

Améliorer la durabilité des systèmes maraîchers Bio sous abri en combinant association de cultures, bandes fleuries et paillage organique

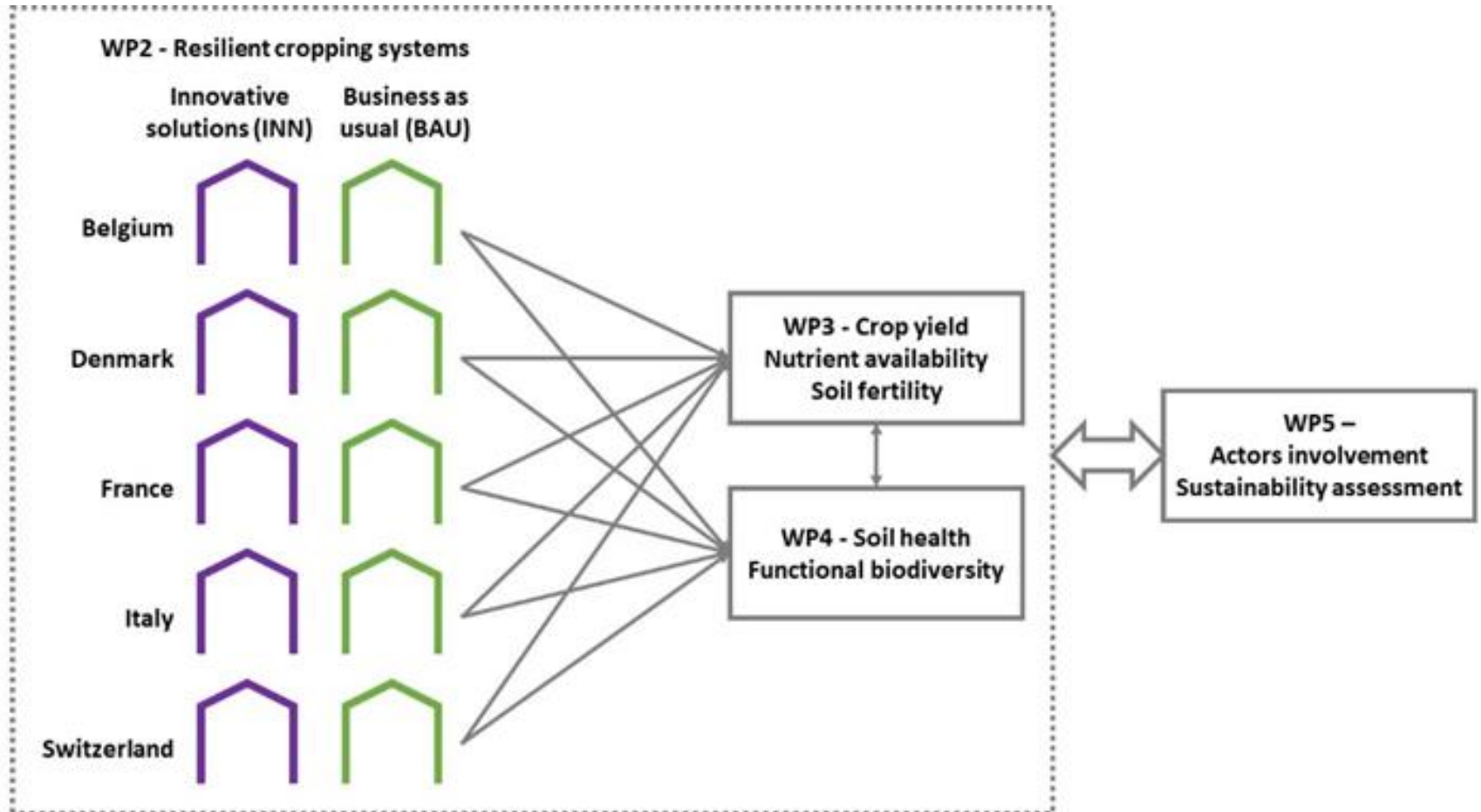


PROJET GREENRESILIENT (2018-2021))

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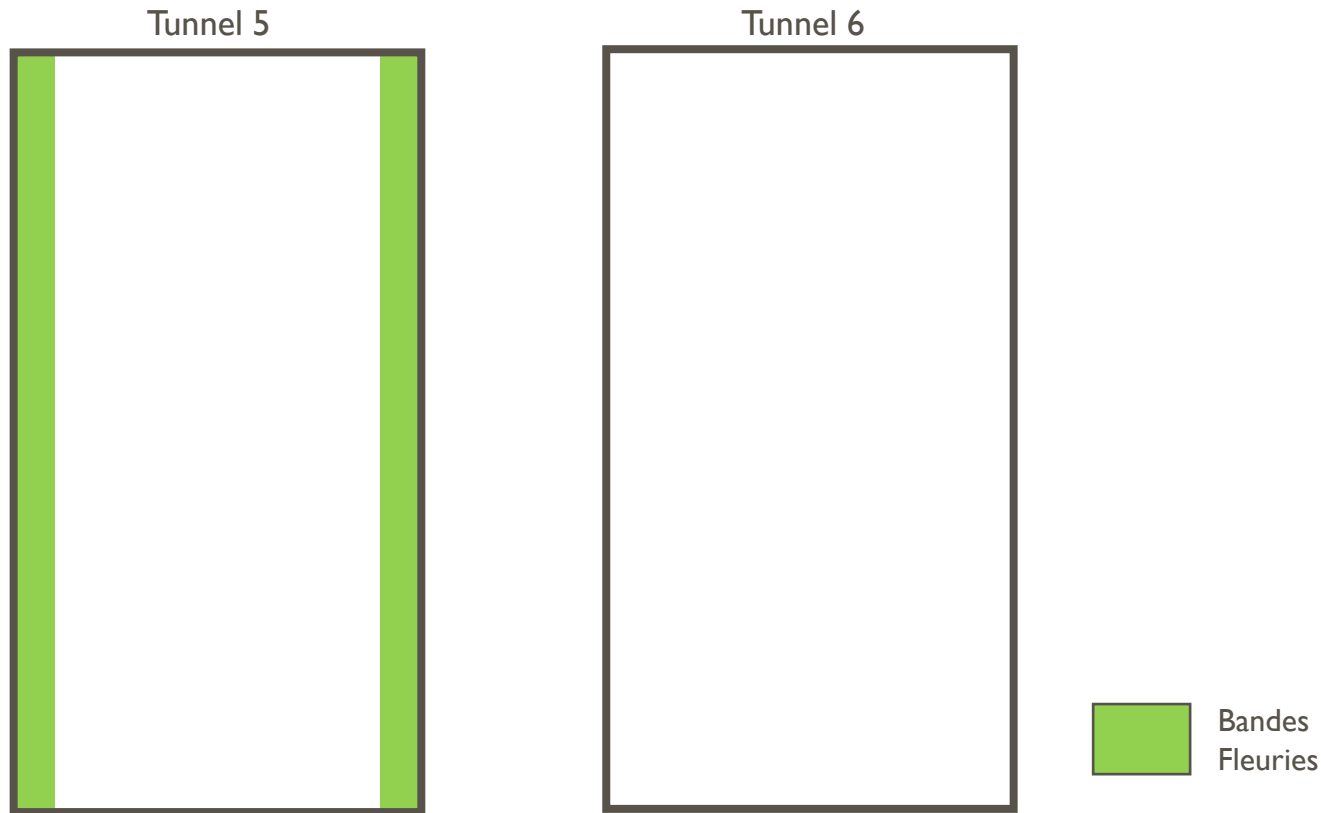
Séminaire Plénier UMT SiBio - 24/09/2020

Project structure



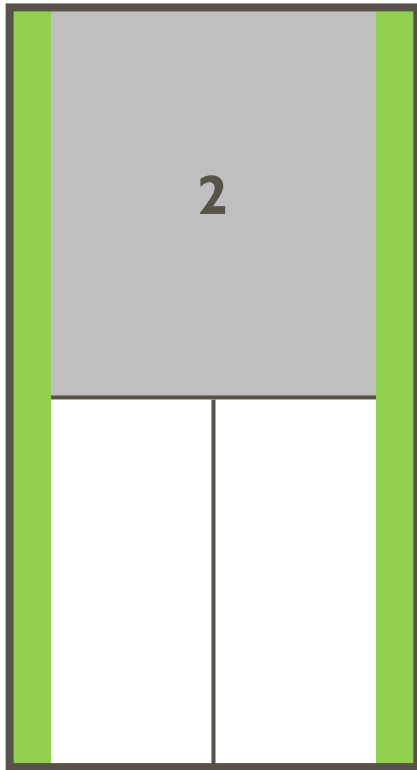
Dispositif expérimental au GRAB

Une approche systémique – 2 tunnels de 400 m²

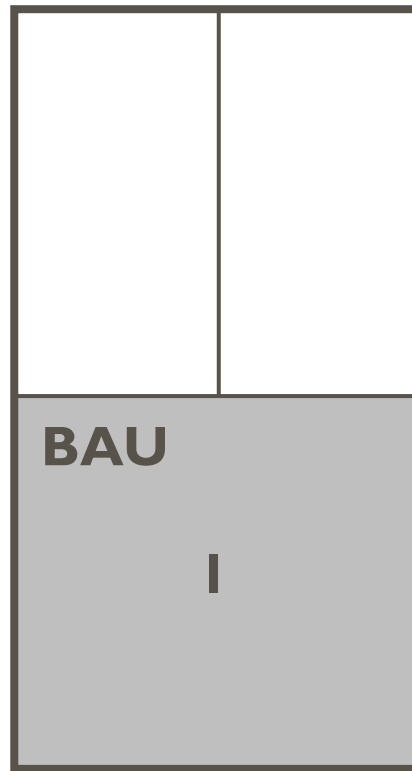


Dispositif expérimental au GRAB

Tunnel 5

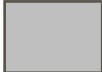


Tunnel 6

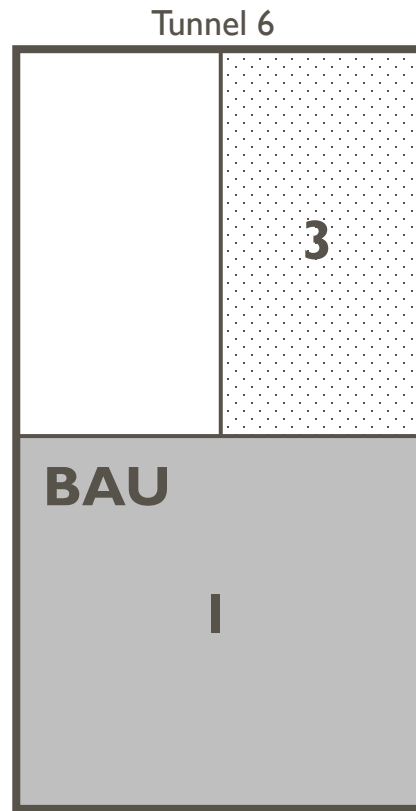
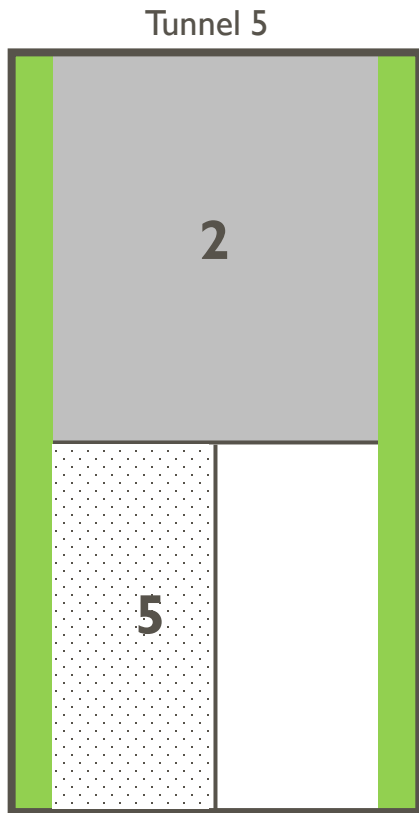


Systèmes	BF	AC	PO
I (BAU)			
2	X		

 Bandes
Fleuries

 Culture pure

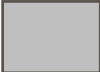
Dispositif expérimental au GRAB



Systèmes	BF	AC	PO
1 (BAU)			
2	X		
3		X	
5	X	X	

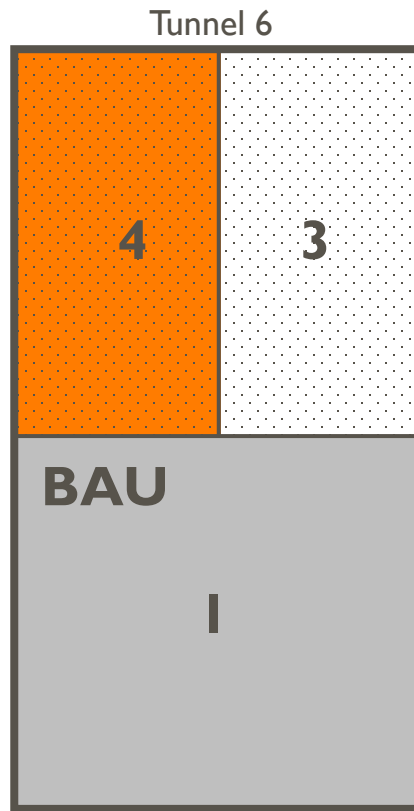
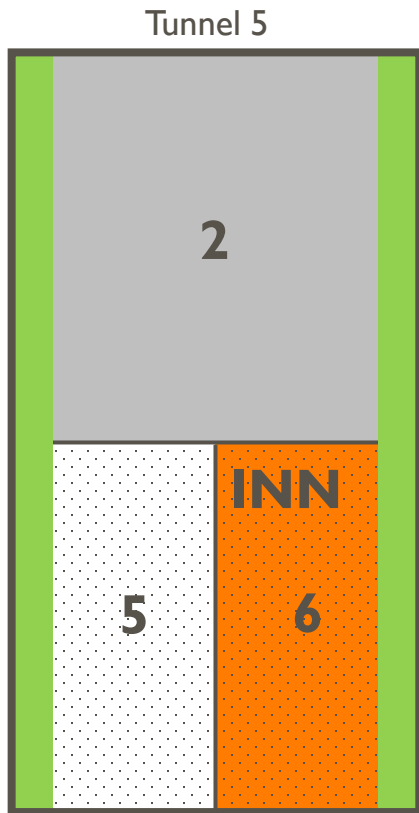
 Bandes
Fleuries

 Association culturale

 Culture pure

Dispositif expérimental au GRAB

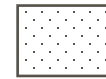
4 placettes de mesure (10 plantes) dans chaque système



Systèmes	BF	AC	PO
1 (BAU)			
2	X		
3		X	
4		X	X
5	X	X	
6 (INN)	X	X	X



Paillage foin de luzerne



Association culturale



Bandes Fleuries



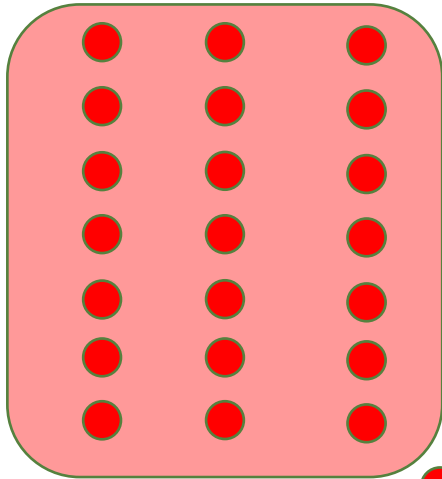
Culture pure

Les bandes fleuries :



Cultures d'été :

PURE CROP

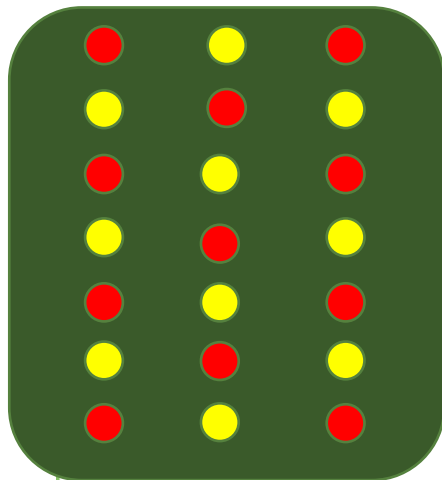


Veg 1

MIXED CROP



Veg 2



2018

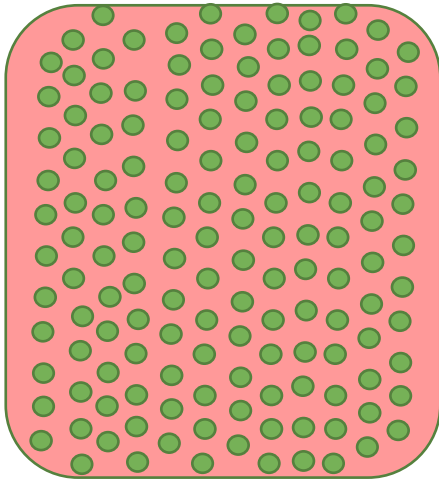


2019



Cultures d'automne :

PURE CROP

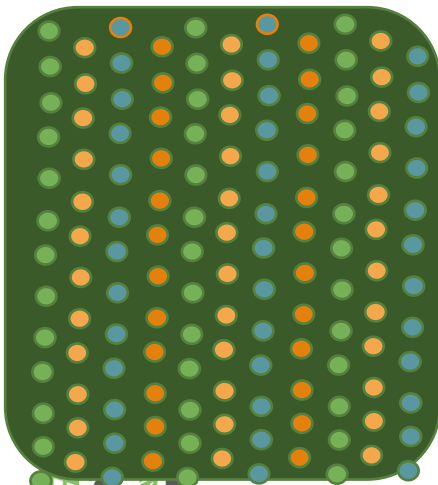


- Veg 1
- Veg 2
- Veg 3
- Veg 4



2018/2019

MIXED CROP



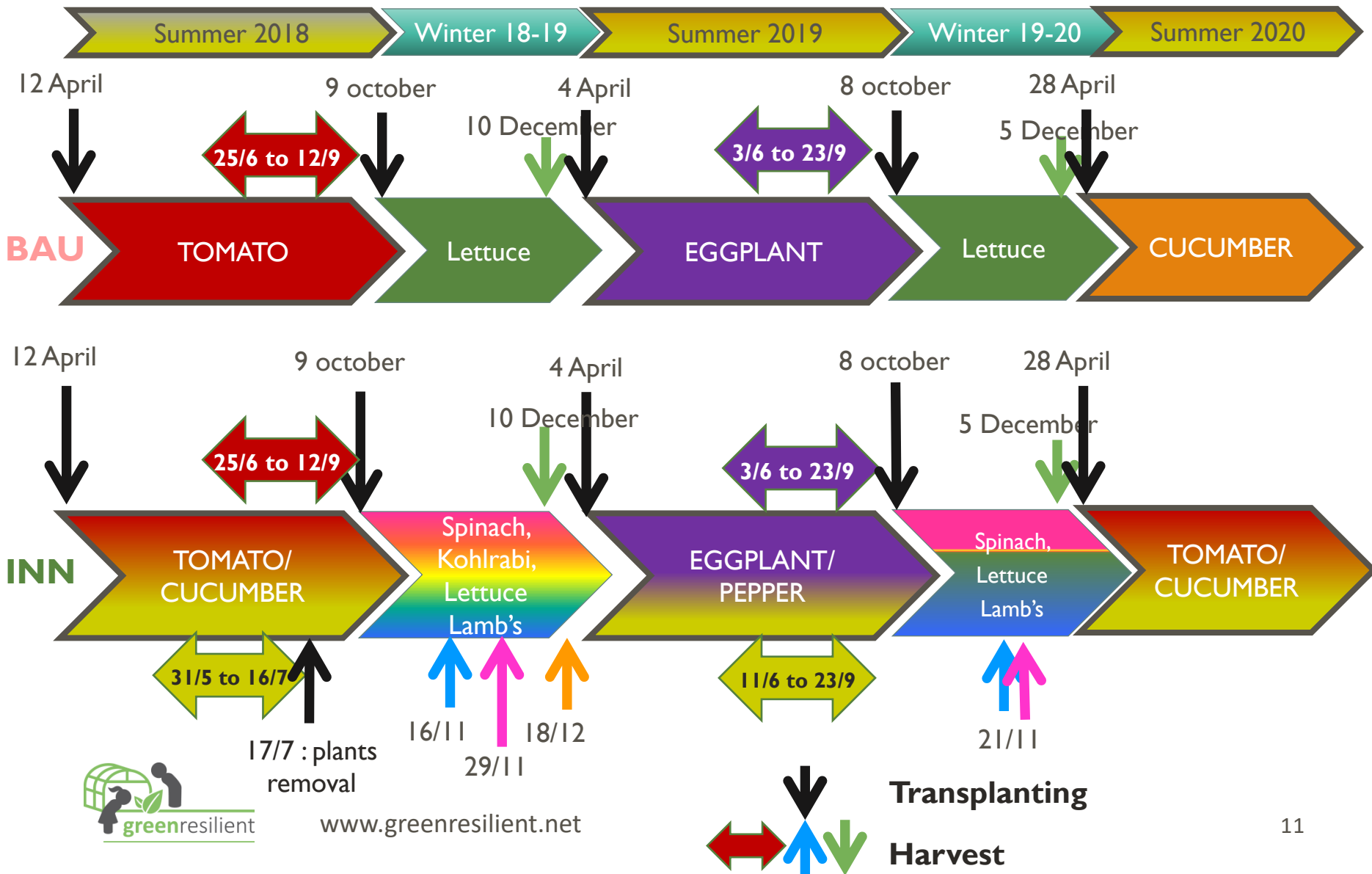
Le paillage organique : foin de luzerne

Alfalfa Hay :

- Composition % (2018-2019): 2,8-1,9 **N** / 0,2 **P** / 1,7-2,1 **K** ; **C/N** : 16,8-23,9
- Layer of 6 cm : 25 t hay/ha



- Rotation : Timetable (1)

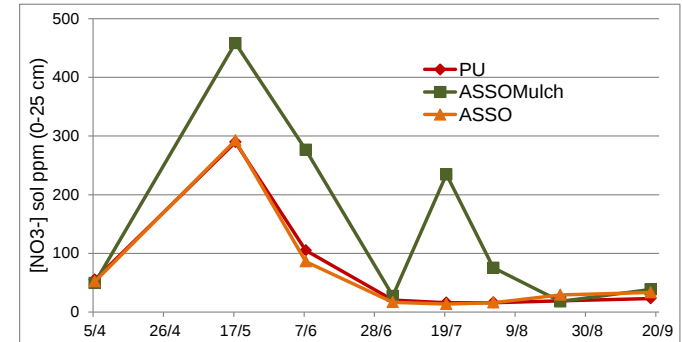
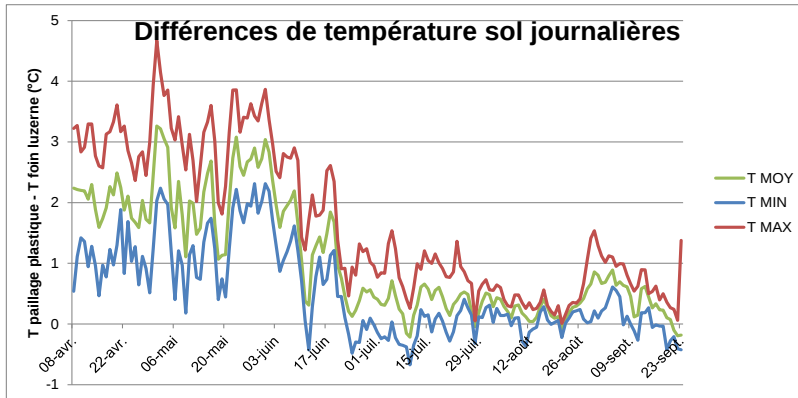


Measurements (3)- GRAB

- On soil :
 - ✓ Soil temperature 10 cm, Soil humidity (Watermark) 15-30-45 cm, SMN
- On plants :
 - ✓ Plant development (height, vigor), Total yield and marketable yield, Pests and diseases, N nutrition status («Pilazo» : NO₃- in the petiole sap)
- Samples:
 - ✓ Soil / nematodes, soil / entomopathogenic fungi, soil / microbial activity, Pitfall traps, pan traps
- Data for LCA

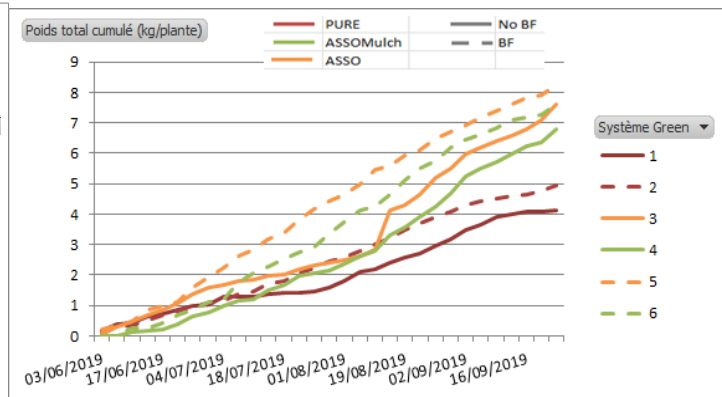
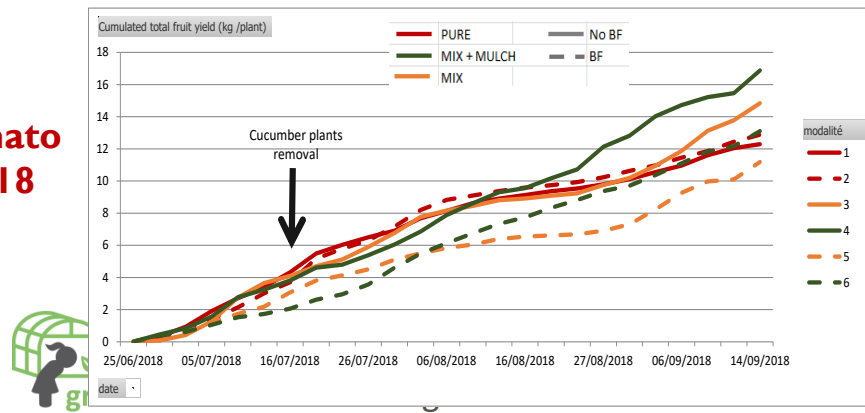
A few results: Soil fertility / Crop performances

- Soil fertility: hafalfa mulch/plastic → reduces soil temperature (-2 à 3°C spring)
→ increases N soil & plant content



- Crop performances : → delayed growth on organic mulch, but yield balance at the end of the crop (except cucumber = short crop)
→ better yield on summer main crop when ASSOCIATED

**Tomato
2018**



**Eggplant
2019**

Association culturelle

2018

2019

2020

Paramètres du sol

Pas d'effet

Développement des cultures

Rendements culture principale
Utilisation de l'N

Paillage organique

Paramètres du sol

2018

2019

2020

↘ température	↘ température	
↗ humidité	↗ humidité	
↗ N sol	↗ N sol	↗ N sol

Développement des cultures

↘ croissance	↘ croissance	
↗ Rendement	↘ précocité	Aucun effet
↗ N plante	↗ N plante	Faible ↗ N plante
↗ Utilisation N	↗ Utilisation N	

A few results: Crop protection & Functional biodiversity

2018

Culture	Facteur	Pucerons			Tuta		
		Ravageurs	Auxiliaires	Ratio aux/rav	Ravageurs	Auxiliaires	Ratio aux/rav
Tomate	FS						
	MC					+	++
	TM						
Concombre	FS	++	+				
	TM	--	--				

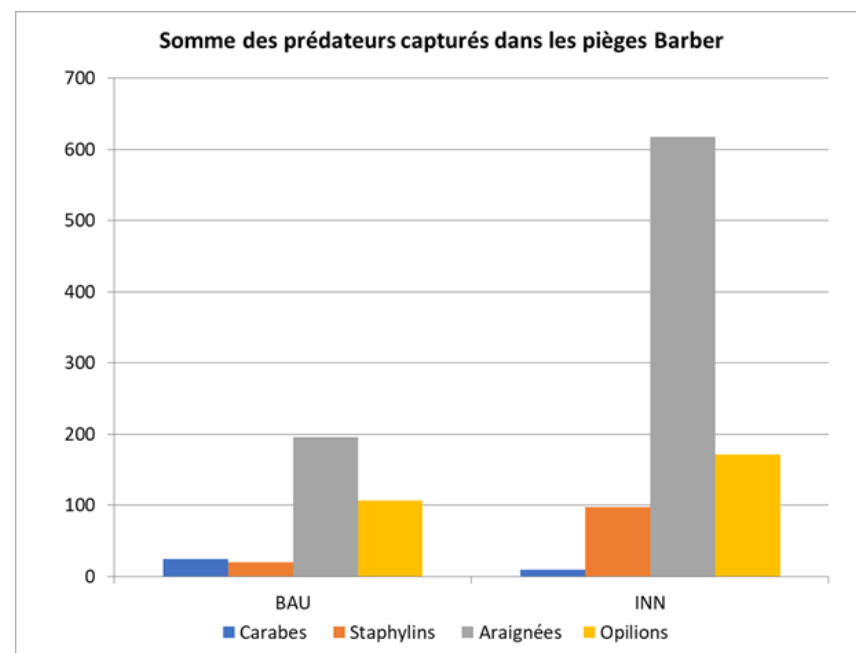
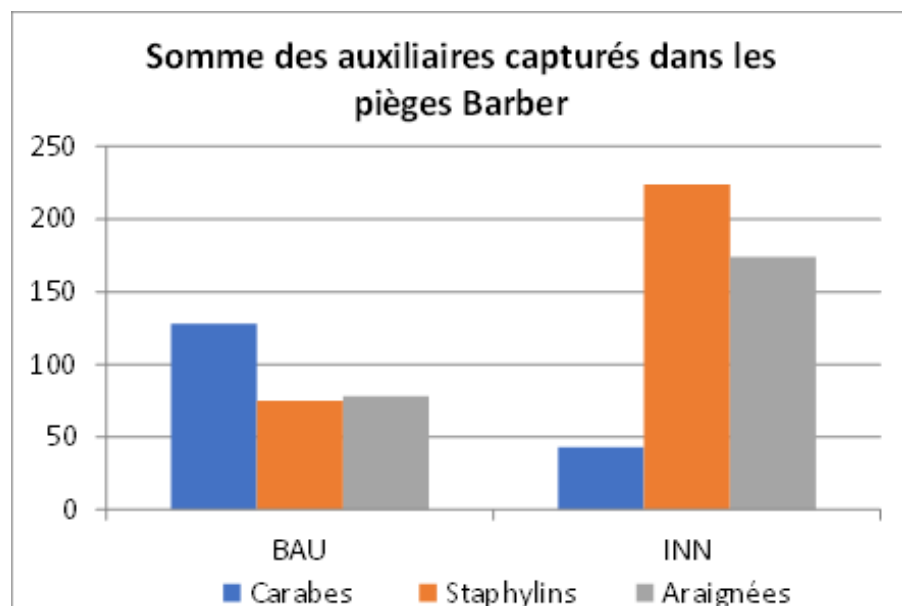
INN : -35% de dégâts de Tuta par rapport à BAU

2019

Culture	Facteur	Pucerons			Acarie		
		Ravageurs	Auxiliaires	Ratio aux/rav	Ravageurs	Auxiliaires	Ratio aux/rav
Aubergine	FS	+	+		--	++	++
	MC	+			--		
	TM						
Poivron	FS	--		+	-	--	
	TM	--	-				

A few results: Functional biodiversity

2018 & 2019: Ground dwelling predators: INN better than BAU



Amélioration de la durabilité du système INN grâce aux trois leviers d'action :

Diversité fonctionnelle

- Plus d'espèces cultivées
- Présence de bandes fleuries
- Grande diversité des arthropodes



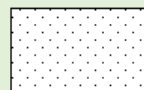
Dépendance aux intrants

- Utilisation de moins de plastique
- Moins de fertilisants
- Moins de phytosanitaires
- Moins de lâcher d'auxiliaires
- Diminution de l'irrigation



Productivité de l'écosystème

- Rendement INN > BAU
- Diversification des productions



Fertilité du sol

- Apport de matière organique
- Amélioration de l'activité biologique

