

Innovative IPM Solutions for Winter Wheat-based Rotations (WP2): Cropping Systems Assessed in the INRA Trials (France)

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OBJECTIVE

Within the context of the PURE project (WP2), innovative IPM solutions were designed, tested and validated for winter wheat-based rotations in different pedoclimatic conditions in Europe.

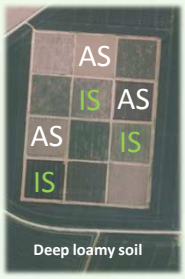
In each location, three cropping systems (C.S.) were designed according to a gradient of pesticide-use intensity: (1) current agricultural practices with a conventional use of pesticides, (2) intermediate level of IPM with a reduction in pesticide use and (3) advanced level of IPM where no pesticides are allowed.

➢ **Here, we describe the field trials and the main characteristics (*i.e.* agricultural practices) of the three cropping systems assessed in the INRA long-term field trials in France.**

LONG-TERM FIELD TRIALS AT INRA (France)

Trial network locations in Europe - WP2 (on-station) INRA trials

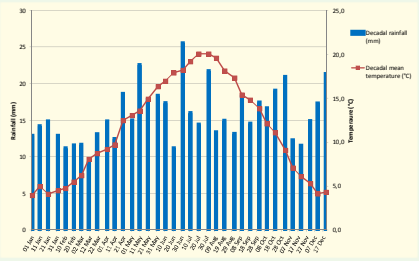




Field trial located in Grignon (A.S.: Advanced System; I.S.: Intermediate System)



Field trial located in Versailles (C.S.: Current System)



Means of rainfall and temperatures in Grignon and Versailles (1993-2013)

MAIN CHARACTERISTICS OF THE 3 CROPPING SYSTEMS ASSESSED

(Colnenne-David C. and Doré T., 2014)

CURRENT SYSTEM (C.S.)

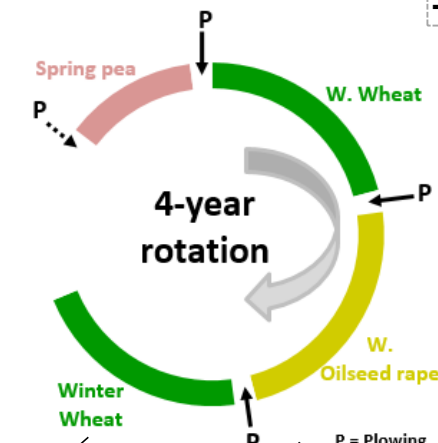
The C.S. was designed to maximize gross margin in bread wheat-based rotation:
➔**high amount of pesticides allowed**
➔yield targets: close to the current regional system

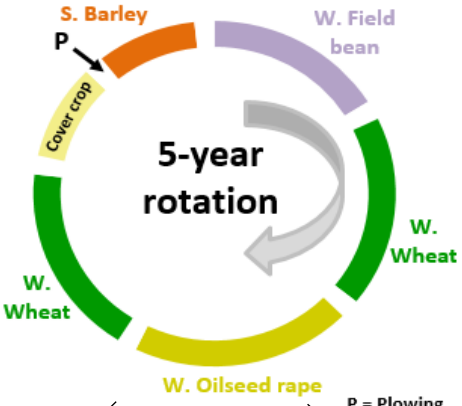
INTERMEDIATE SYSTEM (I.S.)

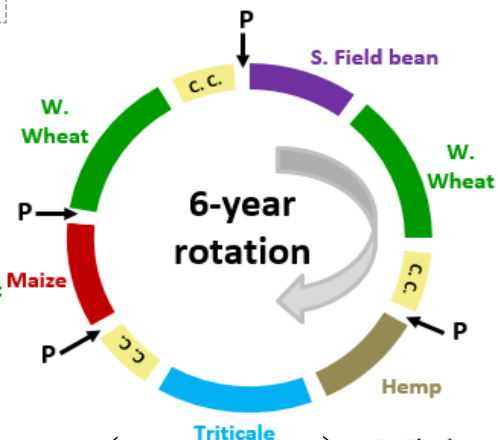
The I.S. was designed with:
➔ multiple environmental targets (*i.e.* **to reduce pesticide use**, to lessen energy consumption, to decrease N leaching, to stabilize the amount of soil organic matter)
➔yield targets: close to the regional low-input C.S.

ADVANCED SYSTEM (A.S.)

The A.S. was designed with:
➔ a pesticide constraint: **no pesticide is allowed**
➔ multiple environmental targets (*i.e.* see I.S.)
➔yield targets: higher than the regional organic C.S.







	P = Plowing		P = Plowing		P = Plowing
TFI ha $^{-1}$year $^{-1}$: 4.64	N fertilization: 147 kgN ha $^{-1}$ year $^{-1}$	TFI ha $^{-1}$ year $^{-1}$: 1.85	N fertilization: 57 kgN ha $^{-1}$ year $^{-1}$	TFI ha $^{-1}$year $^{-1}$: 0.00	N fertilization: 28 kgN ha $^{-1}$ year $^{-1}$
Winter Wheat yield: 9.77 t ha $^{-1}$		**Winter Wheat yield: 8.56 t ha $^{-1}$**		**Winter Wheat yield: 7.53 t ha $^{-1}$**	

Mean values are calculated at rotation scale

REFERENCE: Colnenne-David C., Doré T., 2014. Designing innovative productive cropping systems with quantified and ambitious environmental goals. "Renewable Agriculture and Food Systems". doi:10.1017/S1742170514000313
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