RSR Rice Activities: Biodiversity for Climate Change Adaptation

2017-2024

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Rete Semi Rurali

European Seminar on Agrobiodiversity & SAVE Annual Meeting
9 th to 11th September 2024 - Torino, Italy – Turin, 11/9/2024

Index:

1) RSR Structure
2) Projects:
3) RSR Networking and Alliances
4) RSR Rice focused projects:

3.1) Riso Resiliente I° e II°

3.2) Riso.Lo

5) Conclusions

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RSR- A 35 Organisation Network

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RESEARCHAction

Seeding The Change

Communities

Seed Banks

Third Sector Association

Annual Balance 550k €

2 employers

15 consultants

Scandicci HQ

Lombardy Office

Veneto Office

Emilia. R. Office

Training Centre

RSR Seed Bank

Agrobiodiversity Library

Val Camonica Seed Bank

Schio Seed Bank

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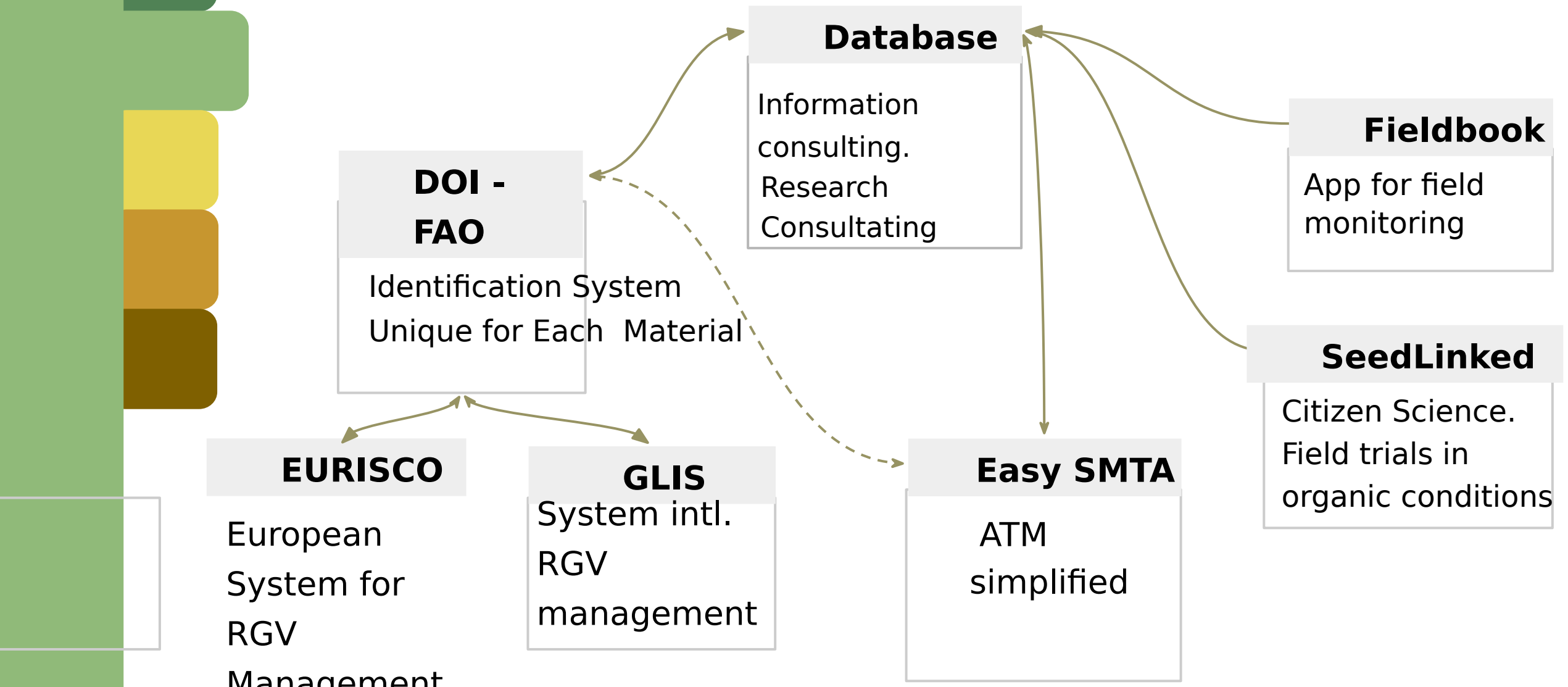
DIVERSITAS
ECOSISTEMA DIGITALE RSR
ricercAZIONE
CASA DELLE SEMENTI
COMUNITÀ
SEMINARE IL CAMBIAMENTO

RSR – Information Ecosystem



Cross-Participation - Alliances relevant to the Foundation

LET'S LIBERATE DIVERSITY!

IFOAM ORGANICS EUROPE

open source seed initiative

International

JAFOWA
Joint Action for Farmers' Organisations in West Africa

CIPRA LIVING IN THE ALPS

Agroecology Europe

AEGILOPS
Greek Network for Biodiversity and Ecology in Agriculture

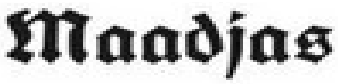
pro specie rara

RED DE SEMILLAS

Rete
Semi
Rurali

Réseau
Semences
Paysannes

ELKANA
Since 1994


Maadjas

KVANN
Norwegian Seed Savers

LET'S LIBERATE
DIVERSITY!

ARCHE NOAH

FÖRENINGEN
Sesam

Irish
Seed Savers

MAATIAINEN

Kulturpflanzen
Nutztiere
Vielfalt

QUINTA DAS ÁGUIAS

Scottish Crofting
Federation

FRØSAMLERNE

MAGHÁZ

SEED
Som fir d'Erhal

Cross-Participation - Alliances

Azione TerrÆ

CAMBIAMO AGRICOLTURA!

National

AIDA
ASSOCIAZIONE ITALIANA DI AGROECOLOGIA

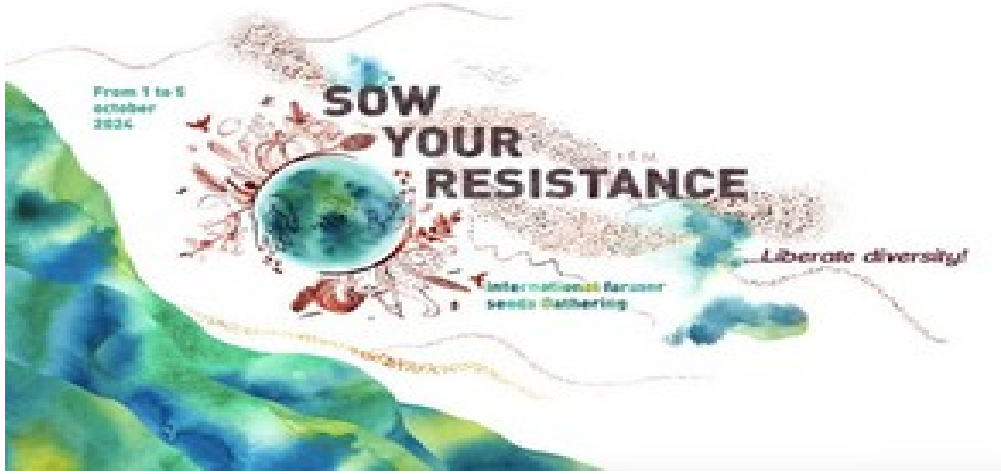
CASA dell'AGRICOLTURA

HUMUS
RETE SOCIALE PER LA BIOAGRICULTURA ITALIANA

LET'S LIBERATE DIVERSITY!

13th forum

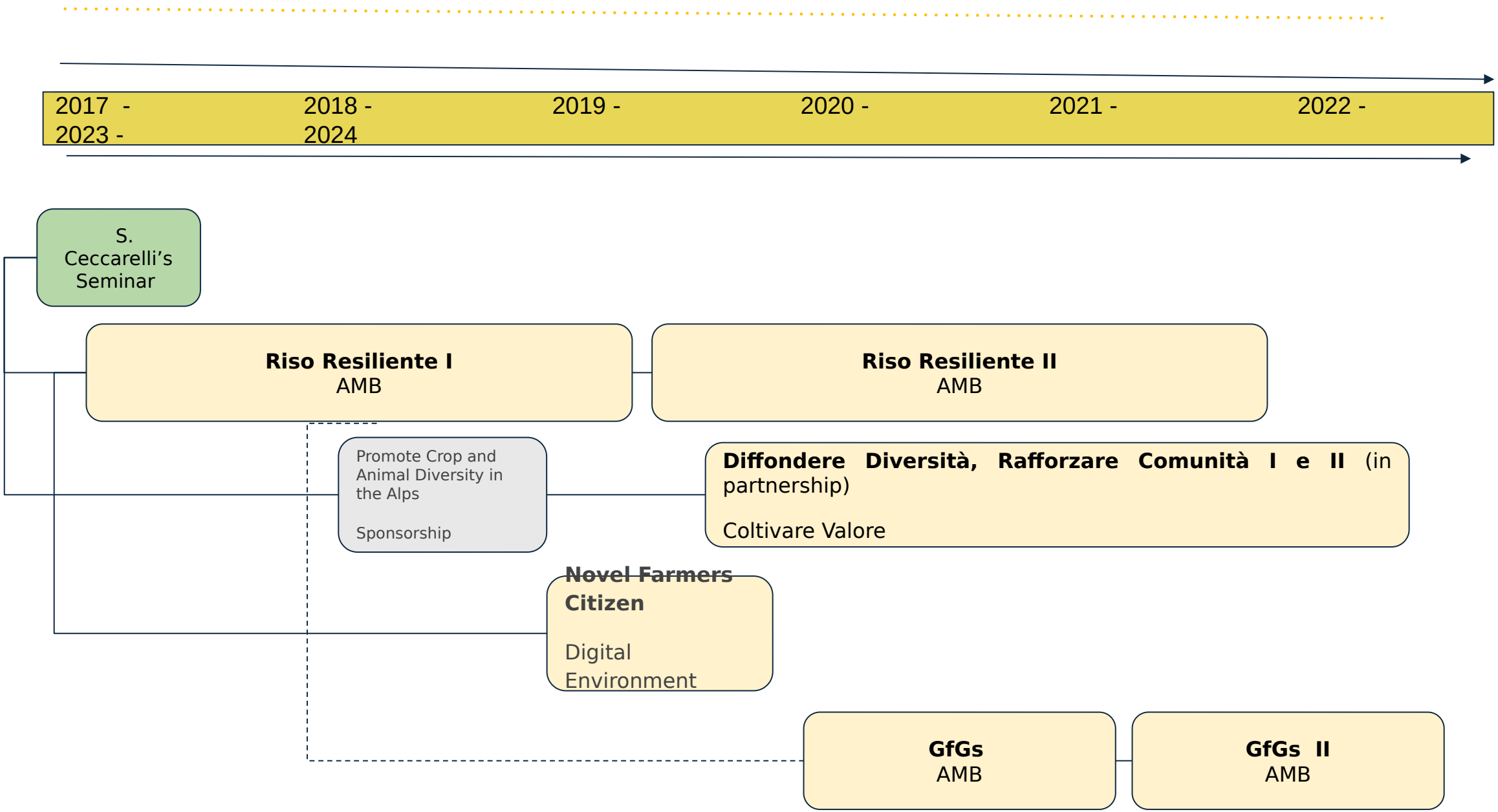
ANTIBES // 2024



JOIN US!

From 1st to 5th OCTOBER 2024

More info here:
https://liberatediversity.org/lld-antibes-2024/


2017 - 2023 -
2018 - 2024
2019 -
2020 -
2021 -
2022 -
S. Ceccarelli's Seminar
Riso Resiliente I
AMB
Riso Resiliente II
AMB
Promote Crop and Animal Diversity in the Alps
Sponsorship
Diffondere Diversità, Rafforzare Comunità I e II (in partnership)
Coltivare Valore
Novel Farmers Citizen
Digital Environment
GfGs
AMB
GfGs II
AMB

Coherence with the Cariplo environmental strategy

Diversity
- Agricultural/cultural system - protection of natural resources
- Market opportunities
- Local solutions to global problems (GW adaptation strategies)

Inclusion
- Opportunities for all, everywhere
- Exchange of knowledge (scientific and local)
- Land-sharing approach

Participatory innovation
- Co-creating innovation from the bottom up
- Employment for young people and women
- Revitalization of rural areas (restoration of abandoned land)

The agro-ecological transition: towards truly sustainable agri-food systems

E
Efficiency

S
Sustitution

R
Redefinition

- Systemic approach
- Significant reduction in inputs
- Agrobiodiversity
- Social aspects

Food System Transformation

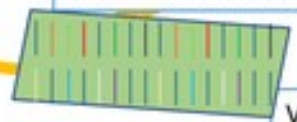
We need a boat to ferry us into ne food systems!

McRae (1995). J. Sust. Agr. 7, 81-87, adapté dans Bàrberi (2021).

2019

214 accessioni italiane di riso dall'IRRI

Moltiplicazione delle accessioni in un'azienda



Valutazione partecipativa

Costituzione di **3 miscele di riso**: a grana tonda, media e lunga A – **5 aziende agricole**

2020

Valutazione partecipativa delle miscele – moltiplicazione e adattamento

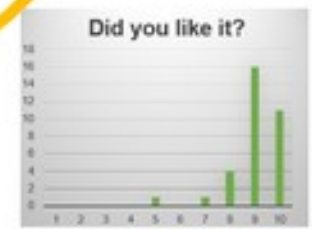
Test di resa alla lavorazione

2021

Panel test con gli agricoltori

2022

Panel test con la cittadinanza



Campioni per test nella cucina di casa

2023

1 Ha di risaia con popolazione evolutiva di riso a grana media

2024...

Popolazione evolutiva di riso disponibile sul mercato

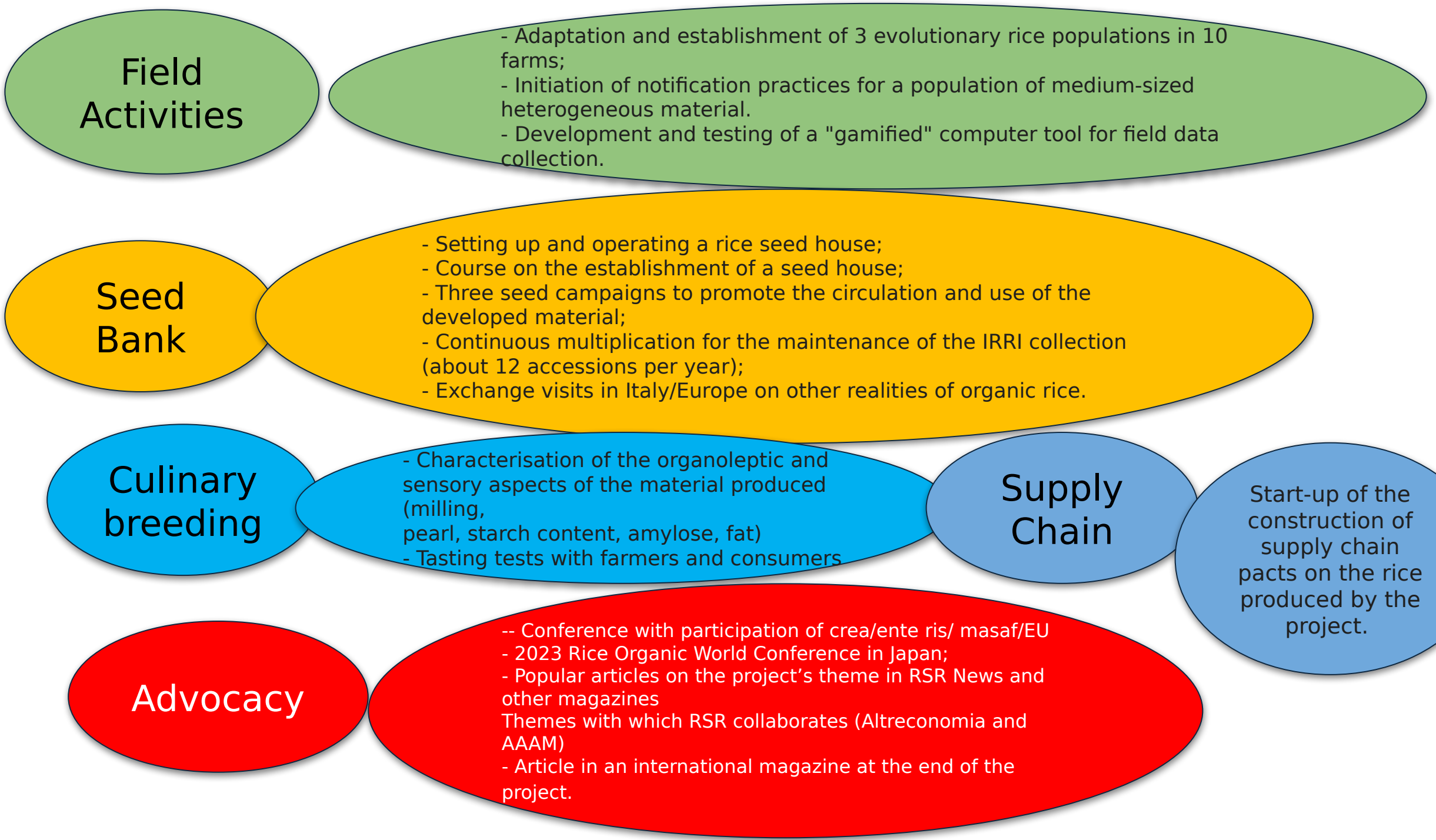
C'è vita
dove si usa
la differenza

From planning…..

To seeding…..

harvesting…..

and threshing.


Field Activities
- Adaptation and establishment of 3 evolutionary rice populations in 10 farms;
- Initiation of notification practices for a population of medium-sized heterogeneous material.
- Development and testing of a "gamified" computer tool for field data collection.
Seed Bank
- Setting up and operating a rice seed house;
- Course on the establishment of a seed house;
- Three seed campaigns to promote the circulation and use of the developed material;
- Continuous multiplication for the maintenance of the IRRI collection (about 12 accessions per year);
- Exchange visits in Italy/Europe on other realities of organic rice.
Culinary breeding
- Characterisation of the organoleptic and sensory aspects of the material produced (milling,
pearl, starch content, amylose, fat)
- Tasting tests with farmers and consumers
Supply Chain
Start-up of the construction of supply chain pacts on the rice produced by the project.
Advocacy
-- Conference with participation of crea/ente ris/ masaf/EU
- 2023 Rice Organic World Conference in Japan;
- Popular articles on the project’s theme in RSR News and other magazines
Themes with which RSR collaborates (Altreconomia and AAAM)
- Article in an international magazine at the end of the project.

RSR Riso Resiliente Project Results

Farm involved: 7 + Vercelli Province Organic Rice Farming District

Citizen Involeved: 95 panel test participants + 150 samples for home made test test

Production surface: 1 ha, still expanding

Paddy rice produced: 4t

White rice produced: 2,2t

White rice sold: 1,5 t (dec. 2023)

Seed used for self seeding: 400kg

Lombardy Region - Rural Development Programme 2014-2020 Operation 10.2.01 - Conservation of animal and plant biodiversity

Project: The European Commission
Multiplication, characterisation and conservation in Lombardia of rice quality seeds for organic farming (RISOLO)

Activities:
1) Morphological and genetic characterisation of resources, morphological description of accessions

2) Genetic characterization of the most interesting accessions, plant health of propagating material and its reproduction

3) In vitro and greenhouse germination tests, in situ conservation of genetic resources

4) Ex situ conservation of genetic resources of interest

5) Information, dissemination and reporting to facilitate the transfer of information to the agricultural world and the dissemination of knowledge

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Fig. Cultivation in pot of the 18 accessions in the Faculty of Agriculture.UNIMI sown on 26-5-23. Photo taken on 15 July.

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Tab.1. Cv proved in the trials			
Sample Code	Varieties	Origin	Code 2023
RSR05653	Agostano	IRGC3135	1
RSR06560	Agostano	IRGC116951	2
RSR06817	Agostano V640	IRGC65747	3
RSR05650	Agortano	IRGC3139	4
RSR05651	Agortano	IRGC8017	5
RSR03374	Bertone	IRGC3142	6
RSR03375	Bertone	Agricoltore	7
RSR06799B	Chinese originario	Agricoltore	8
RSR03379	Chinese ostiglia	Agricoltore	9
RSR06797B	Dellarole	Agricoltore	10
RSR03380	Dellarola	IRGC51527	11
RSR03386	Lencino	Agricoltore	12
RSR03387	Lencino	IRGC65713	13
RSR03486	Nero	IRGC61176	14
RSR04341	Novara	CREA	15
RSR03440	Novara	Agricoltore	16
RSR03388	Originario Lencino	IRGC822	17
RSR05669	Ranghino	CREA	18

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Incontro in campo presso *Società Agricola del Parco* da Marco Cuneo - Cascina Gambarina, Abbiategrasso (MI)

Link per partecipare via ZOOM >> https://us06web.zoom.us/j/82947537806

09.00 | **Registrazione Partecipanti /caffè di benvenuto**

09.30 | Il progetto **Riso.LO**: attività e obbiettivi (UNIMI)

10:00 | Le principali malattie del riso trasmissibili per seme e la gestione in agricoltura biologica (UNIMI)

11:00 | **Visita alle parcelle di moltiplicazione:** osservazioni fenotipiche e dei sintomi fitopatologici (RSR - Rete Semi Rurali)

12:00 | **Conclusioni e rifresco**

Per info
+39 335 782 0012

L'evento partecipa al programma di formazione professionale continua dei Dottori Agronomi e dei Dottori Forestali per 0.375 CFP con riferimento al Regolamento CONAF n. 162/2022.

Rete Semi Rurali | UNIVERSITÀ DI PAVIA Dipartimento di Scienze della Terra e dell'Ambiente | UNIVERSITÀ DEGLI STUDI DI MILANO | DiSAA | DESR

PSR 2014-2020 | Regione Lombardia

Fondo Europeo Agricolo per lo Sviluppo Rurale: l'Europa investe nelle zone rurali

Progetto finanziato dai fondi PR FESR 2021-2027 misura 10 Regione Lombardia

Production of scientific material and promotion

Organic World Congress 2021 | FRANCE

SEPTEMBER 6TH TO 10TH 2021 IN RENNES

AT THE COUVENT DES JACOBINS • RENNES MÉTROPOLE CONFERENCE CENTRE

www.owc.ifoam.bio

Rete Semi Rurali

Beyond the yield driven strategy – breeding for specific adaptation in organic rice in Italy

Introduction

Italy is the largest producer of rice in Europe. The production is based mainly on monocultures and intensive exploitation of land, together with a widespread use of chemical inputs and water. The implementation of a new rice breeding strategy, specifically targeted to the organic rice farming systems (**ORFS**), represents a necessary and urgent contribution to this transition.

Materials and Methods

In 2019 four organic and biodynamic rice farms hosted on-farm trials for the evaluation of 22 local rice varieties (released before 1960) set up in an incomplete randomized block design. Each farm adopted different field management (FM) practices. The following traits were assessed: panicle length, plant height, stem posture, tillering and susceptibility to *Fusarium* spp and *Pyricularia oryzae*. Evaluation involved more than 120 participants who scored each plot from 1 (worst) to 5 (best). The same methodology was repeated in 2020. Data were submitted to spatial analysis, ANOVA and GGE Biplot with GenStat v 21 and R software.

Results

Preliminary results indicate that most phenotypic traits show a significant 'farms x varieties x field management' interaction. The biplot in figure 3 shows the example of grain yield with a different set of top yielding varieties in two distinct groups of farms.

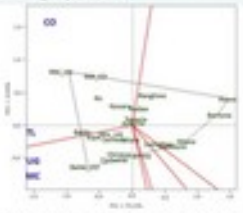


Figure 3. Biplot of grain yield (means of two years) of the 22 rice varieties in four farms (CO, TL, UG and MC).

A similar pattern was observed in the case of resistance to diseases (Fig. 4) with the most resistant varieties differing from farm to farm.

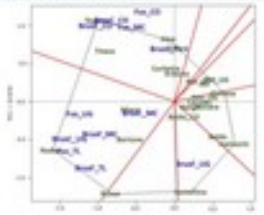


Figure 4. Biplot showing the most resistant varieties to each of three diseases in the four farms (Blast = *P. oryzae*; Fus = *Fusarium* spp). CO, TL, UG and MC are the four farms.

Conclusions The results support the hypothesis that organic and biodynamic farms are an heterogeneous population of target environments. Thus can only be effectively served by a decentralized participatory breeding program developing specifically adapted varieties.

Acknowledgements The authors acknowledge the farmers

Organic rice in Italy

Authors Giuseppe De SANTIS[1*], Daniela PONZINI[1], Bettina BUSSI[1], Rachele STENTELLA[1], Riccardo BOCCI[1], Riccardo FRANCIOLINI, Matteo PETITTI[1], Tommaso GAVIANO[1] Salvatore CECCARELLI[1] [1]Rete Semi Rurali, Italy

Objective

Italy is the largest producer of rice in Europe. The production is based mainly on monocultures and intensive exploitation of land, together with a widespread use of chemical inputs and water. The implementation of a new rice breeding strategy, specifically targeted to the **organic rice farming systems (ORFS)**, represents a necessary and urgent contribution to this transition. The poster describes a set of farmer-led innovations, ranging from agronomic practices for ORFS management to participatory breeding (PPB). The activities involved a multi-actor network in participatory selection of locally adapted varieties suitable to the agro-ecological practices of each farm hosting the field trials. The main objective of this research is to address the most urgent critical issues in ORFS such as water scarcity, soil salinization, climate-driven presence of novel aggressive weeds, the coexistence with many animals in wet habitat and the emission of greenhouse gases (GHG).

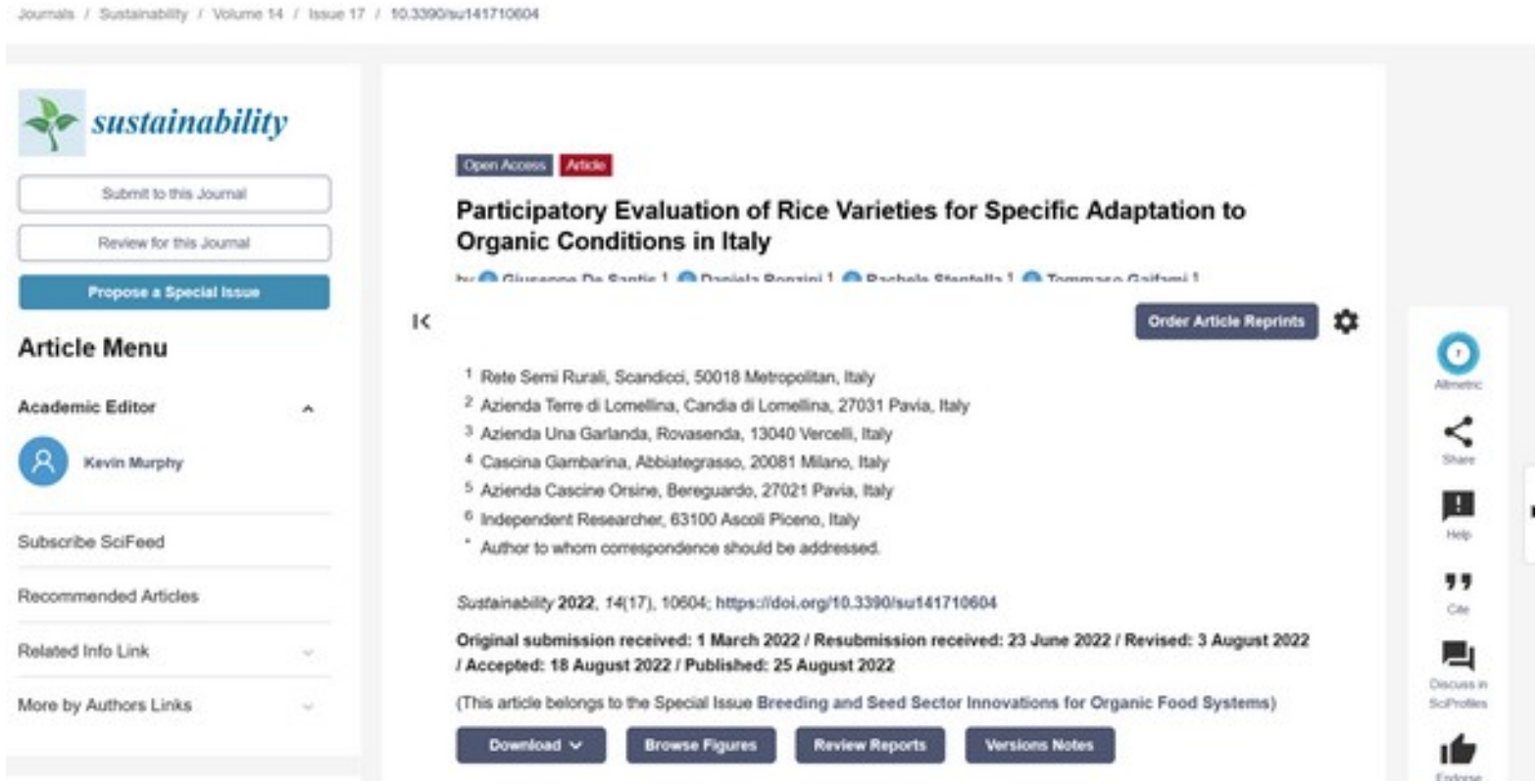
followed by dry conditions combined with different intensity of mechanical weeding (two or four comb harrow passages); iii) sowing over green mulch obtained from different cover crops, followed by flooding. The trial was repeated in 2019 and 2020, using a partially replicated design with plots size of 6 m², 16 unreplicated varieties and 6 varieties replicated 4 times. The resulting 40 plots were arranged in 4 rows and 10 columns. A number of phenotypic traits were collected ranging from ear height to plant height, stem posture, tillering and susceptibility to *Fusarium* spp and *Pyricularia oryzae*. **The participatory evaluation involved more than 120 farmers, technicians and researchers who scored each plot from 1 (worst) to 5 (best).** The data were submitted to spatial analysis, ANOVA and PCA (GGE Biplot) with GenStat v 20 and R software.

EUCARPIA *Breeding and Seed Sector Innovations for Organic Food Systems*
8 – 10 March, 2021

LIVESEED

RISO ITALIANO

Production of scientific material and promotion



Production of scientific material and promotion

Poster Session 15

Natural Biodiversity Promotion in Diversified Organic Rice Farming Systems in Northern Italy

Michele SALVAN[1,2*], Giuseppe DESANTIS[2], Matteo PETITTI[2], Daniela PONZINI[2], Rachele STENTELLA[2], Riccardo BOCCI[2], Irene PICCINI[1] and Simona BONELLI[1]

[1]Department of Life Sciences and Systems Biology, University of Turin, Turin, Italy
[2]Rete Semi Rurali, Scandicci, Italy
[3]Department of Zoology, Poznan University of Life Sciences, Poznan, Poland

Reconciling natural biodiversity conservation with agro-ecosystems is a current challenge for sustainable food systems.

Organic rice production is increasing in Italy, promoting biodiversity, both in terms of rice genetic resources and at ecosystem level. Rice fields can be considered as wetland areas substitutes, crucial as biodiversity hotspot, and thus representing natural or semi-natural habitats within intensively farmed districts. Their ecological role and value increases when combined with agro-ecological farming practices, including cultivar diversification through rice mixtures and dynamic populations.

To assess natural biodiversity in rice farming contexts, we developed a pool of entomological and botanical indicators, focusing on pollinators' ecosystems services, biodiversity stock and wetlands preservation. Insects can be targeted as environmental indicators, since they are relatively easy to monitor and provide an accurate picture of the health of the environment throughout the rice cultivation cycle.

Lepidoptera and Odonata Orders in particular were used as main natural biodiversity and ecosystem services proxy in rice farming systems. Species richness and individuals' abundance per species were correlated with environmentally-related variables, such as natural habitats proximity, water quality and farm management practices, both under organic and conventional conditions.

Rice fields' role as wetland areas substitutes has been studied and evaluated according to farming practices sustainability, within and around rice fields.

We argue, that entomological monitoring can be integrated in organic farming appraisal, to quantify crop and natural diversification. This data, correlated with biodiversity-friendly practices on a scalable field, farm or district/landscape level, could become a useful tool to weigh the measured benefits of biodiversity-friendly rice management practices and related ecosystem services, such as pollination, against the extra economic costs that these entail.

Agro-ecological rice farming system, paired with increased cultivated diversity – including rotations, rice cultivar diversification and rice mixtures – can improve food systems' resilience against abiotic and biotic stresses caused by climate change and enhance natural biodiversity and resilience at both farm and landscape scale.

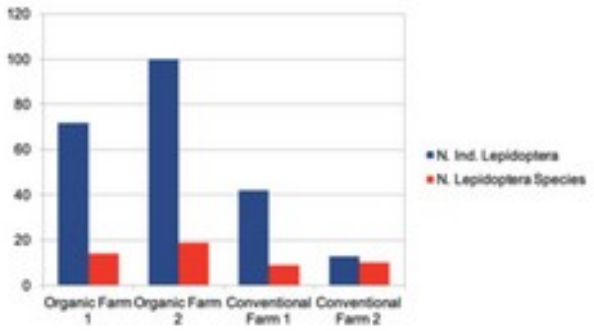


Fig. 1. Lepidoptera abundance and species richness in neighbouring organic and conventional farms. Organic farms contain decidedly more Lepidoptera's individuals compared to control conventional farms. Species richness however is more influenced by surrounding environmental context compared to Lepidoptera's Abundance.

Conclusions

Italian Rural context

Technical Support

Research&Innivation in Marginal Areas

National Organic Seed Plan

National Organic Research Plan

Materiale Eterogeneo Biologico (MEB)

New EU Seed Law

Milano/Adamello Seed Bank

Operative Offices

Lombardy Office

Organic Rice Seed System

Organic Rice Market

Research&Training

Internship

Organic Breeding School

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Thanks for your attention!