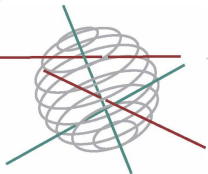


# ALIEN IMPACT

**5. Will climate warming fuel alien plant invasions and enhance impact on the native flora?**

**Ivan Nijs & Maya Verlinden**  
**University of Antwerp**

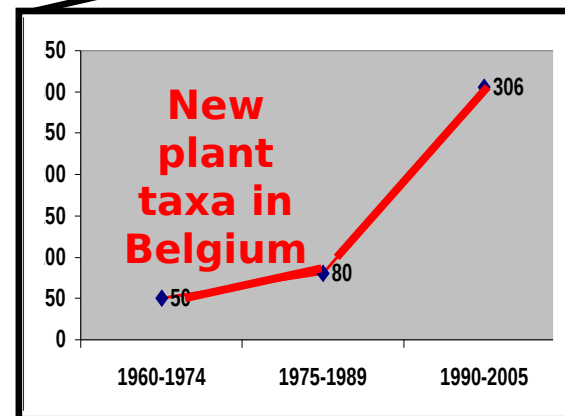
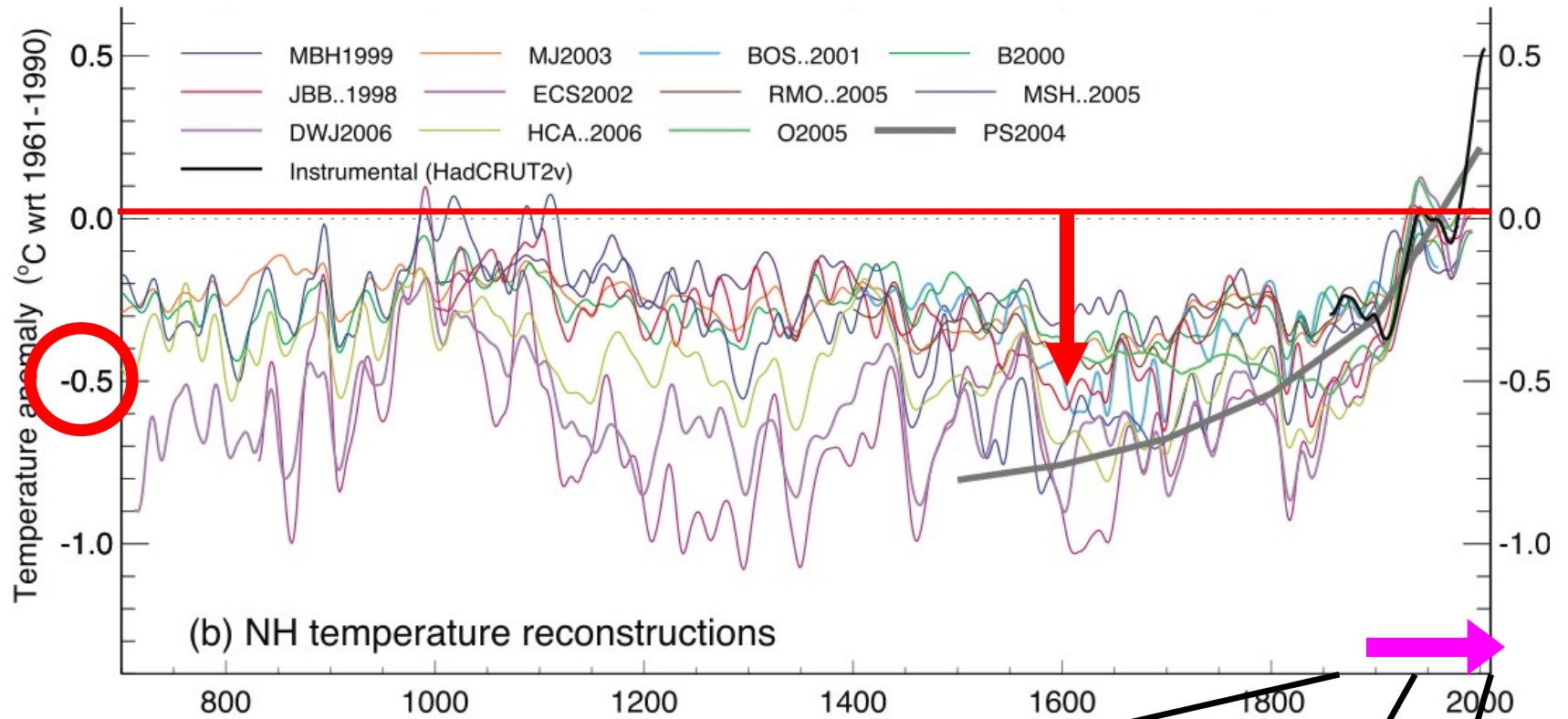




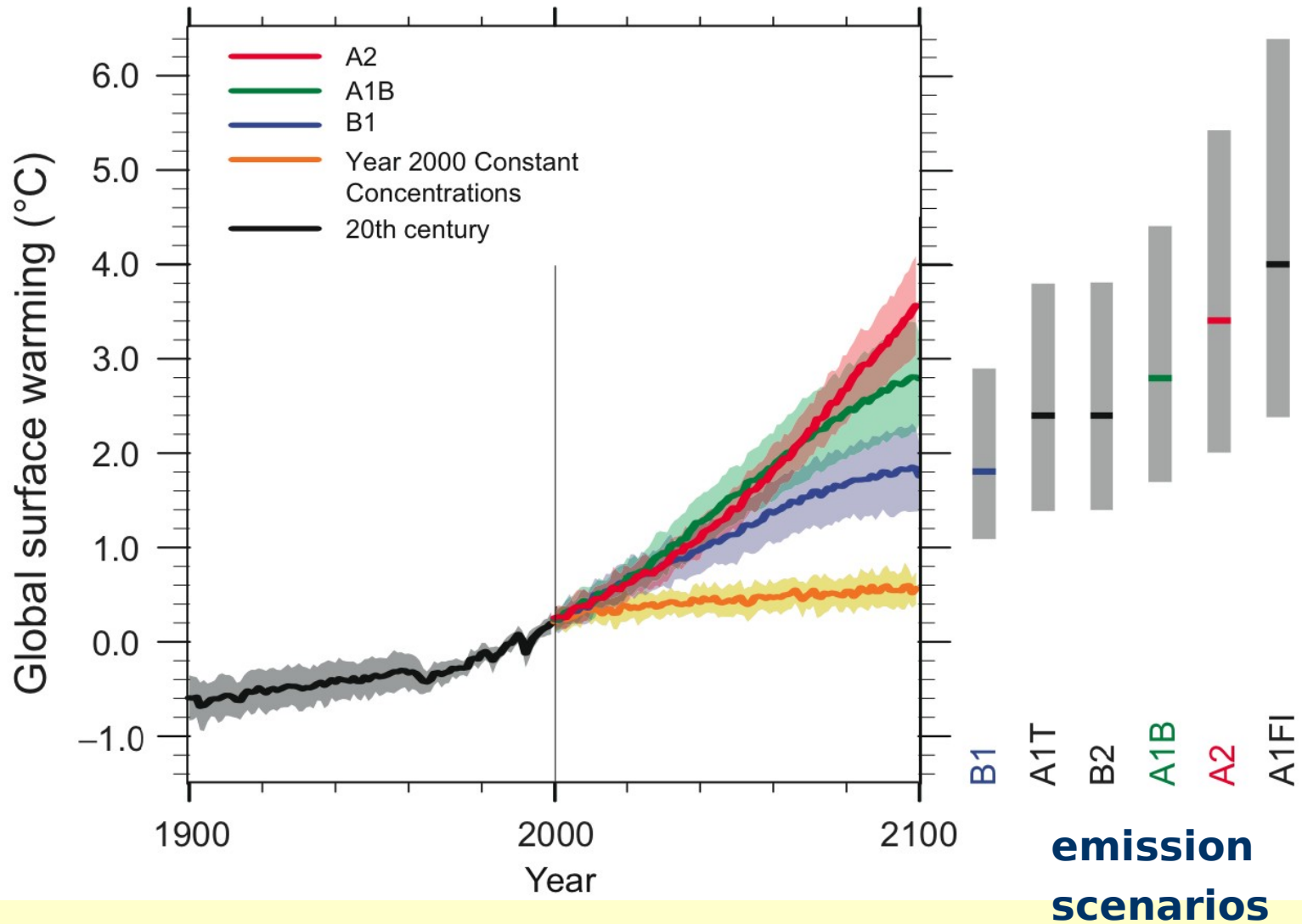
**Ik, Johan**  
G. ROSINSKI - Y. SENTE



**1565**

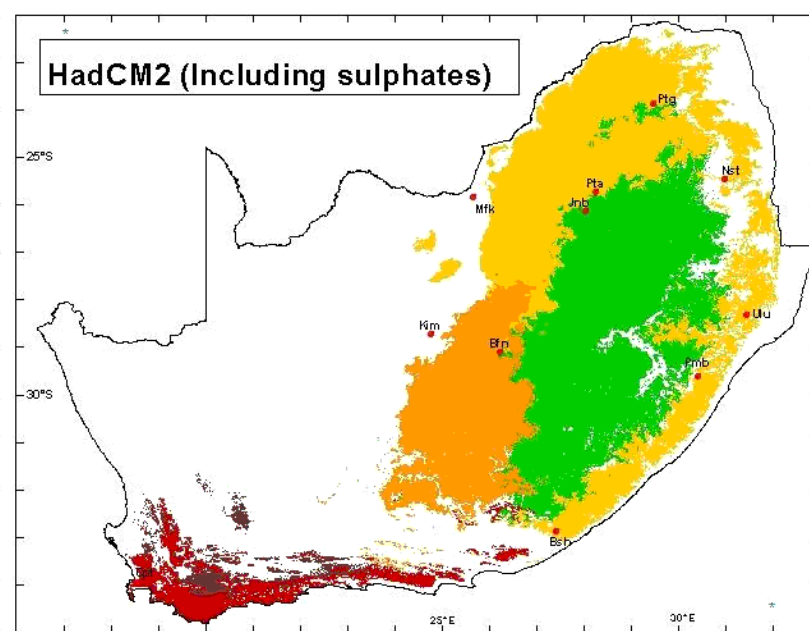
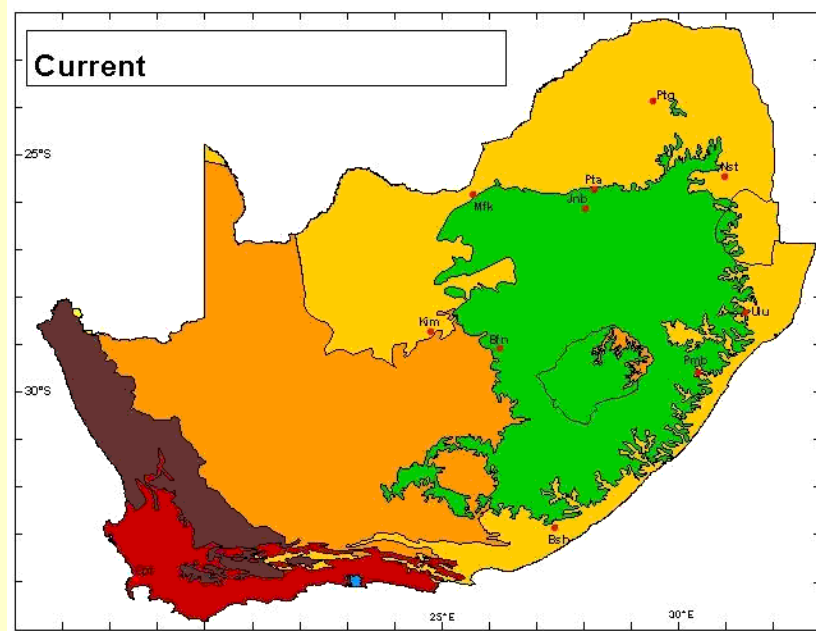


# Multi-model Averages and Assessed Ranges for Surface Warming



# Methods used in studies so far:

- **climate envelope modelling**



Current Southern African E

- Desert
- Forest
- Fynbos
- Grassland
- Nama-Karoo
- Savanna
- Succulent Karoo

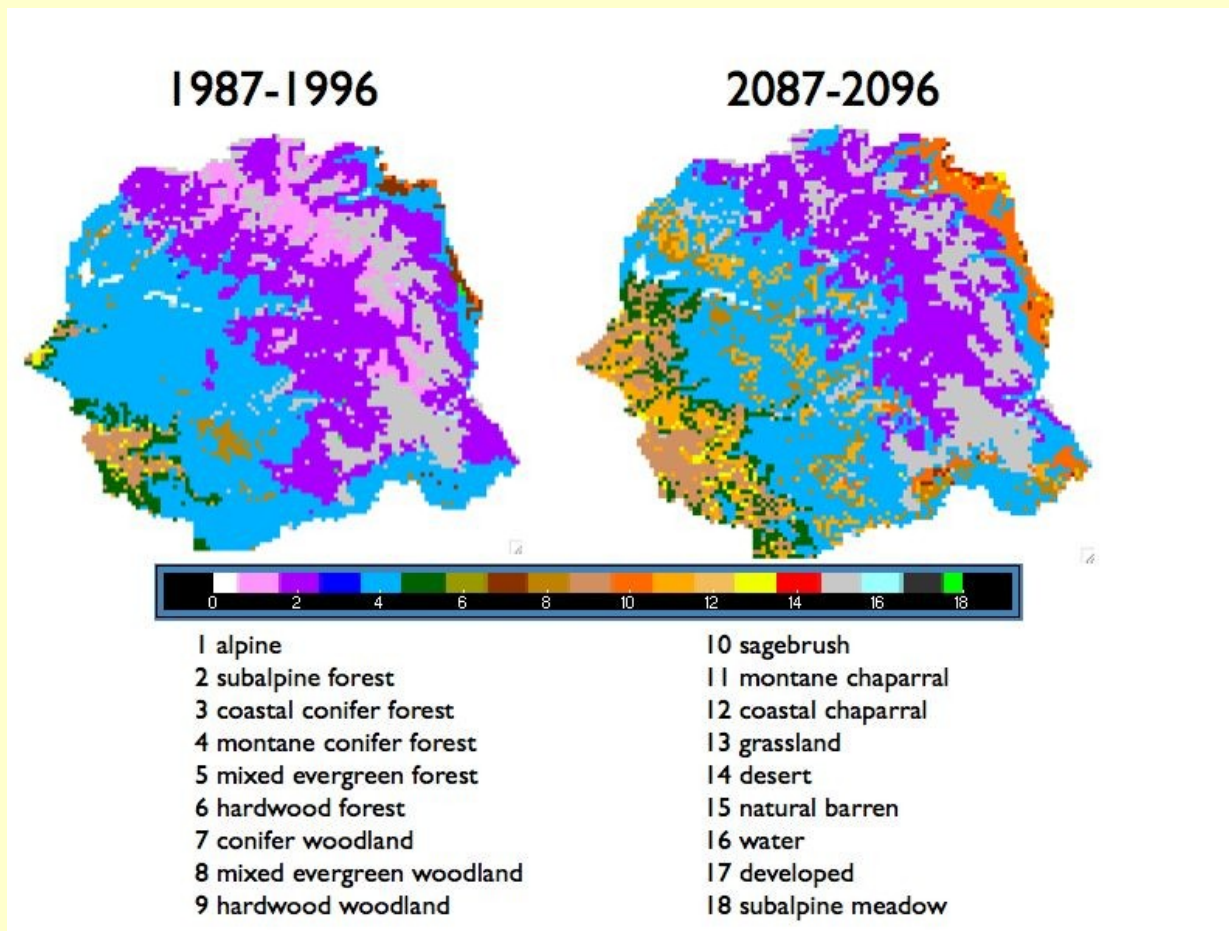
National Botanical Inst  
Climate Change Group  
Kirstenbosch Research  
Cape Town  
South Africa



NATIONAL BOTANICAL INSTITUTE

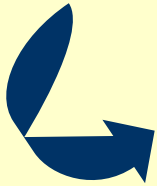
## Possible methods :

- **climate envelope modelling**
- **models of vegetation dynamics (DGVMs)**



## Possible methods :

- **climate envelope modelling**
- **models of vegetation dynamics**
- **growing plants across altitudinal gradients**



**future occurrence: yes**

**future local impact : ?**



# experimental exposure to future conditions



$T_{\text{ambient}}$  or  $T_{\text{ambient}} + 3^{\circ}\text{C}$



## (1) single species



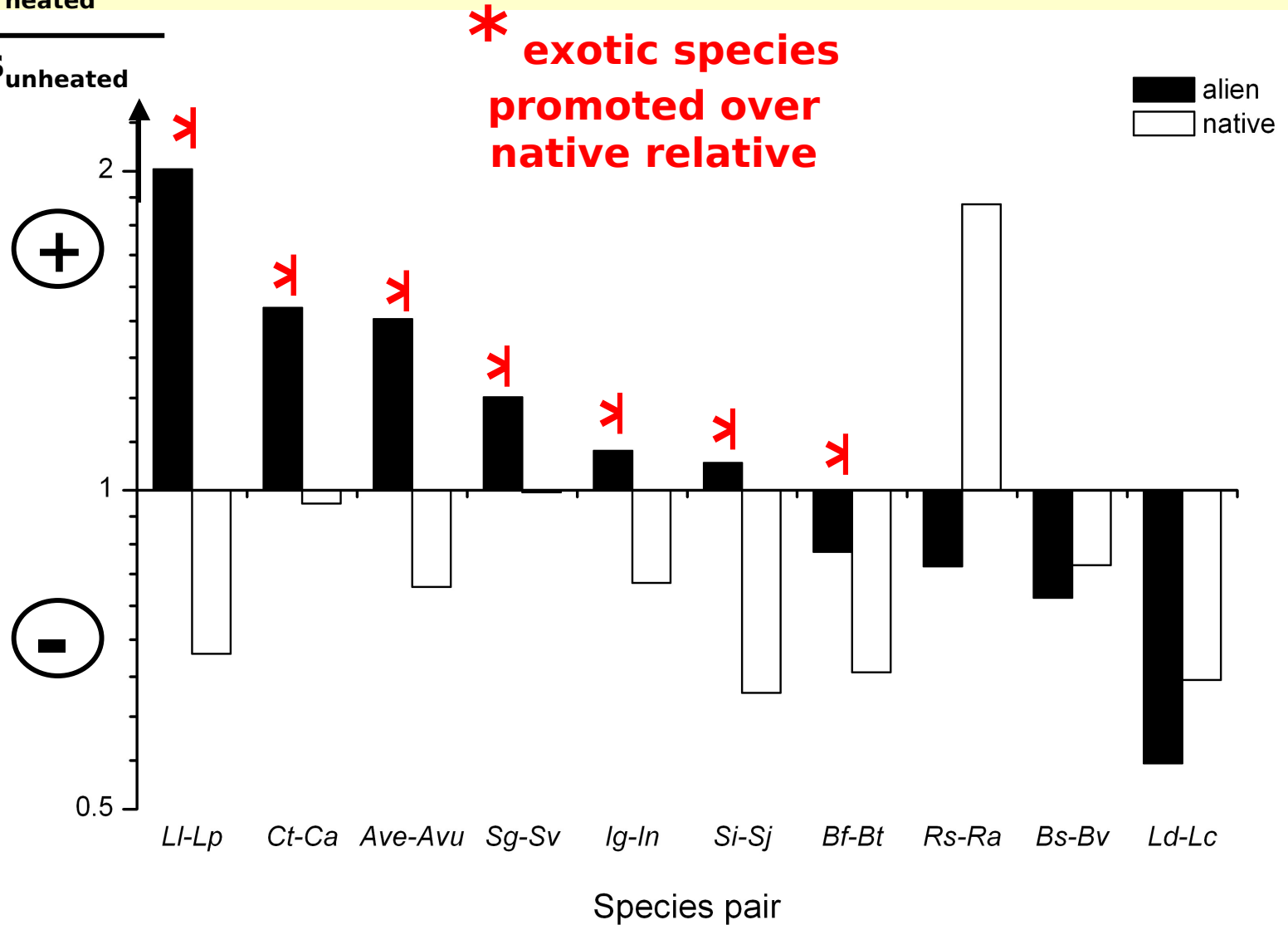
## (2) communities: monocultures (native or invasive) and mixtures



# (1) Single species: do alien species respond better to warming than congeneric natives?

$\text{biomass}_{\text{heated}}$

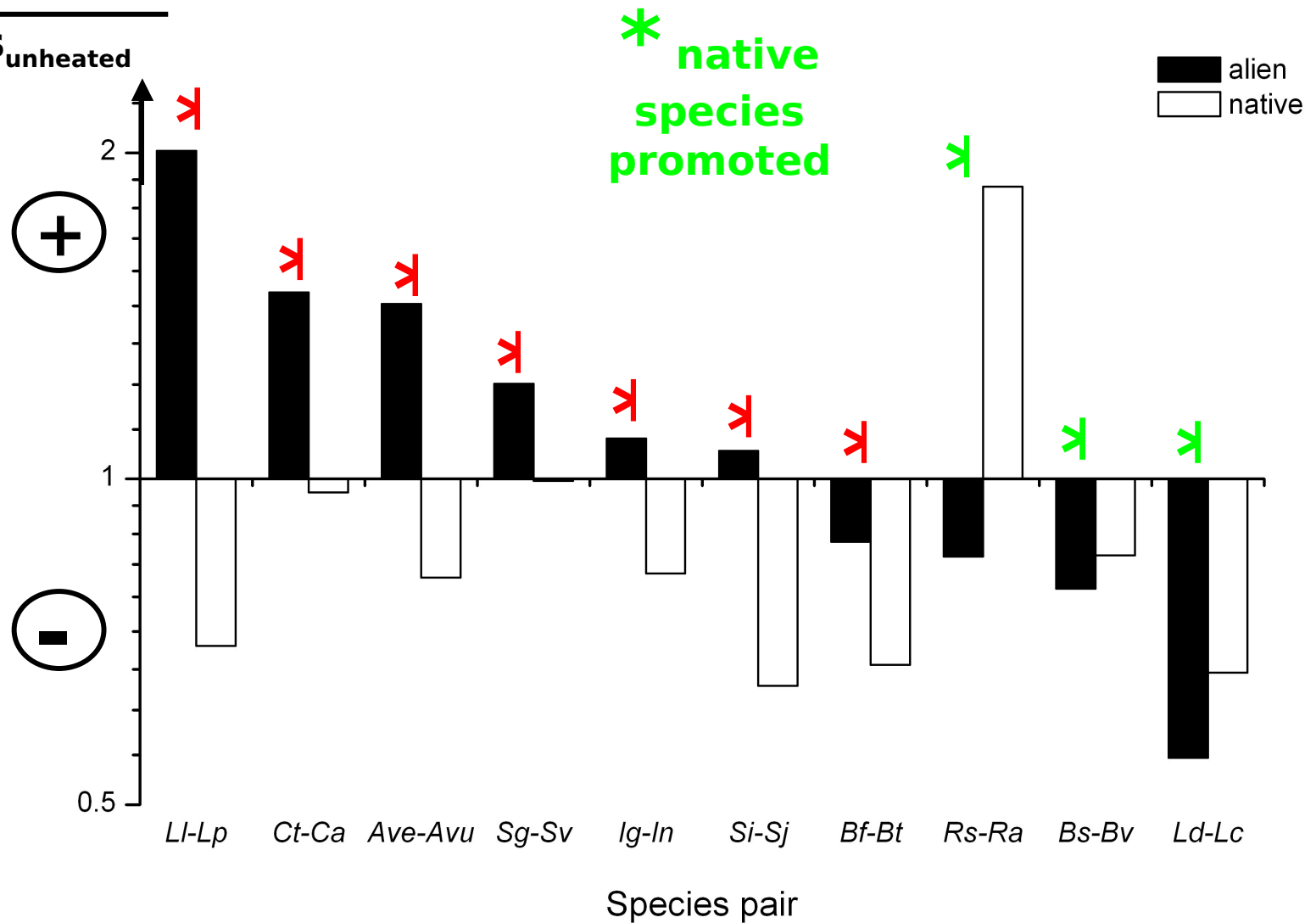
$\text{biomass}_{\text{unheated}}$



# (1) Single species: do alien species respond better to warming than congeneric natives?

$\text{biomass}_{\text{heated}}$

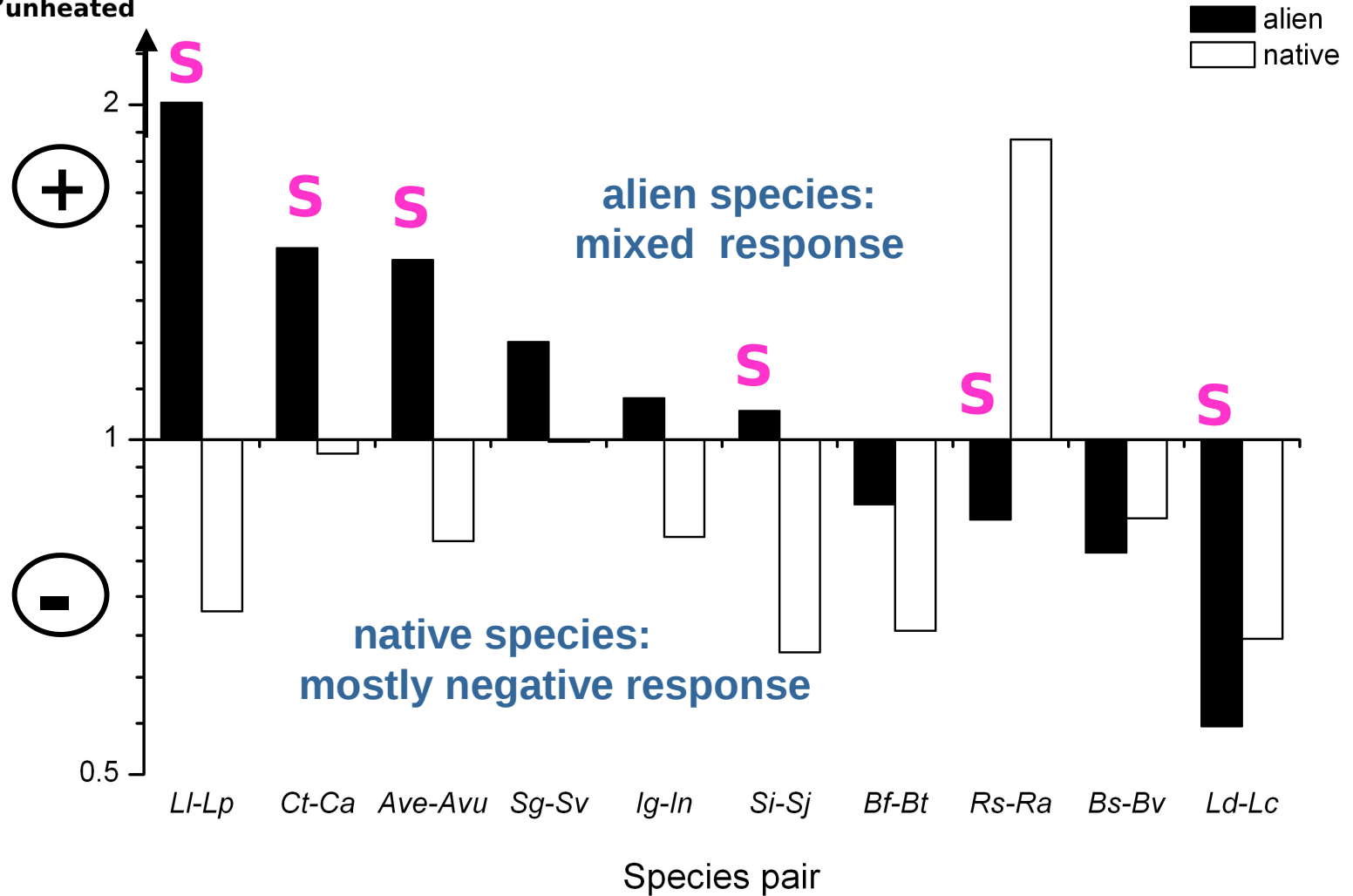
$\text{biomass}_{\text{unheated}}$



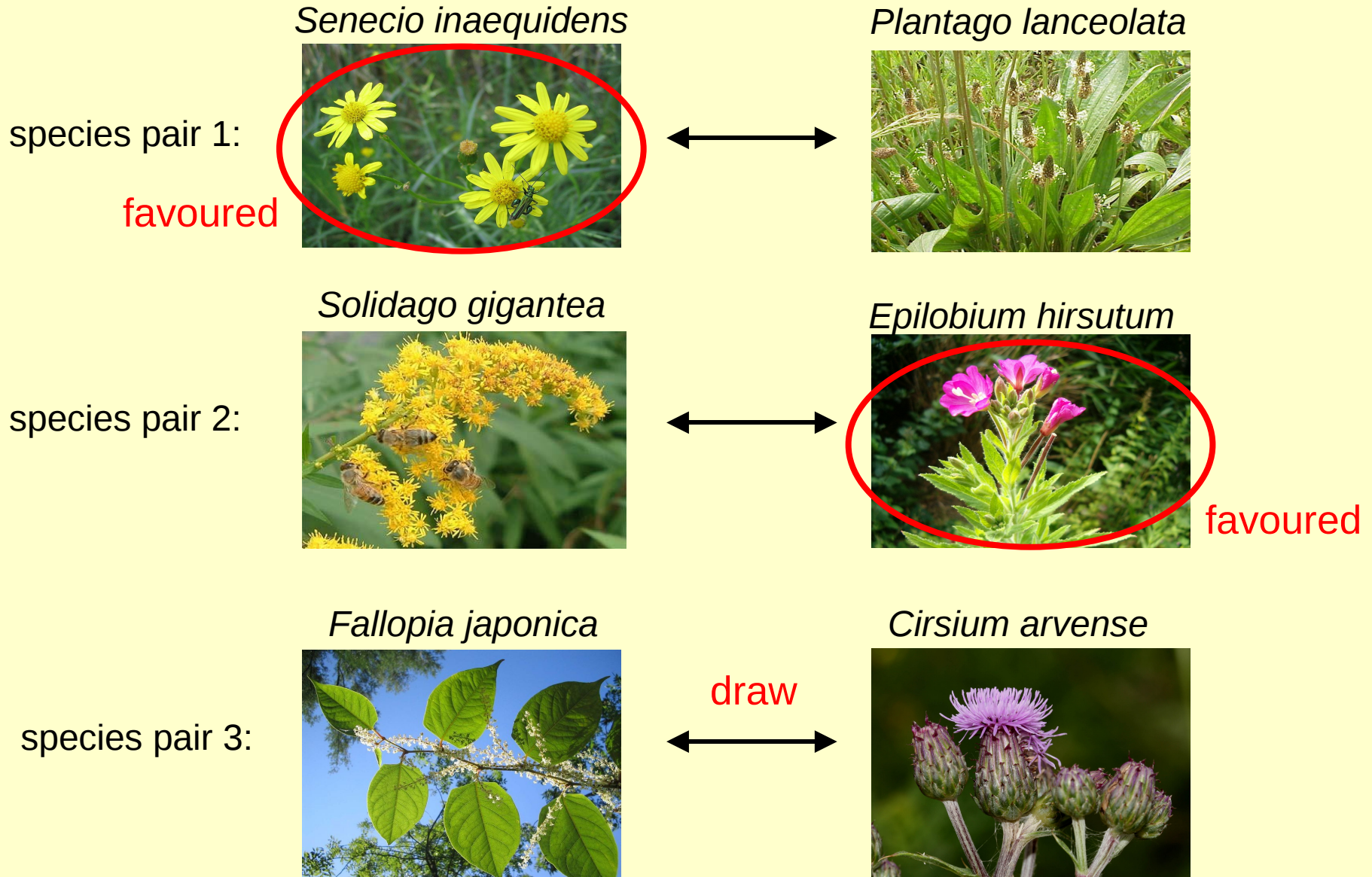
# (1) Single species: do alien species respond better to warming than congeneric natives?

$\text{biomass}_{\text{heated}}$

$\text{biomass}_{\text{unheated}}$

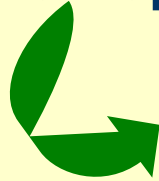


## (2) Communities: does warming make HIPS more competitive?



## Conclusions :

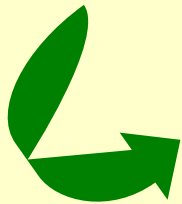
- **congeneric species grown as single plants:**
- **natives responded mostly negatively to warming, vs. alien species mixed**



**more alien species might thrive**

## Conclusions :

- **congeneric species grown as single plants:**
  - natives responded mostly negatively to warming, vs. alien species mixed
  
- **competing HIPS and natives in communities:**
  - some HIPS became more aggressive under warming, but other HIPS less

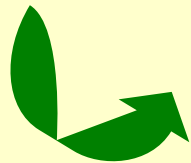


current “trouble species” might alter



## Conclusions :

- **congeneric species grown as single plants:**
  - natives responded mostly negatively to warming, vs. alien species mixed
  
- **competing HIPS and natives in communities:**
  - some HIPS became more aggressive under warming, but other HIPS less
  - not always predictable from their monoculture response



**competition experiments needed**



## Species pairs:

3. *Solidago gigantea* – *Solidago virgo-aurea*
4. *Rumex scutatus* – *Rumex acetosa*
5. *Impatiens glandulifera* – *Impatiens noli-tangere*
6. *Senecio inaquidens* – *Senecio jacobaea*
7. *Bidens frondosa* – *Bidens tripartita*
8. *Artemisia verlotiorum* – *Artemisia vulgaris*
9. *Barbarea stricta* – *Barbarea vulgaris*
10. *Lathyrus latifolius* – *Lathyrus pratensis*
11. *Cerastium tomentosum* – *Cerastium arvense*
12. *Lepidium draba* – *Lepidium campestre*