International Experts gather in Spain to advance the Restoration of *Posidonia oceanica* ecosystems

An international workshop brings together science, technology, and the blue economy to scale up the protection of the "lungs" of the Mediterranean.

On **3rd of June 2026**, within the framework of the European research project **SUNBIO**, a highly successful hybrid **workshop** on ***Posidonia oceanica* Restoration**, one of the most valuable and emblematic marine ecosystems of the Mediterranean Sea, was held at the Universitat Politècnica de Catalunya (UPC) Campus in Vilanova i la Geltrú, Spain, while also offering the possibility of online participation.

The workshop brought together **nearly 100 participants**, including 26 on-site attendees and approximately 70 remote participants. The event gathered marine scientists, restoration practitioners, technology experts, conservation organisations, citizen science initiatives and representatives of the blue economy to exchange knowledge, methodologies and best practices for the restoration and long-term monitoring of *Posidonia oceanica* meadows.

Often referred to as the "**lungs of the Mediterranean**", *Posidonia oceanica* is an endemic seagrass species that plays a critical role in carbon sequestration, coastal protection, biodiversity conservation and the overall health of Mediterranean marine ecosystems. Through **16 oral presentations**, interactive **networking sessions** and **open discussions**, the workshop provided a comprehensive overview of current advances in marine regeneration, from ecological restoration and assisted migration to AI-powered monitoring, robotics and community-based conservation.

The workshop was co-organised within the framework of the **SUNBIO project**, with the contribution of the SUNBIO consortium and the support of Atlantis Consulting and Universitat Politècnica de Catalunya (UPC), also partners of the SUNBIO project.

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Morning Session & Networking Sessions

The morning session opened with a welcome by **Joaquin del Rio** from UPC, setting the context for a full-day programme dedicated to the scientific, technological and practical dimensions of *Posidonia oceanica* restoration. The first group of presentations focused on **restoration effectiveness**, **ecological experimentation**, **transplantation strategies** and **innovative cultivation methods**.

Arianna Pansini from the University of Sassari opened the workshop with the presentation "*Posidonia oceanica restoration effectiveness: evidence from a meta-analysis*". Her presentation addressed the reliability and effectiveness of restoration actions, highlighting the importance of understanding the drivers that influence restoration success under current and future climate change scenarios.

Luca Rindi from the University of Pisa followed with "*Challenges and opportunities: How ecological experiments can enhance the restoration of Posidonia oceanica*". His contribution focused on the value of ecological experiments in improving restoration planning, supporting more predictive monitoring approaches and strengthening the resilience of restored meadows.

Fabio Blanco Murillo, Marie Skłodowska-Curie Fellow at the Stazione Zoologica Anton Dohrn, presented "*Does origin matter? Exploring assisted migration techniques for Posidonia oceanica restoration*". His work explored assisted migration and stress-hardening as promising approaches to improve seed-based restoration and enhance the ability of restored meadows to cope with increasing environmental pressures.

Craig Syms from Seagrass Blue presented "*Midwater aquaculture: A novel tool for seagrass restoration*", introducing midwater aquaculture as an innovative approach that may support controlled plant development before deployment in natural marine environments.

The first session concluded with **Arnaud Boulenger** from STARESO and the University of Liège, who presented "*Multi-scale assessment of the biological and ecological responses of Posidonia oceanica to transplantation for the optimization of seagrass meadow restoration*". His presentation focused on transplantation responses and the recovery of ecological functions, supporting the optimisation of large-scale restoration strategies.

The first **networking and discussion session** gave participants the opportunity to exchange views on the scientific evidence needed to move from experimental restoration trials to larger-scale implementation. The discussion highlighted the **need for stronger links between ecological research**, **field experimentation** and **restoration practice**.

After the coffee break, the second part of the morning session shifted towards **practical restoration systems**, **scalable methods**, **AI-supported monitoring** and the **role of ecological conditions in restoration success**.

Frederik Veger from UPC presented "*Development and evaluation of an ex situ system for monitoring survival and floral induction in Posidonia oceanica*", focusing on controlled systems that can support the monitoring of survival and reproduction-related processes in *Posidonia oceanica*.

Alex Leon, also from UPC, presented "*Study of Low-Cost & Highly Scalable Replantation Methods of Posidonia oceanica*". His presentation focused on the development and monitoring of innovative, low-cost and scalable methods for marine regeneration, contributing to the wider challenge of making restoration more feasible and applicable at larger spatial scales.

Albert Català from UPC presented "*Using satellite images and AI for seagrass monitoring*", demonstrating the potential of satellite imagery and artificial intelligence for monitoring seagrass meadows and tracking changes over time. His work highlighted the growing importance of computer vision, remote sensing and marine technologies in environmental monitoring.

Patrizia Stipcich from the University of Naples Federico II presented "*Insights for future seagrass restoration: the effects of canopy density and thermal conditions on Posidonia oceanica seedlings*". Her presentation explored how ecological and climatic conditions affect the early life stages of *Posidonia oceanica*, offering valuable insights for future restoration planning.

The morning session concluded with **Fabio Badalamenti** from CNR-IAS in Palermo, who presented "*From seedlings to rhizome fragments: the role of substrate in Posidonia oceanica restoration*". His contribution underlined the importance of substrate characteristics, plant–substrate interactions and suitable microsites for successful anchorage, establishment and long-term survival.

A second networking and discussion session followed, focusing on the **technical and ecological challenges of restoration**, including substrate selection, anchoring systems, scalability and the need for environmentally compatible restoration solutions.

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Afternoon Session & Networking Session

The afternoon session, which was moderated by Frederik Veger from UPC, placed strong emphasis on **socio-ecological models**, **citizen science**, **site selection**, **national restoration goals**, **nursery-based approaches** and **robotics-assisted monitoring**.

Gigi Torras, scientific advisor at Arrels Marines, opened the afternoon session with "*Community-rooted seagrass restoration: participatory marine regeneration in Alcanada and Cala Murta (Mallorca)*". Her presentation showcased community-based restoration initiatives in Mallorca, highlighting the role of local actors, diving centres and marine education in connecting people with underwater conservation.

Pau Aguiló from the Centre d'Estudis del Mar, Barcelona Provincial Council, presented "*Monitoring Posidonia in Vilanova i la Geltrú through Citizen Science*". His contribution focused on citizen science, marine environmental education and outreach as tools for strengthening public awareness and supporting local monitoring efforts.

Marzia Cianflone from the University of Naples Federico II presented "*Remote Sensing Approaches to Identify Suitable Sites for Posidonia oceanica Restoration*". Her presentation explored the use of satellite data and remote sensing workflows to identify suitable areas for restoration, monitor habitat changes and support more informed site-selection strategies.

Eugenia Apostolaki, Senior Researcher at the Hellenic Centre for Marine Research, presented "*Restoring seagrass meadows to meet the national climate and biodiversity goals in Greece*". Her presentation connected seagrass restoration with broader national climate and biodiversity objectives, underlining the role of Posidonia oceanica meadows in climate change mitigation, adaptation and ecosystem resilience.

Lewis Stagnetto from The Nautilus Project presented "*Recovering lost Seagrass meadows in Gibraltar; From nursery to the wild*". Their presentation focused on restoration work in Gibraltar, including nursery-based approaches and the transition from controlled conditions to natural marine environments.

The final presentation of the day was delivered by **Ainhoa Idiondo Molina** from ICM-CSIC, with "*AI4SEA: Monitoring Seagrass Ecosystems: Bridging Traditional Methods and Robotics-Based Approaches*". Her contribution highlighted how artificial intelligence, autonomous underwater vehicles, smart observatories and robotics-based monitoring can enhance habitat mapping, long-term observation and in-situ decision-making for marine ecosystems.

The afternoon session concluded with a final networking and discussion session, where participants exchanged views on **how science, technology, restoration practice and community engagement can be better integrated to support long-term marine regeneration**.

Discussion and Conclusions

The workshop concluded with an **open discussion** among participants, highlighting the **need for stronger collaboration between science, technology and local communities** in order to support effective *Posidonia oceanica* restoration. Key points emerging from the discussion included the importance of selecting suitable restoration sites, developing low-cost and scalable methods, and using reliable monitoring tools to assess long-term success. Participants also underlined the value of citizen science, local engagement and knowledge exchange between researchers, practitioners and conservation organisations.

Overall, the workshop confirmed that **the restoration of *Posidonia oceanica* requires an integrated approach, combining ecological expertise, technological innovation and active community participation**.

The importance of *Posidonia oceanica* for the Environment and Society

***Posidonia oceanica* meadows** are among the most important marine habitats in the Mediterranean. They support **high levels of biodiversity**, provide **shelter** for numerous marine species and contribute to the **stability and productivity of coastal ecosystems.**

From an environmental perspective, these meadows act as **powerful blue carbon sinks**, capturing and storing carbon over long periods of time. They also help protect coastlines from erosion by stabilising sediments and reducing wave energy. In a context of accelerating climate change, biodiversity loss and coastal pressure, the protection and restoration of *Posidonia oceanica* is therefore essential for **strengthening the resilience of Mediterranean marine and coastal environments**.

The benefits for society are equally significant. Healthy seagrass meadows support fish stocks and local fisheries, contribute to **clearer waters** and **enhance the attractiveness of coastal destinations**. They are also closely linked to **sustainable tourism**, including **diving tourism**, by supporting **rich marine life and high-quality underwater landscapes**.

In this sense, *Posidonia oceanica* restoration contributes not only to environmental protection, but also to **sustainable Blue Growth**, **local economies**, **coastal resilience** and the **long-term well-being of Mediterranean communities.**

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Video recording

For those who were unable to attend, the **full recording of the workshop**, including the oral presentations and discussion sessions, is available on the **SUNBIO YouTube channel**: https://www.youtube.com/watch?v=Q5qdXbFsr5U

Stay connected

For more information about the SUNBIO project, the workshop outcomes and future activities, please contact:

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Workshop

Posidonia oceanica Restoration

3 June 2026 | Universitat Politècnica de Catalunya campus in Vilanova i la Geltrú | Hybrid

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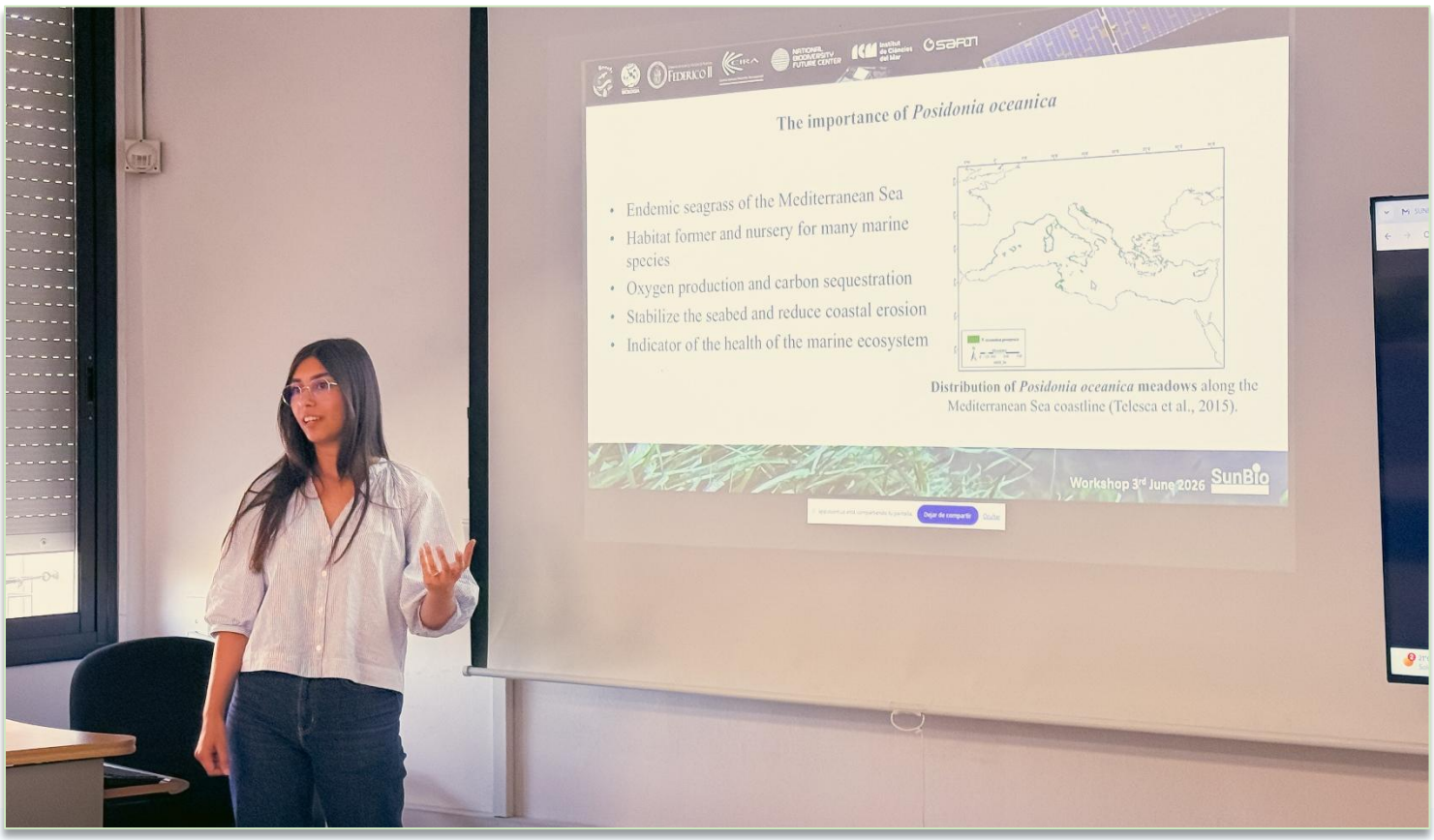

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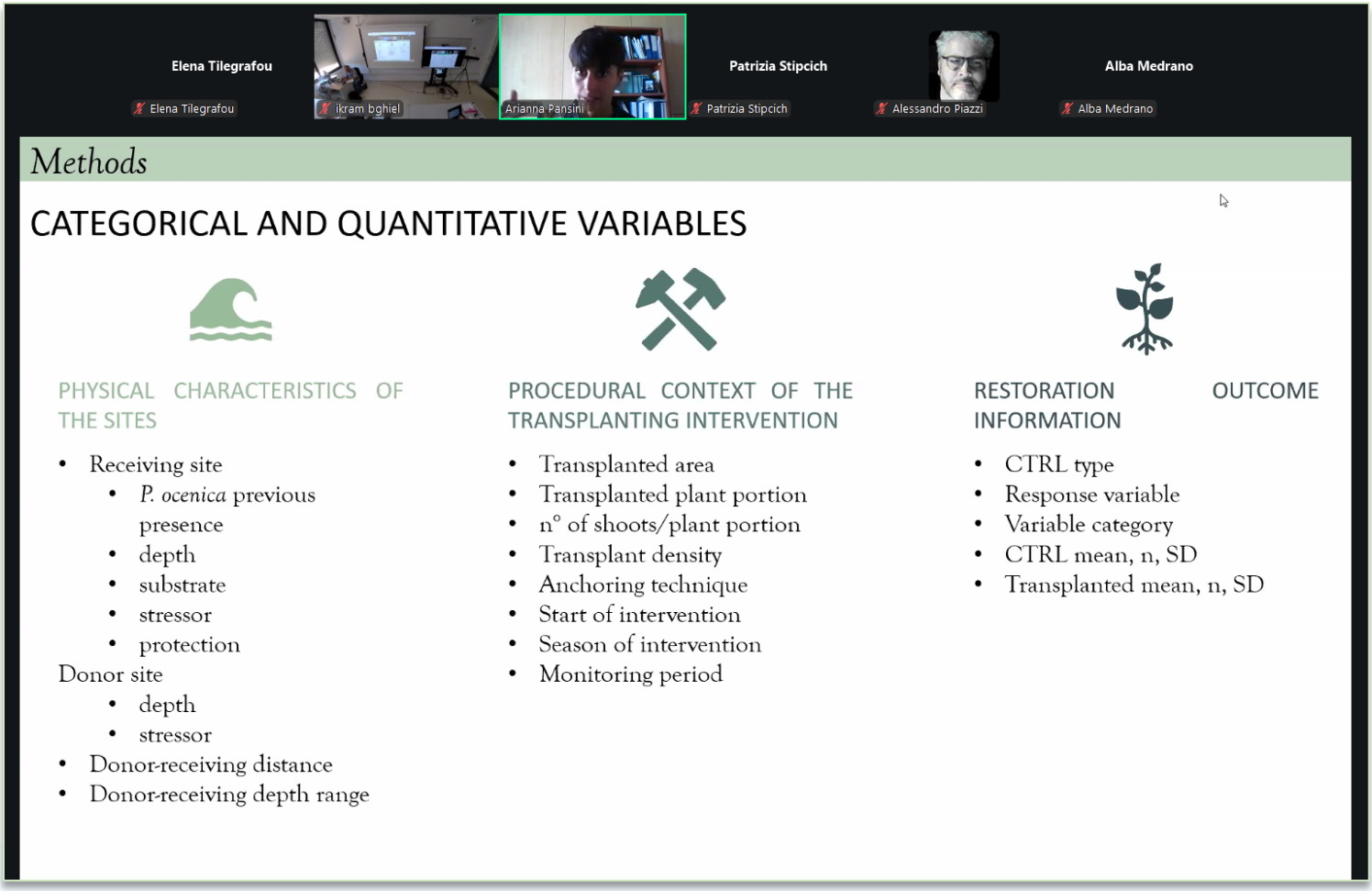

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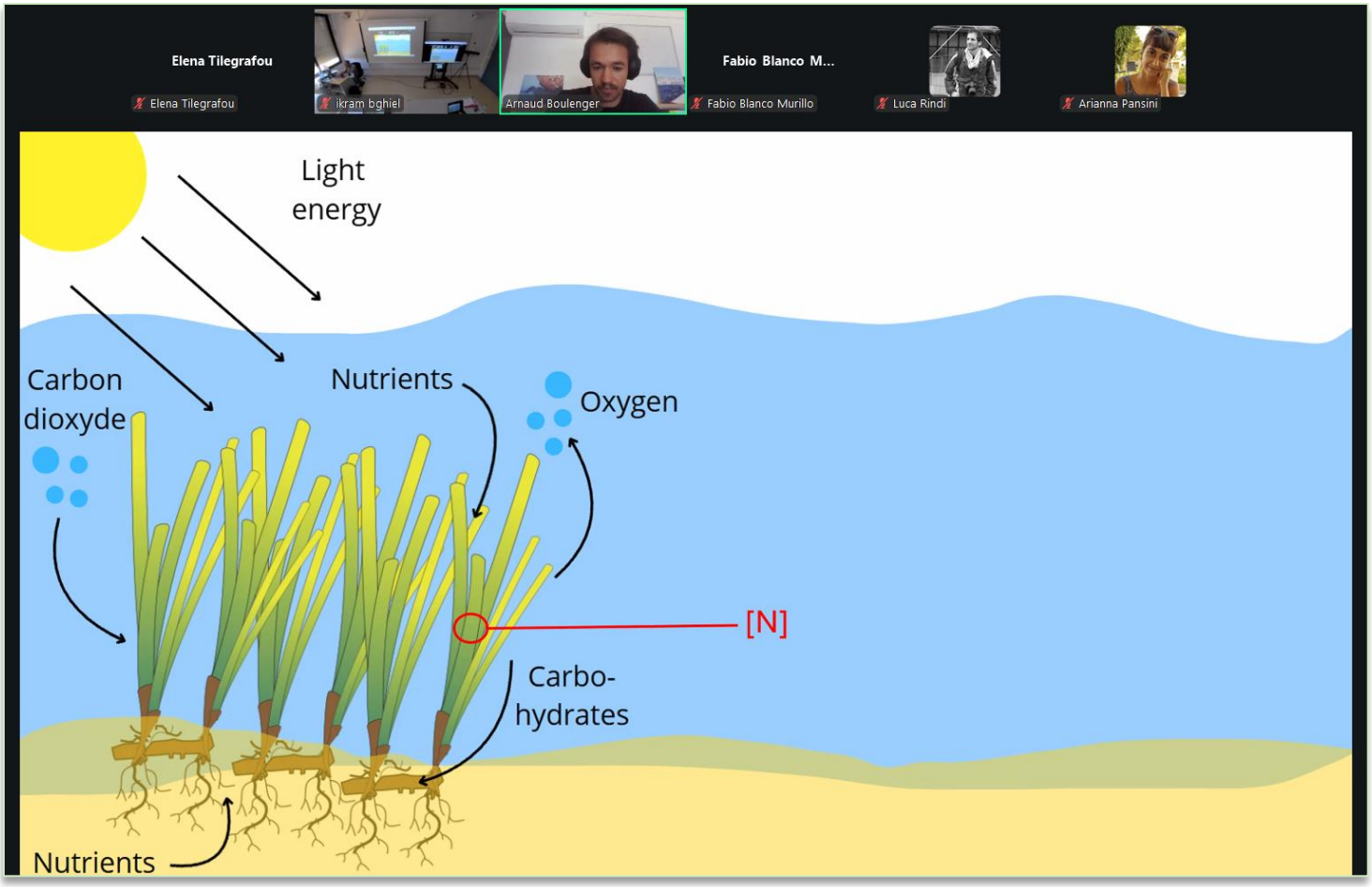

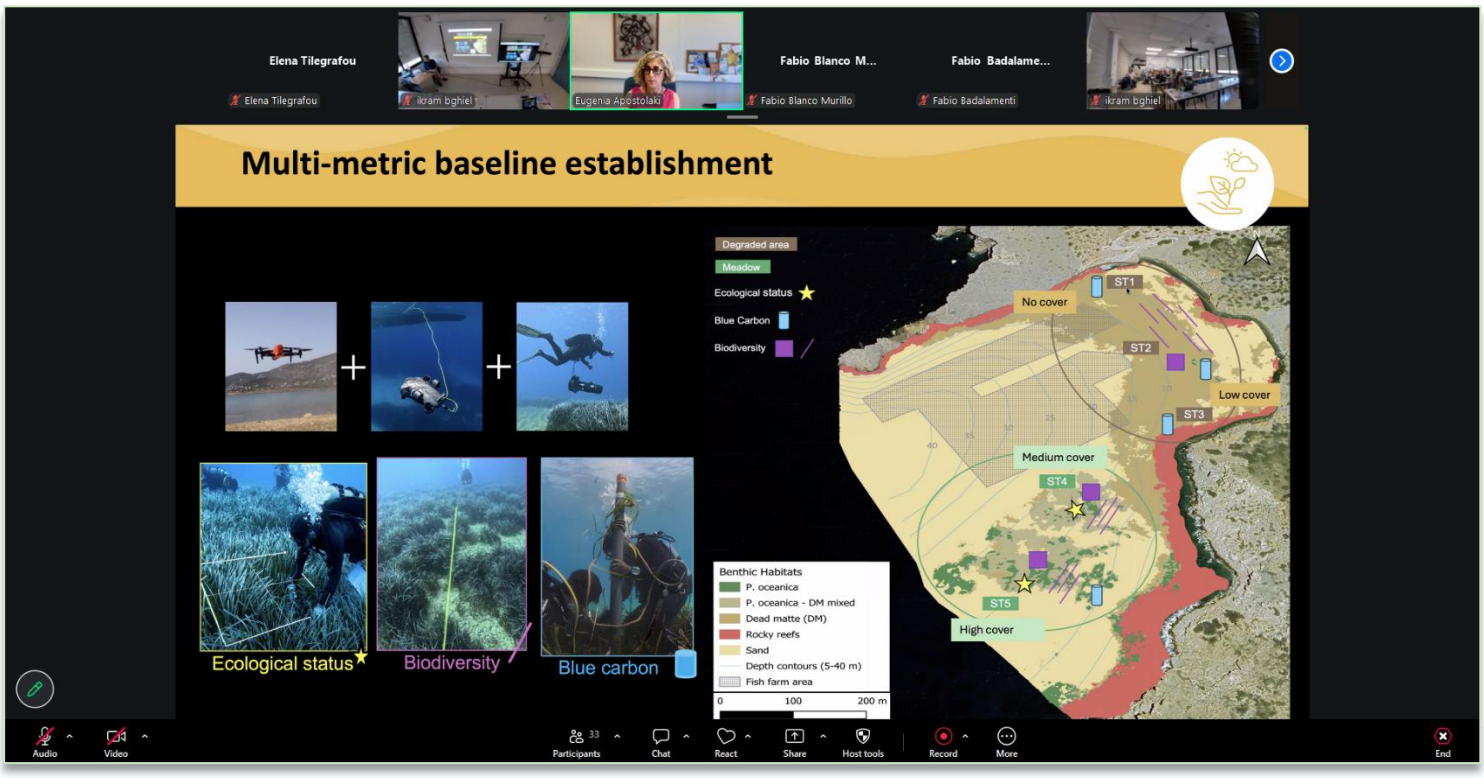

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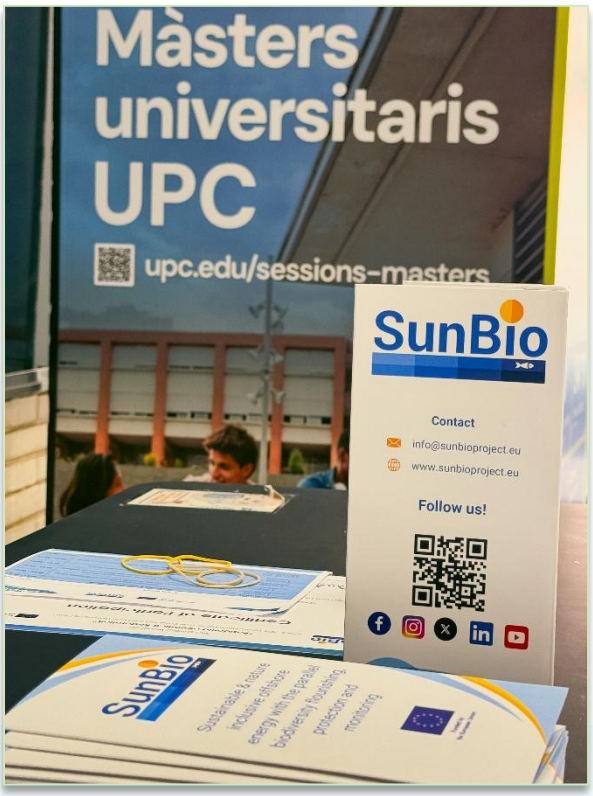

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