Annex X

Activities of the "Cochlodinium Corresponding Group (CCG)"

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Provisional Plan for "the Cochlodinium Corresponding Group (CCG)"

1. Purpose of the activities of CCG

Cochlodinium is one of the concerned species in the NOWPAP region. Especially the damages of coastal fisheries caused by this species are reported in Korea and Japan. However, our understanding of Cochlodinium is insufficient to make policies against it. Therefore, NOWPAP Working Group 3 (WG3) agreed to organize the corresponding group on Cochlodinium so as to make a set of information on Cochlodinium, and to help policy makers concerning coastal fishery.

2. Outputs of the activities of CCG

The outputs of the activities of CCG that the CEARAC secretariat is planning are to make a website about *Cochlodinium* and technical report about this species.

2.1. Web site (output in the first year, 2004)

For the result of the activities of CCG in the first year, CCG tries to make a website which introduces *Cochlodinium* briefly to the public concerning environmental problems. The website includes pictures of *Cochlodinium*, explanation of the species, and information of its damage to fishery, and so on. Pictures and information for the website of *Cochlodinium* are provided by the members of CCG. The constructed website could be loaded in the CEARAC website.

2.2. Technical Report (output in the second year, 2005)

In the second year, a technical report would be published as the final result of activities of CCG. The detail of contents of the report and procedure of technical report composition would be discussed later in CCG. These activities might become case-studies on the HAB reference database, which CEARAC and WG3 have developed

The CEARAC secretariat is scheduling that the work of CCG would be accomplished in two years.

3. Group members of CCG

3.1. Group Leaders

The First Meeting of WG3 elected the following experts of HAB as co-leaders of CCG:

- Dr. Hak-Gyoon Kim (National Fisheries Research & Development Institute, Korea)
- Dr. Yasuwo Fukuyo (The University of Tokyo, Asian Natural Environmental Science Center)

3.2. Group Members

Members of CCG are shown in Table 1. CEARAC secretariat accepted all scientists WG3 experts recommended.

Although Chinese WG3 experts are not on the list of members of CCG, Mr. Mingjiang Zhou is put on our mailing list and read our correspondences so that he (Chinese WG3 experts) can understand CCG's activities.

Table 1. Members of CCG

Name	Country	Organization
Dr. Songhui LU	China	Jinan University
Dr. Yasuwo FUKUYO	Japan	The University of Tokyo, Asian Natural Environmental Science Center
Mr. Haruyoshi TAKAYAMA	Japan	Hiroshima Fisheries Experimental Station
Dr. Kazumi MATSUOKA	Japan	Nagasaki University
Dr. Voquagi MATANADE	lonon	National Research Institute of Fisheries and Environment
Dr. Yasunori WATANABE	Japan	of Inland Sea, Fisheries Research Agency
Dr. Hak Gyoon KIM	Korea	Oceanography Research Team, NFRDI
Dr. Chang Kyu LEE	Korea	Marine Harmful Organisms Research Team, NFRDI
Dr. Kyoung Ho AN	Korea	Aquaculture Environment Institute, NFRDI
Dr. Wol Ae LIM	Korea	Marine Harmful Organisms Research Team, NFRDI
Dr. Tatiana ORLOVA	Russia	Institute of Marine Biology, Far Eastern Branch of Russian
Dr. Taliana ORLOVA	Russia	Academy of Sciences
Dr. Marina SELINA	Russia	Institute of Marine Biology, Far Eastern Branch of Russian
DI. MAIIIIA SELINA	ivassia	Academy of Sciences

4. Procedure of group meetings

 Internet is the main tool for the group meetings for CCG in order to reduce the tasks and costs of meetings. CCG members exchange correspondences with their idea and information for CCG through Internet. All the members will be registered in a mailing list that the CEARAC makes for CCG.

Address of mailing list is:

ccg@npec.or.jp

Please use the above address to correspond with group members and CEARAC secretariat.

- The group activities are also discussed in WG3 Meeting and Focal Point Meeting (FPM).
- The subjects to be discussed are proposed by the co-leaders (Dr. Fukuyo and Dr. Kim) and the CEARAC secretariat.

5. Schedule of CCG

- Provisional schedule of CCG is shown in Table 2.
- The CEARAC secretariat plays a main role in gathering information, harmonizing opinions of the members, and assigning works to the members or the secretariat itself.

Table 2. Provisional Schedule of CCG

	CEARAC Secretariat	Leaders	CCG members									
Early Octber, 2004	"The 1st Correspondence Ex											
Lai 13 000001, 2007	· Propose Provisional	• Exchange opinion and	d information in									
	Plan for CCG	response to the Prov										
October, 2004	Making a proposal of conte		VISTORIAL LIAR									
Early November, 2004	"The 2 nd Correspondence Ex											
Larry Novellber, 2004	• Propose contents of	r	the content of									
	website called "ALL	website	the content of									
	about Cochlodinium"		ad information for									
	• Collect opinions and	• Exchange opinions and information for the website										
	information for the	Life website										
	website											
November25-26, 2004	The 2 nd Working Group 3 Mee	ting:	• Dr. Lee and Dr.									
NOVEIIIDE1 25-20, 2004	• Review the activities of	=	Orlova attend									
	Discuss future activities		WG3 Meeting.									
December, 2004∼	• Revise the proposal of the		WGO MEELING.									
December, 2004	in response to the discu											
January, 2005	"The 3 rd Correspondence Ex											
danuar y, 2005	• Propose revised contents		tont of wobsite									
	of Website	• Exchange opinions an										
	• Collect opinions and	revised contents of										
	information about the	revised contents of	rue mensire									
	revised proposal											
February~March, 2005	• Make a plan of structure	of the website										
	-	OI LIIC WEDSILE										
April, 2005∼	• Construct • the website	a of Tooksiaal Donout										
Marr. 2005	• Make proposal of content	s of rechnical Report										
May ,2005	· Open the Website											
	"The 4th Correspondence Ex											
	• Introduce our website											
	• Propose the contents of	the website and leci	nnical Report									
	Technical Report											
	• Collect opinions and											
	information about the											
	website and Technical											
	Report	rehenges" stoutes										
	"The 5 th Correspondence Ex	(cnanges starts:										
	• Ask CCG members to write											
May 200F	Technical Report	Wuita (Obantana a	ortions of Tachair I									
May, 2005∼		• Write (Chapters or Se	CLIONS OT) TECHNICAL									
December, 2005	"The 6 th Correspondence Ex	Report										
Late December, 2005		r	d information about									
	• Collect opinions and	 Exchange opinions an Technical Report 	וט ווויטרווומנוטוו מטטענ									
	information about											
January 2006	Technical Report.											
January, 2006~	Revise Technical Report											
March, 2006	• Publish Technical Report											

Principles in compiling "All About Cochlodinium"

1. Contents of "All About Cochlodinium" and its editing principles

The purpose for compiling "All About *Cochlodinium*" is to summarize what we already know about *Cochlodinium* and to understand what issues need to be solved, which in longer term, will contribute to minimizing the harms caused by *Cochlodinium*.

The main contents will be; information on red tide occurrence caused by Cochlodinium and the conditions under which they occurred; extent of damage done; and the characteristics of the specie (which is vital to avoid the damage). By going through the existing literatures, what basic information on *Cochlodinium* was summarized in Table 1.

93 literatures on *Cochlodinium* were searched from HAB database by using the keyword "*Cochlodinium*", as listed in appendix. Among these, contents were summarized for 56 literatures which were written in either English or in Japanese. The summary is attached as appendix.

The following contents are considered appropriate for what is to be compiled in "All About *Cochlodinium*".

Contents of "All About Cochlodinium"

1. Information which can be summarized from exiting literatures etc.

- 1) Information related to the occurring conditions and the occurrence of HAB caused by *Cochlodinium*
 - ① Occurrence area (with figures)
 - 2 Time, duration and frequency
 - 3 Co-existing species
 - 4 Trigger for occurrence or disappearance
 - 2) Extent of damage of HAB caused by Cochlodinium
 - ① Status of damage (area, time, duration)
 - 2 Details of damage
 - 3 Extent of Damage (number of affected people, \$, etc.)
 - 3) Characteristics of Cochlodinium
 - ① Morphological characteristics and photo
 - 2 Ecological characteristics (water temperature, salinity)
 - Trigger for multiplication (change of water temperature, nutrient salts concentration, etc.)
 - 4 Life cycle, cyst identification (photo of cyst, trigger for the cyst formation)

${f 2}$. What we do not know about ${\it Cochlodinium}$ (Unknown parameters of ${\it Cochlodinium}$)

- ① Taxonomic matters: some *Cochlodinium* which has same morphological characteristics are classified as different species
- 2 Life cycle: cyst formation not confirmed in sea area
- 3 Toxicity: not confirmed
- Mechanism of the HAB occurrence: stimulation for multiplication (change of water temperature, etc.), occurrence from the cyst in specific sea areas, relations (or competitiveness) between different species, etc.

Table.1 Information which can be summarized from existing literatures, and editing principle

Information to be summarized as cause of red tide or HAB 1) Information related to the occurring conditions and the occurrence of HAB caused by Cochlodinium 2	1001011	mation which can be summarize		
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2. Cooperation to be asked

1) Request for literature information

More information of the below categories is to be collected:

- Co-existing species
- trigger for occurrence and disappearance
- ecological characteristics,
- trigger for multiplication

We would like to ask CCG experts to give literatures and information found in each country. Specific requests will be, for example, to make an English summary of literatures written in their own language, as listed in the Appendix, and to collect literatures not included in the database.

2) Photo

Use of photo will be necessary to introduce the morphological characteristics of *Cochlodinium* and the cyst. Copyright owner's permission for will be required using his/her photo.

				key words	ido						key words	lodinium								Key words	Damage			
				about red t	iue						about Coci	iiouinium								Status of	paniage			Extent of
Number	Literature presence	Author, Title, etc.	Hit number of key words		Size	occurrence time year, month	Duration		Causal species, co-existing species	disappearance	Photo		Morphological characteristics		Ecological characteristics	Trigger for multiplication	Cyst	.,	Trigger for the cyst formation		Time Year, Month	Duration	Damage	Damage (Number of Damaged sea affected people, \$, Yen)
1	Not found	Bae, H.M., Choi, H.G., Lee, W.C. and Yoon, S.J. (1998) Control of the red tide by yellow loess dispersion in *The "Korea-China Joint Symposium on Harmful Algal Blooms", 53-60	0	56	10	47	32	23	71	25	35	15	18	6	26	14	/	6	13	72	38	9	39	37 42
2	Not found	Baek, S.H., Sun, X.X., Lee, Y.J., et al. (2003) Mitigation of harmful algal blooms by sophorolipid J MICKOBIOL BIOTECNN 13 (5): 651-659 COT 2003 Baek, S.H., Sun, X.X., Lee, Y.J., Wang, S.Y., Han, K.N., Choi, J.K., Noh, J.H. and Kim, E.K. (2003) Mitigation of harmful algal blooms by sophorolipid J. Microbiol. Biotechnol. 13(5): 651-659	1													1								
4		[Toto]: Coll-cus (Cho, E.S. and Costas, E. (2004) Rapid monitoring for the potentially ichthyotixic dinoflagellate Cochlodinium polykrikoides in Korean coastal waters using fluorescent probe tools Journal of Plankton Research 26(2): 175-180	11	1		1		1	1	1	1	1	1							1	1			1
5 6		Cho, E.S., Kang, D.W. and Cho, Y.C. (2000) Identification of Cochlodinium polykrikoides against Gyrodinium impudicum and Gymnodinium catenatum in field samples using FITC lectin probes J. Fish. Sci. Tech. 3(2): 83-87	3									1			1	1								
7		Cho, E. S., Kang, D.W. and Cho, Y.C. (2000) Impact of crude oil and dispersant on determination of calcium concentration in whole cell from Cochlodinium polykrikoides Algae 15(2): 73-79	5												1					1	1			1 1
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10		dinoflagellates Cochlodinium polykrikoides, Gyrodinium impudicum and Gymnodinium catenatum based on internal transcribed spacer and 5.88 rDNA regions Algae 16(1): 53-57 (Cho, E.S., Kim, G.Y., Choi, B.D., et al. (2001) A comparative study of the harmful	2									1	1											
11		dinoflage lates Cochlodinium polykrikoides and Gyrodinium impudicum using transmission electron microscopy, fatty acid composition, carotenoid content, DNA quantification and gene sequences BOT MAR 44 (1): 57-66 JAN 2001 Cho, E.S., Kim, G.Y., Oh, B.C., Rhodes, L.L. and Lee, J.D. (2000) Discrimination of three	7	1		1			1		1	1	1		1									
12		Species of dinoflage lates Cochodinium polykrikoides, Gyrodinium impudicum and Gymnodinium catenatum using FITC-lectins Algae 15(3): 175-178 [Cho, E.S., Kim, H.G. and Cho, Y.C. (2000) Sequence analysis of Cochlodinium polykrikoides	5	1		1			1			1	1											
13		isolated form Korean coastal waters using sequences of internal transcribed spacers and 5.88 TDNA Journal of the Korean Society of Oceanography 35(3): 158-160 (Cho, E.S., Lee, S.G. and Kim, C.S. (1999) A simple test for the polysaccharide of a harmful dinoflagellate Cochlodinium polykrikoides using Alcian blue Bull. Nat I Fish. Res. Dev. Inst. Korea 65: 187-188	0																					
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		k	ey words	ords key words red tide about Cochlodinium										Key words Status of Damage										
	a	bout red	tide						about coci	nioainium								Status of Damage				Extent of		
Number Literature present	Author, Title, etc.	Hit umber f key vords	Occurrence area name, location	Size	occurrence time year, month	Duration	Frequency	Causal species, co-existing species	Trigger for occurrence or disappearance	Photo	Basis for identification	Morphological characteristics	Life cycle	Ecological characteristics	Trigger for multiplication	Cyst identification	Photo of cyst	Trigger for the cyst formation		Time Year, Month	Duration	Damage p	Damage (Number of I affected people, \$, Yen)	area
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			key words about red	tide						key words about Cochlodinium													
Number	Literature presence	Author, Title, etc.	Occurrence area name, location	Size	occurrence time year, month	Duration	Frequency	Causal species, co-existing species	Trigger for occurrence or disappearance	Photo	Basis for Morphological characteristics	Life cycle	Ecological characteristics	Trigger for multiplication	Cyst identification	Photo of cyst	Trigger for the cyst formation		Time Year, Month	Duration	Details of Damage	Extent of Damage (Number of affected people, \$, Yen)	Damaged sea area
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