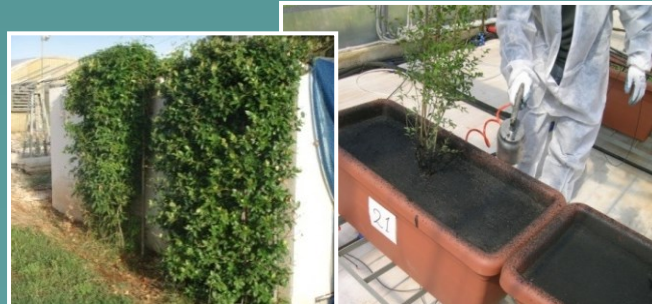


UNIBA: Department of Agricultural and Environmental Science
University of Bari "Aldo Moro"
via Amendola 165/A - 70126 Bari - Italy

Research group: Giuliano Vox, Evelia Schettini and Fabiana Convertino

UNIBA has a long tradition in teaching and scientific research in biosystems engineering:

- Greenhouse microclimate, materials, structures and equipment
- Biodegradable materials
- Livestock structures
- Plastic waste management
- Land use management
- Renewable energy sources and rationale use of energy
- Urban Agriculture



EU Projects

- EC RTD "Biodegradable plastics for environmentally friendly mulching and low tunnel cultivation - **BIOPLASTICS**" (2001-2005);
- EC LIFE Environment "Biodegradable coverages for sustainable agriculture - **BIO.CO.AGRI.**" (2003-2005);
- EC CRAFT "Development of protective structures covered with permeable materials for agricultural use - **AGRONETS**" (2003-2006);
- EC Collective Research "Labelling agricultural plastic waste for valorising the waste stream - **LABELAGRIWASTE**" (2006-2009);
- two Erasmus Thematic Networks (**USAE** and **ERABEE**) and two EU-US ATLANTIS projects (**POMSEBES** and **TABE.Net**);
- European Territorial Cooperation Programme Greece -Italy 2007-13 "Agricultural Waste valorisation for a competitive and sustainable Regional Development - **AWARD**" (2014-2016).

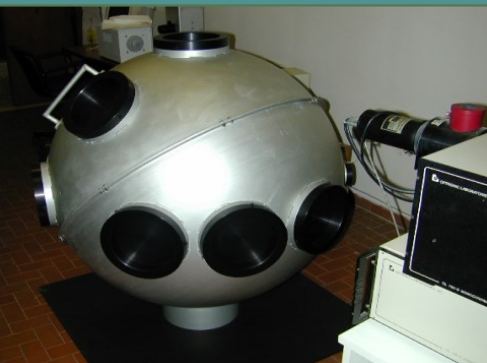
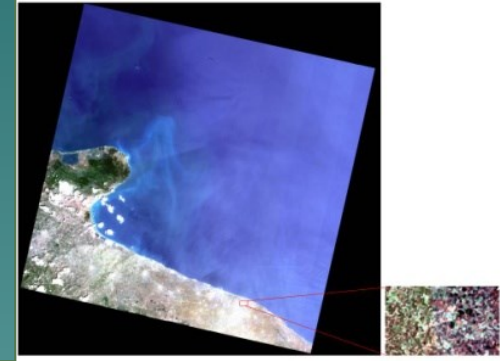
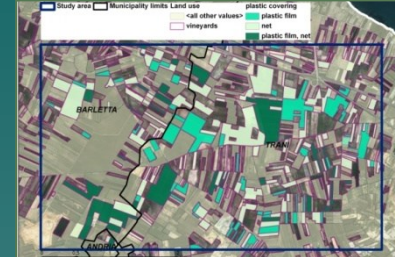
Experimental centre Valenzano (Bari, Italy)

latitude $41^{\circ} 01' N$
longitude $16^{\circ} 54' E$
altitude 124 m a.s.l.



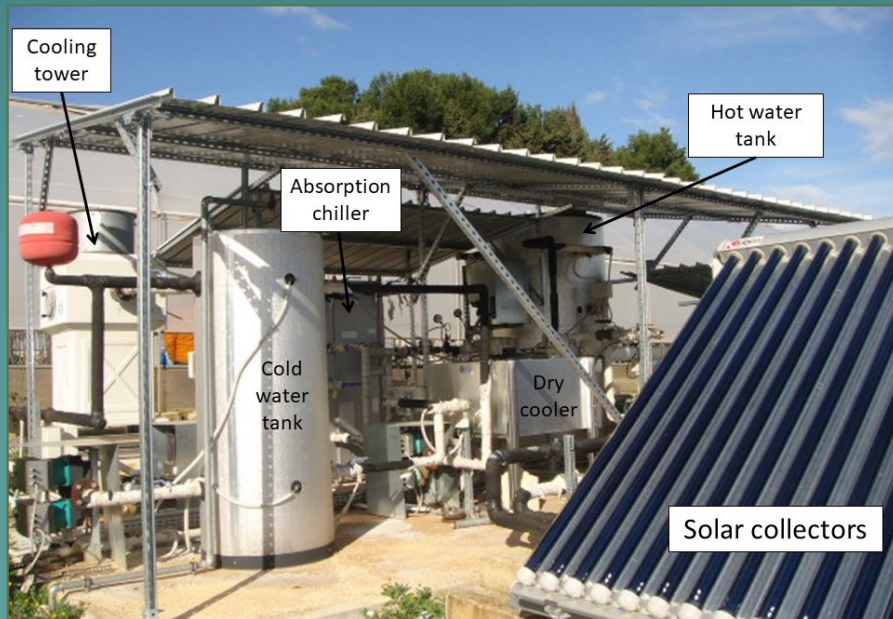
Main research activities on protected cultivation

- laboratory to evaluate radiometric properties of materials for greenhouses covering or for crop protection;
- photoluminescent and photoselective covering materials;
- biodegradable materials for agriculture, extruded or sprayed
- sustainable agricultural plastic waste management



- *Greenhouse climate control with the use of renewable energies*

RES pilot plant for greenhouse climate control: solar thermal collectors, PV modules, absorption chiller, geothermal heat pump, air to water heat pump, biomass boiler.





Available online at www.sciencedirect.com

ScienceDirect

Polymer Degradation and Stability 91 (2006) 3001–3008

Polymer
Degradation
and
Stability

www.elsevier.com/locate/jpolygub

Mechanical properties decay and morphological behaviour of biodegradable films for agricultural mulching in real scale experiment

Giacomo Scarascia-Mugnozza^a, Evelia Schettini^a, Giuliano Vox^a, Mario Malinconico^{b,c}, Barbara Immirzi^a, Stefania Pagliara^b

Resources, Conservation and Recycling 79 (2013) 9–19

Contents lists available at ScienceDirect

Resources, Conservation and Recycling

journal homepage: www.elsevier.com/locate/resconrec



Recycled wastes of tomato and hemp fibres for biodegradable pots: Physico-chemical characterization and field performance

Evelia Schettini^a, Gabriella Santagata^{b,c}, Mario Malinconico^b, Barbara Immirzi^b, Giacomo Scarascia Mugnozza^a, Giuliano Vox^a

^a Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy; ^b Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy; ^c Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy



Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/issn/15375110

Research Paper: SW – Soil and Water

Preparation, characterisation and field-testing of a biodegradable sodium alginate-based spray mulch

Barbara Immirzi^a, Gabriella Santagata^a, Giuliano Vox^a, Evelia Schettini^b

^a Institute of Agricultural and Environmental Science (DISAG), University of Bari, Italy; ^b Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

ARTICLE INFO
Article history:
Received 15 November 2014
Received in revised form 15 December 2014
Accepted 15 December 2014
Available online 15 December 2014

Biosystems Engineering (2004) 87(4), 479–487
doi:10.1016/j.biosystems.2004.01.008
SE – Structure and Environment

Available online at www.sciencedirect.com

ScienceDirect



Effects of Solar Radiation on the Radiometric Properties of Biodegradable Films for Agricultural Applications

G. Scarascia-Mugnozza^a, E. Schettini^a, G. Vox^a

Science of the Total Environment 645 (2018) 1221–1229

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scotenv



Effect of hydrolyzed protein-based mulching coatings on the soil properties and productivity in a tunnel greenhouse crop system

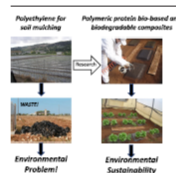
Luciana Sartore^a, Evelia Schettini^{b,c}, Laura de Palma^a, Gennaro Brunetti^d, Claudio Cocozza^d, Giuliano Vox^b

^a Department of Mechanical and Industrial Engineering, University of Brescia, via Valotti 9, 25123 Brescia, Italy; ^b Department of Agricultural and Environmental Science (DISAG), University of Bari, via Amendola 173/A, 70126 Bari, Italy; ^c Department of Agricultural and Environmental Science (DISAG), University of Bari, via Amendola 173/A, 70126 Bari, Italy; ^d Dipartimento di Scienze del Suolo, delle Piante e degli Alimenti – DISSPA, University of Bari, via Amendola 173/A, 70126 Bari, Italy

HIGHLIGHTS

- New biodegradable products from residues of leather industry and natural fillers from renewable resources were manufactured.
- Biodegradable mulching coatings by means of spray technique were made.
- Agronomic performances of biodegradable coatings are comparable to those of LDPE films.

GRAPHICAL ABSTRACT



Solar Cooling: A renewable energy solution

by Giovanni Puglisi^a, Giuliano Vox^a, Angeliki Kavga^{***}, Fabiana Convertino^a, Ileana Blanco^{****} and Evelia Schettini^a

In: Sustainable Agriculture ...
Editors: A. Salazar, I. Rios, pp. 1–79

ISBN: 978-1-60876-269-9
©2010 Nova Science Publishers, Inc.

Chapter 1

SUSTAINABLE GREENHOUSE SYSTEMS

Giuliano Vox^{a,1}, Meir Teller², Alberto Pardossi³, Andrea Minuto⁴, Federico Tinivella⁴ and Evelia Schettini¹

¹ University of Bari, Bari, Italy



Available online at www.sciencedirect.com

ScienceDirect

Agriculture and Agricultural Science Procedia 8 (2016) 583–591

Agriculture and Agricultural Science
Procedia

Florence "Sustainability of Well-Being International Forum", 2015: Food for Sustainability and not just food, FlorenceSWIF2015

Mapping of agriculture plastic waste

Giuliano Vox^a, Rosa Viviana Loisi^a, Ileana Blanco^a, Giacomo Scarascia Mugnozza^a, Evelia Schettini^a

Mapping greenhouse plastic wastes in the west region of Portugal

M. Nanna^a, M.T. Batista^a, F.J. Baptista^a, E. Schettini^a and G. Vox^a



Computers and Electronics in Agriculture 141 (2017) 35–40

Contents lists available at ScienceDirect

Computers and Electronics in Agriculture

journal homepage: www.elsevier.com/locate/compag



Agricultural plastic waste spatial estimation by Landsat 8 satellite images

Antonio Lanotte^a, Fortunato De Santis^a, Gabriele Nolè^a, Ileana Blanco^a, Rosa Viviana Loisi^b, Evelia Schettini^b, Giuliano Vox^a

^a DISAG, University of Bari, Italy; ^b DISAG, University of Bari, Italy

Resources, Conservation and Recycling 117 (2018) 228–242

Contents lists available at ScienceDirect

Resources, Conservation and Recycling

journal homepage: www.elsevier.com/locate/resconrec



Full length article

Agricultural plastic waste mapping using GIS. A case study in Italy

Ileana Blanco, Rosa Viviana Loisi, Carmela Sica, Evelia Schettini^a, Giuliano Vox^a

^a University of Bari – Department of Agricultural and Environmental Science (DISAG), via Amendola 173/A, 70126 Bari, Italy

ARTICLE INFO

Keywords:

Land use management

Agricultural plastic waste

Water management

Plastic waste and water

Water disposal

ABSTRACT

Plastic materials used in agriculture mostly derive from synthetic petro-chemical polymers. They require at the end of their lifetime a suitable waste management system for the collection and treatment. A research was carried out in order to define a GIS methodology for mapping the agricultural plastic waste on the land. The use of geospatial data in the Apulia Region – was investigated by applying orthorectified analysis and remote sensing survey. Besides purposeful Plastic Waste Indicators were created to measure land use to waste generation. The data were georeferenced in a specific geo-database. The analysis showed that the agricultural plastic waste was mostly produced from covering films was 427 kg ha⁻¹, from the anti-hail nets was 159 kg ha⁻¹, from nets for crop protection was 192 kg ha⁻¹, from shading nets was 131 kg ha⁻¹, from irrigation pipes was 104 kg ha⁻¹. Through GIS the area with high density of plastic waste were mapped out and the

Engineering Sustainability

Evaluation of wall surface temperatures in green façades

Vox, Scarascia-Mugnozza et al.

ice | proceedings

Proceedings of the Institution of Civil Engineers

Engineering Sustainability

Volume 160, Part 1, 2017

Issue 1, 2017

Keywords: Building, Urban, Energy, Sustainability, Green, Façade

©2017 Publishing as permitted by the copyright holder

ice
Institution of Civil Engineers
publishing

Evaluation of wall surface temperatures in green façades

Giuliano Vox^a, Ileana Blanco^a, Evelia Schettini^a

^a Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^b Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^c Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^d Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^e Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^f Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^g Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^h Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

ⁱ Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^j Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^k Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^l Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^m Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

ⁿ Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^o Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^p Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^q Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^r Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^s Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^t Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^u Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^v Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^w Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^x Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^y Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^z Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{aa} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ab} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ac} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ad} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ae} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{af} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ag} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ah} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ai} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{aj} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ak} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{al} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{am} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{an} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ao} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ap} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{aq} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ar} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{as} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{at} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{au} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{av} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{aw} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ax} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ay} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{az} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ba} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bb} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bc} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bd} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{be} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bf} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bg} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bh} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bi} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bj} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bk} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bl} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bm} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bn} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bo} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bp} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bq} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{br} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bs} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bt} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bu} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bv} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bw} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bx} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{by} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{bz} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ca} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cb} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cc} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cd} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ce} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cf} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cg} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ch} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ci} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cj} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ck} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cl} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cm} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cn} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{co} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cp} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cq} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cr} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cs} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{ct} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cu} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cv} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cw} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cx} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cy} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

^{cz} Department of Agricultural and Environmental Science (DISAG), University of Bari, Italy

UNIBA will participate in almost all WPs.

One of the four greenhouses that are part of the education and student training process is ours.

WP1: ST 1.1 Current cultivation techniques and practices

UNIBA prepares the review on Covering materials, Heating, Waste management

ST 2.1 Review of previous Training Needs Analysis

WP2: UNIBA contributes with its expertise on intelligent greenhouse technologies

WP3 (coordinated by UNIBA): UNIBA assists in developing the training material.

The experimental greenhouses will be made available for the project activities.

UNIBA coordinates WP, manages the meetings, collects the inputs, complies the relevant reports and proposals.

WP4: UNIBA provides trainers and organizes the final training session

WP5: UNIBA contributes with the actual implementation of the 4ple helix practices by ensuring that all stakeholders participate in the training session and all of them are kept abreast for the project in Italy.

UNIBA coordinates the establishment of an RCC in Italy along with IFOA & CNFAGR.

WP7: UNIBA participates in internal evaluation.

WP8: UNIBA participates by incorporating the material in the related curricula and by promoting the training to its network of relevant university departments.

WP9: UNIBA assists the management by participating in the steering committee and exercising management activities.