

# 素潜り漁における潜水行動

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## Breath-holding Diving by Human during Traditional Inshore Fishery

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Breath-holding diving has been recorded using data-loggers and studied enthusiastically in terms of optimal foraging. In Japan, berath-holding diving is one of the traditional fishing methods, in which divers catch abalone and sell them to earn money. Therefore, the context of optimal foraging in diving animals should be applicable to breath-holding diving in human fishery. In the present study, we attempt to make preliminary analysis of breath-holding diving by human during fishing in terms of optimal foraging diving in diving animals.

The study was conducted at Chikura, Chiba prefecture along the Pacific Ocean during late Augsut 2012. Time-depth recorders (D3GT, Little Leonard) were attached and recoverd after 2-3 successive fishing from 5 voluntary male divers. Breath-holding diving fishery in the study area has the following features: Abalone fishing by male divers; Value of abalone : 6000 JPY/kg; Wearing wet-suit and fins are prohibited; A weight is used to descend.

The main features of the results are as follows: (1) although the dive depth was similar among the divers, there was an obvious individual difference in dive time, which was due to the individual difference in bottom time, (2) although total dive time and dive interval during fishery depend greatly on divers but the total catch of abalone seems to be similar among divers, which leads to individual difference in catch efficiency among the divers, (3) these individual differences in diving behaviour among divers do not seem to be related with the age or experience of the divers and (3) only weak correlation was found between dive depth and dive time ( $r=0.31$ ), which contrasts with many diving animals in previously studies. These findings suggest that, in breath-holding diving fishery, factors affecting to diving behaviour including dive time could be different from those in diving animals. Therefore, it would not be easy to make simple application of context of of optimal foraging diving in diving animals to breath-holding diving fishery in human.

### Summary table

Divers	#1	#2	#3	#4	#5
Age	35	72	65	31	43
Experience (yrs)	5	50	35	1	2
N of fishing	3	4	2	3	4
N of total dives	91	94	105	154	277
Mean dive time (s)	35.9	56.1	32.6	28.5	45.3
S.D.	13.2	10.3	5.6	7.5	10.6
Mean dive depth (m)	6.5	6.9	6.9	6.5	6.9
S.D.	1.8	1.5	1.1	1.7	1.2
Mean asc. time (s)	9.8	9.3	9.5	7.6	10.1
S.D.	2.9	2.8	2.9	2.4	2.9
Mean bottom time (s)	19.2	38.1	15.4	11.6	23.4
S.D.	11.6	10.3	7.0	5.3	10.2
Mean dive interval (s)	206	674	183	120	155
S.D.	247	481	282	289	253
Mean total dive time/day (s)	1085	1318	1712	1459	3082
Correlation (r: dive depth vs. dive time)					
*P<0.05	0.85*	0.27*	0.02	0.78*	0.43*