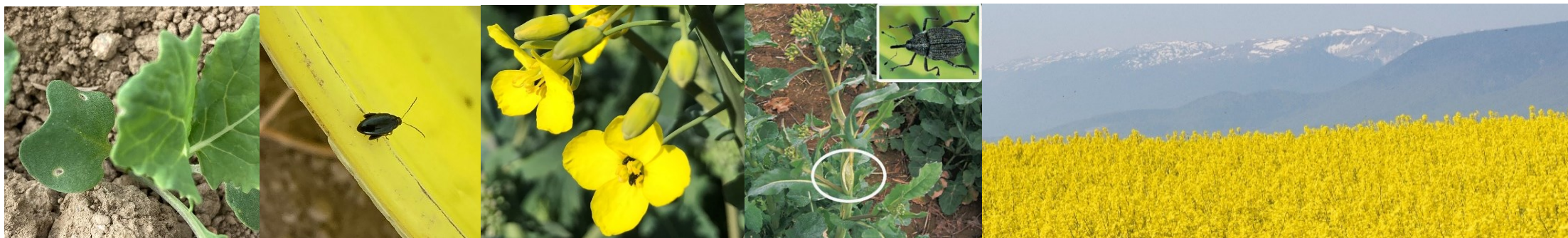


# Integrating sustainability criteria into rapeseed variety performance testing

## An on-farm research network to assess variety pest tolerance



*Eve-Anne Laurent, Laurie Magnin, Romane Thaize, Victoire Carette, Alexy Grand, Katrin Carrel-Spielmann, Mathias Christen, Diane François, Briec Lachat, Marina Wendling, Stève Breitenmoser, Ivan Hiltpold, Alice Baux*

04/10/2025

[www.agroscope.ch](http://www.agroscope.ch) | une bonne alimentation, un environnement sain



# Project Objectives



Complex phenotyping

*Plant  
parameters*



*Insect  
activity*

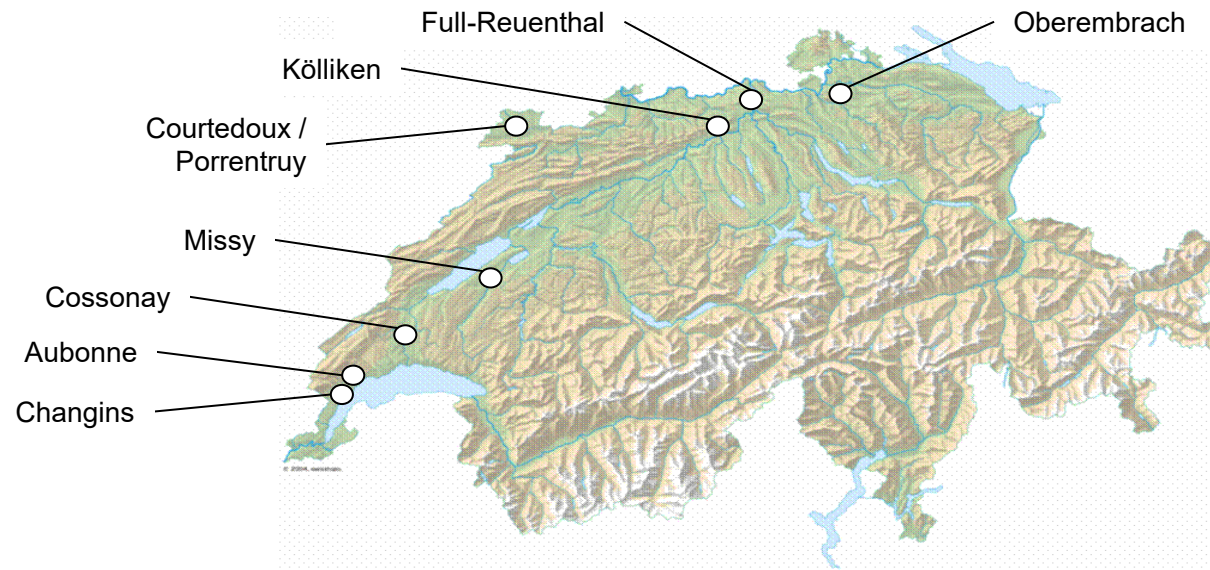


- Identify rapeseed varieties with better pest tolerance
- Compare hybrids and inbred lines under organic conditions
- Assess the effect of rapeseed–faba bean intercropping



# Established trials (2022 – 2024)

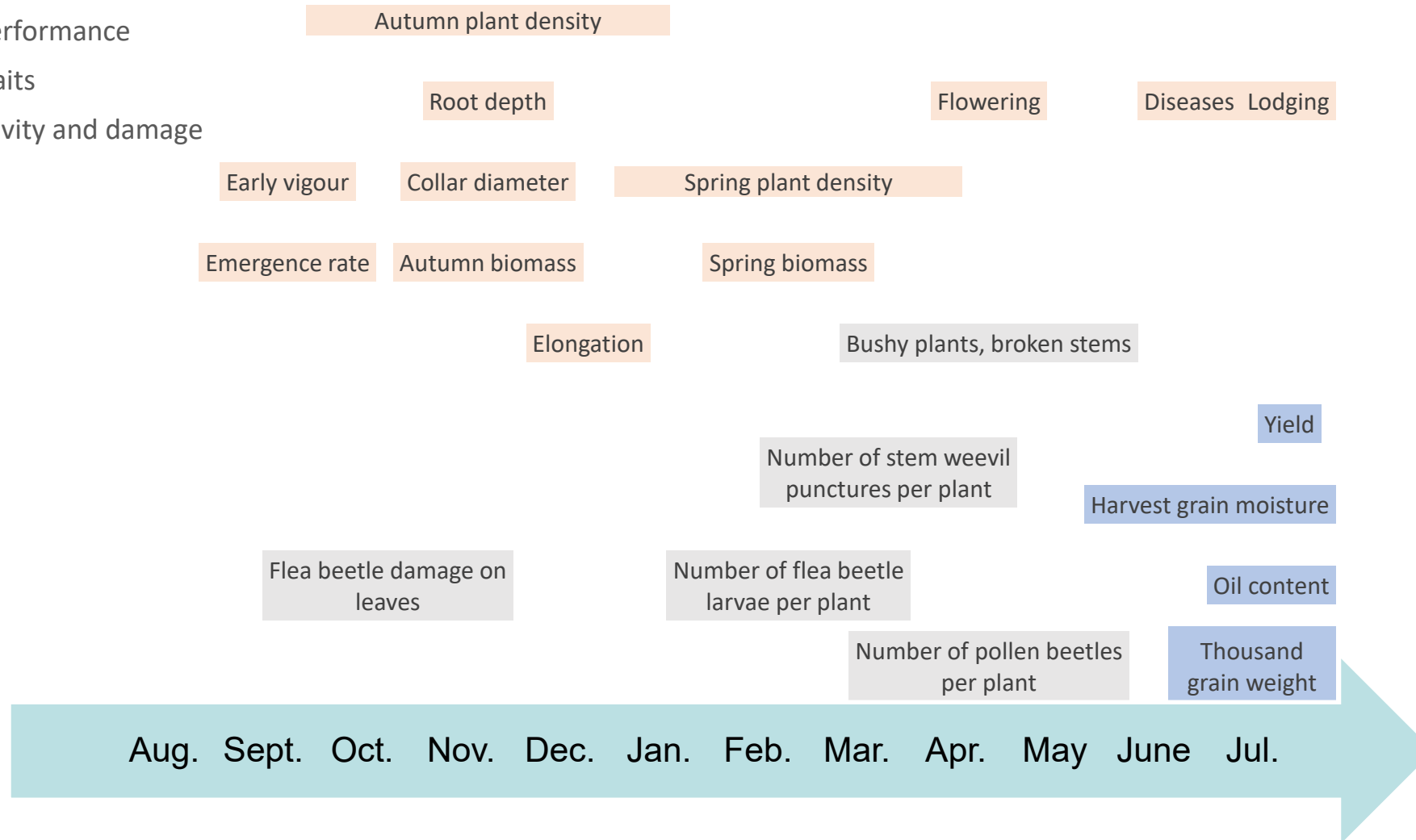
- A network of variety testing trials under organic conditions
- Small plot variety testing trials under extensive conditions
- A trial with three rapeseed varieties intercropped with faba beans
- A trial comparing winter and spring faba bean intercropping
- A greenhouse trial assessing the effect of faba beans on 3 rapeseed varieties (hybrid, inbred line, hybrid HOLL)





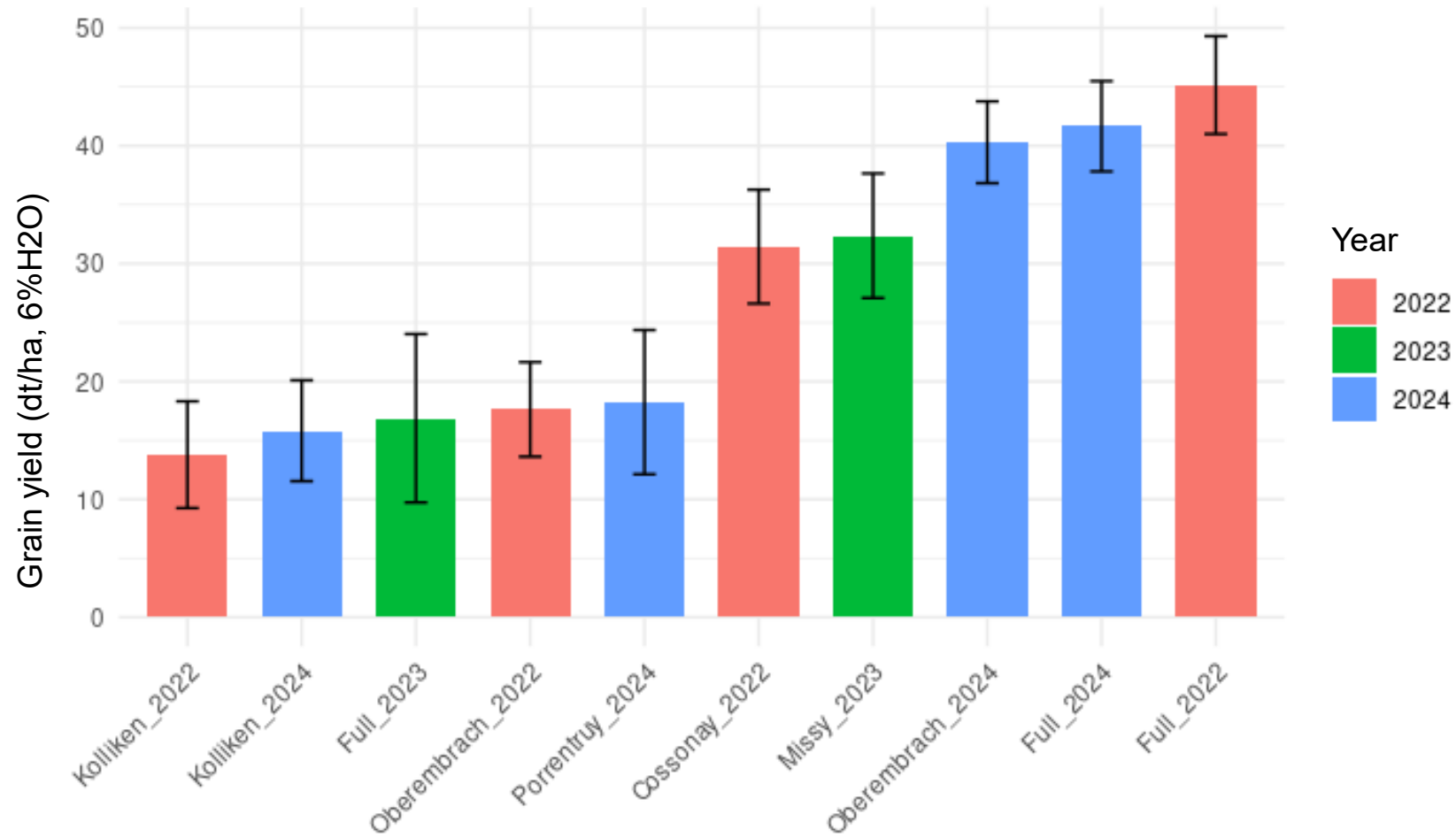
# Conducted measurements

- Variety performance
- Variety traits
- Insect activity and damage





# Yield by Site and Year



**No Site or Year effect on yield**



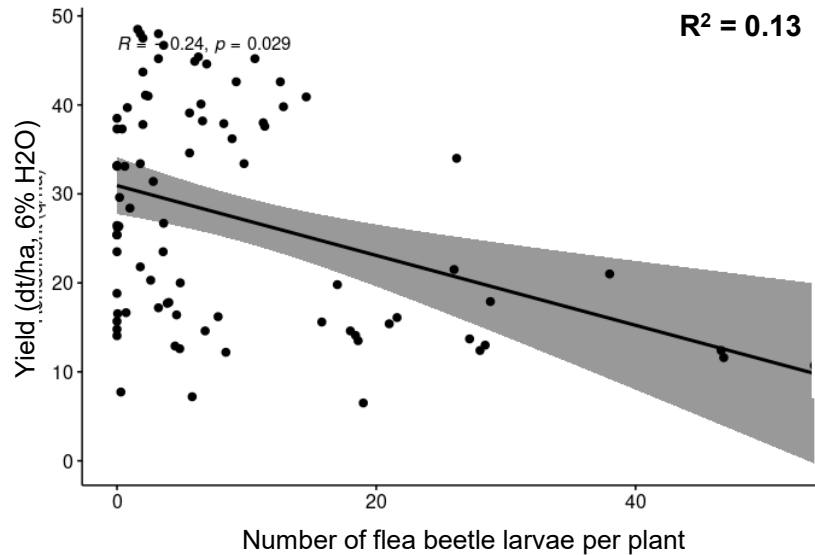
**Is there a correlation between the pressure level of each insect considered and yield ?**



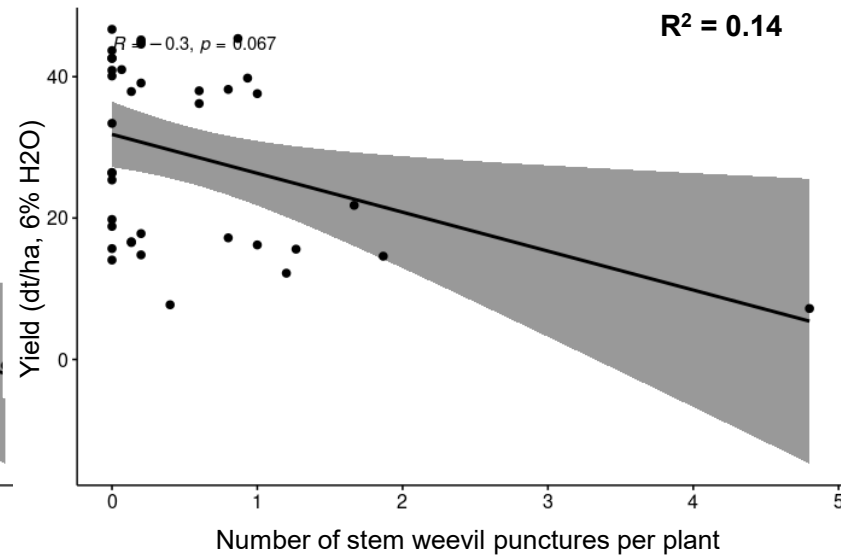
# Relationship between yield and the pressure level of each insect considered



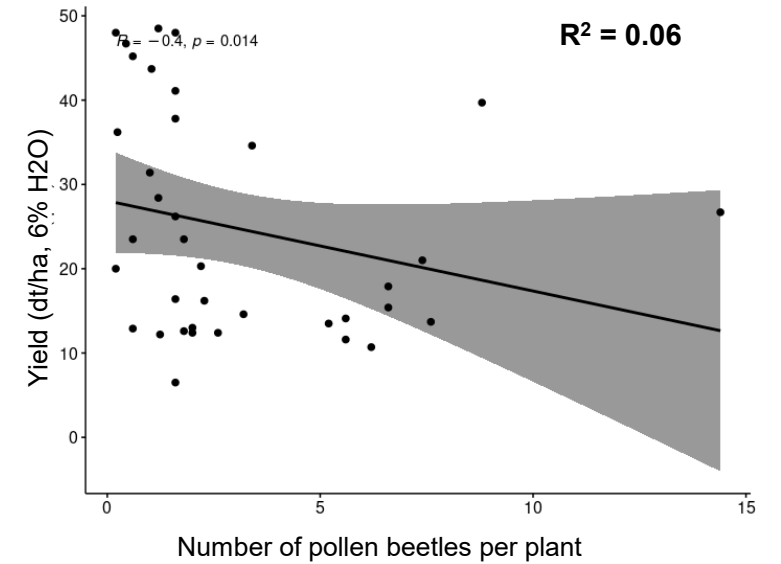
Flea beetle larvae  
(*Psylliodes chrysocephala*)



Stem weevil  
(*Ceutorhynchus napi*)



Pollen beetle  
(*Brassicogethes aeneus*)



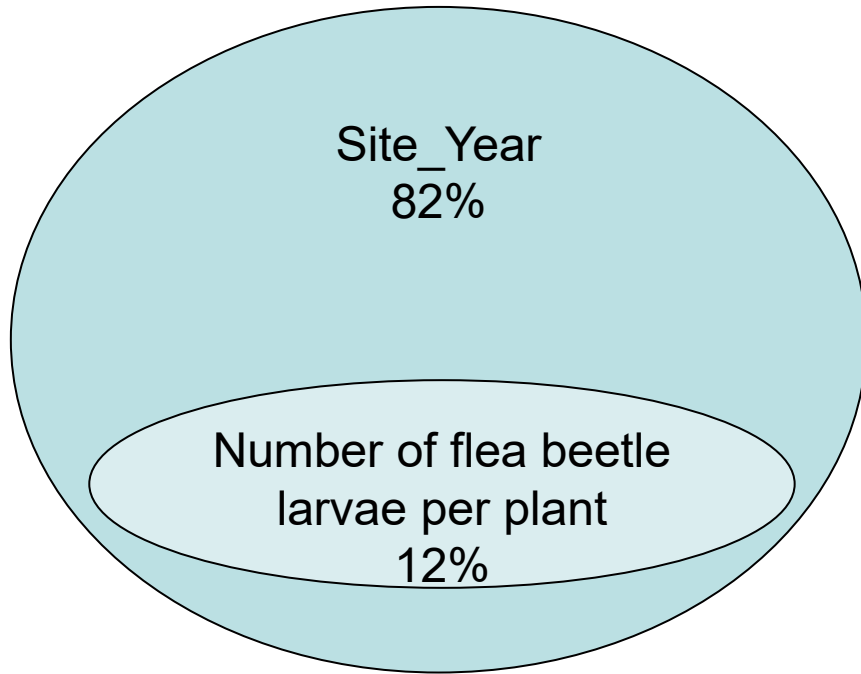
For the sites considered, we did not find any correlation between pest pressure and yield.



**What percentage of variability is explained by the site effect and by the pressure level of each insect considered?**



## Flea beetle larvae (*Psylliodes chrysocephala*)



### Sites\_Year and Varieties considered

Cossonay_2022	Alpaga
Full_2022	Exlibris
Full_2023	Picasso
Full_2024	Sammy
Kolliken_2022	V316OL
Kolliken_2024	Vision
Missy_2023	
Oberembrach_2022	
Oberembrach_2024	
Porrentruy_2024	

The Site\_Year explains 82% of yield variability, of which 12% is explained by the number of flea beetle larvae per plant (p-value<0.05).

The same trend is observed for stem weevils and pollen beetles

## Take home message

- More than 80% of yield variability is explained by Site\_Year effect
- Pest pressure levels contribute marginally within the Site\_Year effect
- Importance of having a trial network with different pest pressure levels

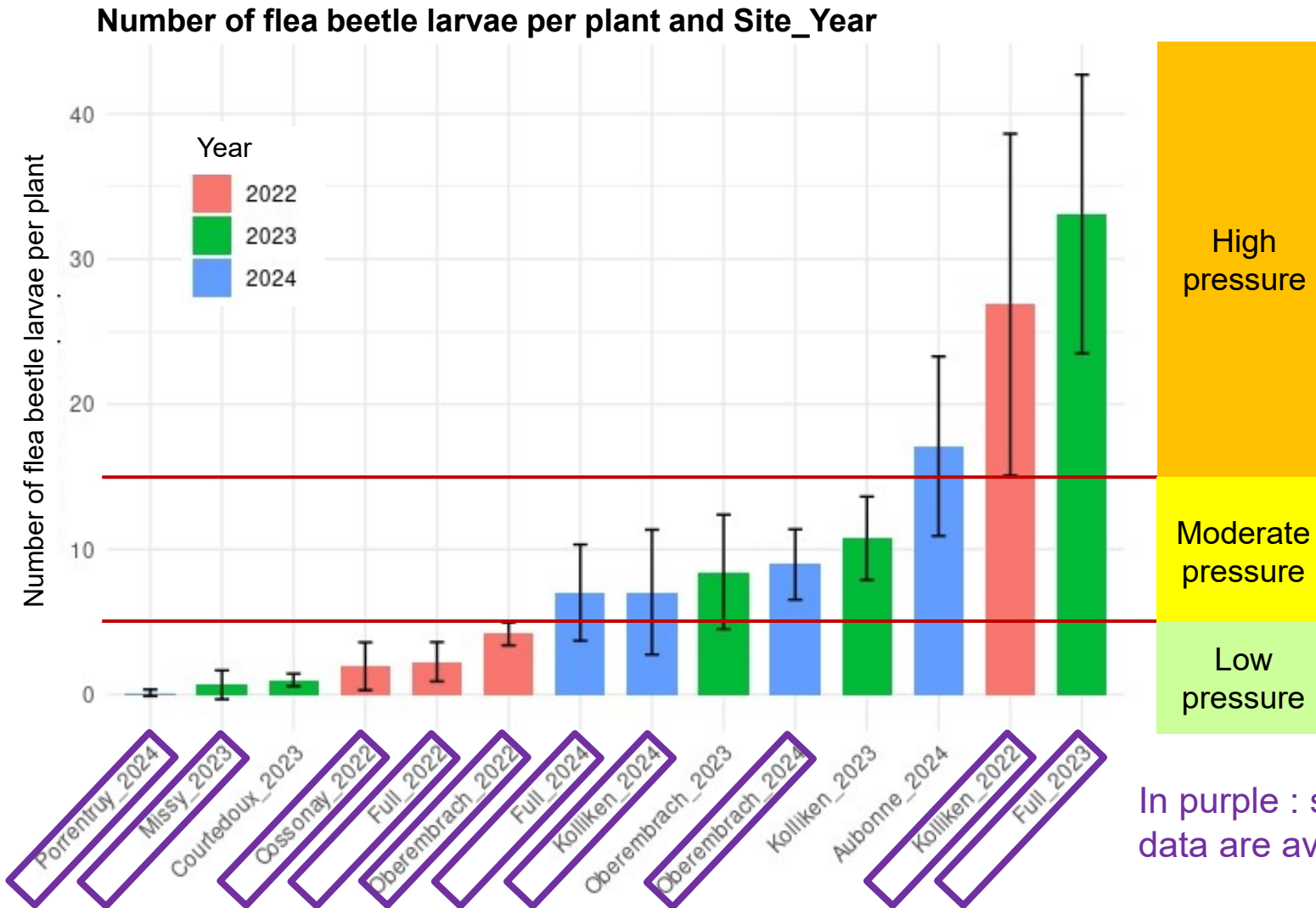




**Does the ranking of varieties vary according to the pest pressure level for each insect considered?**

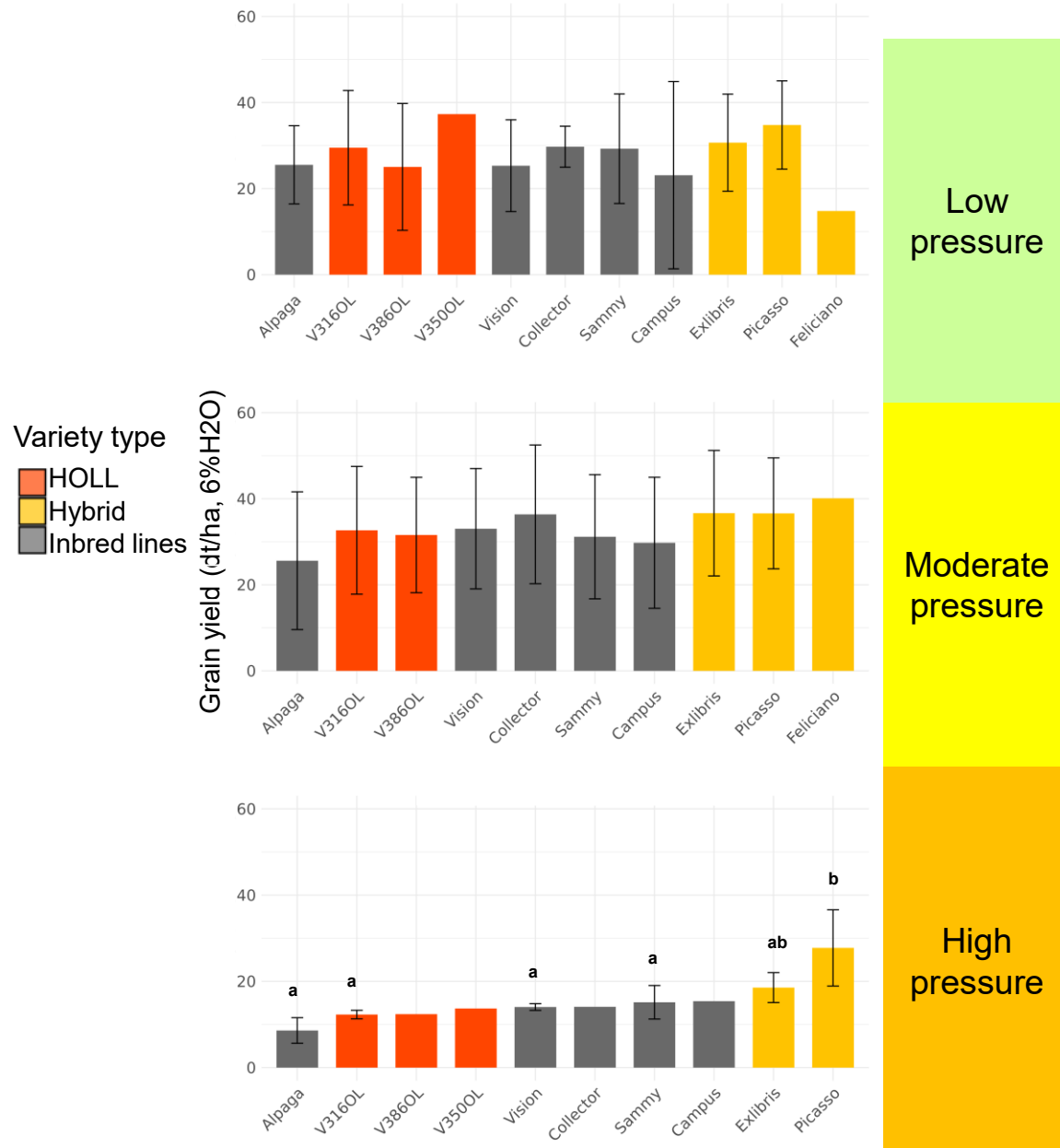


# Characterisation of the flea beetle larvae pressure level (*Psylliodes chrysocephala*)





# Flea beetle larvae (*Psylliodes chrysocephala*)

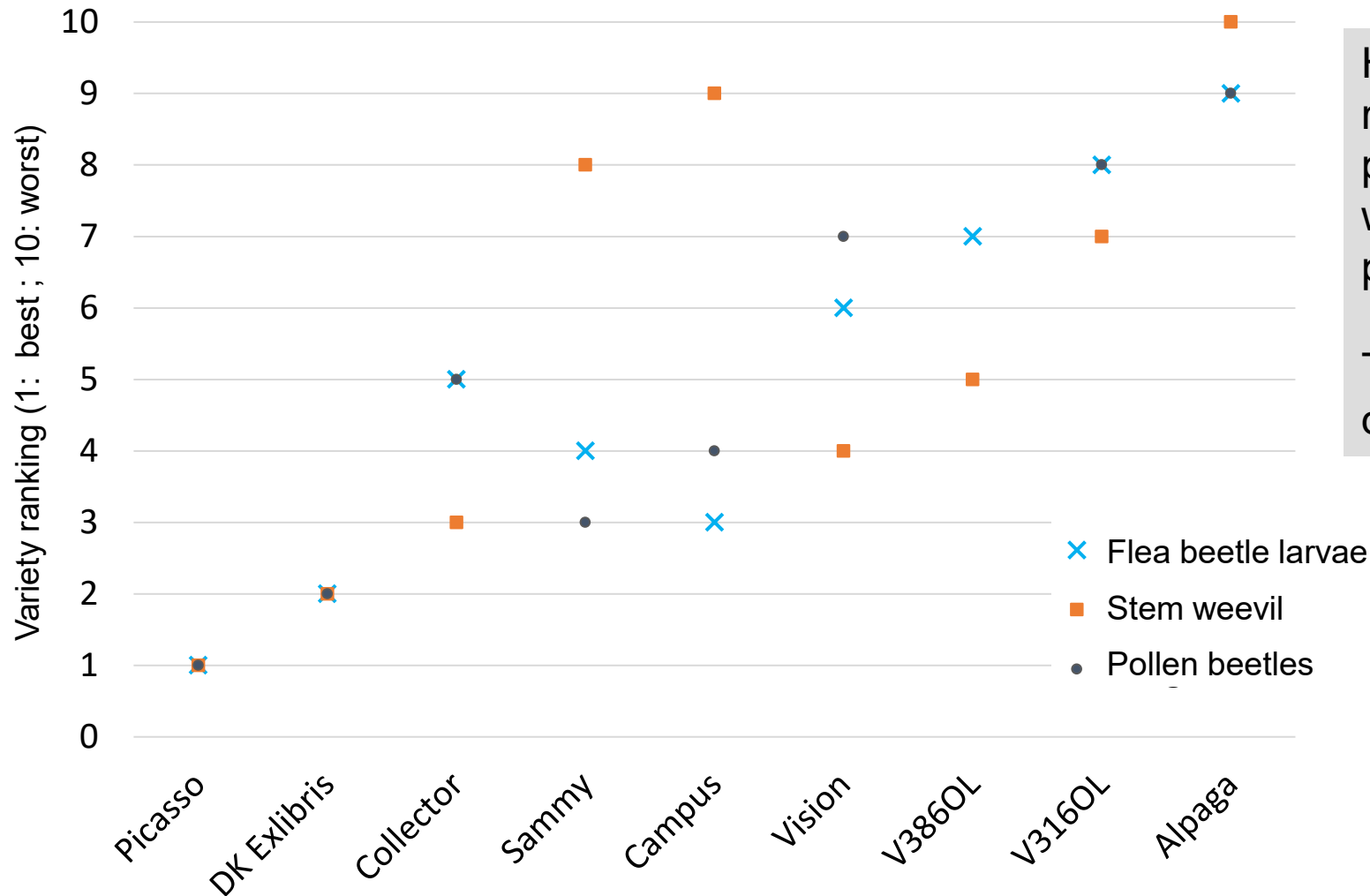


Yield potential of classic hybrid varieties is higher under high flea beetle larva pressure.

Statistical analysis is only possible for varieties tested at multiple sites.

Not enough data to perform statistical analyses for stem weevils and pollen beetles.

# Variety ranking for yield under high pressure level for each insect considered



Hybrid varieties Picasso and Exilbris rank highest for yield under high pressure of flea beetle larvae, stem weevils, and medium pollen beetle pressure.

The ranking of other varieties varies depending on the insect considered.

## Take home message

- No correlation found between pest pressure and yield.
- Classic hybrid varieties show superior yield potential under high flea beetle larval pressure.
- Similar trends observed for stem weevils and pollen beetles, but insufficient data for statistical analysis.
- Hybrid varieties Picasso and Exlibris rank highest for yield under high pest pressure.



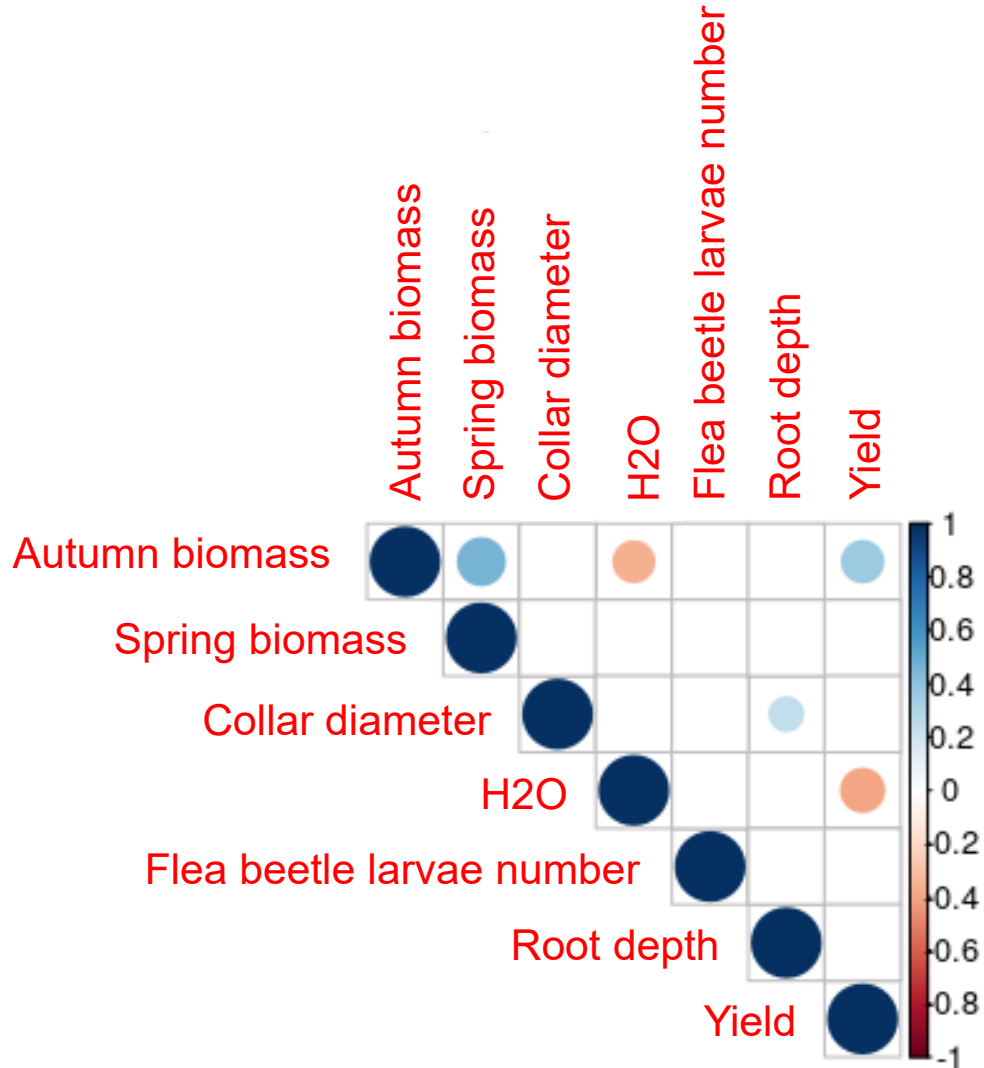
# **Can we identify variety traits influencing pest attack levels and/or variety tolerance to pests?**

# Correlations between observed variables



## Analysis 1: Focus on flea beetle larvae and yield

Sites considered: Full (2022, 2024), Kölliken (2022,2024), Oberembrach (2022, 2024), Missy (2023), Porrentruy (2024)

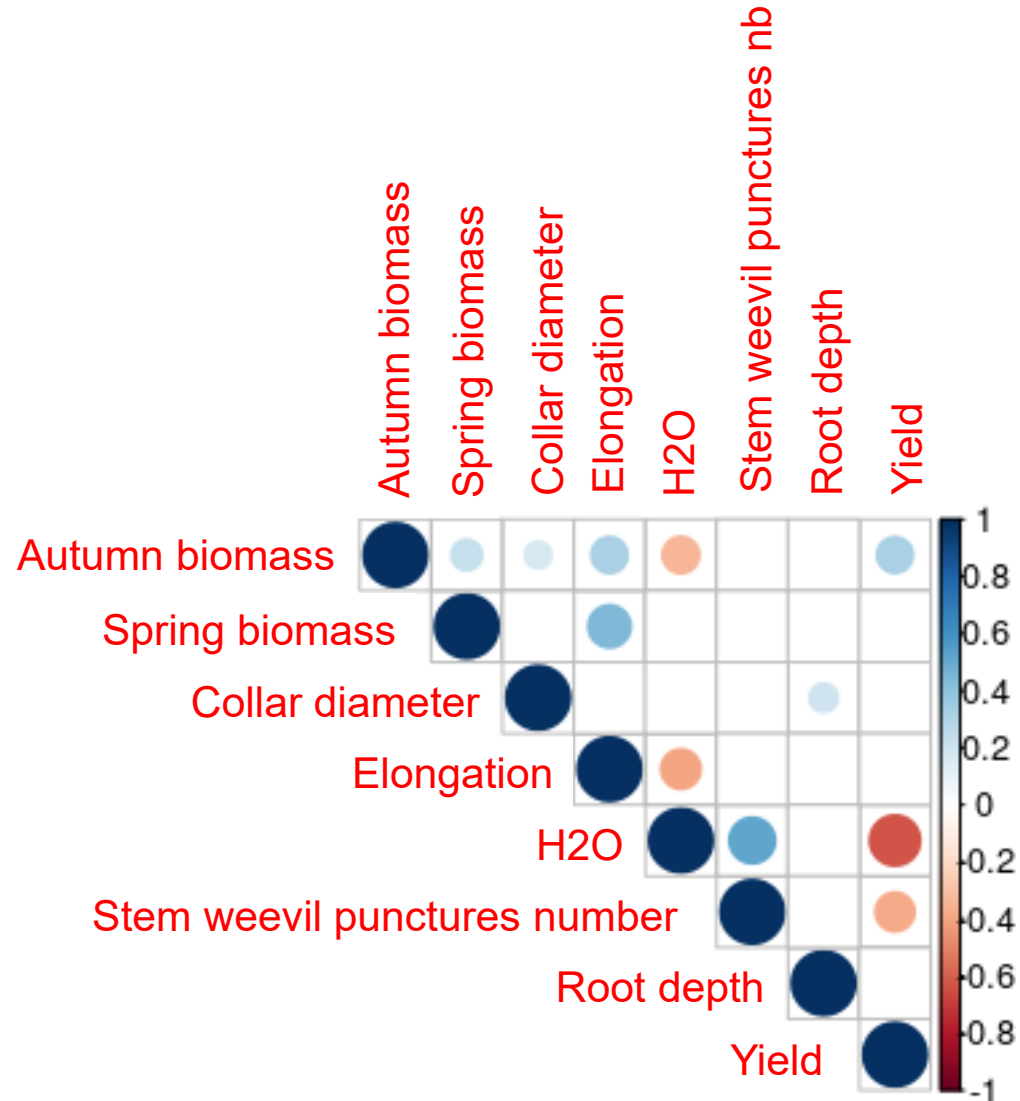


No correlation between the number of flea beetle larvae and observed variables.

# Correlations between observed variables

## Analysis 2: Focus on stem weevil and yield

Sites considered: Full (2024), Kölliken (2024), Oberembrach (2024), Porrentruy (2024)



Weak correlation between:

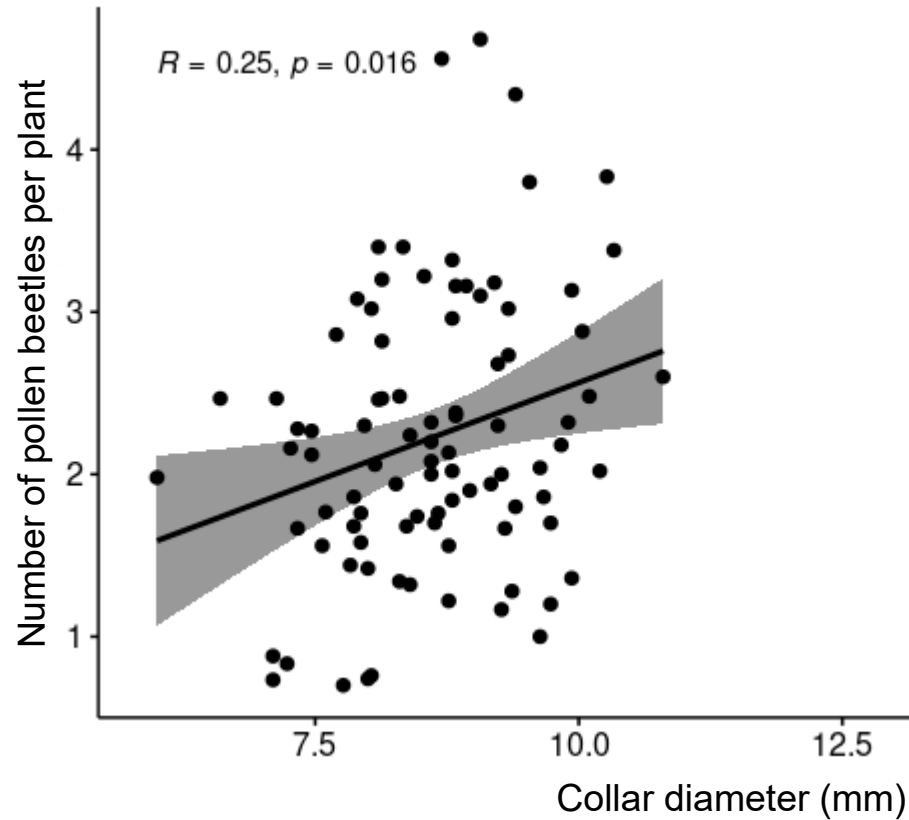
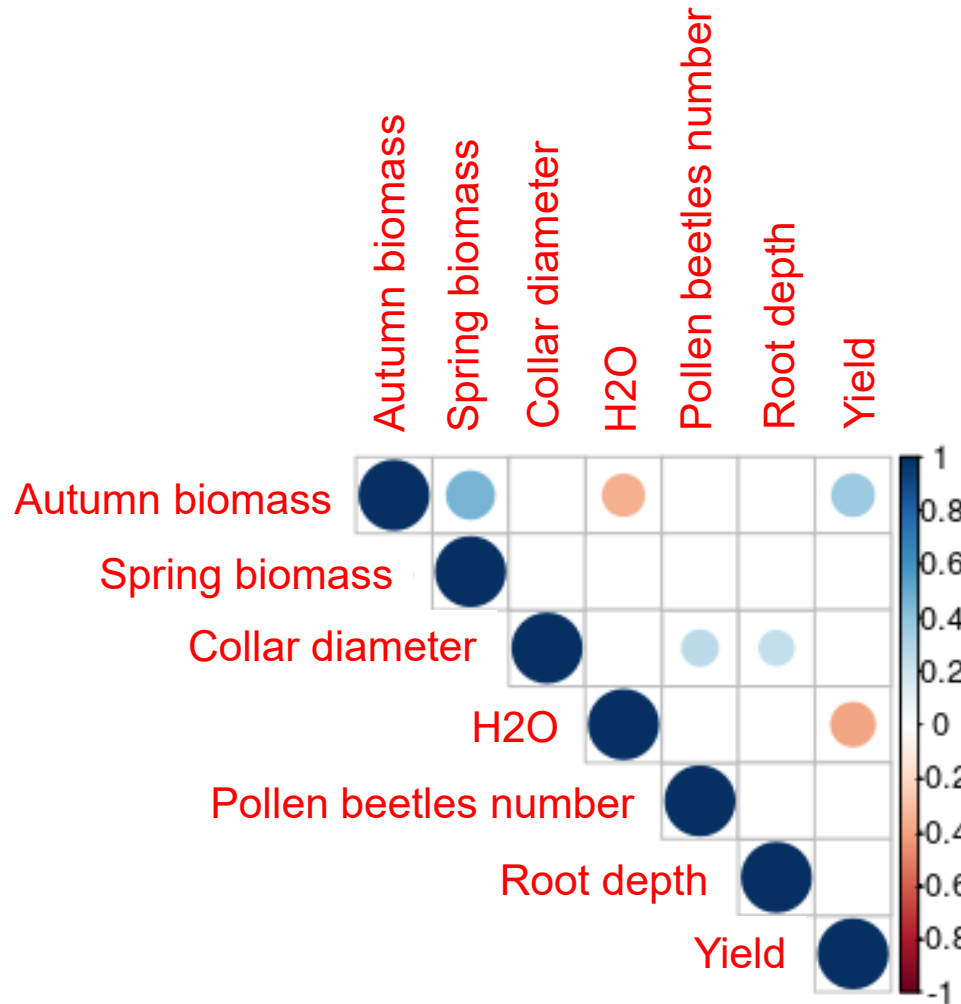
- Number of stem weevil punctures and yield.
- Number of stem weevil punctures and grain moisture content.

# Correlations between observed variables



## Analysis 3: Focus on pollen beetles and yield

Sites considered : Full (2022, 2024), Kölliken (2022,2024), Oberembrach (2024)



Weak correlation between collar diameter and pollen beetles per plant



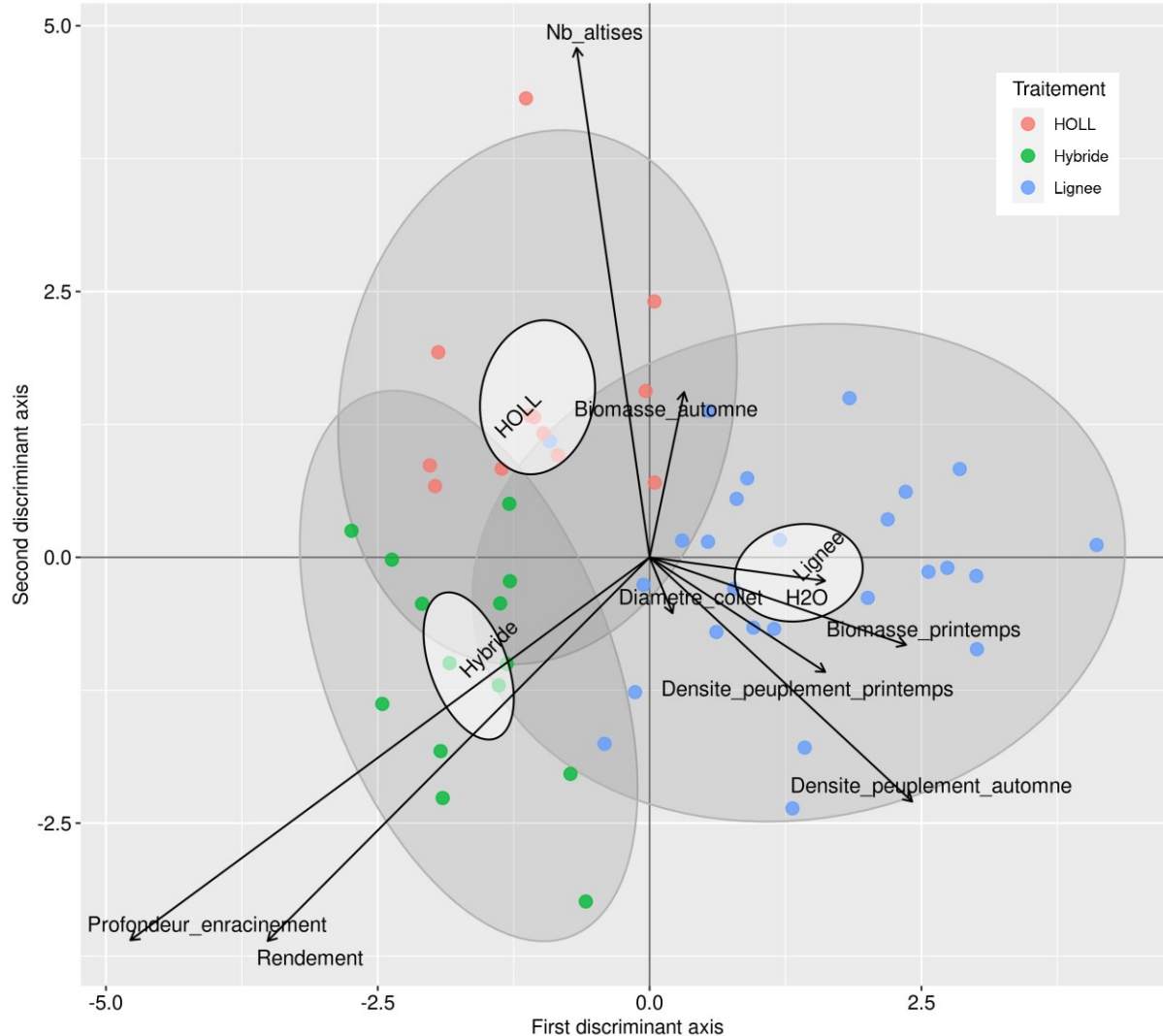
# Can we distinguish groups based on variety type?

# Can we distinguish groups based on variety types ?

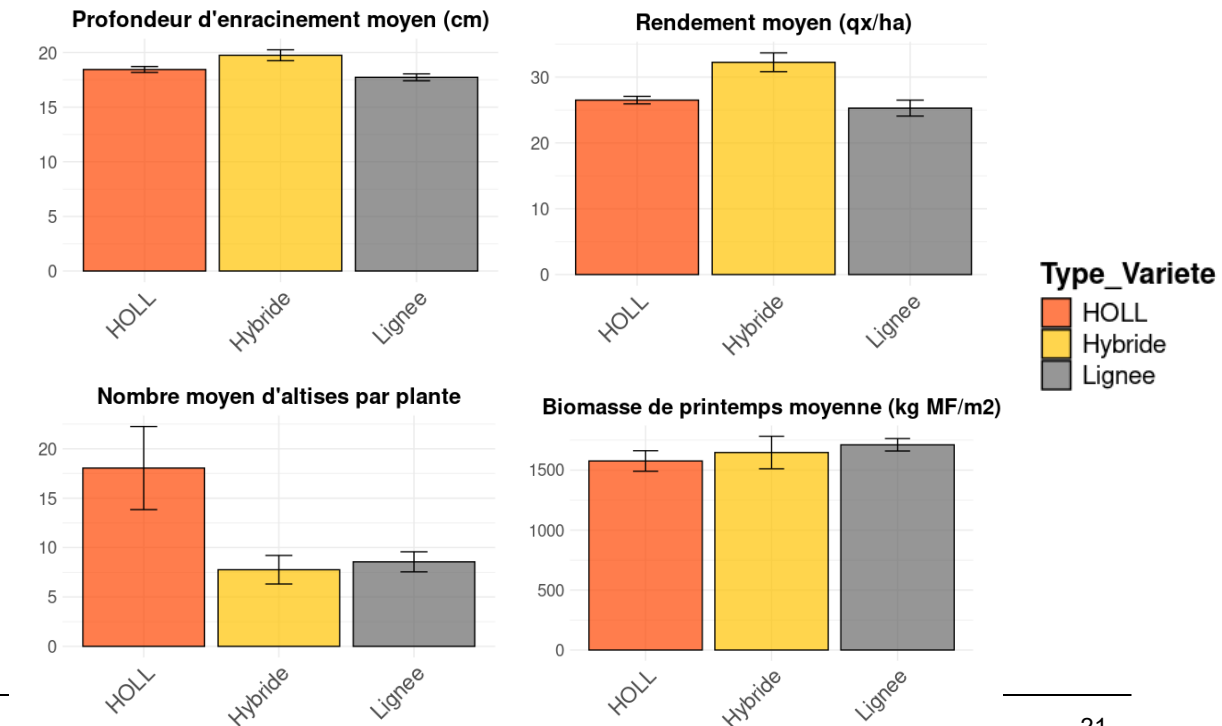


## Analysis 1: Focus on flea beetle larvae and yield

Sites considered : Full (2022, 2024), Kölliken (2022,2024), Oberembrach (2022, 2024), Missy (2023), Porrentruy (2024)



Hybrid, line, and HOLL varieties are classified into distinct groups based on the observed variables (classification percentage > 0.9).



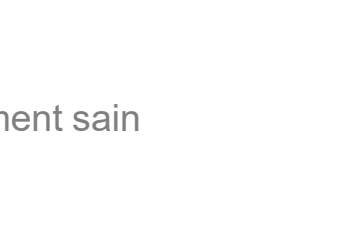
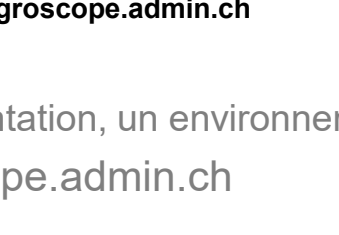
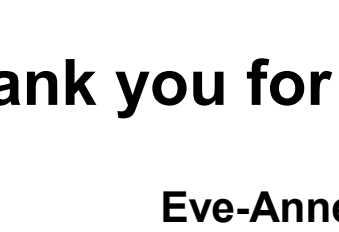
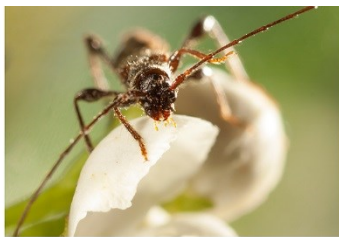
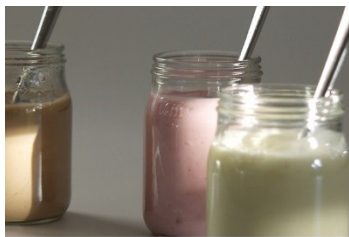
## Take home message

### Variety Traits Influencing Pest Attack Levels and/or Variety Tolerance to Pests?

- ❖ *No correlation observed between flea beetle larvae count and observed variables.*
- ✓ *Weak correlation between stem weevil stings and yield.*
- ✓ *Weak correlation between collar diameter and pollen beetle count per plant.*

It is possible to distinguish groups based on variety type using the observed variables.

The average number of flea beetles per plant is higher for HOLL varieties.



**Thank you for your attention**

**Eve-Anne Laurent**  
eve-anne.laurent@agroscope.admin.ch

**Agroscope** une bonne alimentation, un environnement sain  
www.agroscope.admin.ch

