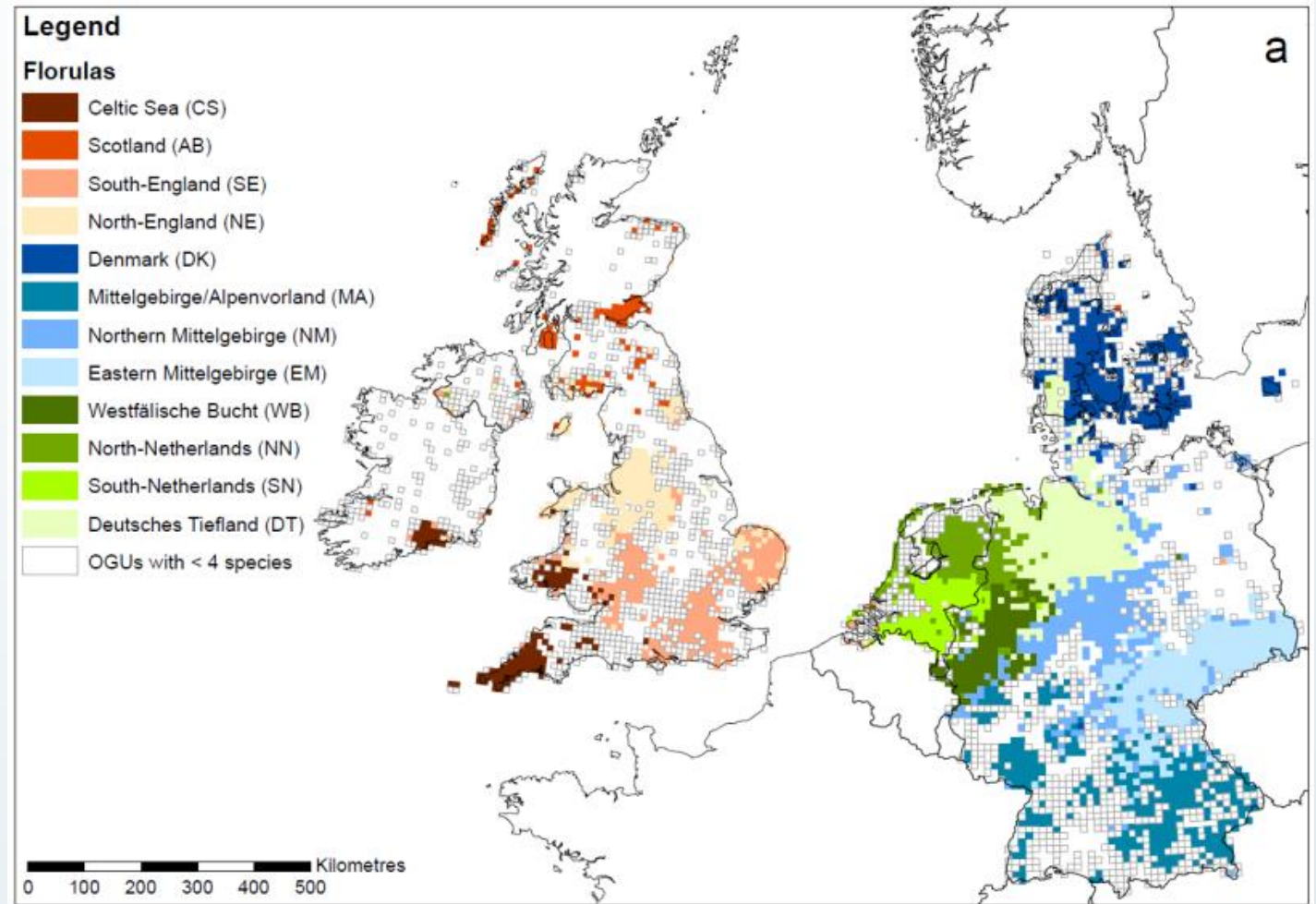
- Are there phytogeographical patterns detectable, and
- Are these patterns – if they exist – the result of ecology, or history?
- On the basis of distribution areas of individual species
- D, UK, DK, and NL
- Cluster analysis



Rubus in Northwest-Europe

Phytogeographical aspects

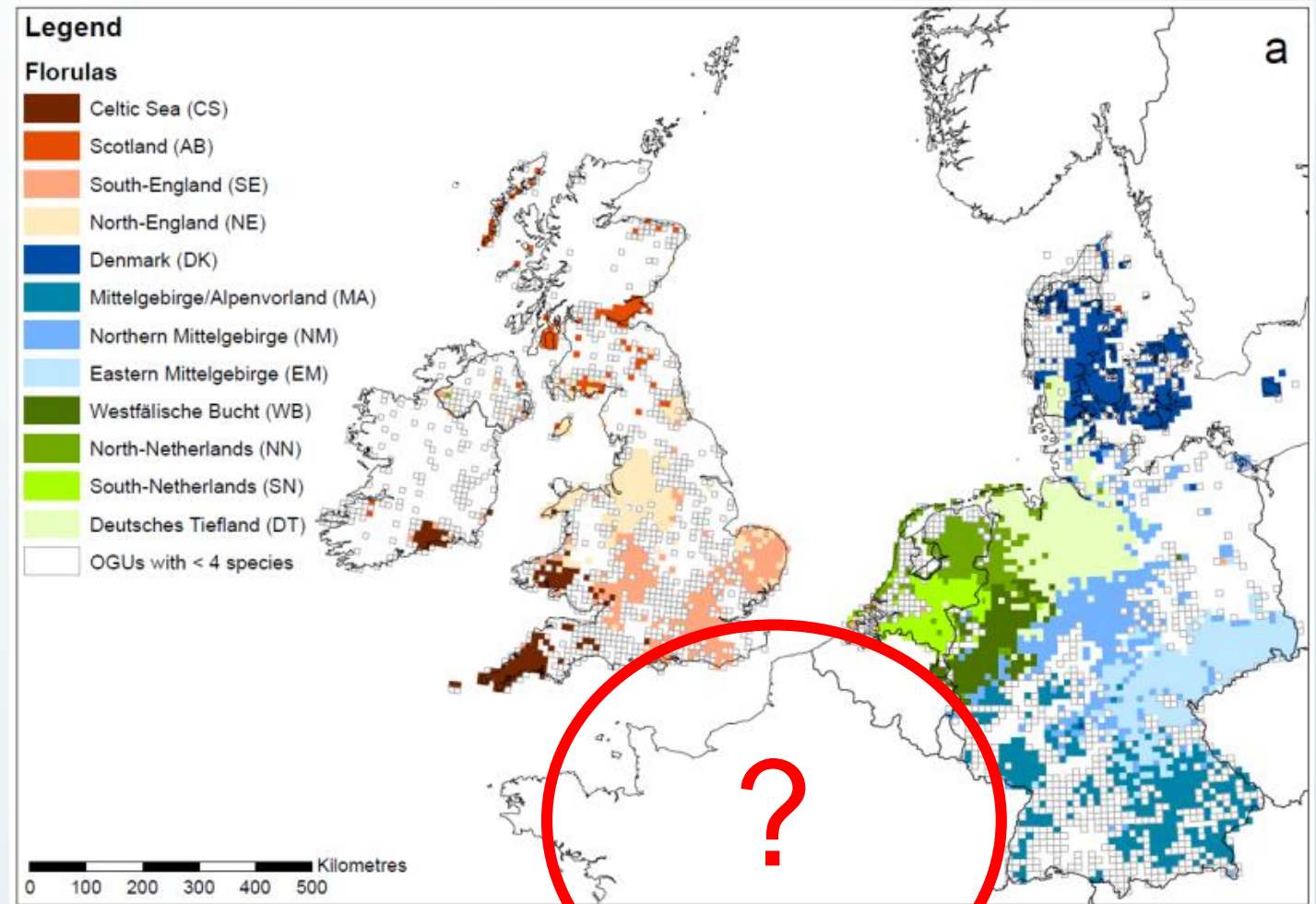
- Are there phytogeographical patterns detectable, and
- Are these patterns – if they exist – the result of ecology, or history?
- On the basis of distribution areas of individual species
- D, UK, DK, and NL
- Cluster analysis
- Three large regions
 - British Isles
 - NW Continent
 - SE Continent



Rubus in Northwest-Europe

Phytogeographical aspects

- Are there phytogeographical patterns detectable, and
- Are these patterns – if they exist – the result of ecology, or history?
- On the basis of distribution areas of individual species
- D, UK, DK, and NL
- Cluster analysis
- Three large regions
 - British Isles
 - NW Continent
 - SE Continent
- Large and important gap: France & Belgium

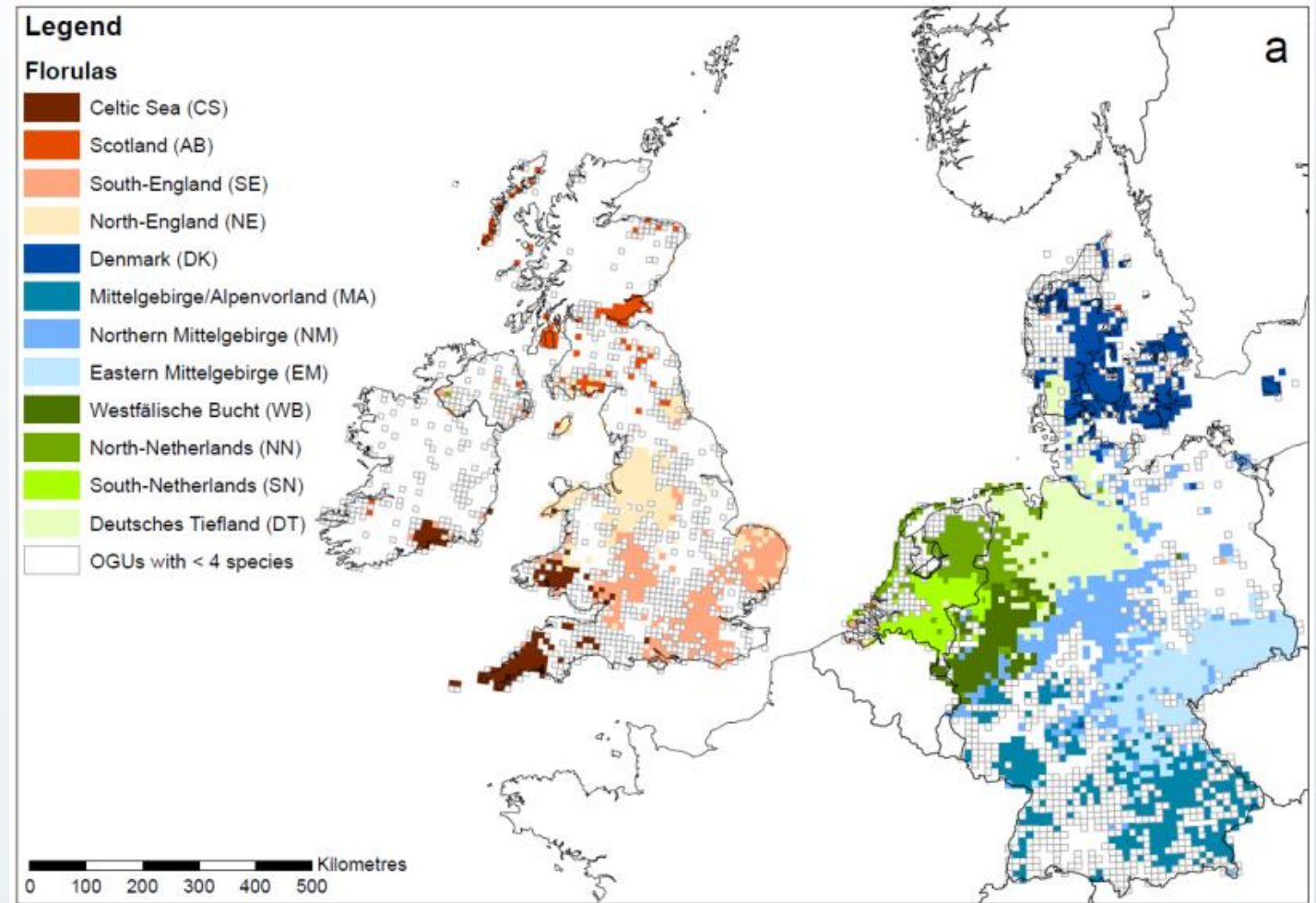


Rubus in Northwest-Europe

Phytogeographical aspects

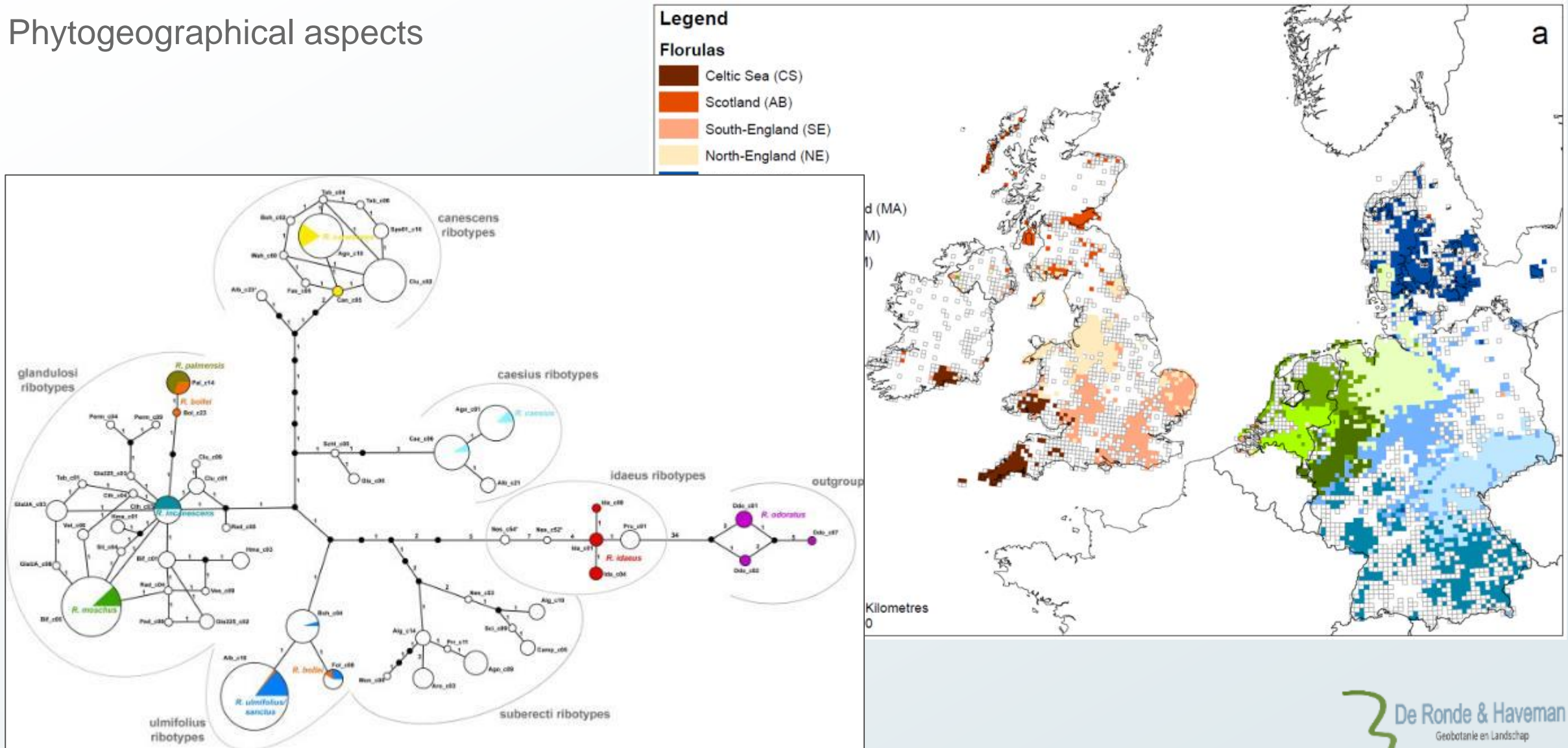
- Are these patterns the result of ecology or history?

Rense Haveman et al. 2016, Capricious, or tied to history's apron strings? Floristic regions in north-west European brambles (*Rubus* subgenus *Rubus*, Rosaceae). J. Biogeogr. 43



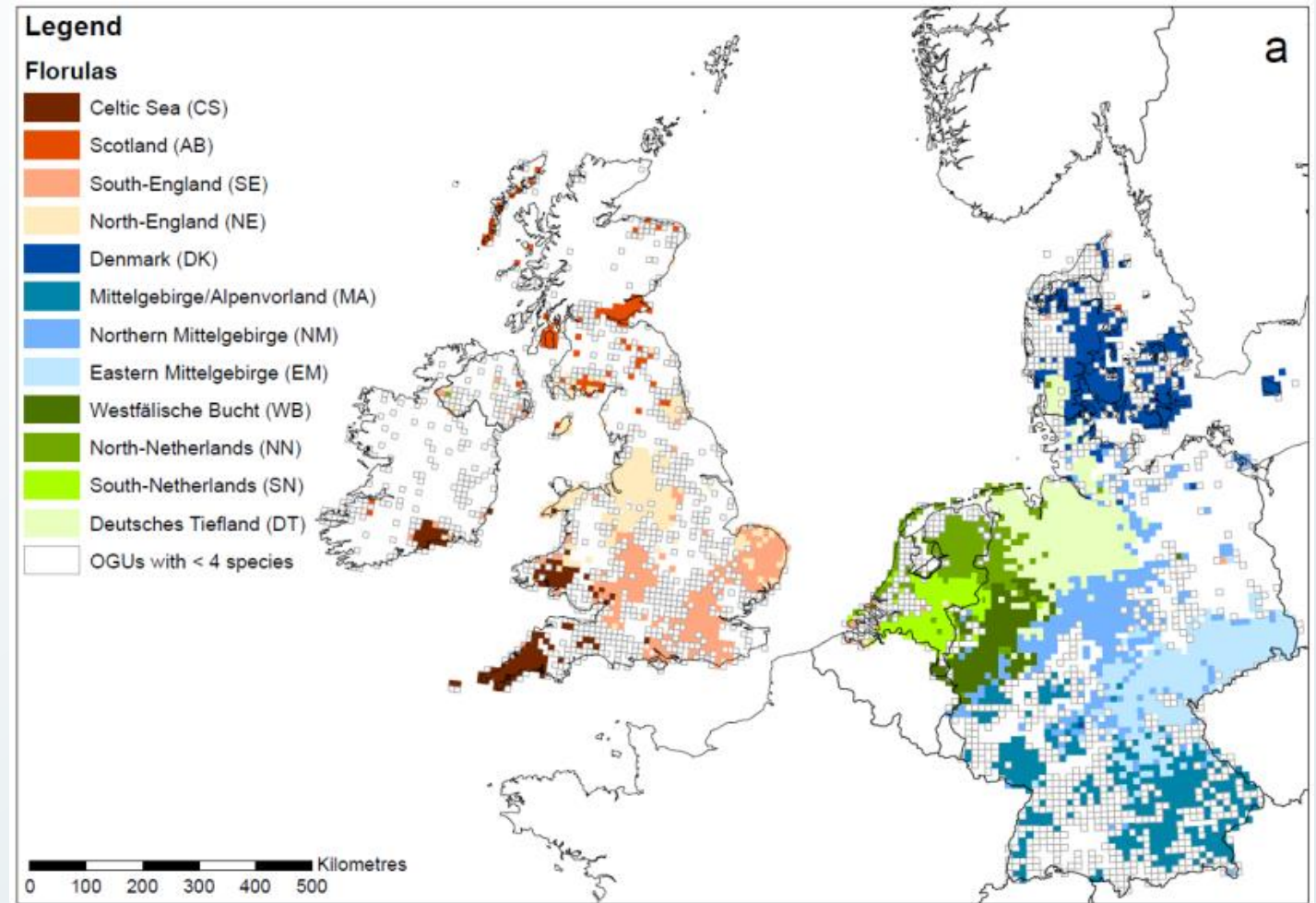
Rubus in Northwest-Europe

Phytogeographical aspects



Rubus in Northwest-Europe

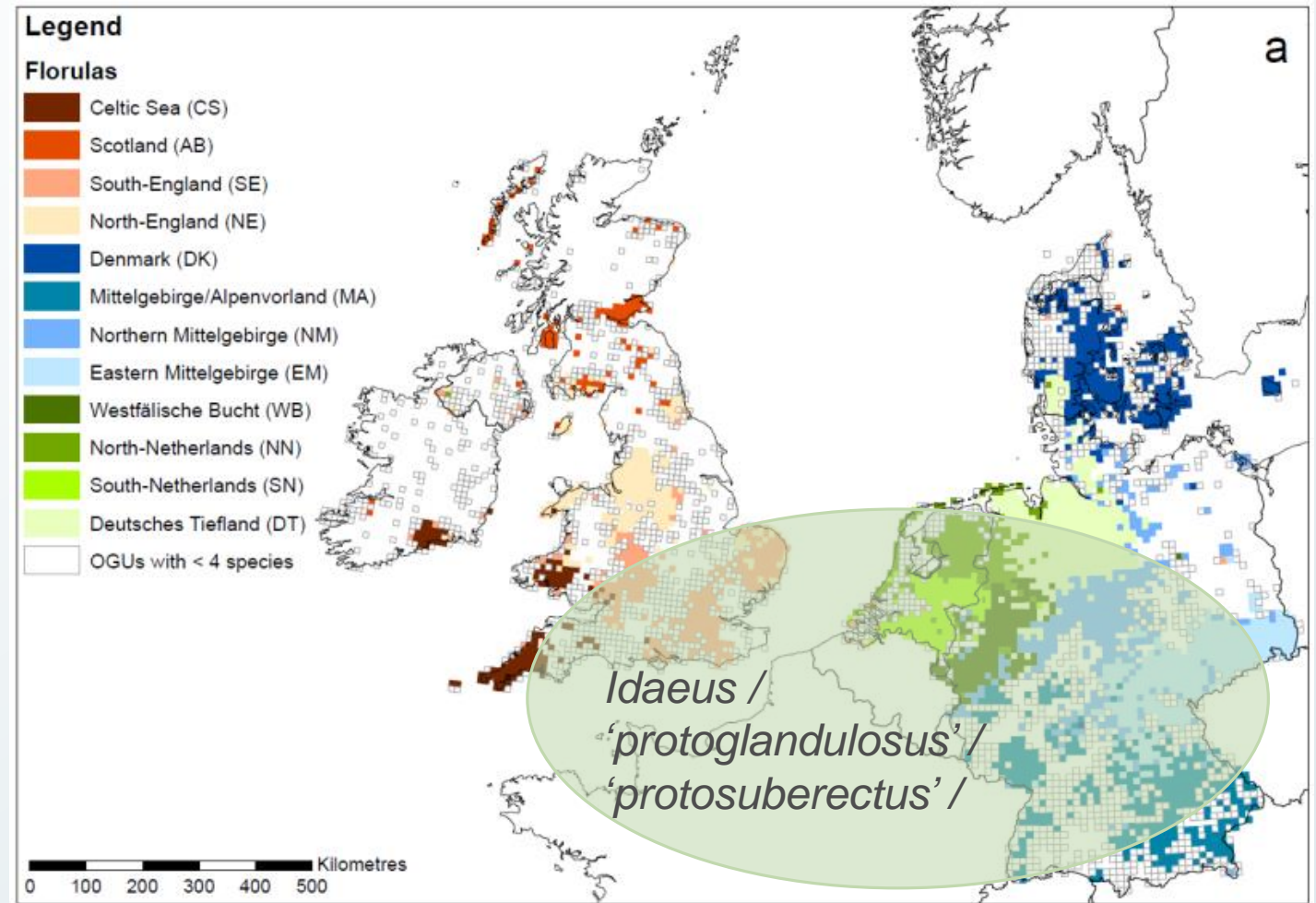
Phytogeographical aspects



Rubus in Northwest-Europe

Phytogeographical aspects

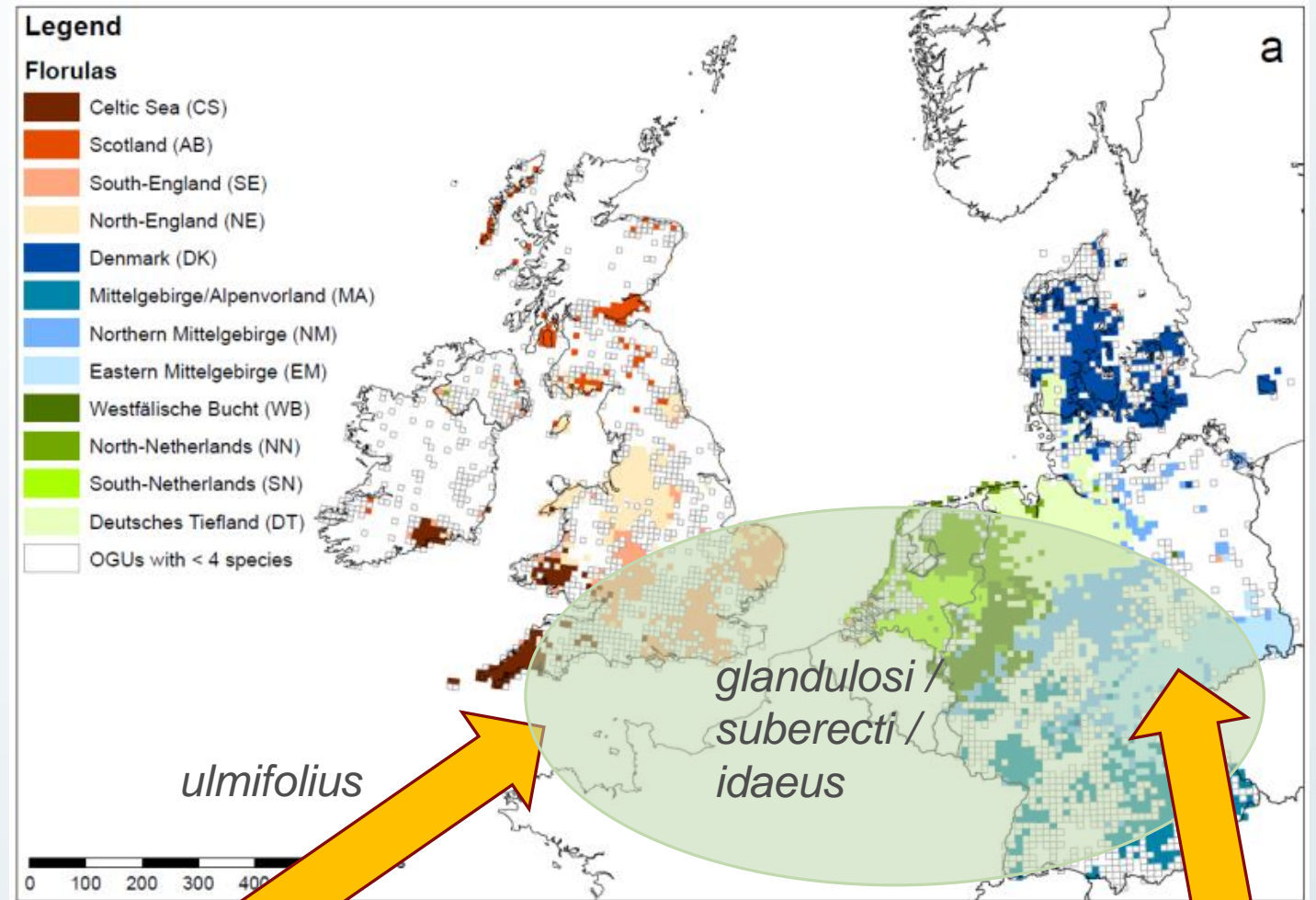
- Pristine woodlands with '*protoglandulosus*', '*protosuberectus*' and *idaeus*
- From the Bronze Age opening of these woodlands by human settlers



Rubus in Northwest-Europe

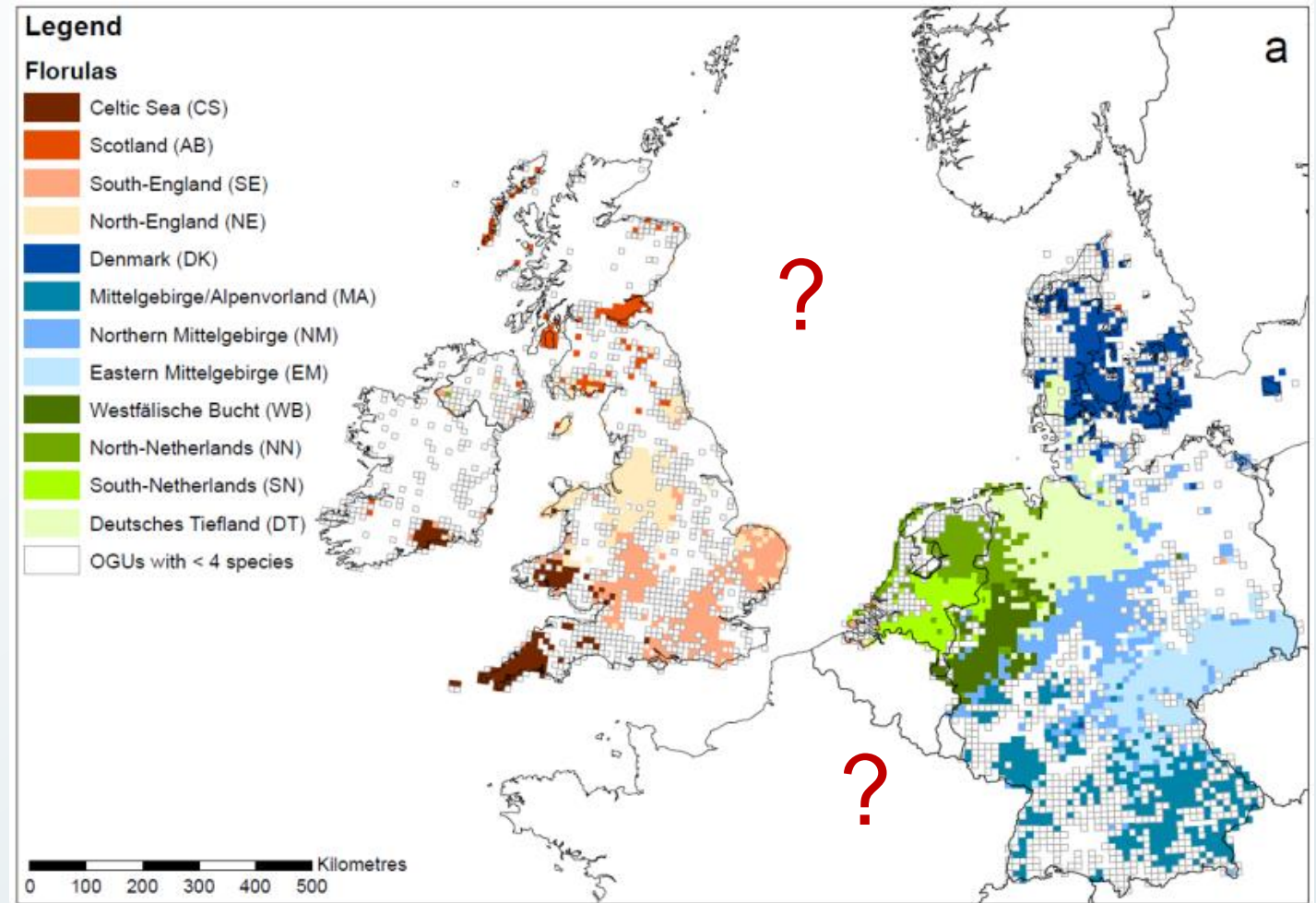
Phytogeographical aspects

- Pristine woodlands with '*protoglandulosus*', '*protosuberectus*' and *idaeus*
- From the Bronze Age opening of these woodlands by human settlers
- Invading warmth loving species from open landscapes which survived the cold Pleistocene in the south: *ulmifolius* in the west, *canescens* in the east
- Hybridisation → stabilisation by apomixis
- 'Inherited Ecology' (warm-moist / warm-dry)



Rubus in Northwest-Europe

Phytogeographical aspects



Rubus in Northwest-Europe

Ecology and nature conservation



Rubus in Northwest-Europe

Ecology and nature conservation

- *Rubus*: species of intermediate environments
- Largest diversity on loamy sands in temperate subatlantic climate in half-shadow
- Quick growers (long shoots with a pit)
- Seed bank
- Fruits eaten (and spread!) by mammals and birds



Rubus in Northwest-Europe

Ecology and nature conservation

- 'Nemophilous' species: low growing, rather delicate species, often 3-nate leafs, tender prickles and numerous glands, shade tolerant (series *Glandulosi*, *Hystrix*, and *Pallidi*)



Rubus in Northwest-Europe

Ecology and nature conservation

- ‘Nemophilous’ species: low growing, rather delicate species, often 3-nate leafs, tender prickles and numerous glands, shade tolerant (series *Glandulosi*, *Hystrix*, and *Pallidi*)
- ‘Thamnophilous’ species: large, high climbing species, 5-nate leafs, large prickles, no glands, and often felted underside of leafs, shade intolerant (series *Discolores* and *Hayneani/Rhamnifolii*)
- Next presentation Iris!



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- **Hedges**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- **Hedges and wooded banks**



© Rense Haveman 2014

Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- **Woodland edges**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- **Woodland edges**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- Woodland edges
- **Woodland clearings**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- Woodland edges
- **Woodland clearings**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- Woodland edges
- **Woodland clearings**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- Woodland edges
- Woodland clearings
- Natural scrubs, e.g. **dune scrubs**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- Woodland edges
- Woodland clearings
- Natural scrubs, e.g. **dune scrubs**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- Woodland edges
- Woodland clearings
- Natural scrubs, e.g. **dune scrubs**



Rubus in Northwest-Europe

Ecology and nature conservation

Typical stands include

- Hedges
- Woodland edges
- Woodland clearings
- Natural scrubs, e.g. dune scrubs

Brambles are important for many animal species



Rubus in Northwest-Europe

Short recap

- *Rubus* in NW-Europe shows a great diversity
- Over 1000 species in Europe
- Only a few sexual species, majority are apomicts
- Phytogeographical patterns are the result of remigrating species from the south, followed by hybridisation and stabilisation through apomixis
- Brambles are important species in structures like hedges, woodland edges and clearings, and e.g. in dune scrubs
- Brambles play an important role for many vertebrate and invertebrate species



**Thank you very much
for your attention!**

