Billfish Research and Management News

Summer 2009

Greetings!

Welcome to the 2009 Mid-Atlantic $500,000. Hard to believe another year has passed. As usual, there's a lot happening in our lab at the Virginia Institute of Marine Science, and much of it is focused on billfish. In this year's newsletter we provide an update on three current billfish studies: an investigation of post-release survival of blue marlin taken on different types of terminal gear, molecular genetic stock structure analyses using larval billfish samples, and a project to determine the range and occurrence of roundscale spearfish throughout the Atlantic Ocean. In the lab we are also investigating molecular markers to discriminate Atlantic and Indo-Pacific blue marlin, habitat utilization of Atlantic blue marlin, the population structure of Atlantic bluefin tuna, post-release survival and habitat utilization of large red drum, and the stock structure of various deepsea sharks. We're thankful to be busy!

If you would like to know more about our research, the domestic or international management of billfish, or graduate education in marine science, please drop by to talk. I'll be down at the Canyon Club weigh station in the early evenings and under the tent after that and my colleague Dr. Jan McDowell will be at the Ocean City weigh station. We'd love to meet you.

Tight lines,

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Life after Catch

In an effort to reduce recreational fishing mortality on white marlin, the National Marine Fisheries Service (NMFS) implemented a rule requiring the use of circle hooks with natural baits in all Atlantic billfish tournaments at the start of 2008. Many local anglers were upset with the rule as it prohibited the use of an Ilander lure (Hawaiian Eye) in combination with a "natural" bait (typically a horse ballyhoo or Spanish mackerel) and a J hook – a rig that is often used for blue marlin and tuna in the mid-Atlantic region. In letters to NMFS regarding the rule it was noted that few white marlin are caught on these larger baits, and that most blue marlin taken on the rig are typically hooked externally, in or about the jaw, a location that one would assume to be associated with high post-release survival. In last year's newsletter we presented results of a hook location study we did that supported those claims. While ~40% of white marlin and sailfish caught on ballyhoo rigged with J hooks were hooked internally (inside the mouth or deeper), only 14% of blue marlin taken on the same baits and hooks were hooked internally. But one cannot estimate post-release survival from hooking location data alone, and over the past year we have been using pop-up satellite tags (PSATs) to study the fate of released blue marlin caught on Ilander/natural baits with J hooks or natural baits with circle hooks. To date, we've deployed and heard back from 53 of our 60 tags. Of the 28 blue marlin caught on Ilander/natural bait/J hook combinations, there have only been two deaths (7% post-release mortality), while none of the 25 blue marlin caught on natural baits with circle hooks have died (0% post-release mortality). That's not much of a difference. However, the post-release mortality of blue marlin caught on the combination rigs with J hooks is significantly lower than

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Winning Fish (weight in lbs.)

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
White	1st	86	69	69	69	77	89	74	78	68	69	75	91
Marlin	2nd	83	68	65	68	69	76	71	67	61	63	61	79
	3rd	76	61	65	64	66	72	68	63	---	63	60	79
Blue	1st	466	615	586	746	455	748	534	522	566	578	558	433
Marlin	2nd	384	488	542	660	410	493	468	480	476	421	---	---
	3rd	359	435	522	519	407	448	412	464	---	---	---	---
Tuna	1st	109	254	242	205	153	120	221	204	172	114	147	82
	2nd	102	218	213	166	142	103	181	185	153	114	136	72
	3rd	95	200	139	108	126	99	105	185	141	112	81	61
Dolphin	1st	36	42	53	33	34	33	33	43	39	29	34	43
Wahoo	1st	44	67	73	47	79	69	38	72	86	76	75	95

Billfish Releases

White Marlin	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Boated	15	20	23	16	18	13	10	14	3	10	10	13
Released	84	136	174	177	153	124	231	432	58	220	182	144
% Released	85%	87%	88%	92%	89%	91%	96%	97%	95%	96%	95%	92%

Blue Marlin	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Boated	9	7	11	14	7	15	8	10	2	3	3	4
Released	3	8	13	16	11	26	17	29	32	10	18	15
% Released	25%	53%	54%	53%	61%	63%	68%	74%	94%	77%	86%	79%

Catch Per Unit Effort (CPUE)

White Marlin	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
# Fish Caught	99	156	197	193	171	137	241	446	62	203	192	157
# Boats x # Days	393	408	426	417	435	381	393	411	399	378	393	384
CPUE (fish/boat-day)	0.25	0.38	0.46	0.46	0.39	0.34	0.61	1.09	0.15	0.61	0.49	0.41

Blue Marlin	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
# Fish Caught	12	15	24	30	18	41	25	39	34	13	21	19
# Boats x # Days	393	408	426	417	435	381	393	411	399	378	393	384
CPUE (fish/boat-day)	0.03	0.04	0.06	0.07	0.04	0.11	0.06	0.09	0.09	0.03	0.05	0.05
Marlin/Boat-Day	0.28	0.42	0.52	0.53	0.43	0.45	0.67	1.18	0.24	0.64	0.54	0.46

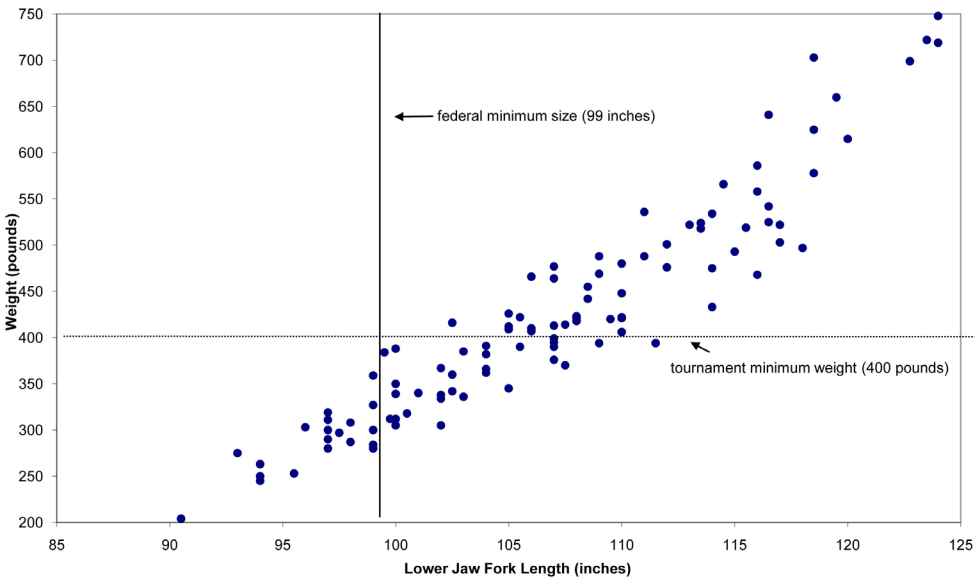
00 — Facts & Figures

2004	2005	2006	2007	2008
75	75	88	92	92
74	68	79	77	88
71	67	77	69	79
518	699	722	536	719
---	525	641	524	625
---	418	469	414	501
182	193	184	212	80
150	78	123	172	78
132	60	118	168	77
44	47	44	39	43
58.5	74	93	77	74

2004	2005	2006	2007	2008
14	14	18	23	31
313	244	444	274	423
96%	95%	96%	92%	93%
2004	2005	2006	2007	2008
3	5	6	3	3
22	25	19	23	11
88%	84%	76%	88%	79%

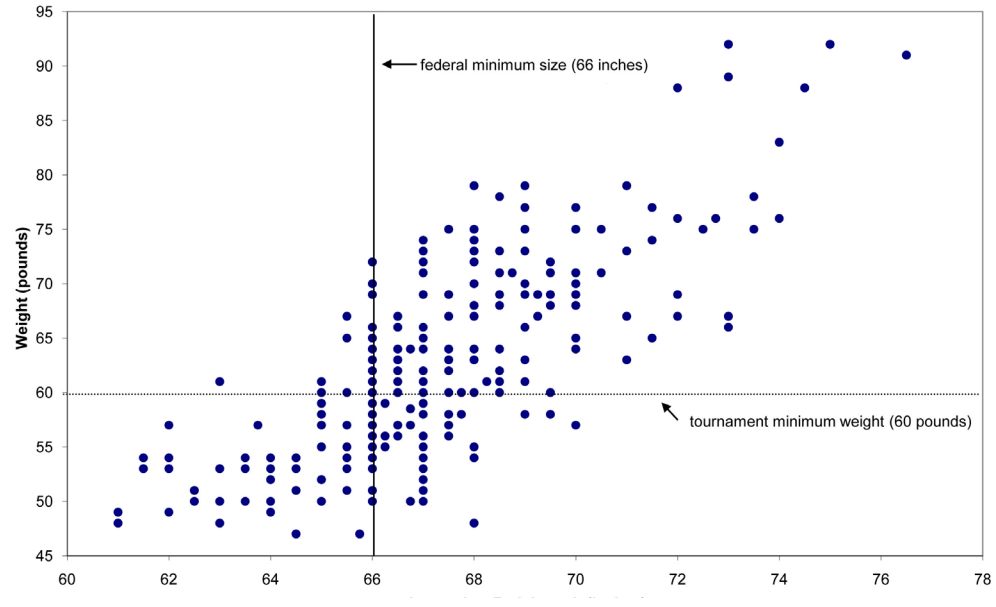
2004	2005	2006	2007	2008
327	258	462	297	454
429	507	528	462	423
0.76	0.51	0.87	0.64	1.07
2004	2005	2006	2007	2008
25	31	25	26	14
429	507	528	462	423
0.06	0.06	0.05	0.06	0.03
0.82	0.57	0.92	0.70	1.10

Blue Marlin Length-Weight Relationships (1992-2008)



There is a good relationship between length and weight for blue marlin. Fish need to be about 5 inches over the federal minimum size of 99 inches lower jaw fork length (LJFL) in order to meet the tournament minimum weight of 400 pounds. It's a different story for white marlin. The federal minimum size is 66 inches LJFL, but white marlin landed at the Mid-Atlantic $500,000 with a LJFL of 67 inches have weighed anywhere from 51 to 74 pounds! The best way to tell if a legal white marlin will make the tournament minimum weight is to see if it "carries the weight" all the way to the tail. Long, thin fish won't make weight!

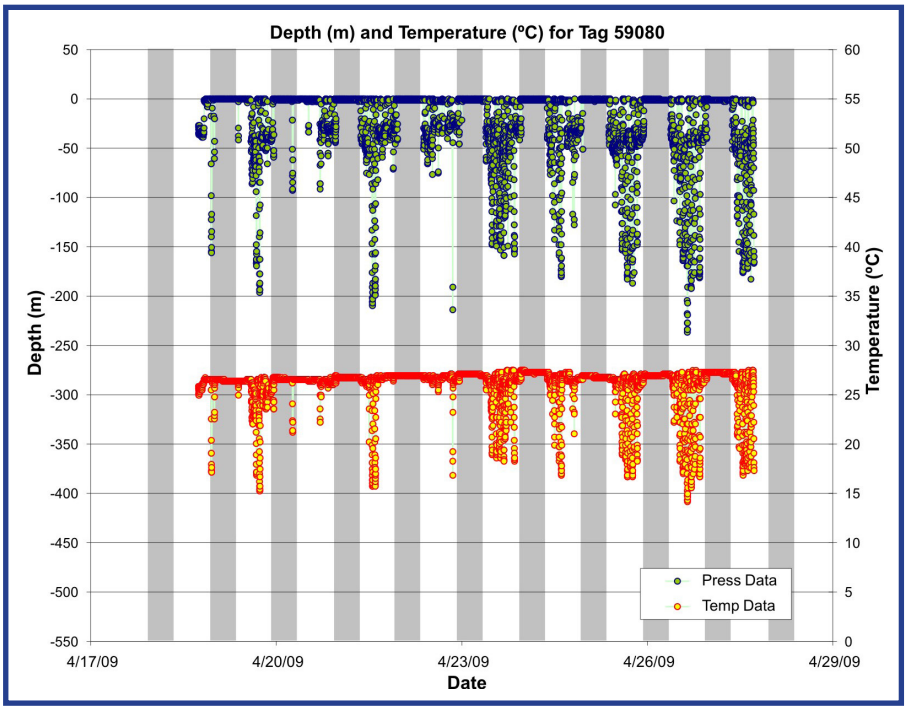
White Marlin Length-Weight Relationships (1992-2008)



that what my former graduate student Andrij Horodysky and I found in a previous study of white marlin caught on ballyhoo with J hooks (35% post-release mortality). The bottom line is that relative to white marlin, blue marlin have a high probability of being hooked around the mouth and head with J hooks and an even higher probability of post-release survival. Our results suggest that it may be time for NMFS to re-examine rule prohibiting the use of natural baits with J hooks in Atlantic billfish tournaments. There may be other ways to afford benefits of circle hooks to white marlin and sailfish without disadvantaging blue marlin anglers, such as requiring circle hooks with lighter leaders. I'm sure this will be a topic of discussion at the upcoming meeting of the NMFS Highly Migratory Species Advisory Panel next month.

Atlantic Billfish Stock Structure

We have conducted several studies on the stock structure of Atlantic billfishes (blue marlin, white marlin, and sailfish) using tissue samples from adults landed at various locations around the Atlantic. However, from our satellite tagging studies we know billfish are highly migratory species, moving as much as 100 miles per day. So catching a fish in an area doesn't necessarily mean it is *from* that area. To effectively address the question of stock structure one must collect samples when the stocks are most likely to be separated, and that is at the time of spawning. However, getting large numbers of samples from billfish for stock structure studies is difficult, and large numbers from billfish in spawning condition is nearly impossible.



Ten days in the life of a blue marlin. *Temperature and depth data for a 115 lb blue marlin caught on a ballyhoo/circle hook on 18 April 2009. Note the striking difference in behavior between days (light columns) when the fish was diving to depths of up to 200 meters and the nights (shaded columns) when it swam near the surface. The fish remained in the general area during the 10 day tagging period, with a net movement of only 60 miles to the northeast.*

So to critically test for stock structure in billfish we've decided to focus on the products of spawning, collecting early life history stages (larvae, early juveniles). These specimens, which are only a few weeks old, cannot have moved too far from the spawning grounds. Working with Dr. Jay Rooker of Texas A&M University Galveston we have obtained large collections of baby billfish from the northern Gulf of Mexico for the past three years. This past spring we collaborated with Dr. Fabio Hazin of the Universidade Federal Rural de Pernambuco in northern Brazil to collect samples of larval billfish from the coast of Brazil. We'll be using a variety of highly variable molecular markers to compare the genetic profiles of these samples over the next several months in an effort to critically test for the presence of stock structure. Stay tuned!

Roundscale Spearfish

As noted in a previous newsletter, white marlin and roundscale spearfish are genetically distinct species but they are morphologically very similar (roundscale spearfish and some white marlin are often called "hatchet marlin"). In some years, roundscale spearfish have comprised a significant fraction of "white marlin" landings at tournaments along the Mid-Atlantic, but what about elsewhere in the Atlantic? Over the past year we have genetically typed 100 "white marlin" samples and 100 "longbill spearfish" samples collected by port samplers in northern Brazil (remember that most anglers have difficulty differentiating white marlin, longbill spearfish, and roundscale spearfish when they are alive and intact – it's a lot harder for a port sampler when the heads and fins have been removed). In our collection of 100 "white marlin" there were seven longbill spearfish and one roundscale spearfish, while in our collection of 100 "longbill spearfish" there were 39 roundscale spearfish and ten white marlin. These preliminary results suggest that roundscale spearfish may not be all that rare, and that they may be misidentified more often as longbill spearfish than white marlin, especially in commercial landings.