

Report on the findings of the scientific
research team during the 2016 RASSPL
Nationals

for



By: Prof. Warren Potts
Mr Matthew Parkinson

Hi Mike and Executive Committee,

Herewith follows our report from the national competition in Struisbaai. Before that, I would just like to thank everyone for being so supportive of the research that we are doing. After speaking to the students, scientists and interns, it seems that all of the anglers were extremely helpful and friendly and we felt that it was an extremely successful event from a scientific perspective. We look forward to continuing our relationship, for the benefit of RASSPL Africa, scientific research, and most importantly, the fish.

We thought that we would give you an update of the results of the research that was conducted during the RASSPL Nationals in Struisbaai. We had a large research team from a number of different institutions this year. These included the honours class and postgraduate students from the Department of Ichthyology and Fisheries Science, Rhodes University, a team of two scientists and one postgraduate student from the South African Institute of Aquatic Biodiversity and a group of two scientists and five interns from the Shark Conservancy.

There were a number of objectives that we set out to achieve:

1. We wanted to see if the rule changes had an influence on the air exposure, fish health and survival during this Nationals compared with the one in East London.
2. We wanted to tag a number of fishes with acoustic tags as part of a large experiment running along the South African coastline.
3. We wanted to specifically examine the impacts of the RASSPL catch and release activities on sharks and rays.
4. We wanted to collect genetic samples of a range of species of interest.

Materials and methods

In order to do this, we split up into groups of three along as much of the fishing areas as we could on each day. The teams comprised people with complimentary skills so that we could optimise the information collected by each group. The process for each team was quite simple. Every time a fish was hooked the student would record the time of day, time from landing to the bucket, the distance from the bucket, difficulty of unhooking, where the fish was hooked, air exposure and the time at which the fish was released. The research team then either took the fish and did a series of RAMP tests (in a bucket) to determine their health (a score of 5 is very healthy, while a score of 0 is basically dead), recorded the blood lactate and blood glucose, tagged the fish with an acoustic telemetry tag or placed the fish into one of three 3000l pools with recirculating water for more than 12 hours, before performing health tests and blood sampling.

Results and Discussion

We recorded data for a total of 209 fish. We conducted RAMP assessments on 126 edible fish, 75 non-edibles, collected blood from 26 edible fish and 23 non-edible fish, kept 17 fish (14 edibles and 3 non-edibles) in the survival ponds, collected 28 genetic samples, tagged 4 fish (2 sand sharks, 2 leopard catsharks) with dart tags and 10 fish (2 dusky kob, 3 white steenbras, 2 eagle rays and 3 smooth hound sharks) with acoustic tags.

So, let us focus on the health and survival experiments (RAMP, Blood and survival ponds). What did we find out? We have separated the results from the last two Nationals into edibles, non-edibles and sea barbel to make it easier for everyone.

Remember in last years' report I mentioned that we should be aiming to reduce total air exposure to below 90 sec to reduce the impacts of our activities on the health and survival of the fishes? Well, I am happy to report that there were marked improvements for all categories of fish (Table 1). The average air exposure reduced from 94.9 to 76.3 sec. for edibles, from 117.9 to 104.4 sec. for non-edibles and from 80.6 to 71.5 sec. for sea barbel.

Last year we identified two areas where we thought that we could improve the amount of air exposure, namely the time taken to get the fish into the bucket and the time to do the measurement and the photographs. For this, we suggested several rule changes and recommendations, including limiting the distance that an angler can fish from his RASSPL bucket and stopping anglers from sharing a RASSPL bucket. These seemed to have worked. If you look at the time that the fish is exposed to air between landing and its placement into the bucket, one can see that the average and maximum times for all fish types have decreased considerably (Table 1). More importantly, the rule which requires the fish measurement to be on the card before the mat photo is taken was scrapped this year. This appears to have had a big impact on the amount of air exposure of the fish. For example, the average air exposure during photos and measurement dropped from 75 to 44 seconds for edible fish and from 98 to 47 seconds for non-edibles (Table 1). This is significant and has had a major impact on the overall air exposure.

Table 1. Comparison of the distance from bucket, time to bucket, time for measurements and photographs and total air exposure of fish subject to catch and release during the RASSPL national competition in 2015 and 2016.

	Distance from bucket (m) (min - max)		Time from landing to bucket (sec) (min - max)		Time for measurements and photos (sec) (min - max)		Total air exposure (sec) (min - max)	
	2015	2016	2015	2016	2015	2016	2015	2016
Edibles	32.4 (3 - 150)	16.3 (1-60)	46.5 (4 - 647)	40.0 (1-60)	75.0 (20 - 246)	43.7 (6-205)	94.9 (5 - 267)	76.3 (18-182)
Non-edibles	40.1 (4 - 250)	17.7 (1-40)	51.7 (5 - 229)	35.6 (4-123)	98.1 (20 - 272)	46.7 91-45)	117.9 (12 - 410)	104.4 (2-229)
Sea barbel	28.7 (2 -150)	23.8 (7 - 50)	42.2 (5 - 200)	26.25 (12 - 58)	74.6 (13 - 346)	41.25 (3 - 35)	80.6 (16 - 185)	71.5 (38 - 129)

So, has the drop in air exposure actually benefitted the fish health and survival? Well, in short, yes it has. The average blood glucose concentration of edible fish after the C&R event has dropped from 2.25 mmol.ml⁻¹ to 1.80 mmol.ml⁻¹ while the blood lactate concentrations dropped from 6.96 mmol.ml⁻¹ to 5.38 mmol.ml⁻¹ from the East London to the Struisbaai nationals. Similarly, the average blood glucose dropped from 3.73 mm.ml⁻¹ to 2.20 mm.ml⁻¹ and the average blood lactate from 4.79 mm.ml⁻¹ to 4.17 mm.ml⁻¹ for the non-edible fishes. This is a clear indication that the fish were less stressed in this nationals than in East London and that our rule changes are working.

The results from the survival experiment were also much better, with no mortalities this year compared with five in the last nationals. These survival experiments do show that most fish can survive the catch and release event. However, while this is a good result, we must bear in mind that there are no predators in the survival tanks and the fish are placed into a calm environment where they can recover. One of the biggest threats to the fish that we release is predation. The surf zone has a range of predators, including the cephalopod (*Octopus vulgaris*), sea birds (eg. Kelp gull, *Larus dominicanus*), other fish (eg. Dusky kob, *Argyrosomus japonicus*, shad, *Pomotomus saltatrix* and leervis, *Lichia amia*) and elasmobranchs (eg. Ragged tooth shark, *Carcharias taurus*) making released fishes vulnerable to predation. Several studies have shown that increased levels of predation are

likely for fishes that are in sub-standard condition and stressed. Shark predation in particular, is thought to be a major cause of fish death after release. This is because stressed fish may be unable to detect predators, make poor decisions, cannot put out a burst of speed to escape a predator and cannot join a shoal. Our results show at least one of these problems are present in our released fishes. The “tail grab” and “body flex” indicators tests the escape response from a predatory threat. Many of the fish in this study did not respond to the tail grab and did not flex their bodies after the catch and release event. This is not unusual and many studies suggest that these indicators are the first to show the effects of catch and release. Although we are not sure how long this will last, we do know that all of the fish responded positively for these indicators at the end of the 24 hour survival experiment. Nevertheless, there is a good chance that released fish will be captured by predators before they have recovered fully and therefore we must endeavour to reduce stress even more to ensure survival.

Besides problems with escaping predators, bleeding may also make the released fish more susceptible to shark predators. Sharks are particularly sensitive to blood odour cues and are able to use odour to discriminate between stressed and unstressed prey. Bleeding (primarily from hook damage) therefore has the potential to increase the detectability of released fish by these predators. The results from this study indicated that 26.9 % of the released fish (28.7 % of the teleosts and 17.8 % of the elasmobranchs) were bleeding and may have therefore been more detectable. When combining this with the reduced escape response, it is likely that many of the fish may die after release.

So, in summary, the findings of this study show that we need to find ways to improve the escape response of fish to predators and we need to reduce bleeding. Our results from this study show that there is a clear (and significant relationship) between air exposure and the RAMP value, which include the escape response indicators (Figure 1) and especially for the edible species. This shows that the fish stop responding to a tail grab and do not flex their bodies when they are exposed to air for a longer time (Figure 1). This means that the longer the air exposure, the greater the likelihood of them getting eaten by predators.

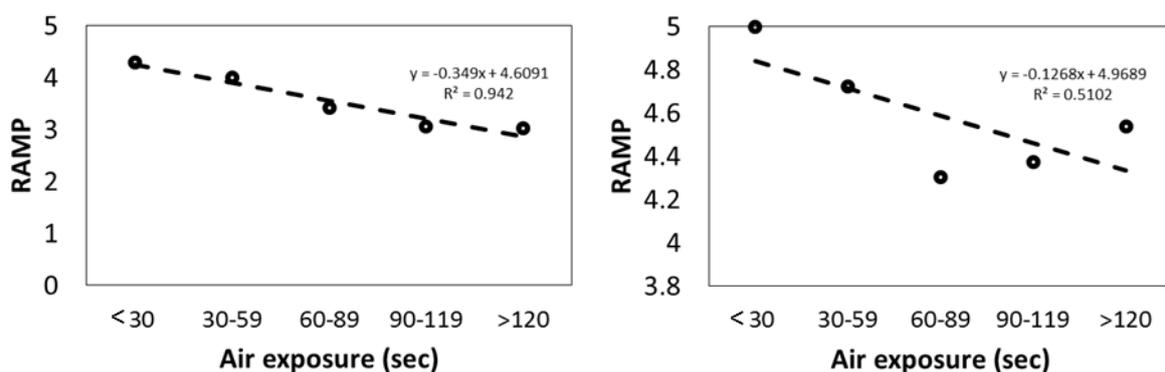


Figure 1. The average RAMP score for edibles (left) and non-edibles (right) at different air exposure categories.

There are several ways in which this can be addressed. We have already reduced the time that it takes for anglers to get their fish into the bucket (with the distance from the bucket rule) and I think that this can still be improved with some more strict enforcement and better awareness. The next main phase where there is air exposure is during measuring and photographing. Here we felt that time is wasted as anglers are often disorganised and are unaware of the rules. For example, most

anglers insist on taking a trophy photograph of every fish that they catch. This is not necessary. It is only required for the first of each species. They also insisted on writing the species and length of the fish before the photo on the mat and this significantly lengthened the air exposure time. Many anglers also unhooked the fish on the mat instead of in the bucket. Others spent time finding their camera and/or pen after the fish was lying on the mat. Each of these problems extend the air exposure and have a negative impact on the health and survival of the fish. Some of the anglers were clearly organised and several maintained air exposure rates of below 40 seconds for their fish (Table 2). These are the anglers that we want to emulate. Based on these findings, we feel that it is really possible to get the average air exposure for everyone right down to below 60 seconds. We do not need an adjustment to the rules to improve this component, we just need more angler awareness and better levels of organisation. The WP Bronzies offer a clinic on handling practices each year and they have also consistently had anglers that handle fish the best in the national events. We would recommend that each franchise spends at least a bit of time presenting a fish handling course (this can be done before the prize giving in one of the franchise competitions) or presenting some educational material to its members. We are planning to develop a video on handling methods to limit air exposure and even screening these videos at the prize giving would be a useful educational tool. Franchise owners are also welcome to email us to help with the development of any additional ideas that they may have.

Table 2. Anglers whose fish had air exposure values of 40 seconds or less during the RASSPL Struisbaai Nationals

Angler	Franchise	Number of fish recorded	Average air exposure
Derik Niewoudt	WP Bronzies	2	27
Zane Rudolph	EP Raggies	2	27
Nieyaaz Hamza	WP Bronzies	2	31.5
Peet Mey	SC Great Whites	2	34
Marinda Venter	Kowie Crackers	2	37
Faheem Adams	WP Bronzies	2	40
Ebrahiem Hamza	WP Bronzies	5	40

As I said above, we also need to try and reduce bleeding in the fishes that we catch. Obviously, much of the cause of the bleeding is beyond our control. For example, you may set the hook into a vein or artery. However, we had a look at the data to see if the hook placement or type of hook had any impact on the amount of bleeding. A total of 30% of the fish that swallowed the hook, 29% of fish that were hooked in the lower jaw and 18% of fish hooked in the corner of the mouth were bleeding. This suggests that fish hooked in the corner of the mouth are less likely to be detected by shark predators. When we compare the type of hook and their placement, it is clear that a greater percentage of fish are hooked in the corner of their mouths when anglers use circle hooks (75%) than j-hooks (59%). It is therefore not surprising that only 18 % of fish captured with circle hooks registered any bleeding compared with 26 % of fish captured with j-hooks. We believe that circle hooks are being used more frequently in RASSPL competitions and would like to see the Franchise owners encouraging their use.

We were unfortunate to not witness the landing of any large non-edibles at this nationals. However, generally the air exposure and total times for the bigger elasmobranchs is very high. This is because

the RASSPL system for these fish has not been well developed up to now. After speaking to the scientists from the shark conservancy, we feel that amendments to the rules on big sharks (fish that do not fit into the bucket) are urgently required. We feel that the photo with the bucket should not be required. For sharks we would like to see one trophy photo with the angler holding his card and with a specially made standard RASSPL ruler attached to the dorsal fin. The shark has to be oriented side on to the camera and preferably lying straight. We will then use a software program (Image J) to calculate the length (precaudal or total) of the shark. It will be in the anglers' interest to ensure that the shark is lying straight. Unlike sharks, we recommend that two photos are taken of rays and skates. The first should be from the top with the RASSPL ruler lying on the back of fish and the second is the normal trophy photograph with the fish. We will also use a software program to estimate the disk width of the rays. We will be testing out the measurements during the 2016/2017 season with the Kowie Crackers.

Much fewer fish were dropped at some stage of the catch and release event this year (3 %) when compared to last year's nationals (12 %). Most of these fish were dropped onto rock or onto dry sand. The majority of the fish were dropped while the angler was taking the third (trophy) photograph. The impact of dropping the fish depends on how high it was dropped from, where (on its body) the impact was and on the substrate on which it lands. From the perspectives of rules, it is really difficult to manage, but I would recommend that the angler does not stand up for the photo. They should remain on their knees (where they should be for the measurement of the fish anyway) and if the fish is small it should be lifted up above the bucket, so that it falls back into the bucket if it jumps. If it is large it should be held above the mat, so that it will fall directly onto the mat. This should minimise the damage caused to the fish when dropped. It would be good if this would be recommended to the anglers by the franchise owners before the new season. To minimise the risk of dropping fish we also recommend that each angler be issued with a RASSPL handling cloth (made out of superabsorbent material). This cloth should be used to handle the fish when taking it out of the bucket, measuring and during photographs, to prevent damage to the fish's skin and protective mucous layer (see Figure 2 below). The best way to get a fish to sit still and relax on the mat is to cover its eyes with a wet cloth. The mat photo should ideally show the cloth covering the fish's eye (Figure 3), which should calm it down and prevent it from jumping onto dry sand.



Figure 2: Wet cloth used to minimise fish being handled with bare hands.



Figure 3: Wet cloth used to cover fish's eye while being measured on the mat.

Species identification issues

There was much debate on the species identification of the leopard catshark and the spotted catshark. Based on what we saw and after confirming with the scientists from the Shark Conservancy, it is almost impossible to distinguish between these species without a genetic analysis. It is therefore in our interest to merge these two species as one and refer to them as leopard catsharks, from now on.

One species group that we can distinguish is the sea catfish (barble). We feel that it is easy enough to distinguish between the white (*Galeichthys feliceps*) and brown sea catfish (*Galeichthys ater*) and suggest that they be treated as two species from now on.

We will have to play other problems that may arise by ear. However, Matt and I will be available by phone on most competition days if there are any queries about a species identification, or anything else.

General organisation

The RASSPL nationals have generally been organised very well and the national and relevant franchise organising committees should be very proud of their achievements. However, as with anything there are always a few issues. The photos have consistently been a challenge, in terms of collecting them timeously, and verifying necessary photos (top daily scorers, prize-winning fishes etc). This year was vastly better, but there is still room for further improvement. It was the first Nationals where all necessary photos were actually checked. In the past there simply was insufficient time, and anglers' word had to be trusted. We feel that the idea behind the photo collection that was implemented in Struisbaai was fairly sound, it was just the execution that was a bit lacking in some regards. By having one person per franchise collecting their anglers' photos, it places the onus on them to ensure that they have collected all of their anglers' photos, and submitted them in time. The cut off for photo hand-in, while very generous, was still missed repeatedly. It appeared that some of the photo collectors were pre-screening photos and picking out which ones they submitted. While this may have been done with the best of intent, on a few occasions they omitted photos that ended up placing a fish in line for disqualification, whereas if they had submitted all of the photos, this could have been avoided. Additionally, instructions were not strictly adhered to in terms of the format of photo folders (each angler having their own folder for example – often there were up to 3 anglers, who shared a camera, in one folder). All of these minor issues, while easily rectifiable, become impossible, time-wise, for the team of verifiers to do in addition to having to check the photos. When all of these issues are only rectified on the last day, it places a huge amount of pressure to catch up on the previous 2 days' photo verification, before completing the final days' photos, and the final results. In future, more emphasis must be placed on who each franchise nominates to collect photos, and instructions on submission format and time cut-offs, must be adhered to. When the photos are suitably organised, and timeously collected, it makes it easy for the scorers to send lists of anglers and their specific catches that need to be checked. Ideally, the scoring team and photo verifying time, need not be the same people, in order to spread the load. Once the scoring is done, photos can be checked, and each day's work and winning anglers can be finalised before the end of the fishing the following day. Photo verifiers would preferably not be fishing in the competition, and could check photos during fishing time the following day.

In terms of the scoring, the process was far more automated than previously, and saved a lot of time. This was what afforded the extra time to dedicate to thorough checking of photos. The scoring at Nationals is a huge undertaking, with around 450 scorecards having to be captured over the 3 days, and the many category winners identified. Lessons are continuously being learned, and should lead to a much smoother implementation in future. Of importance in terms of scoring, is identifying the prize categories at least 2 months in advance, in order for the program to be suitably set up to report on these winners automatically. At the competition itself, submitting scorecards as soon as possible at the end of each day helps streamline the process, as scorecard entering often continued past 23:00. Capturing of scorecards by a single person is still manageable.

Conservation trophy

Thank you very much for the conservation trophy and for the fish handling prizes for individuals. We think that the awareness created by these will improve fish handling practices and look forward to seeing even more improvements next year.

Disqualification of catches based on photos

It was previously mentioned that this was the first Nationals where photos have been properly checked. While anglers seem to have a good grasp of the photo rules in general, apart from often being overzealous in taking 3 photos of everything, as discussed above, photos were not always taken carefully, and/or thoroughly checked by anglers before releasing their fish. The fact that photos were so thoroughly checked, and that anglers didn't take care when photographing their catches, unfortunately lead to many catches being disqualified. A large contributor to this was an absence of the daily symbol (or even any part thereof) in the photo. This symbol is the only way that a catch can be confidently identified as having been caught on that particular day of the tournament. The suggestion of moving the symbol to the top of the scorecard has already been implemented. The improvement of waterproof scorecards should also aid in photos meeting the rules. While the new waterproof paper is a step in the right direction, it will still be a problem in windy conditions. The use of a hard plastic slate is still recommended.

Summary of all recommendations

Fish handling

- Non-edible protocol to be improved, firstly by Kowie Crackers, with suggestions to National level
- Creation of fish handling video and improved education on handling, perhaps including workshops
- Encourage circle hook usage – prize for biggest fish caught on circle hook
- Introduction of fish handling cloths

Scoring/photos at Nationals

- Franchises to select a reliable photo collector

- ALL photos (correctly catalogued) and scorecards to be submitted timeously at collection point
- Scoring and photo checking duties to be split, all results of previous day finalised before lines up the following day

Well Mike and the EXCO, that is all that we have for you for now. We are sorry that it took so long, but we wanted to ensure that we would not just recommend changes for the sake of making changes. There has to be a justifiable reason for changing rules in this competition and we hope that we have convinced you that these changes should happen.

Kind regards,

RASSPL research team