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Forum Phycologicum

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NEWSLETTER OF THE PHYCOLOGICAL SOCIETY OF SOUTHERN AFRICA

From the Editor's Desk

Welcome to Volume 88 of *Forum Phycologicum* — the official newsletter of the Phycological Society of Southern Africa.

Our quarterly newsletters are intended as a platform for you to share any and all phycology-related content with the larger Southern African phycology community. This volume includes a peek into the role of diatom movement and settlements in flow-through operations, recent industry developments highlighting SeaTree Emporium, and two student reflections. To end, this volume's special feature takes the form of oceanic art by our very own PSSA Members.

I also take great pleasure in letting you all know that the new PSSA website —, www.phycologysa.org — now houses an archive containing every newsletter since 1994, i.e. Volume 38 onwards! So if you're feeling nostalgic and fancy a trip down memory lane, be sure to peruse through the Resources section of the website, where past newsletters have been uploaded. We have contracted a webmaster till the end of this year, so I further encourage you all to reach out with any content and/or ideas for the website's improvement during this period.

Last but not least, thank you to all that contributed to this volume of Forum Phycologicum!

Akshata Mehta
Newsletter Editor of the Phycological Society of Southern Africa

Inside this volume

The Role of Diatom Movement and Settlement in a Flow-Through Marine System for Abalone

by
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Aquaculture is one of the fastest growing industries worldwide and whilst abalone harvesting is known to date back centuries, abalone farming, or aquaculture is still largely in its infancy. Aquaculture is expected to achieve significant growth in South Africa to achieve goals related to the Blue Economy. The abalone industry contributes significantly to the economy of South Africa as it increases earnings through exports, creates important job opportunities for low-income coastal communities and reduces the dependency and impact of harvesting wild abalone stocks (Troell et al. 2006).
Benthic diatoms have an important function in the abalone industry as the principal food source for abalone post-larval stages before they can feed on macroalgae or artificial feed. In abalone hatcheries, diatom films - grown on acrylic or plastic sheets are used to induce settlement of abalone larvae, in addition to being used as an initial food source for post-larvae (Van Staden 2021).

Various benthic diatoms have different nutritional value with positives (eg. Nitzschia sp., Navicula sp. and Amphora sp.) and negatives (eg. Licomophora sp.) in terms of benefitting the success of settlement (Roberts et al. 2007). Some diatom species are unsuitable for larval settlement, and the presence of wild benthic diatoms can present a risk to successful settlement. Some, such as filamentous diatoms (Licomophora sp.), may hamper the settlement of abalone larvae as they are not preferred by the larvae (Roberts et al. 2007).

Abalone larvae or newly settled juveniles tend to have an affinity to specific diatom species which they are able to digest (eg. Nitzschia longissimi and Cylindotheca pseudomarginata – beneficial to early post-larval feeding). In a study by Matthews and Cook (1995), it was found that abalone larvae of Haliotis midae have a preferential diet of prostrate genera such as Acnanthes, Amphora and Cocconeis. Studies have shown that the dominant prostrate diatom species such as Cocconeis sp. is a key species that is preferred by post-larvae as an initial food source (Roberts et al. 2007).

Figure 1: Polycarbonate (left) and plastic (right) sheets before diatom settlement (T1).

Figure 2: Polycarbonate (left) and plastic (right) sheets after diatom settlement (T14).

We conducted a study at an abalone farm with a flow-through system, on wild benthic diatom assemblages moving into the system directly from the coast of Hermanus at Walker Bay to determine the wild benthic diatom assemblages that may enter the system and to determine if a preference for settlement substrate exists for diatoms. A settlement experiment using two different material types: plastic and polycarbonate sheets, took place over 14 days during each season in 2019.

Species richness changed significantly over time with an increase in diatoms from the initial sampling period to the end of the 14 days, especially in Summer and Autumn. This trend was observed on both material types (Plastic and Polycarbonate sheets) however there were fewer species on the plastic compared to polycarbonate sheets. It was found that prostrate diatoms like Navicula sp., Amphora sp. and Cocconeis sp. dominated plastic sheets in most seasons with over 45% species abundances. Other species such as Bacillaria sp. and Licomophora sp. were also dominant but more so on polycarbonate sheets for most seasons with 60% species abundances. These are harmful or unstable filamentous species which may disrupt pedal attachment of the abalone larvae resulting in poor or unsuccessful settlement of post larvae, and ultimately poor production (Roberts et al. 2007).

Understanding diatom settlement behaviour for the differing substrates provides useful insight to improve abalone settlement methods. Further, understanding the behaviour of wild benthic diatoms allows decision-makers to adjust production methods seasonally, avoiding potentially harmful diatom species that could negatively influence post-larval settlement and embracing those that induce settlement and provide critical post-larval feed. With better prediction capacity, hatcheries can embrace precision farming for more sustainable and economically feasible production. Further studies on the impact of particular diatoms and their effect on the settlement of post-larvae of Haliotis midae, would allow farmers to harness the true potential that wild diatom populations hold.

Figure 3: Primary (front) and Secondary (behind) sump at Abagold Ltd., Hermanus.

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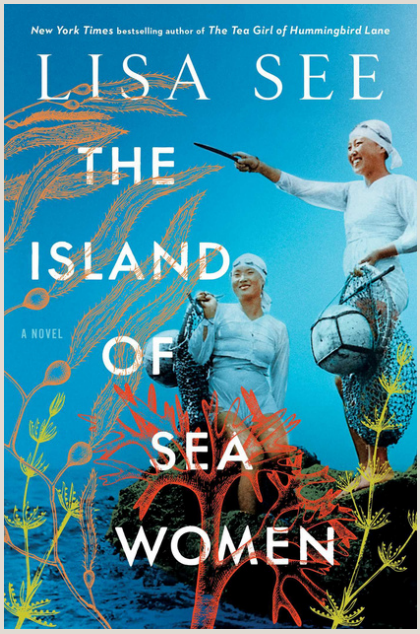
EDITOR'S RECOMMENDATION

BOOK OF THE QUARTER

Set on the Korean island of Jeju, The Island of Sea Women follows Mi-ja and Young-sook, two girls from very different backgrounds, as they begin working in the sea with their village's all-female diving collective.

A classic Lisa See story — one of women's friendships and the larger forces that shape them — The Island of Sea Women introduces readers to the fierce female divers of Jeju Island and the dramatic history that shaped their lives.

Summary credit: Goodreads



SPOTTED: PSSA IN THE WILD

Akshata Mehta, Courtney Puckree-Padua, and Zara Prew at the Space Odyssey-themed Seamester VI 2023 party

The SeaTree Emporium: A Seaweed Force to Watch

by
Bernadette Brown Webb
Biosolutiones Technicas

Many of us dream about the day we can put our knowledge to use to develop our own seaweed-based business or farm. Well, I recently met someone with a fresh, entrepreneurial approach who is doing just that! Her name is Nadia Scheffer, and she is a Seaweed Ambassador who is developing the SeaTree Emporium (https://seaweedsouthafrica.com/) as an outlet for seaweed-based products.

Nadia Scheffer, owner of SeaTree Emporium, selling her Seaweed products at a local market

Nadia's fascination with seaweed started in 2015, when she started making jewelry and home decorations with local kelp, Ecklonia maxima. This led to partnerships with local seaweed concession holders, food product developers, and the Safe Seaweed Coalition. She also participated in the UK-based Bright Tide Accelerator Program in 2022.

SeaTree Emporium is currently focusing on food products. Two versions of a seaweed burger are under development using Porphyra capensis as an ingredient, in partnership with Dr Phil-Afel, a plant-based wellness company (https://www.drphilafel.co.za/). One of the recipes is based on the utilization of vegetables that can be grown in a community garden and used in a soup kitchen. The second recipe is targeted at a more high-end commercial market.
Proof of concept has been achieved for a number of Seaweed food products including pasta, pesto, mayonnaise, spice mix and crackers. The labels list P. capensis, Ulva uncialis, or a combination of both as ingredients. All food products are preservative free, and shelf-life testing has been completed.

SeaTree Emporium recently secured premises in Observatory, which are being set up and outfitted into a small production facility and shop outlet. The business is currently registered with the Supplier Development Programme of one of South Africa's largest food retailers. This will enable them to achieve food safety compliance, food safety certification, and compliance with labelling and packaging standards.

The shop will officially open on August 5th, and launch details will be communicated via the Seaweed South Africa website and other media. In the interim, products are available at the Vegan Goods Market in Tokai, which takes place on the first Sunday of each month. Orders can also be placed one week in advance, by contacting Nadia directly (Email nadia@seaweedsouthafrica.co.za;
Mobile: +27 (84) 574 8757.)

A range of SeaTree Emporium's products including Seaweed Pesto, Seaweed Pasta, and Seaweed Mayonnaise.

In addition to SeaTree Emporium, Nadia has set up SeaBamboo Developments as a commercial entity to house future aquaculture initiatives. This will be done in collaboration with existing aquaculture initiatives, so watch this space!

SeaTree Emporium is also involved in a Social Impact campaign to assist Where Rainbows Meet soup kitchen in Vrygrond, Cape Town. This initiative is carried out in partnership with Dr Phil-Afel and Groa, a garden design and landscaping company. The latter two were instrumental in the development of a community food garden at the soup kitchen. The partnership has started investigating the use of kelp-enriched compost to improve the production and nutritional value of crops grown with this compost. More about this initiative in a later edition!

Nadia's can-do attitude has allowed her to turn challenges into opportunities, and to find open windows where doors have closed. She is turning ideas into realities by building a business from the ground up and is trying to create opportunities for others along the way. Knowing how hard this journey can be, we can only cheer her on!

SEAmester VI: My Journey Beyond the Classroom

by
Cayley Cammell
Department of Biodiversity and Conservation Biology, University of the Western Cape

As the SA Agulhas II left the V&A Waterfront with an enthusiastic crew of students, lecturers and staff on board, the adventure of a lifetime was about to begin. On the initial day out at sea, almost half of the passengers were seasick and for some, this seasickness lasted until the last day of the voyage. Thankfully, I was not one of them, and in a mere 10 days, this ship became my second home.

SEAmester, South Africa's pioneering 'Class Afloat,' aimed to immerse students from diverse scientific backgrounds in the practical applications of marine sciences. It comprised a mix of traditional lectures in the auditorium, engaging deck activities, hands-on lab work, and creative outlets, which I lovingly termed 'brain breaks.' We had the option to choose one of two module streams — Tools of the Trade and Oceans in a Changing World. As the class representative for the latter, I had the privilege of getting to know numerous students, lecturers and ASCA scientists on board.

Each day comprised a series of lectures beginning at 08:30, a host of practical and relaxing activities throughout the day, and a final lecture ending at 21:00. The topics covered ranged from physical oceanography and biogeochemistry to microplastics and astronomy. We even had a very interesting talk from one of the lecturers about her journey as a Marine Sangoma. I was exposed to a host of ship-based instrumentation such as the CTD, Argo-drifters and neuston nets. Our journey along the Agulhas Systems Current Array (ASCA) provided the scientists and lecturers with the perfect teaching opportunities. Witnessing marine science in action and the exciting range of work awaiting me in my future ignited a flame inside of me to build a thriving career in this industry.

Yet, SEAmester was not solely about science. The thoughtful SEAmester team arranged a space-themed dress-up party where many glasses of gin, games and dance moves were shared. On the final evening, we attended an art exhibition where all of our 'brain break' works – mosaics, journals and heritage projects – were displayed. The experience allowed me to forge lasting friendships and establish valuable professional connections within this remarkable group of individuals. By the end of the expedition, I felt inspired to give maximum effort towards my Master's degree and it made me so excited to see the potential impact that I could have on our environment amidst this rapidly changing climate.

SEAmester VI:
South Africa's Class Afloat 2023

Pictured here:

Left: The SA Agulhas II, host ship for SEAmester VI (by Akshata Mehta)

Right: SEAmester group photo with all the lecturers, scientists, and students aboard the SA Agulhas II. Taken on the ship's heli-deck (by Svea Jospehy)

Exploring Biodiversity: A Student's Journey of Discovery and Conservation

by
Cailin Pillay
Department of Biodiversity and Conservation Biology, University of the Western Cape

Embarking on the path of biodiversity and conservation biology is a transformative experience that allows students to delve into the intricate web of life and understand the urgent need to preserve our planet's natural heritage. As a dedicated student in this field, I have embarked on a remarkable journey, encountering both triumphs and challenges along the way. Let me share my story with you.

Exploring Ecological Wonders: My journey began with a deep fascination for the incredible diversity of life on Earth. From the smallest microorganisms to majestic ecosystems, I eagerly absorbed knowledge about the interconnectedness of species and their habitats. Due to my mother taking my sister and me on adventures in nature, I was armed with my passion for conservation, I ventured into the field to witness biodiversity first-hand.

Fieldwork Adventures: As a biodiversity and conservation biology student, I have had the privilege of participating in numerous field expeditions. Whether it was trekking through dense rocky surfaces to find a cave at the PSSA conference 2023, free diving into kelp forests, or surveying wildlife populations in remote locations during environmental internships, these experiences have been instrumental in expanding my understanding of ecosystems and the challenges they face. During these expeditions, I have had the opportunity to contribute to ongoing research projects. I actively participated in data collection, studying species interactions, monitoring population dynamics, and assessing habitat health. These hands-on experiences have deepened my appreciation for the complexity of ecological systems and the importance of conservation efforts.

Conservation Initiatives: Passion alone is not enough to protect our fragile ecosystems. I realized the importance of translating knowledge into action. To that end, I engaged in various conservation initiatives and collaborations. I actively participated in efforts to promote sustainable practices and raise awareness about the importance of biodiversity conservation. One significant project I am involved in is being a professional snake and scorpion catcher. Collaborating with the African Snakebite Institute (ASI), a team of experts, where I receive calls from people who have a snake or scorpion at their homes and I rush to safely catch and release them elsewhere within +/- 20km from where the snake or scorpion was found to ensure conservation and biodiversity is kept intact during my free time. Witnessing the possibility of saving people's lives and organisms' lives has been immensely rewarding.

Struggles and Challenges: While the journey has been filled with moments of triumph, it has not been without its share of challenges. One recurring hurdle is the urgency of conserving biodiversity in the face of increasing human activities, habitat loss, and climate change. Balancing scientific rigour with effective communication to motivate others to act has been a constant challenge. Many people do not call professional snake catches for example, and end up killing the snake. Additionally, the multidisciplinary nature of biodiversity and conservation biology often requires integrating knowledge from various fields. Understanding ecological processes, socio-economic dynamics, and policy frameworks is crucial but demands continuous learning and adaptation. In addition, there is a constant requirement to have great marks for every module in the degree; whilst also maintaining family responsibilities and juggling tutoring, giving snake presentations, catching and releasing snakes, working at three other jobs full time and studying full-time at the University of the Western Cape (UWC).

Catch it if you can:

Cailin Pillay's adventures as a snake catcher for the African Snakebite Institute (left), and a freediver (right).

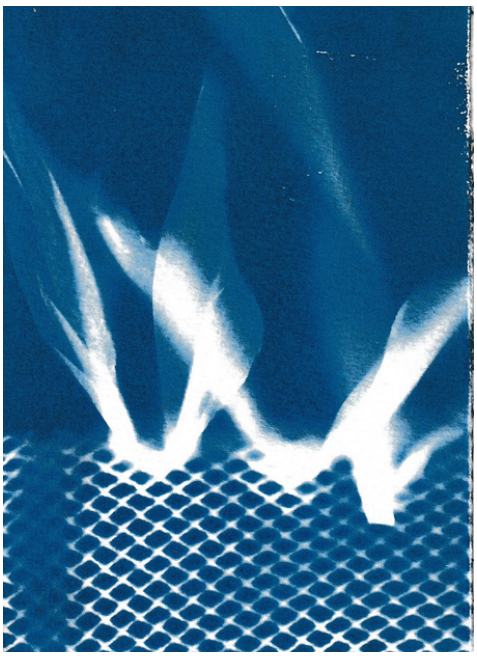
In conclusion, as a student dedicated to biodiversity and conservation biology, my journey has been an incredible mix of discovery, challenges, and accomplishments. From immersive fieldwork experiences to engaging in impactful conservation initiatives, I have come to appreciate the intricate beauty of nature and recognize the importance of safeguarding it for future generations while still earning a little cash on the side to keep me and my family going.

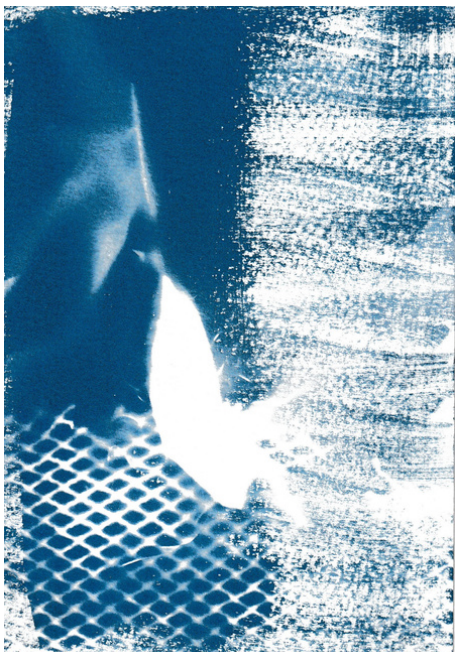
Despite the struggles encountered, my passion for biodiversity and my belief in its intrinsic value has only grown stronger. I am committed to continuing my efforts to contribute to the conservation of our precious natural heritage, collaborating with like-minded individuals and inspiring others to join the cause. Together, we can make a difference in preserving the extraordinary biodiversity that surrounds us.

Special Feature: Oceanic Art

Above: *Mosaics by Zara Prew (left) and Courtney Puckree-Padua (right). A mosaic is a picture or pattern produced by arranging together small pieces of stone, then filling and setting with grout. Zara's mosaic piece (left) is inspired by the kelp forests of South Africa, and Courtney's piece (right) is inspired by intertidals. These mosaics were made as part of the SEAmester VI art stream aboard the SA Agulhas II.*

Below: *Cyanotypes made by Akshata Mehta. Cyanotypes are one of the oldest photographic printing processes, distinctive for their shade of cyan blue, which results from exposure to ultraviolet light. Inspired by the Seaforest, this cyanotype series was imprinted using marine waste (ghost nets and off-cuts of panty liners) and a handmade to-scale SA Agulhas II bottle opener. They were exposed to sunlight for about 50 minutes, and fixed by washing in wastewater from sampling stations aboard the SA Agulhas II.*





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CALL FOR SUBMISSIONS!

We welcome submissions for the next volume of *Forum Phycologicum,* Newsletter of the Phycological Society of Southern Africa.

Submissions can include:

- relevant news
- industry developments
- popular articles
- opinion pieces
- titles of recent publications
- reports
- photo essays
- poems, short stories, anecdotes...

...amongst others.

Please reach out to amehta@uwc.ac.za with your submission ideas.

Reminder: The Programme of Events & Book of Abstracts for the 33rd Congress of the Phycological Society of Southern Africa can be accessed on the website here.

ATTENTION ALL STUDENTS!

The student submission prize for *Forum Phycologicum* is back! The best student newsletter submission of the year will win a prize at the next PSSA Congress. Submissions will also be feature on the PSSA website.

Submissions will be judged on clarity of ideas, creativity, and overall quality of content. Submissions should be a minimum of one-page.