

## Research on silvo-arable systems with valuable broadleaves in Catalonia (NE Spain)

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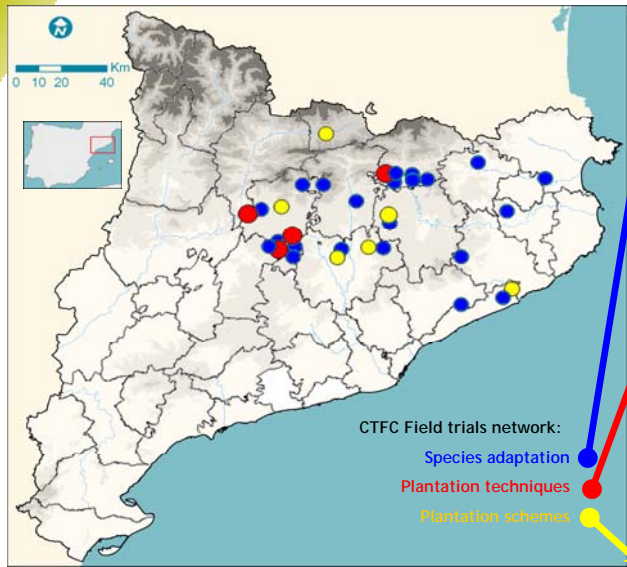
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### Context

The reduction of profitability of agricultural activities in Catalonia leads to the need for developing new and complementary productive alternatives. Small-sized, irregular-shape fields have the highest risk of abandonment, which would lead to landscape homogenization and increased risk of forest fires. An interesting alternative for these areas is the establishment of added value trees, mainly valuable broadleaves (walnut, cherry, ash, maple, etc). CTFC works since 1999 on the study of adaptation, plantation techniques and plantation schemes for growing them at various site conditions under minimal management schemes. The current plantation network includes 32 field trials, totaling 19 ha.



#### Research line 1: Species adaptation

- Evaluation of 8-12 vegetative materials across a wide variety of site conditions: 20 field trials
- Evaluation of pre-commercial clones / progenies of walnut, cherry and pear tree evaluated together with commercial materials: 3 field trials



#### Research line 2: Plantation techniques

- Innovation on weeding techniques: evaluation of methods alternative to tillage and herbicide application: mulching with polyethylene, bioplastic film, wood chips, ramial chipped wood, etc: 3 field trials.
- Innovation on tree protection: study of different models of tree shelter: 1 field trial



#### Research line 3: Innovative plantation schemes

- Use of accompanying species for enhancing growth and adequate tree shape: 3 field trials
- Mixed and pure plantation schemes: study of facilitation processes: 2 field trials
- Diversification of poplar plantations with valuable broadleaves plantations: 1 field trial



### From forestry to agro-forestry

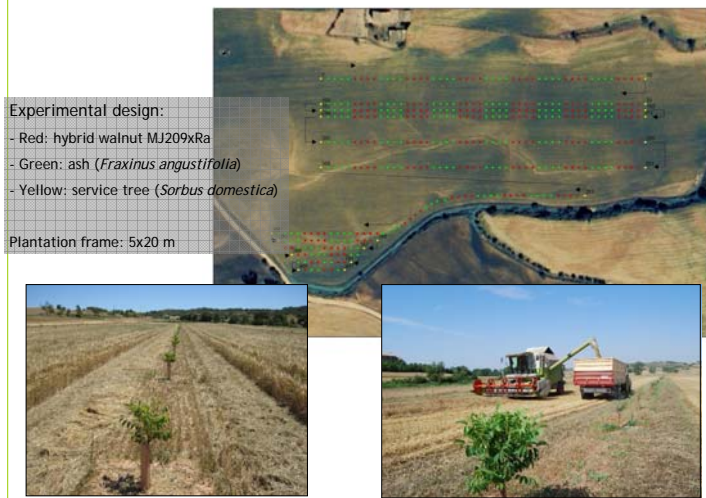
Apart from their use on small agricultural fields, valuable broadleaves are an excellent option for larger fields with deep soils, through the installment of silvo-arable systems, that combine agricultural and forestry production at the same space and time. This scheme allows income diversification, production enhancement and improvement of environmental quality. CTFC works for raising awareness about this systems, that are scarce and not well-known in Catalonia, through the establishment of field trials and specific training.

#### CTFC silvo-arable field trials

##### Cereal (wheat/barley) with walnut, ash and service tree (March 2010)

This 5 ha experience pretends to study the facilitation and competence between trees and crops at a silvo-arable system at Mediterranean conditions, with 3 schemes: trees with crops at both sides, trees with crops at one side and trees without effect by crops.

Measures of crop production are done at different distances from tree rows.

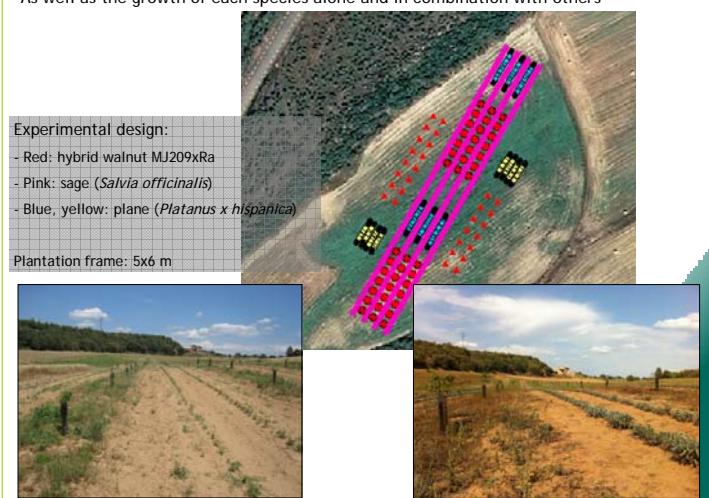


##### Sage (*Salvia officinalis*) with walnut and biomass (March 2012)

This 1 ha system pretends to study the interactions between:

- Sage and hybrid walnut MJ209xRa for valuable timber production
- Sage and hybrid plane (*Platanus x hispanica*) for biomass production

As well as the growth of each species alone and in combination with others



### Results and conclusions

- The field experiences have shown the interest of growing valuable broadleaves in Catalonia, with good adaptation of the major part of species
- Among the species with highest potential, hybrid walnut shows excellent adaptation to a wide range of conditions, while ash (*F. excelsior* in mountain areas and *F. angustifolia* in Mediterranean areas), service trees (*S. domestica* and *S. torminalis*) and maples (*Acer campestre*, *A. pseudoplatanus*) proved to be quite interesting choices for diversification.
- Mulching is a cost-effective technique that minimizes management costs. Biodegradable mulches are an option to be explored and adapted to specific site conditions
- Mixed plantations allow reducing the risks associated to a poor adaptation of a species. The short age of our field trials does not allow having conclusions about the interaction
- The young age of the two silvo-arable experiences (3rd and 1st vegetative period) makes difficult extracting conclusions about their interest in comparison with separated agricultural and forestry systems. The management of agriculture and forestry components is not more complex, so far, than the management of the systems separately.