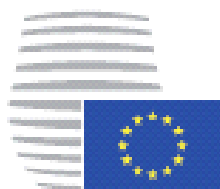


CRA, a results- and innovation-oriented research organization

Stefano Bisoffi

Consiglio per la Ricerca e la sperimentazione in Agricoltura
(*Agricultural Research Council*)

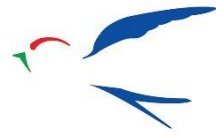


Italian Presidency
of the Council
of the European Union Italia2014.eu

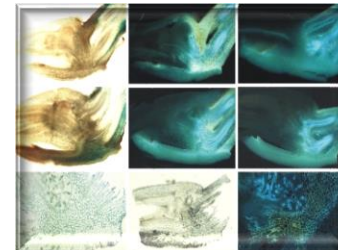
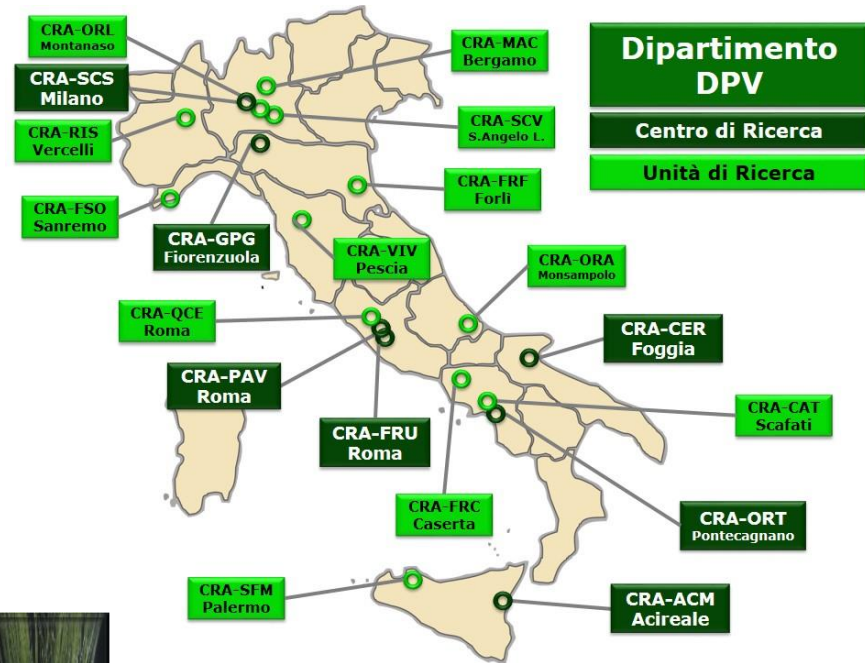
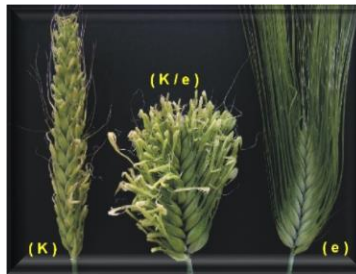


Informal Meeting of Directors of Rural Development
"Innovation and Rural Development"
Rome, 5-7 November 2014

... we operate through four Departments ...



Plant Biology ... with R&D structures distributed all over Italy and Crop Science



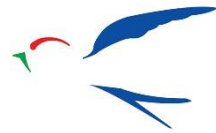
... we operate through four Departments ...



Animal Husbandry and Productions ... with R&D structures distributed all over Italy

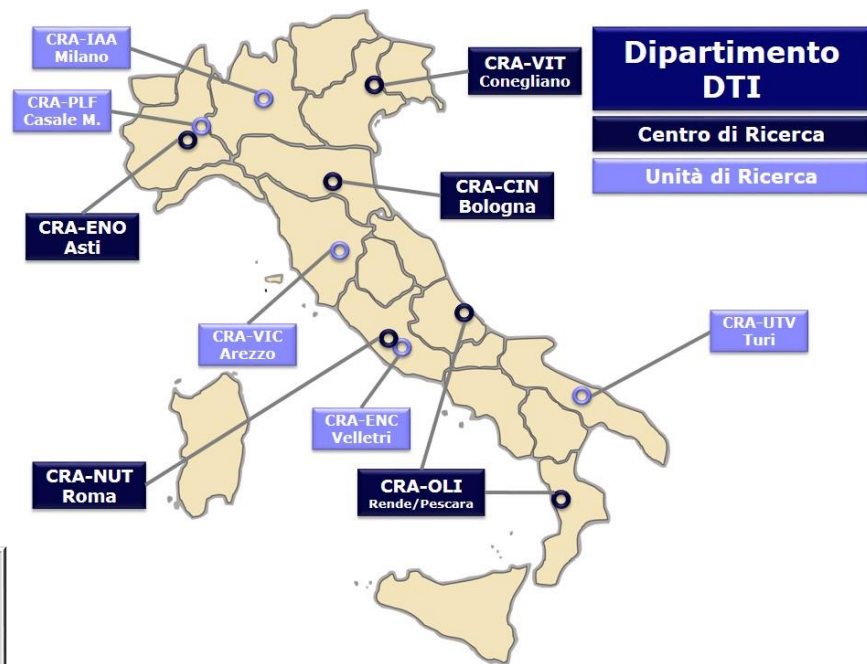


... we operate through four Departments ...

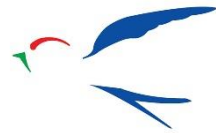


... with R&D structures distributed all over Italy

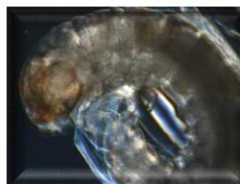
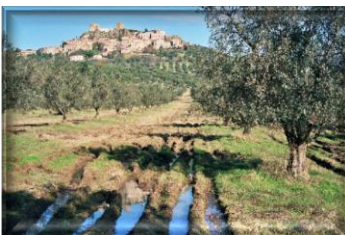
Agro-
Industrial Productions
and Processing



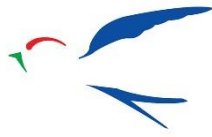
... we operate through four Departments ...



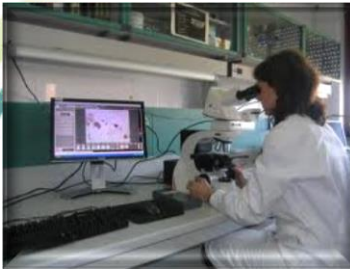
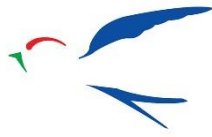
Agronomy, ... with R&D structures distributed all over Italy Forests and Environment

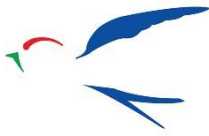


... 5000 ha of experimental farms ...

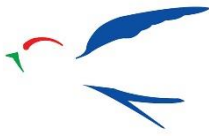


... advanced laboratories and equipment ...



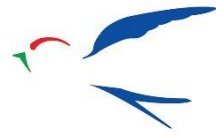


... some
examples of
our work ...



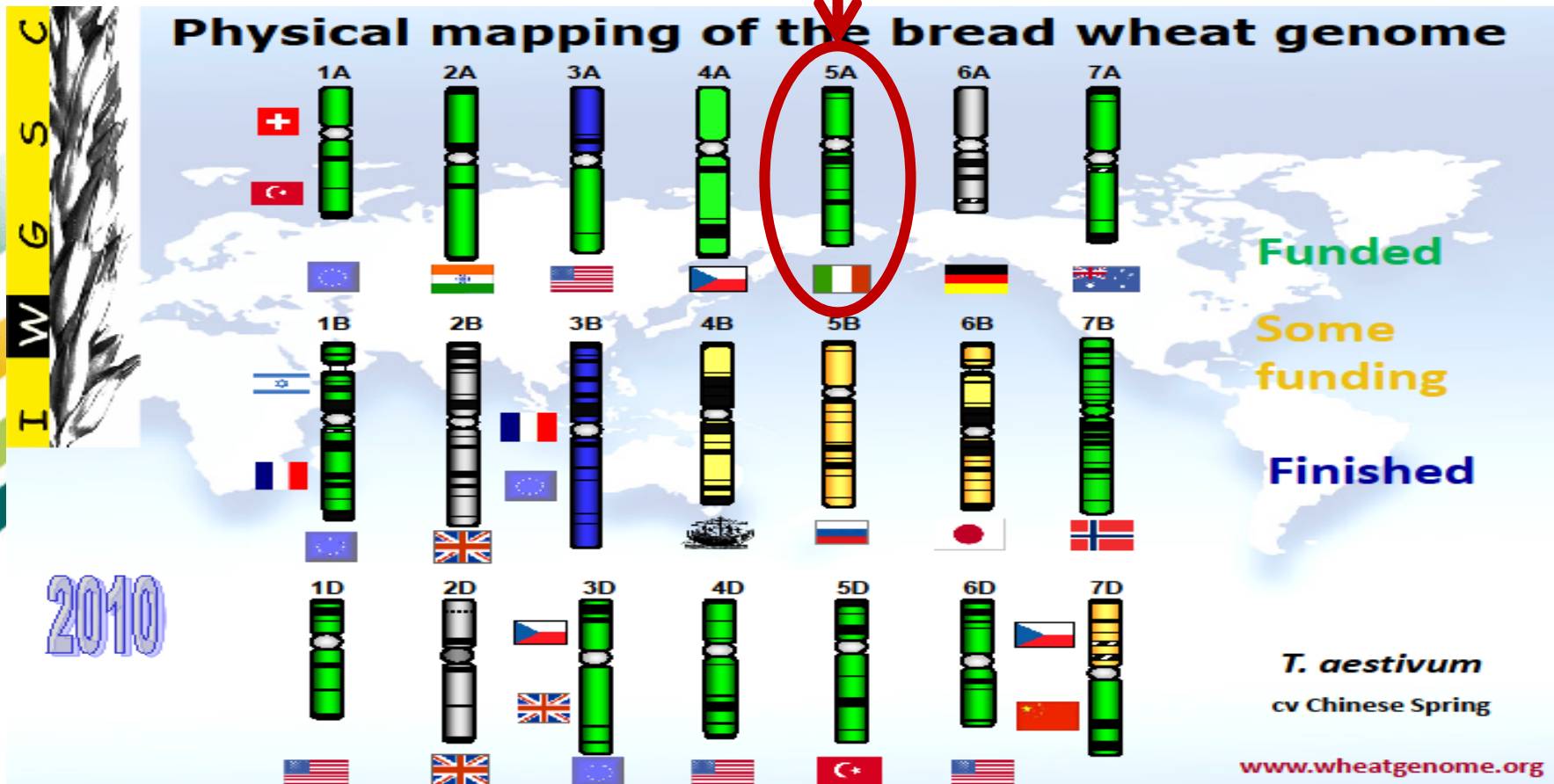
... genetics,
genomics and
breeding ...

... wheat genome sequencing ...

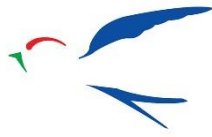


The hardest plant genome sequencing initiative.
International Consortium with the CRA as
Partner

Chromosome **5A**
CRA-GPG



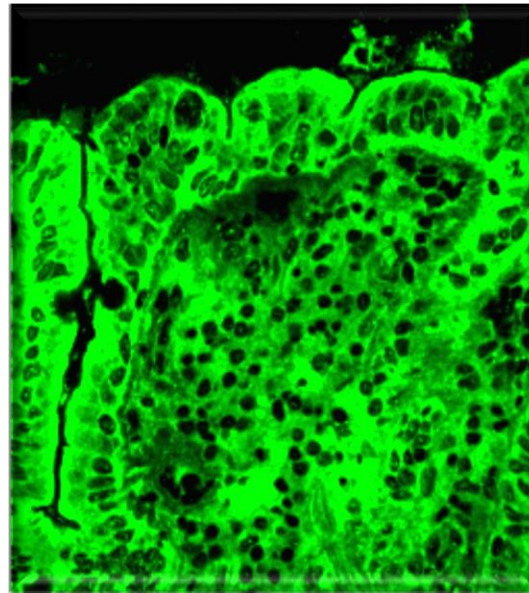
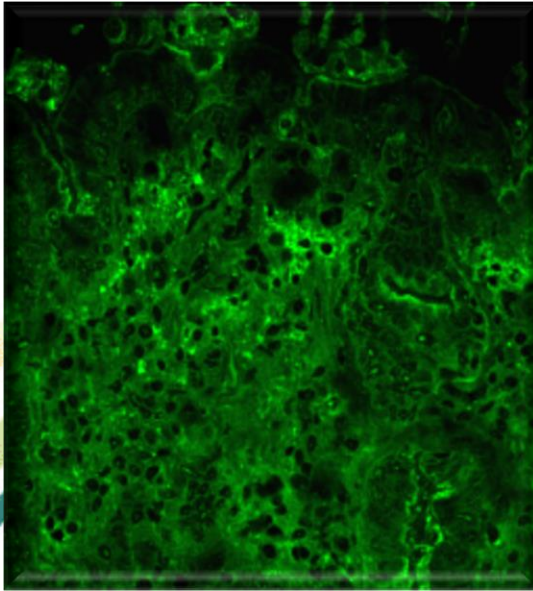
... wheat protein protects celiac patients



(Patent CRA-GPG, CRA-CER, ISS)

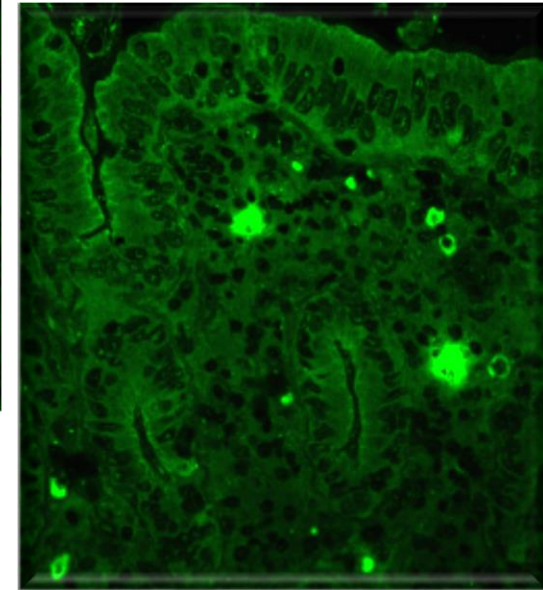
from gluten effects ...

Healthy individual



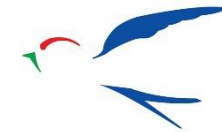
Celiac patient exposed
to gluten

Celiac patient exposed to
gluten + protective
protein



Gut biopsy: tissues treated with a fluorescent marker of celiac response

... peach genome sequencing ...



nature
genetics
OPEN

Verde et al., 2013



The high-quality draft genome of peach (*Prunus persica*) identifies unique patterns of genetic diversity, domestication and genome evolution

Fruit quality-related genes



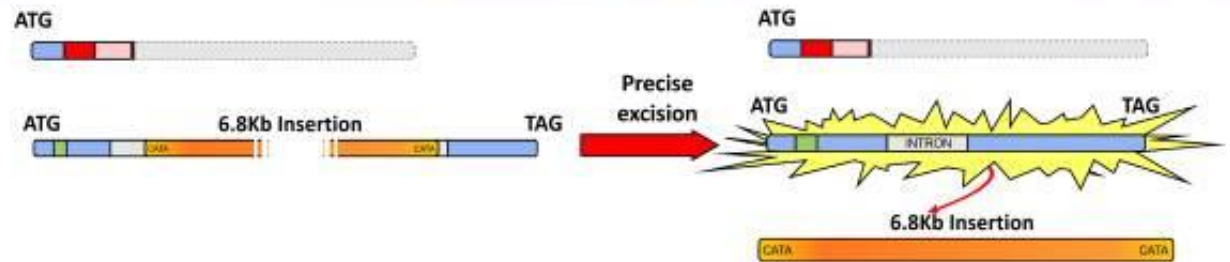
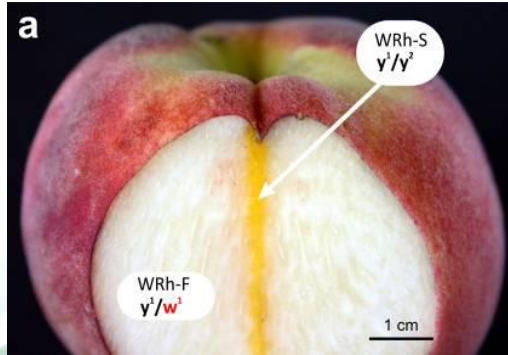
Disease resistance genes detected



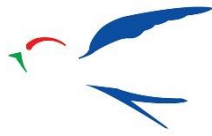
Sharka virus (PPV) damage



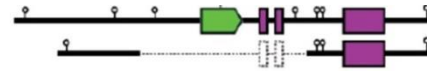
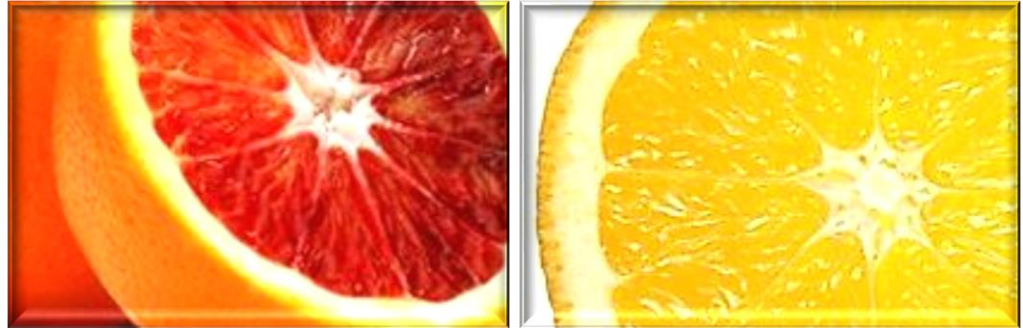
... white/yellow peach pulp gene detected ...



... advanced *Citrus* breeding ...



Red pulp gene identified



'Mandared', seedless triploid hybrid



Clementine
x orange
hybrids

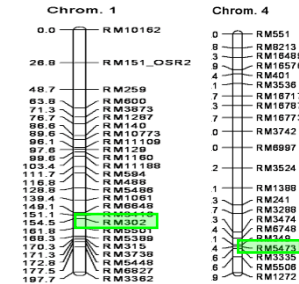


... rice genetic resistance to *Pyricularia oryzae*

‘Gigante Vercelli’ (1946),
resistant for over 60
years



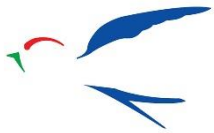
‘Vialone Nano’ (1937)
susceptible



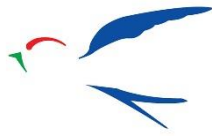
The genetic basis of
resistance has been
localized on rice
chromosomes 1 and 4



Transfer of resistance
to susceptible
varieties by Marker
Assisted Selection



... grain and forage *Leguminosae* ...



Alfalfa: longer persistence, higher drought tolerance



Lupins: high protein content, high drought tolerance



Pea: cold and drought tolerance; conventional and organic farming systems

... 178 cultivars protected by breeder's rights ...



'Carmen', early pear cv, on the market in Italy, EU, ARG, AUS, BRA, CHN, ISR, NZE, MEX, SAF, MOR, SUI, TUN, UKR, URU.
1.700.000 plants in EU

'Jonica' and 'Pircinque', strawberries for mild winter areas (S.Italy, SPA, MEX, BRA, AUS, California)



'Falstaff': red pear, Oscar MacFrut Prize, 2012



Barley varieties: 22% share of the Italian market

'Alitop', nectarine with long *shelf-life*. 300.000 plants in Italy; 25% of new peach plantations

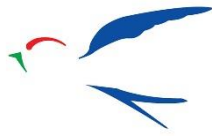


'Antas', subterranean clover, marketed in Australia

'Tacle' and 'Mandalate', successful Citrus varieties in Italy and worldwide



... over 400 registered cultivars ...



Asparagus hybrids
'Ercole', 'Franco',
'Eros', 'Zeno', 'Italo',
represent the bulk of
national production



'Senatore Cappelli',
old durum wheat
cultivar, still
appreciated for
adaptability and
rusticity



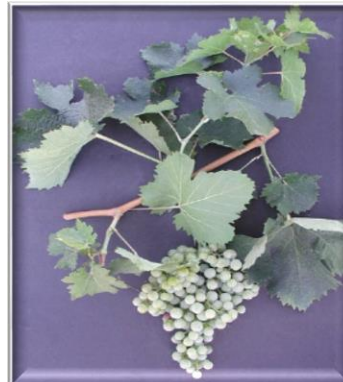
Sweet Pepper
'Friariello',
typical variety
of Campania



'Noverde', cauliflower selection
with high nutraceutical
properties

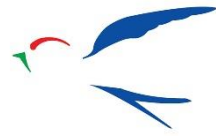


'Vialone nano': PGI
denomination



203
grape
clones

... conservation of agrobiodiversity ...



Cereals	17.316
Forage crops	7.596
Garden crops	2374
Industrial crops	2.714
Fruit and nuts	7.515
Herbs	586
Citrus	672
Ornamentali	266
Olive	3.243
Forest species	3.744
Grape	793
TOTAL	46.519



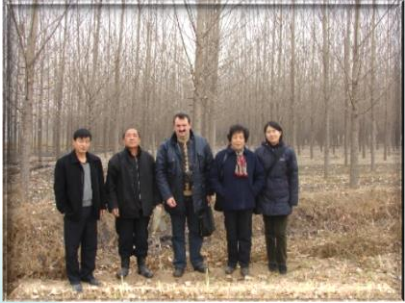
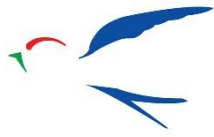
<http://planta-res.entecra.it>

Ongoing project financed by the Ministry of Agriculture for the preservation and use of agrobiodiversity (implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture)

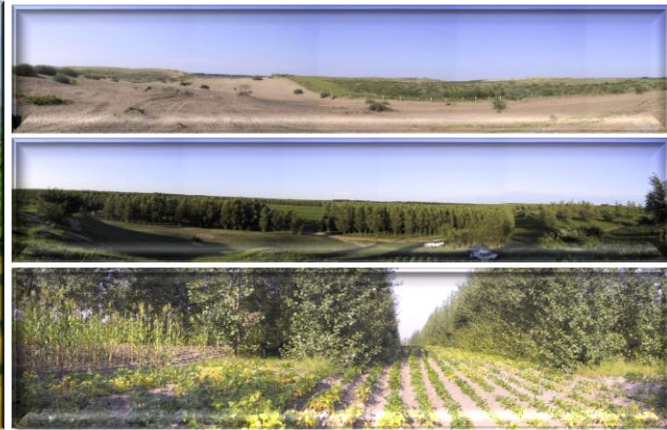
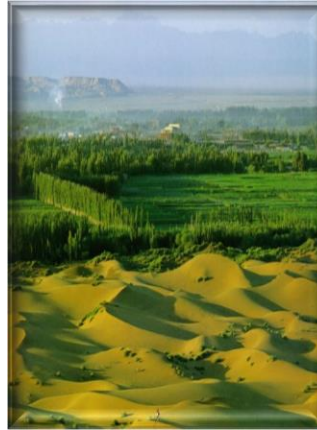


05/11/2014

... poplar breeding and culture ...



Village industries

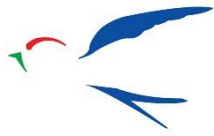


Combating desertification



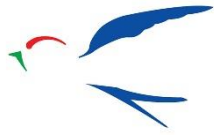
Agroforestry systems





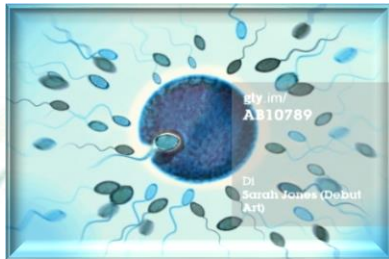
... animal
husbandry ...

... buffalo genetic improvement ...



Genetics

quantitative
molecular



Reproduction techniques

estrus (synchr. techniques, ovulation, ...)
oocytes (IVM, IVF, OPU)
semen (sexing)
embryos (transfer, sexing, freezing, thawing, cloning)



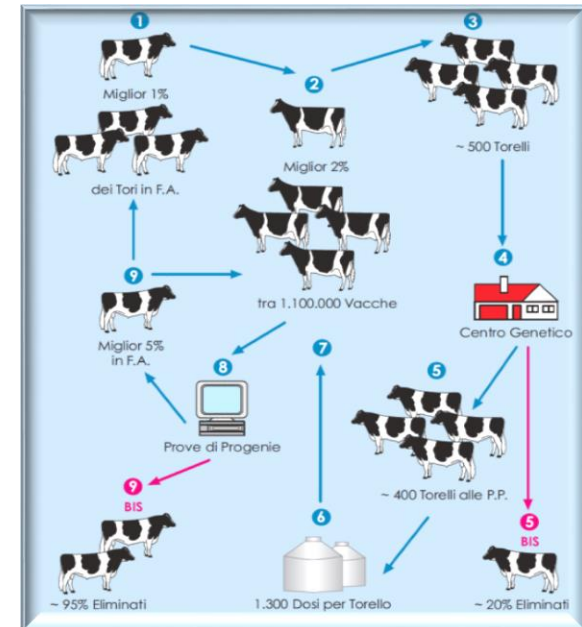
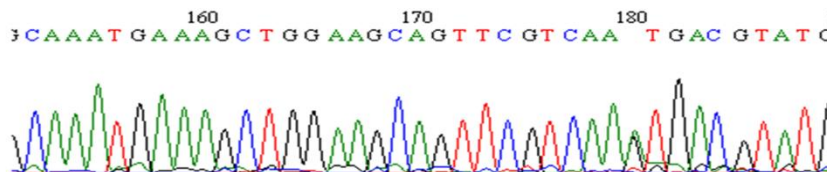
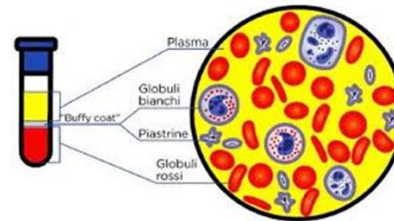
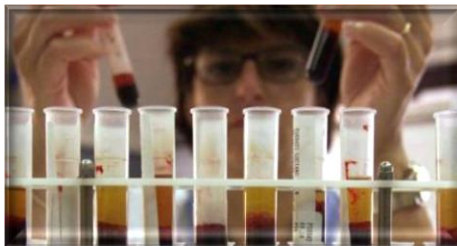
Milk and dairy products quality

safety technology
microbiological control
functional quality
shelf life and quality

... molecular markers for the selection of dairy cows with lower susceptibility to target ...



Markers of the *Leptine* gene
(associated to several
resistance factors) to be used
in breeding programmes



... reduced antibiotic use in animal farming ...

**Antibiotic resistance
Is a consequence of
heavy use in
intensive animal
farming systems**



**Use of Italian hybrid breeds,
higher rusticity and better
products**



**Feed rich in long fibers and
without 'medical' pellets**



**Open air rearing systems;
cages with intermediate floor**



**Meat richer in
essential fatty acid oils
and antioxidants and
with lower cholesterol
content**

... vegetable rennet for cheese production ...

Vegetable rennet as a substitute of rennet derived from suckling animals

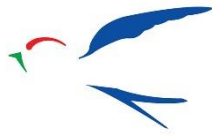


Patent pending: application n° TO2013A000265 of 29/3/2013



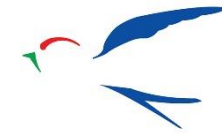
Soft cheese with a pleasant bitter flavour

Suited to consumers that refuse animal-derived rennet for religious or cultural reasons



... production
and processing
technologies ...

... miniature processing plants ...



**Miniature plant
for the production of
mamalades, jams
and preserves for
small farms**

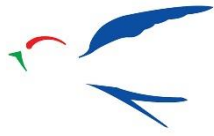
**Transportable creamery for
cheese production on
small and family farms**



**Solar energy
powered
fruit and vegetable
dessiccator**



... innovations in *Citrus* juice products ...



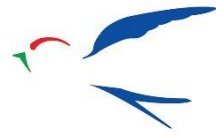
Cold pasteurization systems for orange juice safeguarding nutritional properties



Red orange extracts with nutraceutical properties (lower blood cholesterol and sugar levels)

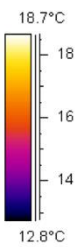
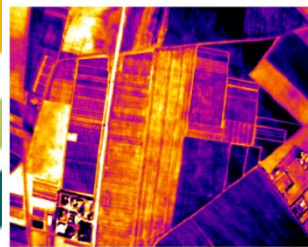
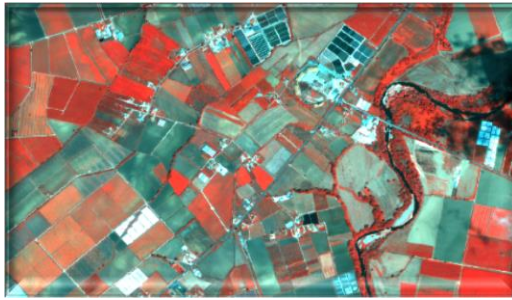
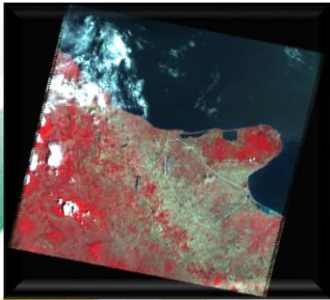


... technologies for precision agriculture ...

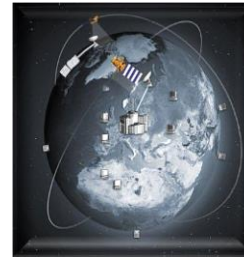


Precision Agriculture adapts the use of inputs (water, fertilizers, pesticides) to the local needs of crops, allowing an increase of production with limited use of resources

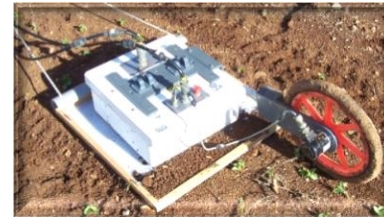
Earth observation



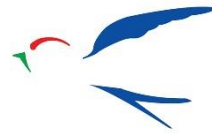
GPS



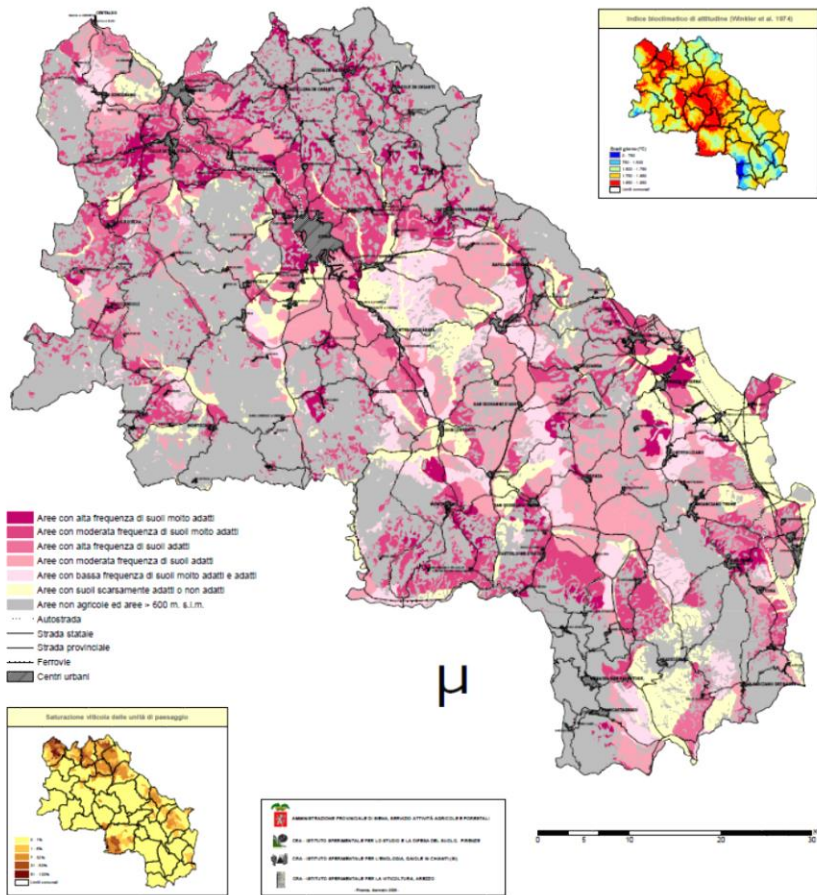
Sensors



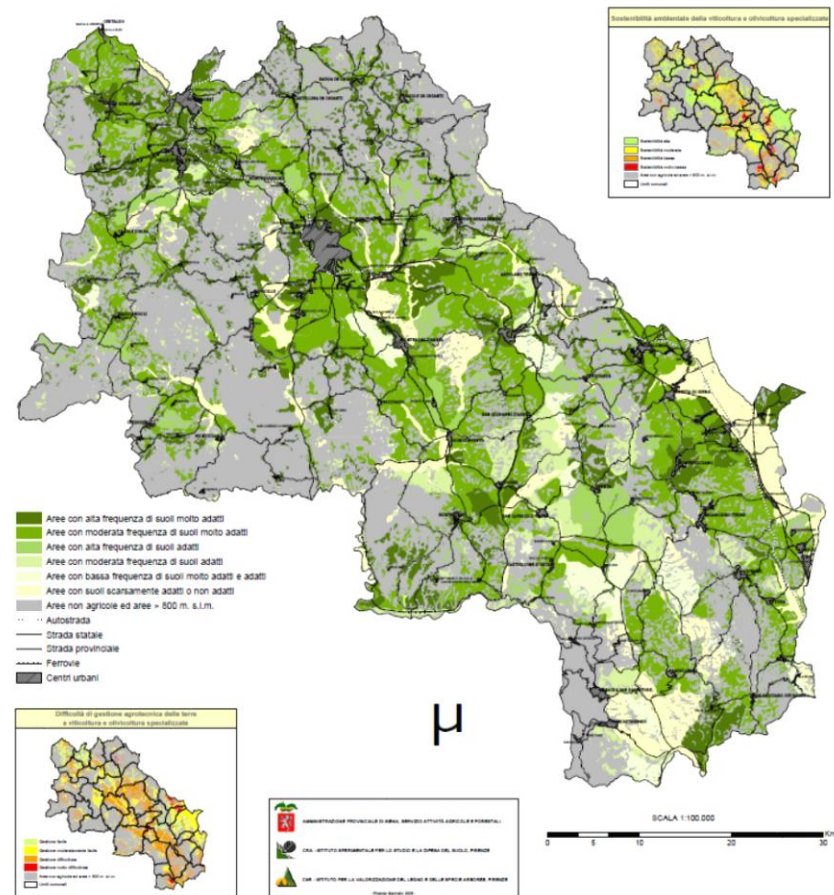
... specific culture suitability maps ...



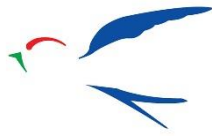
Attitudine dei suoli al vitigno Sangiovese
nella provincia di Siena



Attitudine dei suoli alla olivicoltura
nella provincia di Siena



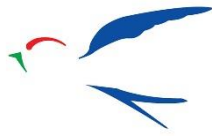
... soilless close circuit cultivation...



Healthier plants,
lower use of water
and fertilizers, no
spread of pollutants,
substrate re-use.



... machinery for impaired workers ...



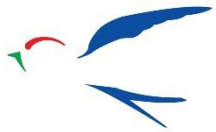
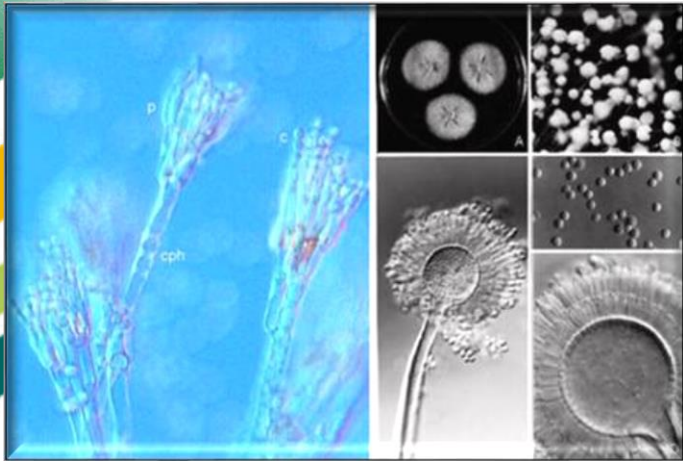
Agriculture is an accident-prone working sector. Equipment has been developed that allow seriously disabled farm workers to keep an active life despite reduced mobility.



... biological detoxification of Ochratoxin A ...

Produced by contaminant fungi
(*Aspergillus* & *Penicillium*);
contaminates cereals, coffee, wine.

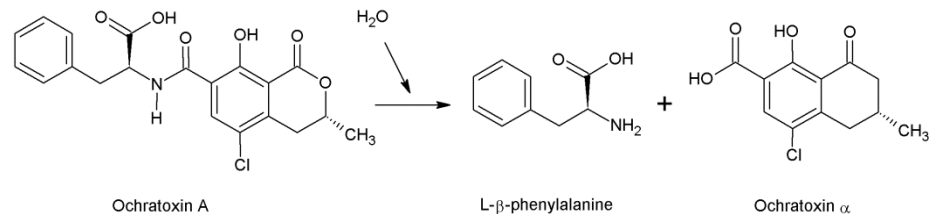
Toxic for liver and kidney,
teratogenic, suspected carcinogenic.



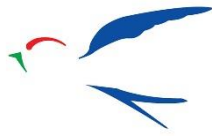
International patent WO 2012/025657 A1



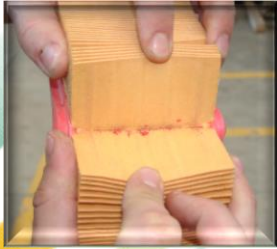
Bacteria of the genus *Brevibacterium*
can **completely degrade** Ochratoxin A



... 40 industrial patents ...



Reduction of powder dispersal in coated-seed sowing machinery



Process and plant for Hydrogen (H_2) and Methane (CH_4) production from animal effluents and dairy production plants

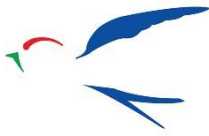


Artificial feeding diet for silkworm



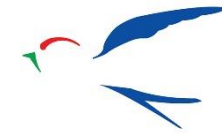
Prototypes for SRF biomass plantations harvesting





... food and
health ...

... support to a correct nutrition ...



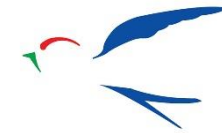
Food composition tables
(since 1946, now on line)

**Guidelines for a healthy
nutrition for the Italian
population**
(directives for a healthy population,
since 1986)



**National survey of food
consumption**

... bee health monitoring ...



National network to monitor the health status of bee populations in areas with high environmental risks and in protected areas

**3.000 bee-hives,
303 sites,
all Italian Regions
covered**

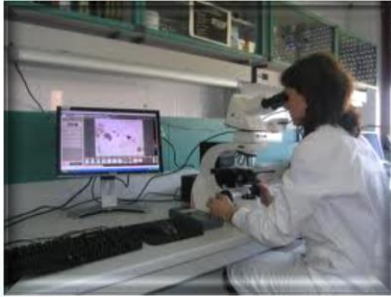
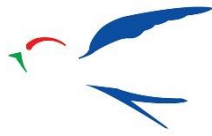
	Ministero delle Politiche Agricole Alimentari e Forestali Rete Rurale Nazionale
	BeeNet Apicoltura e ambiente in rete Bollettino Monitoraggio Apistico A cura del Coordinamento Nazionale: CRA-API, IZS-Ve, Università di Bologna, SIN Gennaio-Giugno 2013
Anno III - N. 1	



Effect of coated seed powders on bees



... monitoring bee colony health ...



Colony development and environment data collection

Nosema apis/*Nosema ceranae*

Deformed Wing Virus (DWV),

Acute Bee Paralysis Virus (ABPV)

Chronic Bee Paralysis Virus (CBPV)

Varroa infestation level

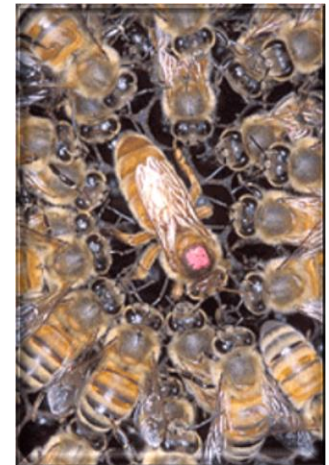
Pollen protein content

Pollen pesticide residues



Neonicotinoids interfere with chemical neurotransmission or ion channels

Loss of memory

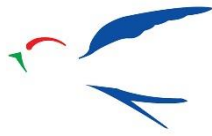


Biased perception



Impaired orientation





... communities
of practice for
innovation ...

... CoP - actors and relationships ...



<http://cdp-agritrasfer.entecra.it/>

*Farmers Organizations
and Agricultural
Support Services of the
Regions*



*Research
Structures*



Schools



Advisors

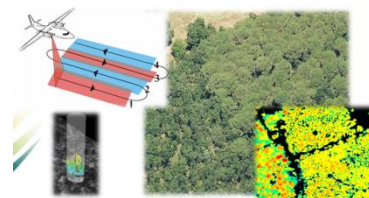
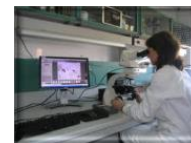
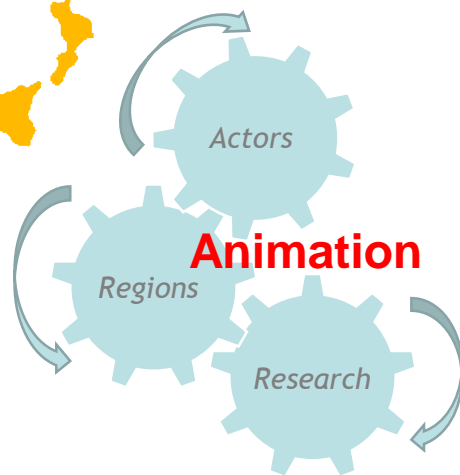


Farmers



Industry

Consumers



Knowledge sharing

Corso Stoccaggio Generalità

La raccolta dei cereali avviene al momento della completa maturazione della granello e, generalmente, in un solo momento nell'arco dell'anno. È necessario, quindi, che in post-raccolta la granello sia opportunamente conservata per rispondere alle richieste commerciali che possono, altresì, avvenire lungo l'intero anno o, addirittura, entro svariati anni.

La fase di stoccaggio ha un ruolo centrale nell'ambito del ciclo produttivo dei cereali in granella. È un elemento di collegamento tra le industrie di trasformazione dei cereali e gli operatori di questa sezione di filiera.

```

graph TD
    A[Attivatore agricolo] --> B[Centrale di stoccaggio]
    B -- Export --> C[ ]
    D[ ] -- Import --> B
    E[Molitorie] --> B
    style C fill:none,stroke:none
    style D fill:none,stroke:none
  
```

0:00 / 3:01
YouTube

[illegible]

DB of results

Document repository

Progetto	Risultato	Descrizione	Classificazione	Trasferibilità
		TITOLO DEL RISULTATO /Innovazione	Agrumi	
		ACRONIMO DEL PROGETTO	PROFLOMER	
		TITOLO DEL PROGETTO	Valorizzazione delle produzioni fil	
		COORDINATORE	Giovanni Vito Zizzo	
		SEDE DEL COORDINATORE	Unità di ricerca per il recupero e l	
		ENTE FINANZIATORE	Ministero delle Politiche Agricole	
		OBIETTIVI GENERALI DEL PROGETTO	OBIETTIVI GENERALI: - introduzione di tecniche e di ma - particolarmente adatti agli ambie - maggiore conoscenza del proble - miglioramento dell'efficienza di fr - insoddisfacenti;	
		DATA INIZIO	22/07/2005	
		DATA FINE	31/12/2008	

[illegible]

Field testing, validation and demonstration

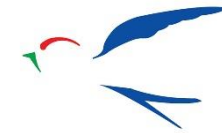


*Open days,
on farm training*



Multimedia

... CoP - vegetable production ...



The problem



Region CAMPANIA
SeSIRCA & STAPA-CePICA SA)

Region BASILICATA
ALSIA

Knowledge exchange

Research results

**Professionals
Farmers,
Students**

Solutions and application



RESEARCH
CRA-ORT
UniBas - DICEM
UniNa-CERMANU
UniNa- L.U.P.T.

COMPANIES
Idea Natura
Società agricola Mellone

Bio compost

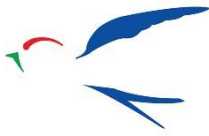


Handbook



Compost Tea

43



... support to
national
services ...

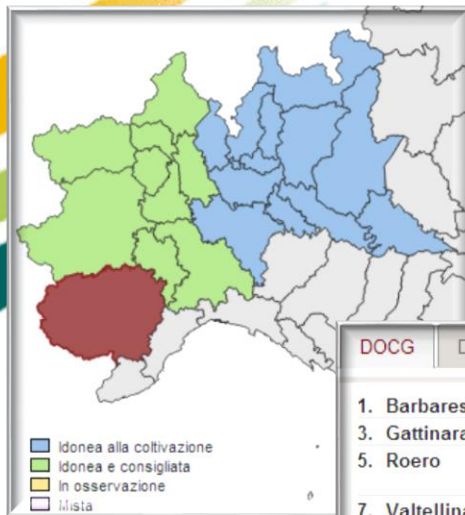
... national register of grape cultivars ...

<http://catalogoviti.politicheagricole.it/home.php>



649 cultivars
1364 clones
8300 pictures

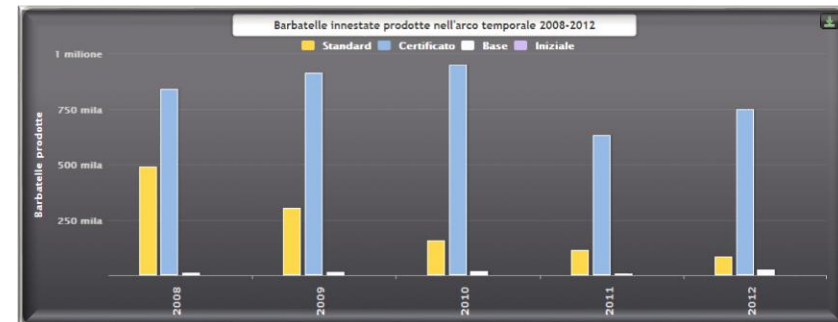
Nebbiolo



**Maps of CDO, CGDO
and TGI wines**

DOCG	DOC	IGT
1. Barbaresco	2. Barolo	
3. Gattinara	4. Ghemme	
5. Roero	6. Sforzato di Valtellina o Sfursat di Valtellina	
7. Valtellina Superiore		

**Production figures of
nursery materials
since 1989**



... forest and carbon sinks inventory ...

L'INVENTARIO NAZIONALE delle FORESTE e dei SERBATOI FORESTALI di CARBONIO INFC-2005. SECONDO INVENTARIO FORESTALE NAZIONALE ITALIANO

METODI E RISULTATI



Carbon stored in Italian forests:
1,26 billion metric tons



National forest surface: 10,5 M ha,
of which:

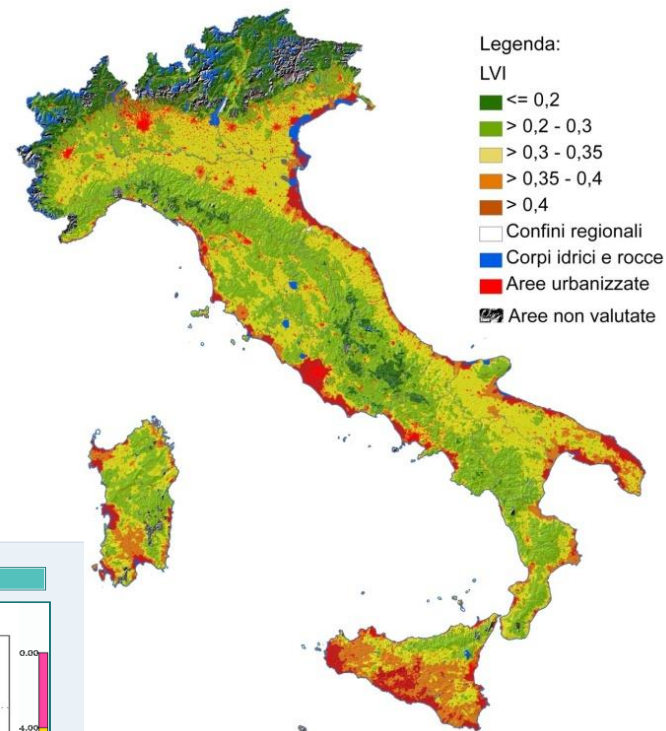
8,8 M ha Forests

1,7 M ha other wooded lands

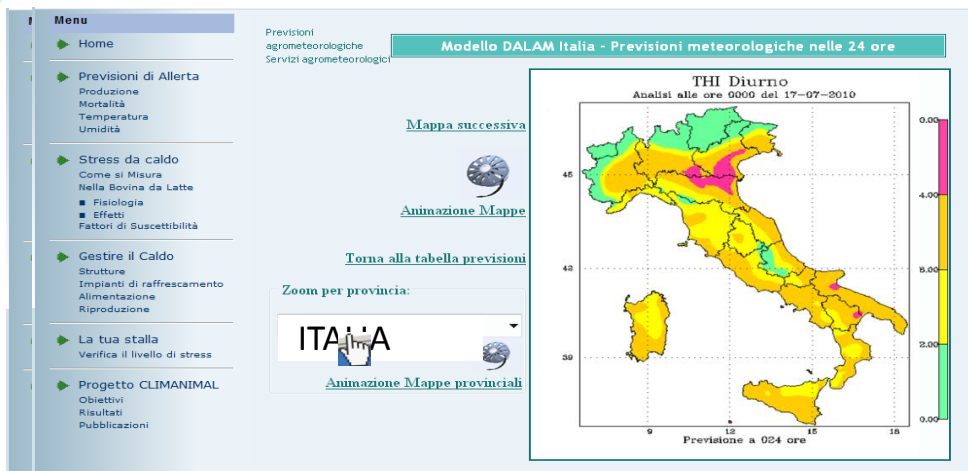
... meteo services for agriculture ...



Agrometeo forecasts and climate monitoring

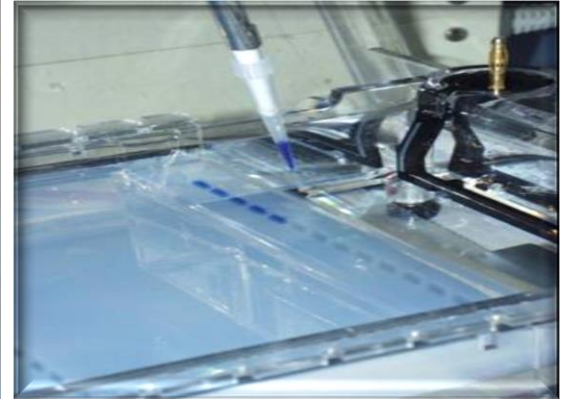
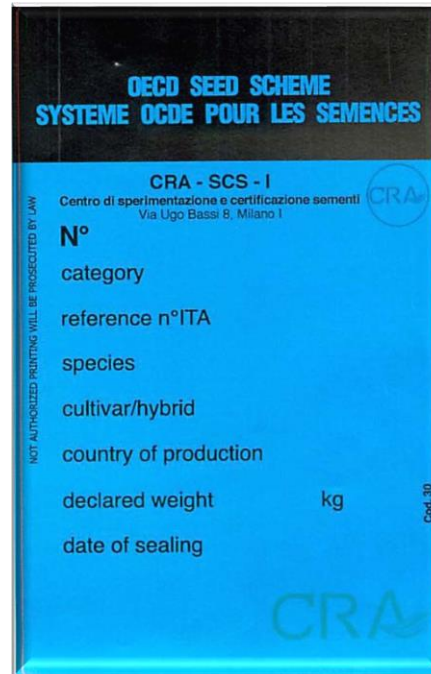


Maps of land degradation



High temperature alert service for dairy cows

... certification of the seed industry ...



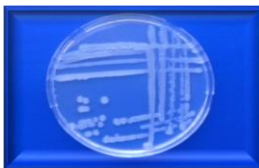
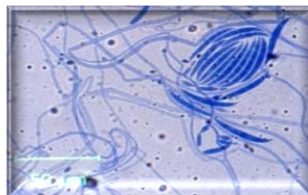
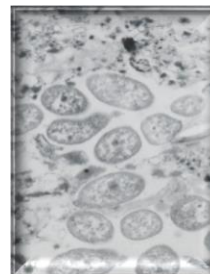
... data bank of pesticides ...



Information on 14.500 plant protection products and over 600 active principles

- mode of use
- timing for application
- cultures
- pests and diseases
- restrictions to use
- health hazards
- producer
- production plant

<http://www.sian.it/fitovis/>



... Lipiza horse: State stud farm ...



ASCaL

The only stud in the world maintained in purity for over a century





Thank you

