

# Impact of *Fallopia japonica* on soil fauna

S. Domken (sdomken@ulb.ac.be), N. Dassonville, G. Josens & P. Meerts

Laboratoire d' Ecologie végétale et Biogéochimie. Université de Bruxelles. Boulevard du triomphe, campus de la plaine CP 244. Belgique

## Introduction



Invasive plant species can modify ecosystem functioning (productivity, soil chemical properties, nutrient cycling, organic matter turn-over). Such modifications might influence soil animal communities. Currently, impacts of exotic invasive plants on soil fauna have been little studied. However, most studies found a decrease of soil fauna density and diversity in invaded sites corresponding to a decrease of food resources diversity. Our study first focused on *Fallopia japonica*. This highly productive, shrub like geophyte is one of the most invasive exotic plant species in NW Europe. When invading grassland ecosystems, *F. japonica* considerably modifies the vegetation structure and increases biomass and litter production.



Mésafauna (0.2 – 4 mm)

Macrofauna (4 – 80 mm)

## Question:

- How does *F. japonica* influence the structure of the soil animal communities (meso and macrofauna)? We studied the soil fauna density, diversity and composition

## Soil fauna sampling

**Sites :** 3 sites were selected with contrasting native vegetation. (grassland, clearing, woodland ).

**Principle:** Comparison between invaded and adjacent uninvaded plots.

### Epigeic fauna



5 pitfall traps  
Collected after 15 days on the field

### Hypogeic fauna



5 soil cores  
2 dates  
Extraction by Berlese-Tullgren method

### Earthworms



20 extractions  
2 dates  
Formaldehyd extraction

Invertebrates were counted and identified at the family level

Individuals were counted weighted and identified at the species level

## Results

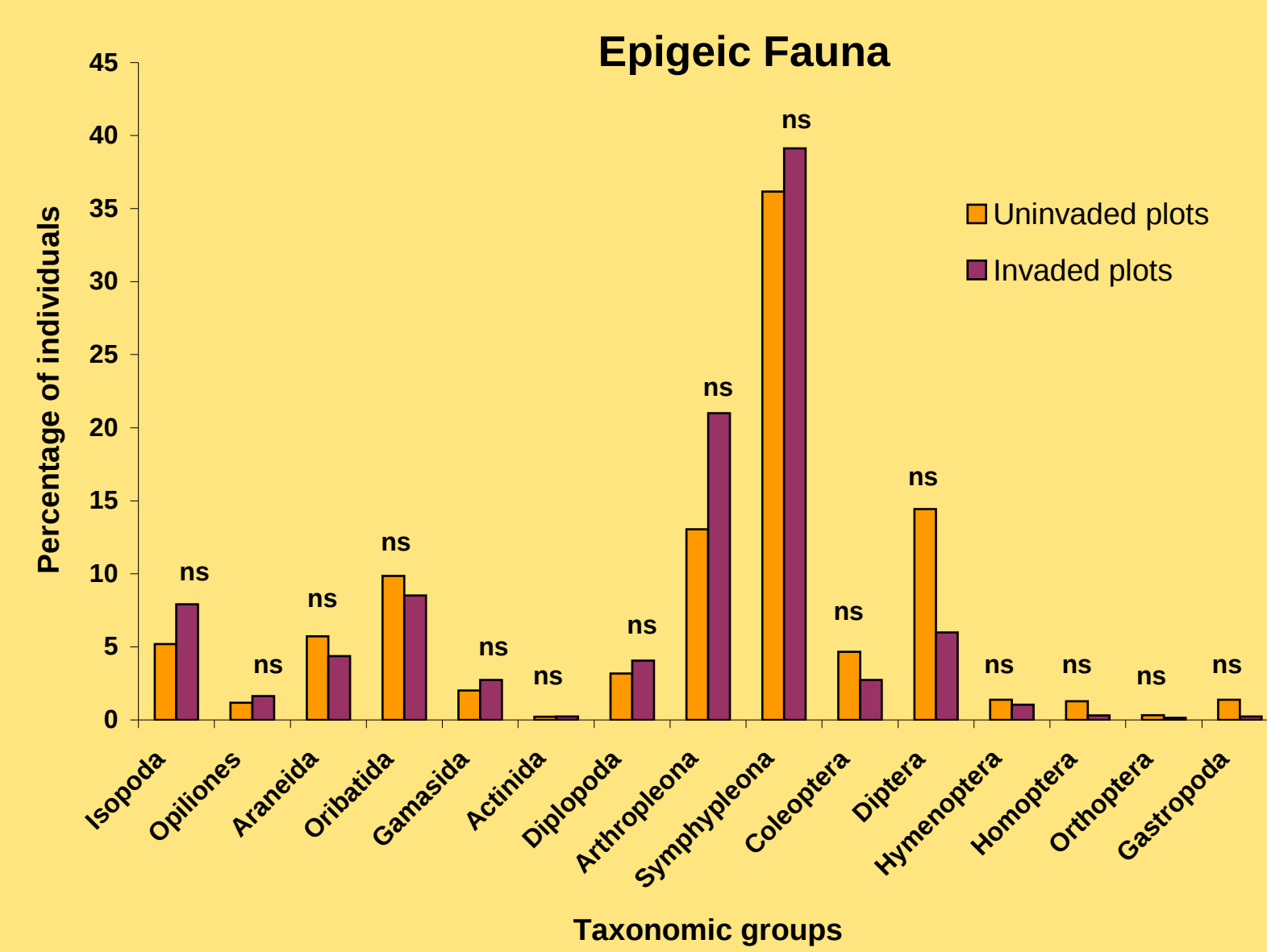
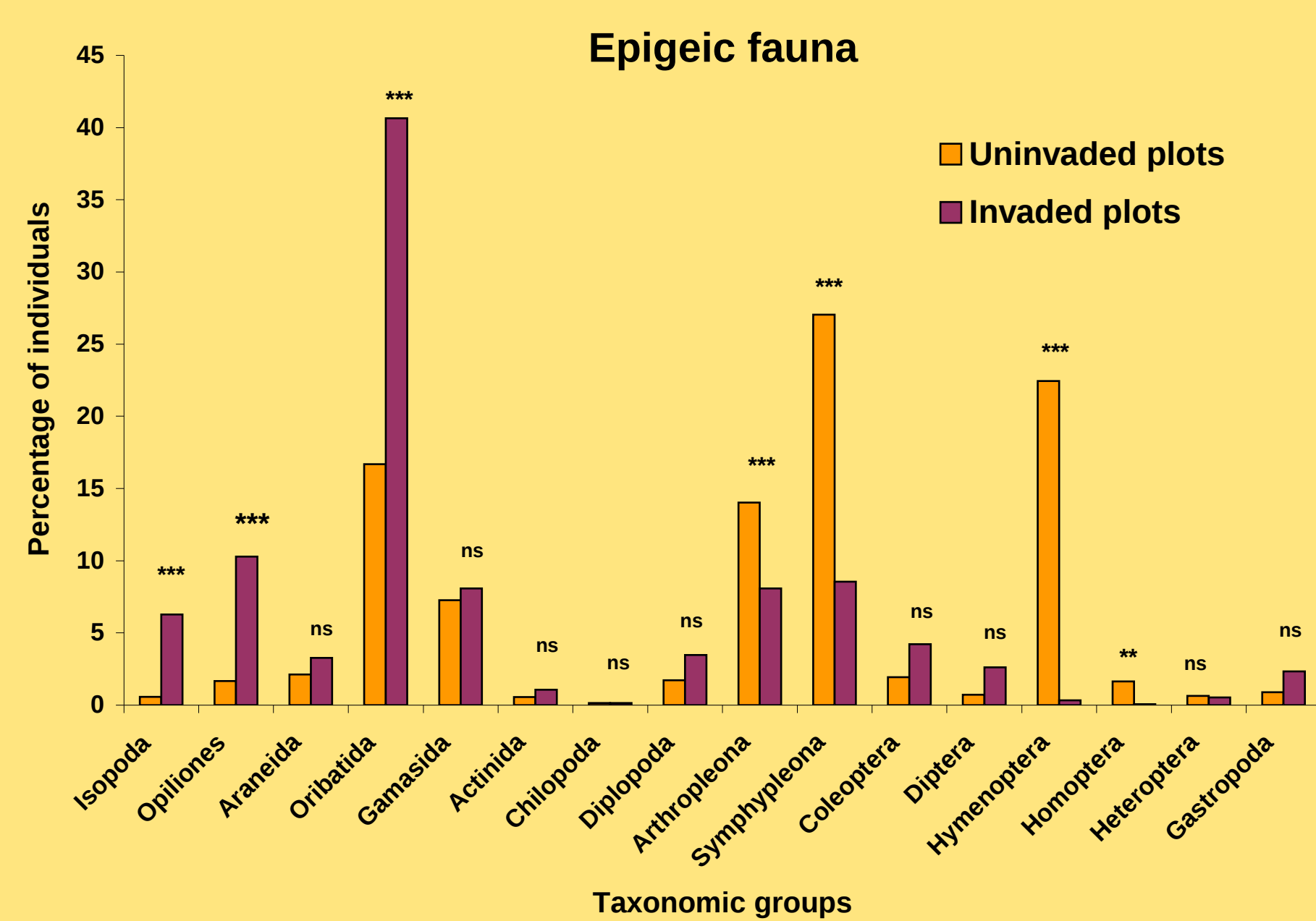
## Impact on density and diversity

### Site 1

*Fallopia* vs Multispecific grassland vegetation

### Site 2

*Fallopia* vs Monospecific *Urtica dioica* stand



Some trends are observed in both sites

- Faunal density decreases in invaded plots
- Differences in proportions

### Groups unchanged under *Fallopia*

Araneida Actinida, Coleoptera

### Groups more abundant under *Fallopia*

Isopoda Diplopoda → Affinity for shaded and moist environments



### Groups almost absent under *Fallopia*

Opiliones Gamasida → Affinity for dry environments



- No significant differences in diversity

⇒ *Fallopia japonica* have a negative impact on soil fauna density  
⇒ its impact on soil fauna could be mediated by microclimate modification

## Impact on assemblage

### Site 1

*Fallopia* vs Multispecific grassland vegetation

### Site 2

*Fallopia* vs monospecific *Urtica dioica* stand

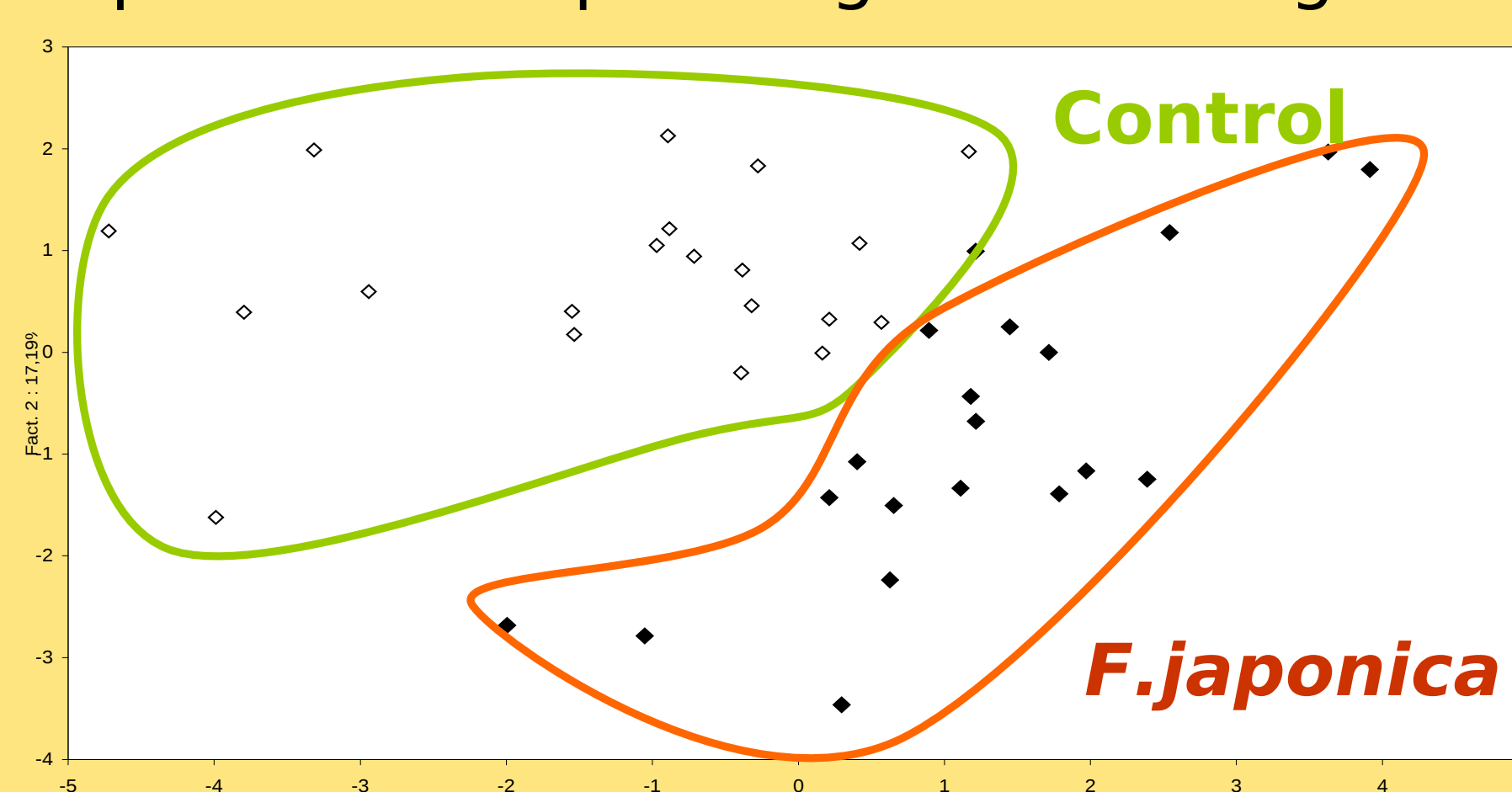


Fig 3 : Principal component analysis (PCA). Projection of the sampling points from the invaded (♦) and the uninvaded (□) plots on PC1 and PC2 for Hypogeic fauna, all dates pooled (4 dates).

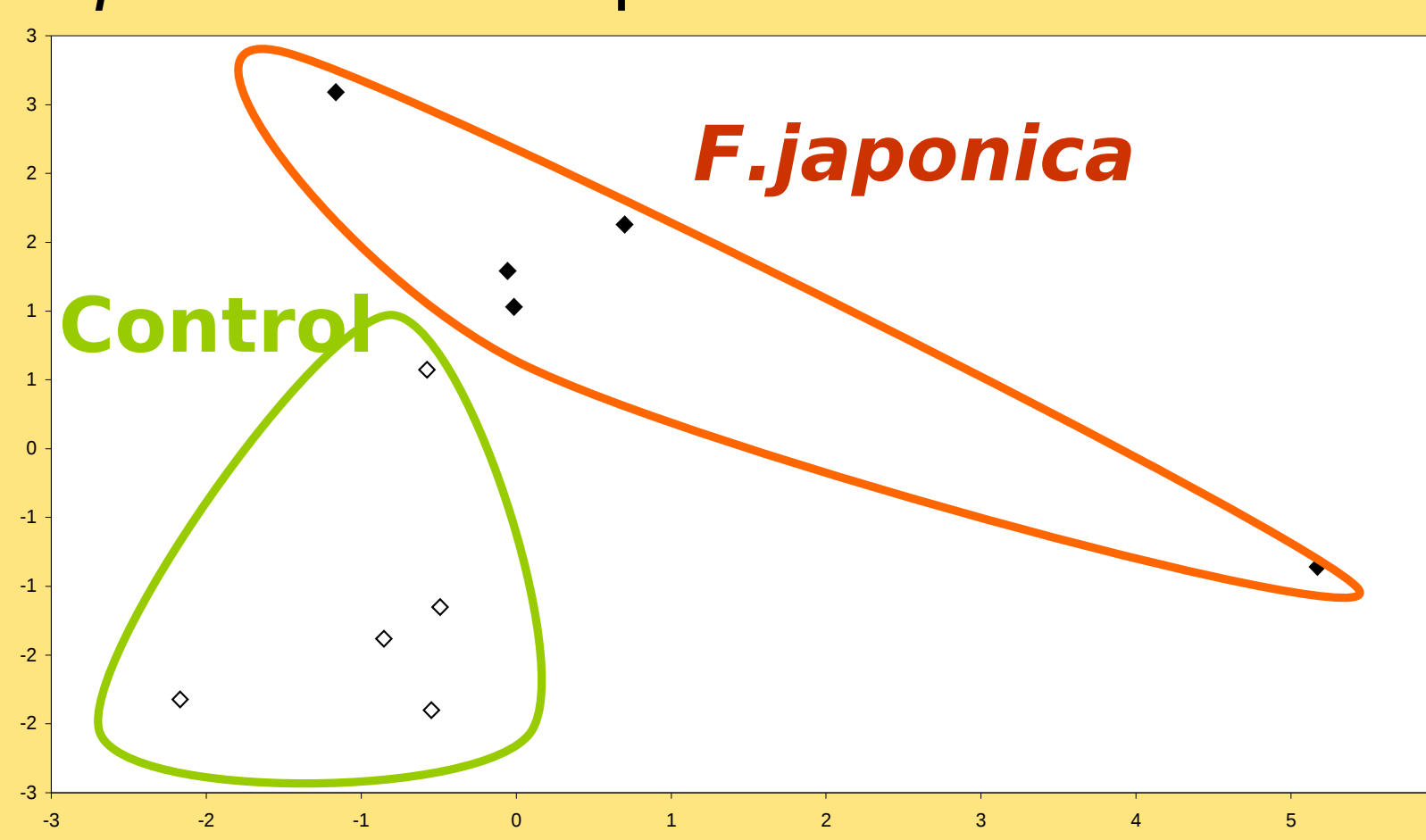


Fig 4 : Principal component analysis (PCA). Projection of the sampling points from the invaded (♦) and the uninvaded (□) plots on PC1 and PC2 for Hypogeic fauna, at one date.

Faunal assemblages are clearly different

⇒ Microclimate modification by *Fallopia* might explain such soil fauna assemblage distinction between vegetation types.

## Perspectives

To test if *F. japonica* has the same impacts on soil fauna in other invaded habitats.

To test if other highly invasive plants in Belgium (*Solidago gigantea*, *Impatiens glandulifera*) have the same impacts as *F. japonica*.