



Multidisciplinary assessment of two organic banana production systems in Martinique

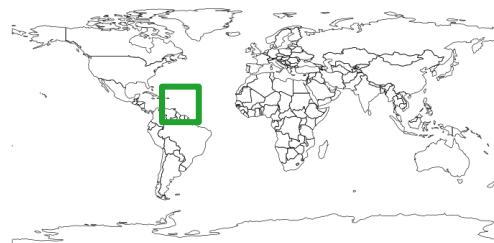
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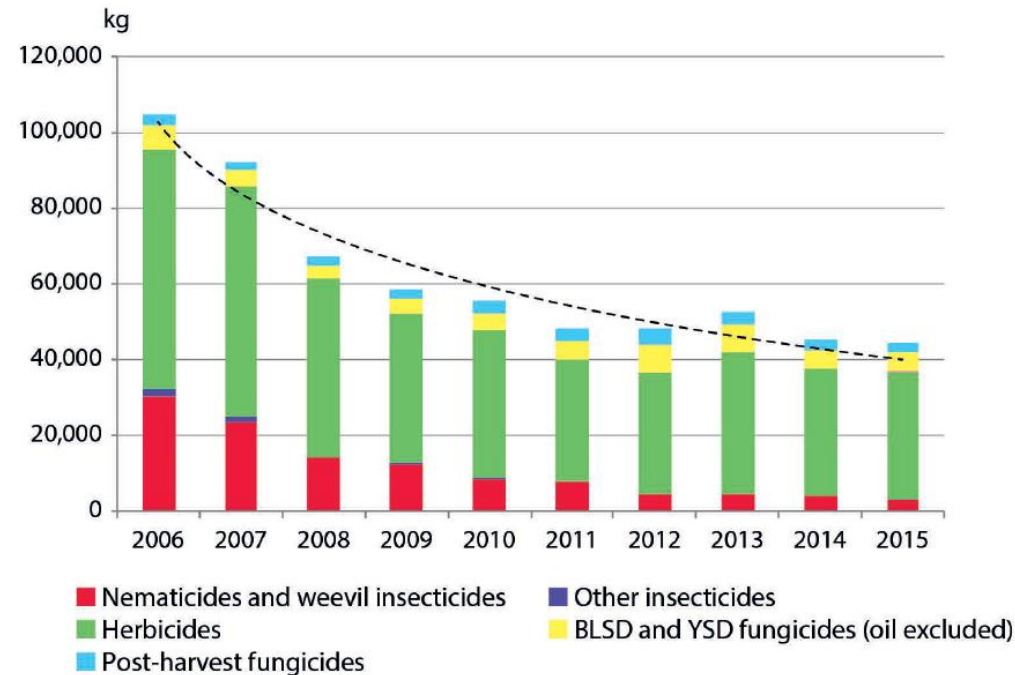


The FWI context

- The French West Indies are part of the European Union and, as such, the regulatory context is very restrictive
- The cost of living and incomes there are high, which implies high labour costs
- Civil society exerts considerable pressure for a reduction in pesticide use



Reduction of pesticide use in FWI



Agroecological transition of Cavendish banana cropping systems without increasing farmers' income

Risède et al. 2019

Take a step further : conversion to organic farming

- The goal of the Banabio project is to design and evaluate innovative organic banana cropping systems.
- Establish technical and economic references on organic banana cultivation for farmers and decision makers
- The project is based on an experimentation evaluating 3 cropping systems: 2019-> 2023
 1. Conventional agriculture (controls)
 2. Intensive organic
 3. Diversified organic





Materials & Methods



BANABIO experiment



Dispositif expérimental BANABIO



Distance entre rangs : 2,85m
Distance entre plants sur ligne : 1,95m

3 Systèmes - SAUtot = 0,46 ha
CO = Conventionnel
BI = Bio Intensif
BD = Bio Diversifié



Soil type = Nitisol
Annual rainfall = 2400mm
Mean temperature = 26°C

Système	Parcelle	Surface (m ²)	Nb plants ban	Densité réelle (p/ha)
CO	CO1	570	104	1825
	CO2	438	96	2192
	CO3	505	104	2059
BI	BI1	523	112	2141
	BI2	482	98	2192
	BI3	438	96	2192
BD	BD1	482	70	1452
	BD2	718	102	1420
	BD3	468	68	1453
Total		4624	850	-



Farming practices in the 3 systems

1. Conventional agriculture (controls)

Average of conventional practices in Martinique

- Density = 1800 p/ha
- Fertilization = 440 kg N/ha
- Weed management = 3 herbicides
- Black sigatoka management = 7 fongicides+7 Banol

Farming practices in the 3 systems

2. Intensive organic

Density = 1800 p/ha

Fertilization = 514 kg N/ha

3. Diversified organic

Density = 1200 banana/ha
+ 600 cocoa/ha

Fertilization = 342 kg N/ha

Weed management = 7 brush-cutter

Black sigatoka management = 14 Banol

Measurements made on the 3 systems

Yield

- Bunch weight
- Cycle length

Soil

- Mineral nutrition
- Earthworms population

Pest pressure

- Weeds biomass
- Weevil pressure
- Number of leaves at harvest

Economic performance

- sum of the estimated costs for each cultivation operation (divided by yield or not)

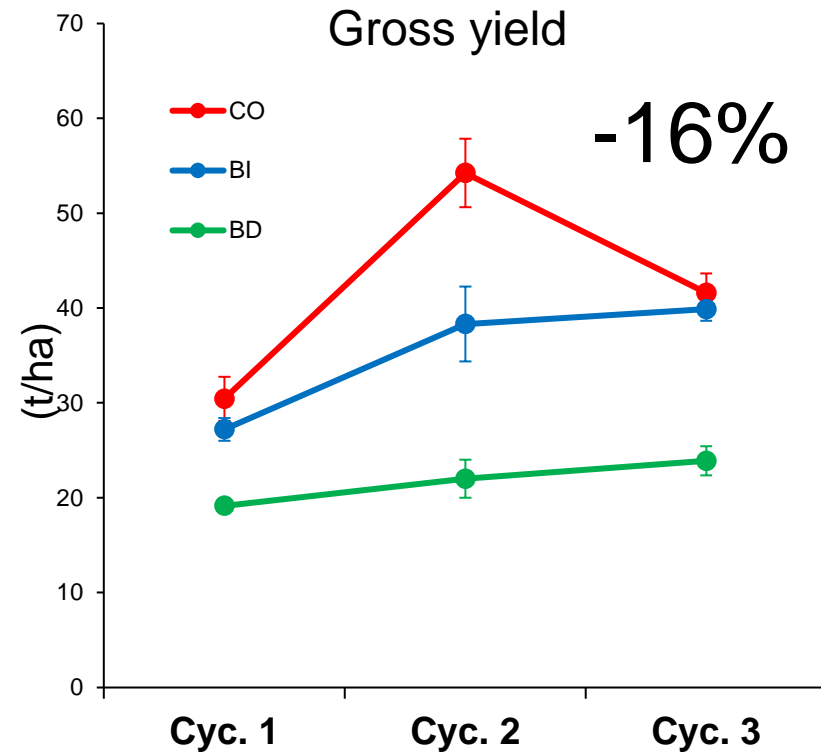


Results

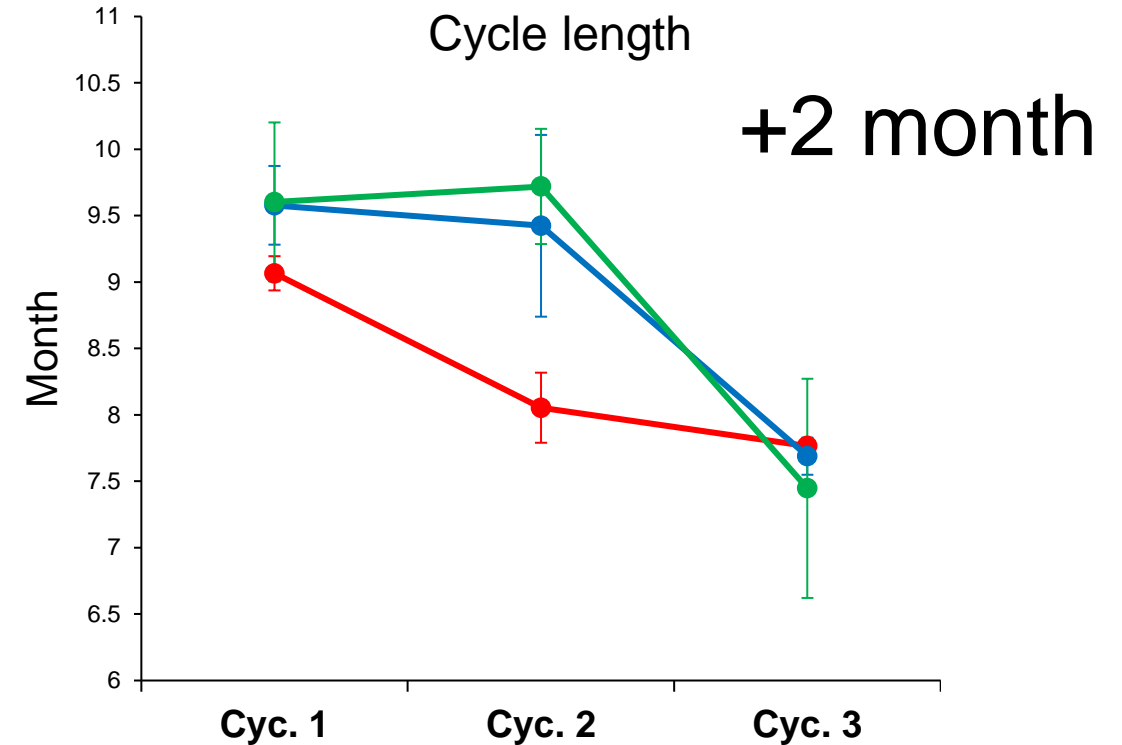
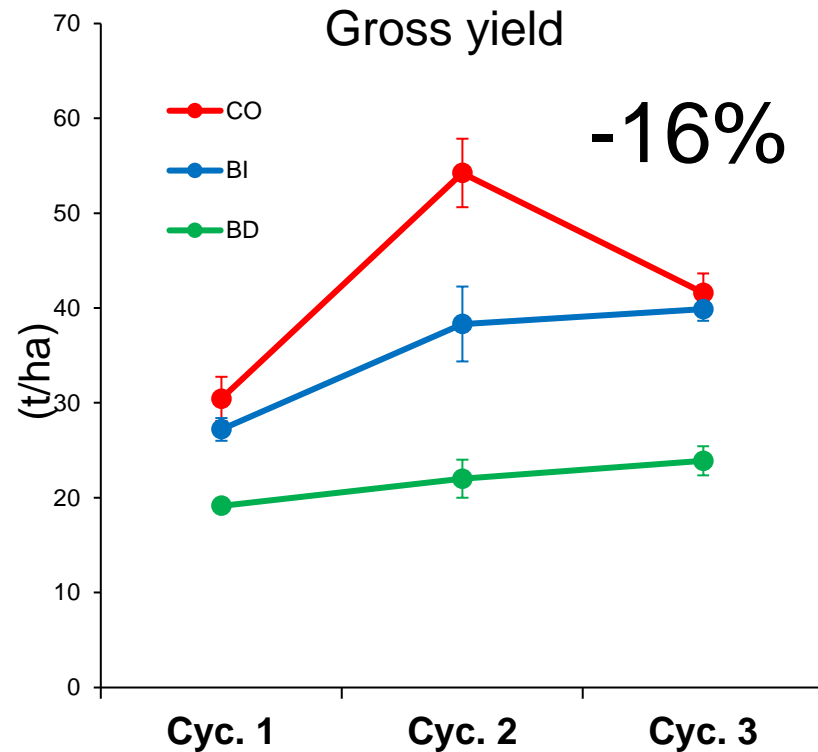
from the first 3 cycles



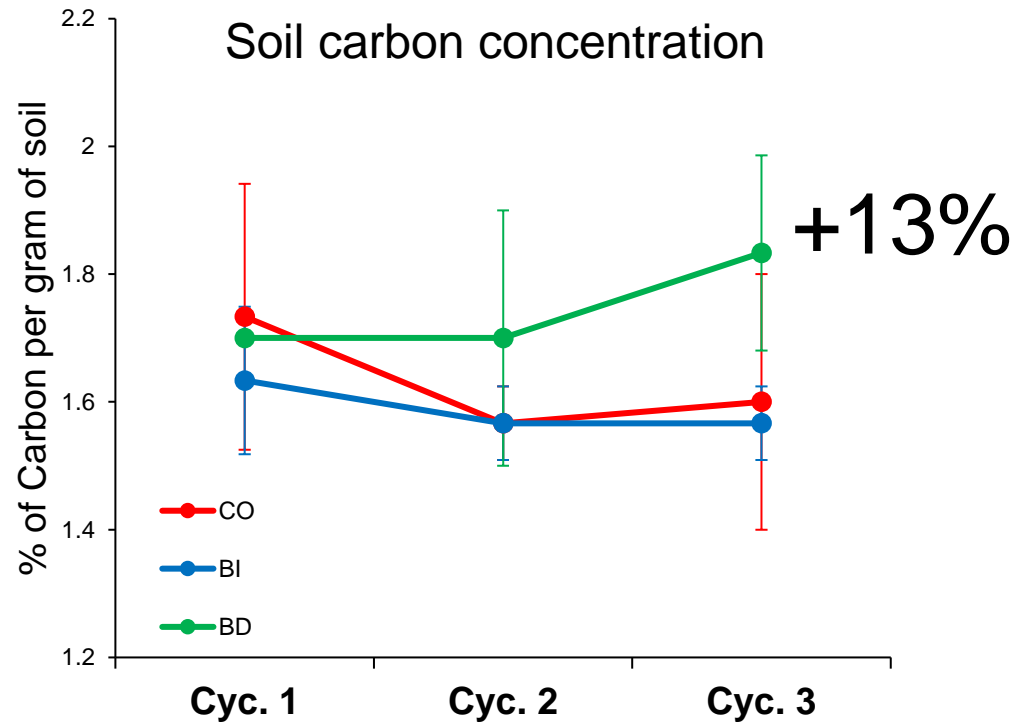
Yield gap between organic and conventional



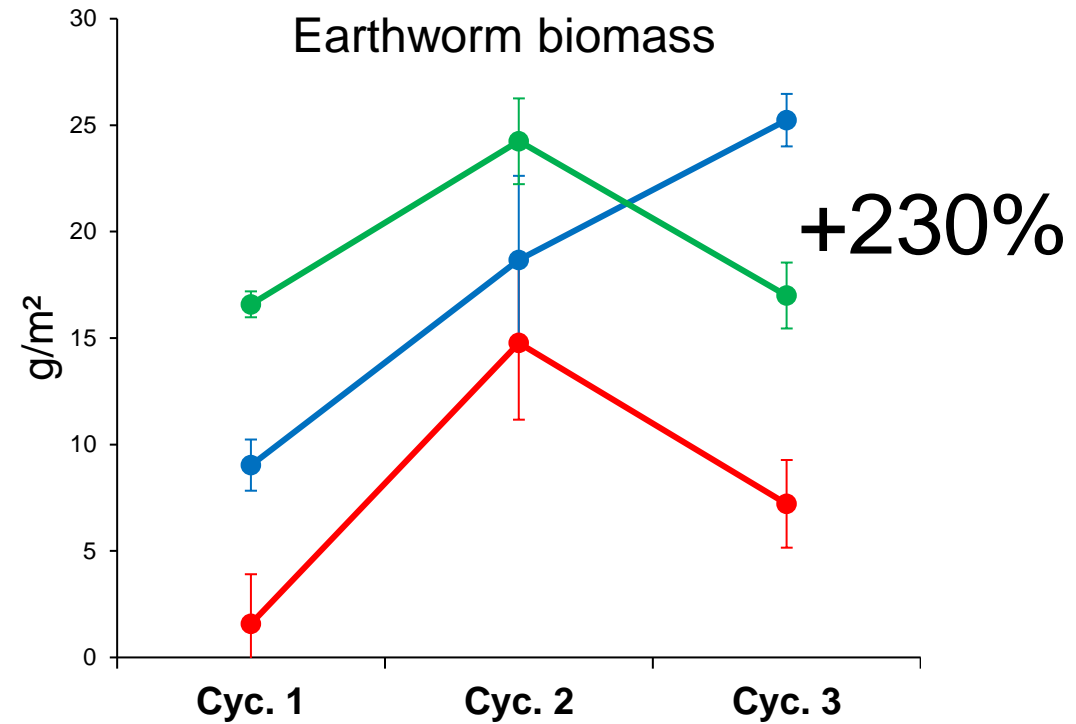
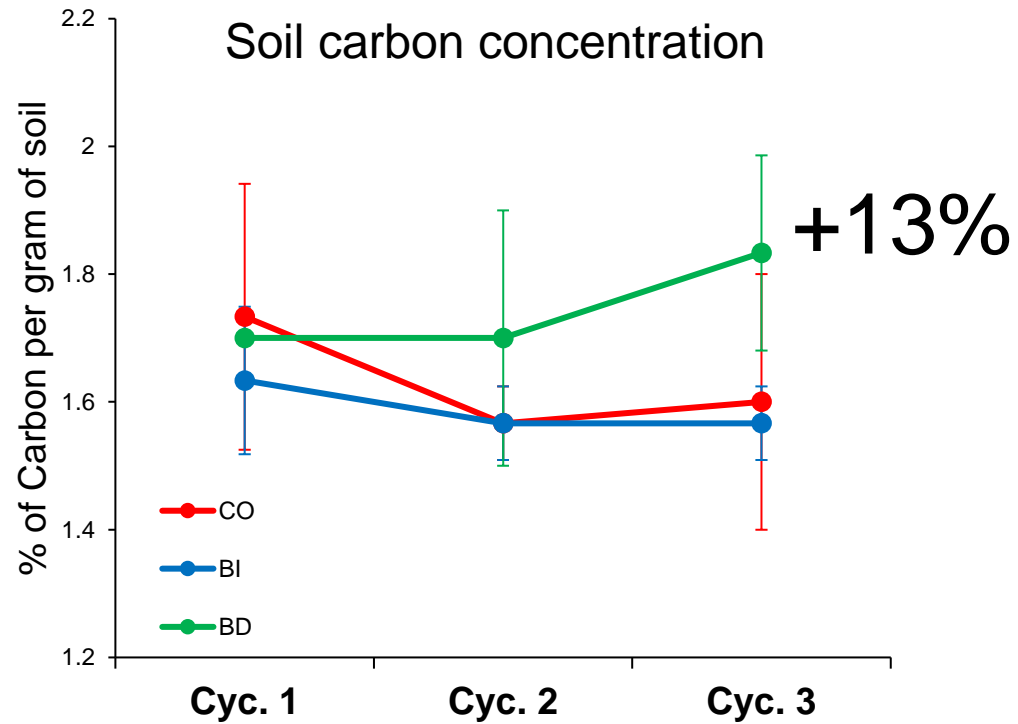
Yield gap between organic and conventional



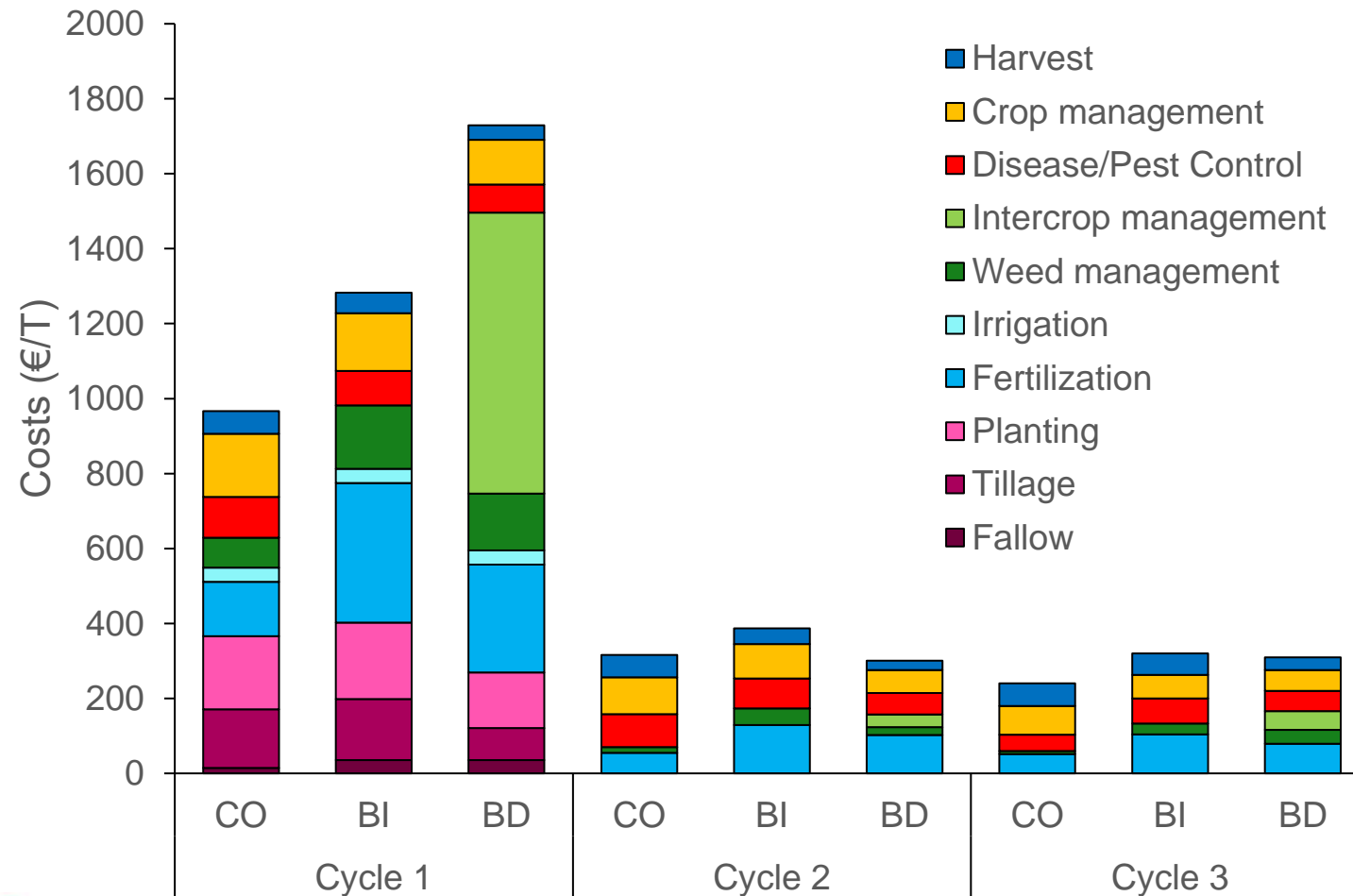
Effect of organic farming on soil



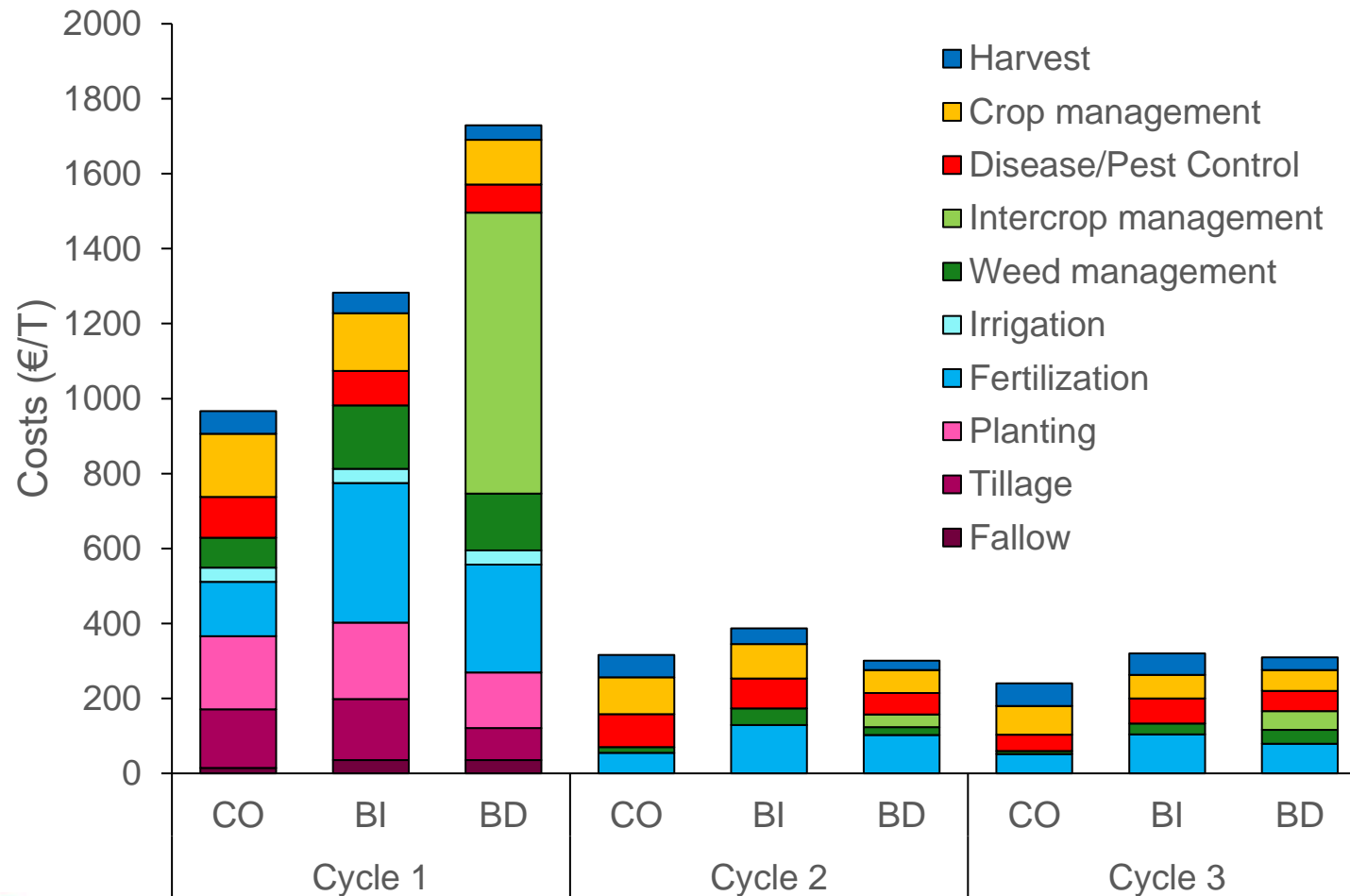
Effect of organic farming on soil



Comparison of production costs between organic and conventional



Comparison of production costs between organic and conventional



Conv. = 542 €/t
vs
Organic (BI) = 744 €/t

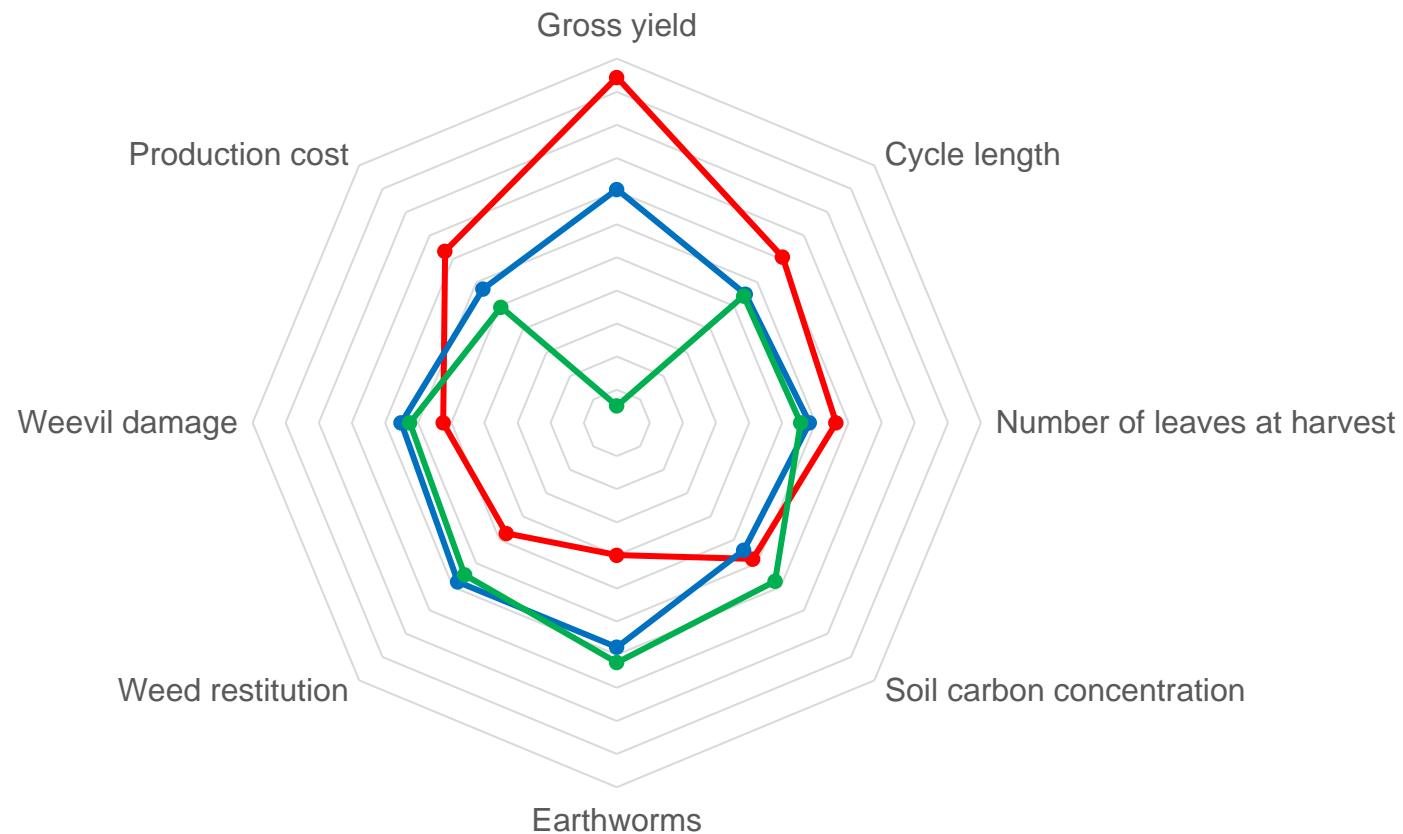
Costs of weed management & fertilization x 2,4 in organic



Discussion & Conclusion



Trade off between costs of production/yield and ecosystem services related to soil biology





Thank you for your attention

For more information, you can visit the BANABIO website:

<https://ecophytopic.fr/dephy/concevoir-son-systeme/projet-banabio>

Black sigatoka

Conv = 2,1
Vs
Organic = 1,4

