CARDIFF NATURALISTS' SOCIETY

Founded 1867

NEWSLETTER No. 119

May 2020

Charity No. 1092496

LIST OF OFFICERS 2019/2020

President
Position vacant

Secretary
Mike Dean
36 Rowan Way, Cardiff CF14 0TD
029 20756869
secretary@cardiffnaturalists.org.uk

Treasurer
Rhian Kendall
treasurer@cardiffnaturalists.org.uk

Membership Secretary
Elizabeth Morgan
membership@cardiffnaturalists.org.uk

Indoor Meetings Secretary
Hilary Wicks
029 20257012
indoor@cardiffnaturalists.org.uk

Field Meetings Coordinator
Position vacant

Newsletter Editor
Stephen Nottingham
stephen@cardiffnaturalists.org.uk

Publicity Officer
Andy Kendall
info@cardiffnaturalists.org.uk

Also on Council
Mary Salter, Gill Barter, Marie Makepeace, Stephen Howe, Patrizia Donovan

http://www.cardiffnaturalists.org.uk
www.facebook.com/groups/CardiffNaturalists
Twitter: @CardiffNats
http://cardiffnaturalists.blogspot.com

Cover: Red juice tooth fungus (Hydnellum packii) on Ucelet Wild Pacific trail, Canada. Photo by Phill Blanning (see pp. 18-19).

Student Bursary Award 2020

We congratulation Francesca Rowlands for winning this year's Bioscience Prize. This is awarded annually, in memory of Prof Ursula Henriques and Dr Mary Gillham, to a University of Cardiff School of Biosciences student for their outstanding 2nd-year fieldwork. Francesca received her award at the CNS meeting on Monday 9 March 2020 from Secretary Mike Dean (photographed below by Andy Kendall). Francesca writes about her work on coral reef fish in Tobago on pages 20-27.

President of Cardiff Naturalists' Society

Our newly-elected President, Professor Anthony K Campbell MA, PhD, FLS, FLSW of the School of Pharmacy and Pharmaceutical Sciences at Cardiff University, decided to stand down from the post with immediate effect on 13 February 2020.

This was unfortunate as the Society had been seeking a new President for some time, and he was bringing in new ideas to the benefit of the Society.

This leaves the Society with the problem of finding a new President, coupled with the fact that I wish to stand down as Secretary having undertaken the role for many years.

I can only ask the membership to consider volunteering to take on these roles before the AGM in September.

Mike Dean

Secretary
Cardiff Naturalists' Society

=====

Deadline for submissions to next newsletter: Monday 31 August 2020.

Future Events of the Society

We are living in unprecedented times due to the spread of Covid-19 (Coronavirus). Cardiff Naturalists' Society's first priority is to protect the health of its members and to minimise the risks of exposure to the virus. It will comply with all recommendations issued by the UK Government and the Senedd to the best of its ability. It was to this end, that the last 'Indoor Meeting' was cancelled together with a proposed Council Meeting (we continue using electronic means of communication).

It was originally anticipated that Field Trips would be planned and implemented on the basis that they are held in the 'Open Air' but at the point of writing this is against Government advice, especially for the older generation. Due to the changing situation, keep up-to-date via the Society's webpage, social media (see page 2), and e-mails that we will send out.

We all have to take precautions as recommended and remain positive. Council can only wish all our members good health and we hope for a return to normality as soon as possible.

Indoor meetings will hopefully restart in September 2020, starting with our AGM. All indoor meetings begin at 7.30 p.m. and are held in the Main University Building, Park Place, Cardiff CF10 3AT. Follow signs inside the building for room location (which varies according to room availability, though it is usually in the same area of the building).

For all the latest information and additions to the CNS Meetings Programme:

http://cardiffnaturalists.blogspot.co.uk/p/programme.html

A brief update on the Colonel H. Morrey Salmon Project

Mike Dean

In the January Edition of the CNS Newsletter, Andy Kendall wrote an article giving an excellent description of the Colonel H. Morrey Salmon Project. The project suffered many delays in the early stages, while an agreement was reached that was acceptable to Amgueddfa Cymru - National Museum Wales, the Salmon family and CNS.

This was achieved and we anticipated that work would commence shortly, especially as several people had made themselves available to undertake volunteer work associated with the project.

However, this was not to be, as the Museum has had to close in response to the spread of the Coronavirus / Corvid-19.

Given the scale of the problem facing the country, it is not surprising this course of action has been taken but nevertheless it is very disappointing. Hopefully, when life returns to normal, we will be able to instigate the project as quickly as possible.

Stellar's Jay, and woolly-bear caterpillar. Photos from British Columbia by Phill Blanning (see pp. 18-19).

New Year's Birdwatch: 19th January 2020

When we decided to make a change from the usual Cardiff venues, we didn't realise we would be sharing Cosmeston Lakes Country Park with a 10km cross country race for 350 runners. However, the car park and race route were very well marshalled and we modified our route so the event had little adverse impact on our activities, apart from making the paths muddier than usual.

It was a perfect winter morning – frosty, sunny and calm – when over 30 CNS and Wildlife Trust members and friends gathered by the Visitor Centre. After viewing the East Lake with its regular congregation of waterfowl and gulls, including mute swans, Canada geese, mallards, tufted ducks & coot, we crossed the boardwalk for another observation point with better views of a little grebe. However, we failed to pick out a reported glaucous gull amongst the many lesser black-backed and herring gulls.

Another good viewing site overlooks the West Lake where a pair of great crested grebes were displaying. Among the rafts of tufted ducks we picked out a few pochard and gadwall. Keeping in single file to avoid impeding the leading runners as they headed for the finishing line, we made our way to a path bordering the East Paddock. From here we had excellent views of a green woodpecker probing the turf for ants. Further up the field, two mistle thrushes hopped about boldly close to a second woodpecker.

Birdsong was sparse in the Park apart from ubiquitous robins and a couple of song thrushes but there were raucous calls from crows, magpies and jackdaws. We crossed the paddocks and returned through Cogan Wood.

Blue and great tits seemed to be all around especially near feeding posts. Dunnocks, robins, nuthatches and a female chaffinch were also attracted to the handouts. A hyperactive goldcrest flitting higher and higher in ivy-draped trees had us craning our necks.

The telescope Rob toted proved useful for enhanced views of less -common birds especially the distant kingfisher which was spotted from the West Lake overlook. Along the route, grey squirrels, a rabbit and a brown rat were the mammals I noted but three ladies were lucky enough to observe 2 of the reintroduced water voles. Returning to the carpark by 1pm, participants dispersed for lunch.

A smaller posse of ten reconvened by arrangement at a car park near Penarth marina and strolled along the Ely riverside path towards the barrage. Elegant goosanders swam obligingly close and were much admired. Two grey and one pied wagtail were glimpsed by some but there were no expected waders.

Black-headed gulls and cormorants lined up in their scores along the barrage piers. A wintering blackcap played hide & seek in an ivy-shrouded shrub and a female black redstart flitted from gable to gable among the rooftops. These 2 special birds were among over 40 species seen on the day and a thrilling addition to my new year's list.

Report and photos by Linda Nottage.

Great crested grebe

Green woodpecker (female)

Sleepy squirrel and birdwatchers in Cogan wood

Weather Summary for North Cardiff 2019

Note: This weather summary for North Cardiff has been compiled from figures recorded in Thornhill, a location with observations going back to 1986.

On a global scale, 2019 was characterised by violent tropical storms, intense rainfall, extreme heat, drought and fire. Nearer to home our weather was influenced by the increasing tendency for the North Atlantic Jetstream to veer away from its normal track, occasionally wandering north over Greenland, sometimes south of Iberia. As a result, Britain's weather during 2019 was often what would be termed extreme.

In Cardiff, January was the driest since 2010, relatively mild in the first half but with a sting in the tail. On the 31st, snow spread from the S W causing major disruption in Devon and Cornwall and giving 6.5 cm in Cardiff overnight.

February started chilly but became very mild towards the end, over 20^{o}C at Trawscoed on the 25th, one of the highest temperatures ever recorded in Wales at this time of year.

March started wet and windy but ended dry and mild, only 2% of the month's rainfall fell during the last 15 days.

Colder weather spread south early in April with a covering of snow over much of Mid-Wales on the 4th extending as far south as Caerphilly. By the 18th of April, temperatures were widely exceeding 20^{o}C, reaching a maximum of 25.9^{o}C in Cardiff on the 21st.

May was a dry month with only 59.4 mm of rain of which 60% fell in 2 wet days (7th & 8th).

Major fluctuations in the position of the Jetstream throughout June, July and August led to a spell of dry warm weather alternating with wet thundery outbreaks. Temperatures exceeded 30^{o}C on at least one day each month sometimes triggering heavy thunderstorms. One caused flooding in parts of Cardiff on the 7th of June.

The autumn was wet, the wettest since 2000. A particularly wet spell occurred in the 8 weeks between 21st of September and the 15th of November when 557.4 mm (21.9 inches) was recorded in North Cardiff.

The 28th September was very wet (55.7 mm) the wettest day of the year!

December started cold and dry but soon turned wet and mild. However Christmas Day was a brilliant dry and sunny day with high pressure following, giving a dry settled end to the year.

Total rainfall for the year was about 228.6 mm (9 inches above the long term average).

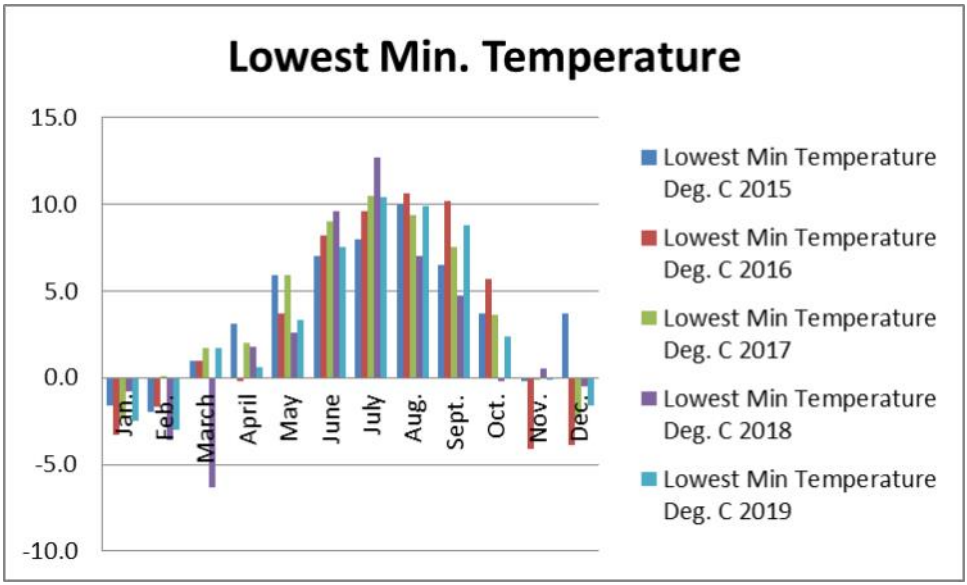
Report from a friend of the Society.

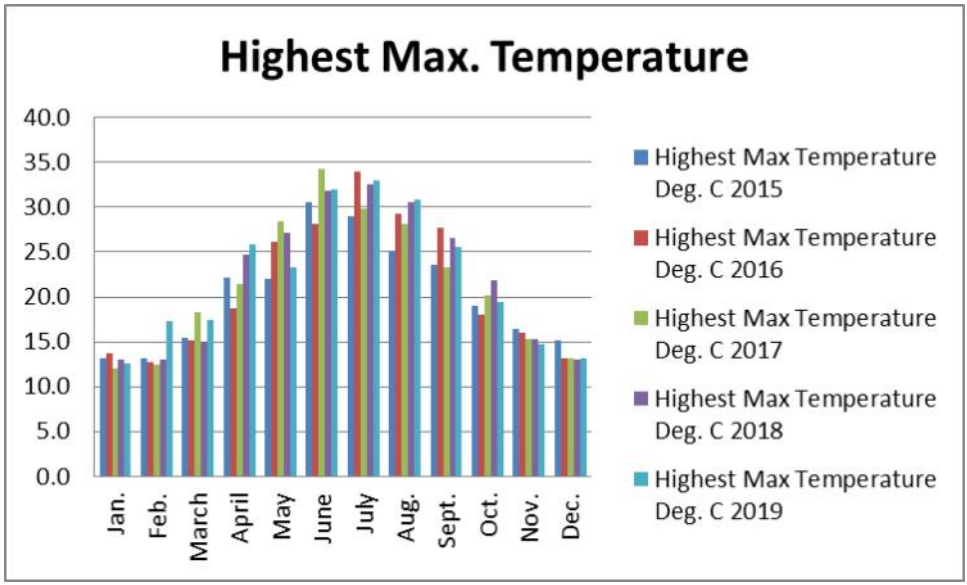
Weather Summary for North Cardiff 2019

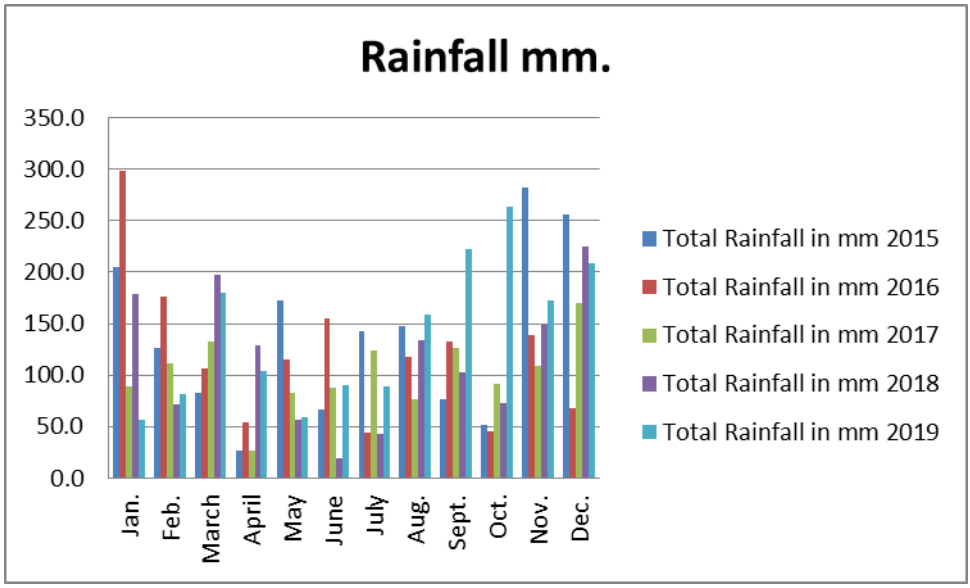
Annual Weather for North Cardiff 2019				
	Jan.	Feb.	March	April
Total Rainfall in mm	56.6	81.6	180.2	104.0
Highest in one day in mm	12.0	17.7	26.0	24.6
Date of Highest Rainfall	26th	3rd	5th	3rd
Highest Maximum Temperature Deg. C	12.6	17.3	17.5	25.9
Date of Highest Temperature	25th	27th	30th	21st
Lowest Minimum Temperature Deg. C	-2.5	-3.0	1.7	0.6
Date of Lowest Temperature	30th	3rd	8th	3rd
Note: Exposures for both rainfall & temperatures are not to Met. Office Standards				

May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
59.4	89.9	89.5	158.4	222.4	263.6	172.7	208.1
23.9	21.8	33.0	33.4	55.7	49.9	24.0	24.8
7th	7th	23rd	16th	28th	25th	1st	19th
23.3	32.0	33.0	30.8	25.5	19.5	14.8	13.2
31st	29th	23rd	24th	21st	1st	1st	10th
3.3	7.5	10.4	9.9	8.8	2.4	-0.1	-1.6
				Between			
6th	6th	3rd	29th	7th & 10th	27th	9th	2nd
			Total Rainfall			1686.4	mm
						66.4	Inches
			Long Term Average			1447.0	mm
						57.0	

Weather Summary for North Cardiff 2019






Rainfall mm.
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Total Rainfall in mm 2015
Total Rainfall in mm 2016
Total Rainfall in mm 2017
Total Rainfall in mm 2018
Total Rainfall in mm 2019

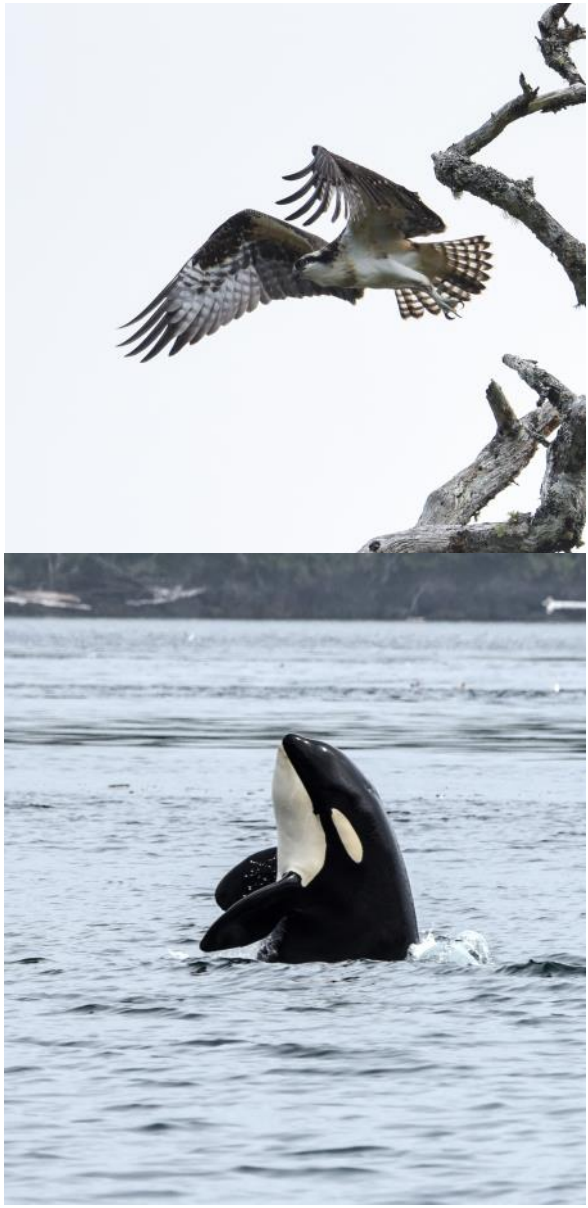
Members' Evening 2020

On Wednesday 15 January 2020, we enjoyed four excellent presentations from Society members. Firstly, Phill Blanning showed photos of the abundant wildlife encountered on a trip to Vancouver Island (see photos).

Then Andy Kendall talked about the time when Holbeck Hall fell into the sea, on 4 June 1993, due to a rotational landslip in Scarborough's South Bay. He showed photos he took at this time. Andy related the landslip to the geology of the area (boulder clay) and put it into historical context, from the Romans (the coast has retreated 3 miles since Roman times) to the present day—a landslip in 2019 caused beach chalets to collapse. The take-home message was that you can't stop the forces of nature!

Linda Nottage was next up, with a presentation about Coed Garnllwyd. This is a Wildlife Trust SWW reserve, just north of Llancarfan. Linda and Rob Nottage are part of the volunteer team who do essential management work in the wood, which is noted for its ash and oak trees, and a large beech tree. Linda described how ash die-back disease is making the wood unsafe for walking along the pathways, which the volunteers are tasked with keeping clear. The reserve has plant species characteristic of ancient woodlands, including Ramses, Herb Paris, and Early Purple Orchids, Linda also showed pictures of some of the fungi, moths, birds and insects to be seen in the reserve.

The final presentation was by Stephanie Matthews, who talked about the serious problem of micro-plastics in our seas and oceans. She described work at the Darwin Centre in Pembrokeshire, where children are involved in studies of micro -plastics and micro-plankton in the marine environment.



Vancouver Island wildlife—osprey and orca. Photos by Phill Blanning.

Tobago Field Course

Francesca Rowlands, winner of the CNS Biosciences Prize 2020

A group of Cardiff University Students embarked on a journey to the Caribbean island of Tobago in June 2019. On arrival, we were transported to Charlotteville, Man O' War Bay, in the north of the island. For our two-week stay, we were accommodated in cabins on the beach which reminded me of the Inspector's lodgings from the programme Death in Paradise. We were privileged to be able to wake up hearing the gentle lapping of the waves on the Caribbean shore.

We snorkelled in three locations: Booby Reef, Pirate's Bay and Turpin's Bay. A typical day involved meeting at 7am; snorkelling from 8am-12pm; lunch 12-1pm; snorkelling again from 1-4pm; a lecture at 6pm; and dinner from 7pm. The evening lectures were on a range of fascinating topics like marine conservation, fish identification and the history of Tobago.

Our first tutorial taught us how to use the snorkelling equipment and on the best floating position to prevent damage to the reef. The favourite tip I learnt was to rub toothpaste into my snorkelling goggles and leave overnight to reduce condensation… and this trick definitely worked!

During my snorkelling time, I particularly enjoyed watching parrotfish. There were nine parrotfish species across the three reefs. They are characterised by their bright colours and fused teeth (Streelman *et al.* 2002). Their colour patterns vary according to their life phases which are juvenile, initial and terminal; initial and terminal stages have distinct features. The abundance surveys consisted of ten 5-minute free swims within each study site, timed with individual waterproof watches, tallying the number of selected species seen. We used a waterproof A5 pad and pencil to record our findings.

On a day off, we took the opportunity to brave the very steep climb on the curvy road to Flagstaff Hill, one of the highest points on the island, where the views were breathtaking. A couple of days later, we went on an excursion to Little Tobago, a tiny island off the northwest coast. We travelled in a glass-bottom boat, which gave us the opportunity to see the fish from a different perspective. One evening, we were lucky enough to go turtle watching and saw two hawksbill turtles nesting. Another absolute highlight for me was seeing a pod of dolphins on one of our trips back from Booby Reef!

During the second week, everyone started their individual projects on Booby Reef, as it had the best visibility for ease of observation. It was a daunting task deciding upon a realistic and interesting study, but we were given guidance by Prof. Jo Cable and Prof. Sarah Perkins.

The aim of my project was to measure the foraging rate of three parrotfish: Striped (*Scarus iseri*), Redband (*Sparisoma aurofrenatum*) and Princess (*Scarus taeniopterus*). I tested the hypothesis that swim speed, life stage, size, species association and time of day affected it (Figure 1).

To understand the impact of these variables, two parameters were recorded, namely feeding frequency and bout length. Both were considered because Bruckner *et al.* (2000) proposed 'spot-biting' and 'focused-biting' as two feeding methods. Spot-biting refers to the single gnaw made at a substrate, whilst focused-biting entails multiple bouts at a single point

Background to Study

These three fish species were chosen due to their high abundance at the study site. They also have an important role in the ecosystem as parrotfish are herbivorous and control algae on coral reefs (Hughes *et al.* 2007).

Figure 1: Parrotfish colour patterns according to species and life phase. Princess (a) initial and (b) terminal; Redband (c) initial and (d) terminal; Striped (e) initial and (f) terminal. Pictures taken on Booby Reef, Man O' War Bay, Tobago (2019).

Coral reefs are declining globally, reducing by 80% in the Caribbean between 1970-2000 (Gardner *et al.* 2003). This is a consequence of intensifying atmospheric and sea surface temperatures, where a 0.10C increase in sea surface temperatures resulted in 35% more coral reef cells being bleached (McWilliams *et al.* 2005). As coral cover declines, a shift from a coral- to algal-dominated state can occur. Following a mass-bleaching event in 2010, coral reefs across Tobago experienced a two-fold increase in algal cover (Alemu and Clement 2014). Therefore, quantifying the foraging behaviour of parrotfish can indicate the ecosystem's resilience and shape future management strategies to conserve and protect the habitat.

Methods and Materials

I conducted 157 5-minute swims following a randomly selected parrotfish during each swim. Prior to starting each swim, I recorded the fish's species, life stage, size class and start location. Additional variables including date/weather/time of day were also noted. During each 5-minute swim, the absolute foraging rate was quantified by logging two factors: the feeding frequency and number of bouts per foray. The species, number and amount of time the followed fish associated with another fish/shoal were also recorded. Observing the parrotfish during the first week allowed me to understand their behaviours and, subsequently, account for these during my project. My study captured some interesting findings.

Results and Discussion

The absolute foraging rate was higher in Princess and Striped parrotfish, which are from the same genus, compared to Redband parrotfish which are from a different genus. Redband fish may have a lower foraging rate as they have a stronger jaw, allowing them to consume more substrate per bite (Bellwood and Choat 1990). Likewise, Redbands and other parrotfish in their genus have a wider diet, consuming various algae, seagrasses, sponges and urchins; Striped, in particular, strictly eat macroalgae (White and Warner 2007).

Striped and Princess parrotfish may have a higher number of bouts per foray to maximise their foraging efficiency, as it takes them longer to find suitable feeding patches. Princess and Striped parrotfish are more abundant on Booby reef. This may be as they are important to prevent the over-proliferation of algae, which Redbands only assist with.

Terminals (larger, older fish) invest more energy into social interaction and territorial behaviour, which reduces their foraging activity. Initials (smaller, younger fish) need more sustenance for growth, development and gamete production, thus requiring a higher absolute foraging rate. Due to the higher abundance of initials to terminals on Booby Reef, it implies initials, particularly those of Princess parrotfish, have a more profound effect on turf-algal control. However, Redbands were an exception, where their foraging activity was not affected across varying life stages and sizes. A possible reason for this is they may be inferior to another territorial species present, allowing them to spend more time foraging.

Despite the foraging rate being higher in pairs/groups to swimming alone, terminals were solitary; initials swam in pairs/shoals (Figure 2). Terminals are brighter, so swimming in pairs/shoals could cause them to stick out in the ‘oddity effect’, making them more vulnerable to predators. The less distinct initials have several benefits to swimming in groups. These include:

(a) reduced predation from damselfish, which are territorial fish more abundant in algae-rich patches - areas of target for herbivorous fish,

(b) less energy is required as water is propelled from the fish ahead and harnessed by the following fish down the side of its body, allowing for movement (Hemelrijk *et al.* 2014),

(c) more time can be invested into foraging and detecting predators or territorial species, as vigilance is spread between shoaling parrotfish (Olson *et al.* 2015).

The feeding frequency was higher during the afternoon than morning. This trend was similar across life stages and supported by previous studies, implying a difference in the nutrient quality of substrate across the day. Photosynthetic rate is higher during the afternoon, increasing the soluble carbohydrates in algae available for parrotfish (Zemke-White *et al.* 2002). Due to this increase in nutrient foraging materials, parrotfish may uptake a generalist diet during the afternoon, leading to their higher feeding frequency.

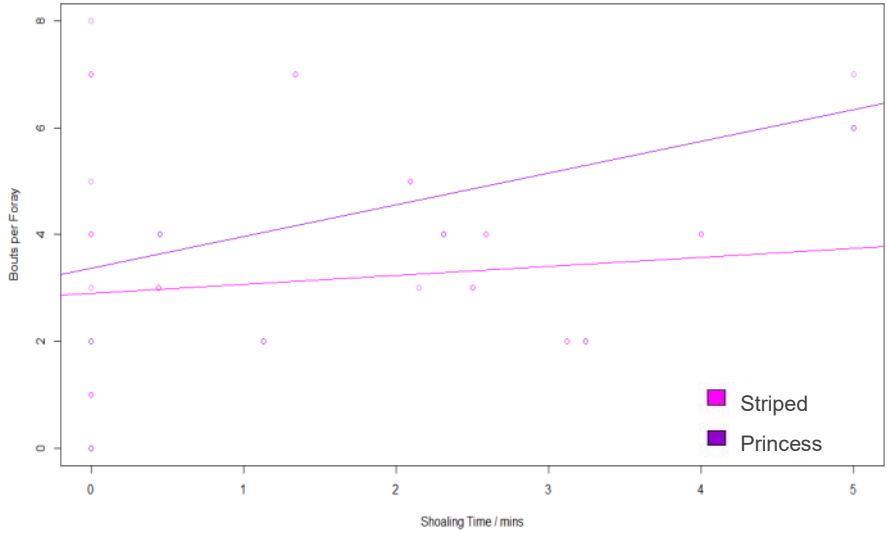


Figure 2: Correlation between the number of bouts per foray and shoaling time in Princess and Redband parrotfish. Individual points represent the total amount of time a single parrotfish species spent in a shoal during a 5-minute observation.

Conclusion

The main findings of my study were:

a) the foraging activity of Redband parrotfish is species-specific, having1-2 bouts consistently per foray, and
(b) the foraging activity in Princess and Striped parrotfish is size-driven, where size is inversely proportional to foraging.

Small-sized Princess parrotfish frequently swam in shoals, which reduces their vulnerability to predation and increases their foraging efficiency. Despite the bouts per foray increasing when swimming in either a shoal or pair, shoaling causes a more substantial rise compared to swimming alone. Bout length is therefore the driving measure affecting the foraging rate. Princess and Striped parrotfish have a higher absolute foraging rate than Redband and are part of the more abundant genus on Booby Reef. Therefore, Princess and Striped parrotfish have a more profound effect in controlling the ecosystem compared to Redbands. With anthropogenic activities threatening the system's stability, future research should investigate the robustness of parrotfish and whether changing conditions will alter the effect of variables on foraging behaviour.

Acknowledgements
I would like to take this opportunity to thank Prof. Jo Cable, Prof. Sarah Perkins, Katie Dunkley and Neil Cook for organising, supporting and sharing their knowledge during the field course. I feel very lucky to have had the opportunity to take part in such a memorable experience and am excited to put my new-learned skills to use in the future.

I particularly want to thank the Cardiff Naturalists' Society for honouring me with the Bioscience Prize Award, in memory of Prof. Ursula Henriques and Dr. Mary Gillham.

References

Alemu, J.B. and Clement, Y. (2014). Mass coral bleaching in 2010 in the Southern Caribbean. PLoS ONE [Online] 9. Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0083829#s3 [Accessed: 4 August 2019]

Bellwood, D.R. and Choat, J.H. (1990). A functional analysis of grazing in parrotfishes (family Scaridae): the ecological implications. Environmental Biology of Fishes 28: 189-214.

Bruckner, A., Bruckner, R.J. and Sollins, P. (2000). Parrotfish predation on live coral: “spot biting” and “focused biting”. Coral Reefs 19: 50-50.

Gardner, T.A., Cote, I.M., Gill, J.A., Grant, A. and Watkinson, A.R. (2003). Long-term region-wide declines in Caribbean corals. Science 301: 958-960.

Hemelrijk, C.K., Reid, D.A.P., Hildenbrandt, H. and Padding, J.T. (2014). The increased efficiency of fish swimming in a school. Fish and Fisheries 16: 511-521.

Hughes, T.P., Rodrigues, M.J., Bellwood, D.R., Ceccarelli, D., Hoegh-Guldberg, O., McCook, L., Moltschaniwskyji, N., Pratchett, M.S., Steneck, R.S. and Willis, B. (2007). Phase Shifts, Herbivory, and the Resilience of Coral Reefs to Climate Change. Current Biology 17: 260-365.

McWilliams, J.P., Côté, I.M., Gill, J.A., Sutherland, W.J. and Watkinson, A.R. (2005). Accelerating impacts of temperature-induced coral bleaching in the Caribbean. Ecological Society of America (ESA) 86: 2055-2060.

Olson, R.S., Haley, P.B., Dyer, F.C. and Adami, C. (2015). Exploring the evolution of a trade-off between vigilance and foraging in group-living organisms. R. Soc. Open. Sci. [Online] 16. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4593673/ [Accessed: 4 August 2019].

Streelman, J., Alfaro, M., Westneat, M., Bellwood, D. and Karl, S. (2002). Evolutionary history of the parrotfishes: biogeography, ecomorphology, and comparative diversity. Evolution 56: 961-971.

White, W. and Warner, R.R. (2007). Behavioural and energetic costs of group membership in a coral reef fish. Oecologia 154: 423–433.

Zemke-White, W.L., Choat, J.H. and Clements, K.D. (2002). A re-evaluation of the diel feeding hypothesis for marine herbivorous fishes. Marine Biology 141: 571–579.

Photo: Sea anemones, Ucelet Aquarium, Phill Blanning. See pages 19-21 for more pictures from Vancouver Island.

PRINTED BY GLAMORGAN VOLUNTARY SERVICES (GVS)

Published by the Cardiff Naturalists' Society © 2020