Science Communication Committee Activities throughout GP3

The Science Communication Committee (SCC) has been actively engaged in a wide range of activities during the GP3 period. These activities include social media campaigns, publications, blog posts, a public awareness movie clip, a recipes e-book, a newsletter, and proceedings. This report highlights the key initiatives, accomplishments, and outcomes of the SCC's efforts in promoting science communication and engagement with the public.

The SCC's mission is to fill the gap between scientific research and the general public by communicating complex science in a clear and engaging way. During the GP3 period, the committee focused on several strategies to accomplish this.

The SCC team used the graphic design platform Canva to produce visually appealing content for social media, ensuring a cohesive visual identity.

The SCC also launched a series of targeted social media campaigns on platforms like Facebook, X (Twitter), and Instagram, delivering scientific information in concise and attractive formats. Regular posts were shared to spark curiosity and enhance the audience's understanding of science.

Instagram statistics

Currently, the SeaWheat Instagram page has 440 followers (+30% compared to GP2) 304 and is following 151 Instagram accounts. Following accounts with similar interests (e.g., seaweed, biological products, alternative foods, Ulva…) has proved in the past to be a good way to reach more accounts and increase the chances of having the SeaWheat Instagram page being shared by others. In total, since the creation of the account, 81 Posts were added to advertise SeaWheat COST Action's related events such as workshops, conferences, training schools, STSMs, Lunch with Ulva (webinar series), and the SEEK platform. A total of 72 stories were released in from September 2023 to September 2024.

The Instagram's "Insights" tool provides both an overview and a detailed version of the different types of interaction between the account and the Instagram community members. The data is shown in cycles of 90 days allowing the comparison between the current cycle (18th of June 15th of September 2023). To evaluate the success of the Instagram account, metrics such as number of followers, accounts engaged, and accounts reached are considered:

- Number of followers: number of Instagram accounts that are actively following and receiving updates from the SeaWheat Instagram account.
- Number of accounts reached: number of accounts that viewed the SeaWheat published content (separated by followers or non-followers). Examples: finding new posts on their feed, watching newly published stories, or actively going to the SeaWheat Instagram page.
- Number of accounts engaged: number of accounts that interacted with the SeaWheat account. Examples: comments on posts, saving the posts, liking the posts or stories, and answering directly to a story.

Based on Instagram Insights, in the last 90 days, 810 accounts were reached of which 33% follower and 67% non follower accounts and +189% of overall impressions (Table 1). Number of accounts engaged increased of +45% of which 93.5% follower. We confirm, as reported in the GP2 report, that overall Posts are the best way to reach non-followers, which can increase the chances of increasing the total number of followers. Stories and Reels, on the other hand, seem to be more important for the engagement with people who are already followers and to keep them informed. Posts also receive more likes and can be saved to other people's accounts to be accessed later, while stories disappear after 24 h and can only be liked or shared. Therefore, stories appear to be a good way to boost the metrics of the Posts rather than being a good engagement tool themselves, as their reach with followers and non-followers is lower. Insight metrics also revealed that the average times the followers are online is at 9am and 12 pm regardless of the day of the week.

Table 1 – Instagram Metrics (Engagement and Reach) of the last 90 days (from 18th June to 15th September 2024):

Metrics	Total	Followers	Non-followers
Accounts Reached	810	277	533
Accounts Engaged	62	58	4
	Total	**Profile visits**	**External link taps**
Profile activity	120	112	8

Table 2 – Engagement Metrics per Post and Story published on Instagram since last 90 days (from 18th June to 15th September 2024).

Social Network	Activity Type	Content	Engagement Metrics	Repost
Instagram	Post	Call for STSM	Likes: 17(94% followers, 6% non-followers), Comments: 0, Reach: 397 (51% followers, 49% non-followers), Saved: 0	
Instagram	Post	Webinar Lunch with Ulva	Likes: 15 (100% followers), Comments: 0, Reach: 222 (57% followers, 43% non-followers), Saved:1	
Instagram	Post	Wokshop Bioactive in Ulva	Likes: 35 (94% followers, 6% non-followers), Comments: 0 , Reach: 161 (88% followers, 12% non-followers), Saved: 3	
Instagram	Post	Webinar Lunch with Ulva	Likes: 9 (100% followers), Comments: 0, Reach: 232 (60% followers, 40% non-followers), Saved:0	
Instagram	Story	Call for STSM	Reach: 99 (99% followers, 1% non-followers), Impressions: 101 Engagement: 1 (99 % followers, 1% non-followers), Likes: 1, Shares: 0, Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva	Reach:102 (99% followers, 1% non-followers), Impressions: 103 Engagement: 2, Likes:2 , Shares:0 , Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva	Reach:96 (99% followers, 1% non-followers), Impressions:96 Engagement:2 , Likes:2 , Shares:0 , Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva	Reach: 88 (98% followers, 2% non-followers), Impressions:90 Engagement:2 , Likes:2 , Shares:0 , Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva	Reach: 278 (30% followers,71 % non-followers), Impressions:278 Engagement:4 , Likes:4 , Shares: 0, Replies: 0	

Instagram	Story	Wokshop Bioactive in Ulva	Reach:82 (97% followers, 3% non-followers), Impressions:85 Engagement:4 , Likes: 4, Shares:0 , Replies: 0	
Instagram	Story	Call for STSM	Reach:78 (99% followers, 1% non-followers), Impressions:79 Engagement:2 , Likes: 2, Shares: 0, Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva	Reach: 93 (% followers, 1% non-followers), Impressions: 95, Engagement:2 , Likes: 2, Shares: 0, Replies: 0	repost from @food_4_future
Instagram	Story	Wokshop Bioactive in Ulva	Reach: 98 (99% followers, 1% non-followers), Impressions: 102, Engagement: 8 (100% non followers), Likes: 8, Shares: 0, Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva	Reach: 95 (97% followers,3 % non-followers), Impressions:98 Engagement: 6 (100% non followers), Likes:6 , Shares:0 , Replies:0	
Instagram	Story	Wokshop Bioactive in Ulva and Traning School	Reach: 81 (100% followers, 0% non-followers), Impressions: 81, Engagement: 4, Likes: 4, Shares: 0, Replies: 0	repost from @food_4_future
Instagram	Story	Wokshop Bioactive in Ulva and Traning School	Reach: 84 (70% followers, 30% non-followers), Impressions: 88 , Engagement: 5 (20% follower, 80% non follower), Likes: 5, Shares: 0, Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva and Traning School	Reach: 55 (96 % followers, 4% non-followers), Impressions:55 , Engagement: 3, Likes: 3, Shares: 0, Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva and Traning School	Reach: 61 (100% followers), Impressions: 61 , Engagement:4 , Likes: 4, Shares: 0, Replies: 0	repost from @food_4_future
Instagram	Story	Webinar Lunch with Ulva	Reach: 46 (100% followers, 0% non-followers), Impressions: 47, Engagement: 1, Likes: 1, Shares: 0, Replies: 0	
Instagram	Story	Wokshop Bioactive in Ulva and Traning School	Reach: 29 (100% followers, 0% non-followers), Impressions: 29, Engagement: 2, Likes:2 , Shares: 0, Replies: 0	
Instagram	Story	Ulva recipy book	Reach: 28 (100% followers, 0% non-followers), Impressions: 28 ,	

			Engagement: 0, Likes:0 , Shares:0 , Replies:0	
Instagram	Story	Wokshop Bioactive in Ulva and Traning School	Reach: 28 (100% followers, 0% non-followers), Impressions: 28 , Engagement:1 , Likes: 1, Shares: 0, Replies: 0	repost from @food_4_future
Instagram	Story	Wokshop Bioactive in Ulva and Traning School	Reach: 27 (100% followers, 0% non-followers), Impressions: 28 , Engagement: 1, Likes: 1, Shares: 0, Replies: 0	repost from @food_4_future
Instagram	Story	Webinar Lunch with Ulva	Reach: 25 (100% followers, 0% non-followers), Impressions: 26 , Engagement: 2, Likes: 2, Shares: 0, Replies: 0	
Instagram	Story	Seaweed awareness	Reach: 52 (100% followers, 0 % non-followers), Impressions: 52 , Engagement: 4, Likes: 4, Shares: 0, Replies: 0	Repost from @THESEAWEEDCO
Instagram	Story	Seaweed awareness	Reach: 36 (100% followers, 0 % non-followers), Impressions: 36 , Engagement: 1, Likes: 1, Shares: 0, Replies: 1	Repost from @THESEAWEEDCO
Instagram	Story	Webinar Lunch with Ulva	Reach: 66 (100% followers, 0 % non-followers), Impressions: 66 , Engagement: 1, Likes: 1, Shares: 0, Replies: 2	

LinkedIn statistics

The LinkedIn account 928 followers, metrics of the last year (from 17/09/2023 to 15/09/2024) indicate a total of 1403 impressions, 35 comments and 38 posts shared. The account Seawheat - COST Action has the Analyses tool, which includes the Visitor demographics that show a breakdown of who has visited your Page and can be filtered by time ranges, Job function, Location, Seniority, Industry, and Company size. For this tool we considered the last 365 days. In Figure 1 are reported the number of Impressions, Reactions and Comments along the last 365 days.

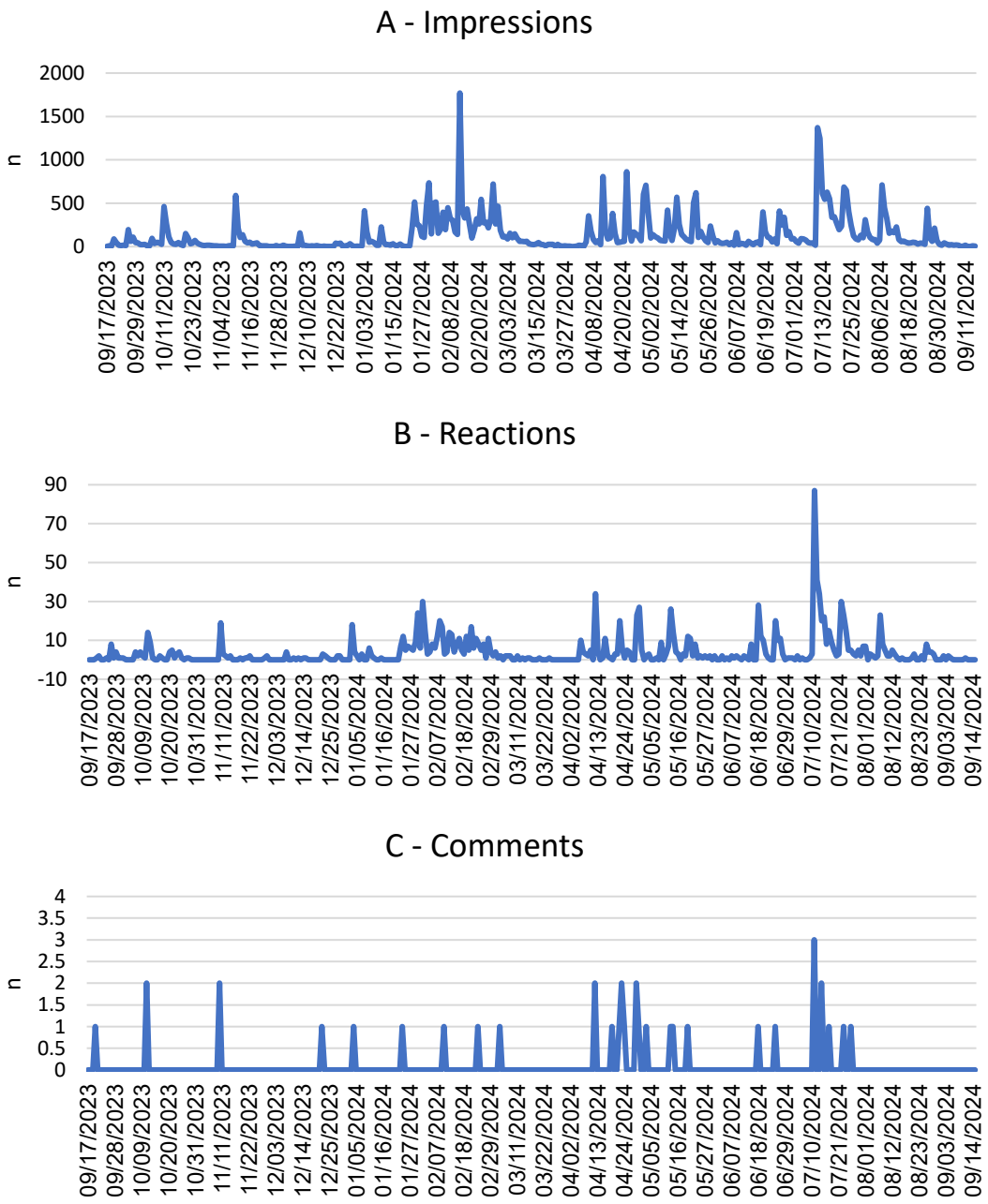

Figure 1: Number of impressions (A), Reaction (B) and Comments (C) along the last 365 days.

Regarding the Location, the total 928 follower were divided as shown in Figure 2, this the highest value observed in Portugal where the 1st workshop “From Ulva aquaculture to food and feed production: state-of-the-art, bottlenecks, risks and gaps” was held, followed by Spain where the 2nd workshop was held (Cadìz). The effect of the workshop can also be observed in other metrics considered, including the number of clicks, impressions, and diffusion of the posts.

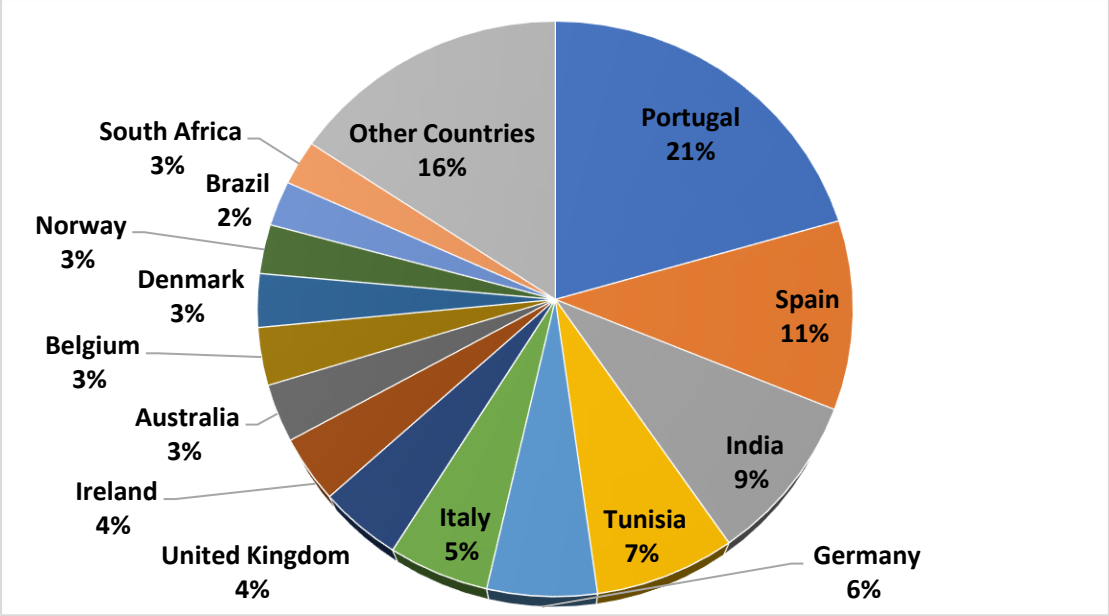

Figure 2: Percentage of followers from different Locations

COOKBOOK

One of the major deliverables of our project is the comprehensive development of a cookbook entitled *Savouring Seaweed: Embracing Ulva as the Future Wheat of the Sea*. This publication is more than a simple collection of recipes; it is a key tool for fostering awareness and adoption of Ulva, a highly versatile seaweed, as a sustainable and nutritious food source. The cookbook was developed in collaboration with renowned chefs, marine biologists, and sustainability experts to bridge the gap between scientific research and public engagement. It highlights the culinary potential of Ulva while educating consumers about its environmental benefits and role in future food systems.

The cookbook serves as a means of translating the technical knowledge gained from mariculture and environmental research into actionable, everyday practices. By presenting Ulva in an accessible and appealing format, it aims to promote its integration into a wider variety of diets, particularly in regions where seaweed consumption is limited. The recipes within are crafted to cater to diverse cultural palates, blending Ulva into both seafood-based and meat-based dishes, with the goal of overcoming consumer hesitancy regarding its strong flavor and unfamiliarity. Moreover, the book places a strong emphasis on the ecological importance of Ulva, detailing its role in nutrient cycling, carbon sequestration, and the preservation of marine biodiversity.

The expected outcomes of this cookbook are multifaceted. First, by increasing public familiarity with and acceptance of Ulva, we anticipate a rise in its demand, which in turn could stimulate the development of more sustainable mariculture practices. Second, as more consumers incorporate Ulva into their diets, this could lead to a reduction in the environmental impact of conventional agriculture, as seaweed farming requires significantly fewer resources such as freshwater, land, and fertilizers. Lastly, the cookbook aims to contribute to broader discussions about climate change mitigation and sustainable food systems by positioning Ulva as an essential part of future diets. Through this deliverable, the project not only supports the commercial viability of seaweed products but also reinforces the

critical role of food innovation in advancing circular economy principles and achieving long-term environmental sustainability.

Animation videos

In this GP, two animated videos were developed to enhance public awareness and understanding of Ulva seaweed and its various applications, with each video tailored to a specific audience to maximize its impact.

The first video, designed for a younger audience, uses vibrant and engaging animations to introduce Ulva seaweed as an exciting and sustainable "superfood of the future." It simplifies complex concepts related to mariculture and environmental sustainability, making them accessible and relatable for children and adolescents. Through captivating visuals, the video illustrates how Ulva grows in the ocean, its ability to absorb excess nutrients like nitrogen and phosphorus, and its role in combating climate change by sequestering carbon dioxide. It also emphasizes how Ulva can be part of daily diets in fun and creative ways, such as in snacks and meals, encouraging young viewers to think about sustainable food choices from an early age. By using playful characters and dynamic storytelling, this video aims to spark curiosity and inspire the younger generation to care about marine ecosystems and the role they can play in fostering a healthier planet.

The second video targets a broader, general audience, focusing on the diverse applications and environmental benefits of Ulva seaweed. This animation presents Ulva as a key player in sustainable food systems, highlighting its potential to alleviate pressures on terrestrial agriculture by serving as a low-resource, nutrient-rich food source. The video discusses how Ulva cultivation requires minimal freshwater and land use, making it an ecologically sustainable alternative to conventional crops. It also covers Ulva's applications beyond food, such as in bioplastics, biofuels, and animal feed, underscoring its versatility in contributing to a circular economy. Through visually engaging explanations, the video communicates Ulva’s role in improving water quality through nutrient uptake and promoting biodiversity by providing habitats for marine life. This video serves as a call to action for the public to recognize the importance of sustainable seafood choices and the broader implications of incorporating seaweed into their diets and daily lives.

Both videos are instrumental in promoting the project's goals of raising awareness about the ecological and practical benefits of Ulva, while also encouraging societal engagement with sustainable practices in food consumption and environmental stewardship.

Webinars – Lunch with Ulva

During the GP3 of the SEAWHEAT, Webinar series were organized with the main goal to share the latest scientific discoveries, research findings, or advancements in Ulva research with a wider audience. Webinars are open to audience beyond COST Action and provide educational content and research insights to help participants learn about a specific scientific topic, concept, or methodology.

These kind of webinars allow to facilitate networking and collaboration among scientists, researchers, and enthusiasts, enabling them to connect and exchange ideas. Additionalythey inspire and motivate participants, especially students and early-career scientists, by showcasing the impact and importance of scientific research.

After presentation that usually takes circa 45 minutes there is time allocated to discussions to foster a deeper understanding of the presented material and encourage participants to engage in meaningful dialogue. In this way a sense of community is developed among participants who are passionate about the subject matter, fostering an environment for ongoing discussions and knowledge sharing.

Webinars are conducted on the Zoom platform. Information about upcoming webinars is disseminated through the primary email channel of the SeaWheat COST Action, as well as on the LinkedIn and Instagram platforms prior to each webinar series.

Table below summarize the webinars, presenters, title and abstract of the presentation as well as number of people who registered and attended the webinars.

25.10.2023.	**Prof. Muki Spiegel**	**The Use of *Ulva* in Integrated Multi-trophic Aquaculture (IMTA), an Ecological Approach For A Sustainable Aquaculture.**
Abstract:	The scarcity of freshwater, overfishing and declining ocean biodiversity, marine eutrophication by anthropogenic activities, and the increasing demand for seafood have all required attention from a more comprehensive, global perspective. Moving from conventional aquaculture toward an ecological approach to developing and managing a sustainable aquaculture that cares for environmental and sociological aspects can relieve at least some of these problematic issues. Nutrient removal using Integrated Multi-Trophic Aquaculture (IMTA) Systems is a promising ecological approach for sustainable aquaculture. The rationale behind the IMTA systems is to convert the excretions of the organisms cultured upstream into valuable food for the organisms cultured downstream. In marine IMTA systems, seaweed has a high capacity for nutrient uptake per unit of culture area and can be an essential additional valuable product. In addition to nutrient removal by the green seaweed Ulva lactuca, the IMTA system proved to be a reliable source of sustainable biomass for human consumption, animal feed and high-value by-products for the food additive industries. IMTA systems in offshore cage cultures and land-based facilities will improve the food conversion rate (FCR) and diversify the mariculture products, ultimately increasing profit for the farmer. In addition, they will often create additional jobs and, no less importantly, will reduce environmental pollution.	
	Registered: 172	**Participated:** 75
14.12.2023.	**Dr. Alexander Golberg**	**Process development for *Ulva* sp. biorefinery: high-voltage pulsed electric field, hydrothermal liquefaction and open fermentation.**
Abstract:	*Ulva* sp. is an emerging biomass to produce food, chemicals and fuels. However, such a biomass processing is challenging, and often new equipment and protocols are needed. Specific challenges include large amounts of intracellular salts and different from lignocellulose biomass cell wall. In this talk I will discuss 1) equipment and process development for extraction of phytochemicals from the *Ulva* sp. biomass using high voltage pulsed electric field preprocessing, 2) hydrothermal biomass processing to produce bio-crude and biochar and 3) halophytic fermentation of Ulva sp. biomass to produce polyhydroxyalkanoates, promising substitutes of polyesters.	
	Registered: 127	**Participated:** 43
29.02.2024.	**Prof. Félix López Figueroa**	**The use of solar energy : photosynthesis , photomorphogenesis and bioactive compounds in Ulva spp. (Chlorophyta)**
Abstract:	Photosynthesis is the key physicochemical process of the Life through which solar energy is transformed in chemical energy (ATP) and reducing	

	potential (NADPH) to be used in assimilation process of inorganic carbon, nitrogen or sulphur. Photosynthesis can be measured as gas evolution i.e oxygen evolution or carbon assimilation or by in vivo chlorophyll a fluorescence used to estimate productivity of Ulva spp. In addition, light is source of environmental information detected by non-photosynthetic photoreceptor (UVA/Blue, green red/far red) and through a transduction chain, the expression of genes can be modulated controlling growth and the synthesis of bioactive compounds i.e. B light stimulates N metabolism and R light the C metabolism.	
	Registered: 103	**Participated**: 74
25.04.2024	**Dr. Erik-jan Malta**	**Ulva production in photobioreactors: (dis)advantages, issues and potential for upscaling**
Abstract:	I will discuss the production of Ulva sp. in photobioreactor systems, in particular for the production of interesting biochemical compounds for various applications. Results will be presented on Ulva growth in the reactors and their chemical composition from my own research and from the literature. Attention will be paid to dynamics in biomass, potential causes, microbiome of the algae, knowledge gaps (in particular with respect to collapses) and potential for upscaling.	
	Registered: 124	**Participated**: 70
27.06.2024	**Dr. Olivier De Clerk**	**Ulva biology, morphology and microbiome dynamics.**
Abstract:	Olivier De Clerck is a phycologist. His research focuses on genetics, diversity and distributions of marine macroalgae. A substantial part of his research involves culturing seaweed strains to study development, morphogenesis and reproduction of various seaweed species. In many cases such experiments are linked to genetic/genomic studies. The latter research bridges his academic interests with applied phycology aimed at cultivating seaweeds (strain selection and ecophysiology) and developing a European seaweed aquaculture sector. He currently supervises a team of five senior researchers, eight doctoral students and three technicians. According to Google Scholar, he has (co)authored more than 250 papers in peer reviewed journals, with >13.800 citations and an h-index of 56. Olivier is a member of the steering group of the European Marine Biological Research Centre (EMBRC) and president of the International Phycological Society. He coordinated the Ulva genome project in collaboration with several European research institutes and acted as group or work package leader in several European research projects (COST Phycomorph and Seawheat, Horizon Europe United, Ultfarms, Algae Pro Banos and iCulture).	
	Registered: 107	**Participated**: 36
25.07.2024	**Dr. Yossi Tal**	**Removal of nitrates from brine sea water effluent of desalination plant**
Abstract:	Sustainable marine aquaculture; Seaweed cultivation and processing in land based systems. Applied marine biotechnology; Microbial nutrients cycles in marine aquaculture environments; Mass cultivation of Macro alga, vertebrate and invertebrate marine species; Molecular microbiology; Ecology of marine environments; Biology and engineering of marine recirculating aquaculture system; Seaweed cultivation and processing; Business development for aquaculture farms: Large projects management in marine aquaculture.	

	Registered: 108	**Participated**:38
29.08.2024	**Dr. Lior Guttman**	**Ulva for improving aquafeed sustainability: insights from IMTA system at the NCM and a bacterial-biotechnological approach for improving seaweed's digestibility and nutritional value.**
Abstract:	Ulva is one of the most promising candidates for replacing unsustainable ingredients like animal and plant meals and oils in aquafeeds. Studying Ulva's dual use in an integrated multi-trophic aquaculture system (IMTA) in water purification and as a protein-rich nutritious ingredient highlights this potential. Still, the high content of indigestible polysaccharides reduces Ulva's nutritional value and digestibility. It is assumed that genomic knowledge on the ecology of the gut microbiome of an algal-fed sea urchin is essential for developing a bacterial-based process for the decomposition of the algal polysaccharides. For this purpose, research was performed to investigate the structure and functionality of bacterial communities along the digestive tract of the algivorous sea urchin Tripneustes gratilla elatensis. The study combines 16S rRNA amplicon sequencing, bioinformatics, and in vitro trials.	
	Registered: 127	**Participated**: 26
26.09.2024	**Dr. Annette Bruhn**	**Harvest of Ulva as a tool for habitat restauration supporting the blue bioeconomy**
Abstract:	Sea lettuce (*Ulva* spp.) forms massive green tides in nutrient-rich water bodies around the globe. The decomposing of *Ulva* biomass reduces environmental quality and recreative value. Harvest of *Ulva* prior to decomposition is of increasing interest as a tool to improve environmental quality and contribute to the circular bioeconomy. In a science-industrial Danish case-study, the extent of *Ulva* green tides was documented between 2018 and 2024 using drone and image technologies. Gentle mechanised harvest of the *Ulva* biomass was tested and documented over three seasons, registering environmental impacts and *Ulva* biomass quality for food and feed purposes. Harvest of *Ulva* can be used as a tool to improve environmental quality in nutrient-rich water bodies, however improving harvest method and post-harvest processing is needed for utilising the biomass for food and feed.	Sea lettuce (*Ulva* spp.) forms massive green tides in nutrient-rich water bodies around the globe. The decomposing of *Ulva* biomass reduces environmental quality and recreative value. Harvest of *Ulva* prior to decomposition is of increasing interest as a tool to improve environmental quality and contribute to the circular bioeconomy. In a science-industrial Danish case-study, the

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	Registered: 126	**Participated**: 63	
24.10.2024	**Dr. Stefan Kraan**		
Abstract:			
	Registered: 106	**Participated**:	