



**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 SAMPLING FISH LARVAE COLLECTION IN KOH KONG**

KOH KONG, CAMBODIA

11-14 March 2020

Prepared by
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TRAINING DEPARTMENT



First published in Phrasamutchedi, Samut Prakan, Thailand in March 2020 by the SEAFDEC-UNEP-GEF Fisheries Refugia Project, Training Department of the Southeast Asian Fisheries Development Center

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For citation purposes this document may be cited as:

FIA/Cambodia. 2020. Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand, Report of The Baseline Survey of Short Mackerel and Sampling Fish Larvae Collection in Koh Kong. Southeast Asian Fisheries Development Center, Training Department, Samut Prakan, Thailand; FR/REP/CAM69, 13 p.

1. Baseline Survey Objective

To monitor the development of short mackerel gonad and to collect sampling fish larvae in Koh Kong province from 11 to 14 March 2020 funded by SEAFDEC/UNEP/GEF.

2. Involved Person in the Baseline Survey

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 of baseline survey short mackerel in Koh Kong province naming as following (see Annex 1, 2 & 3):

- Mr. Leng Sy Vann, Deputy Director of the Department of Fisheries Conservation and NSTFP
- Ms. Ly Sokta, Officer of Department of Fisheries Conservation/FiA
- Mr. Rous Saret, Officer of Department of Fisheries Conservation
- Mr. Lieng Saroeun, Vice chief of Crocodile Industrial development and conservation, Department of Fisheries Conservation
- Ms. Mab Chenda, 3rd Student of Fisheries Science Faculty, Royal University of Agriculture
- Mr. Nou Ngoy, Vice Chief of Fisheries Administration Division, Koh Kong FiAC
- Mr. Seng Bunna, Vice Chief of Fisheries Administration Division, Koh Kong FiAC

3. Baseline Survey Activities

3.1. Collection of fish samples at landing sites and markets

Teamwork from FiA and FiAC went down to collect the fish sampling at the local markets including Village 4 market and Dornng Tung market, in which the 9kg of fish was bought to monitor the development of its gonad (see annex 3).

3.2. Operate fish to monitor its gonad development

Sampling 100 individual fish is operated to monitor its gonad development, including 27 females and 73 males.

According to data analysis for female, its average body weight is 64.73g and average total body length is 17.59cm. For its gonad development stage, it varies from 1st stage to 5th stage, including two individual fish in 1st stage, nine individual fish in 4th stage, and 16 individual fish in 5th stage. As for an average gonad weight it is 2.11g

As for data analysis for male, its average body weight is 70.90g and average total body length is 18.06cm. For its gonad development stage, it varies from 3rd stage to 5th stage, including six individual fish in 3rd stage, 33 individual fish in 4th stage, and 34 individual fish in 5th stage. As for an average gonad weight, it is 2.32g

Generally, in March, an average body weight of fish is 67.81g and its average total body length is 17.82cm. As for its gonad development stage, they are mostly in 4th and 5th stage and its average gonad weight is 2.21g.

3.3. Preparing and storing DNA

Teamwork prepared and cut the part of 30 individual fish body including 15 individual fish from Dornng Tung and other 15 individual fish from Village 4 markets, which are stored in small plastic tubes with ethanol of 99.7% to study and analyze its DNA (see annex 3).

3.4. Sampling Fish Larvae collection

Teamwork from FiA and FiAC went down to collect sampling fish larvae at Koh Yor, Chroy Pros, and Peam Krasob sites that are 8 stations, including 4 stations at Peam Krasob, 2 stations at Chroy Pros, and other 2 stations at Koh Yor sites. The bongo net with the size of 1 m diameter and 5 meter length was applied to collect sampling fish larvae and two times/station was applied to harvest fish larvae in the period of every 5 minute. All sampling 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 and fish larvae collection from 11 to 14 March 2020 in Koh Kong province

No.	Name	Sex	Title	Organization	Telephone
1	Leng Sy Vann	M	Deputy Director	DFC/FiA	017446373
2	Ly Sokta	F	Officer	DFC/FiA	092653427
3	Lieng Saroeun	M	Vice chief of Crocodile industrial and conservation division	DFC/FiA	092660267
4	Mab Chenda	F	3 rd year-student	Fisheries Faculty/RUA	077511674
5	Rous Saret	M	Officer	DFC/FiA	011664696
6	Seng Bunna	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	016885709
7	Nou Ngoy	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	016933192

ANNEX 2: Schedule for the baseline survey of short mackerel gonad development and fish larvae collection from 11 to 14 March 2020 in Koh Kong province

Date/Time	Description	Responsible person
10 March 2020		
9:00am-4:00pm	Leaving Phnom Penh for Koh Kong	<ul style="list-style-type: none"> • Mr. Lieng Saroeun, • Mr. Leng Sy Vann, • Ms. Ly Sokta, and • Mr. Rous Saret • Ms. Mab Chenda
11 March 2020		
8:30am- 4:00pm	Sample fish larvae collection at station 2, 4, 1 and 7	All
12 February 2020		
8:30am-4:00pm	Sample fish larvae collection at station 6 and 8	All
13 February 2020		
8:30-12:00pm	Sample fish larvae collection at station 3 and 5	All
12:00pm-2:00pm	Lunch break	All
2:00pm-5:00pm	Collection of fish sampling at local market in Koh Kong province	
14 March 2020		
8:30-12:00pm	Operate fish to monitor its gonad development	All
12:00pm-2:00pm	Lunch break	All
2:00pm-5:00pm	Operate fish to monitor its gonad development	All
15 March 2020		
9:00am-4:00pm	Leaving Koh Kong for Phnom Penh	All

ANNEX 3: Participants' Photos attending the baseline survey of short mackerel gonad development and fish larvae collection from 11 to 14 March 2020 in Koh Kong province





ANNEX 4: Dataset of short mackerel gonad development and total and form length collected from local market in Koh Kong on 14 March 2020

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0001	18.1	16	4.0	69.2	F	5	1.1	1.59	DT Market	SM	14/03/2020	4.00
KKDT0002	17.5	15.9	3.8	63.4	F	5	1.5	2.37	DT Market	SM	14/03/2020	4.18
KKDT0003	17.5	15.2	3.7	59.5	M	5	1.6	2.69	DT Market	SM	14/03/2020	4.11
KKDT0004	17.4	15.3	4	61.4	M	5	1.6	2.61	DT Market	SM	14/03/2020	3.83
KKDT0005	16.9	15	3.7	51.2	M	1	0.4	0.78	DT Market	SM	14/03/2020	4.05
KKDT0006	18.4	16.4	4.1	85.7	F	4	5.8	6.77	DT Market	SM	14/03/2020	4.00
KKDT0007	17.5	16	3.9	64.9	M	5	1.4	2.16	DT Market	SM	14/03/2020	4.10
KKDT0008	18.3	16.4	3.9	72	M	5	1.4	1.94	DT Market	SM	14/03/2020	4.21
KKDT0009	17.2	15.3	3.8	58.7	M	5	1.1	1.87	DT Market	SM	14/03/2020	4.03
KKDT0010	17	15	3.7	57.3	M	5	1.3	2.27	DT Market	SM	14/03/2020	4.05
KKDT0011	16.7	14.9	3.5	53.4	M	4	1.6	3.00	DT Market	SM	14/03/2020	4.26
KKDT0012	16.8	15.2	3.7	62.2	F	5	1.8	2.89	DT Market	SM	14/03/2020	4.11
KKDT0013	17.7	15.7	3.9	62.7	M	5	1.4	2.23	DT Market	SM	14/03/2020	4.03
KKDT0014	17.4	15.6	3.8	60.7	M	5	1.2	1.98	DT Market	SM	14/03/2020	4.11
KKDT0015	18.3	16.2	4.1	70.3	M	5	0.9	1.28	DT Market	SM	14/03/2020	3.95
KKDT0016	17.3	15.4	3.9	65.1	M	4	3	4.61	DT Market	SM	14/03/2020	3.95
KKDT0017	17.8	15.7	4	64.8	M	5	2	3.09	DT Market	SM	14/03/2020	3.93
KKDT0018	17.1	15.5	3.8	63.9	M	4	2.8	4.38	DT Market	SM	14/03/2020	4.08
KKDT0019	16	14.3	3.4	48.4	F	5	0.2	0.41	DT Market	SM	14/03/2020	4.21
KKDT0020	16.3	14.8	3.6	49.5	F	1	0.1	0.20	DT Market	SM	14/03/2020	4.11
KKDT0021	18	16	3.9	69.6	M	5	1.3	1.87	DT Market	SM	14/03/2020	4.10
KKDT0022	17.7	15.8	4	70.1	M	4	5	7.13	DT Market	SM	14/03/2020	3.95

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*.

KKDT0023	19	16.9	4	80.9	F	4	5.3	6.55	DT Market	SM	14/03/2020	4.23
KKDT0024	18.8	16.5	4.2	80.5	M	4	4.1	5.09	DT Market	SM	14/03/2020	3.93
KKDT0025	18.1	16.2	3.8	63.5	F	5	1.6	2.52	DT Market	SM	14/03/2020	4.26
KKDT0026	18	16	3.9	65.6	M	4	3.3	5.03	DT Market	SM	14/03/2020	4.10
KKDT0027	18	16	3.9	73.1	F	4	4.1	5.61	DT Market	SM	14/03/2020	4.10
KKDT0028	17.2	15.5	3.8	57.5	M	5	1.3	2.26	DT Market	SM	14/03/2020	4.08
KKDT0029	17.5	15.6	3.8	62.8	M	4	2.6	4.14	DT Market	SM	14/03/2020	4.11
KKDT0030	18.2	16.1	4	67.1	M	5	1.1	1.64	DT Market	SM	14/03/2020	4.03
KKDT0031	17	15	3.9	57.2	M	5	1.1	1.92	DT Market	SM	14/03/2020	3.85
KKDT0032	18.5	16.5	4.2	87.8	M	4	6	6.83	DT Market	SM	14/03/2020	3.93
KKDT0033	18.2	16.3	4.1	71.2	M	5	1.8	2.53	DT Market	SM	14/03/2020	3.98
KKDT0034	18.1	16.1	4	71.1	M	5	1.8	2.53	DT Market	SM	14/03/2020	4.03
KKDT0035	16.6	15	3.7	56	M	5	1.1	1.96	DT Market	SM	14/03/2020	4.05
KKDT0036	18	16	3.9	73	F	4	3.6	4.93	DT Market	SM	14/03/2020	4.10
KKDT0037	18	16	4	69.3	M	5	1.5	2.16	DT Market	SM	14/03/2020	4.00
KKDT0038	17.3	15.3	3.8	64	M	4	2.6	4.06	DT Market	SM	14/03/2020	4.03
KKDT0039	17.6	15.5	3.8	66.2	M	5	3.2	4.83	DT Market	SM	14/03/2020	4.08
KKDT0040	18.1	16	4	70.2	M	5	1.5	2.14	DT Market	SM	14/03/2020	4.00
KKDT0041	18	16.1	3.9	69	F	3	1.8	2.61	DT Market	SM	14/03/2020	4.13
KKDT0042	18.5	16.4	3.9	70	M	4	2.4	3.43	DT Market	SM	14/03/2020	4.21
KKDT0043	18.9	16.7	3.9	74.4	M	5	2.7	3.63	DT Market	SM	14/03/2020	4.28
KKDT0044	18.5	16.6	4.1	74.8	M	5	3	4.01	DT Market	SM	14/03/2020	4.05
KKDT0045	18.1	16.1	3.9	70.3	M	5	1.7	2.42	DT Market	SM	14/03/2020	4.13
KKDT0046	18.5	16.6	4	78.6	F	5	2.2	2.80	DT Market	SM	14/03/2020	4.15
KKDT0047	19	16.9	4	79.3	F	4	2.9	3.66	DT Market	SM	14/03/2020	4.23
KKDT0048	18.5	16.8	4.1	83.6	F	4	4.1	4.90	DT Market	SM	14/03/2020	4.10
KKDT0049	18.5	16.5	3.9	69.2	M	5	0.8	1.16	DT Market	SM	14/03/2020	4.23
KKDT0050	18.1	16	4	70.8	M	4	2.6	3.67	DT Market	SM	14/03/2020	4.00

KKV40001	17.7	15.7	4	65.7	M	5	1.4	2.13	Village 4 Market	SM	14/03/2020	3.93
KKV40002	18.8	16.5	4.1	76.5	M	4	1.1	1.44	Village 4 Market	SM	14/03/2020	4.02
KKV40003	17.5	15.4	3.8	60.8	M	5	1.3	2.14	Village 4 Market	SM	14/03/2020	4.05
KKV40004	18.3	16.3	3.9	72.4	F	4	1.7	2.35	Village 4 Market	SM	14/03/2020	4.18
KKV40005	17.5	15.6	4.2	75.7	F	4	3.8	5.02	Village 4 Market	SM	14/03/2020	3.71
KKV40006	17.2	15.2	3.7	59	M	5	0.4	0.68	Village 4 Market	SM	14/03/2020	4.11
KKV40007	17.7	15.8	3.8	60.9	M	4	1.9	3.12	Village 4 Market	SM	14/03/2020	4.16
KKV40008	19.4	17.3	4.2	87.3	F	4	2	2.29	Village 4 Market	SM	14/03/2020	4.12
KKV40009	18	16	3.8	67.3	M	4	3.2	4.75	Village 4 Market	SM	14/03/2020	4.21
KKV40010	18.4	16.4	4.1	77.4	M	4	3.1	4.01	Village 4 Market	SM	14/03/2020	4.00
KKV40011	17.1	15.1	3.8	60.9	M	4	1.9	3.12	Village 4 Market	SM	14/03/2020	3.97
KKV40012	19.3	17.2	4.2	87.9	F	4	2.6	2.96	Village 4 Market	SM	14/03/2020	4.10
KKV40013	16.5	14.9	3.5	52.2	M	5	0.7	1.34	Village 4 Market	SM	14/03/2020	4.26
KKV40014	18.6	16.3	4	76.2	M	4	3.1	4.07	Village 4 Market	SM	14/03/2020	4.08
KKV40015	20	17.8	4.4	97.1	F	5	2.7	2.78	Village 4 Market	SM	14/03/2020	4.05
KKV40016	17.4	15.5	3.9	64	M	4	2	3.13	Village 4 Market	SM	14/03/2020	3.97
KKV40017	18	16.2	4.1	69.5	M	4	4	5.76	Village 4 Market	SM	14/03/2020	3.95
KKV40018	18.5	16.5	4.2	61.6	M	4	4.5	7.31	Village 4 Market	SM	14/03/2020	3.93
KKV40019	18.8	16.7	4.1	73.1	M	4	1.4	1.92	Village 4 Market	SM	14/03/2020	4.07
KKV40020	17.4	15.5	3.9	64.3	M	4	2.4	3.73	Village 4 Market	SM	14/03/2020	3.97
KKV40021	18.5	16.4	4.3	79.1	F	4	4.1	5.18	Village 4 Market	SM	14/03/2020	3.81
KKV40022	19.2	16.5	4.3	74.2	M	4	3	4.04	Village 4 Market	SM	14/03/2020	3.84
KKV40023	18	16	4.1	67.2	M	5	0.9	1.34	Village 4 Market	SM	14/03/2020	3.90
KKV40024	17	15.3	4.1	61.6	M	4	2.9	4.71	Village 4 Market	SM	14/03/2020	3.73
KKV40025	18.4	16.4	4.3	77	M	4	2.5	3.25	Village 4 Market	SM	14/03/2020	3.81
KKV40026	18	16.1	4.1	71	M	4	3.4	4.79	Village 4 Market	SM	14/03/2020	3.93
KKV40027	18	16.3	3.9	64.4	M	3	1.8	2.80	Village 4 Market	SM	14/03/2020	4.18
KKV40028	18	16.1	4.1	74.6	F	4	2.3	3.08	Village 4 Market	SM	14/03/2020	3.93

KKV40029	18	16.2	4.1	68	M	5	1.3	1.91	Village 4 Market	SM	14/03/2020	3.95
KKV40030	18.4	16.5	4.1	71.8	M	5	1.6	2.23	Village 4 Market	SM	14/03/2020	4.02
KKV40031	17.8	15.9	4.2	73.8	M	4	2.3	3.12	Village 4 Market	SM	14/03/2020	3.79
KKV40032	17.8	16.2	4	72.4	M	5	1.5	2.07	Village 4 Market	SM	14/03/2020	4.05
KKV40033	18.9	17.2	4.4	86.1	F	3	4.2	4.88	Village 4 Market	SM	14/03/2020	3.91
KKV40034	17.8	16	3.9	67.5	M	3	1.6	2.37	Village 4 Market	SM	14/03/2020	4.10
KKV40035	19	17.1	4.2	86	F	4	3.8	4.42	Village 4 Market	SM	14/03/2020	4.07
KKV40036	18.6	16.8	4.2	82.7	F	4	4.8	5.80	Village 4 Market	SM	14/03/2020	4.00
KKV40037	17	15.2	3.9	57.5	M	3	1	1.74	Village 4 Market	SM	14/03/2020	3.90
KKV40038	18	16	3.9	68.2	F	3	4.5	6.60	Village 4 Market	SM	14/03/2020	4.10
KKV40039	17.5	15.7	3.9	67.2	M	5	1.7	2.53	Village 4 Market	SM	14/03/2020	4.03
KKV40040	17.8	16.2	4	68.5	M	5	2.4	3.50	Village 4 Market	SM	14/03/2020	4.05
KKV40041	18.6	16.6	4.3	79.2	M	4	3.3	4.17	Village 4 Market	SM	14/03/2020	3.86
KKV40042	17.8	16.2	4	65.7	F	5	0.9	1.37	Village 4 Market	SM	14/03/2020	4.05
KKV40043	17.8	16	3.9	63.8	M	5	1.7	2.66	Village 4 Market	SM	14/03/2020	4.10
KKV40044	17.9	16.3	4.3	72.9	M	5	2.7	3.70	Village 4 Market	SM	14/03/2020	3.79
KKV40045	18.8	17.2	4.4	86.7	M	5	2.6	3.00	Village 4 Market	SM	14/03/2020	3.91
KKV40046	16.6	15	4.1	59.1	M	5	2.5	4.23	Village 4 Market	SM	14/03/2020	3.66
KKV40047	18.3	16.4	4.1	71.2	M	5	1.7	2.39	Village 4 Market	SM	14/03/2020	4.00
KKV40048	17.6	16	4.1	72	M	5	0.7	0.97	Village 4 Market	SM	14/03/2020	3.90
KKV40049	17.7	15.7	4	67.6	M	5	1.6	2.37	Village 4 Market	SM	14/03/2020	3.93
KKV40050	18.4	16.4	4.1	75.4	F	5	1.3	1.72	Village 4 Market	SM	14/03/2020	4.00