



LEGATO

LEGumes for the Agriculture of TOMorrow

Collaborative project

Grant agreement no: 613551

SEVENTH FRAMEWORK PROGRAMME

THEME [KBBE.2013.1.2-02]

**[Legume breeding and management for sustainable
agriculture as well as protein supply for food and feed]**

Deliverable D7.2

Project brochure and poster in English

Due date: 30 April 2014 (M4)

Actual submission date: M4

Project start date: 1st January 2014 **Duration:** 48 months

Workpackage concerned: WP7

Concerned workpackage leader: Dunixi Gabiña. IAMZ-CIHEAM

Dissemination level: PU (public)

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I. Objectives

The LEGATO brochure and poster are **key dissemination documents** and can be used as a calling card of the LEGATO project. They include in a synthesised way the most relevant information of the project, including its aim and objectives, project structure and expected results.

II. Deliverable procedure

The deliverable has been produced by IAMZ-CIHEAM's own personnel, in agreement with LEGATO Coordinator (Dr. Richard Thompson; INRA Dijon). The final layout of both the LEGATO brochure and the poster has been produced by a graphical design company. The pictures have been provided by several LEGATO partners.

The LEGATO brochure will be preferably printed in A4 format. The poster is suitable to be printed in any DIN format, in preference from A4 (297x210 mm) to A0 (841x1189 mm).

III. Conclusion

The LEGATO brochure and poster will be important documents for the project dissemination, with a flexible presentation format.

Annex 1: Graphical material

Brochure (http://www.legato-fp7.eu/pdfs/LEGATO_brochure.pdf)

Project structure

WP1 Genetics: new breeding tools and material
WP2 Biotic stress resistance
WP3 Optimizing plant adaptation to abiotic stress
WP4 Defining traits adapted to consumers' expectations
WP5 Grain legume cropping system management
WP6 Stakeholder interface for target orientation and practical evaluation
WP7 Outreach
WP8 Management

Project Consortium

Strategic aim

The overall aim of LEGATO is to contribute to the sustainable reintroduction of grain legumes in European cropping systems:

- Working on the major European grain legumes, pea, faba bean, and with specific objectives on white lupin, lentils and grass pea.
- Focusing on the identification and testing of novel legume breeding lines possessing valuable characters such as disease and pest resistance, tolerance to abiotic stresses (such as water shortage and heat at the end of the cycle) and quality for human consumption.
- Optimizing the selection of these lines for low-input agriculture and in innovative legume-centred cropping systems, intercropping and multivarietal mixtures, and testing the benefit of inoculation with rhizobium.
- Enabling a quantum leap in the use of marker-assisted selection in legume plant breeding, through the exploitation of comprehensive genomic resources which have recently become available.
- Communicating and exploiting the breadth of knowledge obtained to the gamut of stakeholders.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613551

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Legumes in Europe

Despite the nutritional value in terms of protein they provide for both humans and for livestock, the cultivation of grain legumes in Europe has been constantly decreasing over the last 40 years. It has become urgent to reverse this trend, since legumes play a key role in developing future sustainable farming systems, notably but not exclusively in terms of their potential to mitigate the adverse effects of agricultural production on the environment through: their unique ability to fix atmospheric N₂ via a symbiotic relationship with soil bacteria (Rhizobium) and therefore to have no requirement for N-fertilizers, their diversifying effect in cereal-rich cropping systems and hereby reducing the requirement for pesticides.

Grain legume seeds are rich in protein (up to 40%) and could improve Europe's autonomy for this commodity, as it imports around 70 % of its requirements in protein rich products used for feeds (20-25 Mt of meals + 15 Mt of soybean seeds). In addition to proteins, legume seeds are rich in slowly digestible starch, soluble sugars, fibre, minerals and vitamins as well as secondary metabolites such as isoflavonoids, and can play a major nutritional role with the further benefit of anticancer and other health-promoting compounds. Thus, grain legumes are valuable and health-promoting sources of protein for human consumption, currently underused in Europe, but with an increasing geopolitical importance in view of soaring world protein prices.

However, several factors, including less investment in breeding, have combined to result in yields and profitability of legumes being lower and more variable than those of other crops. This reduces their attractiveness to farmers, and has limited their availability for consumers to a level far below their potential.

Objectives

At the pre-competitive level:

1. Screen and exploit the phenotypic and genetic diversity offered by legume collections
2. Identify genes conferring desirable traits: determination of yield and yield stability, resistance to biotic and abiotic stress, legume seed composition, nutritional and gustatory qualities
3. Develop genetic markers and pre-breeding material for fast breeding of varieties possessing desirable traits
4. Develop fast and efficient selection tools for quality traits based on spectroscopic models

At the agronomic level:

5. Design and assess ex-ante (by multicriteria analysis) the sustainability of novel legume-based cropping systems adapted to local needs, and test their effects on productivity, yield stability, quality aspects, N acquisition and biotic stress management
6. Determine the requirements for inoculation with rhizobium in pea and faba bean, and select adapted and efficient strains
7. Identify novel lines of grain legumes with desirable traits, and generate pre-breeding material combining these traits that will be provided to end-users (including SMEs) to be continued and finalized for variety registration

At the stakeholder level:

8. Prioritise the quality traits relevant for consumers through consumer sensory analysis of innovative legume based food products such as fortified cereal breads (with flours containing mixtures of cereals and grain legumes)
9. Identify current and future consumer food habits and expectations, in terms of sustainability, nutritional and health-promoting qualities, to optimize marketing
10. Disseminate information, innovative genotypes and agronomic practices towards stakeholders and scientific community

Results and impacts

MAIN RESULTS		
INNOVATION • COMPREHENSIVE SCREENING OF GENETIC RESOURCES • NEW PLANT BREEDING TARGETS • INTRODUCTION OF UNEXPLOITED GERMPLASM • NEW CROPPING SYSTEMS		
LEGATO will generate breeding and management tools to reinforce the cultivation of legumes in European agriculture		
BREEDING FOR CULTIVATION Application of novel techniques for characterization, sequencing and selection Selection of new lines resistant to main pests and diseases, tolerant to biotic stresses such as water shortages and heat, with higher and more stable yields	CROPPING SYSTEMS New legume lines will be optimized for low-input systems Innovative cropping systems will be designed and assessed: legume-centred systems, multivarietal sowing, intercropping Inoculation with Rhizobium will be re-evaluated	QUALITY AND CONSUMPTION Evaluation and genetic characterization of factors affecting legume acceptability for consumption (nutritional and organoleptic) New tools for rapid assessment of quality characteristics
Increase of economic profit for farmers Reduction of use of agrochemicals and N fertilizer (reduction of costs) Increased and more stable yields	Increase of the interest by consumers and food industry New products with higher quality and special characteristics, potential for labeling...	
AUGMENTATION OF LEGUME CULTIVATION AND CONSUMPTION IN EUROPE		
FOOD SECURITY AND SELF-SUFFICIENCY Increase of European own supply for food and feed proteins Reduction of external dependence in a context of increasing world consumption, soaring prices and market uncertainty	AGRICULTURAL SUSTAINABILITY Reduction of negative impacts of agriculture (less phytotoxics and N fertilisers) Reduction of energy consumption (N fertilisers) Better economic returns for farming; maintains of rural activity	CONSUMERS HABITS Contribute to an improved diet offering a high protein, high soluble fibre and low cholesterol component Reinforce food security and safety Promote proximity consumption
IMPACTS		

Poster (http://www.legato-fp7.eu/pdfs/LEGATO_poster.pdf)



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Agriculture of TOMorrow**



www.legato-fp7.eu



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Strategic aim

The overall aim of LEGATO is to contribute to the **sustainable reintroduction of grain legumes in European cropping systems**. Working on the major European grain legumes, pea, faba bean, and with specific objectives on white lupin and grass pea, the project will focus on the identification and testing of novel legume breeding lines possessing valuable characters such as disease and pest resistance, tolerance to abiotic stresses and quality for human consumption. Using marker assisted selection and optimising lines for low input and innovative cropping systems.

Objectives

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Project structure



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