cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Funded by the European Union

COPYTREE NEWSLETTER

No. 9, October, 2025

CA 21157 www.copytree.eu

"European Network for Innovative Woody Plant Cloning"

Collaboration on a European level between experts for sharing and applying innovative *in vitro* technology on woody plants

Enjoy your reading!

1. ACTIVITIES

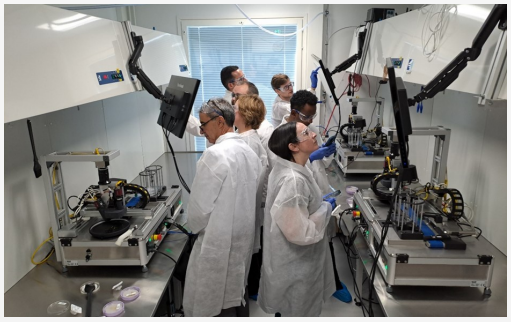
5th TRAINING SCHOOL

1.1. Using robotics for scaling up somatic embryogenesis

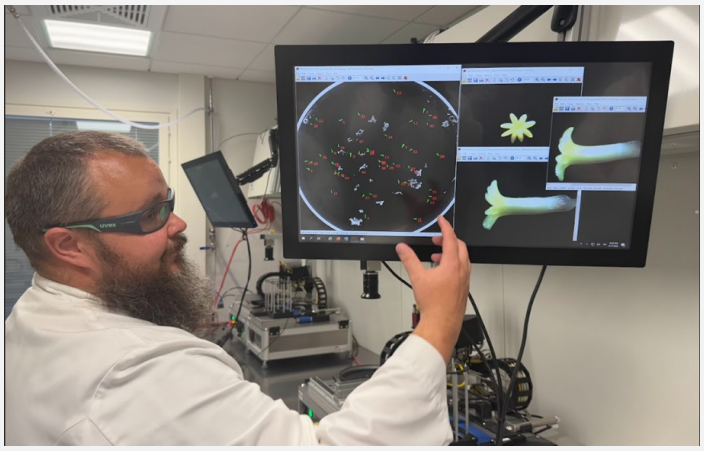
On the September 17th-18th, 2025, Natural Resources Institute Finland (Luke) organized a Copytree Training School ***"Robotics in conifer SE propagation"*** at Savonlinna, Finland. The event brought together six participants from Europe, Africa and South-America, who received hands-on training in applying robotics to woody plant vegetative propagation. The practical sessions focused on operating robotic systems developed jointly by Luke and South-Eastern University of Applied Sciences.

The Training School also provided an opportunity to test robots, not only with Luke's Norway spruce and Scots pine materials but also with participants' own somatic embryo samples from various woody plants, including date palm, sandalwood, grape wine, and cocoa.

The robots – originally designed for spruce – were found to be able to pick up embryos of various species, although requiring some species-specific adjustments.



Participants of the Cost Copytree Training School driving the robots at Luke laboratory.
Photo by Saila Varis.



Robot and local organizer Mikko Tikkinen in action.
Photo by Yenny Lineros.

Visiting Luke's SE germination rooms.
Photo by Tuija Aronen.

In addition of automation, the Training School also addressed other factors influencing scaling-up of SE, both in the laboratory and during a field excursion.

For example, importance of having large genetic materials was highlighted as essential for selecting genotypes with both favorable propagation characteristics and good field performance, ultimately contributing to economically viable outcomes.

Participants of the Training School with the local organizers and invited specialists. From left: Tuija Aronen (local organizer), Lucie Fischerova, Mikko Tikkinen (local organizer, in front), Elmar Bernhardt (invited specialist, in back), Karam Mostafa, Lotfi Fki, Marten Elsinga, Yenny Lineros, Pierre Videau, Jaakko Salminen (local organizer), Jana Krajnakova (invited specialist).

Photo by Saila Varis.

Luke is open for collaborative ideas!

Please contact
tuija.aronen@luke.fi or
mikko.tikkinen@luke.fi
if you are interested in robotics.

IoT-measurements of tree growth and environmental conditions at the Luke's Norway spruce SE field experiment.

Photo by Tuija Aronen.

Lotfi Fki, Mikko Tikkinen and Karam Mostafa at the Luke SE robotics lab.

Photo by Tuija Aronen.

1.2. Short Term Scientific Missions

Granted during the 3rd year of CopyTree (... cont.)

Detailed information is published in the General Room file share on the Internal area of our website:
https://www.copytree.eu/file-share/3a8ec0d4-1206-48fd-919f-547b02a64367

INFORMATION ABOUT STSM

Name: Eva Pokorná

Home Institution & Country: Forestry and Game Management Research Institute, Czech Republic

Title of STSM: Studying strategy for deciduous tree species drought resistance and improvement protocol for micropropagation of oak species to ensure long-term viability

Host Institution & Country: Santiago de Compostela, Spain

Period of the visit: 17.3.2025 - 25.3.2025

During my STSM, I was pleased to gain more experience and practical knowledge in bioinformatics, specifically RNA-Seq data processing, under the guidance of Dr. Jesús Vielba. Continuously, I worked on all aspects related to establishing oak *in vitro* cultures with Dr. Conchi Sánchez and Dr. Nieves Vidal, for which I´m very thankful as well.

INFORMATION ABOUT STSM

Name: Hajer Ben Ghozlen

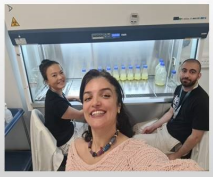
Home Institution & Country: Ghent University, Belgium

Title of STSM: Scaling up plant cell cultures in bioreactors for enhanced bioactive compound production

Host Institution & Country: Luxembourg institute of Science and Technology (LIST), Luxembourg

Period of the visit: 19.05.2025 - 06.06.2025

The mission fully achieved its main goal of gaining hands-on experience with bioreactors to scale up plant cell cultures for bioactive compounds production. The training covered the complete bioreactor workflow, including the set-up, aseptic inoculation, daily monitoring using EVE® software, and harvesting of cultures in 4-liter and 2-liter systems. Importantly, the opportunity established expert contacts and created concrete plans for future research projects.



INFORMATION ABOUT STSM

Name: Dr. Hans Bethge

Home Institution & Country: Leibniz University Hannover, Germany

Title of STSM: ADAM - AI-assisted optimization of culture media to accelerate micropropagation

Host Institution & Country: Vigo University, Spain

Period of the visit: 01.06.2025 - 01.08.2025

Short description (e.g. 2 - 3 sentences) of the STSM outcomes:

During this STSM, we developed ADAM, an open-access web-based platform that transforms plant tissue culture protocol optimization into a data-driven computational process. The software integrates five modules (experimental design, data preparation, machine learning model building, multi-objective optimization, and solution evaluation) to do ML-based optimization for the design of tissue culture media. We are currently finalizing a manuscript for submission describing the platform's validation across multiple tissue culture systems.

INFORMATION ABOUT STSM

Name: Katherine Paola Sandoval Cerron

Home Institution & Country: NEIKER

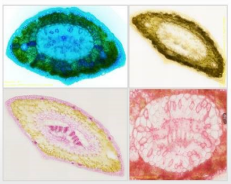
Title of STSM:

Microscopic, stereological analysis and interpretation of the hormonal profile of *Pinus radiata* needles from somatic plants subjected to priming to assess drought and heat stress adaptation

Host Institution & Country: Institute of Experimental Botany of the Czech Academy of Sciences, Czech Republic

Period of the visit: 31.03.2025 – 28.06.2025

Stereological and histological analyses of needles from somatic plants of *Pinus radiata*, together with a hormonal profile, were carried out to assess the effects of heat priming on stress adaptation. The anatomical images and hormone data will be integrated to identify structural and metabolic responses between primed and non-primed somatic plants, contributing to the understanding of a possible stress tolerance mediated by priming and supporting the preparation of a publication.



INFORMATION ABOUT STSM

Name: Luca Regni

Home Institution & Country: University of Perugia, Italy

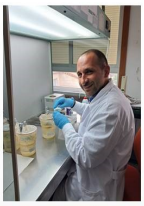
Title of STSM: Advancing Photoautotrophic Propagation Techniques in Olea europaea L. and Actinidia chinensis Planch.: A Collaborative Approach

Host Institution & Country: Consejo Superior de Investigaciones Científicas (CSIC) – Misión Biológica de Galicia, Spain

Period of the visit: 07.09.2025 - 12.09.2025

Short description (e.g. 2 - 3 sentences) of the STSM outcomes:

The STSM enabled to acquire advanced technical and methodological expertise in the use of bioreactors and temporary immersion systems for photoautotrophic micropropagation. The activities strengthened knowledge on innovative *in vitro* culture methods for woody species such as olive and kiwifruit, contributing to the development of more efficient micropropagation protocols.



INFORMATION ABOUT STSM

Name: Maria Dellino

Home Institution & Country: Department of Soil, Plant and Food Sciences (DiSSPA), University of Bari "Aldo Moro", Bari

Title of STSM: An efficient protocol for isolation, fusion and culture systems for olive (*Olea europaea* L.) protoplasts

Host Institution & Country: Ghent University, Belgium

Period of the visit: 28.04.2025 - 08.06.2025

The goal of this STSM was to develop a robust protocol for the *in vitro* culture and isolation of olive (*Olea europaea L.*) protoplasts. During the visit, I acquired techniques for protoplast isolation and fusion, and successfully established a protocol for obtaining protoplasts from callus cells of elite Mediterranean olive cultivars. This experience not only enhanced my *in vitro* culture skills but also significantly advanced my postdoctoral research in olive biotechnology, facilitating future work on gene editing and accelerating the breeding of improved varieties.

INFORMATION ABOUT STSM

Name: Marzieh Mohri

Home Institution & Country: Czech academy of sciences, Institute of Experimental Botany/ Czech Republic

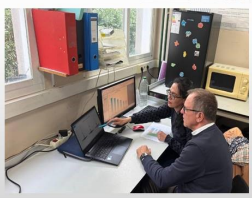
Title of STSM: Machine learning (ML) and AI tools to investigate the effect of phytohormones on Norway spruce embryogenic cultures

Host Institution & Country: Vigo University/ Spain

Period of the visit: 01.09.2025 - 01.11.2025

Short description (e.g. 2 - 3 sentences) of the STSM outcomes:

We identified the most effective phytohormone-based replacements for the BK medium components used during the induction phase of Norway spruce somatic embryogenesis. This involved statistical analysis using R and Python, and Machine Learning algorithms such as CHAID and Random Forest.



INFORMATION ABOUT STSM

Name: Michela Montone

Home Institution & Country: University of Pisa and CREA Research Centre of Vegetable and Ornamental crops, Italy

Title of STSM: Evaluation of epigenetic impact of *in vitro* priming biostimulants application on *Cistus creticus* L.

Host Institution & Country: Université d'Orléans and INRAE Orléans, France

Period of the visit: 22.09.2025 - 05.10.2025

Cistus creticus L. is a woody ornamental species recalcitrant in the germination phase. Preliminary results obtained showed that the use of priming with biostimulants (e.g. seaweed extracts) could be a powerful tool to reduce recalcitrance and improve salt stress tolerance in woody species. Based on results, the possibility of epigenetic modifications following priming treatment is assumed and should be important to investigate in further experiments.

1.2. Short Term Scientific Missions

Granted during the 3rd year of CopyTree

INFORMATION ABOUT STSM

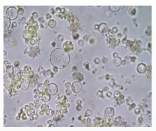
Name: Nuria Alburquerque Ferrando

Home Institution & Country: CEBAS-CSIC, Spain

Title of STSM: Protoplast Isolation from Apricot Plants (*Prunus armeniaca* L.)

Host Institution & Country: Ghent University, Belgium

Period of the visit: 13.10.2025 – 19.10.2025



Short description of the STSM outcomes:

During this STSM, hands-on experience was acquired in the isolation and transformation of protoplasts from apricot leaves. Viable protoplasts were successfully obtained, and enzyme optimization trials were completed, although transformation efficiency remained limited.

The visit provided valuable methodological training and strengthened collaboration between CEBAS-CSIC and Ghent University for future research.

INFORMATION ABOUT STSM

Name: Olha Yaroshko

Home Institution & Country: Institute of cell biology and genetic engineering National Academy of Sciences of Ukraine, Ukraine

Title of STSM: Phenotyping and genotyping of genetically transformed and CRISPR-Cas gene edited recalcitrant crops.

Host Institution & Country: University of Cologne, Institute for Plant Sciences at the Cologne Biozentrum, Germany

Period of the visit: 21.07.2025 - 01.08.2025

Picture 1. A. With my supervisor Markus in the office, B – Olha was sowing sterilized *Amaranthus* seeds which were latter used for *Agrobacterium rhizogenes* - mediated transformation experiments

The large-scale phenotyping of transgenic and CRISPR edited *A. hypochondriacus* lines previously obtained in the laboratory of Markus Stetter, was conducted. The results of transformation conducted with *Agrobacterium tumefaciens* strain GV3101 with incorporated genetic vector pMKV057 (carrying out genes *Luc*, *ZmWUS2*, *IPT*, *nptII*) and *A. rhizogenes* strains AR193 with pMGS18 vector with incorporated *RUBY* gene and gene editing conducted with *A. tumefaciens* strain GV3101 with incorporated genetic vector pMGS37 (carrying out sequences Cas9, gRNA1-gRNA2 AhCYP76AD2, gRNA4 AhCYP76AD5) were observed. The following potential changes in mutant plants were documented: changes in the quantity and form of axillary meristem formation, coloration changes, other morphological changes. The protocols of fast phenotyping of transgenic and gene edited plants was created. The effectiveness of each transformation method was calculated after performing phenotyping.

Picture 2. A, B - *Amaranthus hypochondriacus* plants which were previously transformed *via* different methods and for which I conducted phenotyping, recording all visual changes

INFORMATION ABOUT STSM

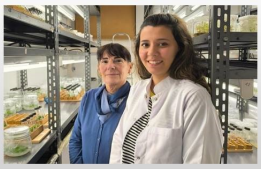
Name: Şafak Esra ASLAN

Home Institution & Country: Giresun University, Türkiye

Title of STSM: Capacity Building for the Micropropagation of Hazelnut: A Step Towards Genetic Conservation

Host Institution & Country: Council for Agricultural Research and Economics (CREA), Italy

Period of the visit: 21.09.2025-31.10.2025



Short description (e.g. 2-3 sentences) of the STSM outcomes: Within the scope of STSM, theoretical and practical experience has been gained on the necessary steps to develop an efficient micropropagation protocol to support the conservation of genetic diversity in hazelnuts. Information has been obtained on optimised culture conditions for all the phases of the micropropagation process in hazelnuts.

INFORMATION ABOUT STSM

Name: Sara Yasemin

Home Institution & Country: Siirt University, Türkiye

Title of STSM: Protoplast Isolation and Plasmid Transfection in Pistachio

Host Institution & Country: Ghent University, Belgium

Period of the visit: 28.07.2025 - 29.08.2025

The STSM successfully established reproducible protocols for protoplast isolation and transient gene expression in pistachio.Systematic optimization with callus and shoot explants led to significantly higher yields, reaching up to 10^6 protoplasts/mL. Transformation efficiency was estimated at approximately 40%, indicating that pistachio protoplasts are suitable to transient gene expression assays.

INFORMATION ABOUT STSM

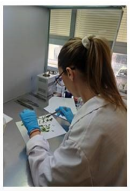
Name: Tatjana Anđelić

Home Institution & Country: Fruit Research Institute, Čačak, Republic of Serbia

Title of STSM: Development of protocols for the proliferation of axillary shoots of selected Serbian berry and fruit tree species in bioreactors

Host Institution & Country: Misión Biológica de Galicia, part of the Spanish National Research Council (CSIC), Spain

Period of the visit: 13.09.2025 -20.09.2025



The main results of this STSM include the successful establishment of bioreactor experiments with raspberry and sour cherry, with the optimization of growing conditions and practical training in the use of the RITA and Plantform systems. The cultures grown in bioreactors will further be used in upcoming experiments to evaluate the effects of liquid media on hyperhydricity and the overgrowth of endogenous microorganisms.

INFORMATION ABOUT STSM

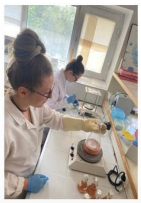
Name: Virginia Zahn

Home Institution & Country: Thuenen Institute, Germany

Title of STSM: Exploring Temporary Immersion Systems and Eucalyptus Micropropagation for Transferable Protocol Development in Forestry Species

Host Institution & Country: Cukurova University, Turkey

Period of the visit: 03.08.2025 - 16.08.2025



The STSM provided hands-on training in plant tissue culture and bioreactor-based propagation, focusing on *Eucalyptus* while facilitating reciprocal knowledge exchange between German and Turkish institutions. It strengthened technical capacity, fostered collaboration within the COPYTREE network, and provided valuable insights into the practical and societal aspects of forest biotechnology.

Acknowledging CopyTree in Your Publications

To **increase the visibility** of our network and support the achievement of CopyTree's goals, we kindly remind all members to **acknowledge COST Action CA21157** in any publication, presentation, or communication resulting from your involvement in CopyTree activities.

Please include the following official statement in the Acknowledgments section of your paper:

Acknowledgments: This article is based upon work from COST Action CA21157 "European Network for Innovative Woody Plant Cloning", supported by COST (European Cooperation in Science and Technology) (www.cost.eu).

1.3. Publications that acknowledged CopyTree

Aronen, T., Sota, V., Cvjetković, B. *et al.* (2025). From lab to forest: overcoming barriers to in vitro propagation of forest trees. *J. For. Res.* 36, 120. https://doi.org/10.1007/s11676-025-01914-y

Castander-Olarieta, Ander, Javier Herrero, Caroline Teyssier, Paloma Moncaleán, and Itziar A. Montalbán. 2025. "Comparative Study of *Pinus radiata* Plant Production Methods: Classical Seed Germination vs. Somatic Embryogenesis, from Operative to Biochemical Approaches" *Seeds* 4, no. 3: 41. https://doi.org/10.3390/seeds4030041

Chmielarz P, Sánchez C, Martins JR, Ley-López JM, Covelo P, Cernadas MJ, Aldrey A, Rico S, Vielba JM, Christie B, Vidal N (2025). Multiplication of axillary shoots of adult *Quercus robur* L. trees in RITA® bioreactors. Forests 2025, 16, 1285. https://doi.org/10.3390/f16081285

Hazubska-Przybył T., Kosek P., Wasileńczyk U., Pałucka M., Wawrzyniak M.K., Valimaki S., Varis S., Aronen T. (2025). Cryopreservation of Embryos and Embryogenic Samples to Conserve Plant Genetic Resources. In: Gantait, S., Chmielarz, P. (eds) Conservation of Plant Genetic Resources. Springer, Singapore. https://doi.org/10.1007/978-981-96-8331-4_6

Miranda S, Malnoy M, Aldrey A, Cernadas MJ, Sánchez C, Christie B, Vidal N (2025). Micropropagation of Apple Cultivars 'Golden Delicious' and 'Royal Gala' in Bioreactors. Plants, 14, 2740. https://doi.org/10.3390/plants14172740

Singh, H., Kumar, P., Singh, J. *et al.* Efficient protoplast isolation and transfection for CRISPR/Cas9-based genome editing in pea (*Pisum sativum* L.). (2025). *Plant Cell Tiss Organ Cult* 163, 12. https://doi.org/10.1007/s11240-025-03198-w

Sota V, Nacheva L, Bošnjak D, Abraham E, Jevremović S, Cvjetković B, Galović V, Jevremović D, Marković Z, Kongjika E, Bogunović S, Zeljković S, Andonovski V, Daničić V and Vujović T (2025). Unveiling the Balkans' advances: In vitro biotechnology of woody plants in the early 21st century. Front. Plant Sci. 16:1586013. https://doi.org/10.3389/fpls.2025.1586013

Sota, V., Wilms, H., Yücesan, B. *et al.* (2025). Challenges in the micropropagation of economically important fruit species in Europe. *Plant Cell Tiss Organ Cult* **162**, 53. https://doi.org/10.1007/s11240-025-03165-5

1.4. XVI SECIVTV Congress – Vigo, Spain

On 3-5 September, 2025, The Spanish Society of In Vitro Culture of Plant Tissues held its XVI Congress

Vigo, SPAIN

The event was organized by a team that included **COPYTREE members Manuel Rey, M.ª Victoria González, and Marcos Viejo**, as part of the Organizing Committee.

The Congress gathered a large representation of the COPYTREE network, with **over twenty members** actively participating through presentations, posters, and discussions.

Scientific sessions covered a wide range of themes, including:

- Micropropagation and Conservation;
- Somatic Embryogenesis;
- Gene Transformation and Editing;
- In Vitro Culture Strategies for Breeding;
- Science and Business.

1.5. Collaborative projects involving CopyTree members

1. **Reprogramming recalcitrant tree species for regeneration and field deployment.** Funded by Spanish Ministry of Science, Innovation and University (PID2024-162781OB-100).
COPYTREE participants: Conchi Sánchez, Nieves Vidal, Jesús Vielba, Purificación Covelo, Beatriz Cuenca, Stefaan Werbrouck, Stephane Maury, Jaroslav Nisler, Lucie Fischerova, Mickael Malnoy and Simón Miranda.

2. **Project: PID2022-137499OB-I00 (01.09.2023–31.08.2027) "Biotechnology approaches to overcome environmental stress conditions in Prunus sp."** Funded by Ministry of Science, Innovation and Universities - Spanish Research Agency.
COPYTREE participants: Nuria Alburquerque, Lorenzo Burgos, Francisco Javier Alfosea-Simón, Marina Martín-Valmaseda.

1.6. CRYOCONNECT - Training School

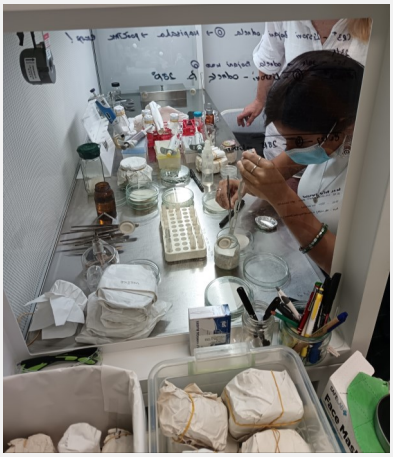
The Fruit Research Institute, Čačak, Serbia hosted a Training School on Cryopreservation within the framework of CryoConnect project

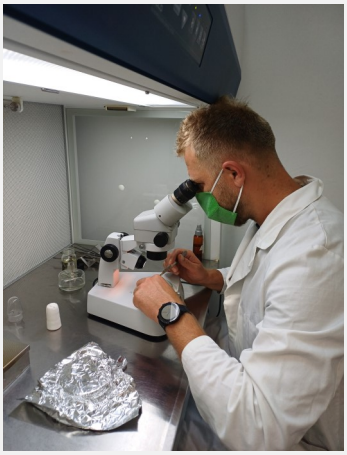
2—5 September, 2025

Local organizer: Tatjana Vujović

This Training School welcomed participants from Albania, Bosnia and Herzegovina, Croatia, Georgia, and North Macedonia.

This Training School covered droplet vitrification, D Cryo-plate, and V Cryo-plate techniques, supported by a detailed manual and upcoming online follow-ups.





CryoConnect is an **ECPGR - European Cooperative Programme for Plant Genetic Resources** initiative to build a cross border cryobank for fruit tree and grape genetic resources in some Western Balkans countries, marking the first regional collaboration in cryopreservation.

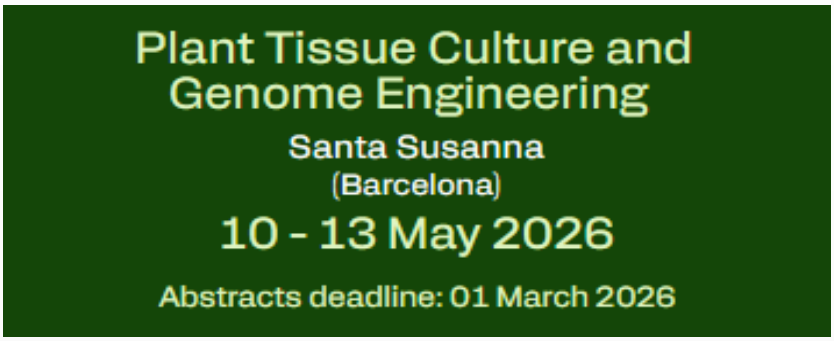
Participating CopyTree members:

Darko Jevremović and **Tatjana Vujović** (Fruit Research Institute, Čačak, Serbia)

Zvjezdana Marković (University of Zagreb, Croatia)

Valbona Sota ([1]University of Tirana; [2]Research Center of Biotechnology & Genetics, ASA, Albania)

2. Upcoming Events



READ MORE

WEBINAR SERIES

Interested in learning more about *in vitro* culture of woody plants?

We are excited to announce our upcoming Webinar Series, where you will gain valuable insights on the following topics:

- Overcoming recalcitrance in woody plants.
- Tools for diagnosis, sanitation, and storing clean stocks.
- Scaling up the production of elite clones at an affordable price.
- Understanding the real risks associated with this technology.
- Raising awareness and providing information tools to improve public acceptance.
- Encouraging foresters and landowners to invest in planting poly-clonal forests.

CopyTree is currently looking for speakers for the webinar series!

The webinars will run for 60 minutes, with 5 minutes for introduction, 45 minutes for presentation, and 10 minutes for addressing participants' questions.

If you would like to submit a topic for consideration, please contact the CopyTree Webinar Coordinator, at tobias.bruegmann@thuenen.de

READ MORE

OPEN CALLS

CopyTree has allocated dedicated budget for several activities in Grant Period 4 (GP4):

- Short-Term Scientific Missions (STSMs);
- Young Researcher and Innovator Conferences;
- Inclusiveness Target Countries (ITC) Conferences;

Calls for applications will soon be published on the CopyTree website.
Stay tuned and check the website regularly for updates and detailed instructions!

3. COMMUNICATION PLATFORMS

WEBSITE & SOCIAL MEDIA PAGES

- **COST Website**: https://www.cost.eu/actions/CA21157/
- **CopyTree Website:** www.copytree.eu

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INTERNAL AREA OF COMMUNICATION

Are you already an approved CopyTree member?

Join our community area by signing up in this link:
https://www.copytree.eu/join-us

After signing up, join different working groups in interactive discussions.

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COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.
www.cost.eu

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