



**Establishment and Operation of a Regional System of
Fisheries *Refugia* in the South China Sea and Gulf of Thailand**

REPORT

**THE BASELINE SURVEY OF SHORT MACKEREL
AND FISH LARVAE COLLECTION IN KOH KONG**

**KOH KONG, CAMBODIA
09-13 MARCH 2019**

Prepared by
FISHERIES ADMINISTRATION, CAMBODIA

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT



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Southeast Asian Fisheries Development Center
Training Department
P.O.Box 97, Phrasamutchedi, Samut Prakan, Thailand
Tel: (66) 2 425 6100
Fax: (66) 2 425 6110
<https://fisheries-refugia.org> and
<https://seafdec.or.th>

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1. Field Trip Objective

- 1) To monitor mackerel gonad development in Koh Kong province from 9 to 13 March 2019 under the support of SEAFDEC/UNEP/GEF.

2. Involved Person

- 2) There are four leaders and officers from Department of Fisheries Conservation and two officers from Fisheries Administration Cantonment in Koh Kong, participating in doing a research and monitoring mackerel gonad development in Koh Kong province naming as following (see Annex 1, 2 & 5):
 - Mr. Leng Sy Vann, Deputy Director of the Department of Fisheries Conservation and NSTFP
 - Mr. Ly Kuntty, Vice chief of Socioeconomic Division, Marine Fisheries Research and Development Institute (MFRDI)
 - Mr. Rous Saret, Officer of Department of Fisheries Conservation
 - Mr. Lieng Saroeun, Vice chief of Crocodile Industrial development and conservation, Department of Fisheries Conservation

3. Field Trip Activities

A. Collection of fish samples at landing sites and markets

- 3) Teamwork led by **Mr. Leng Sy Vann** went down to collect the samples of 5kg mackerel (49fish) at Dornng Tung market, and other 3kg mackerel (38 fish) at Village 4 market on 10 March 2019 in order to operate and monitor fish gonad growth, prepare and store its DNA. Those fish is caught at Koh Yor and Koh Code according to fishermen and sellers (see Annex 2).

B. Operating fish to monitor mackerel gonad growth

- 4) 87 fish samples are operated to monitor its gonad development, including 28 females and 59 males (see Annex 2 & 4).
- 5) According to data analysis of female mackerel, its average total body weight is 58.70g and average total body length is 17.03cm. For its gonad stage, it varies from 1st stage to fifth stage, including 21 fish in fifth stage, 22 fish in fourth stage, 3 fish in third stage, one fish in 2nd stage, and 7 fish in 1st stage.
- 6) But, for the male, its average total body weight is 53.52g, and average total body length is 16.65cm. As for its gonad stage, it varies from 1st stage to fifth stage, including 6 fish in 1st stage, 1 fish in 2nd stage, 5 fish in 3rd stage, 10 fish in fourth stage, and 6 fish in fifth stage.
- 7) Generally, its average total length is 16.77cm and average total weight is 55.19g. For its gonad stage, it varies from 1st stage to 5th stage, including 13 fish in 1st stage, 5 fish in 2nd stage, 11 fish in 3rd stage, 31 fish in 4th stage, and 26 fish in 5th stage.

C. Preparing and storing DNA

- 8) Teamwork prepared and cut the part of 30 fish body that are stored in small plastic tubes to check its DNA (see Annex 3).

D. Sample larvae collection

- 9) Teamwork led Mr. Leng Sy Vann went down to collect sample fish larvae at Koh Yor, Koh Code, and Peam Krasob sites that have 8 stations. The bongo net with the size of 0.45 cm diameter and 1.5 meter length was applied to collect sample fish larvae and per one station was made two times. All sample fish larvae were stored and kept in plastic tube with ethanol of 99.7%.

ANNEX 1**List of participants attending the baseline survey of short mackerel gonad development
from 9 to 13 March 2019 in Koh Kong province**

Name	Sex	Title	Organization	Telephone
1. Leng Sy Vann	M	Deputy Director	DFC/FiA	017446373
2. Ly Kunthy	M	Vice chief of socio-economic division	MaFReDI/FiA	
3. Lieng Saroeun	M	Vice chief of Crocodile industrial and conservation division	DFC/FiA	
4. Rous Saret	M	Officer	DFC/FiA	
5. Seng Bunna	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	016885709
6. Nou Ngoy	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	

ANNEX 2

**Schedule for baseline survey of short mackerel gonad development from 9 to 13 March 2019
in Koh Kong province**

Date/Time	Description	Responsible person
09 March 2019		
9:00am-4:00pm	Leaving Phnom Penh for Koh Kong	<ul style="list-style-type: none"> • Mr. Lieng Saroeun, • Mr. Leng Sy Vann, • Mr. Ly Kunthy, and • Mr. Rous Sareth
10 March 2019		
9:00am- 12:00pm	Collection of fish sample at fishing ground at Village 4 and Dornng Tung market	All
12:00pm-2:00pm	Lunch break	All
2:00pm-5:00pm	Fish operation to monitor fish gonad and DNA	All
11 March 2019		
8:00am-1:00pm	Sample fish larvae collection at station 2, 4, 1 and 7	All
1:00pm -3:00pm	Lunch break	All
3:00pm -5:00pm	Fish operation to monitor fish gonad and DNA	All
12 March 2019		
8:00-1:00pm	Sample fish larvae collection at station 6 and 8	All
1:00pm-3:00pm	Lunch break	All
3:00pm -5:00pm	Fish operation to monitor fish gonad and DNA	All
13 March 2019		
8:00-12:00pm	Sample fish larvae collection at station 3 and 5	All
12:00pm-2:00pm	Lunch break	All
2:00pm-4:00pm	Fish operation to monitor fish gonad and DNA	All
14 March 2019		
9:00am-4:00pm	Leaving Phnom Penh for Koh Kong	All

ANNEX 3

Participants' Photos attending the baseline survey of short mackerel gonad development from 09 to 13 March 2019 in Koh Kong province





ANNEX 4: Data of baseline survey of short mackerel in Koh Kong on 10 March 2019

No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0001	17.8	16.0	4.2	68.4	M	4	1.60	2.34	DT Market	SM	3/10/19	3.81
KKDT0002	17.4	15.4	4.1	62.6	M	4	2.50	3.99	DT Market	SM	3/10/19	3.76
KKDT0003	17.5	15.8	4.2	64.2	F	3	0.90	1.40	DT Market	SM	3/10/19	3.76
KKDT0004	17.3	15.3	3.9	56.1	M	3	0.70	1.25	DT Market	SM	3/10/19	3.92
KKDT0005	18.0	16.1	4.1	65.5	F	4	0.70	1.07	DT Market	SM	3/10/19	3.93
KKDT0006	16.5	14.9	3.9	54.8	M	5	0.60	1.09	DT Market	SM	3/10/19	3.82
KKDT0007	17.2	15.6	4.1	61.2	M	4	1.60	2.61	DT Market	SM	3/10/19	3.80
KKDT0008	16.0	14.5	3.8	46.2	M	1	0.00	0.00	DT Market	SM	3/10/19	3.82
KKDT0009	16.0	14.3	3.8	49.9	M	1	0.00	0.00	DT Market	SM	3/10/19	3.76
KKDT0010	17.1	15.4	4.0	59.2	M	5	0.60	1.01	DT Market	SM	3/10/19	3.85
KKDT0011	17.7	16.0	4.3	68.9	M	4	2.10	3.05	DT Market	SM	3/10/19	3.72
KKDT0012	17.7	15.7	4.3	69.2	F	4	3.10	4.48	DT Market	SM	3/10/19	3.65
KKDT0013	17.3	15.5	4.1	59.6	M	4	1.30	2.18	DT Market	SM	3/10/19	3.78
KKDT0014	18.0	16.1	4.1	73.1	F	4	3.30	4.51	DT Market	SM	3/10/19	3.93
KKDT0015	18.4	16.5	4.4	76.9	F	5	3.90	5.07	DT Market	SM	3/10/19	3.75
KKDT0016	16.5	14.9	3.9	52.3	M	5	0.90	1.72	DT Market	SM	3/10/19	3.82
KKDT0017	17.8	15.9	3.9	61.9	M	5	1.30	2.10	DT Market	SM	3/10/19	4.08
KKDT0018	16.8	14.8	3.8	54.2	M	4	1.20	2.21	DT Market	SM	3/10/19	3.89
KKDT0019	17.7	15.8	4.1	70.4	F	4	1.10	1.56	DT Market	SM	3/10/19	3.85
KKDT0020	17.5	15.9	4.2	63.9	F	4	0.60	0.94	DT Market	SM	3/10/19	3.79
KKDT0021	17.3	16.0	4.0	61.5	F	5	0.70	1.14	DT Market	SM	3/10/19	4.00
KKDT0022	17.0	15.1	4.0	55.2	M	4	1.00	1.81	DT Market	SM	3/10/19	3.78

¹ Fork Length (FL)/Body Deep(BD): less than or equal to 4.30 is short mackerel (SM), *Rastrelliger brachysoma*
more than 4.30 is long mackerel (LM), *Rastrelliger kanagurta*.

No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0023	16.0	14.4	3.7	47.3	M	2	0.00	0.00	DT Market	SM	3/10/19	3.89
KKDT0024	17.2	15.7	4.0	58.3	M	4	0.60	1.03	DT Market	SM	3/10/19	3.93
KKDT0025	16.2	14.5	4.0	51.8	F	3	0.70	1.35	DT Market	SM	3/10/19	3.63
KKDT0026	17.2	15.3	4.0	59.6	M	5	1.50	2.52	DT Market	SM	3/10/19	3.83
KKDT0027	17.8	16.0	4.3	67.1	M	5	0.70	1.04	DT Market	SM	3/10/19	3.72
KKDT0028	17.2	15.5	4.0	58.9	M	5	1.00	1.70	DT Market	SM	3/10/19	3.88
KKDT0029	17.1	15.2	3.9	53.2	M	4	1.00	1.88	DT Market	SM	3/10/19	3.90
KKDT0030	17.8	16.0	4.2	63.8	F	3	1.10	1.72	DT Market	SM	3/10/19	3.81
KKDT0031	17.0	15.2	3.9	57.9	F	5	0.40	0.69	DT Market	SM	3/10/19	3.90
KKDT0032	17.0	15.2	3.9	50.4	M	3	1.20	2.38	DT Market	SM	3/10/19	3.90
KKDT0033	16.9	15.2	3.9	50.4	M	3	0.50	0.99	DT Market	SM	3/10/19	3.90
KKDT0034	18.0	16.0	4.2	67.0	M	5	1.60	2.39	DT Market	SM	3/10/19	3.81
KKDT0035	17.7	15.8	4.1	64.4	M	5	0.60	0.93	DT Market	SM	3/10/19	3.85
KKDT0036	17.0	15.0	4.0	60.9	M	5	1.20	1.97	DT Market	SM	3/10/19	3.75
KKDT0037	17.8	15.8	4.1	63.4	F	3	1.60	2.52	DT Market	SM	3/10/19	3.85
KKDT0038	16.8	15.0	3.9	55.4	M	4	1.30	2.35	DT Market	SM	3/10/19	3.85
KKDT0039	17.0	15.1	3.9	55.6	M	3	1.10	1.98	DT Market	SM	3/10/19	3.87
KKDT0040	17.6	15.8	4.2	64.7	F	4	3.40	5.26	DT Market	SM	3/10/19	3.76
KKDT0041	16.2	14.3	3.9	50.7	M	3	0.00	0.00	DT Market	SM	3/10/19	3.67
KKDT0042	17.3	15.4	4.0	56.7	M	4	0.70	1.23	DT Market	SM	3/10/19	3.85
KKDT0043	16.8	15.0	3.9	52.9	M	4	1.10	2.08	DT Market	SM	3/10/19	3.85
KKDT0044	17.1	15.2	4.1	62.0	M	4	1.20	1.94	DT Market	SM	3/10/19	3.71
KKDT0045	17.3	15.4	4.1	65.1	M	5	1.00	1.54	DT Market	SM	3/10/19	3.76
KKDT0046	16.4	14.3	3.8	48.9	M	5	0.80	1.64	DT Market	SM	3/10/19	3.76
KKDT0047	17.3	15.3	4.0	57.8	M	5	1.10	1.90	DT Market	SM	3/10/19	3.83
KKDT0048	18.4	16.5	4.4	76.9	F	4	2.40	3.12	DT Market	SM	3/10/19	3.75

No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0049	15.1	13.8	3.6	37.8	M	1	0.00	0.00	DT Market	SM	3/10/19	3.83
KKV40001	17.0	15.2	3.9	59.1	M	5	0.80	1.35	V4 Market	SM	3/10/19	3.90
KKV40002	17.0	15.2	4.1	55.6	F	5	0.70	1.26	V4 Market	SM	3/10/19	3.71
KKV40003	15.8	14.2	3.8	51.1	M	1	0.00	0.00	V4 Market	SM	3/10/19	3.74
KKV40004	16.8	14.5	3.9	50.5	M	5	0.60	1.19	V4 Market	SM	3/10/19	3.72
KKV40005	17.6	15.7	4.1	62.6	F	4	1.70	2.72	V4 Market	LM	3/10/19	3.83
KKV40006	18.0	16.1	4.4	67.7	F	4	1.80	2.66	V4 Market	SM	3/10/19	3.66
KKV40007	18.0	16.0	4.3	64.7	F	4	2.10	3.25	V4 Market	SM	3/10/19	3.72
KKV40008	17.8	15.8	4.2	60.3	F	5	0.70	1.16	V4 Market	SM	3/10/19	3.76
KKV40009	17.0	15.0	3.9	54.0	M	4	1.10	2.04	V4 Market	SM	3/10/19	3.85
KKV40010	16.8	14.9	4.0	53.5	M	4	0.90	1.68	V4 Market	SM	3/10/19	3.73
KKV40011	17.1	15.2	4.0	58.5	M	5	0.70	1.20	V4 Market	SM	3/10/19	3.80
KKV40012	15.5	13.7	3.6	40.5	M	4	0.60	1.48	V4 Market	SM	3/10/19	3.81
KKV40013	15.2	13.8	3.6	41.8	F	5	0.00	0.00	V4 Market	SM	3/10/19	3.83
KKV40014	16.1	14.3	3.7	47.2	F	2	0.60	1.27	V4 Market	SM	3/10/19	3.86
KKV40015	15.5	14.0	3.6	43.3	M	1	0.00	0.00	V4 Market	SM	3/10/19	3.89
KKV40016	18.1	16.2	4.2	66.6	F	3	0.80	1.20	V4 Market	SM	3/10/19	3.86
KKV40017	17.1	15.3	4.0	61.0	M	4	1.30	2.13	V4 Market	SM	3/10/19	3.83
KKV40018	17.0	15.1	4.0	56.7	M	4	1.80	3.17	V4 Market	SM	3/10/19	3.78
KKV40019	15.5	13.9	3.5	42.9	M	1	0.00	0.00	V4 Market	SM	3/10/19	3.97
KKV40020	14.8	13.3	3.3	40.0	F	1	0.00	0.00	V4 Market	SM	3/10/19	4.03
KKV40021	14.7	13.0	3.3	35.7	F	1	0.00	0.00	V4 Market	SM	3/10/19	3.94
KKV40022	16.9	14.9	4.0	58.5	M	5	0.70	1.20	V4 Market	SM	3/10/19	3.73
KKV40023	17.0	15.1	3.9	43.0	M	5	1.30	3.02	V4 Market	SM	3/10/19	3.87
KKV40024	17.8	15.6	4.0	59.9	M	4	0.70	1.17	V4 Market	SM	3/10/19	3.90
KKV40025	17.1	15.2	4.0	58.1	M	4	1.30	2.24	V4 Market	SM	3/10/19	3.80

No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKV40026	15.6	14.0	3.6	46.3	M	2	0.60	1.30	V4 Market	SM	3/10/19	3.89
KKV40027	15.2	14.0	3.6	43.0	M	5	0.00	0.00	V4 Market	SM	3/10/19	3.89
KKV40028	15.6	14.0	3.6	42.8	M	5	0.60	1.40	V4 Market	SM	3/10/19	3.89
KKV40029	15.2	13.8	3.5	40.7	M	2	0.30	0.74	V4 Market	SM	3/10/19	3.94
KKV40030	15.0	13.5	3.3	38.9	F	1	0.00	0.00	V4 Market	SM	3/10/19	4.09
KKV40031	14.3	12.8	3.2	33.0	ND	ND	ND	ND	V4 Market	SM	3/10/19	4.00
KKV40032	15.0	13.2	3.5	41.8	M	3	0.70	1.67	V4 Market	SM	3/10/19	3.77
KKV40033	15.4	14.0	3.5	40.3	M	2	0.00	0.00	V4 Market	SM	3/10/19	4.00
KKV40034	16.0	14.3	3.7	49.8	F	1	0.00	0.00	V4 Market	SM	3/10/19	3.86
KKV40035	15.8	14.0	3.6	45.2	M	4	0.60	1.33	V4 Market	SM	3/10/19	3.89
KKV40036	15.7	14.0	3.6	45.2	F	1	0.00	0.00	V4 Market	SM	3/10/19	3.89
KKV40037	15.9	14.2	3.6	44.2	F	1	0.00	0.00	V4 Market	SM	3/10/19	3.94
KKV40038	15.4	13.8	3.6	43.0	M	1	0.00	0.00	V4 Market	SM	3/10/19	3.83