

Description of project

Biodiversity is a great gift from nature. One of the important environmental issues is to conserve biodiversity. To do so, clarifying mechanisms involved in the maintenance and promotion of biodiversity is highly important. The objective of research of this programme was to unravel the above issue from the viewpoints of ecological interaction-information networks. The programme supported the Japanese scientists (mostly early career scientists) to study in foreign institutes involved in this programme, and have a joint seminar each year. We discuss the international research networks that will last after the end of this project.

Departments and institutions involved

Center for Ecological Research Kyoto University, Japan
Graduate School of Medicine, Yamaguchi University, Japan
School of Infomatics and Science, Nagoya University, Japan
Graduate School of Life and Environmental Sciences, Tsukuba University, Japan
Institute for Biodiversity and Ecosystem Dynamics (IBED), Section Population Biology, University of Amsterdam, the Netherlands
Department of Biology, University of Western Ontario, Canada
Max Planck Institute for Chemical Ecology, Germany
Institute for Biology, Free University of Berlin, Germany
Technische Universität, Germany
Biology Department, University of Minnesota, Duluth
Department of Entomology, University of California, Davis
Department of Life Sciences and Systems Biology, University of Turin, Italy
Institute of Biology, University of Neuchatel, Switzerland
Rothamsted Research, UK
School of Biological Sciences, University of Southampton, UK

How collaboration started

By mutual agreement of the organisers, we established our JSPS Core-to-Core Programme devoted to studies on ecological interaction networks that promote biodiversity – From gene to ecosystem.

Amount of money awarded

ca 25,000,000 yen/year from JSPS.

How the matching funds were sourced

The Core-to-Core Programme related to expanding core interests, with travel funded by various appropriate travel grants.

How participants are benefitting from the scheme

An exchange programme has been established for students and early career researchers. New collaborations and research opportunities have been set up and annual meetings have taken place providing a forum for exchange of ideas.

Collaborative developments since the project started

There have been published proceedings including the *Journal of Plant Interactions*, representing joint publications.

Plans for the future

The consortium members are most keen to continue the collaboration by applying for possible funding. There is also the intention to publish a textbook in the Springer Brief Series.

Further applications to JSPS for funding or plans for this

Applications will be made for JSPS Bilateral Programmes (Joint Research Projects and Seminars).

Related Symposium

Please see below the symposium programme relating to the JSPS Core-to-Core Programme on “Studies on ecological interaction networks that promote biodiversity – From gene to ecosystem”, held at the Max Planck Institute for Chemical Ecology, Jena, Germany, on October 15-16, 2012.

JSPS Core-to-Core Program

**Studies on ecological interaction networks that
promote biodiversity
-From gene to ecosystem-**

October 15-16, 2012

Max Planck Institute for Chemical Ecology

PROGRAM

OCT. 15. 2012

9.00-9.15

Opening

Model Session (7 talks)

9.15-9.30 (15 min)

Atsushi Yamauchi¹, Maurice W. Sabelis², Minus van Baalen³ and Yutaka Kobayashi⁴
Evolutionary process of "Cry Wolf" signal: Can a constitutive signal be an honest signal?

9.30-9.45 (15 min)

Yasuhiro Suzuki, Megumi Sakai

Chemical Ecology Systems as Immune Systems - Investigation of the Evolution of SOS signal by "Cry wolf" plants

9.45-9.55 (10 min)

Megumi Sakai, Yasuhiro Suzuki

Investigation of the Evolution of Herbivore Induced Plant Volatile chemical, HIPV by "Cry wolf" plants

9.55-10.05 (10 min)

Daisuke Takahashi, Åke Brännström, Rupert Mazzucco, Atsushi Yamauchi, Ulf Dieckmann
Evolution of anti-correlated diversity in a two-community food-web model

10.05-10.15 (10 min)

Koichi Ito, Atsushi Yamauchi

The evolutionary dynamics of anti-herbivore defense level under the associational resistance

10.15-10.30 (15 min)

Katerina Stankova, Alessandro Abate, Maurice W. Sabelis

Irreversible prey diapause as an optimal strategy of a physiologically extended Lotka-Volterra predator-prey model

10.30-10.45 (15 min)

Shoko Sakai, Arndt Telschow, Sören Metelmann, Yukihiro Toquenaga

Game theoretical analysis of plant-pollinator networks reveals geographic differences between temperate and tropic communities

Coffee Break (10.45-11.15)

Plant-Plant Signaling Session (4 talks)

11.15-11.30 (15 min)

John A Pickett

New applied opportunities from plant-plant signaling demonstrating the value of biodiversity

11.30-11.45 (15 min)

Richard Karban, Kaori Shiojiri, Satomi Ishizaki, William C. Wetzel, and Richard Y. Evans
Kin Recognition Affects Plant Communication and Defense

11.45-11.55 (10 min)

Kinuyo Yoneya, Junji Takabayashi

Effects of plant-plant signaling on the composition of arthropods' community on willow plants

11.55-12.05 (10 min)

Koichi Sugimoto, Kenji Matsui², Rika Ozawa, Junji Takabayashi

Biosynthesis of (Z)-3-hexenyl glycoside in the volatile-exposed plants

Multi-trophic Interaction Session (10 talks)

12.05-12.15 (10 min)

Hiroyuki Takemoto, John Pickett, Wilf Powell, Yooichi Kainoh, and Junji Takabayashi

Variability of plant chemicals in insect-plant interactions: how do parasitic wasps cope with the variability?

12.15-12.30 (15 min)

Rika Ozawa and Gen-ichiro Arimura

Temperature-dependent tritrophic interaction consisting of bean, herbivorous mite, and predator -

12.30-12.40 (10 min)

Rika Ozawa, Hirokazu Ueda, Kazuhiko Matsuda, Tetsuo Gotoh, Junji Takabayashi

Microorganisms in two-spotted spider mites are involved in a tritrophic interaction among lima beans, spider mites and predatory mites

12.40-12.55 (15 min)

Alexandre C. Menezes-Netto, Odair A. Fernandes' Yooichi Kainoh

Olfactory response of the parasitoid *Cotesia kariyai* to host and non-host infested maize plants

Lunch Time (13.00-14.00)

14.00-14.10 (10 min)

Hojun Rim, Masayoshi Uefune, Rika Ozawa, Akio Nakano, Junji Takabayashi

Elucidating factors by which *Orius* spp. is attracted and arrested to Okra

14.10-14.25 (15 min)

Marie Alexander, Jeremy N. McNeil

The effects of wind speed and host plant volatiles on the response of male *Macrosiphum eurporbiae* (Thomas) to the female sex pheromone

14.25-14.40 (15 min)

Angela Köhler, Gaétan Glauser, Ted Turlings, and Matthias Erb

Responses of generalist and specialist insect herbivores to maize benzoxazinoid derivatives

14.40-14.55 (15 min)

Francesca Barbero, Dario Patricelli, Simona Bonelli, Luca Pietro Casacci, Christoph Crocoll, Simon A. Zebelo, Cinzia M. Berteza, Jonathan Gershenzon, Massimo E. Maffei, Jeremy A. Thomas, Emilio Balletto

Ant-induced plant volatiles reveal host presence to a myrmecophilous parasite butterfly

14.55-15.10 (15 min)

Sven Geiselhardt, Tobias Otte, Beatrice Blenn, **Monika Hilker**

Phenotypic plasticity in host plant use and its impact on speciation of herbivorous insects

15.10-15.20 (10 min)

Masayoshi Uefune¹, Soichi Kugimiya², Takeshi Shimoda³ and Junji Takabayashi¹

Starvation and herbivore-induced plant volatiles affect the color preferences of parasitic wasps

Coffee Break (15.20-15.50)

Physiology Session (6 talks)

15.50-16.05 (15 min)

Anna Nakashima, Yoko Iijima, Stephan H. von Reuss, Hiroyuki Tasaka, Koh Aoki, Daisuke Shibata, Wilhelm Boland, **Kenji Matsui***¹

MGDG with C12 and C10 oxo acids are formed after tissue disruption in Arabidopsis

16.05-16.15 (10 min)

Mugo Cynthia Nyambura, Alessandra Scala, Kenji Matsui, Junji Takabayashi, Robert C. Schuurink

Deficiency in green leaf volatiles attenuates Arabidopsis early defense response against *Pseudomonas syringae*

16.15-16.30 (15 min)

Kazuhiko Matsuda

Unraveling the mechanism of pyrethrin biosynthesis

16.30-16.40 (10 min)

Andrea Occhipinti, Irene Bricchi, Cinzia M. Berteza, Ivan A. Paponov, Massimo Maffei
Comparative dynamics of plasma membrane potential depolarization and gene expression induced by *Spodoptera littoralis*, *Myzus persicae*, and *Pseudomonas syringae* in *Arabidopsis thaliana*

16.40 -16.50 (10 min)

Carla Brillada, Masahiro Nishihara, Stefan Garms, Wilhelm Boland, Massimo E. Maffei, Gen-ichiro Arimura

***In planta* function of PITPS2 for indirect defence against herbivores**

16.50-17.05 (15 min)

Massimo E. Maffei¹, Andrea Occhipinti¹, Luca Dall'Osto², Roberto Bassi², Rika Ozawa³, Gen-Ichiro Arimura³ and Junji Takabayashi³

Biology and chlorophyll catabolism in two-spotted spider mites

17.15-

Business Meeting

Diner (19.00-21.00)

OCT. 16. 2012

Field Ecology Session (8 talks)

9.00-9.15

Takayuki Ohgushi

Ecological and evolutionary aspects of indirect interaction web

9.15-9.25 (10 min)

Claire Hafdahl

Local Adaptation of Reproductive Strategies in *Solidago altissima*

9.25-9.40 (15 min)

Timothy P. Craig, Joanne K. Itami, and Takayuki Ohgushi

Oviposition preference in lacebugs *Corythuca marmorata*: a dynamic ideal free distribution

9.40-9.50 (10 min)

Yuzu Sakata, Timothy P. Craig, Joanne K. Itami, Takayuki Ohgushi

Distribution patterns of an invasive insect *Corythuca marmorata* on *Solidago altissima* in the invasive and origin range

9.50-10.00 (10 min)

Shigeaki Hirano, Takayuki Ohgushi

Behavioral changes of herbivores influence herbivore-induced plant responses

10.00-10.10 (10 min)

Yoshino Ando

Adaptive evolution of plant defense strategy in invasion process

10.10-10.20 (10 min.)

Koya Hashimoto, Takayuki Ohgushi

Intra- and inter-specific density dependence of two butterfly species sharing same host plants

10.20-10.35 (15 min.)

Masayoshi Uefune, Junichro Abe, Satoru Urano, Kaori Shiojiri, Soichi Kugimiya, Koukichi Nagasaka, Takeshi Shimoda, Takayuki Mitsunaga, Kouta Sano, Yoshitsugu Ohara, **Junji Takabayashi**

A Biological control system using parasitoid attractants and supplemental food in greenhouses - If you build it, she will come -

10.35-10.45 (10 min.)

Yongqi Shao, Huijuan Guo, Stefan Batram & Wilhelm Boland

In vivo Pyro-SIP analysis of active gut microbiota of the cotton leafworm, *Spodoptera littoralis*

10.45-10.50

Closing

Coffee Break (10.50-11.20)

11.30-13.00

Max Plank Institute for Chemical Ecology Tour (2 groups)

Lunch time (13.00-14.00)

15.00-16.30

Jena guided tour (in English, Japanese)



Delegates participating in the JSPS Core-to-Core Programme: “Studies on ecological interaction networks that promote biodiversity – From gene to ecosystem”, Max Planck Institute for Chemical Ecology, Jena, Germany, October 15-16, 2012.