



Department of Agronomy Food
Natural resources Animals Environment



"Feeding humans, animals and soils with pulses: an Italian perspective" Sassari 21 Settembre 2016

Wild *Phaseolus vulgaris* distribution map



© Paul Gepts

Origin and evolution of cultivated *Phaseolus*

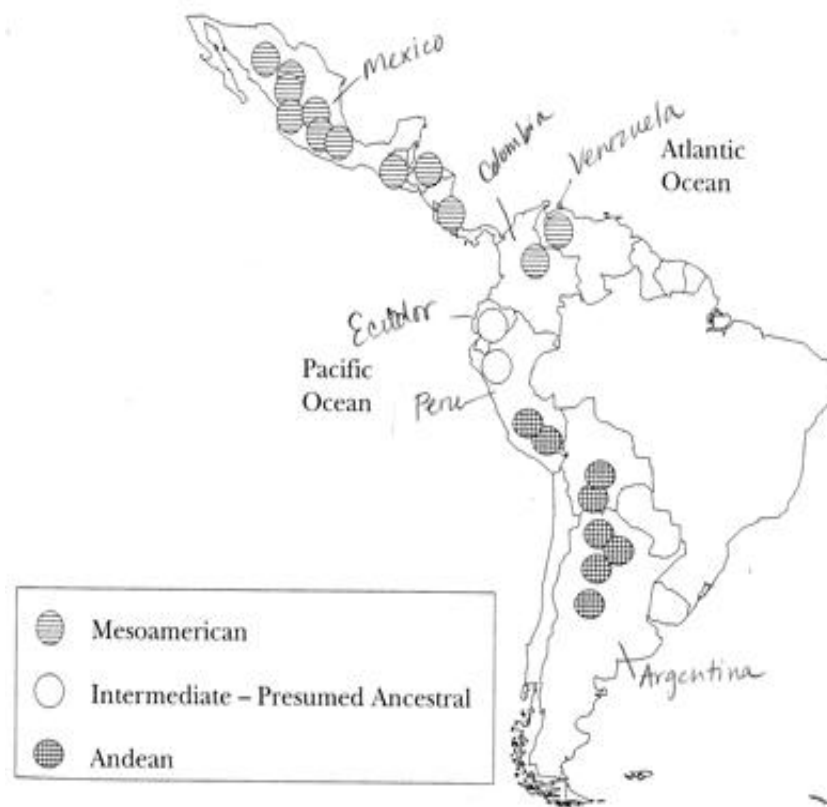
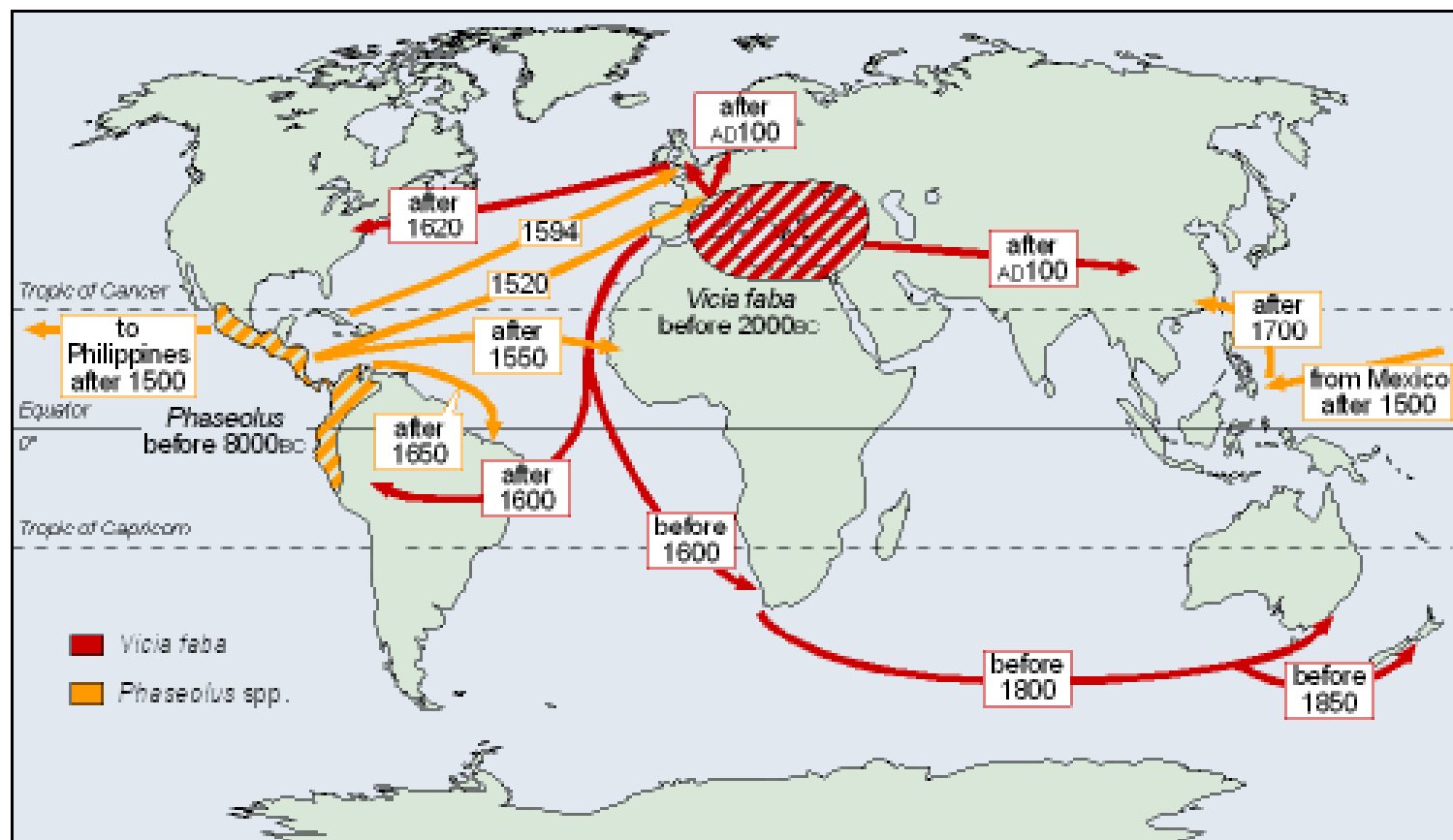


FIG. 1. Distribution of wild *Phaseolus vulgaris* in Latin America. Shaded circles: Middle American gene pool; hatched circles: Andean gene pools; open circles: intermediate forms.

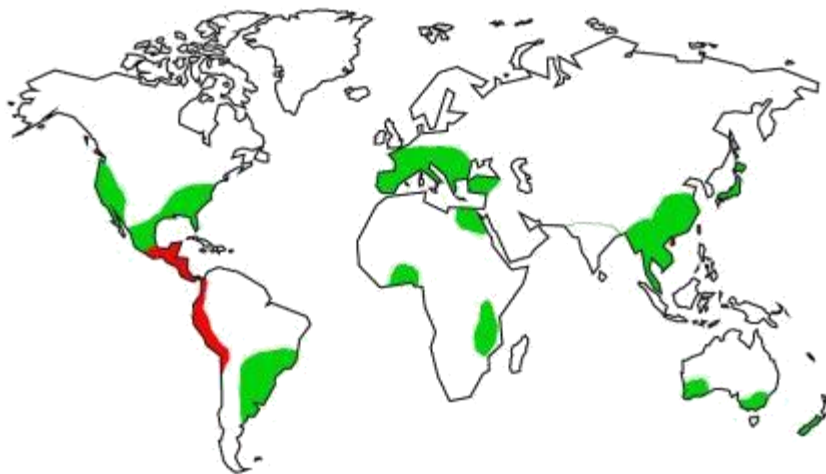
Gepts, 1996

Bean spread from the original locations



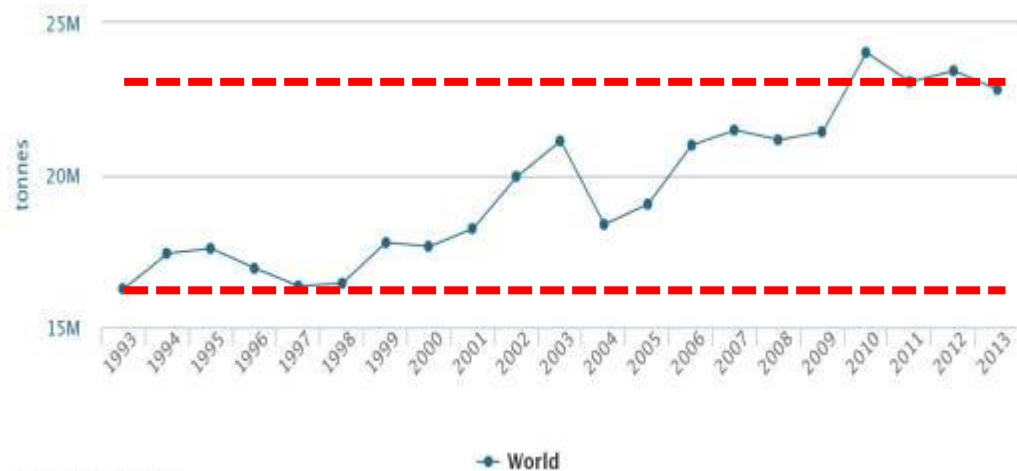
The common dry bean or ***Phaseolus vulgaris*** L., is the most important food legume for direct consumption in the world. Among major food crops, it has one of the highest levels of variation in growth habit, seed characteristics (size, shape, colour), maturity, and adaptation. It also has a tremendous variability (**> 40,000 varieties**).

Beans are grown in every continent except Antarctica. Brazil and India are the largest producers of dry beans, while China produces, by far, the largest quantity of green beans. Worldwide, **23 million tonnes of dry common beans and 17.1 million tonnes of green beans were grown.** (FAO)



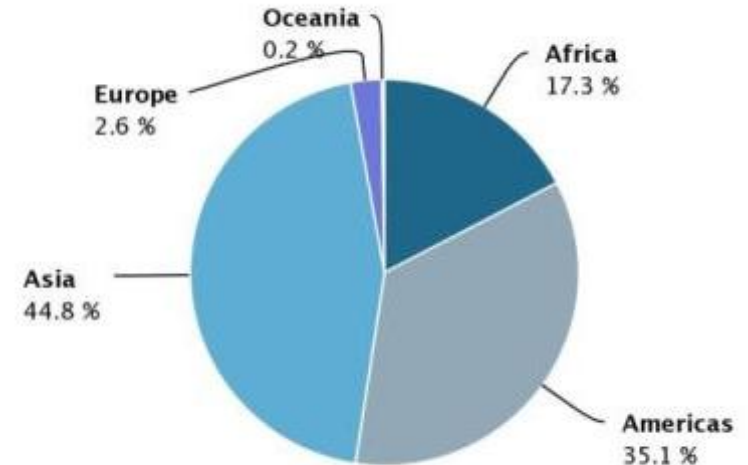
- Region of origin:
- Region of cultivation:

World bean Production (1993 – 2013)

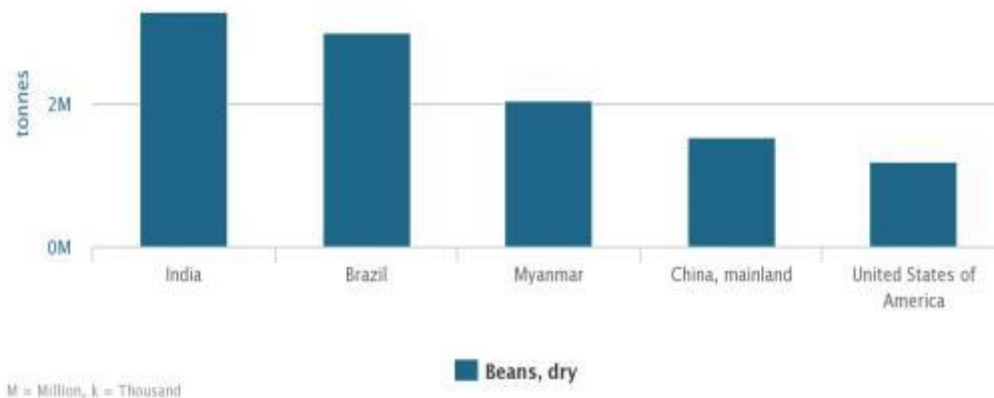


+ 30%

Production share by region
(average 1993 – 2013)



Production of top 5 producers (average 1993 – 2013)



FAOSTAT



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

"Feeding humans, animals and soils with pulses: an Italian perspective"
Sassari 21 Settembre 2016

DAFNAE
Department of Agronomy Food
Natural resources Animals Environment

Which source of proteins??

TOTAL DIETARY FIBRE *

		Fibre (grams)	Percent Daily Value**
	Navy Bean	19.1	76%
	Split Pea	16.3	65%
	Lentil	15.6	62%
	Pinto Bean	15.4	62%
	Chickpea	12.5	50%
	Bran Flakes	7.1	28%
	Whole wheat spaghetti	6.3	25%
	Whole wheat bread	3.8	15%

*Amount in 1 cup cooked, except for Bran Flakes (1 cup dry) and whole wheat bread (2 slices)

**Recommended daily value = 25 grams fibre/day

4 oz Ground Beef



24 grams Protein
320 Calories

4 oz Black Beans



24 Grams Protein
120 Calories

=

PLUS

High Acidity
High Cholesterol
Saturated Fat
No Fiber
Heterocyclic Amines

Lower Acidity
No Cholesterol
No Saturated Fat
9 Grams Fiber
Phytonutrients

Malnutrition....

NUTRACEUTICALS

coined from "nutrition" and "pharmaceutical"
"a food (or part of a food) that provides medical or health benefits, including the prevention and/or treatment of a disease."

FUNCTIONAL FOOD

"food products fortified with special constituents that possess advantageous physiological effects" (Hardy, 2000; Kwak & Jukes, 2001a; Stanton, Ross, Fitzgerald, & Van Sinderen, 2005)

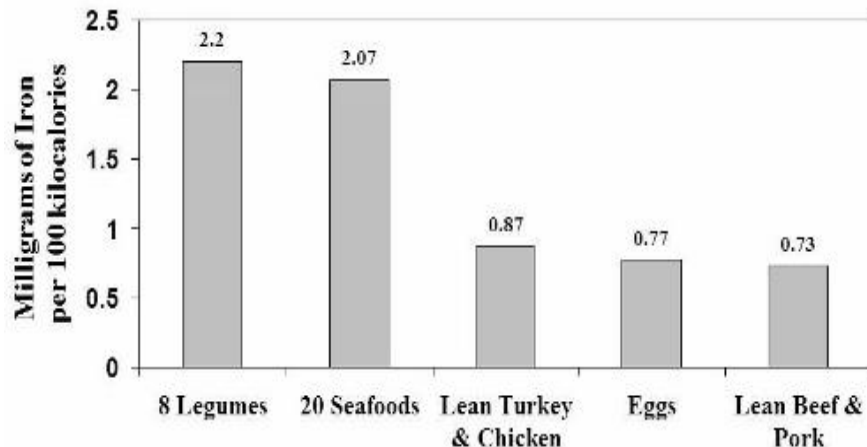
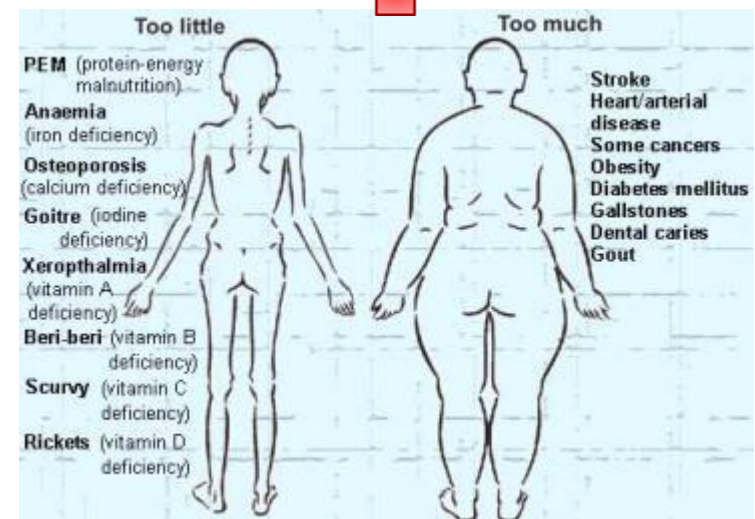
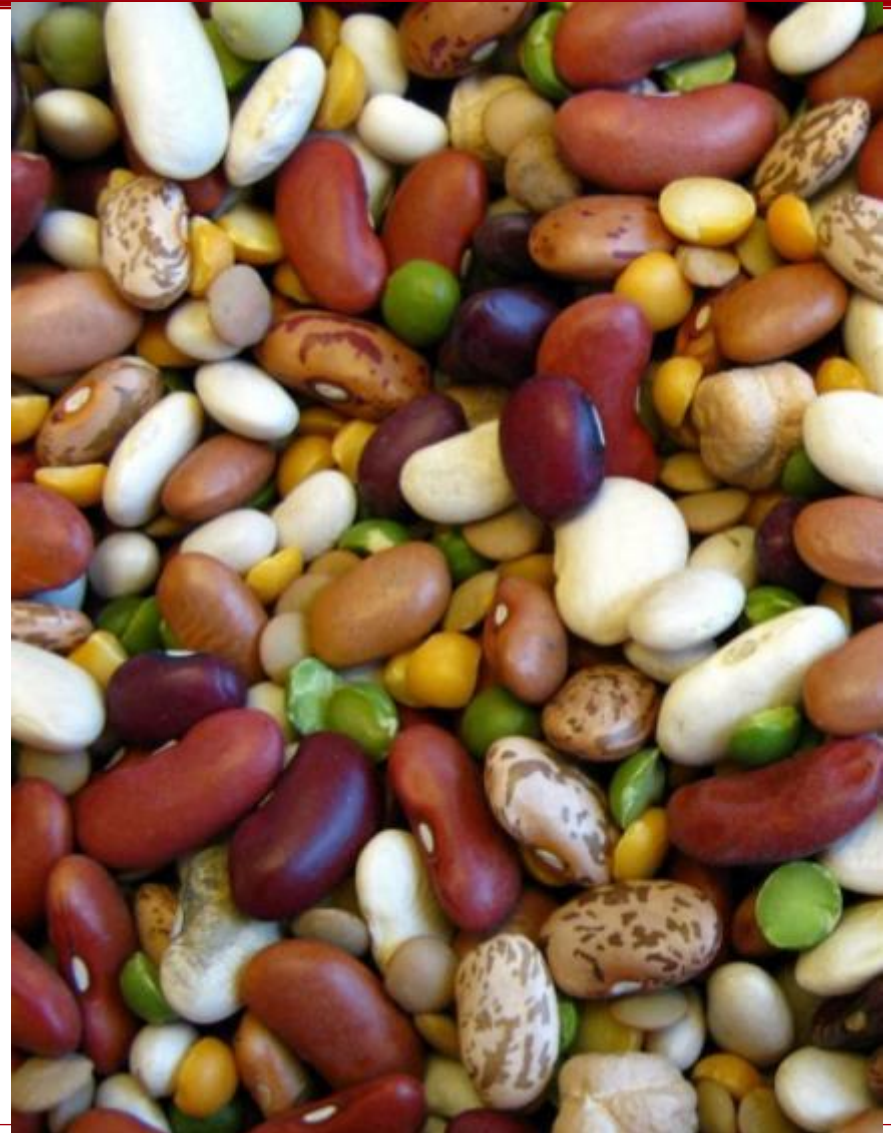


Table 2. Glycemic Indices of Various Beans (from (81)).		
	GI _{White Bread} [*]	GI _{Glucose} [*]
Pinto beans	55	39
Kidney beans	42	27
Baked beans, canned	57	40
Dried beans	40	29
Black-eyed peas	59	42
Butter beans	44	31
Chick peas	47	33

^{*} Calculated glycemic index when either white bread or glucose were used as the reference food. Expressed as a percentage of the reference food.



ONE BEAN.....MANY TYPES!!!



Veneto region can be considered an important place in Europe where many types of beans are cultivated

**FAGIOLO
LINGUA DI FUOCO
(B)**

**BIANCO DI SPAGNA
(A)**



**FAGIOLO
«BONEI»
(B)**

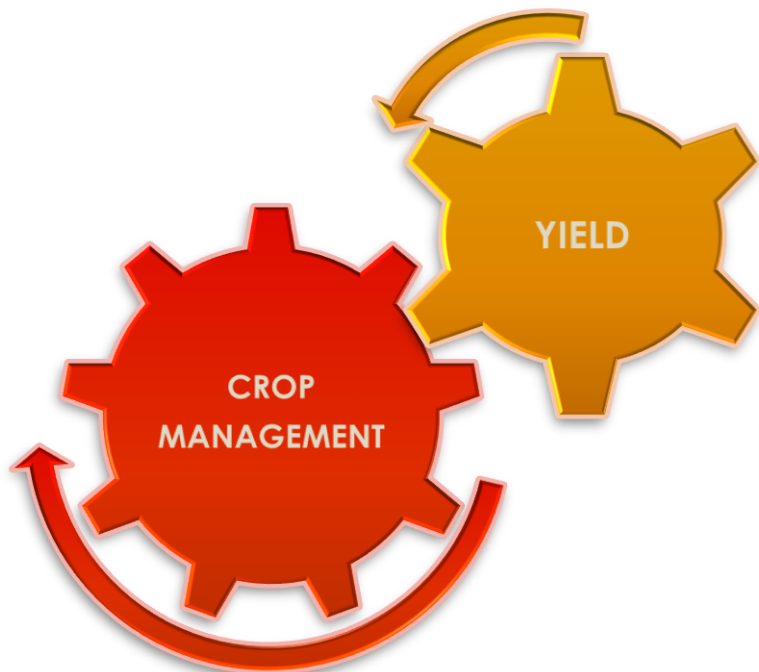
**FAGIOLO RIGHETTA D'ORO
DI POSINA
(C-D)**

**FAGIOLO
GIALET
(C)**

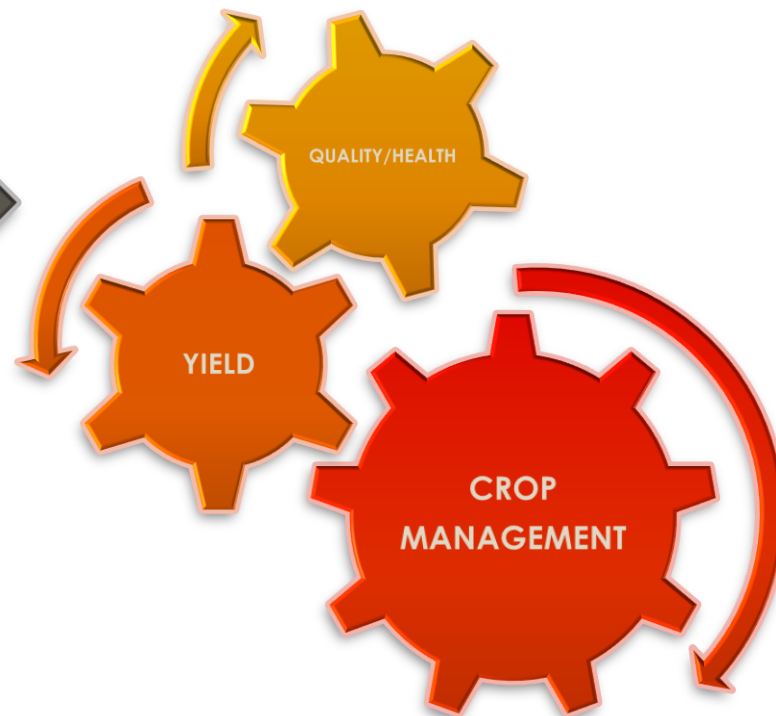
**FAGIOLO
«BALA ROSSA»
(D)**

THE EVOLUTION OF PLANT MANAGEMENT OBJECTIVES

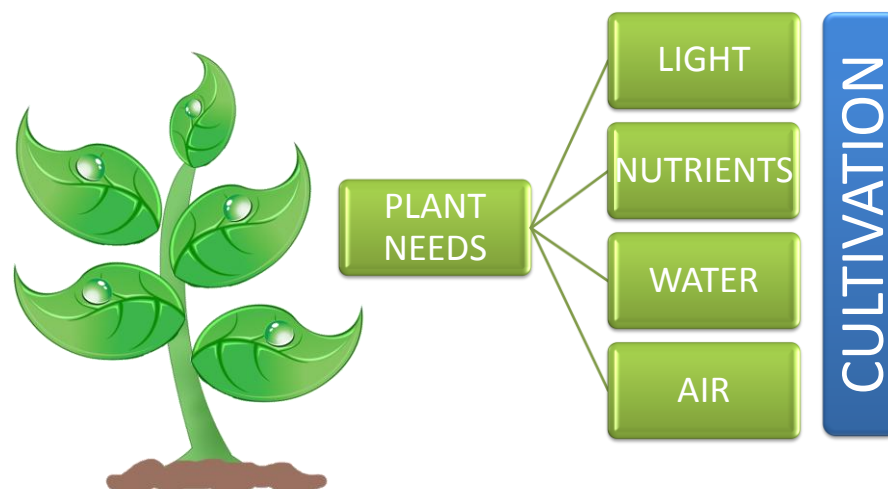
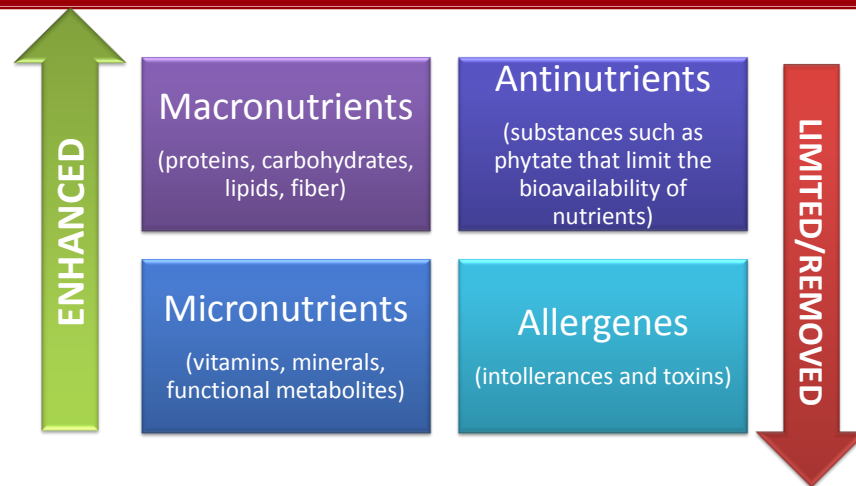
In the past.....



In the future....



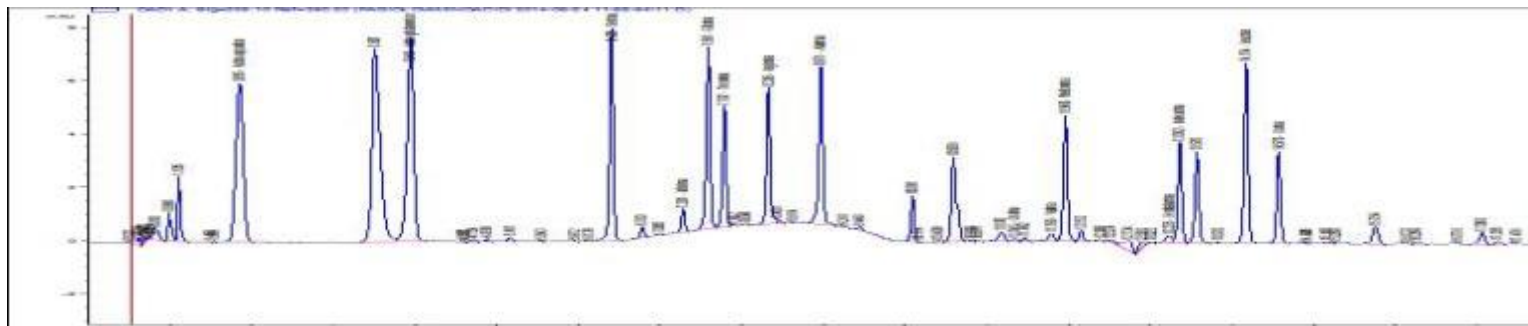
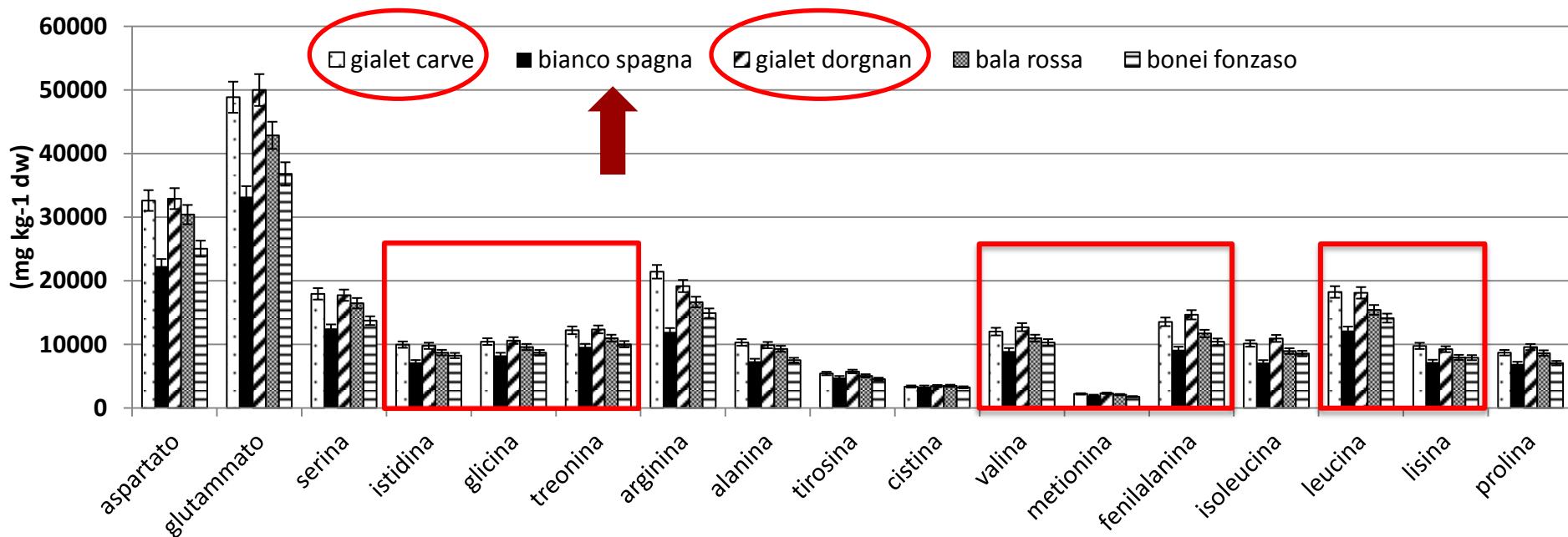
**QUALITY
IS FIELD
BASED!**



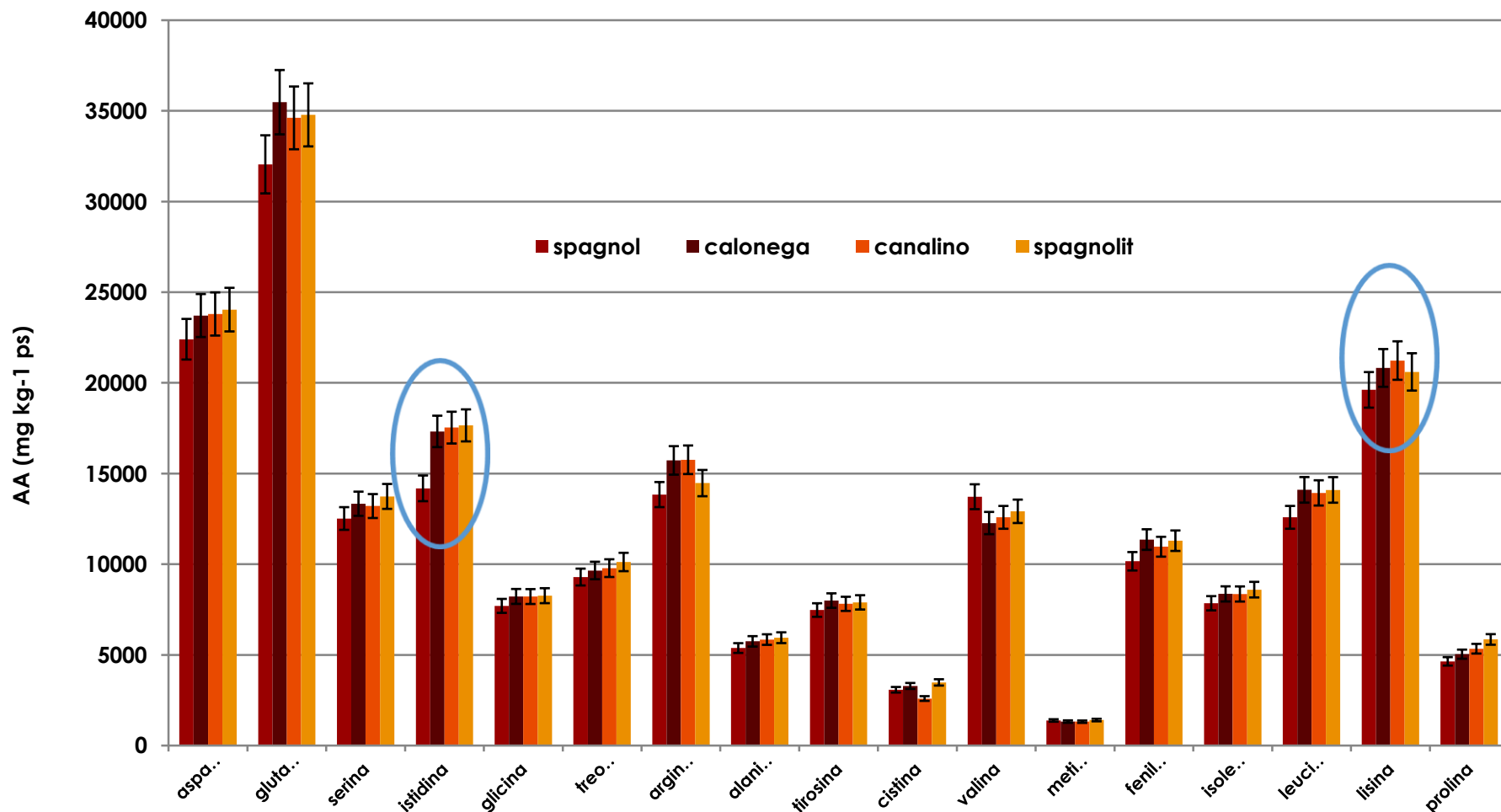
QUALITY SHOULD BE OUTSPOKEN...



Aminoacidic profile of typical bean genotypes cultivated in Veneto region



Aminoacidic profile of typical bean genotypes cultivated in Veneto region



ANTINUTRITIONAL ASPECTS???



Biotechnol. Agron. Soc. Environ. 1999 3 (4), 210-216

The investigation of antinutritional factors in *Phaseolus vulgaris*. Environmental and varietal differences

Mercedes Muzquiz, Carmen Burbano, Gemma Ayet, Mercedes M. Pedrosa, Carmen Cuadrado

Area de Tecnología de Alimentos. SGIT-INIA. Aptdo 8111. 28080 Madrid (Spain). E-mail: muzquiz@inia.es

Received 9 February 1999, accepted 21 July 1999.

Gas production



Oligosaccharides

- Raffinose
- Stachyose
- Verbascose

Phytic acid



- unavailable micro- and meso-elements
- protein complex formation
- phosphorous unavailability

Saponins



- lysis of erythrocytes
- permeability of the mucous membrane of the intestine

Lectins



- proteins that bind to sugars

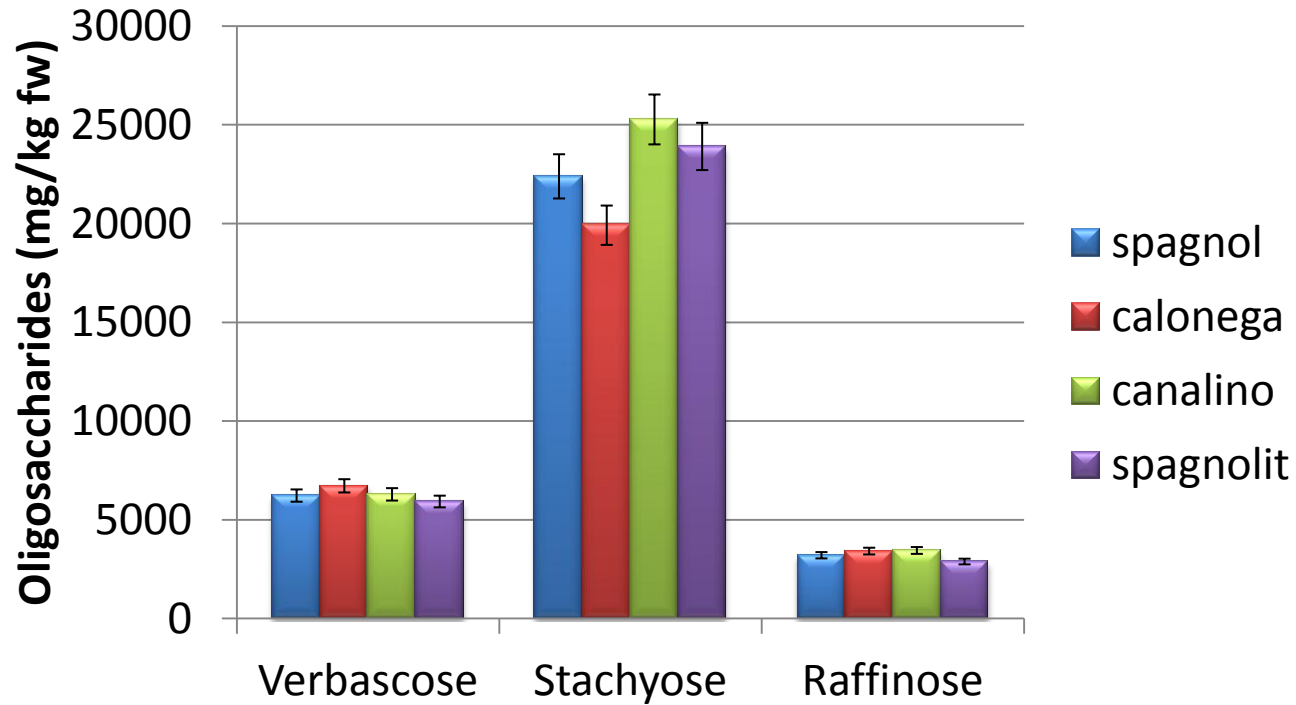


UNIVERSITÀ
DEGLI STUDI
DI PADOVA

"Feeding humans, animals and soils with pulses: an Italian perspective"
Sassari 21 Settembre 2016



Oligosaccharides in some genotypes



SPAGNOLIT

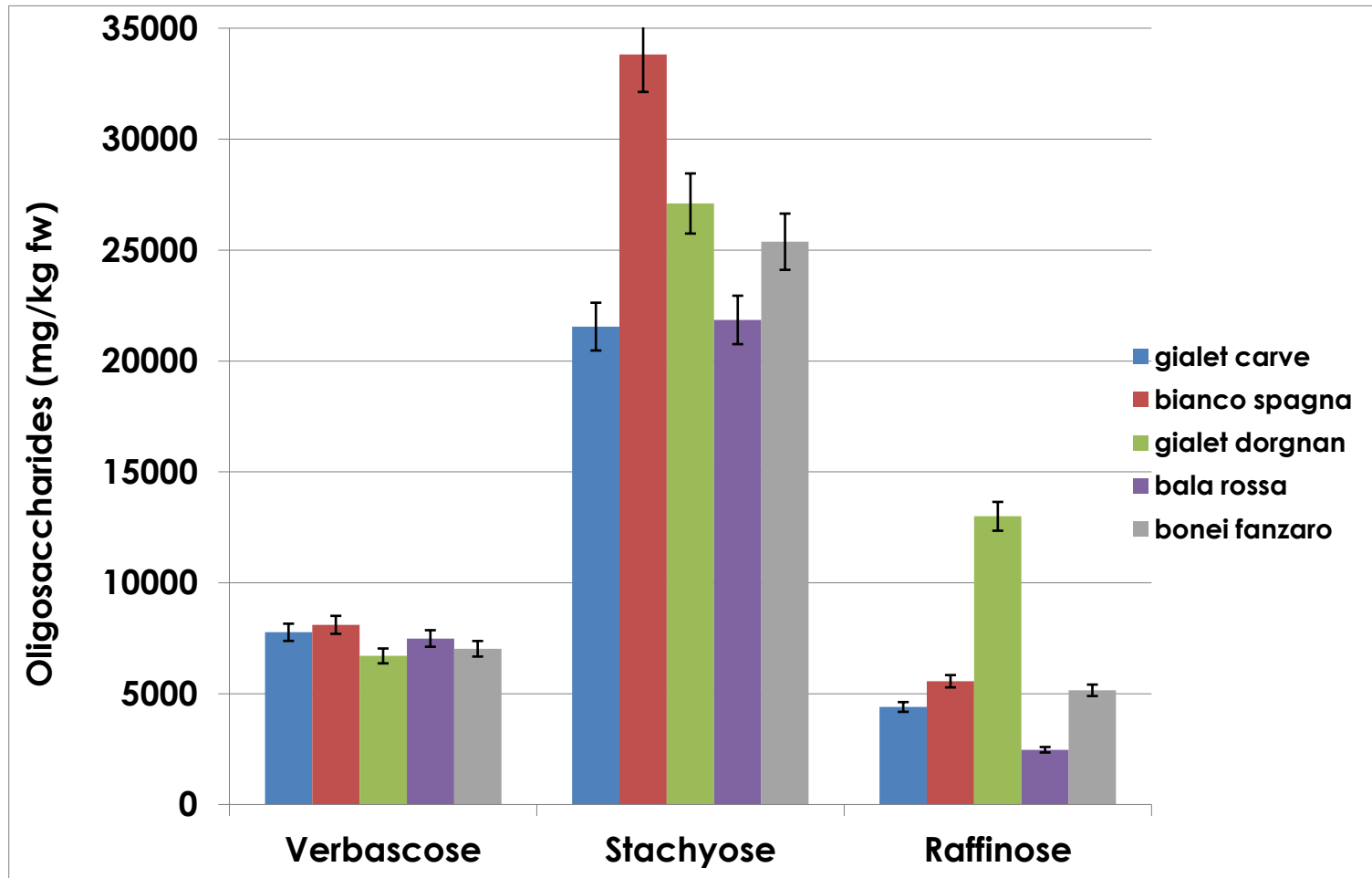
SPAGNOL

CALONEGA

CANALINO



Oligosaccharides in other genotypes



SUPPLEMENTS GLUCOSE-BLOCKERS

Based on protein concentrates of
Phaseolus vulgaris (common bean) natural source of
phaseolamin



protein capable of inhibiting in vitro the activity of the
digestive enzyme α -amylase

The effect of the anti-nutritional phaseolamin is in this case used to
prevent, by inhibiting the enzyme α -amylase, the digestion of complex
carbohydrates with a consequent decrease of the absorbed calories



weight loss

Conclusion

- High variability
- Been limited consumption in Italy is mainly due to “cultural aspects”
- To “push” the use are needed:
 - Better communication
 - Little changes in the agronomic techniques
 - Some breeding??
- Maybe push on...

CERTIFIED QUALITY????



5 PGI Beans

Over 20 “typical” beans

 **Fagiolo di LAMON**
IGP - Indicazione Geografica Protetta



Geographical indications and traditional specialities

