ECPA
BOLOGNA 2023

14th European Conference on Precision Agriculture

Bologna - Italy, 2-6 July 2023

Congress Center - Hotel Savoia Regency

UNLEASHING THE POTENTIAL OF PRECISION AGRICULTURE

PROGRAM

Avenue media®
Conference & Expo

14TH EUROPEAN CONFERENCE ON PRECISION AGRICULTURE

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SUNDAY 2 JULY 2023

17.00 – 18.00	Participants' Registration
18.00 – 19.30	Welcome Cocktail

MONDAY 3 JULY 2023

ROOM 1

09.00 -11.00	**PLENARY SESSION**
09.00	CONVENERS OPENING & PRESENTATION OF THE CONFERENCE
09.30	WELCOME ADDRESS
10.10 – 10.55	**GENERAL PERSPECTIVES**
10.10	*What is the adoption of Precision Agriculture over Europe? A case study on remote sensing* T. Pavlenko (Geisenheim, Germany)
10.25	*A monitoring system to track adoption of digital technologies in agriculture over time* A. Gabriel (Freising, Germany)
10.40	*Precision Agriculture: Addressing Adoption Gaps with Open-Source System Design* M. L. Everett (Post Falls, United States)
11.00	COFFEE BREAK
11.30 – 15.00	**AUTONOMOUS VEHICLES**
11.30	*Drivers for robot use in field crop farming: farmers' perspectives from four case areas in Europe* T. W. Tamirat (Copenhagen, Denamrk.)
11.45	*Economics of autonomous machines for regenerative agriculture* A. Al Amin (Newport, United Kingdom)
12.00	*Optimal use of an agricultural robot in an arable crop rotation: a case study in the Netherlands* J. E. Ørum (Copenhagen, Denamrk.)

ROOM 1

12.15	*Strawberry flower and fruit detection based on an autonomous imaging robot and deep learning* W. S. Lee (Gainesville, Unites States)
12.30	*Follow the leader: A trajectory generator and controller for precision tree scanning* C. Grimm (Corvallis, United States)
12.45	*Collaborative Smart-Robot for Yield Mapping and Harvesting Assistance* M. N. Conejero (Madrid, Spain)
13.00	LUNCH
14.30	*Enhancing navigation benchmarking and perception data generation for row-based crops in simulation* M. Martini (Torino, Italy)
14.45	*Fields2Cover open-source library: A modular approach to agricultural coverage path planning* G. Mier (Wageningen, Netherlands)
15.00 – 16.00	EDUCATION AND TRAINING
15.00	*How to design relevant PA training courses for technical advisors* L. Pichon (Montpellier, France)
15.15	*Towards a digital twin for optimal field management* M. Pastell (Helsinki, Finland
15.30	*Gamification for communicating the advantages of precision farming: The Farming Simulator case* D. S. Paraforos (Geisenheim, Germany)
15.45	*How to teach precision agriculture through reverse engineering pedagogy?* B. Ploteau (Montpellier, France)
16.00 – 16.30	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00 – 18.00	POSTERS
18.00 – 19.00	GROUP & SOCIETY MEETINGS

MONDAY 3 JULY 2023

ROOM 2

09.00 -11.00	PLENARY SESSION – (see schedule from ROOM 1)
11.00	COFFEE BREAK
11.30 – 13.00	SURFACE CHARACTERISATION
11.30	*Crop recognition at orchard level in Mediterranean conditions using time series of spectral indexes* H. Izquierdo (Valencia, Spain)
11.45	*Impact of changing attributes on the management zones for integrated crop-livestock system* H. Oldoni (Campinas, Brasil)
12.00	*Technological approach to evaluate the livestock trampling effect on soil compaction* J. M. Serrano (Evora, Portugal)
12.15	*Long-term evaluation of the Grassmaster II probe used to estimate productivity of dryland pastures* J. R. Marques da Silva (Evora, Portugal)
12.30	*Quantifying real-time opening disk load to assess compaction and potential for planter control* A. Sharda (Manhattan, United States)
12.45	*Forecasting tree crop yield with limited data - a macadamia case study* J. Brinkhoff (Armidale, Australia)
13.00	LUNCH
14.30	*Spatio-temporal clustering analysis of soil moisture and vegetation indices for zone delineation* B. V. Ortiz (Auburn, United States)
14.45	*Can the spatial structure of soil health indicators aid in Soil Health assessment?* E. M. Pena-Yewtukhiw (Morgantown, United States)
15.00	*A Novel Approach of Map-Sensor-based Site-specific Nitrogen Fertilization in Winter Wheat* M. A. Munnaf (Ghent, Belgium)
15.15	*Unleashing precision agriculture data for improve soil carbon accounting* T. Bishop (Sydney, Australia)
15.30	*Farmer-led on-farm experimentation enhanced with digital agronomy* L. Longchamps (Ithaca, United States)

ROOM 2

15.45	POSTER PRESENTATION
16.15	COFFEE BREAK
16.45– 17.45	POSTERS
18.00 – 19.00	GROUP & SOCIETY MEETINGS

ROOM 3

09.00 -11.00	PLENARY SESSION – (see schedule from ROOM 1)
11.00	COFFEE BREAK
11.30 - 13.00	GENERAL METHODOLOGY

11.30	*Limits of Grain Yield Monitor Data to Evaluate Treatment Differences within On-farm Experimentation* J. P. Fulton (Columbus, United States)
11.45	*Introducing Bayesian priors to semi-variogram parameter estimation using fewer observations* Y. L. Zhang (Montpellier, France)
12.00	*A Bayesian Network approach for grain protein content prediction of winter wheat* M. Karampoiki (Stuttgart, German)
12.15	*A novel approach for field sampling optimization incorporating a generic operational cost constraint* M. Dumont (Montpellier, France)
12.30	*Changing How Agronomic Trials are Conducted: Modulated On Farm Response Surface Experiments (MORSE)* S. J. Shirtliffe (Saskatoon, Canada)
12.45	*Proximal and remote sensing to define different management zone and site-specif of durum wheat crops* E. Romano (Treviglio, Italy)
13.00	LUNCH

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MONDAY 3 JULY 2023

ROOM 3

14.30 – 16.00	SPATIAL METHODOLOGIES
14.30	*A new metric to evaluate spatialized crop model performances* D. Pasquel (Montpellier, France)
14.45	*Comparative Study of Interpolation Methods for Low-Density Sampling* F. Hoffmann Silva Karp (Ste-Anne-de-Bellevue, Canada)
15.00	*A statistical test to evaluate the relevance of auxiliary time-series to predict another time series* B. Oger (Montpellier, France)
15.15	*How to best compare remote sensing data versus proximal sensing data* Y. Valloo (Montpellier, France)
15.30	*A scalable approach to nowcasting soil water at the within-field scale* N. S. Wimalathunge (Sydney, Australia)
15.45	*Multitemporal validation of remote and proximal sensing for vineyard management zone identification* A. Deidda (Nuoro, Italy)
16.00 – 16.30	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS

TUESDAY 4 JULY 2023

ROOM 1

09.00 – 12.30	WEED & PEST MANAGEMENT

09.00 — *Trends and beliefs of precision farming technologies to reduce pesticide use and risks*
S. Fountas (Athens, Greece)

09.20 — *How can Precision Agriculture contribute to the 50 % pesticide reduction of Farm-to-Fork strategy?*
A. Escolà (Lleida, Spain)

09.35 — *Plant health assessment with thermal and multi-spectral UAV imagery in winter rye crops*
M. Schirrmann (Postdam, Germay)

09.50 — *Sugar beet disease detection based on remote sensing data and artificial intelligence*
Y. Lebrini (Beauvais, France)

10.05 — *Potato plant disease classification by using deep learning and sparse sensing*
A. Vončina (Ljubljana, Slovenija)

10.20 — *Detection of Fusarium oxysporum by hyperspectral imaging in strawberry plants*
M. Perez-Ruiz (Seville, Spain)

11.00 — COFFEE BREAK

11.30 — *Almond orchards pest management using remote sensing for targeted pest control and sanitation*
A. Chen (Shmona, Israel)

11.45 — *Establishment of a UAV-based phenotyping method for European Pear Rust in fruit orchards*
S. Reim (Dresden, Germany)

12.00 — *Comparing satellite and high-resolution imagery for freeze damage detection in California vineyard*
B. Sams (Modesto, United States)

12.15 — *Evaluation of the competition between barley and different weed species from RGB images*
C. Gée (Dijon, France)

13.00 — LUNCH

TUESDAY 4 JULY 2023

ROOM 1

14.30 – 16.00	PESTICIDE SPRAYING
14.30	*Second-generation ultrasonic sensor in precision spraying: testing and actuation range refinement* A. Pagliai (Firenze, Italy)
14.45	*Studying the pneumatic system of an air-assisted sprayer for adjusting pesticide dose variations* A. Vigo-Morancho (Zaragoza, Spain)
15.00	*Efficient and safe spraying applications with UAVs in viticulture: The experimental field DIWAKOPTER* B. Poss (Geisenheim, Germany)
15.15	*Effects of canopy density-based airblast fan airflow adjustment on vines spray deposit* M. Grella (Torino, Italy)
15.30	*Comparison between 60° and 30° hollow cone nozzles for targeted UAV-spray applications in vineyards* A. Biglia (Torino, Italy)
15.45	*Adapting a conventional sprayer for real-time volume adjustment in vineyards* M. Gatti (Milano, Italy)
16.00	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS
18.00 – 19.00	GROUP & SOCIETY MEETINGS
19.30	GALA DINNER Hotel Savoia

TUESDAY 4 JULY 2023

ROOM 2

09.00 – 11.00	**NUTRIENTS MANAGEMENT**
09.00	*Determining Site-Specific Corn Nitrogen Rate and Timing using APSIM Model* L. Thompson (Falls City, United States)
09.15	*Evaluation of crop model-based MNR maximizing N application rates on site-specific level in maize* E. Memic (Stuttgart, Germany)
09.30	*Variable rate nitrogen in a potato-wheat-wheat cropping system* E. A. Flint (Logan, United States)
09.45	*Implementation of variable rate of inputs in winter crops under rainfed conditions* M. Videgain (Zaragoza, Spain)
10.00	*Variable-rate fertiliser application to manage spatial variability in hilly vineyard of Prosecco PDO* M. Sozzi (Padova, Italy)
10.15	*Impact of public policy strategies on the adoption of precision agriculture: the case of the Greek potato agricultural system* G. V. Vlontzos (Volos, Greece)
11.00	COFFEE BREAK
11.30 – 16.00	**FIELD CROP CHARACTERISATION & MONITORING**
11.30	*Vegetation indices from Sentinel-2 and PlanetScope images and their relationship with soybean yield* L. R. Amaral (Campinas, Brazil)
11.45	*Assessing the effectiveness of UAV-based multispectral imaging for detecting high-yielding varieties* M. P. Camenzind (Freising, Germany)
12.00	*After harvest yield mapping of winter wheat using data from satellites and combines* O. Alshihabi (Skara, Sweden)
12.15	*How accurate is straw cereal plant density estimation from spectral measurements at early stages* T. Yang (Avignon, France)
12.30	*Yield prediction in winter wheat using machine learning; improving implemented farm management tool* M. K. Langgaard (Aarhus, Danmeark)

TUESDAY 4 JULY 2023

ROOM 2

12.45	*Assessing within-field soybean yield variability using textures over Sentinel images* R. G. Freitas (Campinas, Brazil)
13.00	LUNCH
14.30	*Dynamic tracking of wheat senescence based on UAV multispectral imaging and leaf spectroscopy* X. Song (Freising, Germany)
14.45	*Using digital soil mapping tools to assess the soil spatial variability impact on irrigated cotton* L. N. Lacerda (Athens, United States)
15.00	*UAV remote sensing of agronomic parameters and yield in chickpea and lentil* D. Marusig (Trieste, Italy)
15.15	*Per-parcel high-resolution mapping of critical crop-growth parameters with proximal & remote sensing* Z. Kandylakis (Athens, Greece)
15.30	*A generalised approach to downscale areal-averaged yield data: a use-case in cotton quality* M. Tilse (Sydney, Australia)
15.45	*Pasture quality monitoring based on proximal and remote sensors: case study in the Montado ecosystem* J. Serrano (Evora, Portugal)
16.00	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS
18.00 – 19.00	GROUP & SOCIETY MEETINGS
19.30	*Gala Dinner* *At Hotel Savoia Regency*

TUESDAY 4 JULY 2023

ROOM 3

09.00 – 16.00	MACHINE LEARNING

09.00 — *Integrating neural networks, clustering analysis, and remote sensing for peanut maturity prediction*

09.15 — *A novel machine learning approach to map 3D soil constraint variability*
P. Filippi (Denham Court, Australia)

09.30 — *Early prediction of durum wheat yield in Italy using a machine learning modelling framework*
M. Fiorentini (Falconara Marittima, Italy)

09.45 — *Use of unsupervised algorithms and auxiliary information to improve potato yield estimation*
A. Uribeetxebarria (Derio, Spain)

10.00 — *Automatic diagnosis of a multi-symptom grapevine disease by decision trees and graph neural network*
A. Tardif (Pons, France)

10.15 — *Grape counting in RGB videos – comparing two instance segmentation models*
M. Ariza-Sentís (Wageningen, Netherlands)

11.00 — COFFEE BREAK

11.30 — *Generalization of deep learning models to the semantic segmentation of natural images in vineyards*
R. Marani (Bari, Italy)

11.45 — *Data augmentation techniques for grape bunch segmentation in natural images*
R. Escobedo (Logrono, Spain)

12.00 — *Cassava Detection under Real Field Conditions using YOLOv5*
E. C. Nnadozie (Freising, Germay)

12.15 — *Quantifying Wheat Spikes through Smartphone Camera and YOLOv5 under open field conditions*
F. Marinello (Padova, Italy)

12.30 — *Apple fruit sizing through low-cost depth camera and neural network application*
G. Bortolotti (Bologna, Italy)

TUESDAY 4 JULY 2023

ROOM 3

12.45	Improving the Generalization Ability of Random Forest for Potato Chlorophyll Estimation Y. Haibo (Freising, Germany)
13.30	LUNCH
14.30	*Novel chestnut tree crowns segmentation method by UAV oblique photogrammetry* L. Comba (Torino, Italy)
14.45	*SiaPy – user friendly software for hyperspectral image segmentation of hyperspectral images* J. Lapajne (Ljubljana, Slovenija)
15.00	*Weed25: a weed database for machine learning* P. Wang (Chongqing, China)
15.15	*Wheat weeds recognition using AI architecture, an open plant phenotype database and field conditions* R. Dainelli (Firenze, Italy)
15.30	*Real-time Detection and Counting of Weeds in Winter Wheat Using YOLOv4 with Attention Module from UA* P. Alirezazadeh (Postdam, Germany)
15.45	*Detecting and localizing mushroom clusters by a Mask R-CNN model in farm environment* C. Charisis (Athens, Greece)
16.00	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS
18.00 – 19.00	GROUP & SOCIETY MEETINGS
19.30	GALA DINNER Hotel Savoia

WEDNESDAY 5 JULY 2023

ROOM 1

09.00- 09.30	INVITED SPEAKERS
09.30 – 13.00	WATER MANAGEMENT

09.30   *Stay-green monitoring for maize drought tolerance under field environments using hyperspectral data*
H. El Sharawy (Freising, Germany)

09.45   *Estimating Crop evapotranspiration for small plots via data fusion of spectral and SAR data*
T. Shilo (Gvat, Israel)

10.00   *On-Farm Evaluation of Variable Rate Irrigation for Winter Wheat in Semi-arid Western U.S.A.*
N. C. Hansen (Provo, United States)

10.15   *Defining Temporally Variable Urban Turfgrass Irrigation Zones with Thermal IR or ECa data*
R. Kerry (Provo, United States)

10.30   *Monitoring chickpea physiological traits by Sentinel-2 imagery to support irrigation management*
O. Perach (Tel Aviv, Israel)

10.45   *Assessment of indices calculated from remote and proximal sensing to discriminate irrigation levels*
A. Matese (Firenze, Italy)

11.00   COFFEE BREAK

11.30   *Grape yield prediction based on vine canopy morphology obtained by 3D point clouds from UAV images*
A. Šupčík (Bratislava, Slovakia)

11.45   *A new Leafiness-LiDAR index to estimate light interception in intensive olive orchards*
L. Sandonís-Pozo (Lleida, Spain)

12.00   *Using a vegetation index to define homogeneous zones for variable rate irrigation in vineyard*
M. Bolognini (Milano, Italy)

12.15   *Precision monitoring of vine water stress using UAVs and open-source processing chains*
V. Burchard-Levine (Madrid, Spain)

WEDNESDAY 5 JULY 2023

ROOM 1

12.30	*Grapevine water status in a variably irrigated vineyard with NIR hysperspectral imaging from UAV* L. Brillante (Fresno, United States)
12.45	*Water status estimation using thermal imagery at different scales in the vineyard* I. Bahat (Luzit, Israel)
13.00 - 14.00	LUNCH BOX
14.00 – 18.00	**FIELD VISIT**

ROOM 2

09.00 – 11.00	WOODY CROP CHARACTERIS
09.00	*An online fruit counting application in apple orchards* D. Mengoli (Bologna, Italy)
09.15	*UAV photogrammetry vs mobile terrestrial laser scanning for woody crops characterization* J. Torres-Sánchez (Cordoba, Spain)
09.30	*Automatic estimation of trunk cross sectional area using deep learning* C. Grimm (Corvallis, United States)
09.45	*Delimiting VRI management zones in an olive grove under complex soil and terrain variability* Vanderlinden, K. (Cordoba, Spain)
10.00	*Evaluating the application of multispectral proximal sensing on Ground Vehicle in an olive orchard* C. Perna (Firenze, Italy)
10.15	*PRECISIONPOP: a multi-scale integrated system for poplar plantation monitoring* M. Brambilla (Treviglio, Milano)
11.00	COFFEE BREAK
11.30 -13.00	CROP MODELS
11.30	*Does sensor choice matter for assessment of vineyard spatial variability?* S. F. Di Gennaro (Firenze, Italy)

WEDNESDAY 5 JULY 2023

ROOM 2

11.45	*Predicting grapevine harvest yield variables: application of a multivariate multiblock modelling* A. Cheraiet (Montpellier, France)
12.00	*Mapping grape yield with low cost vehicle tracking devices* J. P. Gras (Montpellier, France)
12.15	*Investigating factors influencing within-vineyard variability under different pedological contexts* F. Graziosi (Bologna, Italy)
12.30	*Redesigning spatial On-Farm Precision Experiments for innovative vineyard crop protection* O. Naud (Montpellier, France)
13.00 - 14.00	LUNCH BOX

14.00 – 18.00   **FIELD VISIT**

ROOM 3

09.00 – 13.00   RS SENSING

09.00	*Field-scale winter wheat growth monitoring and yield forecasting using SAR and optical data fusion.* B. Buszke (Gdansk, Poland)
09.15	*Sensing management from space: predicting harvest dates* S. Y. Han (Sydney, Australia)
09.30	*Evaluating the spectral response of cotton and corn to different cover crops using UAV imagery* J.M.P. Czarnecki (Mississippi State, United States)
09.45	*Estimation of agronomic soil properties from multitemporal PRISMA satellite imaging spectroscopy* R. Casa (Viterbo, Italy)
10.00	*Hyperspectral sensing and mapping of soil fertility for amending within-field heterogeneity* Y. Inoue (Tokio, Japan)

WEDNESDAY 5 JULY 2023

ROOM 3

10.15	*Visible-Near Infrared Diffuse Reflectance Spectra for Predicting Soil Nitrogen Mineralization Rate* F. Y. Ruma (Ghent, Belgium)
11.00	COFFEE BREAK
11.30	*Using cover crops as reflectors of the spatial variation in soil nutrient availability* S. I. Futerman (Kiryat Tivon, Israel)
11.45	*Target-N: Sentinel-2 based nitrogen optimisation in Swedish winter wheat production* K. Persson (Skara, Sweden)
12.00	*Satellite-based analysis of biomass yields in heterogeneous fields* L. Hagn (Freising, Germany)
12.15	*Modeling the canopy reflectance to forecast tomato biomass for the precise nitrogen management* V. A. Cerasola (Bologna, Italy)
12.30	*Potential of the dark green color index for dynamic monitoring of N requirements in wheat crop* A. S. Voisin (Diijon)
12.45	*Practical methods for aerial image acquisition and reflectance conversion using consumer cameras* C. Yang (College Station, United States)
13.00 - 14.00	LUNCH BOX
14.00 – 18.00	**FIELD VISIT**

THURSDAY 6 JULY 2023

ROOM 1

09.00 – 10.00	**WATER MANAGEMENT**
09.00	*Testing Irrigation Management Based on an Unoccupied Aerial Vehicle and an Artificial Neural Network* O. Rozenstein (Rishon LeZion, Israel)
09.15	*Smart irrigation system for precision irrigation in yellow fleshed kiwifruit* E. Baldi (Bologna, Italy)
09.30	*An optical trapezoid model for actual evapotranspiration based on SWIR portion of the spectrum* A. Mokhtari (Freising, Germany)
09.45	*Smart Irrigation Approach to Stimulate Agro-Forestation of Native Trees in Dry Mediterranean Ecosyst* I. Litaor (Kiryat Shmona, Israel)
11.00	COFFEE BREAK
11.30 – 13.00	**PLENARY SESSION**
11.30	Invited Speakers
12.00	Awards & Conclusion Org. Committee

ROOM 2

09.00 – 10.15	**CROP MODELS**
09.00	*Combining crop growth modeling, active sensing and machine learning for precision N management* Y. Miao
09.15	*Integration of mechanistic model outputs as inputs into data-driven models for yield prediction* D. Al-Shammari (Sydney, Australia)
09.30	*Synthetic data for site-specific crop response model using WOFOST and geostatistical simulation* T. Tanaka (Gifu, Japan)
09.45	*Predicting plant-level cabbage yield using the assimilation of UAV-derived LAI into WOFOST* Y. Yokoyama (Gifu, Japan)

THURSDAY 6 JULY 2023

ROOM 2

10.00	*Evaluation of the PROMET model in on-farm research at the "Experimental Field BeSt-SH"* B. Brandenburg (Kiel, Germany)
10.15	COFFEE BREAK
11.30 – 13.00	PLENARY SESSION – *(see schedule from ROOM 1)*

ROOM 3

09.00 – 10.45	PROBES
09.00	*Evaluation of portable tools for fast field assessment of winter wheat grain quality* B. Morandin Figueiredo (Skara, Sweden)
09.15	*Instrumentation for On-the-Spot Measurement of Soil Health Indicators* V. Adamchuk (Sainte-Anne-de-Bellevue, Canada)
09.30	*Low-Cost Spectrometers for Soil Properties Analysis* A. Zeggada (Torcegno, Italy)
09.45	*Evaluation of the Soil Quality of Chilean Orchards using SoilOptix Technology* R. A. Ortega (Santiago, Chile)
10.00	*Assessment of new non-invasive roving techniques for mapping soil spatial variabilities* S. Gianessi (Cesena, Italy)
10.15	*Parameters to increase LiDAR mounted UAV efficiency on agricultural field elevation measurements* L. Bernabe Santos (Baton Rouge, United States)
10.30	*A Low cost sensor to improve surface irrigation management* S. Moinard (Montpellier, France)
11.00	COFFEE BREAK
11.30 – 13.00	PLENARY SESSION – *(see schedule from ROOM 1)*