

Strategies for Organic and Low-input Integrated Breeding and Management



April 2013

Newsletter 2

Table of contents

- Some feedback from the Congress p.1
- What's going on in Europe? Better regulation and the process of revision of seed legislation p.7
- Dissemination activities p.11
- SOLIBAM on the cloud and calendar p.12
- SOLIBAM snapshots p.13
- SOLIBAM partners p.14

Shaping the future of agriculture: The role of diversity in low-input and organic cropping systems

SOLIBAM 1st Stakeholder congress
April 19th-20th 2012

Climate change, population growth, poverty have been the key elements discussed during the SOLIBAM First Stakeholders Congress that took place in Grottaferrata (Italy).

Different keynote speakers opened the debates with the stakeholders presenting the challenges for the future of agriculture on 5 themes:

1. Seeds and sustainable use of plant genetic resources,
2. Greening of agriculture,

3. Climate change, what challenges for breeding and agriculture?

4. Cropping systems of the future, the European Framework Directive on sustainable pesticide use

5. Shaping diversity research

During the two days Congress around 80 persons participated and 50 posters were presented. The best three posters were chosen by a jury and prized with local produce freely given by farmers.

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Collaborative Project
(large-scale integrating project)



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Snapshots from the Congress

We asked some of the speakers to present their view on the factors that are increasing the pressure on agricultural systems worldwide, starting with the challenges of the European project SOLIBAM.

Veronique Chable, of the French National Institute for Agricultural Research, explains what SOLIBAM means and how it is developing new breeding approaches.

"Solibam is a project that was born 3 years ago to develop our view of organic agriculture, which links also to the development of the relation between research and farmers to increase diversity, to increase sustainability of agriculture and to enlarge our view organic agriculture and to share our view. At the first meeting of the partners we all agreed that our keyword is 'diversity'. Diversity to adapt to many kinds of environment, practices... All organic farmers have their own practices, and every time they have to adapt to the consumers, and diversity is a necessity at first.

We are breeding and we hope to breed as fast as possible for the organic agriculture. So we're increasing the knowledge and the methodologies altogether, and at the same time we try to have concrete research, so varieties, populations, diversity inside the populations... It's not only research for research, but it's research for results, and results for the development of organic agriculture."

Promoting diversity in agriculture is an ambitious goal. According to the Food and Agriculture Organization, over the last century about 75% of the world's crop varieties have been lost.

We now rely on just three crops: wheat, rice and maize – the 60% of our calories. How did this happen? The answer of **Devra Jarvis**, from Bioversity International.

"I think one of the main threats is - I would say - globalization. I think one of the larger issues is a lot of control of the seeds resources. I think the issue is that farmers need to have enough diversity within their systems, and we want to



Snapshots from the Congress

have sustainable system, which means less external chemical inputs. The main threat is that modern breeding is not really adapted to that; it's adapted to high-input agriculture. We need to get away from that to have the politics that support different types of actions, because diversity is a way of having multiple solutions for people."

Philippe Baret, from the Louvain University of Belgium, says another big problem is the lack of good research behind the mainstream agricultural practices.

"We need a new model, like agroecology or organic farming, but there is a difficulty to shift from the traditional paradigm to the new paradigm.

One of my students at the beginning of his thesis quoted this sentence: 'transgenic plants are the solution, but what is the problem?' And that's a good summary of the situation. There's a development of solutions, very technological, very fashionable, but they're not addressing the real

issues that are on the fields, that are the issues of the farmers, especially of the poorest farmers.

The Solibam approach, which is based on an implication of the actors, is clearly in the right direction to answer the challenges of the future of agricultural research, because is working on identifying the right questions."

And in order to answer these questions, we need a radical change. This is the opinion of **Gianluca Brunori**, from Pisa University.

"I identify this difference between radical innovation and incremental innovation. It is needed now a radical innovation, because the shift from existing agriculture (mainly monocultural agriculture, industrial agriculture) and agrobiodiversity based agriculture is a radical change.

I think that sometimes a shock is needed. So if there is a regulation change, this will produce a kind of top-down approach, but at the same time the solution to the new context will be based on

distributed knowledge, so farmers trying to get collective actions, grouping together to solve problems that sometimes cannot be solved by the outside.

We have to turn farmers of the new generation into researchers, and researchers should see themselves as farmers as well: so intermixing the roles of people.”

In the Solibam approach, the farmers themselves need to have more than a say in what diversity means. Because unless we begin with the soil, the seeds and the plants, we cannot really understand organic agriculture. **Patrick de Kochko** is a farmer in the south-west of France. He coordinates the Peasants Seeds Network, involved in Solibam project, and he knows very well the meaning of the word variety.

“In the condition of organic farming and in the condition of low-input farming everything is based on the quality of the soil: we have different types of soil, different conditions, different climates, so we need adaptation. And adaptation is given by the diversity.

One plant will not be very well here, but the other one neighbouring will do well in that environment. So if you have a large diversity, you can be sure that you'll get something, every year. Our system is based on nourishing and respecting the soil, and then the soil will nourish the plants. So we are completely convinced that what we are doing now is just preparing the future. I think that would be the future. Even if we are marginal today, [we will have no choice in a few years] we really need to change the system, and more and more people are having consciousness of that.”

But every day farmers and small breeding companies need to fight against the restrictions on seeds exchange, which hold the development of agrobiodiversity back. According to **Regine Anderson**, from Fridtjof Nansen Institute in Norway, farmers still do not have enough legal space to do their job.

“Until 2008 in the EU it was actually not allowed - and it's still not allowed - for farmers to exchange and sell farm saved seeds. And also, the seeds that are allowed on the official list on plant varieties,



Snapshots from the Congress



Snapshots from the Congress - Poster session and prize

they have to meet certain requirements of genetic homogeneity, which is actually the opposite of what we're trying to support with genetic diversity.

The most important aspect for the future of agricultural biodiversity in Europe at the moment is legal space for farmers and breeders involved in diversity management, involved in conserving and sustainable using of crop genetic diversity. That they have a legal space not only to manage to do what they do, but also to be supported and promoted in what they do. So that's the legal space that is needed, and when we have that is possible to go on."

Solibam project's goal is to shift from theory to practice, bringing biodiversity into the fields. This is the objective of **Salvatore Ceccarelli**, from the International Center for Agricultural Research in the Dry Areas. He does the so-called participatory breeding, where researchers and

farmers work together to spread different plant varieties in the developing countries.

"Participatory plant breeding as a science is still plant breeding. The major difference is the way in which it is organised and who is taking decisions. While in conventional plant breeding the majority of the work is done in research stations and all the decisions are taken by the scientists, in participatory plant breeding most of the work is done in farmers' fields, and the decisions are shared between farmers and scientists, so that the opinion of the farmers is automatically incorporated in the varieties which are produced. This also implies that many different varieties are produced in many different places, depending on the needs of the farmers who participate in that particular village or in that particular country.

Our programme started in Syria in 1995. Initially it was a bit difficult because they didn't even understand the idea that there could be different



Snapshots from the Congress - Poster session and prize

varieties. The very same idea of diversity within the crop was very foreign to them.

When we planted 200 different varieties in their field, there was an incredible explosion of interest. I remember the farmers running up and down, showing each others that variety or the other variety.... And that's how we started. We learnt the lesson that perhaps the first step is to show the diversity within a crop and then build on the reaction of the farmers.

This idea is central also to Solibam. We are using whatever opportunity to expand this work, because we see increasingly that it is actually responding to a natural curiosity that farmers have for something new."

Solibam project will do its best to bring biodiversity back into the fields, shaping the future of agriculture for the next generation!

You can continue to follow the Congress on:

1. The SOLIBAM podcast: <http://www.solibam.eu/modules/podcast/1.mp3>
2. Our Vimeo Channel: <https://vimeo.com/channels/518750>

What's going on in Europe?

Better regulation and the process of revision of seed legislation

Riccardo Bocci (AIAB)

Seed and propagating materials (S&PM) in Europe are regulated by a list of 15 Council Directives specific for the different crops. Moreover 90 other legal acts govern the seed sector, demonstrating how is fragmented and complex. Figure 1 points out the main objectives of S&PM legislation and presents its main components: registration and certification.

In all the vertical directives emphasis is put on

Aware of the activities on populations and in general of the role of diversity in farming systems done by many different scientific bodies and farmers' association in Europe, DG SANCO and AGR1 will organise an expert meeting on this issue for the end of May 2013. The aim is to share views and experiences on genetically diverse plant material (e.g. populations) and find solutions to put this material on the market as seed.

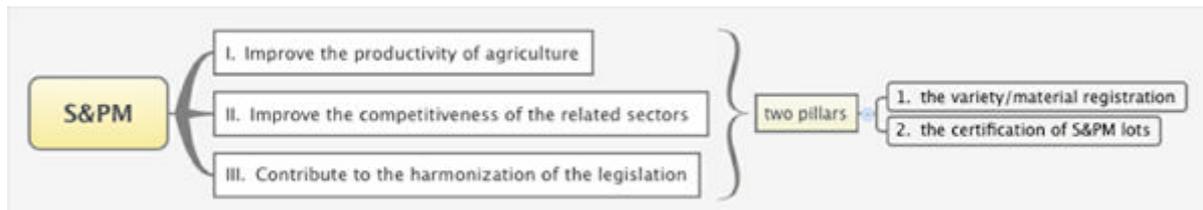


Figure 1: The past/actual objectives of the S&PM directives and their two pillars

productivity, and the assumption is that **uniformity** and strict rules to get it will increase productivity. In July 2012 the European Court of Justice in its Judgment on the Kokopelli case drew the same conclusions on the importance of uniformity as a key for productivity.

In particular articles 57 and 58 of the sentence stated that: "By ensuring that all seed sold under a particular name has the same genetic characteristics, the criterion relating to uniformity encourages an optimum yield [...]" and that: "Consequently, the requirement of listing in the official catalogues and the related acceptance criteria allow the variety to be defined and its stability and uniformity to be verified, for the purposes of ensuring that seed of a given variety has the qualities necessary to ensure a high level of agricultural production that is of good quality, reliable and maintained over time."

But it still true? Can we affirm on scientific basis that only uniformity is the key for agricultural productivity? According to the work and research performed by SOLIBAM partners one can challenge that uniformity is still so important for agricultural systems at least for low-input and organic ones.

For example wheat populations are more and more cultivated by farmers through all of Europe, demonstrating the importance of cultivating diversity.

Different categories of seeds are defined in the directives:

1. Basic seed, intended for the production of certified seed;
2. Certified seed, intended for production of the produce;
3. Commercial seed, only for certain species (fodder plant and oil and fibre plant); loosely defined as seed officially examined regarding germination, analytical purity and content of seed of other species;
4. Standard seed (for vegetables and grapes), official examination is required to test varietal identity and purity.

In all the seed directive there is no clear definition of the term seed, whereas the term "propagating material" is provided by the legislation.

Propagating material

"[...] parts of plant and all plant material, including rootstocks intended for the propagation and production of vegetables [...]"

Better regulation

This discussion about populations is taking place during the process of revision of the entire EU framework on seed marketing. That is why is so important. This is the right time to adapt future laws to current farming practices, having

in mind the role that diversity - at its different levels - can play to make farming systems more sustainable and resilient to climate changes. The legislators should not adopt laws and regulations trying to turn the reality into their models, as done for years in the name of agricultural modernisation. On the contrary they have to adapt laws to different realities and needs, trying to find the right place for everyone.

At this regard, **DG SANCO** released the final text of the Regulation on 6th May 2013 and now it will start negotiations within Parliament and Council. This technical text offers some good news but also it still presents some critical drawbacks. But it is important to say that many critical points are still unclear do the fact that the Regulation is on the general principles and specific delegated acts are planned in the next future for regulating specific issues.

1. Scope of the legislation

According to the article 2 (scope) networks of conservation of plant genetic resources as well as exchanges in kind between persons other than professional operators are excluded by the scope of the Regulation. This article should clarify once for all the difference between "exchange" and "marketing", allowing the activities of seed savers or gardeners conserving agricultural biodiversity.

Reading the definition of "professional operators" it seems that farmers are excluded and therefore the exchanges among farmers are not considered placing seeds on the market. This point needs to be clarified in the following negotiations in order to allow the exchange of seeds of not protected varieties within farmers' seed networks.

2. Marketing definition

The actual directives define marketing as "the sale, holding with a view to sale, offer to sale and any disposal, supply or transfer aimed at commercial exploitation of seed". This definition allows different interpretation in different Member Countries, and according to the national interpretation also exchange among farmers was considered marketing. Usually the only exchange admitted was the transfer of seed among seed savers or gardeners due to the fact that they don't do any commercial exploitation of seed, i.e. they don't sell the produce of the seed but they use it for self-consumption.

The draft regulation changes this definition and "placing on the market" become "the holding for the purpose of sale within the Union, including offering for sale or for any other form

Why a Regulation instead of new Directives?

A regulation is a legislative act of the EU that becomes immediately enforceable as law in all member states simultaneously. Does not need transposition. Does not leave space to member states' interpretation.

of transfer, and the sale, distribution, import into, and export out of, the Union and other forms of transfer, whether free of charge or not". The idea of **commercial exploitation** of seed is not more considered and it is not really clear if the exchange of seed among seed savers or gardeners is to be considered "placing on the market".

One interpretation could be that, according to the scope of legislation, the Regulation doesn't apply to exchange in kind, so the definition of marketing doesn't include exchange.

3. Officially recognised varieties

The Regulation contains a new definition of variety, at least for agricultural species and vegetables. In fact the Regulation utilises the same wording of the Council Directive 2008/90/EC on the marketing of fruit plant propagating material and fruit plants intended for fruit production. This Directive allows the registration of varieties if they have been "already marketed before 30 September 2012 in the territory of the Member State concerned, provided that they have an officially recognised description."

These ideas (placed on the market before the entry into force of the regulation and the officially recognised description) are now applied to all plant reproductive materials. These ORD varieties should also have a region of origin, but not more quantitative restriction are considered. Indeed, the new Regulation wipes out the idea of conservation varieties, that took 10 years to be implemented.

4. What about populations or new farmers' varieties?

At the last minute the text proposed by DG SANCO includes also the possibility of putting on the market populations/**heterogenous material** (art.14.3). But the Regulation doesn't define how these materials should be marketed and leave the problem to new delegated acts that will have to set out:

(a) rules on labelling and packaging;

(b) rules concerning description of the material, including the breeding methods and parental material used, description of the

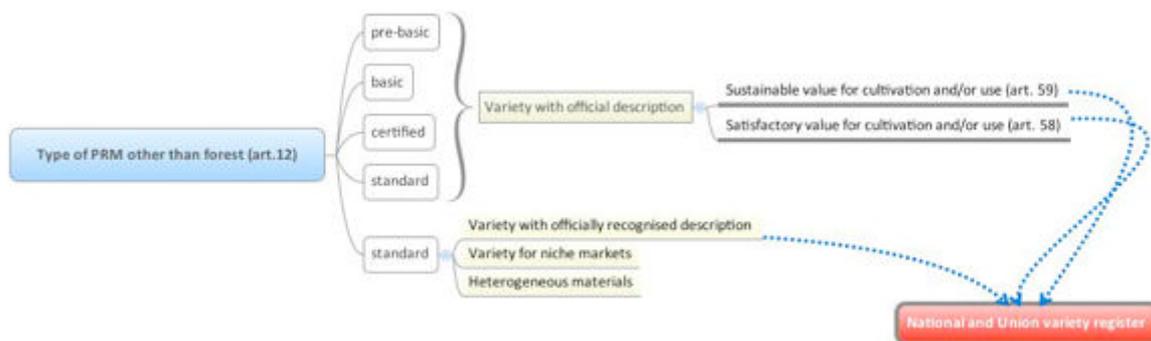


Figure 2: The new Regulation on PRM

production scheme for the plant reproductive material and availability of standard samples;

(c) rules relating to information and samples of production to be kept by the professional operators and the maintenance of the material;

(d) establishment by the competent authorities of registers for heterogeneous material, modalities for registration and content of those registers;

(e) establishment of fees, and cost items for the calculation of those fees, concerning the registration of heterogeneous material referred to in point (d) in a manner ensuring that the fee does not constitute a barrier to the registration of the heterogeneous material concerned.

Therefore it is not yet clear what kind of space could have populations in the future.

5. Niche markets

The Regulation defines a third categories of varieties that will exempted from the requirement of variety with official description (see figure 2): niche market plant reproductive material. They don't have to be registered in order to be put on the market and are identified by only two characteristics:

(a) it is made available on the market in small quantities by persons other than professional operators, or by professional operators employing no more than ten persons and whose annual turnover or balance sheet total does not exceed EUR 2 million;

(b) it is labelled with the indication 'niche market material'.

Even in this case delegated acts will have to set out more specific rules for these materials, e.g. the maximum size of packages, containers or bundles.

Heterogeneous material and niche market

varieties are certified as standard materials, following the procedure on going for vegetables, e.g. post-control on the market.

6. Value of cultivation and use (VCU)

It is strange that the new Regulation enlarges the role of VCU, instead of reducing it. Indeed, during the process of negotiation, the Final Report "Evaluation of the Community acquis on the marketing of seed and plant propagating material (S&PM)" prepared by the Food Chain Evaluation Consortium (FCEC) in 2009 stated that "assessing the true effectiveness of VCU is a

Art. 58 Satisfactory value for cultivation and/or use

For the purpose of paragraph 2(b) of Article 56, varieties shall be deemed to have a satisfactory value for cultivation and/or use if, compared to other varieties examined under similar agro-climatic conditions and similar production systems, their characteristics, taken as a whole, offer, at least as far as production in any region is concerned, a clear improvement either for cultivation in general or for the specific uses which can be made of the crops or the products derived therefrom.

Member States shall adopt rules concerning the examinations to determine the satisfactory value for cultivation and/or use of the varieties to be registered in their national variety register. Those rules shall concern the characteristics of the varieties in one or more of the following areas:

- (a) quality and agronomic characteristics, including yields;
- (b) suitability for cultivation in resilience and low input production systems, including for organic agricultural production.

Each Member State shall publish those rules and notify them to the Agency, the Commission and the other Member States.

Article 59 Sustainable value for cultivation and/or use

For the purpose of paragraph 2(c) and paragraph 3(c) of Article 56, varieties shall be deemed to have a sustainable value for cultivation and/or use if, compared to other varieties examined under similar agro-climatic conditions and similar production systems, their characteristics, taken as a whole, offer, at least as far as susceptibility to pests, input of resources, susceptibility to undesirable substances or adaptation to divergent agro-climatic conditions are concerned, a clear improvement either for cultivation in general or for the specific uses which can be made of the crops or the products derived there from.

The Commission shall be empowered to adopt delegated acts, in accordance with Article 140, setting out rules concerning the examinations to determine the sustainable value for cultivation and/or use of the varieties. Those rules shall concern the characteristics of the varieties in one or more of the following areas:

- (a) resistance to pests;
- (b) reduced need for input of specific resources;
- (c) decreased content of undesirable substances; or
- (d) increased adaptation to divergent agro-climatic environment.

Those rules shall take into account, where applicable, the available technical protocols.

difficult exercise. It is easy to demonstrate what has been achieved, as presented in the figures on productivity's increase over years in VCU trials; but difficult to predict productivity evolution without VCU as increase of productivity has been observed in crops (e.g. vegetables) and areas (e.g. USA, Australia) where regulated VCU is not mandatory. The FCEC team believes it would be worth making a further analysis of the utility and efficiency of the VCU on a crop-by-crop basis and to better understand why VCU is so important in agriculture crops and not needed for vegetable crops (e.g. logic of keeping VCU for industry chicory and not having VCU for industrial vegetable crops)".

One possibility opened by this Report was to make VCU testing voluntary, considering the actual difficulties of the system (e.g. 27 Member states have 27 different systems of implementation) and that in vegetables even without VCU tests the quality of varieties put on the market has been increased over years. On the contrary, the proposed text creates two different type of VCU systems, one called "Satisfactory VCU" and another "Sustainable VCU" (see boxes). It is important that for the first time it is said that Member states should have VCU for organic agricultural production, but it is difficult to see how this issue will be addressed by National Agencies due to the decrease of public money allocated for such tests.

Smarter rules for safer food

The European Commission has adopted on Monday 6 May 2013 a package of measures to strengthen the enforcement of health and safety standards for the whole agri-food chain. The package of measures provide a modernised and simplified, more risk-based approach to the protection of health and more efficient control tools to ensure the effective application of the rules guiding the operation of the food chain.

The package includes regulations on:

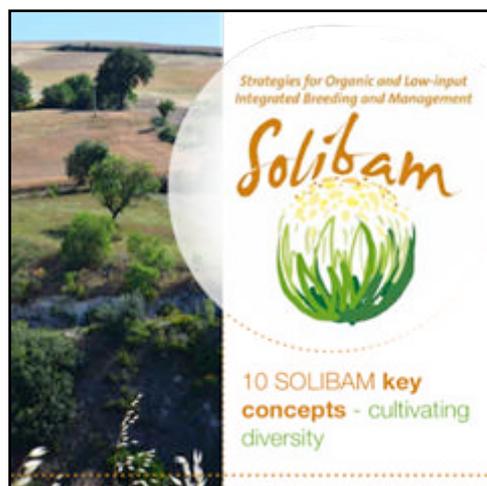
1. Official controls,
2. Animal health,
3. Plant reproductive material (including seeds),
4. Plant health.

The text of the proposed regulations and their impact assessments could be downloaded on the DG SANCO website:

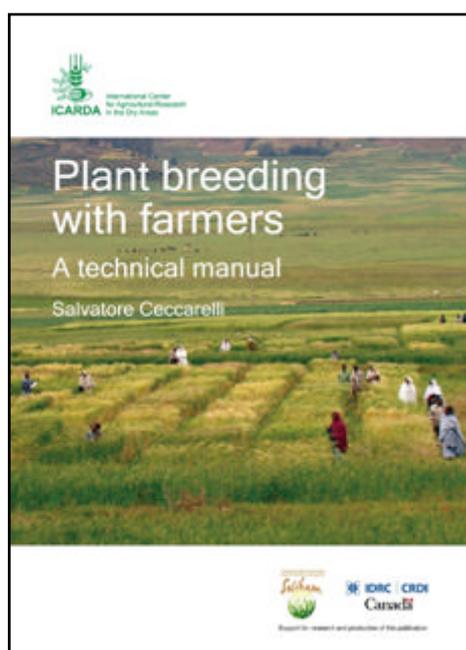
http://ec.europa.eu/dgs/health_consumer/pressroom/animal-plant-health_en.htm

Dissemination activities: two more booklets!

In May 2013 the SOLIBAM consortium will publish its first layman booklet explaining the 10 keynote concepts addressed by SOLIBAM and how the project deals with them. It will be soon available in all the project languages from the website.



N°	Concepts	Key person	Partner
1	Resilience	I. Goldringer	INRA
2	Robustness	E. Serpolay	INRA
3	Functional biodiversity	C. Moonen	SSSUP
4	Yield stability	M. Wolfe	ORC
5	Adaptability	S. Ceccarelli	ICARDA
6	Intercropping	P. Barberi	SSSUP
7	Sustainability	H Østergård	RISO
8	Evolutionary processes	P. Riviere	INRA
9	Organoleptic quality	C. Vindras	ITAB
10	Participatory research	V. Chable	INRA



In 2012 the SOLIBAM consortium published a Technical Manual on Participatory Plant Breeding, aiming at clarifying the methodological aspects of PPB according to SOLIBAM partners.

The Manual is freely available from our website www.solibam.eu.

Dissemination activities: SOLIBAM on the cloud!



[https://
vimeo.com/channels/518750](https://vimeo.com/channels/518750)



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www.facebook.com/Solibam?ref=hl](https://www.facebook.com/Solibam?ref=hl)

Next meetings and events

27-30 May 2013 - Rome (IT) - International symposium on genetics and breeding of durum wheat

Organized by the International Maize and Wheat Improvement Center (CIMMYT), International Center for Agricultural Research in the Dry Areas (ICARDA) and the Italian National Research Council (CNR) and National Academy of Sciences. The programme of this scientific symposium covers the origin and evolution of durum wheat; genetic resources and germplasm enhancement; breeding strategies and tools; adaptation and sustainability; disease and pest resistance; technological and nutritional quality; and structural and functional genomics.

<http://dwis.accademixl.it/index.php>

30 - 31 May 2013 - Rome (IT) - Consultation to Promote Public-Private Partnerships for Pre-breeding (ITPGRFA/FAO)



Italy - wheat fields trials 2012



SOLIBAM
Snapshots from
the 2013 Congress



The 23 SOLIBAM Partners

Institut National de la Recherche Agronomique (France)

Associazione Italiana per l'Agricoltura Biologica (Italy)

The Organic Research Centre, Elm Farm (UK)

Technical University of Denmark, DTU (Denmark)

Institut Technique de l'Agriculture Biologique (France)

Technical University of Munich (Germany)

Instituto de Tecnologia Quimica e Biologica (Portugal)

Agencia Estatal Consejo Superior de Investigaciones Cientificas/Instituto de Agricultura Sostenible (Spain)

Escola Superior Agraria de Coimbra (Portugal)

Centre for Agricultural Research, Agricultural Institute, Hungarian Academy of Sciences (Hungary)

Scuola Superiore Sant'Anna, Pisa (Italy)

University of Perugia (Italy)

Agroscope Reckenholz-Taenikon Research Station ART (Switzerland)

Institute of Food and Resource Economics (Denmark)

INRA Transfert (France)

University of Pisa (Italy)



Crop breeding companies

Saatzucht Donau - cereal breeding (Austria)

Gautier Semence - vegetable breeding (France)

Agrovegetal - legume breeding (Spain)

Arcoiris - vegetable breeding (Italy)



Institutions from African countries and international organisation

International Center for Agricultural Research in the Dry Areas (International)

Coordination Nationale des Organisations Paysannes du Mali (Mali)

Mekelle University (Ethiopia)



<http://www.solibam.eu>

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