



## Curriculum Vitae

### Personal Information

Name / Surname	Luigi Manfrini
Address	11, Via Faenza, 40139, Bologna
Phone	+393474643264
E-mail	luigi.manfrini@unibo.it
Citizenship	Italian
Marital status	Married with 2 children
Date of Birth	2 <sup>nd</sup> September 1979
Fiscal Code	MNFLGU79P02H294Y

### CURRENT WORKING STATUS

- Senior assistant professor at the Department of Agro-Food Sciences and Technologies of the University of Bologna. Scientific and disciplinary field: AGR/03 General arboriculture and fruit tree cultivation.
- Member of the register of agronomists

### Education

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|-------------------------------|---|
| 23-27 March 2015              | - "Introduction to spatial data processing" course held at the Council for Research in Agriculture and the Analysis of Agricultural Economics Agriculture and Environment Research Center, Bari office (CREA-AA, Bari formerly CRA-SCA)   |
| May 2010- November 2012       | - Training course concerning the creation of innovative and high-tech companies at We Tech Off, business incubator of Aster - Emilia-Romagna Region, promoted by the Ministry of Economic Development   |
| October/November 2009         | - Aster Match - Course that dealt with the following topics: self-presentation strategies, information treatment according to the interlocutors, presentation of data from research. Emilia-Romagna Region, promoted by the Ministry of Economic Development.   |
| June 2009                     | - Business Plan course related to the Spinner 2013 program promoted by the Emilia-Romagna Region  |
| 4-5 April 2007                | - Participation in the workshop on gas exchange measurements. City of Castello. Ecosearch   |
| January 2006-April 2009       | - PhD in Ornamental Forest Arboreal Cultures and Ornamental Forest Agrosystems and Landscape. Disciplinary sector AGR/03. Title: Precision Horticulture: application on apple orchards. As part of the doctorate, a 6-month period of in-depth study of the doctoral thesis was carried out at the Australian Center for Precision Agriculture, Sydney, Australia under the supervision of Dr. James Taylor   |
| April 2004                    | - Qualified to the profession of Agronomist   |
| September 1998- February 2004 | - Five-year degree in Agricultural Sciences and Technologies with specialization in Vegetable and Fruit Production at the University of Bologna. Thesis title: Study of cytokinesis activity as a function of ecophysiological factors. As part of this training course, an in-depth period of 7 months was carried out at the experimental institute "Hort Research" (now Plant & food Research) in Havelock North, New Zealand, under the supervision of Dr. Stuart Tustin. |
| August-December 1999          | - Erasmus project at Hame Politeknik. Lepaa, Finland lasting 5 months. Here, exams in English of recognized courses were held within the Degree course in Agricultural Science and Technology of the University of Bologna and the training internship of 200 hours focused on evolutionary factors and the pathology of Finnish indigenous crops. In addition, a study and research visit were carried out at the Estonian Agricultural University, Tartu, Estonia.          |

July 1998 - Scientific High School Diploma at the "E. Fermi" of Salò (BS)

## Professional experience and acknowledgments received

### Working experiences

- 01/02/2021-31/03/2021 - Non-occasional self-employment contract at the Department of Agro-Food Sciences and Technologies of the University of Bologna with the subject "Precision techniques for the recognition of fruit and the porosity of the canopy"
- 01/02/2018 – 31/01/2021 - Research fellow at the Department of Agro-Food Sciences and Technologies of the University of Bologna on issues relating to "Precision applications in apple and kiwi crops".
- 01/02/2014-31/01/2018 - Fixed-term researcher (RTD / A) at the Department of Agricultural Sciences of the University of Bologna following the victory of the FIRB-2013 competitive tender, which provided for the direct call for the winners. Project title: Integration and comparison of innovative technical means and itineraries with different "ecological intensity" aimed at an intelligent management of conservative agricultural systems. Project code RBFR13L8J6 (Action Line 1). Subsequent renewal of the position for 2 years as part of the H2020- EUFRUIT project.
- 01/03/2011 – 01/02/2014 - Research fellow at the Department of Agro-Food Sciences and Technologies formerly the Department of Agricultural Sciences of the University of Bologna with topics concerning "The response of some ecophysiological characteristics to the water restitution of apple and pear trees", "Precision fruit growing protocols for Actinidia".
- August 2011-July 2015 - Founding member and president of the start-up then an innovative company HK - Horticultural Knowledge srl
- April 2010-March 2011 - Freelance agronomist with the role of consultant for fruit companies and cooperatives (Apofruit, Apoconerpo, Consorzio Modi Europa, Patfruit, Intesa, Consorzio Melapiù)
- April 2009-April 2010 - Scholarship funded by the Emilia-Romagna Region through the "Spinner 2013" program for the development of high-tech business projects. The study was carried out at the Department of Agro-Food Sciences and Technologies formerly the Department of Tree Crops of the University of Bologna.
- January-April 2009 - Scholarship for the "Evaluation of the effect of photoselective networks on commercial apple orchards" funded by the company "La Lodigiana" at the Department of Agro-Food Sciences and Technologies formerly the Department of Tree Crops of the University of Bologna.
- January 2006 - December 2009 - PhD scholarship in Ornamental Forest Arboreal Crops and Ornamental Forest Agrosystems and Landscape on precision fruit growing issues funded by the Melapiù Consortium of Ferrara.
- March-December 2005 - Scholarship funded by MIUR funds entitled "Effect of water availability on the potential for carbon accumulation in an apple orchard in production" at the Department of Agro-Food Sciences and Technologies formerly the Department of Arboreal Cultures of the University of Bologna
- December 2005-2013 - Quality parameters controller at shops, points of sale and producer organizations for the Melapiù and Modi Consortium of Ferrara
- January-February 2005 - Project contract entitled "Profile of carbohydrates in actinidia plants as a function of production load and microclimatic conditions" subsidized by MIUR funds at the Department of Agro-Food Sciences and Technologies formerly the Department of Arboreal Crops of the University of Bologna
- April-December 2004 - Project contract entitled "Real-time fruit growth measurements on apple and peach after ReTain application" funded with "Valent Biosciences" funds at the Department of Agro-Food Sciences and Technologies formerly the Department of Tree Crops of the University of Bologna.

### Periods of study and research abroad

- September 2006-March 2007. Carrying out of experiments during the PhD period at the Australian Center for Precision Agriculture, Sydney, Australia
- September 2002-April 2003. Writing of the five-year degree thesis and research collaboration at the Hort Research institute (now Plant & Food Research) in Havelock North, New Zealand.
- August-December 1999. Erasmus scholarship at Hame Politeknik. Lepaa, Finland

- Scientific responsibility or participation in international research projects admitted for funding on the basis of competitive calls that provide for peer review**
- 2021-2023. ICT-AGRI-FOOD 2019. Sunburn and HEat prediction in canopies for Evolving a warning Tech solution (SHEET). (OU Member)
  - 2016-2019. EUFRUIT- Network tematico H2020. (OU Member)
  - 2011-2015. FruitBreedomics, 7 PQ. (OU Member)
  - 2011-2015. ApMed - Apple and Peach in Mediterranean Orchards". 7 PQ – Arimnet. (OU Member)
  - 2014-2017. APPELEGENIE, 7 PQ. (OU Member)
  - 2006-2011. ISAFRUIT, 6 PQ. (OU Member)

- Scientific responsibility or participation in national and regional research projects admitted for funding on the basis of competitive calls for proposals that provide for peer review**
- 2020-2021. New techniques to improve the sustainability of the fruit nut supply chain in Emilia-Romagna. PSR Emilia-Romagna. (OU member)
  - 2020-2021. Kiwisost - Innovations in agronomic practices to promote water saving and environmental sustainability in the cultivation of Kiwi in the Lazio region. PSR Lazio. (OU member).
  - 2019-2021. S3O-Smart, Specialized, Sustainable Orchard. POR-FESR Emilia-Romagna. (OU member)
  - 2018-2021. BIOFERTIMAT - Use of recycled matrices as fertilizers for organic fruit and vegetable crops. An approach for improving the area's circular economy. PSR Veneto. (OU member)
  - 2017-2019. Sensors and IRRINET: Integration of information from networks of meteorological stations and private sensors with the water balance model IRRINET. PSR Emilia-Romagna. (OU member)
  - 2017-2019. Rationalization of irrigation systems on tree crops in response to climate change. PSR Emilia-Romagna. (OU member).
  - 2017-2019. Quality and organic fruit and vegetables for a competitive and sustainable supply chain. PSR Emilia-Romagna. (Scientific manager)
  - 2017-2019. INNOVANOCE: Innovation and efficiency of the fruit nut supply chain in the Emilia-Romagna Region. PSR Emilia-Romagna. (OU member)
  - 2014-2016. FIRB2013 "Future in Research 2013". Title of the funded project: Integration and comparison of innovative technical means and itineraries with different "ecological intensity" aimed at an intelligent management of conservative agricultural systems. Project code RBFR13L8J6 (Action Line 1) (Head of Operating Unit).
  - 2014-2015. Quality and enhancement of the Abate Fétel pear. SISMA (Emilia-Romagna Region). (OU member).
  - 2014-2015. Monitoring of productive and physiological performances at different regimes and irrigation methods in Abate Fétel. PSR Emilia-Romagna. (OU member).
  - 2010-2014. Apple fruit quality in the post genomic era. AGER (OU Member).
  - 2010-2013. Development of protocols for monitoring and early forecasting of productive and qualitative potential in kiwiculture (cv Hayward). PSR Emilia-Romagna. (OU member)
  - 2010-2013. Innovapero. AGER. (OU member).
  - 2010-2013. Influence of different irrigation strategies on vascular flows to and from the kiwi fruit. Prin 2009. (OU Member).
  - 2007 Realization of the production chain project "Lowland apple growing - Modi@" PSR Emilia-Romagna (OU Member)

- Responsibility for scientific studies and research entrusted by qualified public or private institutions**
- 2020/21. Farm technologies srl. Test of a vision system to identify the porosity of the canopy and the number of plant fruits. Budget: 60000 € (Scientific director, holder of the funds is Dr. Chiara Pastore.).
  - 2020. APOFRUIT Italia soc. coop. Agricultural. Development of irrigation management protocols on yellow-fleshed kiwis. Budget: € 10,000. (Scientific director of one of the activities of the agreement, the holder of the funds is Prof. Elena Baraldi).
  - 2019. Farm technologies srl. Study of the environmental adaptation of the apple (Cv. Gala) and kiwi (Cv. Hayward) species to environmental changes and soil water balance through calibration of the Idroplan system. Budget: € 8000 (Scientific coordinator. Holder of the funds Prof. Brunella Morandi)
  - 2018. Farm technologies srl. Study of the environmental adaptation of the apple tree species (CV Gala) to environmental changes and soil water balance through calibration of the Idroplan system. Budget: 4000 €. (Scientific director and holder of the agreement)
  - 2018. APOFRUIT Italia soc. coop. Agricultural. Development of irrigation management protocols on pear (cv Abate), kiwifruit (cv Hayward and SunGold). Budget: 75564 € (Scientific director and holder of the agreement)
  - 2017 APOFRUIT Italia soc. coop. Agricultural. Processing and technical support for real-time monitoring of kiwifruit sizes. Budget: 4400 € (Scientific director and holder of the agreement)
  - 2015 Jingold S.P.A. Modulation / forecast of the production load on Jintao yellow kiwifruit. 3000 € (Scientific coordinator and holder of the agreement)
  - 2015. APOFRUIT Italia soc. coop. Agricultural. Processing and technical support for real-time monitoring of kiwifruit sizes. 4000 € (Scientific coordinator and holder of the agreement)

- Achievement of national and international awards and recognitions for research activities and activities with a high innovation content**
- 2016. Winner of the "Best presentation as a young researcher" award at the "First International apple symposium" of the ISHS. Yangling, Shaanxi, China, October 2016.
  - 2010-2012. Winner of "We Tech Off" grants, business incubator of Aster - Emilia-Romagna Region, promoted by the Ministry of Economic Development, which supports the creation of innovative and high-tech companies and related training courses.
  - 2009. Winner of the "Spinner 2013" grants, a program of the Emilia-Romagna Region dedicated to highly qualified people for the development of innovative ideas and projects and for the enhancement of talents, in collaboration with universities, research centers and companies in Emilia-Romagna.
  - 2006. Winner of the "Marco Polo" scholarship for conducting research activities abroad. Duration of the grant: 3 months. Location: Australian Center for Precision Agriculture, Sydney, Australia.
  - 2002. Winner of a scholarship granted by the Faculty of Agriculture - University of Bologna for carrying out research and writing theses abroad. Duration of the grant: 7 months. Location: "Hort Research", Havelock North, New Zealand.
- Results obtained in technology transfer in terms of participation in the creation of new businesses (spin off), development, use and marketing of patents**
- Founding partner and president until July 2015 of the startup, then an innovative company HK-Horticultural Knowledge s.r.l.
  - Creator of the precision kiwiculture monitoring protocol (Know-How and rights belonging to the University of Bologna), inherent in the supply chain project promoted by the Emilia-Romagna region and financed by NEW PLANT Società Consortile Agricola s.r.l.

## Teaching and seminar activity

### University teaching and seminar activities

- From the academic year 2021/2022 to date holder of the module 93663 – “Precision Orchard Management (6 cfu)” held as part of the master’s degree course in Precision and Sustainable Agriculture.
- From the academic year 2017/2018 to date holder of the module "Nursery techniques" of 3 CFU, part of the integrated course 79423 - "Pomology and nursery techniques" held as part of the master’s degree course in Agricultural Sciences and Technologies of the Department of Agro-food Sciences and Technologies.
- Academic year 2020/2021. Seminar activity within the "PASA" Master's Degree course Precise and sustainable agriculture - cod. 5705 in course 93651, Technology Innovation for Smart Agricultural Systems (I.C.) 93654 Crop Sensing, Data Harvesting And Robot Technologies For Precision Agriculture of the Department of Agro-Food Sciences and Technologies of the University of Bologna (in English)
- February 21, 2019. Speaker at Academic Basecamp within the Master's Degree course "International Master in Horticultural Science" - ImaHS of the University of Bologna and Bolzano. (in English).
- Academic year 2017/2018 teaching of the "Precision Fruit Growing" module in the first level Master's course at the University of Teramo "Precision Agriculture".
- Academic year 2016/2017 holder of the 3 CFU "Fruit Tree Physiology" module, part of the integrated course "72613 - Fruit Tree Physiology and Fruit Quality" held at the Graduate School of Agriculture and Veterinary Medicine of the University of Bologna.
- Academic year 2015/2016 supplementary teaching activity as part of the course "72647- Ecosystems and Plant Ecophysiology" of the Master's Degree in "International Master in Horticultural Science" of the University of Bologna.
- Academic year 2014/2015, 2015/2016 and 2016/2017 Supplementary teaching activity in the context of the course "65911- Arboriculture" of the graduate school of agriculture and veterinary medicine of the University of Bologna.
- From 2018 dissemination activities at the European Researchers' Night - Bologna.
- 25-30 / 04/2014. Lecturing of 40 hours in the "Precision Agriculture" training module within the ISCOCEM project - Technological development and innovation for the sustainability and competitiveness of southern cereal farming - at the Department of Agriculture of the University of Reggio Calabria.
- 19-21 November 2013: Theoretical-applicative Short Course entitled: "Methodology of combined measurement of gas exchange and leaf fluorescence" at the Department of Agriculture of the University of Reggio Calabria as part of the PhD course in Biology Applied to Agro-Food and Forestry Systems.
- From the 2004/2005 academic year to the 2013/2014 academic year, seminar and exercise teaching activities within the teaching of "Ecophysiology of tree plants" of the specialist degree courses in "Agro-industrial systems sciences" and teaching of "Frutticoltura I" and didactic, seminar and exercise activities within the teaching of "Ecosystems and Plant Ecophysiology" of the specialist degree course in "International Horticultural Science" (in English).

### Extra-university teaching, demonstration and technical seminar

- Lecturer in 2020 for training courses on "physiology of fruit trees" for the DINAMICA professional training institution (7 hours total)
- November 6, 2020. Tutorial at the IEEE International Workshop on Metrology for Agriculture and Forestry. Title "From fruit recognition to fruit growth monitoring: an overview of the field applications"
- November 20, 2019. Speaker at the International Workshop on monitoring and managing of tree crop systems through remote sensing and precision agriculture techniques. Pisa, Polo Piagge, University of Pisa.
- November 22, 2019. Seminar at the Apofruit headquarters in Cesena on the technical / agronomic aspects of the supply chain project "innovative interventions to support a high-quality fruit supply chain"
- 11 May 2018. Speaker at the Scientific Seminar organized by GRUSI, ANBI, and CER. Theme: "Irrigation progress in fruit and vegetables". Macfrut 2018 Fair, Rimini.
- Lecturer in 2018 for training courses on "Precisone Fruit Growing" for the Centoform accredited professional training institution (12 hours total)
- Lecturer in the year 2018 for training courses on "Precisone Fruit Growing" for the DYNAMIC professional training institution (8 hours total) Docente nell'anno 2018 per corsi di formazione con tematica "Frutticoltura di Precisone" per Associazione Biodistretto della Valle dei Laghi (4 ore totali)

- June 13, 2017: Refresher seminar for the Orders of Agronomists and Foresters of Emilia-Romagna and the province of Bologna. "New technologies for innovation in agriculture"
- January 26, 2017. Seminar activity at the 16th Pear and Apple Fruit Day, Istituto Fratelli Navarra Ferrara. Title: "Innovative approaches for the water management of the pereto"
- 12 May 2017. Technical seminar activity during the MACFRUT fair. Title: Interaction of the "Perfrutto" forecasting service with the Irrirame budget model
- January 14, 2016. Seminar "Agronomists on the job 2.0" - Technology transfer: from the world of research to the creation of a start-up. University of Palermo.
- February 2016. Seminar activity at the Liceo Ginnasio Galvani of Bologna concerning the measurement techniques of physiological parameters on tree crops
- 18/28 November 2016. Technical seminar activity at the experimental company Fratelli Navarra and companies belonging to the Apofruit and Cico Mazzoni cooperatives regarding the "Rationalization of irrigation systems on tree crops in response to climate change".
- 20 August 2015. Seminar / technical activity at the experimental tests of the F.lli Navarra Foundation for Agriculture. Theme: "Verification of the irrigation response of different pear rootstocks"
- February 2013: Refresher seminar for the Orders of Agronomists and Foresters of Emilia-Romagna and the province of Bologna. Precision agriculture: research and innovation
- From February 2011 to today: reports on physiological aspects, fruit growth dynamics and precision approaches to temperate crops, at the Apofruit technical-training days
- March 2008 - Ecophysiology Group Activity report. Australian Center for Precision Agriculture, Sidney, Australia
- March 2007. Speaker at the 4th Melapiù Technical Day - Precision apple growing in Fuji: managing information from the orchard
- January 2006. Seminar activity at the Laimburg Experimental Center. Title: "Methods for studying cellular demography in apple trees".
- May 2005. Seminar activity at Valent Bioscience meeting. Title: "Fruit growth measurements after ReTain applications on apple".

#### Participation in mass media events

- <https://agronotizie.imaginenetwork.com/vivaismo-e-sementi/2017/01/30/melo-e-pero-le-coltivazioni-cambiano-pelle/52638>
- <https://www.freshplaza.it/article/73010/Frutticoltura-in-crisi-La-risposta-e-nellinnovazione/>
- <https://www.freshplaza.it/article/4078755/pericoltura-di-precisione-e-redditivita-del-frutteto-binomio-possibile/>
- <https://www.freshplaza.it/article/4037209/anche-la-frutticoltura-puo-essere-precisa/>
- <https://www.freshplaza.it/article/4075444/come-prevedere-la-produzione-di-mele-con-due-mesi-di-anticipo/>
- 25 November 2011. Conference on Precision Agriculture organized by the Emilia-Romagna region, in collaboration with the CRPV, to take stock of the state of the art and recent innovations in fruit growing. [https://www.youtube.com/watch?v=\\_nfsVhE6q0Y](https://www.youtube.com/watch?v=_nfsVhE6q0Y)
- 20 August 2015. Research and Experimentation - Guided tour of the irrigation response tests on different pear rootstocks. Az. Fratelli Navarra Ferrara. <https://youtu.be/9E8YwlcI0Hw>
- 28 September 2015. Description of the results of the SISMA regional project coordinated by the Department of Agricultural Sciences of the University of Bologna and by the CRPV for the enhancement of the Abate pear. <https://youtu.be/Cn51XzEUvU8>
- 29 November 2019. Use the precision fruit growing to improve the fruit production of the Emilia-Romagna region. <https://www.youtube.com/watch?v=NDT4nkd7iaQ>

## Student supervising

- PhD**
- 2020- ongoing. Giacomo Gatti. Thesis co-supervisor: "A histological approach to model the growth of sweet cherry fruit from floral induction to harvest with special regard to the factors influencing crop load and quality". 35th PhD cycle in "tree production systems, fruit, forest and ornamental trees and grape" of the University of Bologna. Industrial doctorate in co-tutorship with the Laimburg experimental institute, Bolzano.
  - 2019- ongoing. Gianmarco Bortolotti. Thesis co-supervisor: "Innovation in fruit crops: advanced management techniques and innovative applications for improving sustainability in fruit production". 34th PhD cycle in "tree production systems, fruit, forest and ornamental trees and grape" of the University of Bologna.
  - 2016-2018. Kushtrim Bresilla. Thesis co-supervisor: "Sensors, Robotics and Artificial Intelligence in Precision Orchard Management". 31st PhD cycle in "tree production systems, fruit, forest and ornamental trees and grape" of the University of Bologna.

### Supervisor of Master's and Bachelor's theses

- 2020. Nicolò Furini. Course 9235 - Agricultural Sciences and Technologies (Master's Degree). Implementation of a decision support system for monitoring irrigation and apple fruit growth.
- 2020. Matteo Manzoli. Course 9235 - Agricultural Sciences and Technologies (Master's Degree). Physiological responses to different irrigation managements on Chandler (Junglans regia L.)
- 2020. Matteo Foschini. Course 9235 - Agricultural Sciences and Technologies (Master's Degree). Evaluating the effects of a 50% reduction of light intensity in apple orchards, by assessing photosynthesis response in different irrigation treatments.
- 2020. Matteo Baldi. Course 9235 - Agricultural Sciences and Technologies (Master's Degree). Ecophysiological characterization of Actinidia chinensis in its phenological stages.
- 2020. Lorenzo Cavallina. Course 9235 - Agricultural Sciences and Technologies (Master's Degree). Actinidia deliciosa Vs. Actinidia chinensis: A Comparison of Physiological and Productive Parameters
- 2018. Slaven Tadic. Course 8884 - Agricultural Sciences and Technologies (Master's Degree). Assessment of the IPL index for orchard management in Pyrus communis cv. Abbé Fétel.
- 2018. Pietro Melandri. Course 8524 - Agricultural Technologies (Bachelor's Degree). Response to water stress: relationships between water potential and gas exchange in different apple genotypes.
- 2018. Giulio Masiero. Course 8884 - Agricultural Sciences and Technologies (Master's Degree). Physiological response of pear cv Abate Fétel following overhead irrigation.
- 2018. Giacomo Gatti. Course 8884 - Agricultural Sciences and Technologies (Master's Degree). Air-conditioning irrigation on apple trees var. fuji (Malus x Domestica Borkh.): study of microclimatic, physiological and productive effects.
- 2018. Antonino Ferrara. Course 8532 - Planning and management of agro-territorial, forest and landscape ecosystems (Master's Degree). Estimation of the production load and the effectiveness of chemical and manual thinning based on a neural system for detecting the number of fruits.
- 2017. Samantha Belloi. Course 8884 - Agricultural Science and Technology Course (Master's Degree). Study of the effect of photoselective networks during the cytokinesis phase on the vegetative-productive development in Malus domestica.
- 2017. Nicolò Furini. Course 8524 - Agricultural Technologies Course (Bachelor's Degree). Precision periculture: monitoring of the growth performance of Abate Fétel grafted on four different rootstocks.
- 2017. Lorenzo Cavallina. Course 8524 - Agricultural Technologies (Trinennial Degree). Response to the use of multifunctional nets in sweet cherry: influence on quality parameters in long storage
- 2017. Gianmarco Bortolotti. Course 8884 - Agricultural Science and Technology Course (Master's Degree). Physiological response of Abate Fétel following overhead irrigation with climate control function.
- 2017. Federico Stanzani. Course 8883 - International horticultural science / international fruit and vegetable cultivation (Master's Degree). Monitoring fruit growth parameter through a wireless sensor device integrated with an Internet of Things platform.
- 2015. Francesca Tozzi. Course 8530 - Agricultural Sciences and Technologies (Master's Degree). Photosynthetic efficiency studies based on chlorophyll fluorescence and gas exchange analysis: applications for innovative management techniques and new fruit varieties
- 2015. Francesca Tognin. Course 0878 - Agricultural Sciences and Technologies (Master's Degree). Use of chlorophyll fluorescence for irrigation modulation in Pyrus communis

**Co-supervisor of Master's and Bachelor's theses**

- 2019. Riccardo Giuliani. 8526 - Economics and marketing in the agro-industrial system (Bachelor's Degree). Physiological responses of *Actinidia chinensis* (cv SunGold) during the growing season.
- 2019. Giacomo Luchetti. 8524 - Agricultural technologies (Degree). Effect of irrigation restitution on the physiology and productivity of the fruit nut (J. regia).
- 2019. Elettra Miraglia. 8524 - Agricultural technologies (Degree). Sicily, land of avocados, the green gold of vegans
- 2019. Arianna Mancinelli 8524 - Agricultural technologies (Degree). Mango: from tropical crop to potential treasure of an exotic island in Italy
- 2019. Alice Lucchi. 8524 - Agricultural technologies (Degree). The superfruits
- 2018. Mattia Foschini. 8884 - Agricultural Sciences and Technologies (Master's Degree). Effects of applying the Brevis® chemical thinner on foliar photosynthesis and the growth rate of apple fruits.
- 2017. Andrea Micheli. 8530 - Agricultural Sciences and Technologies (Master's Degree). Use of polyfunctional nets on rootstocks with different vigor in cherry: physiological effects on water relations, gas exchanges and fruit growth
- 2017. Alice Tugnoli. 8530 - Agricultural Sciences and Technologies (Master's Degree). The effect of rootstock on the physiological and productive efficiency of the cherry tree in pre and post harvest.
- 2015. Sara Pondini. 8524 - Agricultural technologies (Degree). First evaluations on the use of drones in apple growing
- 2010. Eleonora Grilli 8530 - Agricultural Sciences and Technologies (Master's Degree). Precise management of the orchard - From checking the fruit load to real-time verification of fruiting progress.

**Referente Tirocini**

- From 2015 to date, the contact person for several students

**Cariche istituzionali legate alla didattica**

- Since 2018, internationalization coordinator for the Degree Course in Agricultural Sciences and Technologies of the Department of Agro-Food Sciences and Technologies of the University of Bologna



## Conferences and transfer of research activities

### Participation in working groups within national and international networks active in the research and training sectors

- Since 2015. Secretary of the Working Group of EUFRIN "Decision Support Platform" (<https://eufrin.eu/index.php?id=13>)
- Since 2013. Scientific contact for innovation in irrigation techniques and precision applications for the Apofruit group

### Organization, participation in the scientific committee of national and international conferences

- 2019. Convener, member of the Scientific and Organizing Committees, International Symposium on Precision Management of Orchards and Vineyards (ISHS) Palermo, 7/11 October 2019 (<http://www.pmov2019.it/>)
- 2019. Member of the Scientific Committee, IX International Symposium On Irrigation Of Horticultural Crops (ISHS). Matera, Italy 17-20 June 2019. (<http://irrigationmatera2019.com/scientific-committee/>)
- 2018. Member of the Scientific and Organizing Committee, XII SOI Days (Italian Horticultural Society), Bologna 19-22 / 6/2018
- 2016. Member of the Scientific and Organizing Committee, XI Orchard and Plantation Systems (ISHS), Bologna 29 August / 2 September 2016

### Invited speaker and chair at international conferences

- 2020. IEEE International workshop on Metrology for Agriculture and Forestry. Trento, November 4-6, 2020 (<https://www.metroagrifor.org/tutorials>). Invited speaker for the tutorial communication "From fruit recognition to fruit growth monitoring: an overview of the field applications" and Co-Chair of the first general session.
- 2019. Co-chair in different sessions at the International Symposium on Precision Management of Orchards and Vineyards (ISHS) Palermo, 7/11 October 2019 (<http://www.pmov2019.it/>)
- 2019. International workshop on monitoring and managing of tree crop systems through remote sensing and precision agriculture techniques. Pisa, 20 November 2019. Precise Orchard Management (POM): innovative techniques to take control of fruit production. (Invited speaker)
- 2016. 1st International Apple Symposium, Shaanxi, China. 10-16 October 2016. Development of precision apple fruit growing techniques: monitoring strategies for yield and high-quality fruit production. (Invited speaker)

### Participation as a speaker at scientific conferences in Italy or abroad

- 2021. XII International Symposium on Integrating Canopy, Rootstock and Environmental Physiology in Orchard Systems. 26-30 July 2021. Wenatchee, WA (United States of America). *Actinidia deliciosa* Vs. *Actinidia chinensis*: A Comparison of Physiological and Productive Parameters (Oral presentation)
- 2018. 30th International Horticultural Congress, Istanbul, Turkey. 12-16 August 2018. Microclimatic, physiological and productive effect of the overcanopy irrigation management in an apple orchard in the province of Ferrara (Oral Presentation)
- 2018. XII Scientific Days SOI, Bologna, Italy. June 19-22, 2018. Effect of overhead irrigation on the physiology and productivity of an apple orchard (Oral Presentation)
- 2018. 11th International Symposium FRUTIC - Fruit, nut and vegetable production engineering symposium. Berlin, Germany. 6-8 February 2018. Overcanopy irrigation: physiological and productive effect on an apple orchard. (Oral Presentation)
- 2016. International Symposium on Sensing Plant Water Status - Methods and Applications in Horticultural Science. Potsdam, Germany. 5-7 October 2016. A multi-tool approach for assessing fruit growth, production and plant water status of a pear orchard. (Oral presentation)
- 2015. 10th European Congress on Precision Agriculture. Volcani Center, Israel. 12-16 July 2015. Approaches for assessing fruit growth, plant status and production of an orchard. (Poster and Short presentation)
- 2015. 9th International Symposium FRUTIC - Fruit, nut and vegetable production engineering symposium, Milan, Italy. 19-22 May, 2015. Monitoring Strategies for Precise Production of High-Quality Fruit and Yield in Apple in Emilia-Romagna. (Oral presentation)
- 2013. EFITA-WCCA-CIGR Conference "Sustainable Agriculture through ICT Innovation", Turin, Italy, 24-27 June 2013. The Precise Growing of Pomefruit Orchards for the Production of High Quality Fruit and Yields (Oral presentation)
- 2010. IX SOI Scientific Days. Florence 10-12 March 2010. Precision fruit growing: spatial analysis of the effect of thinning on the production load of an apple orchard. (Oral presentation)
- 2010. 28th International horticultural congress (IHC). Lisbon, Portugal. 22-27 August 2010. Precision fruit growing: how to collect and interpret data on season variation in apple orchards. (Oral presentation)
- 2007. VIII SOI scientific days. Sassari 4-7 May 2007. Some effects of shading on the growth of 'Fuji' apples in the phase of cellular expansion (Oral presentation)

**Participation (presentation of posters or audience) in national and international scientific conferences**

- 2019. 12th European Conference on Precision Agriculture. Montpellier, France. 8-11 July 2019. Precise daily fruit growth: a good indicator of drought stress in apple (Poster)
- 2019. IX International Symposium on Irrigation of Horticultural Crops. Matera, Italy 17-20 June 2019. Overcanopy irrigation in apple orchard: a two-year study on the microclimatic, physiological, and productive effects (Poster).
- 2017. 11th European Conference on precision Agriculture, Edinburgh, UK. 17-20 July 2017. Decision support systems for fruit growing: Perfrutto and Irriframe: integration for the optimized management of the production and irrigation. (Poster)
- 2010. 28th International horticultural congress (IHC). Lisbon, Portugal. 22-27 August 2010. A large-scale view of thinning in apple orchards: a spatial analysis of the orchard thinning effect (Poster)
- 2009. 7th European Conference on precision Agriculture. Wageningen, Nederland. 5-7 July 2009. Options for precision horticulture in Gala orchards based on site-specific relationships between environmental factors and harvest production parameters. (Poster)
- First global workshop on high resolution digital and soil sensing and mapping. Sydney, Australia. 5-8 February 2008. (Audience)

**Participation in editorial committees and reviewers of scientific journals**

- Editor for international scientific journals: Agronomy (MDPI); Frontiers in plant Sciences; Acta Horticulturae (ISHS).
- Reviewer of international scientific journals including Scientia Horticulturae, Computer and Electronics in Agriculture, HortScience, Springer Nature - Scientific reports, Agronomy, Frontiers in Plant Sciences, Acta Horticulturae.

**Member of national and international scientific societies**

- Member of the International Society for Horticultural Science (ISHS)
- Member of the Italian Fruit and Vegetable Society (SOI)

**Personal skills and competences**

Languages

English

	Comprehension		Speaking		Written
	Listening	Reading	Oral interaction	Oral production	
<i>European level</i>	C1	C1	C1	C1	B++

**Organizational skills**

- Good organizational skills in the logistical, operational and development aspects of research projects acquired during the development of the degree and doctoral theses.

**Capacità e competenze tecniche**

- Planning and organization of scientific experiments
- Presentation and publication of research results
- Archiving, processing, and statistical analysis of data from scientific research
- Environmental and cultural effects that characterize fruit growth
- Use, set up and data analysis of open circuit systems for the determination of gaseous exchanges at leaf and fruit level, analysis of A / Ci curves, and use of CIRAS 1-2 and Li-COR 6400 system.
- Remote deployment, control and management of WiFi data collection systems
- Determination of water potentials at tree level.
- Determination and analysis of chlorophyll fluorescence
- Application of cell counting techniques (Goffinet and Lang methodologies)
- Mapping, and geostatistical applications, georeferencing and the collection of spatial data.

**Computer skills and competences**

- Excellent knowledge of the Windows operating system and other operating systems, Office (Word, Excel, Power Point), statistical analysis programs (SAS, Statistics, JMP, etc.)
- Basic use and programming of data logger systems (Campbell CR 10 / 10x / 1000)
- Excellent knowledge of the ArcGIS package, and spatial data modelling programs (Vesper) applied to precision fruit growing

**Artistic skills**

- Lover of music and art in general

**Other skills and competences**

- Athletics, cycling, swimming, competitive / amateur triathlon
- October 2015. Participation in the "IronMan world championship" (Kona - Hawaii, USA)
- 1999. Vice Italian University Rowing Champion in category two without.
- 1998-1999. "Under 15" rowing coach at the Rowing club Garda Salò company.

## Scientific publications and dissertations

### Scientific papers

1. Giovannini, A., Venturi, M., Gutiérrez-Gordillo, S., **Manfrini, L.**, Corelli-Grappadelli, L., and Morandi, B. (2022). Vascular and Transpiration Flows Affecting Apricot (*Prunus armeniaca* L.) Fruit Growth. *Agron.* 2022 12, 989.
2. Rossi, F., **Manfrini, L.**, Venturi, M., Corelli Grappadelli, L., and Morandi, B. (2022). Fruit transpiration drives interspecific variability in fruit growth strategies. *Hortic. Res.* 9, 1–10.
3. Bonora, A., Bortolotti, G., Bresilla, K., Grappadelli, L.C., and **Manfrini, L.** (2021). A convolutional neural network approach to detecting fruit physiological disorders and maturity in ‘Abbé Fétel’ pears. *Biosyst. Eng.* 212, 264–272.
4. Bonora, A., Muzzi, E., Franceschini, C., Boini, A., Bortolotti, G., Bresilla, K., Perulli, G.D., Venturi, M., **Manfrini, L.**, and Grappadelli, L.C. (2021). Preharvest Factors Affecting Quality on “abate Fetel” Pears: Study of Superficial Scald with Multivariate Statistical Approach. *J. Food Qual.* 2021.
5. Boini, A., Casadio, N., Bresilla, K., Perulli, G.D., **Manfrini, L.**, Grappadelli, L.C., and Morandi, B. (2022). Early apple fruit development under photoselective nets. *Sci. Hortic. (Amsterdam)*. 292.
6. Perulli, G.D., Gaggia, F., Sorrenti, G., Donati, I., Boini, A., Bresilla, K., **Manfrini, L.**, Baffoni, L., Di Gioia, D., Grappadelli, L.C., Spinelli, F., Morandi, B., 2021. Treated wastewater as irrigation source: a microbiological and chemical evaluation in apple and nectarine trees. *Agric. Water Manag.* 244. <https://doi.org/10.1016/j.agwat.2020.106403>
7. Losciale, P., Gaeta, L., **Manfrini, L.**, Tarricone, L., Campi, P., 2020. Orchard Floor Management Affects Tree Functionality, Productivity and Water Consumption of a Late Ripening Peach Orchard under Semi-Arid Conditions. *Appl. Sci.* 10.
8. **Manfrini, L.**, Corelli Grappadelli, L., Morandi, B., Losciale, P., Taylor, J.A., 2020. Innovative approaches to orchard management: assessing the variability in yield and maturity in a ‘Gala’ apple orchard using a simple management unit modeling approach. *Eur. J. Hortic. Sci.* 84, 1–8.
9. Ceccanti, C., Landi, M., Antichi, D., Guidi, L., **Manfrini, L.**, Monti, M., Tosti, G., Frascioni, C., 2020. Bioactive properties of fruits and leafy vegetables managed with integrated, organic, and organic no-tillage practices in the Mediterranean area: A two-year rotation experiment. *Agronomy* 10. <https://doi.org/10.3390/agronomy10060841>
10. Perulli, G.D., Boini, A., Bresilla, K., Morandi, B., Corelli Grappadelli, L., **Manfrini, L.**, 2020. Growth analysis of sweet chestnut burr in two seasons with differing weather conditions. *Italus Hortus* 27, 31–39. <https://doi.org/10.26353/j.itahort/2020.1.3139>
11. Boini, A., Bresilla, K., Perulli, G. D., **Manfrini, L.**, Corelli Grappadelli, L., and Morandi, B. (2019). Photoselective nets impact apple sap flow and fruit growth. *Agric. Water Manag.* 226, 105738. doi:10.1016/j.agwat.2019.105738.
12. Boini, A., **Manfrini, L.**, Bortolotti, G., Corelli-Grappadelli, L., and Morandi, B. (2019). Monitoring fruit daily growth indicates the onset of mild drought stress in apple. *Sci. Hortic. (Amsterdam)*. 256, 108520. doi:10.1016/j.scienta.2019.05.047.
13. Morandi, B., **Manfrini, L.**, Lugli, S., Tugnoli, A., Boini, A., Perulli, G. D., et al. (2019). Sweet cherry water relations and fruit production efficiency are affected by rootstock vigor. *J. Plant Physiol.* 237, 43–50. doi:10.1016/j.jplph.2019.04.007.
14. Bresilla, K., Perulli, G. D., Boini, A., Morandi, B., Corelli Grappadelli, L., and **Manfrini, L.** (2019). Single-Shot Convolution Neural Networks for Real-Time Fruit Detection Within the Tree. *Front. Plant Sci.* 10, 1–12. doi:10.3389/fpls.2019.00611.
15. Corelli Grappadelli, L., Morandi, B., **Manfrini, L.**, and O’Connell, M. (2019). Apoplasmic and simplasmic phloem unloading mechanisms: Do they co-exist in Angeleno plums under demanding environmental conditions? *J. Plant Physiol.* 237, 104–110. doi:10.1016/j.jplph.2019.04.005.
16. Perulli, G. D., Bresilla, K., **Manfrini, L.**, Boini, A., Sorrenti, G., Grappadelli, L. C., et al. (2019). Beneficial effect of secondary treated wastewater irrigation on nectarine tree physiology. *Agric. Water Manag.* 221, 120–130. doi:10.1016/j.agwat.2019.03.007
17. Perulli, G.D., Sorrenti, G., Bresilla, K., **Manfrini, L.**, Boini, A., Quartieri, M., Toselli, M., Grappadelli, L.C., Morandi, B. 2019. Secondary treated wastewater as a support strategy for tree crops irrigation: Nutritional and physiological responses on apple trees. *Environmental Engineering and Management Journal*. Volume 18, Issue 10, 2019, Pages 2171-2179
18. Lopez, G., Boini, A., **Manfrini, L.**, Torres-Ruiz, J. M., Pierpaoli, E., Zibordi, M., Corelli-Grappadelli, L. (2018). Effect of shading and water stress on light interception, physiology and yield of apple trees. *Agricultural Water Management*, 210, 140–148. <https://doi.org/10.1016/j.agwat.2018.08.015>
19. Tozzi, F., van Hooijdonk, B. M., Tustin, D. S., Corelli Grappadelli, L., Morandi, B., Losciale, P., **Manfrini, L.** (2018). Photosynthetic Performance and Vegetative Growth in a New Red Leaf Pear: Comparison of Scion Genotypes Using a Complex, Grafted-Plant System. *Frontiers in Plant Science*, 9. <https://doi.org/10.3389/fpls.2018.00404>

20. Charles, M., Corollaro, M.L., **Manfrini, L.**, Endrizzi, I., Aprea, E., Zanella, A., Corelli Grappadelli, L., and Gasperi, F. (2018). Application of a sensory-instrumental tool to study apple texture characteristics shaped by altitude and time of harvest. *J. Sci. Food Agric.* 98: 1095–1104. doi: 10.1002/jsfa.8560.
21. Lauri, P.É., Barigah, T.S., Lopez, G., Martinez, S., Losciale, P., Zibordi, M., **Manfrini, L.**, Corelli-Grappadelli, L., Costes, E., Regnard, J.L., 2016. Genetic variability and phenotypic plasticity of apple morphological responses to soil water restriction in relation with leaf functions and stem xylem conductivity. *Trees - Struct. Funct.* 30, 1893–1908. <https://doi.org/10.1007/s00468-016-1408-3>
22. Torres-Ruiz, J.M., Perulli, G.D., **Manfrini, L.**, Zibordi, M., Lopez Velasco, G., Anconelli, S., Pierpaoli, E., Corelli-Grappadelli, L., Morandi, B., 2016. Time of irrigation affects vine water relations and the daily patterns of leaf gas exchanges and vascular flows to kiwifruit (*Actinidia deliciosa* Chev.). *Agric. Water Manag.* 166, 101–110. <https://doi.org/10.1016/j.agwat.2015.12.012>
23. **Manfrini, L.**, Pierpaoli, E., Zibordi, M., Morandi, B., Muzzi, E., Losciale, P., Corelli Grappadelli, L. 2015. Monitoring strategies for precise production of high-quality fruit and yield in apple in Emilia-Romagna. *Chemical Engineering Transactions*.44, 301-306.
24. Losciale, P., **Manfrini, L.**, Morandi, B., Pierpaoli, E., Zibordi, M., Stellacci, A.M., Salvati, L., Corelli Grappadelli, L. 2015. A multivariate approach for assessing leaf photo-assimilation performance using the IPL index. *Physiologia Plantarum.* 154 (4) 609-620
25. Corollaro, M.L., **Manfrini, L.**, Endrizzi, I., Aprea, E., Demattè, M.L., Charles, M., Bergamaschi, M., Biasioli, F., Zibordi, M., Corelli Grappadelli, L., Gasperi, F., 2015. The effect of two orchard light management practices on the sensory quality of apple: Fruit thinning by shading or photo-selective nets. *J. Hortic. Sci. Biotechnol.* 90, 99–107. <https://doi.org/10.1080/14620316.2015.11513159>
26. Morandi, B., Losciale, P., **Manfrini, L.**, Zibordi, M., Anconelli, S., Pierpaoli, E., Corelli Grappadelli, L. 2014. Leaf gas exchanges and water relations affect the daily patterns of fruit growth and vascular flows in Abbé Fétel pear (*Pyrus communis* L.) trees. *Scientia Horticulturae*.178. 106-113.
27. Morandi, B., Losciale, P., **Manfrini, L.**, Zibordi, M., Anconelli, S., Galli, F., Pierpaoli, E., Corelli Grappadelli, L. 2014. Increasing water stress negatively affects pear fruit growth by reducing first its xylem and then its phloem inflow. *Journal of Plant Physiology.* 171 (16). 1500-1509.
28. Morandi, B., Losciale, P., **Manfrini, L.**, Pierpaoli, E., Zibordi, M., Corelli Grappadelli, L. 2012. Short-period changes in weather conditions affect xylem, but not phloem flows to young kiwifruit (*Actinidia deliciosa*) berries. *Scientia Horticulturae*, 142, pp. 74-83.
29. Bastías, R.M., **Manfrini, L.**, Grappadelli, L.C., 2012. Exploring the Potential Use of Photo-Selective Nets for. *Chil. J. Agric. Res.* 72, 224–231. <https://doi.org/10.4067/S0718-58392012000200010>
30. Morandi, B., Zibordi, M., Losciale, P., **Manfrini, L.**, Pierpaoli, E., Grappadelli, L.C. 2011. Shading decreases the growth rate of young apple fruit by reducing their phloem import. *Scientia Horticulturae*, 127 (3), pp. 347-352.
31. Morandi B., **Manfrini L.**, Losciale P., Zibordi M. e Corelli Grappadelli L. (2010). The positive effect of skin transpiration in peach fruit growth. *Journal of Plant Physiology.* 167(13): 1033-1037.
32. Morandi B, **Manfrini L.**, Losciale P., Zibordi M., and Corelli Grappadelli L. 2010. Changes in vascular and transpiration flows affect the seasonal and daily growth of kiwifruit (*Actinidia deliciosa*) berry. *Annals of Botany*, doi:10.1093/aob/mcq070.
33. **Manfrini L.**, J. A. Taylor and L. Corelli Grappadelli. 2009. Spatial Analysis of the Effect of Fruit Thinning on Apple Crop Load. *European Journal Horticultural Science. Eur.J.Hortic.Sci.* 85 (4) 211-218.
34. Morandi, B., **L. Manfrini**, M. Zibordi, M. Noferini, G. Fiori and L. Corelli Grappadelli. 2007. A low-cost device for accurate and continuous measurement of fruit growth. *Hortscience.* 42(6): 1380-1382

### Technical papers

1. Bortolotti, G. e Manfrini, L. (2022). Forme di allevamento planari per un frutteto più produttivo. *L'Informatore Agrar.* 70–72.
2. Manfrini, L., Bortolotti, G., Perulli, G., Anconelli, S., Boini, A., Bonora, A., Solimando, D., Gentile, S., Baldi, E., Polidori, G., et al. (2021). Noce, ridurre asporti idrici e nutrizione senza danneggiare la produzione. *Riv. Di Fruttic.* 56–59.
3. L. Manfrini, S. Anconelli, D. Solimando, G. D. Perulli, A. Boini, M. Venturi, K. Bresilla, A. Bonora, L. Corelli Grappadelli, B. Morandi, G. Sorrenti, G. Luchetti, M. Toselli. 2020 Testato un nuovo modello per l'irrigazione del noce da frutto. *Rivista di Frutticoltura*, 6, 25-31
4. G. Bortolotti, L. Manfrini, A. Boini, G.D. Perulli, K. Bresilla, D. Pontara, M. Bertoldi, C. Rossi, L. Corelli Grappadelli. 2020. Produrre energia in frutteto con coperture fotovoltaiche. *L'Informatore Agrario.* 10, 71-74.

5. G. D. Perulli, G. Sorrenti, M. Quartieri, K. Bresilla, A. Boini L. Manfrini, L. Corelli Grappadelli, B. Morandi. 2020. Acqua reflua urbana come fonte irrigua da utopia a realtà. *Rivista di Frutticoltura*, 6, 38-41
6. L. Manfrini, G. D. Perulli, K. Bresilla, B. Morandi, A. Boini, L. Corelli Grappadelli, G. Bortolotti, D. Solimando, T. Letterio, S. Anconelli. 2019. Tecnologia e intelligenze artificiali per sistemi irrigui di precisione. 4, 30-35
7. G. Lopez, A. Boini, L. Manfrini, J.M. Torres-Ruiz, E. Pierpaoli, M. Zibordi, P. Losciale, B. Morandi, L. Corelli Grappadelli. 2019. Mallas de sombreeo como herramienta para mitigar los efectos negativos de una sequía en manzano. *Frutticoltura*. 67, 2-9
8. Luca Corelli Grappadelli, Kushtrim Bresilla, Brunella Morandi, Luigi Manfrini. 2018. L'innovazione tecnologica alla base della frutticoltura di precisione. *Rivista di frutticoltura e di ortofloricoltura*, 9, 50-53
9. Corelli Grappadelli, L., Losciale, P., Manfrini, L., and Morandi, B. 2018. Cambiamento climatico atteso: possibili scenari per l'irrigazione *Rivista di frutticoltura e di ortofloricoltura*. 2, 46-51.
10. S. Anconelli, D. Solimando, T. Letterio, B. Morandi, L. Corelli Grappadelli,
11. G. Bortolotti, G. Gatti, S. Tadic, F. Rossi, O. Facini, C. Chieco, M. Gerin, L. Manfrini. 2018. Impianti climatizzanti soprachioma contro le ondate di calore. *Riv. di Fruttic. e di Ortofloric.* 2, 40-44.
12. Manfrini L., Morandi M., Zibordi M., Pierpaoli E., Losciale P. e L. Corelli Grappadelli. 2017. Frutticoltura di precisione: produrre qualità sostenibile. *L'informatore agrario*. 6, 50-54.
13. Tugnoli A., Micheli A., Cavallina L., Lugli S., Manfrini L., Corelli Grappadelli L., Morandi B., 2017. Vigoria e produttività: i portinnesti nanizzanti sono più efficienti. *Rivista di Frutticoltura e di Ortofloricoltura*. 4, 28-33.
14. Corelli Grappadelli, L., e Manfrini, L. (2017). Frutticoltura precisa, stato dell'arte e soluzioni per il futuro. *Riv. di Fruttic. e di Ortofloric.* 6, 2-6.
15. Manfrini, L., Morandi, B., Anconelli, S., Galli F., Losciale, P. e Corelli Grappadelli L. 2016. Pericolture di precisione: monitoraggi per gestire l'irrigazione. *Rivista di Frutticoltura e di Ortofloricoltura*. 10, 28-32.
16. Pierpaoli E., Zibordi M., Manfrini L., Morandi B. e Corelli Grappadelli L. 2015. Monitoraggio e previsione del calibro medio e della produzione di pero (cv. Abate Fétel) in Emilia Romagna. 15, 60-65
17. Anconelli S., Solimando D., Corelli Grappadelli L., Losciale P., Manfrini L., Galli F., Verzella D. (2014). Irrigazione del pero: scelta del volume irriguo. *L'Informatore Agrario*. 33, 68-71
18. Stefano Anconelli, Domenico Solimando, Luca Corelli Grappadelli, Luigi Manfrini, Fabio Galli, Denis Verzella. 2014. Resistenza allo stress idrico dei portinnesti del pero. *Agricoltura*, 6, 48-49
19. Morandi, B., Losciale, P., Manfrini, L., Zibordi, M., Anconelli, S., Galli, F., Pierpaoli E. e Corelli Grappadelli L. 2014. La pera: ottimizzare la gestione irrigua per migliorarne la qualità. *Rivista di Frutticoltura e di Ortofloricoltura*. 10, 36-42.
20. Luca Corelli Grappadelli, Brunella Morandi, Marco Zibordi, Luigi Manfrini, Emanuele Pierpaoli, Stefano Anconelli, Fabio Galli, Pasquale Losciale. 2013. Nuove conoscenze fisiologiche
21. per un'irrigazione più precisa. *Rivista di Frutticoltura e di Ortofloricoltura*. 10, 36-42
22. Corelli Grappadelli L., Manfrini L., Zibordi M., Pierpaoli E., Losciale P. e B. Morandi M. 2012. Irrigare in funzione del frutto: innovazione possibile? *Rivista di Frutticoltura e di Ortofloricoltura*. 5, 60-65
23. Manfrini, L. E., Pierpaoli. 2012. Incubatori d'impresa e "start up": dai giovani ricercatori l'innovazione tecnologica. *Rivista di Frutticoltura e di Ortofloricoltura*. 12, 67-68
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25. Manfrini L., Morandi M., Zibordi M., Losciale P., Pierpaoli E., Bastias Ibarra RM., Taylor JA. e L. Corelli Grappadelli. 2011. Melicoltura di precisione: analisi spaziale del carico produttivo in relazione al diradamento dei frutti. *Rivista di Frutticoltura e di Ortofloricoltura*. 11, 38-42.
26. Losciale P., Pierpaoli E., Manfrini L., Zibordi M., Morandi B., Bastias R.M. e Corelli Grappadelli L. 2010. Il "pescheto asimmetrico" uno strumento di studio delle relazioni pianta-luce. *Rivista di Frutticoltura e di Ortofloricoltura* 7/8: 56-63.
27. Morandi, B., Manfrini, L., Zibordi, M., Losciale, P., Pierpaoli, E. e Corelli Grappadelli, L. 2010. Il kiwi: un frutto che modifica la sua dinamica di accrescimento lungo la stagione. *Rivista di Frutticoltura e di Ortofloricoltura*. 11, 36-42.
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1. Perulli, G.D., Peters, R.L., von Arx, G., Grappadelli, L.C., Manfrini, L., and Cherubini, P. (2022). Learning from the past to improve in the future: tree-ring wood anatomy as retrospective tool to help orchard irrigation management. *Acta Hortic.* 179–188.
2. Losciale, P., Manfrini, L., Morandi, B., Zibordi, M., and Corelli Grappadelli, L. (2022). A plant-based index for plant water status detection and irrigation scheduling in pear 'Abbé Fetel': first results on the use of the I PL index. *Acta Hortic.* 311–316.
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4. Bortolotti, G., Bresilla, K., Piani, M., Grappadelli, L.C., and Manfrini, L. (2021). 2D tree crops training system improve computer vision application in field: A case study. In *2021 IEEE International Workshop on Metrology for Agriculture and Forestry, MetroAgriFor 2021 - Proceedings, (IEEE)*, pp. 120–124.
5. Peppi, L.M., Zauli, M., Manfrini, L., Grappadelli, L.C., De Marchi, L., and Traverso, P.A. (2021). Implementation and Calibration of a Low-Cost Sensor Node for High-Resolution, Continuous and No-Manning Recording of Fruit Growth. *Conf. Rec. - IEEE Instrum. Meas. Technol. Conf. 2021-May*.
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7. Bortolotti, G., Manfrini, L., Pontara, D., Bertoldi, M., Boini, A., Perulli, G.D., Bresilla, K., Rossi, C., and Grappadelli, L.C. (2021). Application of organic photo-voltaic films on fruit trees: a proof of concept for a self-sustainable orchard. In *Acta Horticulturae*, pp. 205–210.
8. Taylor, J.A., Bates, T.R., Manfrini, L., and Guillaume, S. (2021). Zoning and data fusion in precision horticulture: current and needed capabilities to assist decision-making. In *Acta Horticulturae*, pp. 173–188.
9. L. M. Peppi, M. Zauli, L. Manfrini, P. A. Traverso, L. Corelli Grappadelli and L. D. Marchi, "A Low-Cost and High-Accuracy Non-Invasive System for the Monitoring of Fruit Growth," 2020 IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor), Trento, 2020, pp. 18-23, doi: 10.1109/MetroAgriFor50201.2020.9277571.
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