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Assessment of camelina crop management options without herbicide across a multi-environment trial in Northern France

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A need for camelina crop management options without herbicide





- Project to develop a local oilseed biorefinery in Northern France since 2012

(GENESYS research program - https://sas-pivert.com/)

- Camelina (*Camelina Sativa* L. Crantz) has been identified as a good candidate to supply this biorefinery

(Bonjean and Le Goffic 1999; Berti et al. 2016; Righini et al. 2016)

- Weeds are one of the major limiting factors for camelina production and processing

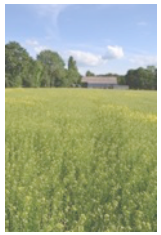
(Berti et al. 2016, Davis et al. 2013, Lenssen et al. 2012)

- Uncertainties about chemical weeding strategies and emerging new ways to control weeds in camelina crop

(Scheliga and Petersen 2016, Walsh et al. 2012, Heiska 2009, Saucke and Ackermann 2006)

Objective of the study

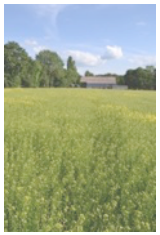


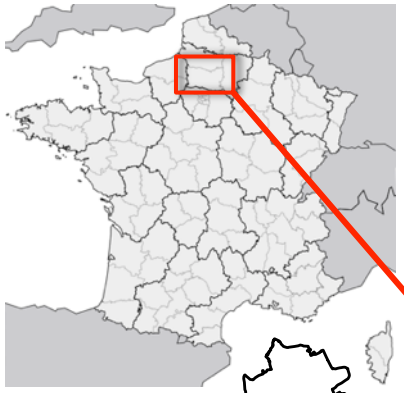


→ Assess camelina crop management strategies **without herbicide** designed in the context of the development of an oilseed biorefinery in Northern France

A multi-environment trial in Northern France







→ 9 field experiments
→ 3 soil types

- Clay
- Loamy
- Sandy

- 2017
- 2018

NOYON
BEAUVAIS
CLERMONT
COMPIEGNE
SENLIS

Four crop management options tested

1 control
= current management

3 alternative management options with a high soil coverage

Camelina simple density	**DD** Camelina double density	**CP** Camelina/Pea intercrop	**CB** Camelina/Barley intercrop




SOWING RATE

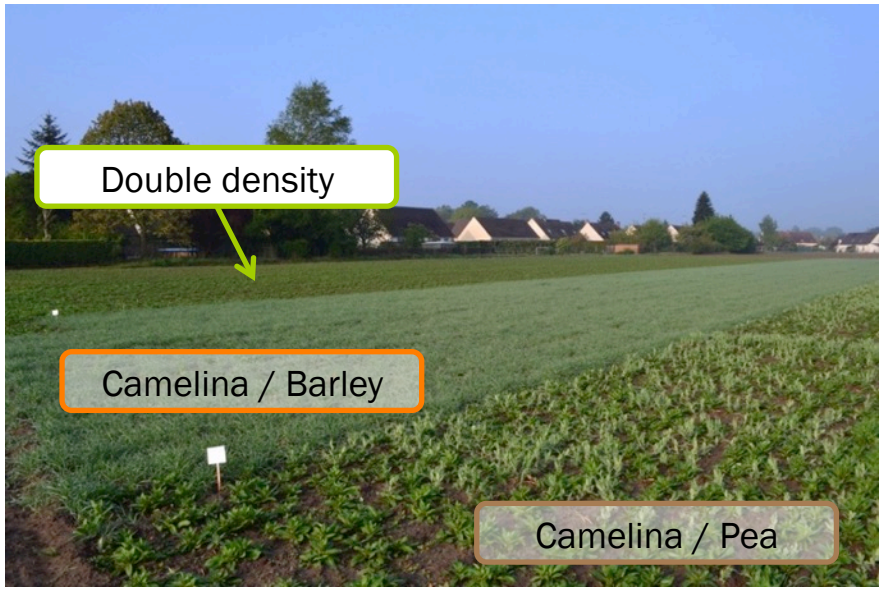
Camelina	4 kg.ha^{-1}	8 kg.ha^{-1}	4 kg.ha^{-1}	4 kg.ha^{-1}
Intercrop			100 kg.ha^{-1}	70 kg.ha^{-1}

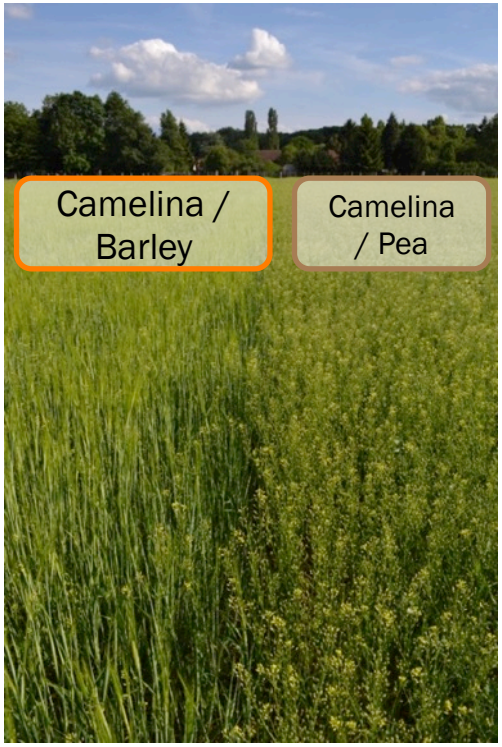
HERBICIDE

Novall (metazachlor + quinmerac) 0.8 to 1 l.ha^{-1}	Ø	Ø	Ø

Experimental design and main measurements

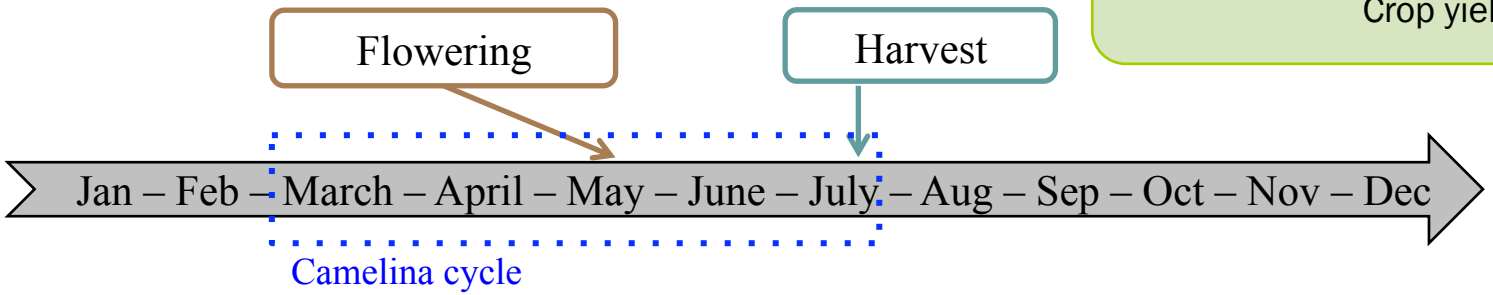
- Four strips without repetition (around 0.25 ha for each strip)



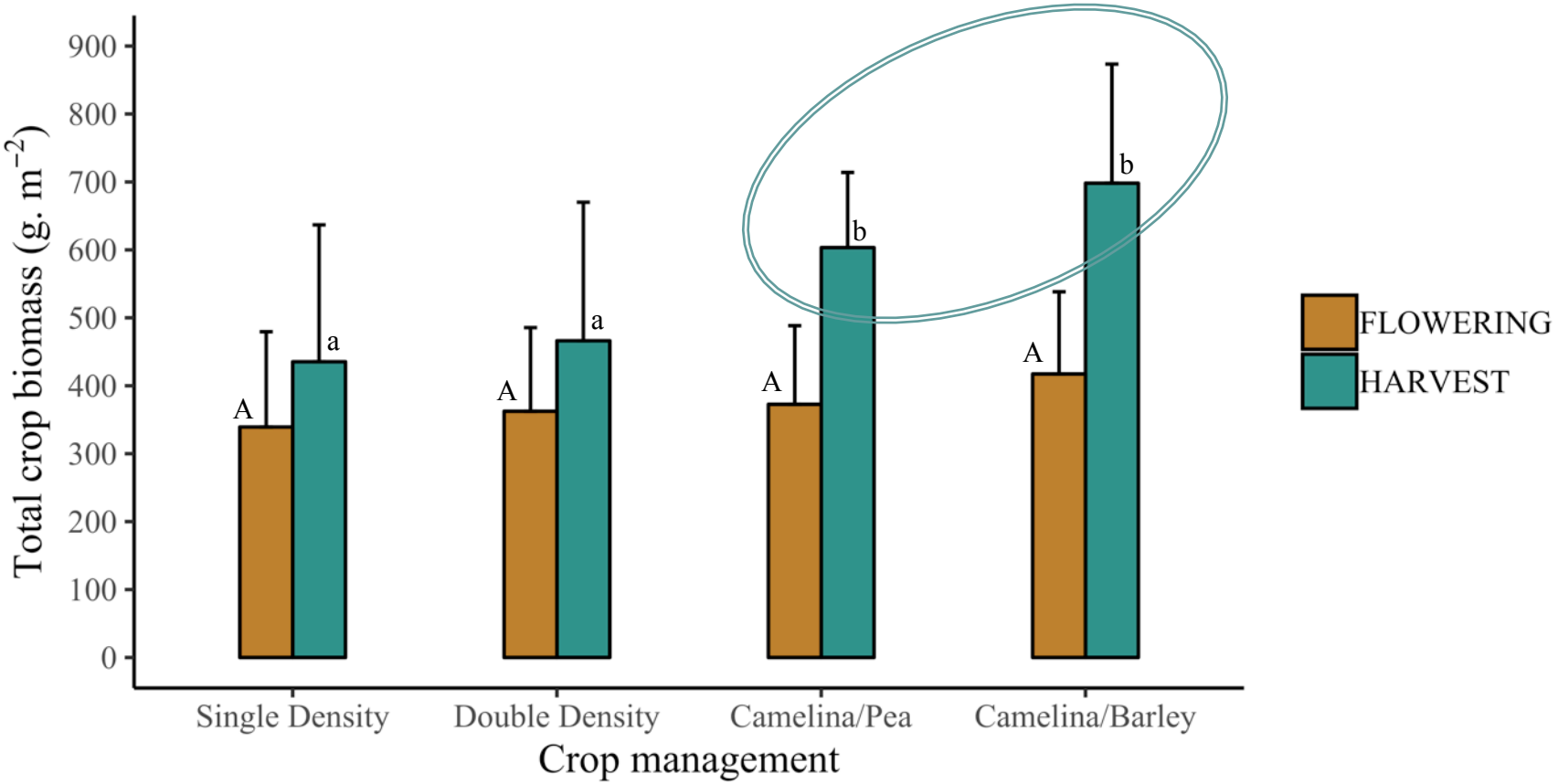


- 6 plots of 0.5 m^2 for each treatment at 2 dates

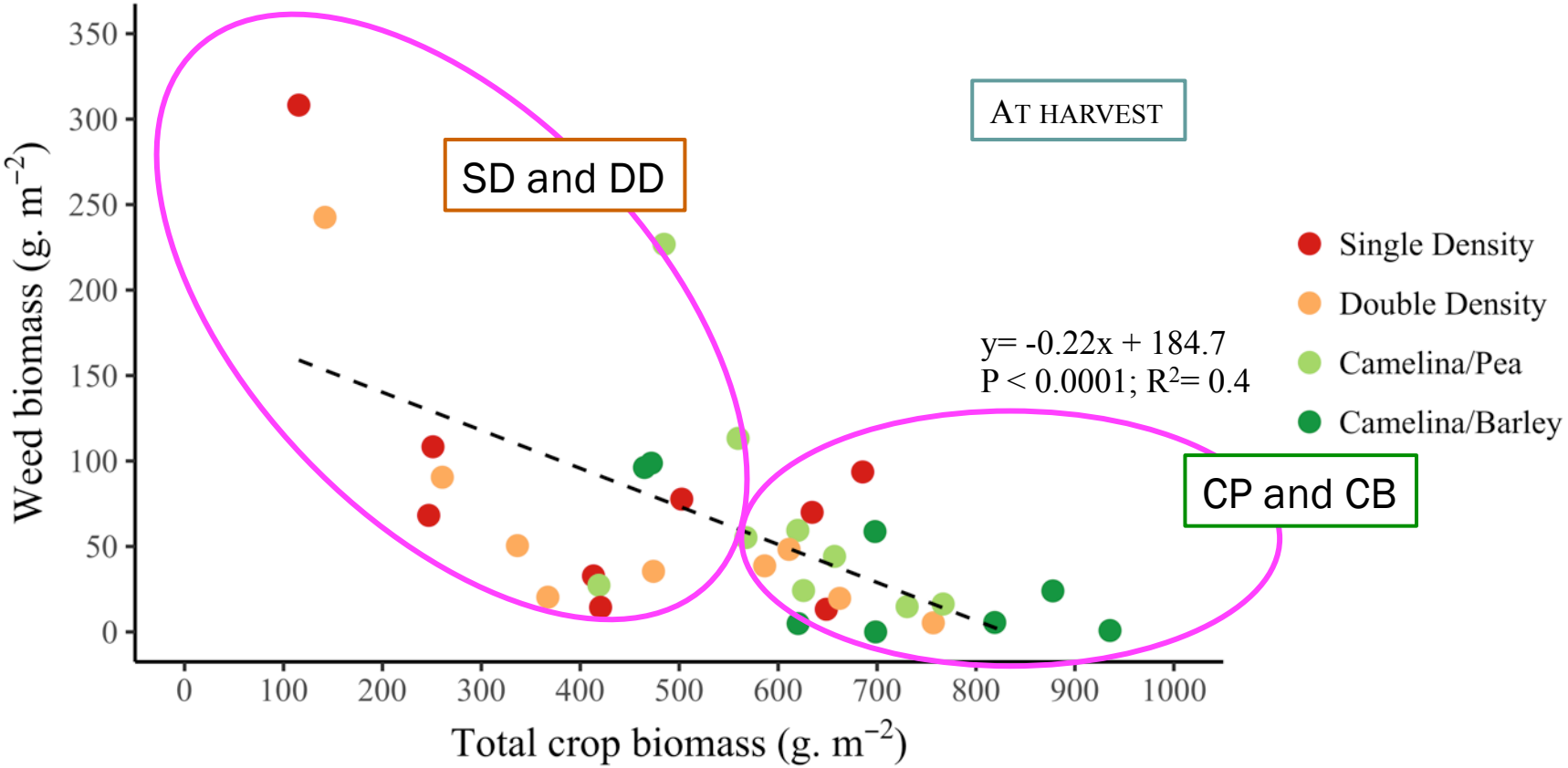
MEASUREMENT OF:
Weed and crop biomass
Crop yield



Crop biomass significantly increased at harvest for the intercrops

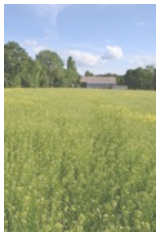


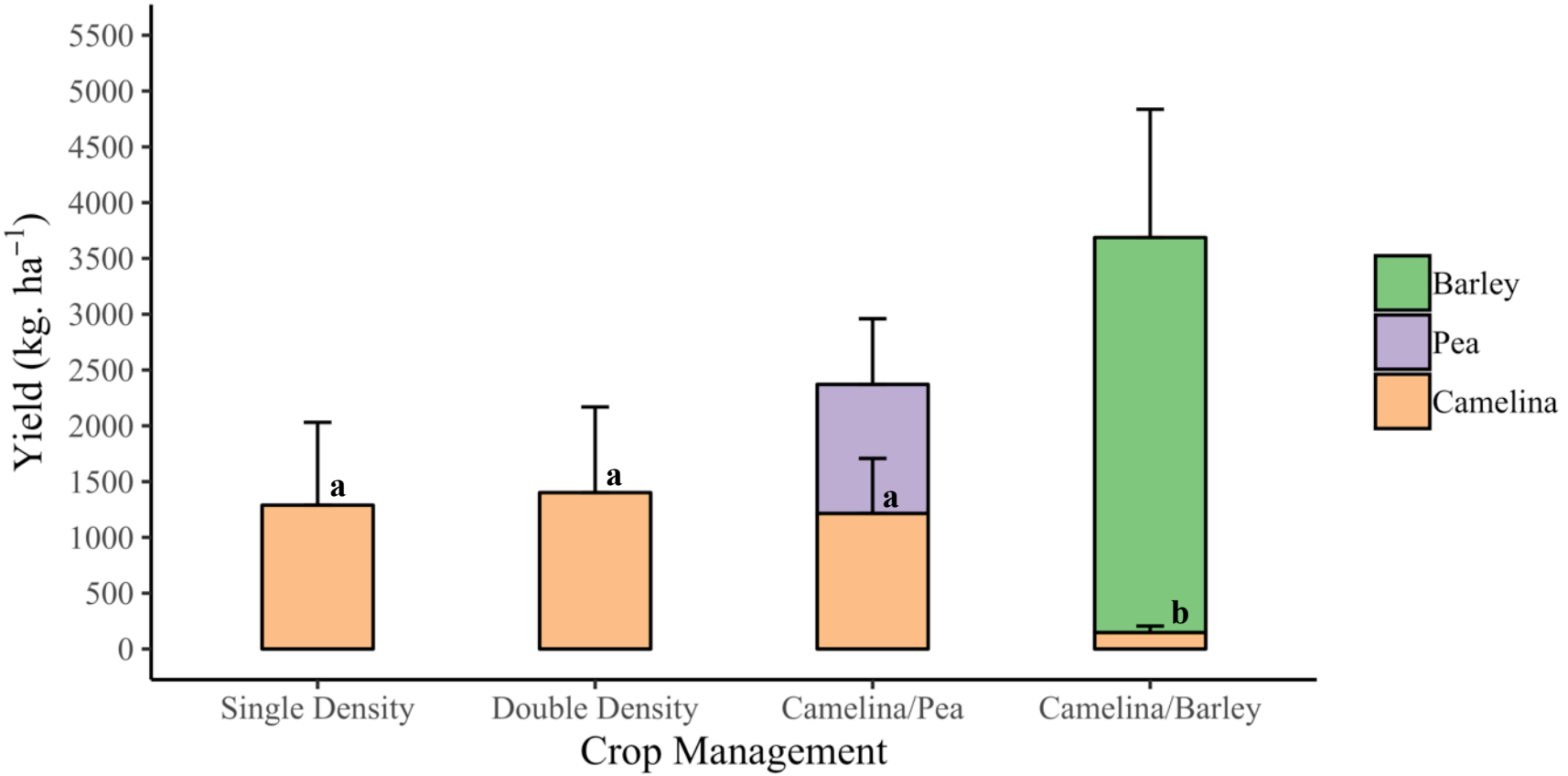
Negative correlation between weed biomass and crop biomass



Contrasted camelina yields and satisfying pea and barley yields







Global assessment of the crop management options

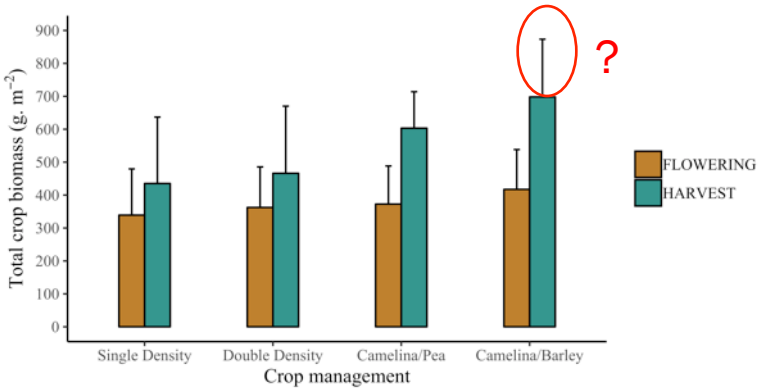
	SS Camelina single density	DD Camelina double density	CP Camelina/Pea intercrop	CB Camelina/Barley intercrop
HERBICIDE	✔	Ø	Ø	Ø
CROP BIOMASS	=	=	+ +	+ +
WEED BIOMASS	+	+	− −	− −
CAMELINA YIELD	=	=	=	− −
GLOBAL ASSESSMENT OF THE ALTERNATIVE CROP MANAGEMENT OPTIONS		☑ *Cost? Diseases?*	☑ *Risk of nitrate leaching?*	☒

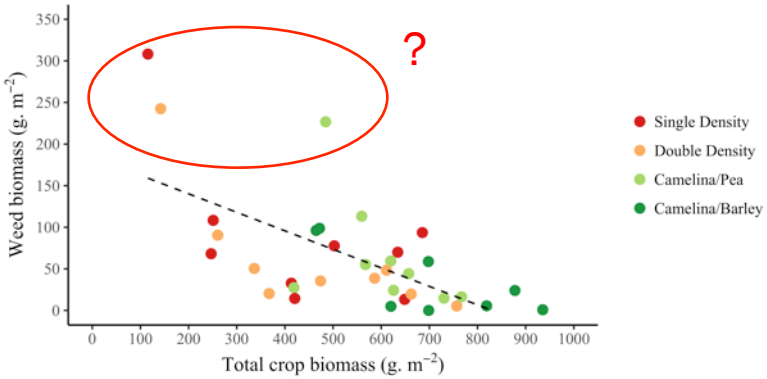
Perspectives





- Are the effects of the crop management options the same when considering the soil type (loamy, clay or sandy) and the cropping system practiced by the farmer?





- What are the performances of the 4 crop management options regarding quality, environmental, and economic criteria?

Ex: oil and protein contents, impurity level, nitrate leaching, profitability, etc.





Thank you for your attention !





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