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Does plant functional composition in flower strips promote functional composition of carabid communities and weed predation in the adjacent rapeseed crop?

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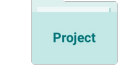


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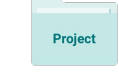
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INTRODUCTION

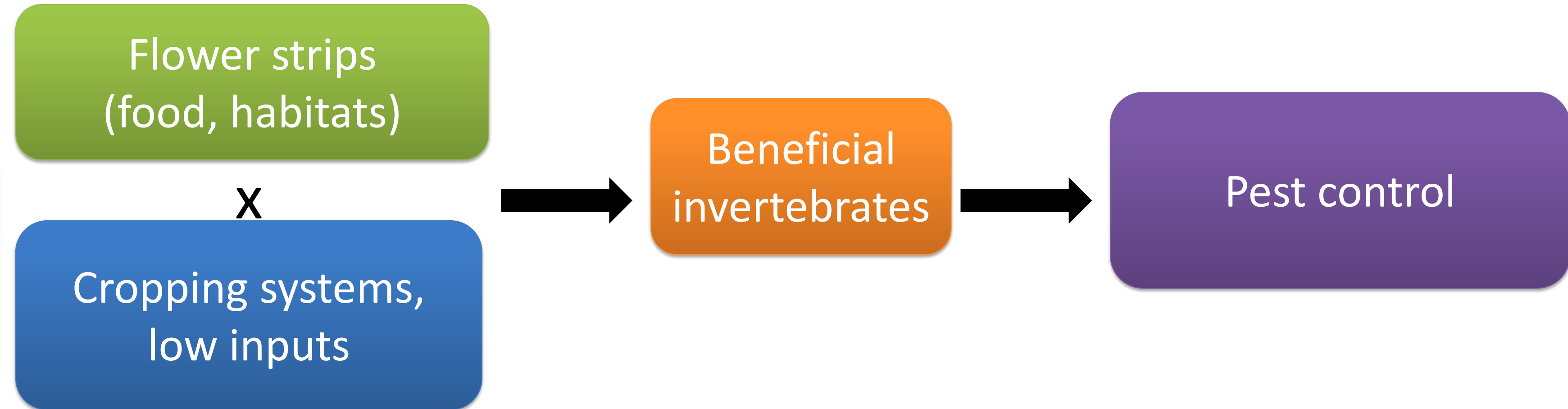
- **Rapeseed** : high vulnerability to pests → huge pesticide inputs in rapeseed crops leading to negative effects on environment
- **Flower strip sowing** : agroecological lever to promote pest control by beneficial invertebrates,
- Literature : positive effects of flower strips on soil invertebrate abundance **BUT** the effects on pest control deserve more attention

OBJECTIVE : To understand the role of flower strip functional composition on the functional composition of carabid communities and the pest control in the rapeseed crops by a trait-based approach.

GARGAMEL Project

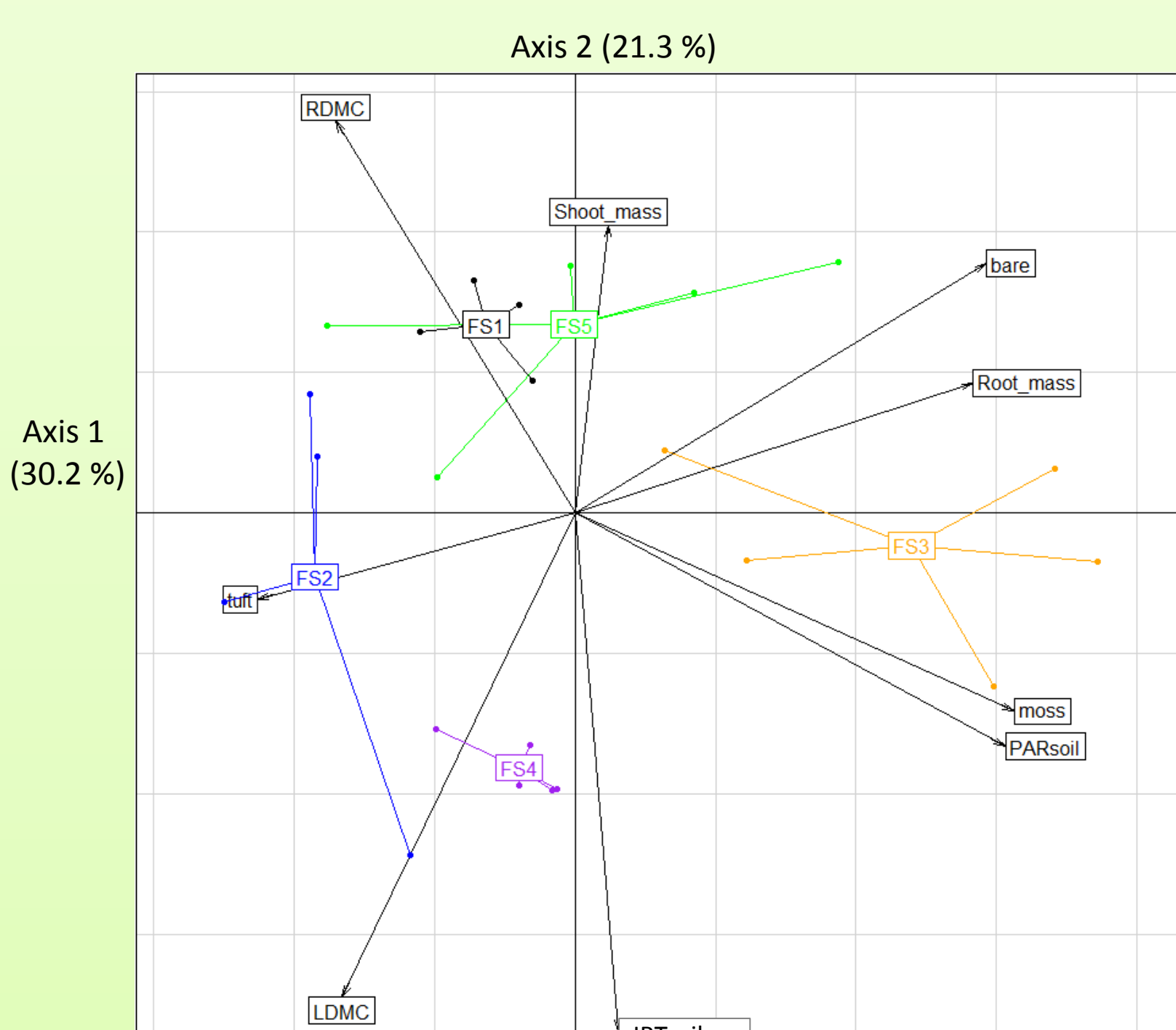
<http://www.smach.inra.fr/Actions-cles/biodiv/Gargamel>

→ To test the effects of botanical composition in flower strips on biological control in the adjacent crops



Flower strip characterization

- 5 Flower strips (FS 1-5) sown in 2013 (6 x 44 m, n = 5)
- Botanical inventories in autumn 2015 (transect method)
- Aerial + root traits → Community weighted means (CWM)
- Micro-climate measurements



Parameters : Shoot_mass : shoot biomass (g m⁻²), IRTsoil : infrared surface soil temperature (°C), LDMC*, leaf dry matter content (mg g⁻¹), moss : moss covering (%), PARsoil : solar radiation at soil surface (μmol s⁻¹ m⁻²), RDMC : root dry matter content (mg g⁻¹), Root_mass : root mass (g m⁻³), bare : bare soil proportion (%), tuft : tuft covering (%)

* Aerial traits from the literature (LEDA)

→ Flower strips differed according to soil micro-habitats and plant traits (LDMC et RDMC)



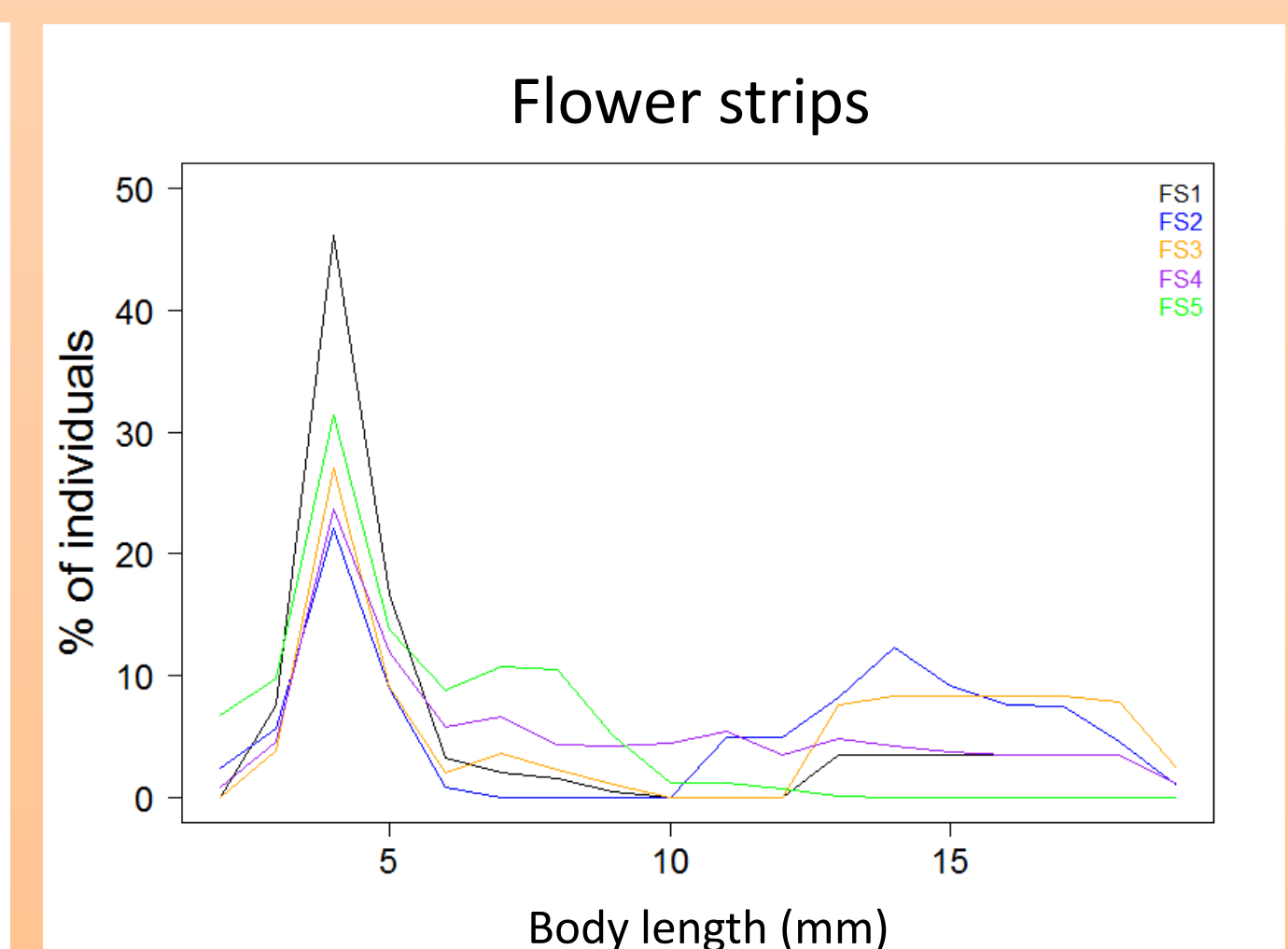
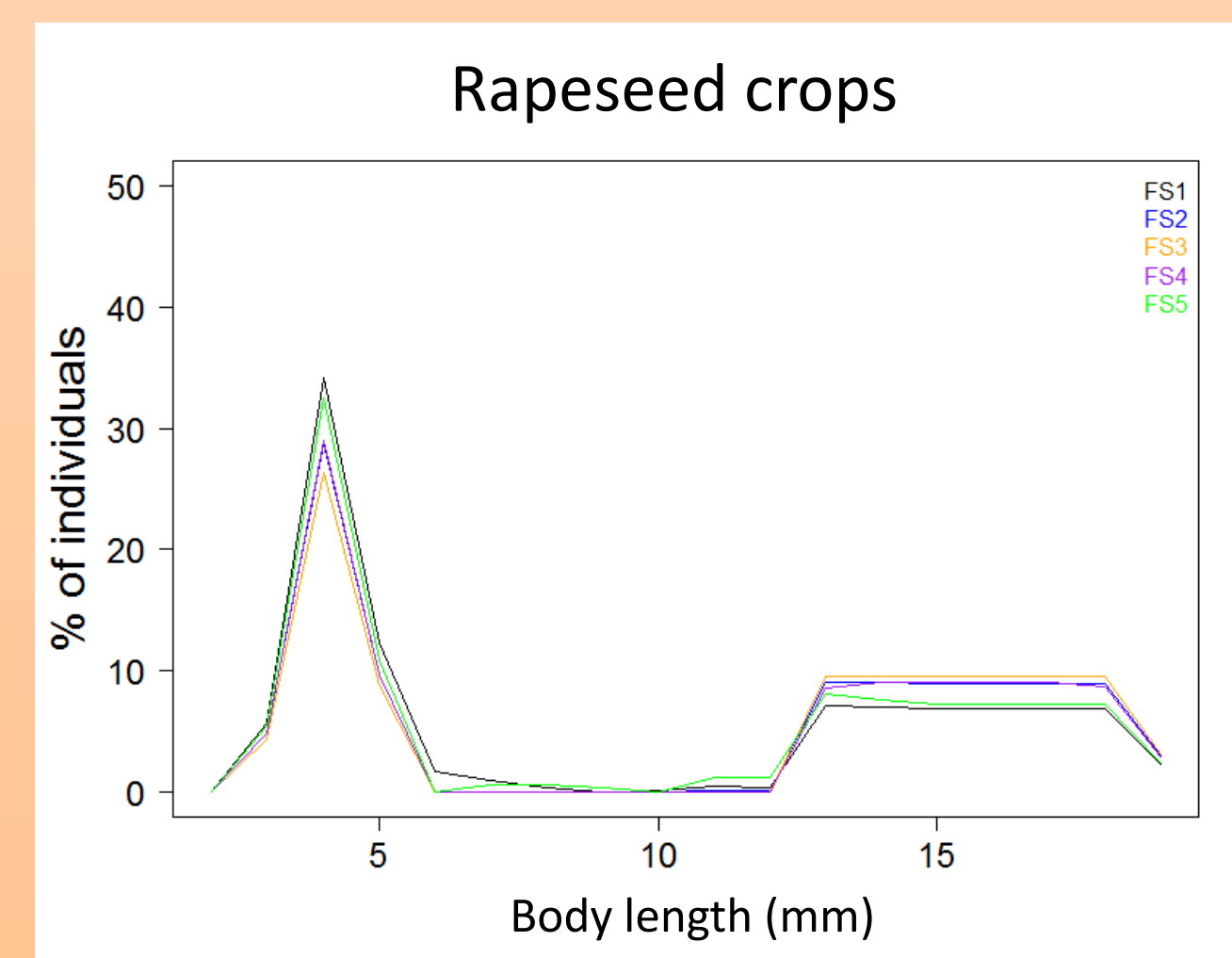
Effects of flower strips on Carabid communities

- Inventories in autumn 2015 (pitfall traps) in flower strips and in the adjacent rapeseed crops (2 dates x 5 rep)
- Morphological and behavioural traits (BETSI) → Community weighted means (CWM)



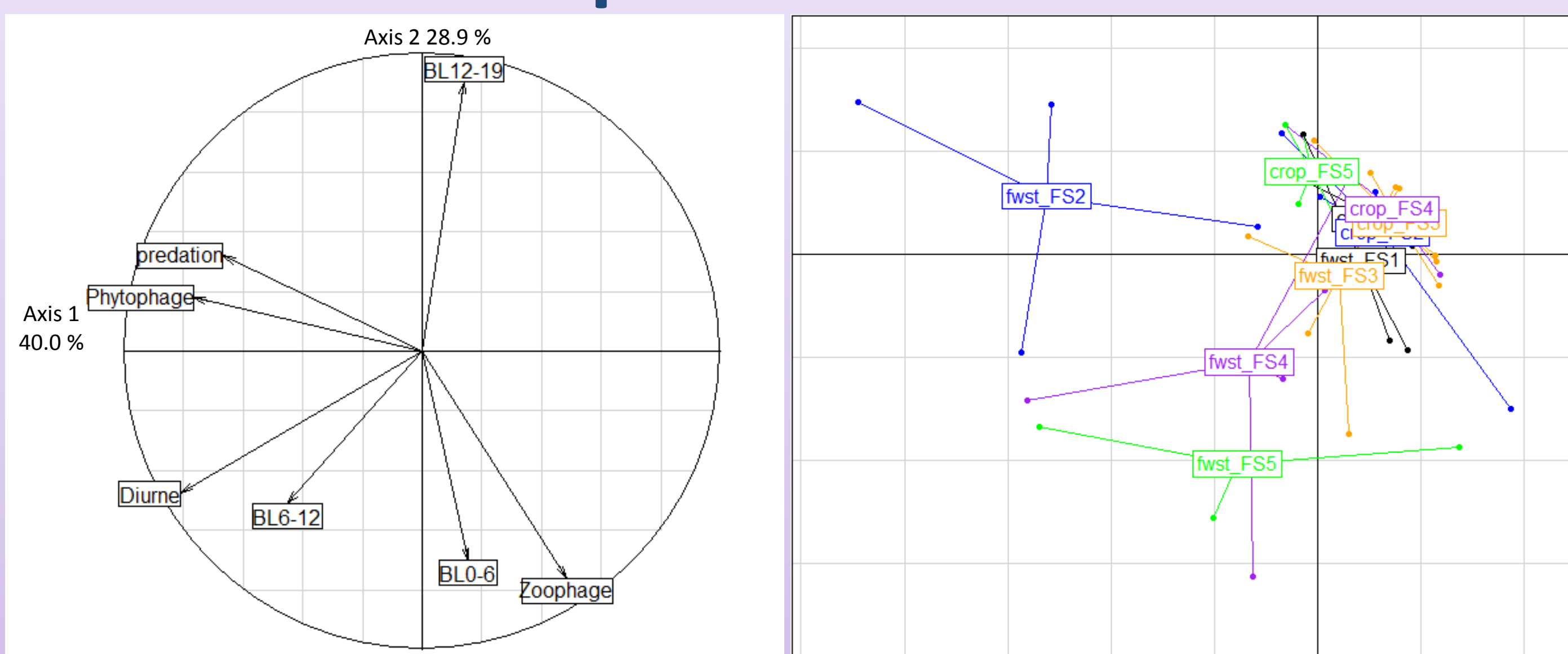
	Crop vs Flower strip	Flower Strip composition
Species richness	P < 0.001	NS
Shannon	NS	NS
Wing: Macropterous	P < 0.001	NS
Food: Seeds	.	NS
Food: Roots	P < 0.001	NS
Food: Animals	NS	NS
Activity: Diurnal	P < 0.01	NS
Mean body length	P < 0.05	NS

→ Differences in functional composition of carabid communities between flower strips and the adjacent rapeseed crops



- Rapeseed crops : high filtering on carabid body length
- Flower strips : filtering removal, differences in body length classes

Effects of flower strips on weed predation



→ Weed predation is correlated to carabid communities characterized :
 - diurnal and phytophagous activities
 - intermediate body length

CONCLUSION

- Functional composition of flower strips shapes functional composition of carabid communities **BUT NOT** in the adjacent rapeseed crop.
- Weed predation is correlated to carabid community weighted means **BUT** these correlations are time-dependent, probably due to carabid phenology and/or resource availability.

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