



Greenhouse Gas Removal by Seaweed

# ASIAN NETWORK FOR USING ALGAE AS A CO<sub>2</sub> SINK THE ASIA-PACIFIC PHYCOLOGICAL ASSOCIATION



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## Newsletter

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### ASIAN NETWORK FOR USING ALGAE AS A CO<sub>2</sub> SINK

In response to the commitment expressed in the Kyoto Protocol on climate change, the Asian Network for Using Algae as a CO<sub>2</sub> Sink, a working group of Asian Pacific Phyco logical Association (APPA), was established to encourage collaboration among member countries in conducting research in sustainable CO<sub>2</sub> removal by marine-life mechanism. The network was initiated during the 4th Asian Pacific Phyco logical Forum (APPF) held in Bangkok, Thailand in 2005. The network has been led by Korea and consists of 16 members from 12 countries of Asia-Pacific region. The major objectives of the network is to collaborate in the research and development on the use of algae to remove CO<sub>2</sub>, which aims to address the problem of global warming.

The participating members of the working group agreed to follow-up action on Agenda 21 for Green Paths to the Future & the Memorandum of Understanding during the 4th APPF in Bangkok, Thailand (October 30 ~ November 4, 2005). The agreement was ratified and concluded by Prof. Siew-Moi Phang, President of the APPA, as well as the members of the working group of the network for the future collaborative activities under the United Nations Framework Convention on Climate Change (UNFCCC) during the International Symposium on Marine Algae & Global Warming held in Seoul, Korea (October 16 ~ 19, 2006).



1. The panel discussion on “Asian Network for CO<sub>2</sub> Reduction Using Seaweed” was held on November 3, 2005 during the 4th Asian Pacific Phyco logical Forum at Rama Garden Hotel, Bangkok, Thailand. It was followed by the official establishment of the “Asian Network for Using Algae as a CO<sub>2</sub> Sink”.
2. More than 80 of the phycologists from the Asia Pacific region joined the fruitful panel discussion.
3. Group photo of the members of the “Asian Network for Using Algae as a CO<sub>2</sub> Sink” at the 4th Asian Pacific Phyco logical Forum in Bangkok.

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## *The 1st Workshop of the Working Group for the Asian Network for Using Algae as a CO<sub>2</sub> Sink*

The Korean Society of Phycology (KSP) convened the 1st Workshop for the Asian Network for using Algae as a CO<sub>2</sub> sink during the International Symposium (October 16 ~ 19, 2006) at the Conference Building in the National Assembly, Seoul, Korea. In the special session of the symposium, the KSP prepared, in collaboration with the members of the Korean National Assembly, CO<sub>2</sub>-removal strategies to lower the levels of major greenhouse gas emissions.

There was a total of 13 members from 10 countries in attendance: John Beardall (Australia), Zhengyu Hu (China), Put O. Ang Jr. (Hong Kong), Dinabandhu Sahoo (India), Hiroshi Kawai (Japan), Sung Min Boo (Korea), Ik Kyo Chung (Korea), Jin Ae Lee (Korea), Jin Hwan Lee (Korea), Siew-Moi Phang (Malaysia), Wendy Nelson (New Zealand), Yuwadee Peerapompisal (Thailand), and Dang Diem Hong (Vietnam).

The workshop was the preliminary inter-governmental practical meeting among Asian countries on cooperation in Asian Network for Using Algae as a CO<sub>2</sub> Sink. The program included a mini-symposium, the presentation of R&D activities in the seaweed resources and industry and issues of seaweeds as sinks of greenhouse gases. The mini-symposium, convened by Professors Siew-Moi Phang and Jin Ae Lee, host the following presentations.

Sung Min Boo, Jin Ae Lee, Jin Hwan Lee & Ik Kyo Chung : Algae and global warming - sea weed solution.

Siew-Moi Phang : Seaweed farming in Malaysia as a contribution to carbon dioxide management.

Yuwadee Peerapornpisal & Khanjanapaj Lewmanomont : CO<sub>2</sub> sink of marine and freshwater algae in Thailand.



4. Group photo of the participants in the International Symposium on Marine Algae and Global Warming. The 1st workshop of the "Asian Network for Using Algae as a CO<sub>2</sub> Sink" was held in the National Assembly Building, Seoul, Korea, during the symposium, October 16-19, 2006.

Wendy A. Nelson : New Zealand seaweed resources and their use : issues and challenges for the future.

Dinabandhu Sahoo : Role of large scale seaweed cultivation in carbon sequestration.

Dang Diem Hong & Huynh Quang Nang : Seaweed resources of Vietnam and their cultivation as sink of greenhouse gases.

Zhengyu Hu & Yonghong Bi : Advances on CO<sub>2</sub> reduction by microalgae in China.

Hiroshi Kawai : Status of macroalgal communities in Japan.

John Beardall & Slobodanka Stojkovic : Algal performance and population in an increasing CO<sub>2</sub> world.

A six-meeting agenda for the discussion of future collaborative activities of the Asian Network for using Algae as a CO<sub>2</sub> sink, under the UNFCCC, was adopted. The tasks to be accomplished were; (1) formulation of the Working Group, (2) identification of gaps in the algae as a CO<sub>2</sub> sink research areas, (3) development of a database for the use of algae as a Clean Development Mechanism (CDM) in the respective nations, (4) formulation of a bilateral research proposal, (5) monitoring of the progress, and (6) convening of follow-up meetings. The members agreed to convene the follow-up meetings of the Working Group in different countries, and scheduled the next meeting for Kobe, Japan, during the 19th International Seaweed Symposium.



5. The 1st meeting of the workshop was held in the Conference Hall of the Assembly building of the Korean National Assembly, Seoul. Prof. Jin Ae Lee, the secretary of the network, informed the Working Group members that official permission was successfully granted in June 2006 by the Ministry of Marine Affairs and Fisheries, Korea, for the “Asian Network for Using Algae as a CO<sub>2</sub> Sink” program.

6. The meeting for the formulation of the 2006-2007 work plan of the Working Group of the network was held in the Hotel Holiday Inn, Seoul, Korea on October 18, 2006.

7. Group photo of the Working Group members of the “Asian Network for Using Algae as a CO<sub>2</sub> Sink” in front of the Korean National Assembly at the 1st workshop.

## *2nd Workshop of the Working Group for the Asian Network for Using Algae as a CO<sub>2</sub> Sink*

The 2nd workshop of the working group was convened as a special session of the 19th International Seaweed Symposium (March 26 ~ 31, 2007), at the Kobe International Conference Center. The program included two mini-symposia, convened by Professors Sung Min Boo and Jin Ae Lee, and two sessions of meeting as well. Professor Ik Kyo Chung, the principal investigator of the research project, “Algae and Global Warming” (AGW), Ministry of Marine Affairs and Fisheries, Korea, gave a presentation on ‘Algae and global warming: the Seaweed solution.’

A total of 15 members from 11 countries were in attendance: Song Quin (China), Put O. Ang Jr. (Hong Kong), Dinabandhu Sahoo (India), Gravo

S. Gerung (Indonesia, new), Hiroshi Kawai (Japan), Sung Min Boo (Korea), Ik Kyo Chung (Korea), Jin Ae Lee (Korea), Jin Hwan Lee (Korea), Siew-Moi Phang (Malaysia), Charles Santhanaju Vairappan (Malaysia), Wendy Nelson (New Zealand), Danilo Largo (the Philippines), Anong Chirapart (Thailand), and Dang Diem Hong (Vietnam).

The first item of the workshop agenda was reviewing and endorsing the Meeting Report of the 1st Workshop on the Asian Network for Using Algae as a CO<sub>2</sub> Sink. The rest were followed, the most significant tasks being the identification of the gaps, formulation of bilateral research proposals and the development of a database.



8. The 2nd Workshop of the “Asian Network for Using Algae as a CO<sub>2</sub> Sink” was convened in the Kobe International Conference Center, Kobe, Japan, during the 19th International Seaweed Symposium, March 26-31, 2007.

9. Sessions of mini-symposia on “Reduction of CO<sub>2</sub> Using Seaweeds” were co-convened by Prof. Jin Ae Lee and Prof. Sung Min Boo during the 2nd workshop. Prof. Ik Kyo Chung, the principal investigator of the “Algae and Global Warming” project, the Ministry of Marine Affairs and Fisheries, Korea, presented a report entitled “Algae and global warming - seaweed solution”.

10. Dr. Wendy A. Nelson suggested an idea for an international investment opportunities fund proposal on the impacts of commercial kelp farms on atmospheric composition. The research would have international collaborative potential involving researchers from New Zealand, Korea, and other countries.

11. Group photo of the members of the “Asian Network for Using Algae as a CO<sub>2</sub> Sink” at the 2nd Workshop in Kobe.

## **WHAT IS TO BE DONE**

*The followings are the list of the tasks to be performed by the Asian Network for Using Algae as a CO<sub>2</sub> Sink in the near future. They are made up with the discussion at the network workshops on the identification of gaps in the algae as a CO<sub>2</sub> sink research areas.*

### **PUBLICATIONS**

1. A comprehensive summary and critical analysis of the magnitude of current CO<sub>2</sub> sequestration by seaweeds and how this compares with current emissions is required.
2. CO<sub>2</sub> budget of the seas: removal/sequestration of carbon through algal photosynthesis or the CO<sub>2</sub> absorption capacity of various algal species, including an estimate of the carbon uptake rates by coral-associated algae
3. Comparison of CO<sub>2</sub> sequestration by algae with CO<sub>2</sub> sequestration by land forest
4. Baseline information on atmospheric CO<sub>2</sub> levels on a regional/country basis

### **NETWORK ACTIVITIES**

1. Working Group members encourage their government agencies and algal industries to promote policies that are effective in pollution abatement as well as environmentally sound.
2. Working Group members and their respective governments should take initiatives on the potential use of algae to stabilize CO<sub>2</sub> levels by 2012, as recommended by the Kyoto Protocol.
3. A database on the various aspects of carbon sequestration using algae should be developed and made accessible to the various members.
4. Regular international meetings and workshops will be convened to discuss the importance of algae as natural CO<sub>2</sub> scavengers and to promote a scientific program for capacity-building and international cooperation.
5. Regular reports and proceedings will be prepared by the WG of the Asian Network for using Algae as a CO<sub>2</sub> Sink.
6. The number of participating member countries of the Asian Network for Using Algae as a CO<sub>2</sub> Sink will be expanded.

### **RESEARCH & DEVELOPMENTS**

1. Appraisal of the achievable growth rates of a wider range of algal species in order to identify the species of high CO<sub>2</sub>-sink potential
2. Survey and exploitation of algae in a wider range of species that show a high CO<sub>2</sub>-sequestration potential
3. Determination of algal performance according to critical environmental factors in global warming such as CO<sub>2</sub> availability, pH and temperature
4. Determination of the time for turnover/growth of algae to a harvestable size to predict how much sea space would be required for enhanced production
5. Appraisal of seasonal variation in growth rates of algae of high CO<sub>2</sub>-sequestration potential to determine possible temporal fluctuations in CO<sub>2</sub>-sink activity
6. Research into means of maximizing growth rates/yields, per unit area of sea surface, of algae of high CO<sub>2</sub>-sequestration potential
7. Development of an algal cultivation strategy to enhance biomass production and at the same time to maintain a sound and sustainable marine environment
8. Research to determine the best yields in fermentation/anaerobic digestion (ethanol, biogas) or lipid content (biodiesel) of algae of high CO<sub>2</sub>-sequestration potential

## ANNOUNCEMENTS

Dr. Wendy A. Nelson, a member of working group of Asian Network for Using Algae as a CO<sub>2</sub> Sink, Asian Pacific Phycological Association, suggested an idea for an international investment opportunities fund proposal. (There are funds specifically available for joint NZ/Korea research.) The purpose of this study would be to examine the impacts of commercial kelp farms on atmospheric composition, particularly to assess the potential impacts of large scale kelp farming in Korea and South-East Asia on atmospheric composition, air quality, and stratospheric ozone. The research would be an international collaboration potential involving researchers from New Zealand, Korea, and collaborators. For further information, please contact Dr. Nelson.

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Professor Song Qin will organize an International Training Workshop on Marine Biotech in Qindao, October 22 - November 4, 2007. During the workshop he may make a symposium on CO<sub>2</sub> fixation. For further information, please contact Prof. Song Qin.

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We are planning to participate the 13th session of the Conference of the Parties (COP 13) and the 3rd session of the meeting of the Parties to the Kyoto Protocol (CPM 3), which will be held in Bali, 3 to 14 December 2007, with the Working Group members for Asian Network for Using Algae as a CO<sub>2</sub> Sink of APPA. For further information, please contact Prof. Jin Ae Lee, Secretary, Asian Network for Using Algae as a CO<sub>2</sub> Sink.

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The Korean scientists of the Project “Algae and Global Warming”, Ministry of Marine Affairs and Fisheries, Korea, have focused on mapping out short-to-long-term strategies to encourage UNFCCC’s approval of seaweed CDM methodology since June 2006. The main activity plans are the followings; (1) To collect data that verifies that the seaweed mechanism is sufficiently effective as a CO<sub>2</sub> sink, (2) To figure out the mechanism of CO<sub>2</sub> removal by seaweed and other marine-organism metabolism, (3) To develop management technologies to enhance marine-environment conservation while conducting research in sustainable CO<sub>2</sub> removal by marine-life mechanism, (4) To draw up a plan to participate in CO<sub>2</sub>-removal technology sales and emissions trading in response to the enactment of Kyoto Protocol, (5) To stand together with other international parties to create a favorable environment for the approval of the methodology for seaweed CDM project activities. The Principal Investigator of the Project is Prof. Ik Kyo Chung. Anyone can contact the project by visiting the web-site <http://agw-seaweed.net> or by writing to

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