

# Baking quality of wheat organic heterogeneous material and variety mixtures: much more than flour blends

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# Context

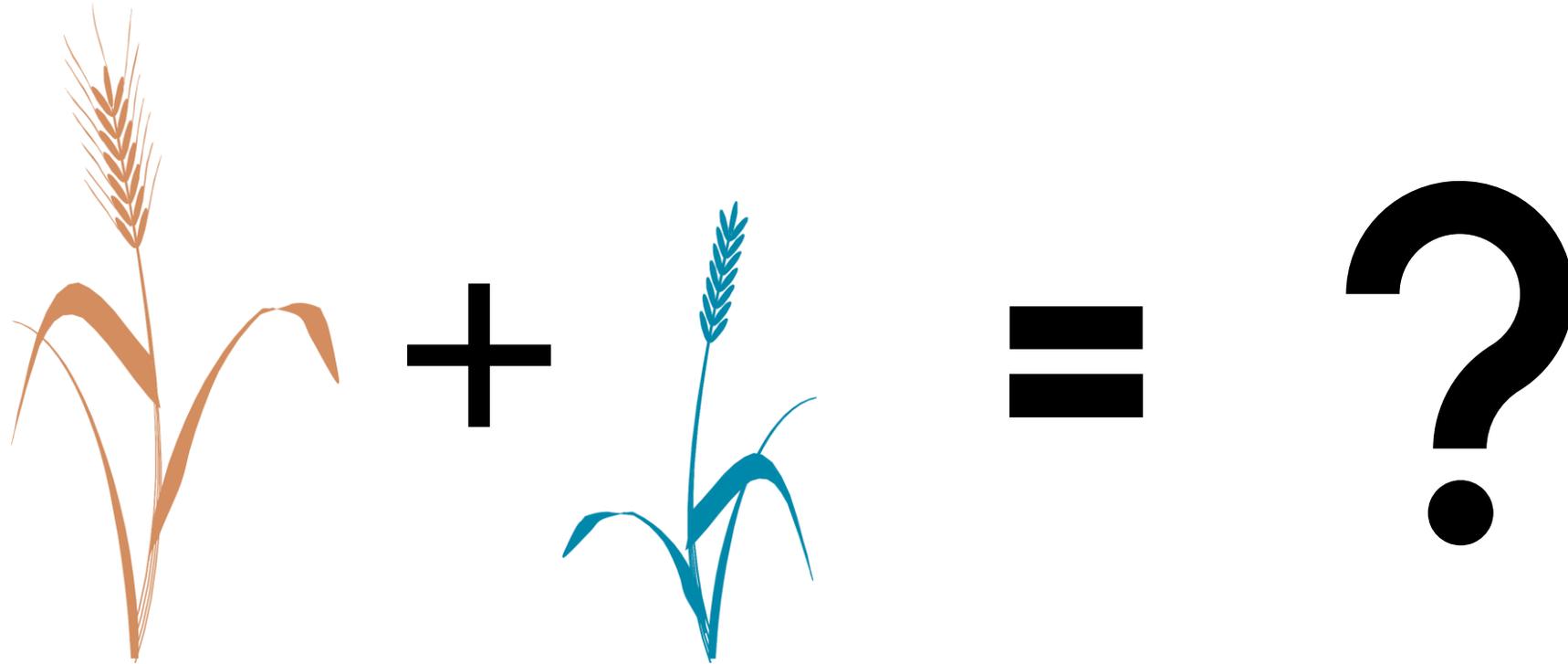
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- Innovation for organic breeding : intra-crop diversity
  - Variety mixtures
  - « Organic Heterogeneous Material »
- Advantages :
  - Increased stability – **compensation** & adaptation
  - Increased performance – **complementarity**



**Little knowledge yet about assembly rules**

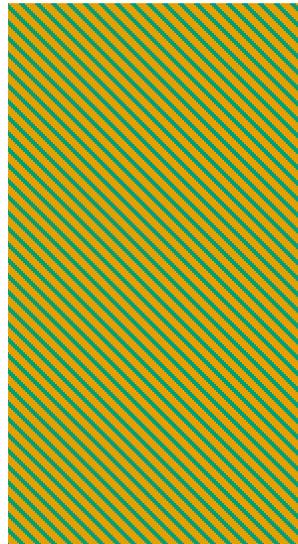
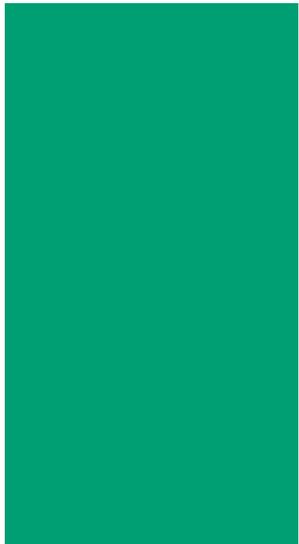
Research question : identify beneficial or detrimental trait associations



# Methodology

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- Organic trials in Gembloux, Belgium
- Compare variety mixtures with their constituting pure stand varieties
  - Hagberg Falling Number, Zélény Sedimentation test, grain protein



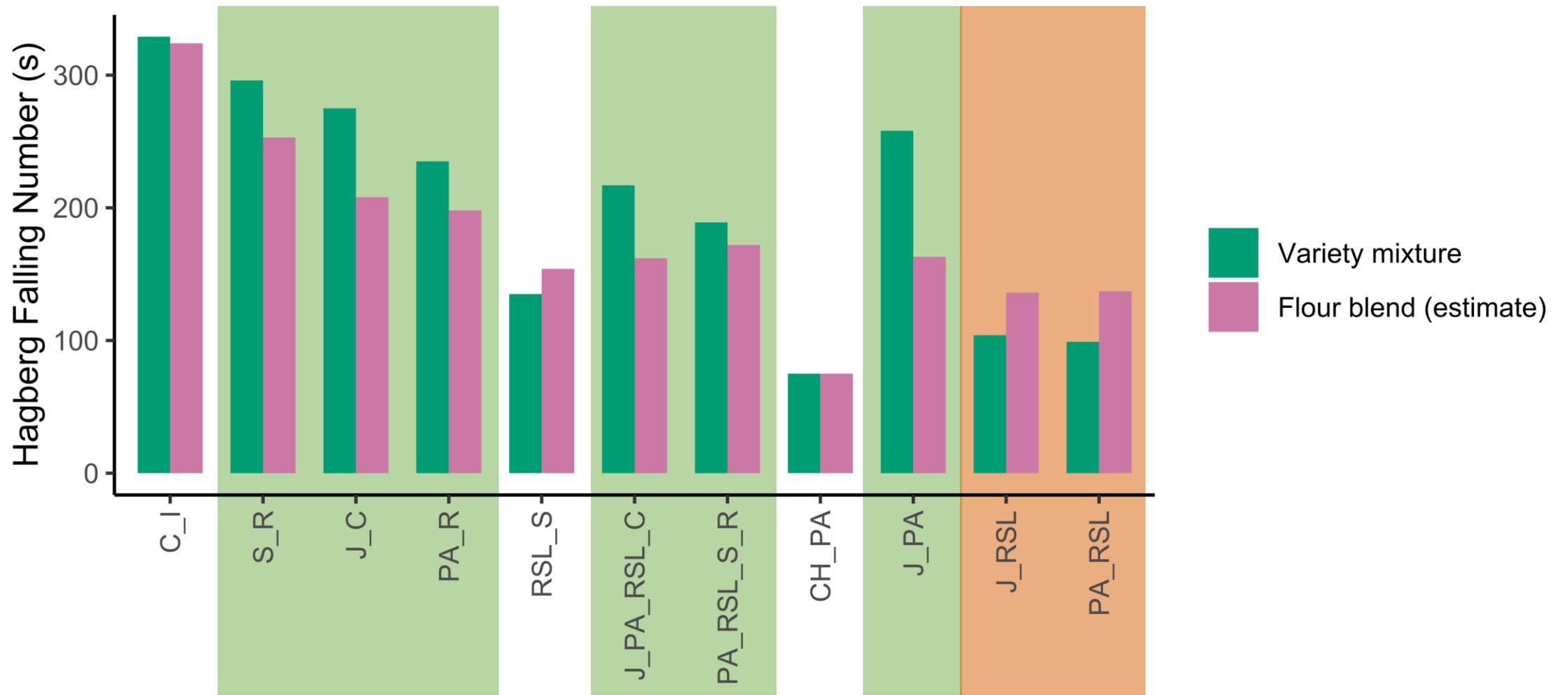
# Methodology – mixtures

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- 11 mixtures:
  - 9 two-variety mixtures
  - 2 four-variety mixtures
- Replacement design, equal proportions
- Combinations of 8 varieties:
  - 4 modern varieties: (Renan, Soissons, Imperator, Claire)
  - 4 heritage varieties: (White Chiddam, Japhet, Rouge de Saint-Laud, Prince Albert)
- Assembly logic: gradients of contrasts



# Results

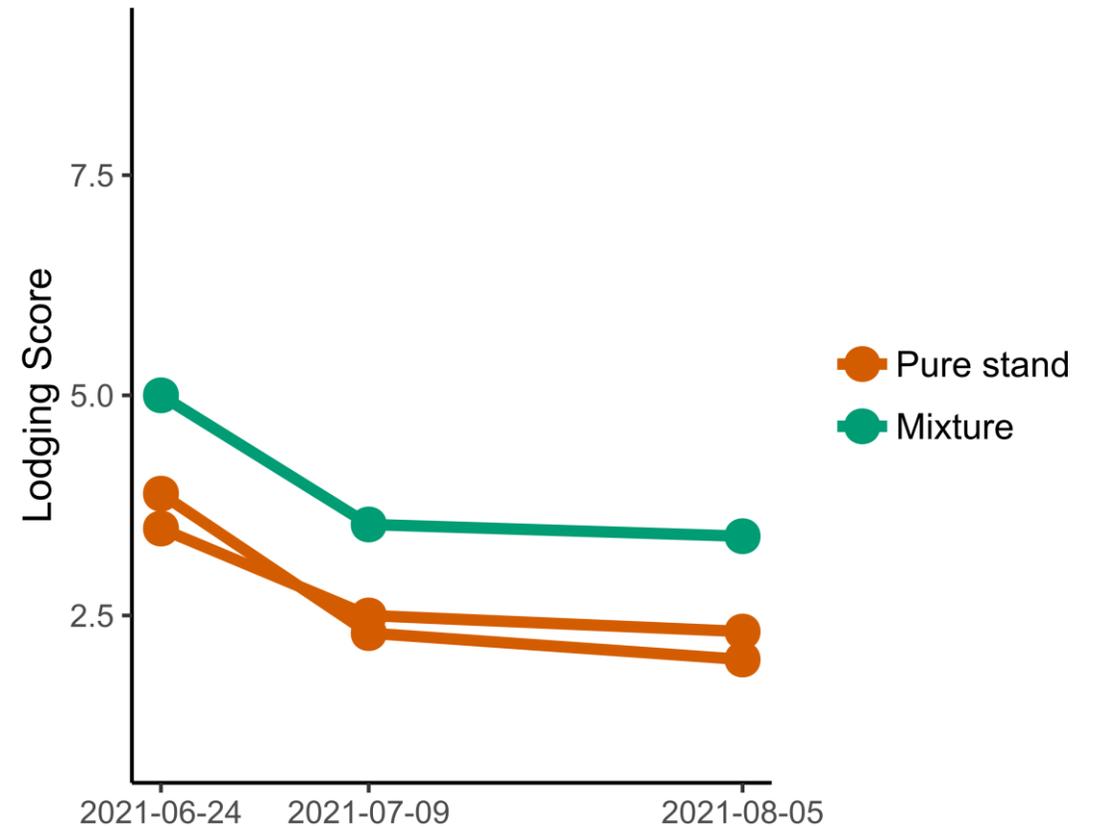
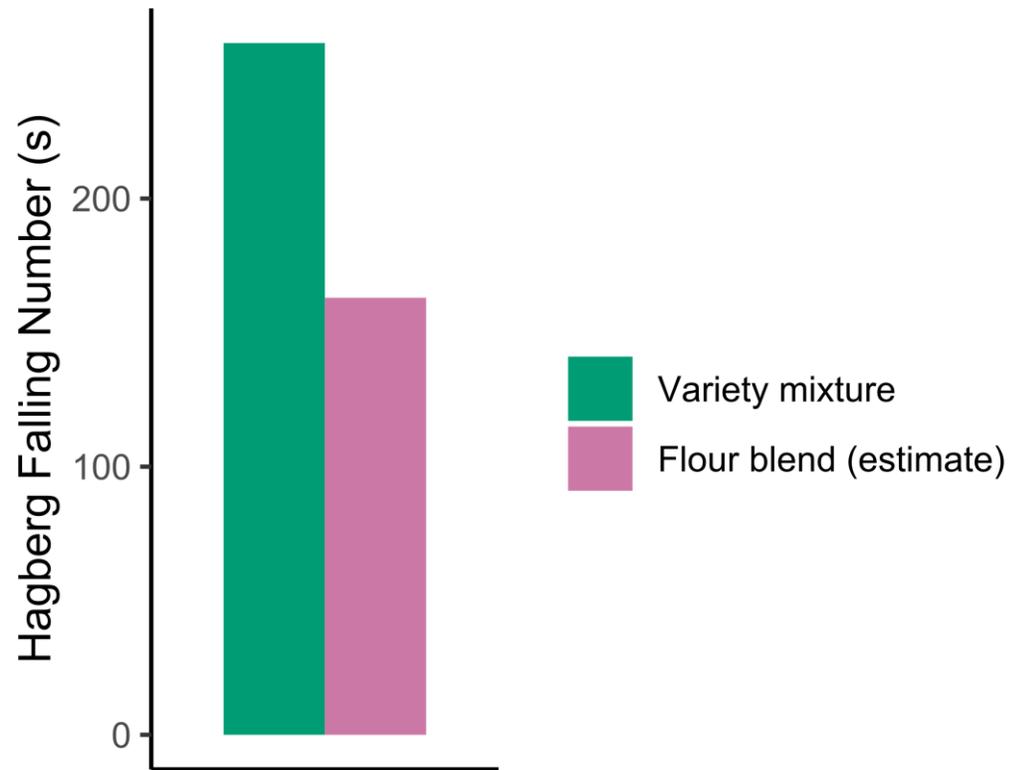


## Results – Hagberg Falling Number

- Mostly positive effect
- Related to lodging

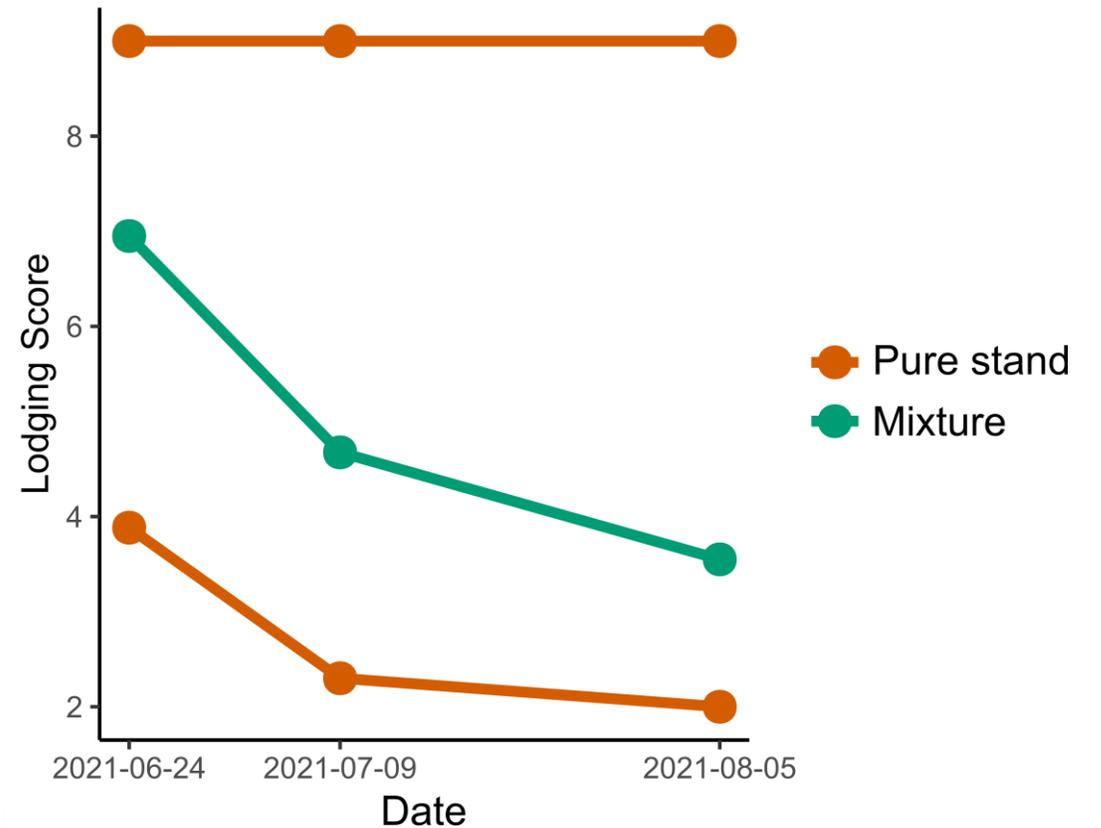
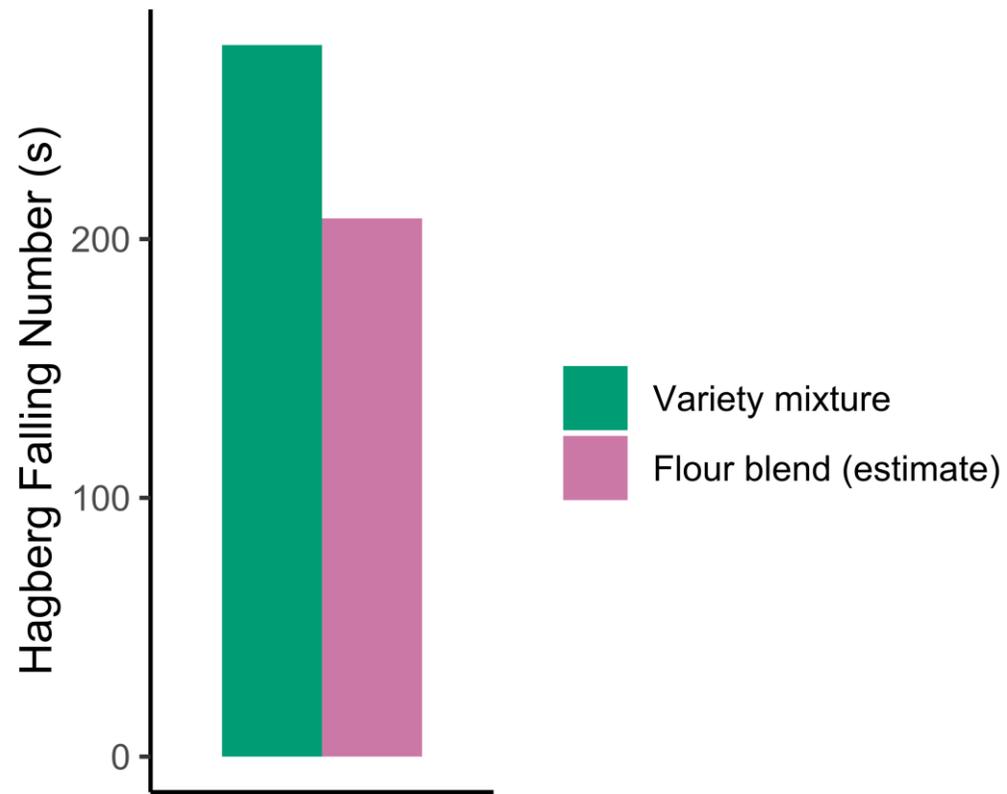
# Mixture outperforms both components

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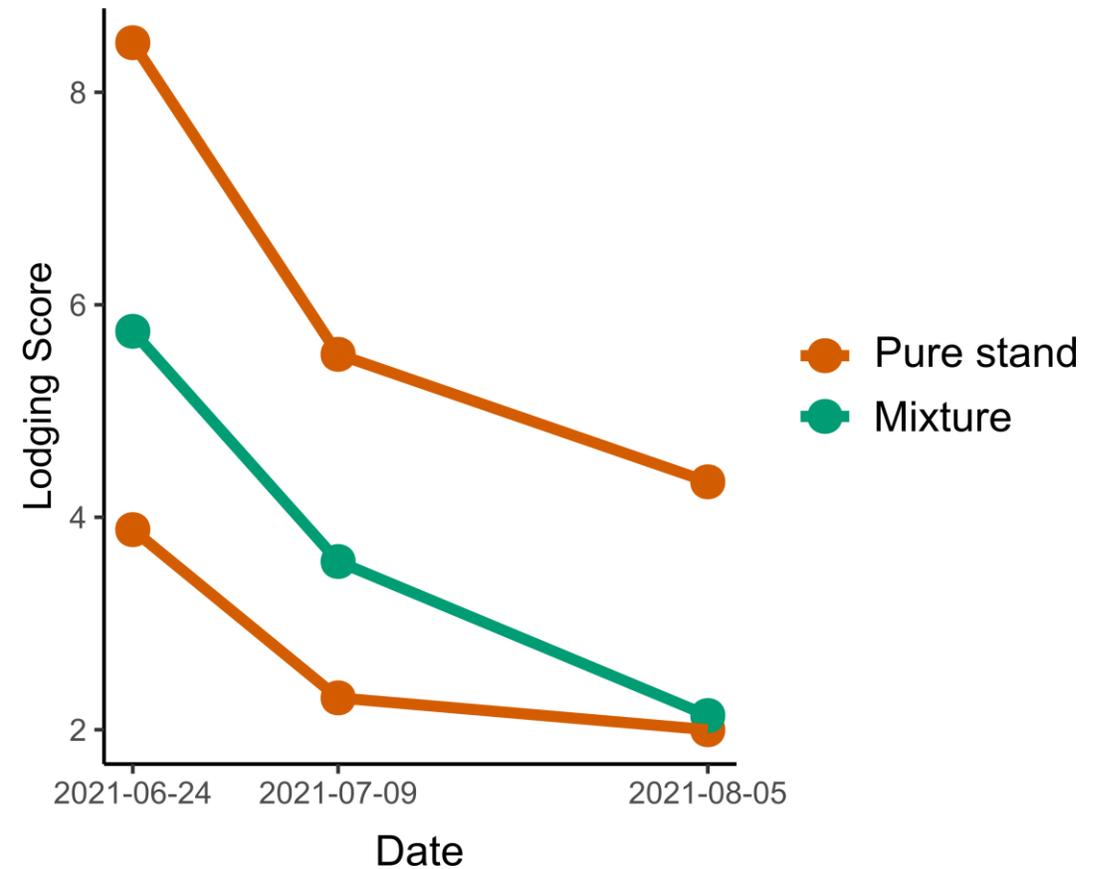
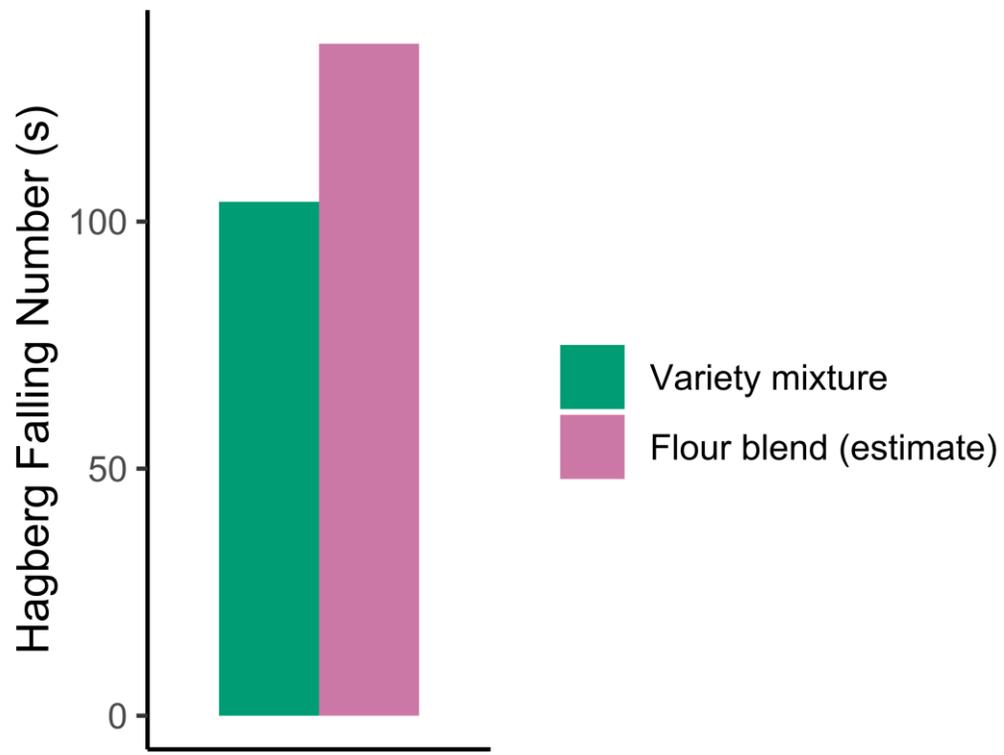
# Mixture outperforms worst component

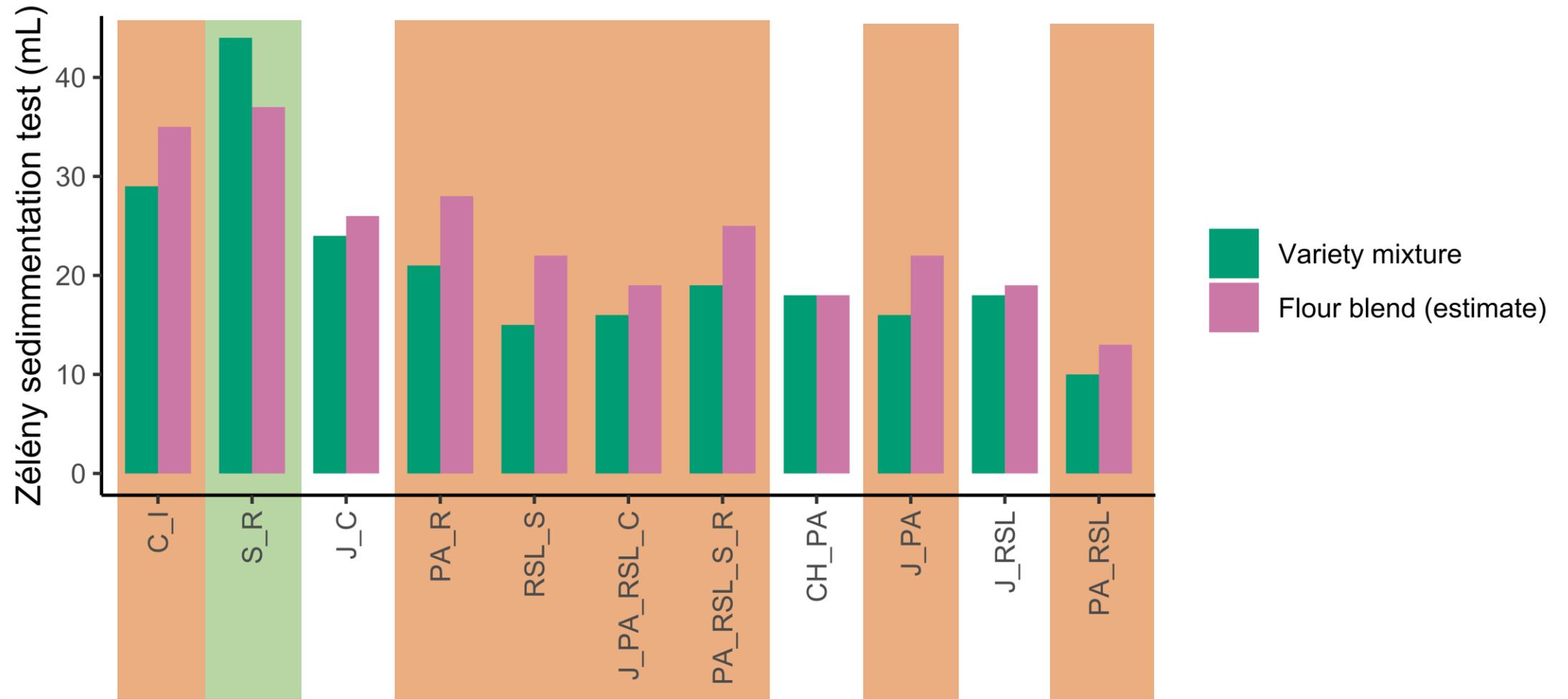
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# Mixture performs as bad as worst component

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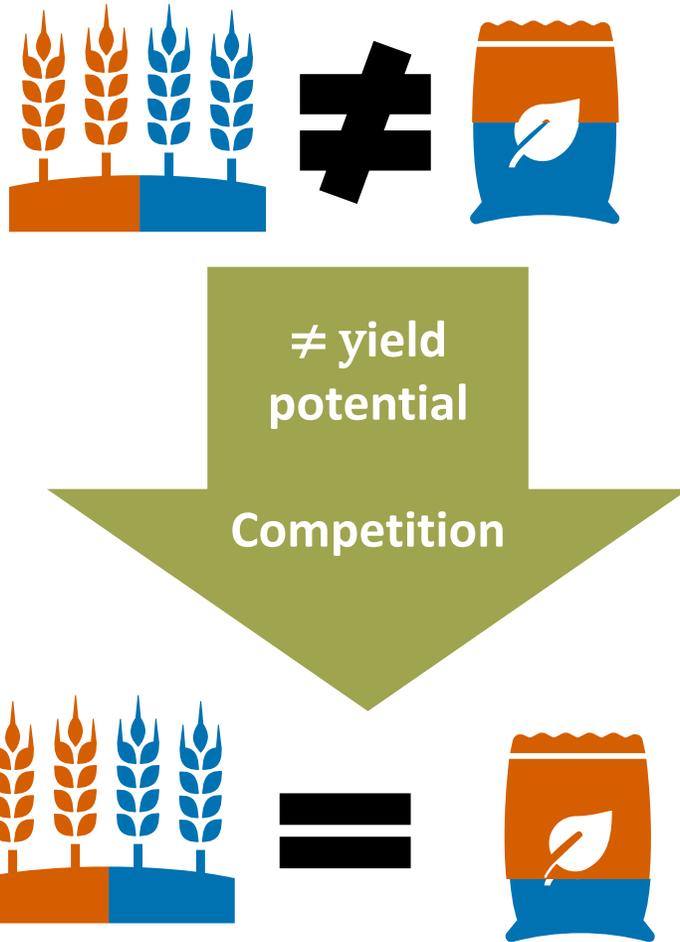


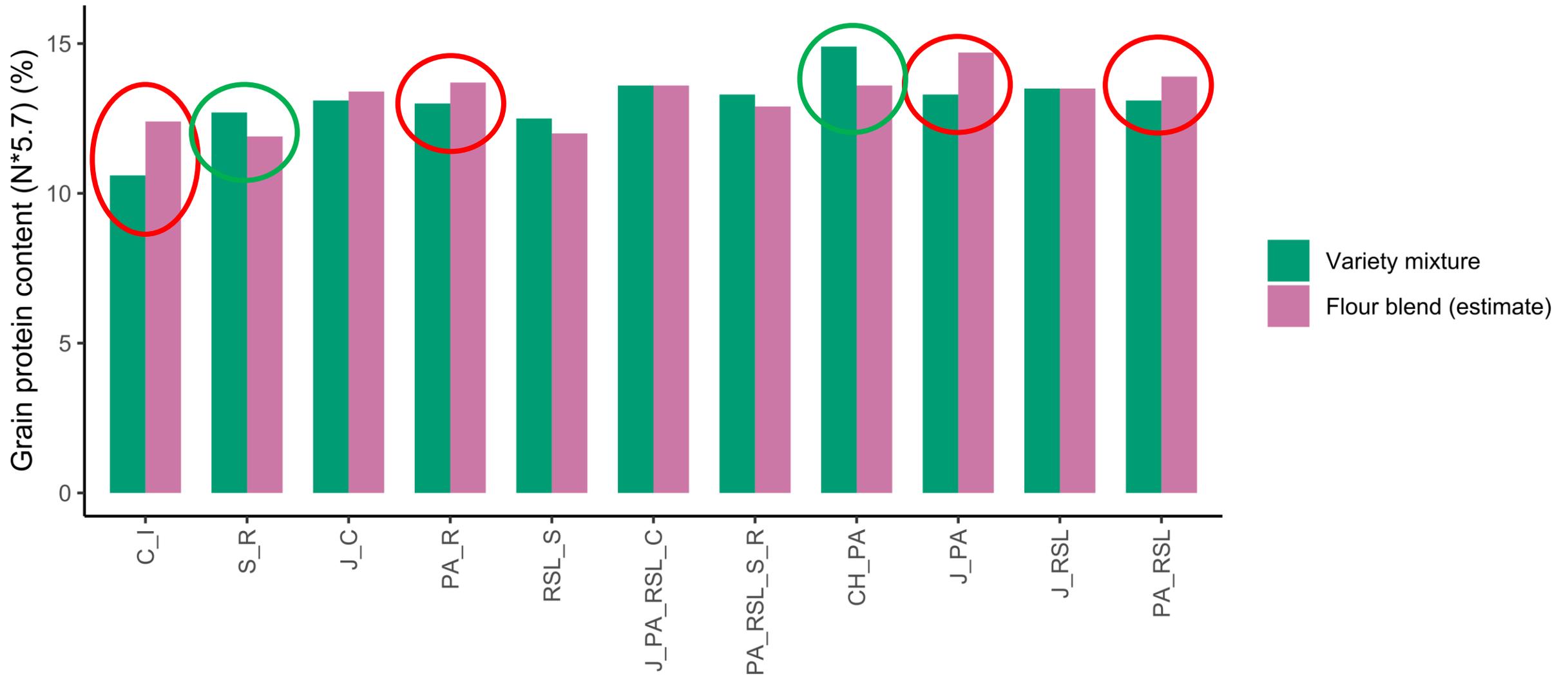


Results – Zélény sedimentation test

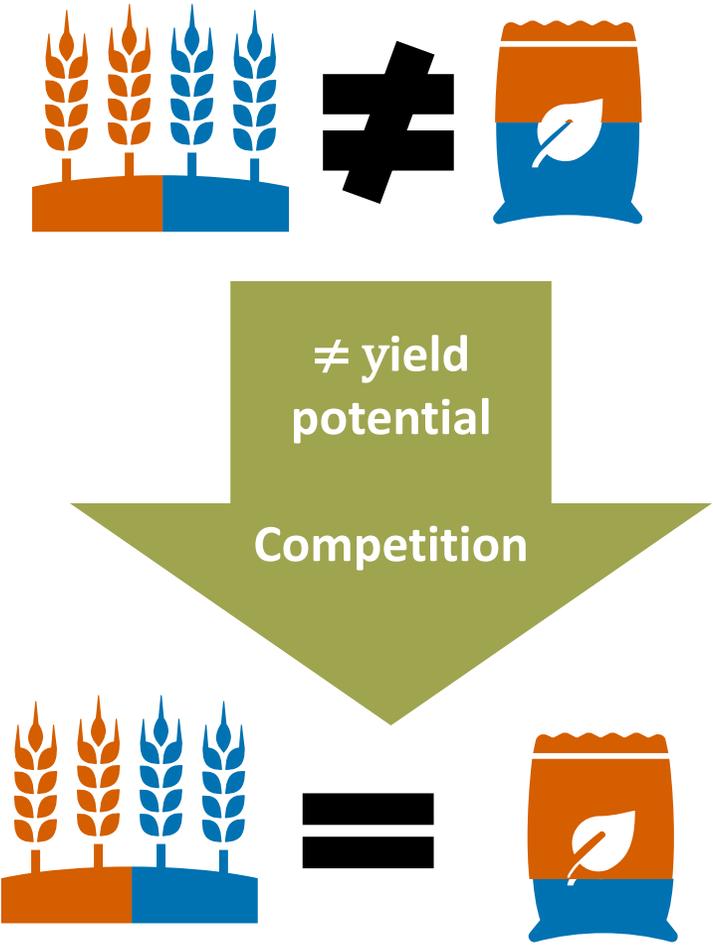
- Mostly negative effect

## Proportion of both varieties the mixture

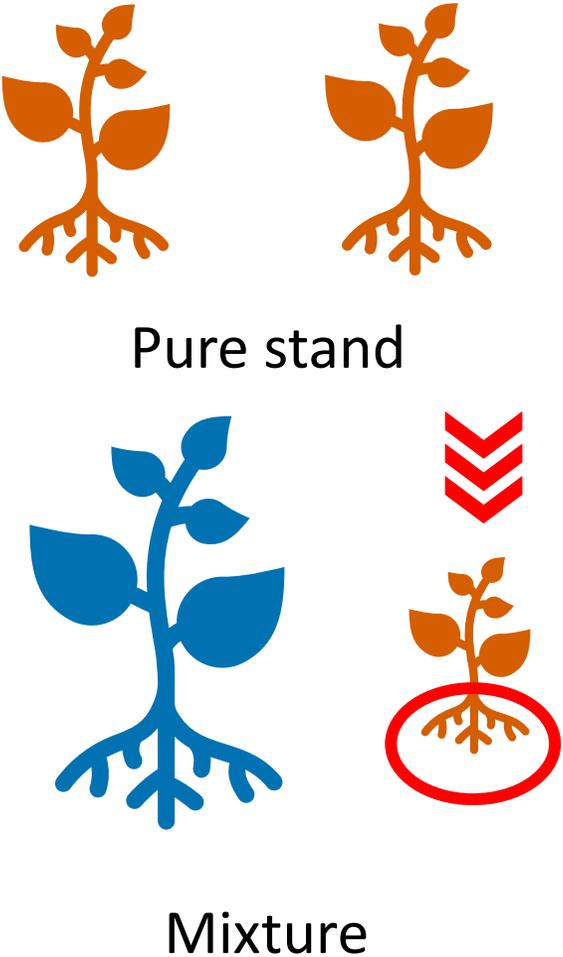


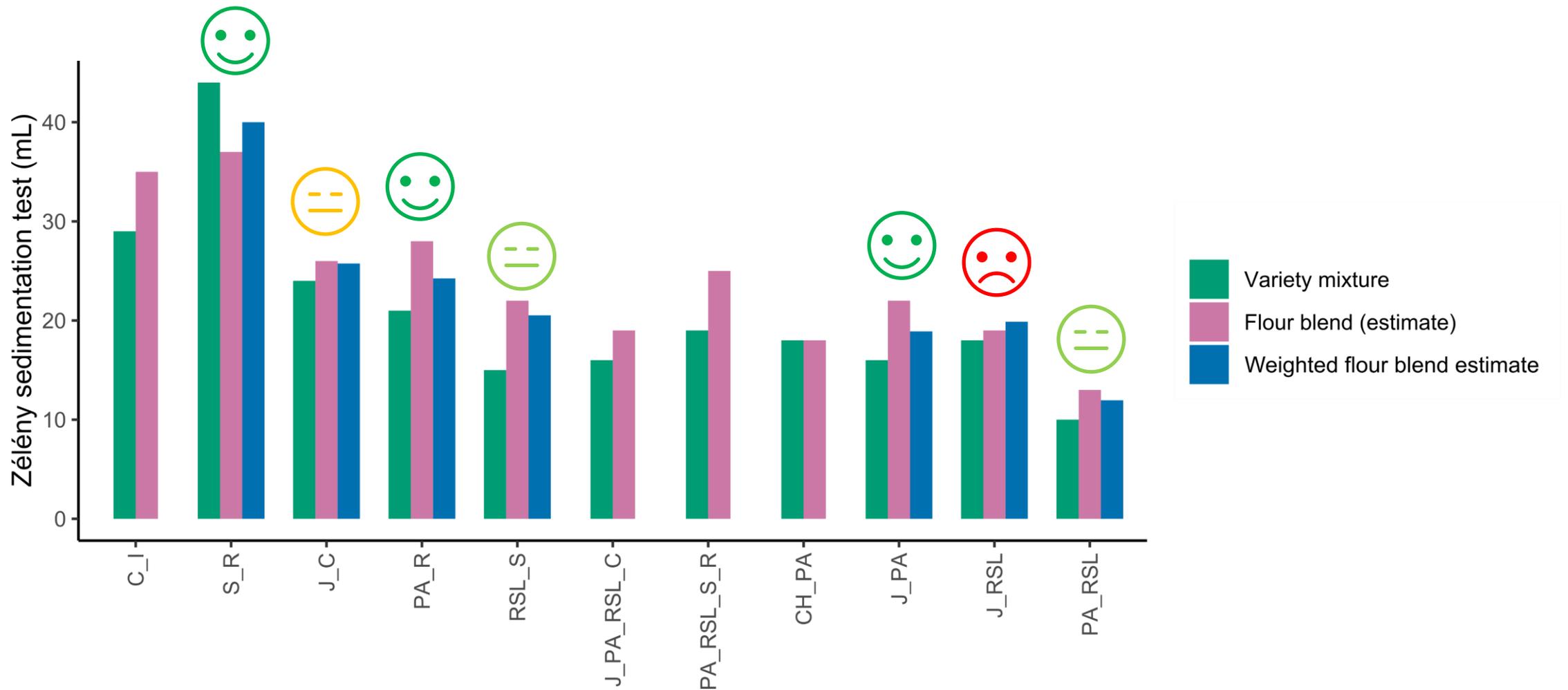


# Proportion of both varieties the mixture



# Competition and nitrogen absorption (hypothesis)





Results – Zélény sedimentation test

- Mostly negative effect

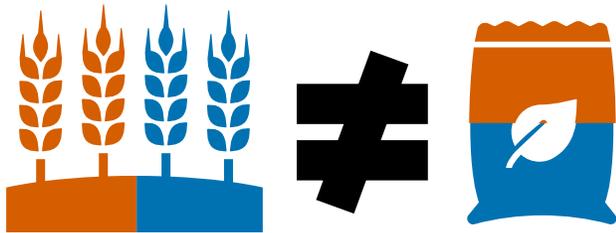
- ≠ proportion

- Root competition & nitrogen absorption

# Take-home messages

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## Variety mixtures $\neq$ flour blends



Proportions at harvest



Competition  
(e.g. soil nitrogen)



Facilitation  
(e.g. lodging)

-> Knowledge about in-field interactions is important!



Thank you for your attention

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