The Grower

Newsletter for the Association of Scottish Shellfish Growers

July 2019

Oysters by Royal Appointment

It's not often that The Grower can quote from the Court Circular - if ever. But in The Times for Friday June 14th there was an announcement from St James's Palace saying, "13th June, 2019 The Earl of Wessex today visited Cumbria and was received by Her Majesty's Lord-Lieutenant (Mrs Peter Hensman)." It goes on to say that His Royal Highness was visiting BAE systems, in Barrow in Furness, and officially opened the Visitor Hub at Cumbria Wildlife Trust at the South Walney Nature Reserve. Then it continues ……"The Earl of Wessex afterwards visited the South Walney Oyster Farm Hatchery Site, Walney Island near Barrow in Furness. The Royal Visitor, Prince Edward can be seen above with the staff and some family members of what readers of The Grower know better as Morecambe Bay Oysters!

Inside this issue readers will find there is a story about Morecambe Bay Oysters (page 11) written before it was known that there was this front-page story in the offing. Although Kelsey Thompson knew in advance that the visit was to take place he could not tell anyone. He had been visited a month earlier by the Lord Lieutenant named above who said there was a Royal Visitor interested in oysters wanting to visit. In the intervening time he had visits from the Police and the Royal Household. There was then just time for all staff to get busy with a massive tidy-up. Kelsey's oysters are not yet granted a Royal Warrant but we can hope. (More photos in Photonews on the page 23).

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ASSG Conference

Date for your diary. 31 October and 1 November ASSG Conference and Trade Fair at Corran Halls, Oban. Booking opens mid July at www.assg.org.uk

Stranraer Oyster Festival, 13-15 September

The small seaside town of Stranraer will once again play host to Scotland's only Oyster Festival this September. This will be Stranraer Oyster Festival's third year and follows on from the incredible success of the last two. Opening on the evening of Friday 13th September with music, food, drink, fireworks and a wonderful procession and Ode to an Oyster, the next two days will see celebrity chefs, mouth-watering food and a celebration of the ever increasing locally produced gins, beers and whisky. On Saturday evening the focus moves from the festival site to the hugely successful Big Bash on the ice-rink at the towns North West Castle Hotel where upwards of 600 locals and visitors alike will dance the night away to The Dangleberries.

Thousands of oysters will be eaten over the weekend and on the Saturday afternoon the third annual Scottish Shucking competition will take place. This incredible event will see the winner represent Scotland at the World Championships in Galway two weeks later, overseen and judged by none other than the world champion Patrick McMurray who will fly in from Toronto for the weekend event.

In its first year, 10,000 people attended bringing an estimated £550,000 to the local economy. The following year word had spread and over 14,000 came from even further afield resulting in no beds being available in local hostelries within a radius of 25 miles and even greater financial benefit to the area!

Organisers have booked in Tony Singh as celebrity chef this season and hope he is as popular as Nick Nairn was last year. The weekend is not just about the packed marquees as the town of Stranraer comes alive too with local cafes, restaurants and bars looking to partake in the most incredible community celebration - a celebration that is open to one and all!

www.stranraeroysterfestival.com/

Pictured below; Contestants in last year's oyster shucking contest with one well-kent face for ASSG members in the line up.

Dates for your diary

Aquaculture Europe
October 7-10, 2019
Berlin

35th National Shellfish and marine Culture Show
October 9-10, 2019
Vannes, France

Inaugural meeting of NAEMO
October 30, 2019
Corran Halls, Oban

ASSG Annual Conference
October 31-November 1, 2019
Corran Halls, Oban, Scotland

Joint meeting ICSR / Australian Shellfish Reef Restoration Network
Port Stephens, NSW, Australia
March 17-20, 2020

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CEO's Column
Nick's Notes

Dr Nick Lake, CEO of the Association of Scottish Shellfish Growers (ASSG)

How time flies - when you are enjoying yourself!

It can't be June already!? It would be good to think that "flaming June" will live up to pre climate change expectations but there is no sign of it as I write!

The one good outcome is that the weekly biotoxin update has yet to start seeing significant levels arising in most areas. The Scottish weather at least on the east coast shows no immediate sign of allowing stratified waters and harmful algal blooms to establish.

Almost as perennial as the weather is my continued desire not to assault anyone with the dreaded "**B-----**" word – how much longer can it last? It is worth pointing out that a better "B" word is that a "**Balanced**" view of the World is required whatever side of any arguments you find yourself on. Ever attuned to the big stories the ASSG Conference this year will take place on 31st October – Halloween and the date currently set for a new relationship with the EU - all within our conference theme of "resilience" – Oban will be the place to be (more details later).

Annual shellfish outputs

June is the month we can take stock of how the industry is collectively performing – following the publishing of the official Marine Scotland Cultivated Shellfish Production Survey (see bit.ly/Scottishshellfish2019 Ed.)

Headlines can be as polarising as those for the "B" word and so some delving into the detail of the 2018 statistics and what lies behind the hard figures can bring some balance to any assessment.

Year on year (2017/2018) production figures showed a decline for all species whether for the table or for on-growing. Does this indicate 2018 was a poor year – after all we had a long and exceptionally hot summer with some areas unable to harvest due to natural algal bloom issues? Conversely is it more to do with the successful 2017 production year and higher than average output figures? Realistically it actually reflects the performance of the shellfish seed which was placed into the water 2 or 3 years before and the fact that shellfish production follows natural conditions – far more than allowed by an accountant's spread sheet!

Undoubtedly there continue to be a range of challenges for shellfish growers – the greatest being natural variability of both seed and the growing conditions. A more balanced view of the statistics requires a longer time frame and a basic understanding of key influences.

Scottish oysters

During 2018 Scotland continued to maintain the existing approved zone status for all notifiable shellfish diseases. In terms of oysters all seed stock can only be supplied by hatcheries approved as disease free, and any movements of part grown stock requires to be assessed as part of a biosecurity plan to limit any potential disease spread risk. To date such a system has ensured that oyster herpes virus has remained outwith Scotland. Caution in securing seed supplies is wholly warranted as infected stock has the potential to cause extremely high levels of mortality in juvenile Pacific oyster. In areas of the North Sea, France, England and Ireland including the North, such losses have to be made up by inputting vastly more seed to ensure adequate survival to achieve sufficient outputs for the market. Such a seed hungry production system has significant additional costs which it is difficult to perceive could be sustained in Scotland? Seed costs are higher here because we only source from disease free suppliers – but the environmental considerations make this a worthwhile exercise. Growers will plan ahead for their seed requirements and typically there are no hatchery shortages. However, if sometimes exceptional natural on-growing losses occur due to weather conditions (I wrote some time ago about the hard winter we had in 2017 – did this impact overall survival in exposed stock?) there can be limited opportunities to make up shortfalls by supply of part grown stock from other disease-free areas. Hence, we can see variability in market outputs for a wide range of economic and production reasons.

One journalist considering the production figures noted to me that the direct link with the natural environment "was what made the shellfish cultivation industry genuinely interesting"! Interesting or perplexing – you decide?

Strength of demand

It is worth pointing out that the production survey does not reference market conditions or desirability of Scottish production other than individual commodity prices. There has never been stronger demand for Scottish oysters within all the market sectors - from farm gate sales to supermarkets. Unfortunately, we are not an industry where the supply tap can be turned on and off in an instant – 2-3 years planning is required. No one is going to enter oyster farming as a business opportunity on a "gold-rush" basis. The businesses we have remain committed to producing high quality oysters for an appreciative customer base. Obviously, the consumer network is growing and so we will hope to see our producers progressively expanding production and encouraging new entrants into the industry to ensure the knowledge, experience and legacy is retained - of producing sustainable shellfish in Scottish lochs.

Just to be reassured of this – the combined Pacific oyster production figures for the table and for on-growing amounted to almost 8.27 million shells in 2018.

CEO's Column cont.

This combined annual figure has been held at close to this level since 2015.

Going native

The Pacific oyster is the bedrock of the Scottish industry and without such production it would be difficult to perceive that native oyster (*Ostrea edulis*) cultivation would have been able to be sustained in recent years. Again, the shellfish production statistics do little to illuminate the true status of this sector – or the development opportunities which may be emerging? Much is currently being made regarding the potential for native oyster habitat regeneration and the desired re-emergence of the species over large areas of the North Sea / English Channel and beyond. There are a range of issues driving this interest and the recent Native Oyster Restoration Alliance (NORA2) Conference held in Edinburgh considered these (Overview reported elsewhere in this newsletter see pages 15-19 Ed.).

From a Scottish cultivation perspective native oyster has always been in the mix – but only commercially undertaken by a few producers due to the specialist nature of such production. Equally in terms of disease-free hatchery seed production it can be achieved within the UK but currently only attempted on a small scale. With a long grow out period of around 5 years and a tendency to be extremely sensitive to site cultivation conditions, limited numbers within the low hundreds of thousands, are currently produced for the table. The native oyster market attracts a premium price from connoisseurs which makes maintaining a cultivation business as a stand-alone – precarious but with potential rewards.

It is worth noting that despite the price premium received, production outputs for the table have progressively declined since 2009. On-growing (part grown stock in the water) outputs have varied dramatically from nothing to over a million shells and reflect in part the availability of batches of hatchery seed and success in keeping them alive.

Are we beginning to see stock for on-growing produced by cultivation substitute for shells destined for the table market - as greater demand is building up from restoration projects? Whether this occurs will ultimately depend on the success of restoration projects and the ideology driving them – the native oyster is a Biodiversity Action Plan species with international conservation objectives. Self-recruitment may be a goal for some of these restoration projects – hence their success may remove the requirement for cultivated stock to augment the established populations. On the other hand, in many current projects the regenerated native oyster habitat is not likely to become subject to harvesting and so these schemes are unlikely to supply the table market as a food resource – leaving cultivation a market to supply?

Now that we are officially in a climate change emergency (whatever that means?) there is also the question of how climate change resilient the native oyster will actually be? At what point will it be decided that chasing a rewilding dream in an environment that has become hostile to some of our native species is a good use of public resources?

Natural balance

In a Scottish context there is a further strength or possible barrier depending on your perspective - of supplying restoration projects with native oysters. In many areas where restoration is being considered these are non-approved for disease purposes. The principal

CEO's Column cont.

disease agent of native oyster being *Bonamia spp*. which Scotland has largely managed to prevent spreading in the wild. If restoration projects wish to relay stock which is in part resistant or has been challenged and survived Bonamia this is not a product which we can produce in Scotland as we are disease free. Hence Scottish shellfish producers or approved hatcheries will be restricted to those restoration projects requiring unchallenged stock.

Ironically the farming of Pacific oysters and the need for seed is not only assisting with the viability of hatcheries and allowing niche species such as the native oyster to be supplied but also helping create suitable habitat for the natives. Most well-established Pacific oyster farm sites will report that around and often under their trestles on the foreshore are to be found native oysters which have taken up residence. Presumably they settle onto the course substrate often containing empty shells - with juveniles originating from the small pockets of wild stock we can still find principally on the West coast. The emphasis to maintain biodiversity in Scotland may well be best placed in ensuring our scattered small beds of native oysters remain undisturbed and protected from disease – a role which some of our shellfish cultivation businesses have been quietly undertaking in many locations.

Such incidents of increased biodiversity associated with shellfish cultivation is not uncommon (we will be hearing more of the scientific evidence for this at this year's conference) – but difficult to quantify as a benefit to the nation when considering at face value annual shellfish production statistics.

Mussel production

In Scotland volume production of shellfish is reliant on the blue mussel (and what we now know are a range of hybrids of the *Mytilus spp.*). Seed supply is currently solely dependent on collection of "spat" from the wild and natural selection for viability and growth characteristics. Annual success of spat collection at individual sites has been the major factor impacting industry outputs - with combined production for the table and on-growing amounting to 9000 tonnes in 2018 based on the official statistics. In 2017 this was nearer 13 000 tonnes but noted to be a highly productive year for seed at many locations around the Scottish coast.

The natural variability of spat abundance within and between years dependent on location means that many shellfish businesses have to take a balanced view of the likely availability to them of this raw resource. Resilience for any production business is based on the spreading of risk between inhouse spat collection and securing opportunities to buy spat in from other areas or sources.

The apparent fall in 2018 outputs is of significance as in 2009 the industry produced only 500 tonnes less than the current almost 7000 tonnes for the table. In the intervening years we have seen a major rise in the efficiency of businesses, considerable investment and larger sites established.

If the resilience of the mussel cultivation industry is based on seed supply that is where we need to focus our efforts to ensure continued success and consistency of production.

We are not alone in Scotland as recognising that mussel seed supply is the cornerstone of the cultivation industry. Various other countries in the Northern hemisphere have found similar constraints in predicting mussel spat supply, and the health of the wild stocks upon which they are reliant for both fisheries and aquaculture.

Finding NAEMO?

That is relatively easy in this case! The North Atlantic and European Mussel Organisation (NAEMO) will hold their first meeting in Oban on the 30th October hosted by the ASSG with support from Marine Scotland.

Last year's ASSG conference was the catalyst for this group of researchers to form under the leadership of Åsa Strand who gave an interesting analysis of mussel stock issues in Sweden and a wider appreciation of collective knowledge of blue mussel stock dynamics in the Northern hemisphere. The conclusion was that no one organisation or international body had sufficient long-term evidence of distribution or dynamics of the

CEO's Column cont.

species. Anecdotal views from both industry and scientists are that we have seen a marked decline in mussel stocks in certain key areas throughout the Atlantic region. The underlying reasons for this are not immediately evident and could be attributed to a range of factors.

The over riding question has to be is this part of a natural cycle where populations peak and fall or are there other issues potentially of a man-made nature which are impacting on the viability of the blue mussel?

The NAEMO meeting will be an opportunity to bring together a wide range of international researchers with an interest in this area and consider both national observations and research initiatives - together with the potential to focus research priorities overall.

ASSG Conference 2019

Building the resilience of the Scottish shellfish cultivation industry is the over-riding theme for this year's event in Oban - 31st October and 1st November. This theme fits well with the roles of our sponsors - Crown Estate Scotland and Marine Scotland.

The issue of Scottish mussel seed supplies has been described before – in the context of the alternative strategy of developing hatchery production techniques. Such an approach has notably been used in other parts of the World with great success and so is this an approach we may have to renew our efforts to master in Scotland?

An update from the NAEMO deliberations will assist this appraisal and there will also be a wider initiative flagged up by the Scottish industry – the Shell-volution programme. This will seek to put demand driven research to the fore with an integrated range of issues all linking to the future resilience of the shellfish cultivation industry and delivering food supplies.

Such ambition is based on the recognised need for longer term developments to be put in train outside of the typical short-term approaches often evident in current academic research proposals. Importantly industry needs to be driving such research in partnership with government to ensure outputs are able to be adopted and deliver clear socio-economic and environmental benefits. This becomes ever more important given the recognition of the "Climate Change Emergency" and the need for resilience planning.

Topics for discussion

Headlines on the first day include international experts considering the suitability and resilience of bivalves for aquaculture production and the industry view of key steps in facilitating shellfish cultivation utilising science and technology. The various levels of consumer expectations in terms of supply to the key market sectors will be covered by UK industry leaders including how bivalve shellfish can be transformed into high value seafood through rigorous standards and chain of custody systems.

On the second day the focus will be very much on industry development - covering deep water mussel cultivation in the Irish Sea and also the scientific evaluation of the environmental benefits and biodiversity dividends associated with mussel longline systems. There will also be an assessment of the community benefit arising from shellfish cultivation including determining an acceptable overall scale of production within the coastal environment.

From a Scottish industry perspective, we will be focusing on the underlying requirement for hatchery seed supply to support oyster growers against a background of disease and stock issues in other European countries. Can Scotland safeguard the current approved zone status and improve the resilience and outputs of the cultivation sector?

All this of course in the context of the "Best Scottish Shellfish" competition sponsored by Highlands and Islands Enterprise and judged by an expert panel together with our annual dinner on the evening of the 31st October - and of course outstanding seafood lunches on both days!

The full programme of events with invited speakers will be on the ASSG website in mid July - along with a booking form.

I look forward to catching up in Oban if not before – and hopefully to a productive summer!

All the best

Nick

Some canny readers spotted the April Fools' Day items that Nick alluded to in the last issue . They did not however include the Shellfish Culture feature on page 13 and if there was one we are still searching it out.

Letters to the Editor

From Mark Dravers, Guernsey Sea farms

June 2019

Dear Madam

I used to think that the number of articles about native oyster reef restoration in the 'The Grower' was simply a harmless indulgence by the editor reflecting her personal interests. I also used to bemoan the fact that there is no funding for shellfish research in the UK. However I have learnt recently that both of these assumptions are wrong, there really are a lot of *edulis* restoration projects going on, but more seriously it seems that there is an increasing bias in regulatory organisations against *gigas.*

The obvious point that needs to be made is the ASSG represents shellfish growers - the clue is in the name and the title of the newsletter - and, while we all want a healthy marine environment, we are not a conservation organisation and, even with the most optimistic outcomes, *edulis* growing is only ever going to be a very minor part of the shellfish industry.

The second obvious point is that everyone needs to recognise that ALL oyster growing is good for the environment and *edulis* and *gigas* will happily coexist and, in fact, there is good evidence that *gigas* actually attracts *edulis* settlement, and where there is wild settlement there is actually increased biodiversity.

We somehow need to get *gigas* removed from the emotive sounding list of 'invasive non-native species'. This has reached new heights of absurdity with *gigas* smashing parties and a TV nature programme (Springwatch Episode 3 – only available until 29th June on BBC iPlayer Ed.) that I haven't seen because I was warned that it would be bad for my blood pressure! The nearest analogy I can think of is that we don't go around uprooting non-native fir trees when they self seed in our woodlands. Based on experience in Scandinavia it is quite predictable where wild *gigas* may occur with rising sea temperatures. In Scotland there will a few found on rocks in shallow water as there are in Norway.

I hate to be a kill joy, but, sadly, we are unlikely to see any 'reefs' - of *edulis* or *gigas* - in my lifetime anyway!

There is a lot of experience in the shellfish industry of trying to grow *edulis*, and a lot problems concerning disease are common to both species. We need to work together with research and conservation organisations to better direct the research.

Mark Dravers
Guernsey Sea Farms

Mussel-ing in for the Shetland economy

Focus on East Voe Shellfish founder, Kenny Pottinger

Isabel Johnson

The wild waters around Shetland provide a naturally rich habitat for a variety of fish and shellfish to thrive. One of the most successful of these is rope-grown mussels, and in 2018 some 5,160 tonnes of mussels from Shetland reached the marketplace, representing around 75 per cent of Scotland's total output.

The significance of the industry to the islands' economy is clear, with around 100 people directly employed and many others supported by ancillary industries such as engineering, manufacturing, boat building, and so on. These jobs are mainly in rural areas, thus strengthening communities and contributing to Shetland's wider economy.

That sense of community is particularly important to Kenny Pottinger – a fact that he demonstrates, not only through the rural employment opportunities he has created through his business, East Voe Shellfish, but also by serving as chairman of Seafood Shetland's shellfish growers' committee and as a member of Scalloway Community Council. Passionate about parental involvement in schooling, he is chairman of Scalloway Parent Council and vice chair of Anderson High School Parent Council.

Kenny has been growing mussels off the west coast of Shetland for 17 years. His sites are located around the islands of Burra and Trondra, and near the village of Scalloway.

He attributes his first spark of interest in the industry to his uncle, Jim Georgeson - one of Shetland's early pioneers in mussel farming. From there, drawing on his experience as a fisherman, Kenny set up his own sites and expanded his aquaculture knowledge by working on a salmon farm while his first mussels reached maturity. He recalls: "I have always been interested in fishing and the sea. As a schoolboy, I set creels and fitted in hauling them around school, youth club and football. When I left school, I joined the crew of various white fish fishing boats, the last of which was the Alison Kay, where I had the opportunity to gain my skipper and engineer tickets through the NAFC Marine Centre in Scalloway."

Today, Kenny operates 9 sites, producing around 600 tonnes of mussels per annum. He employs three full -time and two part-time workers, and other casual employees to help out during his busier periods. In setting up his business, he acknowledges a lot of support from established mussel farmers. "Working together to share best practice and address any issues has been very positive for Shetland's mussel growers," he says. "A single voice for the industry - in the form of the Shetland

Isabel Johnson has provided communications and marketing support for the seafood sector – and for Seafood Shetland in particular - for 19 years. Working at a local level, she has given the industry immediate access to communications support in both good times and bad. Building a close relationship over this time has resulted in Isabel being very much part of the Seafood Shetland team and, as such, she is well informed to respond quickly to any issues as they arise. A particular highlight was working on the award-winning 'So Much To Sea' campaign, the focus of which was to encourage people to experiment with new species, and also to raise overall awareness of the significance of the industry to the Shetland community. The ambitious campaign involved a series of events, film production, an exhibition, promotional material and press activity. The campaign lives on through a range of initiatives that are supported by Shetland's seafood sector as a whole.

Pictured below; Kenny works his lines at one of his sites, Whal Wick in Clift Sound.

Mussels in Shetland cont.

fish processors and mussel growers' association, Seafood Shetland, and its chief executive, Ruth Henderson - cuts through the amount of common administration and bureaucracy that face us all."

Operating in a relatively young but progressive industry, Kenny has experienced significant change. "The whole system has become much more automated and efficient," he reflects, "with continual improvements to harvesting and grading machines."

When it comes to infrastructure, Kenny has recently extended his shore base and now plans to introduce more continuous rope to replace the existing dropper system across his sites. "The new rope, which hangs in loops, makes handling of the mussels much easier. And, for spat collection, the continuous rope makes thinning out to stimulate growth very straightforward."

Mussels grow faster in the summer time, when the sea is rich with plankton and marine life. The down side to this is that the warmer weather can also bring biotoxins into the marine environment. These naturally occurring chemicals, found in certain types of algae, can, of course, accumulate in filter-feeding shellfish and, if consumed, cause food poisoning in humans. For Kenny, food safety is paramount. He comments: "The established toxin testing process means that any problem is identified immediately and harvesting is suspended, with the site closed until the threat has passed."

One area where Kenny feels that there is still much to learn - when it comes to mussel growing - is, very simply, nature. He explains: "Spat fall and mussel growth is a completely natural process. There is a lot we need to understand about the cycle of growth and what environmental factors influence that. We really welcome any research projects that help to expand our knowledge and inform development."

Kenny's mussels are sold through the Scottish Shellfish Marketing Group. "Selling through the Group is excellent," he says. "We simply take the mussels ashore and arrange collection. From there, SSMG handles the entire sales and distribution process. Having organised all this myself in the early days, I am very aware of what a task it is, and really appreciate what the Group does for its members."

For Kenny, the best and worst of mussel farming comes in the form of the extremities of the environment in which he operates. "The high is being off on site with a bonny day. The low? Battling the elements on a terrible day!"

Ruth Henderson, chief executive of Seafood Shetland, said: "I truly value Kenny as chairman of Seafood Shetland's shellfish growers' committee. He is very supportive of the organisation, its members, and me personally. He always shows a keen interest and is a willing participant in any initiatives that we are working on – from science trips to press tours. I truly value his knowledge and know that I can always draw on his grower expertise."

Pictured above; view of one of Kenny's other sites, Booth looking south down Clift Sound.

Pictured right; the same site but looking north up Clift Sound, with the Trondra Bridge just visible in the background and the settlement of East Voe coming into sight on the right side, where Kenny stays.

Photo credit; Ben Mullay

Are shells a valuable and usable resource?

James Morris

Shellfish farming is becoming increasingly recognised as highly sustainable food source, coinciding with a time where public conscience surrounding the link between what we eat and our individual and collective climate impact has never been higher. Now, backed by large funding schemes at national and supra-national levels, "blue growth" industries are beginning to gain the attention and funding that they deserve. This will lead to further expansion and innovation in aquaculture and marine food production. It is, however, critically important to maintain this "sustainable food source" label as the sector grows. In this regard, there are many aspects that need careful consideration, and one that is regularly overlooked is waste production management.

The shellfish food production industry is a particularly interesting case-study, as its main waste product can, in some cases, account for over 75% of the fresh product by mass, is something that humans have historically and culturally treasured, and whose major mineral component is used in vast quantities around the globe: that something is shells! …and approximately 8 million tonnes are produced annually worldwide!

As part of the **CACHE** (**CA**lcium in a **CH**anging **E**nvironment) project funded by the European Union, I was given the opportunity to spend two years delving into the topic of shells as a valuable resource. I began by exploring the historical significance of shells, tracing their use back to early humans, and the various applications they were used for: from building materials and tools, to jewellery, to early currencies. The many observations of shells embedded within society throughout human history stand as testament to our crude fascination with them, and a primitive understanding of their value.

Shells are composed of between 95 – 99.9 % calcium carbonate ($CaCO_3$). As a mineral, calcium carbonate is sought after, and highly valuable. It is mined across the world in the form of limestone and used in many industries from cement production to paper whitening. While conducting an in-depth review of peer-reviewed science publication databases, I found over 800 articles directly related to the potential uses of shell in a variety of applications*. Surprisingly, however, very few of these concepts had been translated into real-world applications. It also became clear that many of the individuals and companies that I spoke to who were involved in aquaculture production, or indeed those that use mined limestone, had not considered the potential value of shells to them. My project quickly morphed from "discovering potential applications for shell waste" to how best to link individuals who produce shells as a by-product with industries that are interested in new and environmentally friendly sources of calcium carbonate, and whether shells can be processed easily and adequately, and in an environmentally friendly manner for various application types.

Potential shell uses are many, and include; shell fragments as a biofilter medium, shell dust as an agriculture soil liming agent, shell powder as a calcium supplement for the poultry industry, and the list goes on. A full summary and market analysis of the uses of shells already exploited, and a list of other potentially viable uses are described in my full CACHE report, available to view and download for free here:

bit.ly/shellwaste

The first major reason for shells not being valued appropriately is the difficulty of aggregating enough shell material in a single location or at a single time to make processing them for a specific application worthwhile. Luckily, shellfish production in Europe is large confined to specific regions, and thus, with a little effort, cooperation can be brokered between shell producers to create large shell collections from various sources, making exploitation of the resource much simpler and cost effective.

Secondly, the degree of cleaning and processing of fresh shells will vary according to the application targeted. For instance, shells to be used as a biofilter medium, might need to be cleaned to be free of tissues, and then crushed to the desired grain size: a relatively

James has a background in marine biology, studying in various locations around the UK before moving to Brussels, Belgium in 2016 to join the EU-funded Marie Curie CACHE network at the Royal Belgian Institute of Natural Sciences. Here, he spent two-years researching potential applications for shell waste. Following the completion of this project, James spent a year working as a scientific consultant, focusing on potential shell use applications for a number of large companies. He now works in Brussels in policy areas relating to science-industry knowledge exchange and innovation, but keeps a keen interest in mollusc aquaculture: as an advocate, and a consumer!

For more information about the EU funded CACHE network, visit: www.cache-itn.eu

Shell re-use cont.

simple process. On the other end of the spectrum, those advocating shells as a base-material for the creating biodiesel catalysts, describe the need to burn fresh shell fragments at over 800˚C for several hours to obtain an activated material. Shell producers are unlikely to have such processing facilities readily available to them, and would need to work in cooperation to establish collective processing facilities or develop partnerships with industries, such as the aggregates industry, who regularly carry out these procedures. Government or EU funding for projects such as these may be available under "zero waste", "circular economy" or "blue growth" initiatives.

The take home messages from my project are:

If you are a mollusc producer, do not consider your shells as a nuisance waste product – there are many potential applications available for their use! If the amount of shells you produce is too small to make processing them worthwhile, then speak to other local producers to see if a large exploitable collection can be established and maintained. Facilities to clean and process fresh shells for particular applications may be attractive funding opportunities for current or future national and EU initiatives. Otherwise partnerships can be established with other industries more experienced in the necessary procedures.

If you are, or know, companies that use limestone or chalk in products or processes, why not consider whether shells can partly or completely replace the mined limestone used?

More details about established and potential shell applications, and the processing techniques required are documented in the full final report from my CACHE research, which can be viewed and downloaded for free here: https://zenodo.org/record/2662011#.XOl5JogzY2x

* A full database of articles relating to shell applications is available at the CACHE project website at: https://www.cache-itn.eu/projects/publications/ - link name: "JPMorris_WP6_D6.3_Literature database"

Pictured below; Oyster shell waste in Lau Fau Shan, Hong Kong Island. Oyster meat is harvested directly on the shoreline here, and sold on either dried or for use in oyster sauce, in both cases without shell. For many years, shells have been dumped where they are landed, and now shell piles are becoming environmentally damaging to coastal villages and surrounding waters in this area. Initiatives to use these shells are now being established, as what was once thought of as a harmless waste product transformed into an environmental hazard, but is now being viewed as a potentially valuable resource. Photo credit; James Morris, Lau Fau Shan, Hong Kong SAR, December 2016

NEWS
Morecambe Bay Oysters – a plea for growers/restorers to plan ahead

Morecambe Bay Oysters are addressing the newly increased interest in native oysters by hatching these in the colder winter months alongside Pacific oysters in their hatchery on Walney Island. There are real advantages to this with sea water bacteria levels particularly of vibrios being far lower. They have been doing this for a long time as it was standard practice at the Government research facilities in Conwy where much of the pioneering work on hatchery rearing and broodstock conditioning was carried out. As they are trying to produce natives alongside their Pacific production there are increased costs to this, extra heating, lighting, algal production. This year they have produced around 2 million native oyster spat from October to January and could hatch more if ordered well in advance. They can provide bonamia-free nursery seed of various sizes but what they cannot do is grow it large enough to be placed directly on the sea-bed by regeneration programmes because their beach site, although great for growing Pacific oysters is too high velocity for natives.

There is substantial investment needed to produce these oysters over the winter months so the message must be, and is no doubt the same for all hatcheries, place your orders and financial deposit early if you want to ensure supply. A hatchery is not a supermarket where you can buy as you need; it is a real production with significant investment of time and effort called for. So please think ahead!

Morecambe Bay Oysters can be contacted at *info@morecambebayoysters.co.uk*

Pictured right; Kelsey Thompson of Morecambe Bay Oysters talking with Hazel Allen at the NORA meeting in Edinburgh.
Below left; Samples of native oyster seed produced this winter as seen at NORA 2.

Below right; Kelsey Thompson showing visitors the nursery ponds at the Morecambe Bay Oysters hatchery site on Walney Island, which is also the site of an important nature reserve.

NAEMO workshop 2019

Blue mussels are keystone species with a corresponding high value for biodiversity. Mussels also contribute with other valuable ecosystems services, both supporting services, provisional services, regulating services and cultural services. Over the past years, blue mussel (*Mytilus spp.*) beds in Europe and North America have been reported to be in regression, yet the causes and consequences of this decline are not fully understood. Furthermore, as the current mussel culture industry is dependent on collection of wild spat, sustainable management of wild blue mussel beds is essential to sustain the mussel aquaculture industry, yet there is a lack of knowledge related to the dependencies and interactions between wild and farmed mussels.

To address these challenges and the lack of knowledge, the network NAEMO (North Atlantic European Mussel Organization) was formed shortly after last years conference arranged by the Association for Scottish Shellfish Growers (ASSG, October 2018). The first NAEMO meeting will now be held in Corran Halls, Oban, October 30th, as a back-to-back session to the 2019 ASSG conference. The topic of the workshop will be "Setting the stage for mussel research in the north Atlantic region". Objectives to be addressed during the workshop are determination of specific objectives/tasks for the network, development of a joint knowledge platform for existing information about mussel status and population trends and related ongoing research, identification of knowledge gaps related to management of blue mussels and identification of potential areas of collaboration. The workshop will include interactive and participatory group discussions, plenary session with presentations and a poster session.

We therefore welcome abstracts for oral or poster presentations for the workshop. The abstract should contain title, author names, presenting author affiliation, and an abstract of 200 words, using Times New Roman, size 12 and single space text (see template below left). Please state if oral or poster presentation is preferred. Registration to the workshop and abstract submission can be submitted to Julie Webb (j.webb@bangor.ac.uk) or Alessandro Laudicella (Alessandro.Laudicella@sams.ac.uk). Deadline for abstract submission is July 31st, and for registration September 30th. Places at the workshop are limited and with priority given for relevant research interests.

Confirmation of acceptance for oral or poster presentation will be sent in the beginning of September. For any questions, please refer to Åsa Strand, asa.strand@ivl.se, Julie or Alessandro (contact information stated above).

The workshop is supported by Marine Scotland

Scottish Government
Riaghaltas na h-Alba
gov.scot
marinescotland

Formatting instructions for NAEMO

TITLE OF THE COMMUNICATION (Times New Roman, 12 pt, Bold, UPPERCASE)

Author Name M. Surname[1§*], Name M. Surname[2], Name M. Surname[3] **(Times New Roman, 11 pt, sentence case)**

[1] *Department of…, University of…, City name, Country name [Times New Roman, 10 pt, Italics]*
[2] *Department of…, University of…, City name, Country name*
[3] *Department of…, University of…, City name, Country name*

ABSTRACT (max 200 words, Times New Roman, 12 pt, single spaced)

KEYWORDS (Times New Roman, 12pt, sentence case)
[3 or more key words]

*Presenting author

§ Corresponding author: email.contact@me.com

REFERENCES (Times New Roman, 10pt, sentence case, only if relevant)

Save the date

20th International Conference on Shellfish Restoration
Port Stephens, NSW, Australia, 17-20 March 2020

On behalf of the organising committee, New South Wales Department of Primary Industries (NSW DPI) would like to invite you to attend the Australian Shellfish Reef Restoration Network meeting and 20th International Conference on Shellfish Restoration that will be held in Port Stephens, on the 17-20 March 2020.

Abstracts and registrations will be opening shortly and a meeting webpage will be coming soon!

Recent publications

The Native Oyster Restoration Alliance (NORA) and the Berlin Oyster Recommendation: bringing back a key ecosystem engineer by developing and supporting best practice in Europe.

Bernadette Pogoda, Janet Brown, Boze Hancock, Joanne Preston, Stephane Pouvreau, Pauline Kamermans, William Sanderson, Henning von Nordheim
Aquat. Living Resour. 32 13 (2019)

Available on open access at this link

bit.ly/NORApubl

NORA2 meeting in Edinburgh

Janet H Brown reports

The first meeting to establish NORA, (the Native Oyster Restoration Alliance), held in Berlin in 2017 was centred on preparing a statement of intent after many years of diligent preparation. The 69 people gathered for NORA1 discussed what the aims of the alliance were to be and how these aims were to be pursued.

Meeting 18 months later in Edinburgh was quite a different proposition. For one thing the number of delegates had more than doubled and were limited mainly by the capacity of the Royal Society of Edinburgh to accommodate just 155 people. This meeting however centred on what was happening and there was a great deal of work to report on.

The conference was generously sponsored by The Glenmorangie Company with support from Scottish Natural Heritage (SNH), the Marine Conservation Society and Heriot Watt University. The Dornoch Environmental Enhancement Project (DEEP) which is funded by Glenmorangie was much in evidence with all the student helpers wearing their distinctive DEEP T-shirts and doing a great job, culminating in providing potted histories of the oysters and oyster wars on the Firth of Forth delivered in what could only be described as bracing conditions on the windswept shores of the Firth. But that was the field trip at the end of the conference – there was a lot of work for them before that.

Mairi Gougeon, MSP, Minister for Rural Affairs and Natural Environment marked its importance by opening the meeting. There was a full programme of talks on the various projects underway: many illustrating different approaches being made in the very different conditions across Europe in which restoration is being attempted. Diverse sessions were grouped together and presented under headings such as "What works, what doesn't and why" for inshore projects in one session and for offshore in the next. It is early days to answer these questions, but undoubtedly different approaches are being made and with different aims. For one example, Project RESTORE aims to re-establish deep reefs in German waters where the native oyster has been declared extinct. A film "Hope for the European Flat Oyster" available on the NORA website (https://noraeurope.eu/restoration-projects/germany-restore-oyster-restoration-project/) presents the aims of this and even shows something of what the end point with dramatically enriched biodiversity might look like. A UK based project aims for restoration including an oyster fishery such as the ENORI project (Essex Native Oyster restoration Initiative).

Pictured below; Delegates enjoying an evening reception hosted by the The Glenmorangie Company in the magnificent surroundings of the National Museum of Scotland Photo credit; Tristan Hugh-Jones

NORA2 cont.

Other sessions were on "Biosecurity and Management", "What does success look like and how do we get there?" The final sessions were parallel sessions on "Ecosystem services- unlocking business models for restoration"; and "Future proofing: challenges and solutions" and a third session dealt with industry matters.

In another lucky trick of timing (or of excellent management?) a paper on the NORA agreement was published coinciding with the conference and that gives a summary of all projects currently in progress that are signed up to work along the lines NORA has agreed. This is available at https://doi.org/10.1051/alr/2019012 from Aquatic Living Resources.

There was good news presented at the beginning of the conference by Henning von Nordheim (German Federal Agency for Nature Conservation (BfN)) who was able to announce that funding for a further two years for the secretariat of NORA had been obtained by BfN, and also perhaps of even greater import, that bottom trawling was to be excluded from the Borkum Reef area of the North Sea within the next few months which means a great deal for the potential success of the RESTORE project. Trawling and reef structure cannot coexist.

At the end of the meeting Henning announced further good news in that Philine zu Ermgassen had been appointed Secretary to NORA and she will shortly take up the post based in Berlin.

Also Dr Boze Hancock of TNC also announced that the next ICSR would be held jointly with the Australian Shellfish Reef Restoration Network in Port Stephens, NSW Australia 17-20 March 2020.

Pictured this page; Top right; Visitors from Cawthron Institute, Nelson, New Zealand, on left Julien Vignier and right, Nick King.
Below; from left Iain Ross of Maorach Beag, in background David Shearer of Lochnell Oysters and on right Alex Mackenzie
Right; Charitos Zapitis, newly appointed at Alfred Wegener Institute to establish the oyster hatchery on Helgoland as part of project RESTORE (Phase 2 PROCEED).

The prize for the best poster was awarded to Dr Anaëlle Lemasson (University of Cambridge); the prize being a fine bottle of Glenmorangie whisky. There followed similarly generous presentations to the scientific committee who had chaired the sessions and helped in the organisation. Happily and deservingly an extra special bottle of Glenmorangie was given in the final presentation to Henning von Nordheim in recognition of his role in so much of the preliminary work and far-sightedness necessary to establish NORA and his ongoing work in the field of oyster restoration and the essential background work on policy and legislation he has carried out over the years.

Further coverage continues on following pages with more photos on the back page.

NORA2 cont. PhD mini-symposium

I was most fortunate in being able to attend the PhD student workshop held before the start of the full conference. This was to me like hearing the news straight from the coal face; the work actually in progress to various degrees. Some projects were just starting out while others were almost completed with PhD theses written and papers published. Some presentations also provided a nice practice opportunity before presenting in front of the far larger audience at the main event but the small scale of this event made it particularly useful.

Ana Rodriguez (Heriot Watt/St Andrews) started off with a brief but succinct account of her oyster larval work and their settlement preferences, which are largely determined by the presence of another oyster and also biofilm. Ana had also done detailed work on the behaviour of the larvae which show a pattern of seeking the bottom hence another example of planktonic larvae exhibiting behaviour that prevents it being distributed far and wide but instead showing behaviour that will tend to favour its staying near its parental stock.

Hannah Lee (Heriot Watt University), introduced a novel study on a carbon budget for oysters that could present a budget akin to the green budget worked out for the Amazon, but in the case of oysters – blue carbon. It is very early days in her study and she also presented in the main conference – she argued that a disproportionate amount of attention is given to photosynthetic marine ecosystems and her work aims to improve understanding of service provision in terms of carbon storage and water quality management.

Bérenger Colsoul (Alfred Wegener Institute (AWI)) – with a talk entitled "From hard rocks to PROCEED" reported on what he had studied in his PhD which was looking at suitable substrate material for settlement of young oyster spat. The title referred to this topic and what it is leading on to which is a second phase of the RESTORE project which continues from this year in 2 parts, one of which is called PROCEED which will be centred on production of spat on substrate. (This includes the establishment of a hatchery on Helgoland, an island off the German coast.)

Verena Merk (AWI) presented some information that was truly amazing. I had always assumed reefs could only form if there is natural settlement. When checking on the growth of her oysters put out at 10m depth she found that not only did they grow very well

Nora 2 cont. PhD mini-symposium

but they had actually formed mini-reefs by becoming fastened to each other by the growth of epifauna. She also found that her oysters were already producing larvae. This is information from oysters placed out the same year.

Maria Hayden-Hughes of the newly established Shellfish Centre at the University of Bangor has been looking into the historic position of oysters in Wales and is now seeking to revive beds around Puffin Island, working with the hand-dredged mussels growers. This project is at a very early stage yet.

Alice Lown (University of Essex) at the other end of a PhD programme and about to start a 2 year post-doc had been looking at the relation between species richness of macrofaunal species with density of oysters. This showed clear increasing species richness with increasing density but this gets suppressed in areas with high densities of the slipper limpet, *Crepidula fornicata.*

Brecht Stechele (University of Ghent) was another student with a mathematical bent modelling to determine where oysters can thrive. The modelling takes into account the food required for growth, the excess that is needed for reproduction and can determine the best temperature to get the best assimilation so he can determine that for optimum conditions it can take *Ostrea edulis* 80 days to reach puberty but that it takes 160 days in the less optimal conditions in Belgium. He is looking for collaborators to provide data that can go on to the Add-My-Pet web site (https://www.bio.vu.nl/thb/deb/deblab/add_my_pet/) a site that aims to collect referenced data on the energetics of animal species.

Zoë Holbrook (University of Southampton) talked about comparing 3 populations of *O. edulis* and comparing hatchery production versus wild populations but since changes can be marked on even a very local scale, the work is complicated, expensive and the need for biosecurity is extreme.

Luke Helmer (University of Portsmouth) who had organised this session and chaired it admirably talked of his work on suspended broodstock cages. *Crepidula* came into his talk also with a figure of 4034 *Crepidula* per m^3 recorded at the mouth of Chichester Harbour (Surely time for desperate measures? See page 19)

Pictured below; The speakers at the PhD mini-symposium crowd around a statue of David Hume at the Royal Society of Edinburgh, an inspiring location for their talks. From left to right, Ana Rodriguez, Verena Merk, Maria Hayden-Hughes, Hannah Lee, Zoë Holbrook, Brecht Stechele, Luke Helmer, Alice Lown, Eric Harris-Scott and Bérenger Colsoul.

The Hitch Hiker Shellfish

Janet H Brown

Sharp eyed readers and those also with a good memory may recall some time ago The Grower had a short piece "Pest Control via gastronomy" (July 2018 issue). I was reminded of this at the NORA 2 meeting hearing of the extreme concentrations of *Crepidula fornicata* recorded by Luke Helmer of Portsmouth University in the entrance to Chichester Harbour. I looked up the link given at that time and it seems that the company is doing well. For one thing the web address provided in the previous issue of The Grower no longer works – it is now www.lacrepidule.com/

They call *Crepidula* the hitchhiker shellfish and have a topical story as to how it arrived in France – on the hulls of US boats on D Day. The more prosaic story of its arrival at least in the UK is that it was first recorded in UK in Liverpool Bay in 1872 but is no longer found there. Low winter temperatures can control its northerly spread. It became established in Essex with shipments of *C virginica* between 1887 and 1890 from the USA but it can be transported on ships' hulls. So maybe some did arrive in France on D Day.

This website now comes with recipes that look quite delicious. There is one indication that all may not be so straightforward with the harvesting since separating the meat from its shell is perhaps not so simple, "Once fished, the Atlantic Limpet arrives at the ALD factory to be shelled. Traditional steam-shelling techniques not being adapted to the fragile flesh of the limpet, we had to find an alternative which was more respectful of its delicate nature. Thanks to several years of research and development, we have successfully developed and perfected a shelling method which uses neither heat nor chemical treatment and allows an optimal separation of the flesh from the shell. Once liberated, the flesh is cleaned in purified sea water and immediately frozen to IQF (Individual Quick Frozen) standards in order to keep all the sense-stimulating and nutritional values. This method not only allows us to offer a completely clean limpet, but also permits the effective exploitation of the shell."

I cannot find any mention on this web site of the fact that this is a true invasive non-native species (INNS). And more surprisingly there is also a news item on the website saying they are beginning an MSC assessment for the Atlantic limpet fishery. Have any of our readers tried this product – any views?

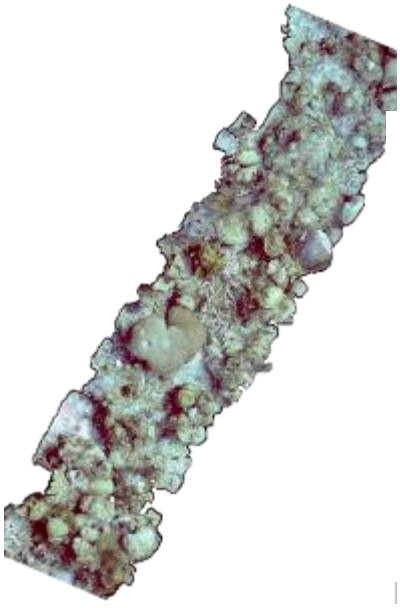
Some things to think about?

My technical right-hand man sees things on the intersection between marine biology and 3D technology which may be of interest to share with other readers. Comments welcome either as contributions for future issues or as "Letters to the Editor."

Below is a link to the winner of the European Inventor Award 2019 for developing a non-toxic antibiofouling solution for boats - antifouling carpet? There is an interesting video to see here which poses a question, "Why do sea urchins not get coated with fouling organisms?" Would this carpet prevent transport of important pests on the hulls of small boats? On the other hand would it prevent restoration of native oysters if used too liberally on any hard structure in the seas? And are the nylon filaments in the carpet a hazard themselves? See the item at bit.ly/2Kz4Kwk

How to measure a 3D surface – such as a growing native oyster reef? There was discussion on monitoring of restoration projects at NORA2 – is this a possibility - photogrammetry? This problem has cropped up elsewhere when monitoring sponges - see this link bit.ly/2L54eFL

Even if you are not interested in photogrammetry this website has fully 3D images that you can actually rotate on your screen provided you have the latest version of Microsoft 365. This facility is not available with The Grower (yet) but here is an illustration of what you can see in 3D of an image of Transect 6, Flat Cay, St. Thomas, USVI by Lauren Olinger on Sketchfab.



Book review- “The Mysteries of Mussels & How They Grow”

A Childrens’ Book About the Life of Mussels

The importance of communicating information about science and shellfish to the general public is recognised but how often do we include younger people with such aspirations? If we want to influence opinion maybe we need to interest the young. That is exactly what Kirti Ramesh has done. She appeared in the Grower April 2015 issue telling us that her PhD project as part of the CACHE project was titled “Intracellular formation of amorphous calcium carbonate and its interactions with intracellular pH homeostasis” to which she kindly added – this means “in simpler terms that I will be studying how mussels and oysters actually make their shells.”

She wrote to me in May explaining, “I recently finished my doctorate in Kiel, Germany as part of the EU funded project, CACHE-ITN. This project aimed to study how shells are produced in Europe’s most important commercial marine shellfish species. Specifically, my research within the project focussed on the mechanisms by which blue mussels make their very first shells, during their larval stages. My work also looked at how the miniscule but critical process of making larval shells may be affected by expected changes in the environment due to the anthropogenic emission of CO_2. During this time, while trying to explain my research to friends or family, I came to realise that lots of people do not know about the life-history of mussels and it is certainly not something that kids are taught. Quite often, people consider them a fairly boring animal, almost akin to pebbles on a beach or have an interest in them purely in terms of food. However, with that mindset, it is almost impossible to then spark an interest in helping conserve and protect these animals that have a crucial role in the ecosystem. This is how I came to write a children's book which describes the spectacular lives of mussels and why they are important in the environment. My book titled “The Mysteries of Mussels & How They Grow” is available on Amazon (all marketplaces). The book is written in verse and follows the life of Jorn, a blue mussel larva. The book has been illustrated by the wonderful, Bristol-based children's’ book illustrator, Kate Nelms.

Kirti contacted me as Editor and it seemed to me the only way to get an idea of whether this was a good book for children was to do some test readings. It looked very interesting to me but what did the children think? It is not anything akin to market research but one can expect an honest appraisal. They clearly liked the illustrations and having a microscope in the picture to help them understand that these larvae were basically invisible without that assistance obviously intrigued them. But this is what they said.

Pictured right; Dr Kirti Ramesh at work with baby native oysters in her current work at Kristineberg marine station, in Sweden. Maybe her next book will be about oysters?

Alastair 9 “I like that”

Joseph 9 “It was an incredible atmosphere”

Alastair went on to say the book was trying to promote anti-pollution and he told me he likes to eat mussels. They didn’t know about the larvae but he did know something about the rings on the shells. Callum 13 said he liked it because it wasn’t like a child’s book—he added—”You want to keep reading because it has a rhyme”- he felt the rhyming really carried one along more easily than if it has been written as a purely factual account.

In another bit of market research, sub-contracted to N. Ireland, Oliver 13 said, “Very informative, great pictures, quite advanced but understandable,” and he enjoyed the rhyming! Dante, aged 9 said it was very sad as Jorn was unhappy with the temperature rising.

Only obtainable from Amazon, Price £5.35

Pictured below from left, the impartial reviewers, Dante, Oliver, Alastair, Callum and Joseph, and the book.

Oyster cultivation in a changing climate - a joint workshop of BlueFish, SAGB and ARCH -UK

Chris Hauton reports

On Wednesday 15th May ARCH-UK, with BlueFish and the Shellfish Association of Great Britain (SAGB), hosted an afternoon workshop to consider the challenges of oyster cultivation in Europe in the context of a changing marine climate. The event, held at Fishmongers' Hall in London, first heard reports of some current shellfish cultivation and restoration projects in England and Ireland. Speakers, including researchers from University of Southampton, Essex and BIM Dublin, reviewed current activities in different flat oyster restoration projects but also highlighted the potential challenges of increased temperatures and more variable salinity to success of all oyster culture throughout the UK and Europe.

Delegates also heard of the development of the Native Oyster Network

(https://nativeoysternetwork.org/), co-hosted by the Zoological Society of London and University of Portsmouth, which aims to work with the Native Oyster Restoration Alliance (NORA; https://noraeurope.eu/) to facilitate an ecologically coherent and collaborative approach to native oyster restoration in the UK and Ireland. (A report of their 2nd meeting appears on pages 15 – 19 of this issue, Ed.)

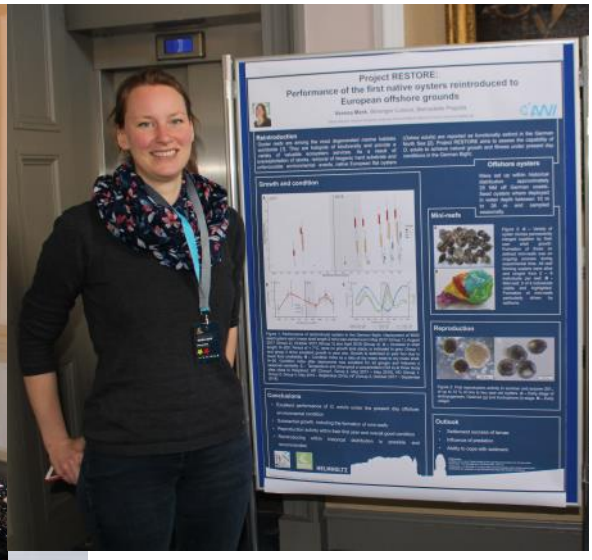
Thereafter, speakers from the Roslin Institute and the University College Cork outlined current research to identify genetic markers of resistance to disease in Pacific and native oysters and also approaches to the restoration or conservation of oyster stocks in the presence of disease. The workshop closed with two presentations from the recently launched Shellfish Centre at Bangor University, summarising new initiatives to understand the challenges presented by human pathogenic microbes in oysters.

Professor Chris Hauton (pictured below speaking at the meeting) is Professor of Marine Ecophysiology within Ocean and Earth Science, National Oceanography Centre Southampton at the University of

PHOTO NEWS – ROYAL VISIT TO WALNEY

Pictured below; Kelsey Thompson shows HRH Prince Edward the nursery facilities while on the right Paul Marshall shows him the larval rearing tanks containing native oyster larvae and explains the process.

PHOTO NEWS
from the NORA2 meeting



Pictured top left; Loch Nell Oysters stand with from left Iain Ross of Maorach Beag, David Shearer of Loch Nell Oysters, Dan Renton of the CROMACH Project and John Hamilton of Loch Nell Oysters.
Above; Verena Merk of AWI who reported on successful growth of her oysters and on the surprising fact that not only were they breeding within months of being put out but some had been formed into mini-reefs by the action of epibionts!
Left; Bill Sanderson on the field trip to the Firth of Forth with Henning von Nordheim holding a relict of the past oyster fishery.
Below; also on the shores of the Firth, from left Bernadette Pogoda, Henning von Nordheim, Boze Hancock, Bill Sanderson and Pauline Kamermans.

Shellfish Culture

Pictured left; Another use for shells - from www.zzuwsblauw.nl For other uses of shells see article on pages 10 and 11

Photo credit for this page; J H Brown