
## 3rd DIGITAL NEWSLETTER


# BRESOV 2nd Annual Progress Meeting

From 30 June to 2 July, the 2nd Annual Progress Meeting of the BRESOV project took place. Due to travel restrictions caused by the covid-19 pandemic, the meeting, initially planned to be held in Valencia by the project partner Universitat Politècnica de València (UPV), was held online. Over three days of virtual meetings, progress within the different work packages of the project was discussed.
One day focused on the achievements in the pre-breeding and plant breeding work packages, which included first the broadening of the genetic bases of tomato, snap bean and brassica, promoting the use of crop wild relatives, landraces and gene discovers and second the development of populations, advanced breeding lines and improved genetic material for European organic agriculture. On another day the project partners presented the progress achieved for high quality organic seed production and the results for multi-site evaluations of pre-breeding lines on-farm.
In addition, the sister projects LIVESEED and ECOBREED were represented by their coordinators, Dr. Monika Messmer and Dr. Vladimir Meglič, respectively. Interesting input was also given by new BRESOV Advisory Board members Sandra Goritschnig (ECPGR) and Thor Gunnar Kofoed (COPA-COGECA).

# Why BRESOV is important


"In Switzerland, organic vegetables hold the second place for the largest share of the total market. With the continuous growth of the organic agricultural lands and the organic market, it is important to enlarge the offer of organic varieties with a better performance (resistance/tolerance and productivity) which also meet the market's demand. BRESOV spreads from the research of interesting traits in genebanks to the growing of alternative varieties on-farm of three important vegetable crops. The research is spread across Europe and beyond, which means a diversity of regional conditions, of needs and agricultural practices that will be investigated and a broad outreach to the agricultural stakeholders and consumers."

**Meet the BRESOV team**

# Spotlight: Increasing the production of high-quality organic seeds - WP4 activity summary

**Work Package 4 research activities** focus on ways to increase the production of high-quality organic seeds. WP4 is led by VEGENOV and comprises seven partners: UNICT, ITAKA, FiBL, VEGENOV, SECL, EUROSEEDS, UPV, and OBS, which is a sub-contractor of EUROSEEDS.

WP4 has **two objectives**:

1. Develop protocols adapted to the specific conditions of organic farming to improve organic seed yield
2. Determine products and tools to control the sanitary and genetic quality of organic seed lots

WP4 activities are divided into **three tasks**:

- **Task 4.1:** Determination of the optimal agronomic conditions for organic seed production (high yield and quality of seeds)
- **Task 4.2:** Evaluation of alternative seed treatments to the use of chemical treatments to control sanitary quality of organic seed lots
- **Task 4.3:** Development of tools to control the genetic quality of seed lots (molecular marker sets)

**T4.1** mainly focuses on the setup of trials to test the effect of agronomic parameters that could influence significantly the yield (thousand seed yield, number of seeds per plant, number of seeds per square meter) and the quality of produced seeds (germination rate, number of normal/abnormal seedlings).
Five trialing sites with different pedo-climatic conditions and growing structures perform the trials over 2 or 3 seasons in the three crops (Brittany in France (two sites), Switzerland (one site) and Sicily in Italy (two sites).

In the first cycle of trials (2018/2019), density of plants was the main factor to be assessed (in Brittany and Sicily). First results show that plant density has an impact on tomato seed production (yield) and, depending on the cultivar selected, also on brassica. Snap bean seed production was less affected by plant density, but had an impact on snap bean seed germination in some cultivars (quality of seeds).
The effect of different harvesting regimes on seed production of tomato was specifically evaluated in Switzerland as this is an important question raised by local producers.
In the second cycle of trials starting in mid-2019, trials in Brittany and Sicily focused on the nutrition factor, i.e. the assimilation of nitrogen with the use of microorganisms or not. Trials are ongoing for most of the crops or only finishing, results will be analyzed in the coming months. The effect of different harvesting regimes is also evaluated for the second time in Switzerland to confirm the results of the first year. Data analysis is ongoing.
Seed companies and stakeholders have been asked to provide their input regarding other factors that could influence seed yield and quality under organic growing conditions through a questionnaire. Pest management for sure is in the top list, followed by plant nutrition (e.g. the use of microorganisms) and the management of the soil microbiome. In the third and final year of the trialing cycle, it is planned to focus on some of those key factors and to validate the effect of the most promising factors evaluated in the first 2 cycles. Pre-breeding lines coming from the breeding work of WP3 partners will be assessed at the same time to highlight the potentialities of these new materials in terms of seed production under organic farming.

**T4.2 activities** are split into two main sub-tasks: the evaluation of organic products developed by ITAKA towards 3 to 5 major seed-borne pathogens affecting each of the three crops, and the development of detection tools to identify the presence of those same seed-borne pathogens in seed lots.

An important literature review has been achieved during the first year of the project on existing detection tools and on biocontrol agents and natural compounds used in organic farming to control major seed-borne pathogens affecting tomato, brassica and snap bean.
Based on this state-of-the-art and first tests, a selection of 6 promising products has been made by ITAKA for evaluation as seed treatments against seed-borne pathogens in the 3 crops. These products are based on micro-organisms and on natural extracts. Three rounds of trialing cycles are ongoing, using first commercial varieties and then pre-breeding lines from WP3.
In addition, partners are developing new detection tools, mainly molecular-based tools, to detect the presence of major seed-borne pathogens in seed lots. PCR-based pathogen detection and quantification tests on seed lots for the targeted diseases that are being developed will be evaluated with regards to their specificity and their sensitivity (detection power) before being validated on artificially infected or, if possible, naturally infected seeds. Experiments are now ongoing and will last 3 years.

**T4.3 activities** focus on the development of molecular tools to control the genetic quality of seed lots in the three crops, mainly to detect weed seeds, but also to provide information about the varietal homogeneity of the seed lot. So far, SSR markers have been selected from literature information in the three crops. Ongoing texts are evaluating their polymorphism power and their ability to detect the DNA of all varieties or genetic materials in different dilutions of mixtures of DNA from different varieties. In parallel, the technique of DNA extraction from seeds is being optimized.

# Where has the BRESOV team been?

## Tomato diversity for school children from "Colegio Claret Valencia Benimaclet" at UPV, Valencia

On 26 February 2020, 20 children from year 3 (8-9 years) together with three teachers from the “Colegio Claret Valencia Benimaclet” primary school visited the Universitat Politècnica de València (UPV). Children were taught about the diversity of tomatoes and the importance of conserving the diversity of plants, and visited the germplasm bank and greenhouse trials where they became acquainted with the importance of conserving diversity for a sustainable agriculture.

## Creation of the “Association of Producers and Traders of the Valencian Tomato”

A new association of farmers and traders of the local Valencian tomato landrace (“Association of Producers and Traders of the Valencian Tomato”) has been created, with headquarters at UPV. The association has been constituted by 11 farmers plus UPV and is aimed at enhancing this local variety. Several of the farmers are organic producers, which gives an added value to this locally appreciated tomato variety, and also participate in growing and testing BRESOV materials.



## Annual meeting between researchers and field technicians working on the bean crop in Villaviciosa, Asturias, Spain

SERIDA researchers and field technicians working in the bean crop met on 4 March 2020 in Villaviciosa, Asturias, Spain, to disseminate advances in research projects (including BRESOV) and to exchange experiences on the development of the bean crop in the last season in Asturias.

## Euroseeds SVOwic meeting on 9 March 2020

Results achieved within year 1 of the project on Task 4.1 were presented to representatives of the vegetable industry during the SVOwic meeting held by Euroseeds on 9 March 2020. First outcomes of experiments performed to test the effect of different plant densities and nutrition/use of microorganisms on seed yield were presented.

## Ad-hoc Working Group Organics Skype meeting on 24 April 2020

The BRESOV project was presented to relevant stakeholders in organic breeding and seed business at the ad-hoc Working Group organised digitally by Euroseeds on 24 April 2020. The goal was also to increase the involvement of stakeholders in the project and to find experimental factors interesting for industry for Task 4.1 in the 3rd year of experiments.

## Presentation of FiBL's trials and introduction to BRESOV during a demonstration on-farm, Switzerland

*Flurgänge* are afternoon/evening events organised by FiBL and usually hosted by an organic farm. Participants are mainly farmers looking for an exchange of information and tips, and learning from the scientific advisors. This time, the Flurgang/Demonstration took place on 17 July 2020 in Zurich at the organic farm Ortoloco, where the Swiss trials for Task 5.2are carried out. Ortoloco is an "association" farm that distributes weekly baskets to subscribers, who are also members and participate in the tasks of the farm with a certain number of hours per year.
The topic of this evening was **solidarity-based agriculture**, and the BRESOV project was presented to participants and the ongoing trials were visited.

# BRESOV in the News

## BRESOV disseminated to university on 28 February 2020

UNIVERSITÀ degli STUDI di CATANIA

Bollettino d'Ateneo

HOME VITA D'ATENEO

### "Bresov", nuovi prodotti biologici resilienti al cambiamento climatico

*Il Dipartimento di Agricoltura, Alimentazione e Ambiente coordinatore del progetto Horizon 2020*

28 febbraio 2020
Alfio Russo

Migliorare geneticamente le varietà di broccolo, fagiolino e pomodoro con l'obiettivo di ottenere nuove linee resilienti e sostenibili della filiera dei prodotti biologici che ben si adattano agli agrosistemi orticoli sempre più sottoposti ai nuovi scenari del cambiamento climatico.

È quanto prevede il progetto Horizon 2020 **"BRESOV" (Breeding for Resilient Efficient and Sustainable Organic Vegetable Production)**, di cui l'Università di Catania è capofila e coordinatrice con la supervisione scientifica del prof. Ferdinando Branca, associato di Orticoltura e Floricoltura del dipartimento di Agricoltura, Alimentazione e Ambiente dell'ateneo catanese.

## BRESOV Communication Campaign from 5 March 2020

**Newspaper *El Comercio*:**
*https://www.elcomercio.es/asturias/mas-concejos/faba-asturiana-adapta-20200305001024-ntvo.html*

**Regional TV: *RTPA News*** (min 34-39)*: https://www.rtpa.es /video:TPA%20Noticias.%20Segunda%20edicion_551583402032.html*

### «La faba asturiana se adapta mal a la producción ecológica»

Juan José Ferreira, en la jornada sobre la faba asturiana. / A. G.-O.

El Serida trabaja con más de 300 variedades de fréjoles dentro de un programa europeo para mejorar su competitividad

## 'Villaviciosa look for the perfect snap bean' (from 28 June 2020)

News published in the newspaper *La Nueva España*:
https://www.lne.es/centro/2020/06/28/villaviciosa-busca-frejol-perfecto/2652904.html

## Digital news in the newspaper *El Comercio* from 7 July 2020

Snap beans from Asturias to promote organic farming in Europe:
https://www.elcomercio.es/asturias/heroes-del-campo/frejoles-asturianos-potenciar-cultivo-ecologico-europa-20200704113548-nt.html

## UNICT press release: 'Fagiolino, pomodo e broccoli: dal progetto Bresov indicazioni per prodotti biologici resislienti al cambiamento climatico'

Published in city newspaper *Catania News*, *Cronaca oggi*, the online newspapers *Sicilia Report*, *Hashtag sicilia*, *Newsicilia*, *Globus Magazine*, *Sikelian*, Published in the regional newspaper *Quotidiano di Sicilia* and the region's main newspaper, *La Sicilia*.


# News from the fields – and the tables!

## Tomato field experiments in Valencia

The BRESOV Selected Set of tomato, constituted by 50 varieties selected from the Breeding Set and Core Collection for their diversity and adaptation to organic conditions, has been grown in an organic field in the municipality of Alcàsser in Valencia (Spain). The 50 varieties are grown under three conditions: control, low nitrogen fertilization, and reduced irrigation. These Selected Set materials have been characterized and fruits have been taken for metabolomics analyses. The experiment is also replicated by CREA in order to have two evaluation sites.

## Tomato trials

*Tomato: Irrigation of the pot trial (T5.3) prior to the start of the water stress treatment and brainstorming on how to best conduct this experiment*

*Tomato: Selected set trial*

*Trial T41 and T5.2 on campus and on-farm respectively*

## Snap bean trials

*Snap bean greenhouse experiment 2019-20*

*Snap bean fields 2020 in Potenza (Italy)*

*Snap Bean field trial with organic farmer, 2020*

*Snap bean sowing and germination of FiBL, 6 of the 8 varieties sown are displayed*
*Picture by Lynn Julen (FiBL)*

*Snap bean field trial at SERIDA, Villaviciosa, 2020*

*Common bean field trials 2020*

## Brassica Trials

*B. oleracea downy mildew resistance testing at VURV, Czech Republic*

## Multi-location variety trials

In BRESOV Work Package 5 led by FiBL, promising varieties and/or advanced breeding lines are cultivated on-farm in several European locations and in China.

| Partner | Tomato | OF/GH | Broccoli | Bean | Location |
|---|---|---|---|---|---|
| P4-UTAD | | | | | Braga, Portugal |
| P5-VURV | | | | | Pustějov, Czech Republic |
| P6-FiBL | | GH | | | Dietikon, Switzerland |
| P9-UNILIV | | | | | Scarisbrick, United Kingdom |
| P11-VRDS | | OF | | | Bacau, Romania |
| P12-CREA | | OF | | | Monteprandone & Roseto Degli Abruzzi, Italy |
| P13-BAAFS | | GH | | | Beijing, China |
| P14-ZAAS | | GH | | | Zhejiang, China |
| P16-SERIDA | | | | | Asturias, Spain |
| P18-ITAKA | | GH | | | Ragusa, Italy |
| P21-SECL | | GH | | | Pleumeur-Gautier, France |

Material evaluated in previous variety trials in the project is commonly cultivated by European partners alongside local variety or standard reference for each crop. The aim of this trial is to verify the potential of this new or niche material under regular organic production conditions at every location. At the end of two years trials, the team will be able to give farmers recommendations on varieties particularly adapted to their location or cultivation procedures, or, in the case of breeding lines, promote their inclusion in future breeding programmes.

### Impressions from some of the trials in 2020:

*Planting of broccoli and gradually maturing plants at VURV in Czech Republic.*

*Broccoli planting (upper photo) Marathon (reference variety; left) main head and Rasmus (right) secondary sprouts at UTAD, Portugal.*


*SERIDA´s trial localized in an organic field in La Cuevona, Ribadesella, Asturias in Spain. Picture shows the evolution of the field trials and pods of two tested bush bean cultivars*

*ITAKA's tomato trial in Sicily on planting day.*

*Tomato trials at VRDS in Romania: Seedling preparation; different aspects and stages of tomato seedling*

*Bean and tomato trials at VRDS in Romania: experimental field establishment at Romanian farm*

*Bean and tomato trials at VRDS in Romania: experimental field establishment at Romanian farm*

*Bean and tomato trials at VRDS in Romania: experimental field development at VRDS*

*Bean and tomato trials at VRDS in Romania: Sampling for lab investigation*


*UNILIV broccoli harvest in the British rain.  a. Peter and Jade getting wet; b. broccoli sampling station; c. example of disease in the crop; d. Peter with Chris (the farmer), who appeared when the rain had passed; e. CNBro09; f. Waltham; g. Rasmus.*

*Broccoli harvest at SECL in Brittany, France with from left to right heads from the reference variety Steel, and the test varieties CNBro09 and Rasmus.*

*The bean trial at SECL in France one month post-sowing.*


*Battaglia (upper) and Concetti (lower) tomato farm trials carried out by CREA in Italy.*

*FiBL's trials in Dietikon, Switzerland. Broccoli in the field adjacent to the polytunnel with the tomato (left), germination of snap beans (after broccoli) and covered tomato production (right)*

**Read more news**

## BRESOV videos

### FiBL's on-farm snap bean cultivation for BRESOV

Bush beans variety trial at the Fondlihof, Dietikon, Zürich, Switzerland (BRESOV). In this video, Joelle Herforth-Rahmé from FiBL presents a bush vean variety trial conducted in the frame of BRESOV in multiple locations across Europe.

**https://www.youtube.com/watch?v=M61fSRScYpY**


## What's next?

- 17-20 February 2021: BRESOV at Biofach 2021, Nürnberg Messe, Germany
- 8-10 March 2021: International conference "BREEDING AND SEED SECTOR INNOVATIONS FOR ORGANIC FOOD SYSTEMS" organized by the EUCARPIA Section Organic and Low Input Agriculture jointly with LIVESEED, ECOBREED, BRESOV and FLPP projects
- 8-10 September 2021: Organic World Congress
- 14-17 December 2021: III International Organic Fruit Symposium and I International Organic Vegetable Symposium

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