INTERCROPPING OF WINTER PEA WITH DURUM WHEAT CAN ALLOW TO REDUCE LEGUME PESTS AND DISEASES

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5th International Food Legumes Research Conference and 7th European Conference on Grain Legumes, Antalya, Turkey

OBJECTIVES

- **Pests and diseases are often a major concern**, particularly in low inputs systems with few or no pesticide (organic) treatments.
- **Intercropping (IC) can allow a significant reduction in harmful insects and diseases** (e.g. Kinane and Lyngkjaer, 2002).
- **No reference on winter crops IC was available** despite winter crops seems more adapted to Southern Europe conditions.
- **Aim of our study: Evaluate Durum wheat – Winter pea IC efficiency to reduce pests and diseases damages comparing:**
  - ***i)*** **Green aphids and weevils dynamics in SC and IC**
  - ***ii)*** **Pea ascochyta and main durum wheat foliar diseases development in SC and IC**

CONCLUSIONS

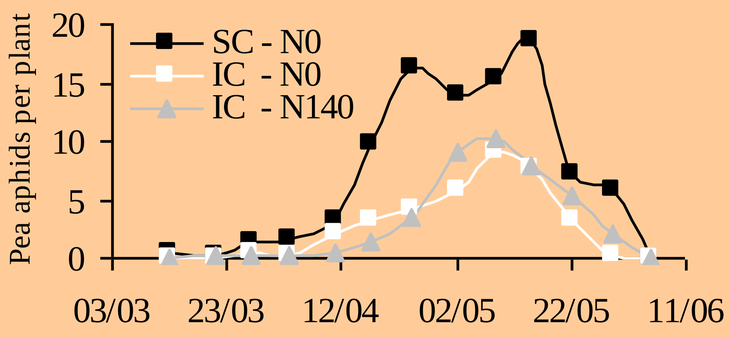
- **Pests and diseases damages were globally reduced (not always) and never increased in IC compared to SC**
- **Durum wheat - Winter pea intercropping efficiency (to reduce pests and diseases) depends on:**
  - ***i)*** **Insect behaviour** (mobility and ability to recognize its target in a mixed cover)
  - ***ii)*** **Disease dispersion mode** (interaction with IC microclimate modification)
  - ***iii)*** **Plant architecture and farming practices interactions** (for example the 'umbrella' effect)

MATERIAL AND METHODS

- **A three years experiment** was carried out in Auzeville (SW France) since 2006
- **Three main treatments were compared (row substitutive design):**
  - ***i)*** **W-SC:** Durum wheat sown at 336 seeds/m²
  - ***ii)*** **P-SC:** Winter pea (cv. Lucy) sown at 72 seeds/m²
  - ***iii)*** **IC:** Each specie sown at half of SC density in row-intercropping
- **Various fertiliser-N sub-treatments and fungi managements**
- **Measurements carried out:** ***i)*** Pea aphids dynamic; ***ii)*** Number of nodules; ***iii)*** Percentage of drilled nodules; ***iv)*** Attack of pea ascochyta; ***v)*** Attack of durum wheat mildew, brown rust, fusarium and septoria

RESULTS AND REFERENCES

Evolution of pea aphids per plant (2007)



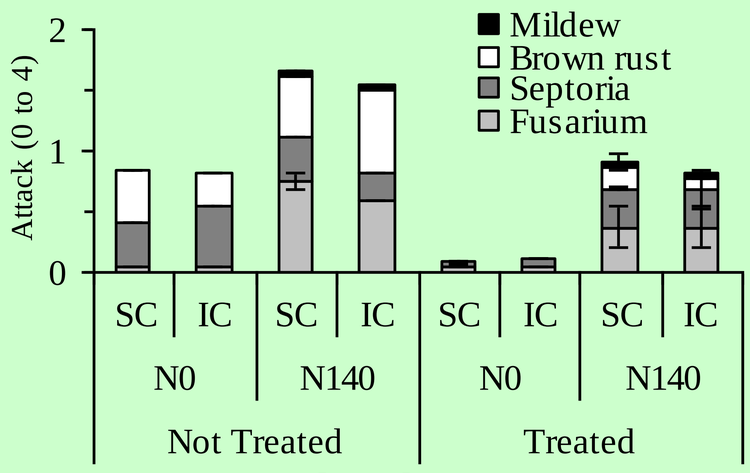
- Small number of pea aphids (this year)
- Pea aphids reduced in IC
- No difference between N treatments

→ IC efficient to reduce pea aphids

Hypothesis: Physical barrier of wheat? Habitat modification?

Durum wheat diseases damages (22/05/07)

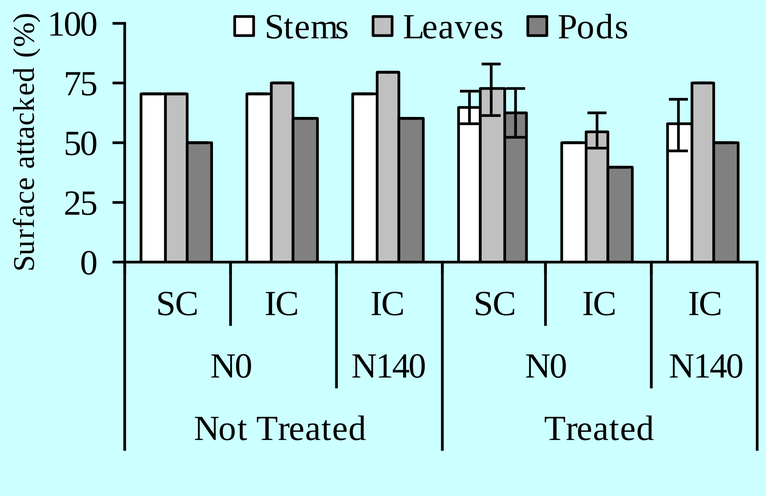
Attack = Plants attacked (%) x Surface attacked (%)



- Diseases not reduced in IC
- N increased wheat diseases
- Wheat diseases reduced by fungicide

→ IC not efficient to reduce wheat diseases this year

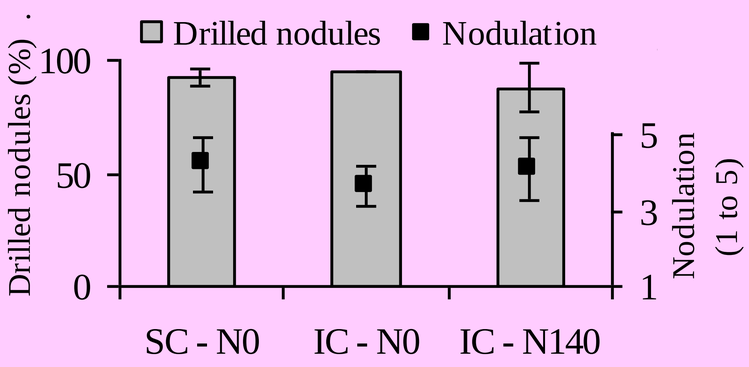
Pea ascochyta damages (22/05/07)



- Stems & leaves more attacked than pods
- Fungicide treatment reduced Ascochyta attack only in IC (interaction…)

Hypothesis: Better fungicide efficiency in IC because of lower pea DM?

Nodulation and % of drilled nodules (2007)



- Nodulation not affected by IC
- % of drilled nodules high in both IC & SC
- % of drilled nodules similar in IC & SC

→ IC not efficient against weevils

Hypothesis: Great mobility of weevils?

REFERENCES

- Kinane JS and Lyngkjær M (2002) Effect of barley-legume intercrop on disease in an organic farming system. Annual report of the Danish research centre for organic farming
- Vandermeer JH (1989) The ecology of intercropping. Cambridge university press, Cambridge, UK
- Willey RW (1979) Intercropping. Its importance and research needs. Part 1. Competition and yield advantages. Field Crops Abstr. 32:2-10