



**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
20-24 JANUARY 2020**

Prepared by
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**SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT**



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Baseline Survey Objective

To monitor the development of short mackerel gonad and to collect sampling fish larvae in Koh Kong province from 20 to 24 January 2020 funded by SEAFDEC/UNEP/GEF.

1. 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

2. 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 Dorng 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 97 individual fish is operated to monitor its gonad development, including 38 females and 58 males.

According to data analysis for female, its average body weight is 68.01g and average total body length is 17.64cm. For its gonad development stage, it varies from 1st stage to 4th stage, including one individual fish in 1st stage, 13 individual fish in 3rd stage, and 25 individual fish in 4th stage. As for an average gonad weight it is 2.64g

As for data analysis for male, its average body weight is 60.57g and average total body length is 17.08cm. For its gonad development stage, it varies from 1st stage to 5th stage, including two individual fish in 1st stage, six individual fish in 2nd stage, 16 individual fish in 3rd stage, 33 individual fish in 4th stage, and one individual fish in 5th stage. As for an average gonad weight, it is 2.24g

Generally, in January, an average body weight of fish is 64.29g and its average total body length is 17.36cm. As for its gonad development stage, they are mostly in 4th stage and its average gonad weight is 2.44g.

3.3. Preparing and storing DNA

Teamwork prepared and cut the part of 30 individual fish body including 15 individual fish from Dorng 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 20 to 24 January 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 20 to 24 January 2020 in Koh Kong province

Date/Time	Description	Responsible person
20 January 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
21 January 2020		
8:30am- 4:00pm	Sample fish larvae collection at station 2, 4, 1 and 7	All
22 January 2020		
8:30am-4:00pm	Sample fish larvae collection at station 6 and 8	All
23 January 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	
24 January 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
25 January 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 20 to 24 January 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 24 January 2020

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0001	18.5	16.5	4.3	83.6	M	3	4.3	5.14	DT Market	SM	24/01/2020	3.84
KKDT0002	18.4	16.3	4.1	72.6	F	4	2.3	3.17	DT Market	SM	24/01/2020	3.98
KKDT0003	17.1	15.4	3.9	61.7	M	3	2.5	4.05	DT Market	SM	24/01/2020	3.95
KKDT0004	17.8	15.8	4.1	64.9	M	3	0.8	1.23	DT Market	SM	24/01/2020	3.85
KKDT0005	17.9	16	4.1	68.7	F	4	2.6	3.78	DT Market	SM	24/01/2020	3.90
KKDT0006	18	16.1	3.9	67.4	M	4	1.4	2.08	DT Market	SM	24/01/2020	4.13
KKDT0007	17	15.1	3.9	59.4	F	3	1.3	2.19	DT Market	SM	24/01/2020	3.87
KKDT0008	18.2	16.3	4.2	75.9	F	4	2.6	3.43	DT Market	SM	24/01/2020	3.88
KKDT0009	17.6	15.8	4.1	69	F	3	2.2	3.19	DT Market	SM	24/01/2020	3.85
KKDT0010	17.7	15.9	3.9	66.9	F	4	2.5	3.74	DT Market	SM	24/01/2020	4.08
KKDT0011	18.1	16	4	67.4	F	4	2.1	3.12	DT Market	SM	24/01/2020	4.00
KKDT0012	17	15	3.9	62	M	4	2.7	4.35	DT Market	SM	24/01/2020	3.85
KKDT0013	18	16	4	73.5	M	4	4.8	6.53	DT Market	SM	24/01/2020	4.00
KKDT0014	18.1	16.1	3.9	66.9	F	3	1.6	2.39	DT Market	SM	24/01/2020	4.13
KKDT0015	18	15.9	3.9	68.2	F	4	3.9	5.72	DT Market	SM	24/01/2020	4.08
KKDT0016	16.9	15	3.9	59.9	M	4	2.4	4.01	DT Market	SM	24/01/2020	3.85
KKDT0017	18	16	4.2	76.6	M	4	4.1	5.35	DT Market	SM	24/01/2020	3.81
KKDT0018	18	16	4.2	76.2	F	4	2.4	3.15	DT Market	SM	24/01/2020	3.81
KKDT0019	16.3	14.4	3.7	51.1	M	4	2.6	5.09	DT Market	SM	24/01/2020	3.89
KKDT0020	17	15.2	3.9	60.2	M	3	3.4	5.65	DT Market	SM	24/01/2020	3.90
KKDT0021	18	16	4.1	65.6	M	4	5.8	8.84	DT Market	SM	24/01/2020	3.90
KKDT0022	17.5	15.5	4.1	68.3	F	4	1.7	2.49	DT Market	SM	24/01/2020	3.78
KKDT0023	18	16	4.1	82.6	F	4	3	3.63	DT Market	SM	24/01/2020	3.90

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*.

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0024	19.2	17	4.3	86	F	4	4	4.65	DT Market	SM	24/01/2020	3.95
KKDT0025	17	15	3.7	55.8	M	3	2.4	4.30	DT Market	SM	24/01/2020	4.05
KKDT0026	17.8	15.9	4.1	71.7	F	4	3.3	4.60	DT Market	SM	24/01/2020	3.88
KKDT0027	19.4	17.3	4.4	96.5	M	4	5.7	5.91	DT Market	SM	24/01/2020	3.93
KKDT0028	17.3	15.3	3.3	57.3	F	3	1.6	2.79	DT Market	LM	24/01/2020	4.64
KKDT0029	17.1	15.2	3.7	60.9	M	3	1.9	3.12	DT Market	SM	24/01/2020	4.11
KKDT0030	17	15.2	3.8	60.1	M	3	1.3	2.16	DT Market	SM	24/01/2020	4.00
KKDT0031	17	15.3	3.9	61.7	M	3	2.1	3.40	DT Market	SM	24/01/2020	3.92
KKDT0032	17.4	16	4	68.5	F	4	2.9	4.23	DT Market	SM	24/01/2020	4.00
KKDT0033	17.3	15.5	4	65.1	M	4	1.7	2.61	DT Market	SM	24/01/2020	3.88
KKDT0034	17	15.2	3.7	57.8	M	1			DT Market	SM	24/01/2020	4.11
KKDT0035	17	15	4	64.5	F	4	2.9	4.50	DT Market	SM	24/01/2020	3.75
KKDT0036	17.1	15.2	4	66.9	M	3	1.7	2.54	DT Market	SM	24/01/2020	3.80
KKDT0037	16.7	15	3.8	59.3	M	3	0.7	1.18	DT Market	SM	24/01/2020	3.95
KKDT0038	17.2	15.7	3.9	68	F	4	3.1	4.56	DT Market	SM	24/01/2020	4.03
KKDT0039	18.5	16.4	4.1	72.7	F	4	2.1	2.89	DT Market	SM	24/01/2020	4.00
KKDT0040	18	16	4	68.1	M	4	1.4	2.06	DT Market	SM	24/01/2020	4.00
KKDT0041	18.2	16.3	4.2	75.1	F	4	1.9	2.53	DT Market	SM	24/01/2020	3.88
KKDT0042	18.1	16	4	73.5	M	4	2.6	3.54	DT Market	SM	24/01/2020	4.00
KKDT0043	18.5	16.6	4	78.4	F	3	1.5	1.91	DT Market	SM	24/01/2020	4.15
KKDT0044	16.8	15	3.4	47.7	M	1			DT Market	LM	24/01/2020	4.41
KKDT0045	17.5	15.8	4	69.2	F	2	1	1.45	DT Market	SM	24/01/2020	3.95
KKDT0046	17.2	15.5	3.9	59.1	M	4	1.6	2.71	DT Market	SM	24/01/2020	3.97
KKDT0047	16.7	15	3.8	57.6	M	3	2.6	4.51	DT Market	SM	24/01/2020	3.95
KKDT0048	18.2	16.2	4	77.4	F	4	4.5	5.81	DT Market	SM	24/01/2020	4.05
KKDT0049	17.1	15.1	4	64	M	4	5.2	8.13	DT Market	SM	24/01/2020	3.78
KKDT0050	17.5	15.6	3.9	65.7	F	3	2.9	4.41	DT Market	SM	24/01/2020	4.00

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKV40001	17.4	15.3	4.1	72.7	M	4	3.8	5.23	Village 4 Market	SM	24/01/2020	3.73
KKV40002	17.9	16	3.9	69.6	F	4	2.2	3.16	Village 4 Market	SM	24/01/2020	4.10
KKV40003	17.8	16	4	68.9	F	4	4.4	6.39	Village 4 Market	SM	24/01/2020	4.00
KKV40004	17.2	15.4	3.9	64.1	M	4	3.4	5.30	Village 4 Market	SM	24/01/2020	3.95
KKV40005	17.2	15.3	4	62.9	M	4	2	3.18	Village 4 Market	SM	24/01/2020	3.83
KKV40006	17.2	15.3	4	63.9	M	4	2.9	4.54	Village 4 Market	SM	24/01/2020	3.83
KKV40007	19	17	4.4	85	M	4	3.1	3.65	Village 4 Market	SM	24/01/2020	3.86
KKV40008	17.6	15.9	4	67.1	F	4	2.7	4.02	Village 4 Market	SM	24/01/2020	3.98
KKV40009	17	15	3.7	54.5	M	4	1.3	2.39	Village 4 Market	SM	24/01/2020	4.05
KKV40010	17.1	15.3	3.9	63.1	F	4	3.9	6.18	Village 4 Market	SM	24/01/2020	3.92
KKV40011	18	16.1	3.9	71.7	F	4	3.3	4.60	Village 4 Market	SM	24/01/2020	4.13
KKV40012	17	15.3	3.8	62.5	F	4	1.4	2.24	Village 4 Market	SM	24/01/2020	4.03
KKV40013	18	16.2	4.1	75	M	4	4.1	5.47	Village 4 Market	SM	24/01/2020	3.95
KKV40014	17.2	15.5	3.9	65.1	M	4	3.1	4.76	Village 4 Market	SM	24/01/2020	3.97
KKV40015	18.8	16.3	4	75.4	M	4	2.4	3.18	Village 4 Market	SM	24/01/2020	0.22
KKV40016	16.8	15.2	3.7	58	M	4	1.9	3.28	Village 4 Market	SM	24/01/2020	4.11
KKV40017	16.8	15.3	3.6	58	F	4	2	3.45	Village 4 Market	SM	24/01/2020	4.25
KKV40018	17	15.4	3.7	57	M	4	1.6	2.81	Village 4 Market	SM	24/01/2020	4.16
KKV40019	17	15.3	3.5	59	F	4	1.7	2.88	Village 4 Market	LM	24/01/2020	4.37
KKV40020	16.8	15	3.6	53	M	4	1.4	2.64	Village 4 Market	SM	24/01/2020	4.17
KKV40021	15.4	14.2	3.2	43.4	F	1			Village 4 Market	LM	24/01/2020	4.44
KKV40022	17.2	15.3	3.8	56.9	F	3	1.1	1.93	Village 4 Market	SM	24/01/2020	4.03
KKV40023	17	15.3	3.8	58.7	M	4	1.8	3.07	Village 4 Market	SM	24/01/2020	4.03
KKV40024	16.6	15.1	3.8	57.8	M	3	2	3.46	Village 4 Market	SM	24/01/2020	3.97
KKV40025	16.9	15.3	3.8	57.1	M	4	2.1	3.68	Village 4 Market	SM	24/01/2020	4.03
KKV40026	17.3	15.5	3.8	58.2	M	3	1.1	1.89	Village 4 Market	SM	24/01/2020	4.08
KKV40027	16.7	15	3.7	51	F	2	1.2	2.35	Village 4 Market	SM	24/01/2020	4.05

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKV40028	17	15.2	3.9	61.9	F	4	3.1	5.01	Village 4 Market	SM	24/01/2020	3.90
KKV40029	17.4	15.5	3.9	62	M	4	2.5	4.03	Village 4 Market	SM	24/01/2020	3.97
KKV40030	17.8	16.1	4.1	62.1	F	2	1.2	1.93	Village 4 Market	SM	24/01/2020	3.93
KKV40031	17.5	15.8	4.1	62.4	M	4	2.2	3.53	Village 4 Market	SM	24/01/2020	3.85
KKV40032	16.8	15.5	3.9	57	M	4	2	3.51	Village 4 Market	SM	24/01/2020	3.97
KKV40033	17	15.1	3.9	59.5	F	4	3.1	5.21	Village 4 Market	SM	24/01/2020	3.87
KKV40034	15.2	13.8	3.5	42	F	1			Village 4 Market	SM	24/01/2020	3.94
KKV40035	15.9	14.3	3.7	48.2	M	2	0.2	0.41	Village 4 Market	SM	24/01/2020	3.86
KKV40036	17	15.2	3.9	53	M	5			Village 4 Market	SM	24/01/2020	3.90
KKV40037	16	14.3	3.7	51.9	M	4	2.2	4.24	Village 4 Market	SM	24/01/2020	3.86
KKV40038	16.3	14.8	3.8	47.9	M	2	2.3	4.80	Village 4 Market	SM	24/01/2020	3.89
KKV40039	16.5	15.3	3.8	51.9	M	3	1.4	2.70	Village 4 Market	SM	24/01/2020	4.03
KKV40040	16.9	15.2	3.9	59	F	3	1.1	1.86	Village 4 Market	SM	24/01/2020	3.90
KKV40041	16.4	14.7	3.9	54.5	M	3	1.7	3.12	Village 4 Market	SM	24/01/2020	3.77
KKV40042	16.8	15.3	4	58.5	M	3	1.1	1.88	Village 4 Market	SM	24/01/2020	3.83
KKV40043	16.2	14.6	3.9	53.9	M	3	1.4	2.60	Village 4 Market	SM	24/01/2020	3.74
KKV40044	16.7	15	3.9	55.5	F	4	2.1	3.78	Village 4 Market	SM	24/01/2020	3.85
KKV40045	15.6	14.1	3.7	48.4	M	3	1.6	3.31	Village 4 Market	SM	24/01/2020	3.81
KKV40046	16.3	15	3.7	53.2	M	3	1.2	2.26	Village 4 Market	SM	24/01/2020	4.05
KKV40047	16.1	14.5	3.7	48.3	M	3	1.8	3.73	Village 4 Market	SM	24/01/2020	3.92
KKV40048	16.4	14.9	3.8	55.8	F	2	2	3.58	Village 4 Market	SM	24/01/2020	3.92
KKV40049	17	15.3	3.9	58.6	M	3	2.1	3.58	Village 4 Market	SM	24/01/2020	3.92
KKV40050	16.8	15	3.8	52.9	M	3	2.7	5.10	Village 4 Market	SM	24/01/2020	3.95