No. 33 February 2019

International Newsletter

Research Institute for Sustainable Humanosphere Kyoto University, Japan

=Foreword=

International Research Activities at RISH in 2018

Professor Hiroyuki Hashiguchi
Chair of the International Academic Exchange Committee of RISH, Kyoto University

The Research Institute for a Sustainable Humanosphere (RISH) of Kyoto University was established in 2004, and approved as a Joint Usage/Research Center to promote humanospheric science, with academic activities conducted through domestic and international collaborative research programs. International collaborations are especially important in the academic activities of RISH. Most members of RISH have been involved in multilateral collaborations with other universities or research institutes at the international level. As a preface to the international newsletter, we would like to overview our international research activities in fiscal year 2018.

RISH holds Memoranda of Understanding (MOU) with many foreign institutions. There are currently 22 MOUs, as listed in Table 1. Our counterparts are widely spread over 12 countries, in eight Asian, three European, and one North American regions. On August 28, 2018, an MOU was signed between Professor Mohammad Fayek Uzzaman, Vice Chancellor of Khulna University, Bangladesh and Professor Takashi Watanabe, Director of RISH. Khulna University is a public university in Bangladesh. We are happy to add more MOUs, as collaborations with foreign institutions cover a wide spectrum, including several research fields and a number of RISH members.

Table 2 lists scientists who visited this fiscal year. Among these professors and associate professors, Prof. Saip Nami Kartal from Istanbul University, Turkey, Dr. Bharati Kakad from Indian Institute of Geomagnetism, India, and Dr. Chuchu Chen from Nanjing Forestry University, China, kindly contributed to this international newsletter with reports on their visits to RISH.

Photo taken by all participants in signing ceremony between Khulna University and RISH

RISH sponsors many symposia and scientific meetings. In fiscal year 2018, we supported a total of 26 symposia. Of these, ten were regarded as international meetings, as shown in Table 3. Internationalization is an important keyword for Kyoto University. RISH obtained “Special funding for the international promotion of Kyoto University” from university headquarters, and used the funds to foster humanosphere science for young foreign researchers, mainly from Asian countries. The funds are used to support the 3rd Asia Research Node Symposium on Humanosphere Science (Taichung, Taiwan, September 25–27). The details of this symposium are reported in this international newsletter. The funds also allowed us to increase the number of educational lectures that are mainly intended to promote atmospheric studies in the equatorial region. We plan to offer an International School on Equatorial Atmosphere at Bandung, Indonesia, March 18–22, 2019. The international academic exchange committee of RISH continues to encourage more productive partnerships to strengthen the quality and effectiveness of research on global issues.

=International Activity Report=

The 3rd Asia Research Node Symposium on Humanosphere Science at Taichung, Taiwan

Professor Hiroyuki Hashiguchi
RISH, Kyoto University

In 2016, the Research Institute for Sustainable Humanosphere (RISH) launched a new program called the Humanosphere Asia Research Node (ARN). This program aims to strengthen its function as a hub for international collaborative research, and to foster innovation in the field of humanosphere science, with the ultimate goal of delivering solutions to global-scale problems. ARN integrates our various facilities and human networks in the ASEAN region and Japan to consolidate international collaborative research on the Sustainable Humanosphere. To further strengthen the international network and to discuss the "Present and Future of Humanosphere Science", RISH held the 3rd Asia Research Node Symposium on Humanosphere Science at National Chung Hsing University (NCHU) in Taichung, Taiwan, September 25–27, 2018. The symposium sought to share concepts and recent advances in Humanosphere Science, thereby fostering students and young researchers who will sustain and expand such science. The symposium featured 35 oral and 58 poster presentations.

At the opening ceremony of the symposium, Prof. Takashi Watanabe, Director of RISH and Prof. Chou Chi-Chung, Dean of the Office of Research and Development, NCHU, gave the opening addresses. On the first day, sessions were divided into three topics: Atmospheric Observations with MST radars; Energy Transfer and Conversion in Geospace; and, Plants for Sustainable Humanosphere—Biomass and Bioactive Compounds. An elevator speech, in which poster summaries were orally presented within one minute, closed the first day. At a banquet at the Park City Hotel Central Taichung, all participants enjoyed a delicious Taiwanese meal.

On the second day, we began with a session: Integrated Vector Management: a Strategy for Sustainable Humanosphere. Then, the poster session was conducted and many students and young researchers discussed their research results. In the afternoon, we visited Muh Sheng Museum of Entomology and Sun Moon Lake as an excursion, during which friendships among participants deepened.

The last day of the symposium consisted of four sessions: Our Footprints on the Global Environment: Threats to Ecosystem Sustainability; Wireless Power Transfer for Sustainable Electronics; Water, Carbon, and Nutrient Cycling in Forest under Climate Change; and, Atmospheric and Ionospheric Studies with New Instruments and Technology. In the closing ceremony, best student poster awards were presented to six students. The closing address was given by Prof. Hwang Shaw-Yhi, Associate Dean of College of Agriculture and Natural Resources, NCHU.

A total of 201 participants, including 140 students, attended the symposium, which was deemed a great success. With sincere gratitude to all participants and organizers, we sincerely hope that our work can further our understanding of the differences and difficulties in the world, and accelerate the formation of a Sustainable Humanosphere.

Group photo of the 3rd ARN Symposium in Taiwan


In Muh Sheng Museum of Entomology

=Overseas Visiting Scholar=

Research Activities at RISH, Kyoto University

Professor Saip Nami Kartal
Faculty of Forestry, Istanbul University Turkey

I have been to the Research Institute for Sustainable Humanosphere (RISH), Kyoto University many times since the last 16 years as a post-doctoral scientist, visiting scientist and visiting professor. It has been always a great pleasure to visit RISH and to meet well-known and distinguished researchers. My visits to Kyoto University over the years have been particularly rewarding.

In my recent visit, I collaborated with Professor Dr. Tsuyoshi Yoshimura and his colleagues and students on the issues related to the remedial treatments of wood by diffusible wood preservatives. The recent study has focused on penetration of sodium fluoride (NaF), and di-sodium octaborate tetrahydrate (DOT) preservative compounds in wood in remedial treatments by considering the effects of solution concentration, heartwood-sapwood, and conditioning duration as well as presence of copper (Cu) ions. In fact, the current study has been part of our continued collaboration with Professor Yoshimura since 2015. We have been focusing on boron-based wood preservatives as well as NaF as diffusible wood protecting chemicals. The efficacy of NaF and DOT against drywood termites is poorly documented, and the development of proper protecting and control methods against drywood termites requires a much more thorough understanding of the treatment levels to provide effective chemical loading into the wood. Obtaining threshold values for the two compounds in treated wood might be also beneficial to develop better management methods against drywood termite species. Our objective was to determine the minimum amount of chemical compound needed to arrest drywood termite attack in these chemical control methods. The outcome of this study has been already accepted (*Performance of fluoride and boron compounds against drywood and subterranean termites and decay and mold fungi*) as a scientific paper to be published in Journal of Forestry Research.

During my stay, we also submitted a research paper to an international journal focusing on the use of ulexite and colemanite boron minerals as remedial treatments in sugi sapwood and heartwood specimens (*Movement of boron from ulexite and colemanite minerals in sapwood and heartwood of Cryptomeria japonica* - Journal of Forestry Research) which has been recently accepted for publication. The study relied on non-purified boron minerals to cut the costs of production of commercial boron compounds such as DOT. In the study, ulexite and colemanite minerals without further purification processes were packed into the holes in wood specimens, and the diffusion of the boron element in/from wood specimens was determined.

In the recent study, we have studied the effect of Cu ions on boron and fluoride penetration in sap and heartwood portions of sugi wood. Diffusible chemicals are generally selected for remedial treatments of buildings and wooden materials since these types of chemicals move slowly through water within the wood and do not fixed in the wood. As diffusible compounds, boron has long been used in dip/diffusion processes for treatment of building framing to prevent beetle attack, while fluoride has been used to treat wooden windows and doorframes. Due to its high efficacy against decay fungi, NaF has become an important wood-protecting chemical in initial and remedial treatments since it diffuses via free water through refractory wood species. Fluoride and boron are not strongly fixed to the wood, they remain at protective levels for many years following surface or dipping applications. Copper, on the other and, can diffuse into wet wood; although the degree of diffusion is more limited than that found with fluoride and boron. While Cu is not strongly reactive with the wood, a certain percentage does react with the wood to become “fixed”. Over time, however, this component would be

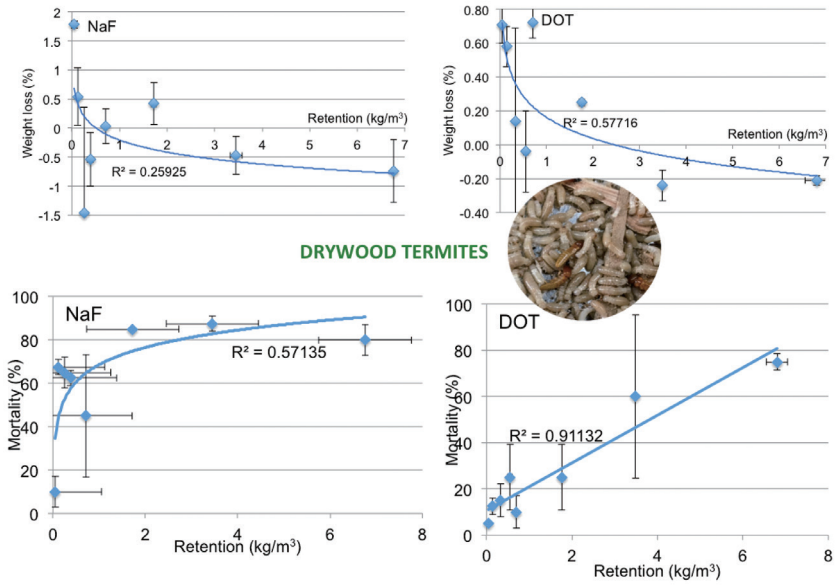


Fig. 1 Efficacy of DOT and NaF against drywood termites

expected to diffuse from the wood under high moisture regimes.

During rather hot July and August months, I visited some famous shrines and temples in Kyoto once again. I also found a chance to visit the cities of Nara, Kobe and Osaka as my favorite places after Kyoto. My recent stay at RISH again this year has been one of the most precious professional periods for me. The kindness of Professor Dr. Tsuyoshi Yoshimura and all other members of RISH, the focus on wood-related research and the peaceful surroundings in Kyoto made my stay unforgettable. I would like to extend my sincerest thanks to my host Professor Dr. Tsuyoshi Yoshimura for his very warm hospitality during my stay. I am also thankful to Junior Associate Professor Dr. Toshimitsu Hata, Assistant Professor Dr. Aya Yanagawa, Mr. Akio Adachi, Ms. Kaori Sunagawa, Dr. Kyoko Inoue, Dr. Izumi Fujimoto, Dr. Kazuko Ono, and the graduate students of the laboratory. I look forward to continuing my collaboration with RISH, Kyoto University in coming years.

=Overseas Visiting Scholar=

Subpacket structures manifested in Ground EMIC wave observations

Associate Professor Bharati Kakad
Indian Institute of Geomagnetism, India

Earth's magnetosphere is a natural available laboratory to explore various plasma waves, and their interactions with the energetic particles. These waves are usually get generated in the boundary regions, where free energy sources are available to trigger their generation through different plasma instabilities. For example Electromagnetic ion-cyclotron (EMIC) are ultralow frequency Pc1 (0.12–5 Hz) waves generated in the equatorial region of Earth spanning broad range of L-shells (3–9R_E). EMIC waves play an important role in the loss process of energetic electrons (MeV range) in the Earth's radiation belts that implies significance of study of these waves. The signatures of EMIC waves can be seen in the ground and space based observations of magnetic field through induction coil magnetometer (ICM). Recent studies using satellite observations have reported that subpacket structures play a key role in the nonlinear wave growth of EMIC waves. In this context determining the characteristics of EMIC rising/falling tone emissions is important. After their generation in the equatorial region the EMIC waves propagate along magnetic field line to its footprint in the ionosphere and its variations can be captured by the ground ICMs as well. To understand the EMIC wave subpacket structure characteristics and effect of propagation on them, we looked into the ICM observations from Indian Antarctica station Maitri (Geographic 70.77°S, 11.75°E, Geomagnetic 63.11°S, 53.59°E, L=5). We thoroughly investigated the subpacket structure characteristics in the ground observations of the EMIC wave. Six quiet time EMIC wave events during 2015–2016 were analyzed and their details were compiled. The frequency spectrogram for these events are shown in Figure 1. Based on their frequency extent in the power spectrum these events are considered to be associated with proton or helium band EMIC. The EMIC rising tone repetitive periods were found to be 1.9–6.7 minutes. Our analysis suggests that the amplitude-frequency dependence of EMIC subpacket structures is less significantly affected during their prorogation to the ground. Overall, it is found that more than 70% of the time the EMIC waves are right-handed elliptical polarized. The important finding is that the duration of the subpacket structure is found to be directly proportional to the EMIC wave amplitude. These observed characteristics and tendencies followed by EMIC wave subpacket structures on the ground were examined in the light of existing nonlinear wave theory and they are in good agreement. Such studies are important to understand the effect of propagation on the EMIC subpacket structures, and to explore

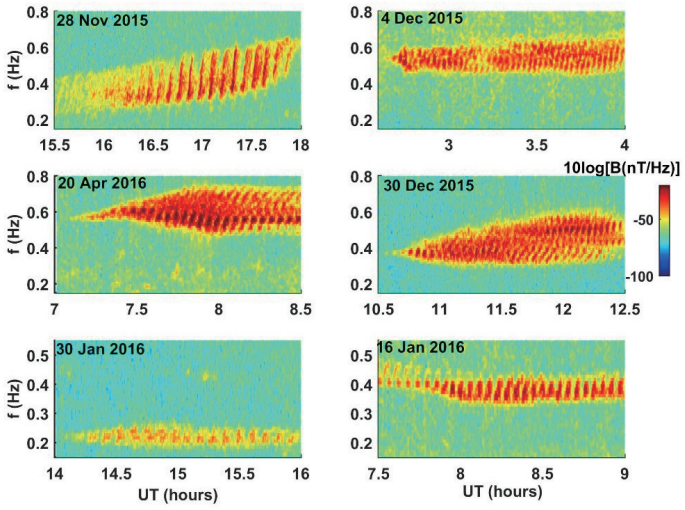


Fig. 1 Shows the frequency spectrogram of total magnetic field recorder by ICM at Maitri for six quiet days. The presence of discrete rising tome emissions of EMIC waves are clearly seen.

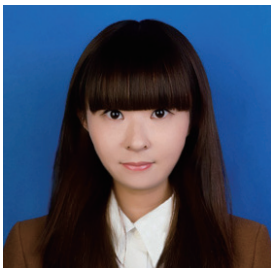
the possibility of usage of ground observations to probe the source region ambient parameters. This work is published in Journal of Geophysical research (space physics) during October 2018.

Our institute, Indian Institute of Geomagnetism, operates ICM experiment at Indian Antarctic station Maitri since 2011, however these datasets were not explored particularly to examine the low frequency EMIC waves. We have a long association with prof. Yoshiharu Omura, RISH, Kyoto University, Japan and during his visit to India we started exploring these observations. I am extremely grateful to RISH, Kyoto University to provide me an opportunity to work as a visiting scientist during October-December 2017. This visit was extremely useful for me. Particularly, I want to thank Prof. Yoshiharu Omura for his constant support and guidance. The discussions with him are always the source of motivation and made me think deeper to understand the underlying physics. My stay was extremely comfortable with cooperative, pleasing, and joyous staff members and research students at RISH, Kyoto University.

=Overseas Visiting Scholar=

Research Activities at RISH on Bioinspired Chitin Nanofiber-based Hydrogels

Junior Associate Professor Chuchu Chen
Nanjing Forestry University, China



My research within RISH (from June 20, 2018 to September 19, 2018) was focused on the preparation of bioinspired hydrogels based on chitin nanofibers. For the last couple of years, I have concentrated on this topic and got the kindly help from Prof. Hiroyuki Yano and Kentaro Abe since 2013, when I was a PhD student.

Hydrogels are water-swollen polymeric materials that maintain three-dimensional networks, with the ability to absorb and retain a large amount of water. However, suffering weak mechanical properties, hydrogels are generally limited to be applied as load-bearing materials. There are two major types of hydrogel, synthetic and natural, depending on their origin. Given the global focus on using natural resources, chitin-based hydrogels, which are of natural origin-chitin is the most abundant natural amino polysaccharide-are considered one of the most promising classes of materials owing to their biocompatibility and biodegradability, and being non-toxic. In the previous time (when I was a visiting PhD student and invited by Prof. Hiroyuki Yano to RISH during November 8, 2013 to November 7, 2014), we introduced methods for the fabrication of high-strength hydrogels using chitin nanofibers (ChNFs) under alkali or calcium chloride conditions. In current work, we provides an alternative approach for the preparation of quinone-crosslinked chitin nanofiber-based hydrogels using amino groups, inspired by the quinone hardening process during sclerotization of insect cuticles. Moreover, inspired by the quinone-crosslinking chemistry and the nanofiber structure (the insect cuticle can be described in general as a fiber reinforced composite material: a fibrous chitin network and a matrix composed of cuticle proteins) of the insect cuticle, we further created a cuticle-mimetic hydrogel, which was synthesized by hard reinforcing chitin nanofiber networks with soft gelatin matrix. Such quinone-crosslinking reaction provided the resulting composite hydrogels an excellent tensile strength and dark color (Fig. 1). Giving the desirable mechanical properties even with high water content, the bioinspired chitin nanofiber-based hydrogels represent a class of scaffolds for tissue engineering, such as tendon and ligament, due to the retaining of a large volume of water and thus providing a highly hydrated environment similar to that in native tissues.

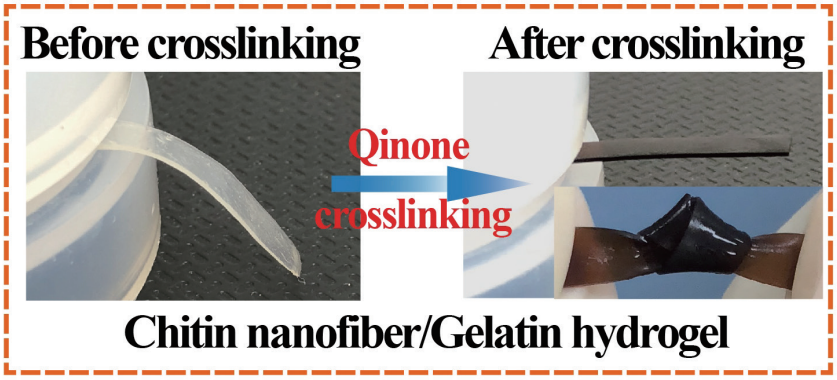


Fig.1 Hydrogels before and after quinone crosslinking reactions

Overall, during the three-month stay in RISH, I got a lot of research inspirations and experiences which was quite helpful in my academic career. Finally, I would like to thank RISH committee to provide the “Visiting Scientist” program. Then, I would like to express my sincere thanks to Dr. Kentaro Abe for his invitation, and all the members in the Lab. of Active Bio-based Materials for their kindly help during my research work and daily life. I hope that the collaboration will continue in the future years.

=RISH Mission Research Fellow=

Creation of highly specific anti-oomycetes compound by metabolic design

Dr. Takashi Kawasaki

Oomycetes include the *Phytophthora* and *Pythium* genera, which cause root spoilage and blight, serious forms of damage to terrestrial plants; *Phytophthora infestans*, an infectant of potato and tomato is a typical example. This infectant is the plant pathogen that destroyed potatoes throughout Europe in the middle of the 19th century, causing the historic potato famine in Ireland. Potatoes are a major staple crop, with around 100 million tons a year consumed worldwide. The annual damage caused by the potato infectant has reached $5 billion US. This continues to seriously damage agriculture, and is one of the problems in securing food.

In the fishery industry, disease caused by *Saprolegnia parasitica*, which occurs in fertilized eggs of salmonid fishes, is particularly serious, and has been spreading major damage in salmon and trout farming. It is also known to infect animals such as horses and dogs, and the infection can affect people as well. *Pythium insidiosum* has been reported as an example of human infection, which may become serious. It is thought that it is difficult to treat this infection with conventional antifungal agents, because oomycetes are different from fungi in cell walls, steroids in cell membranes, and so on. Therefore, there is a need for compounds that exhibit specific antimicrobial activity against oomycetes that affect agriculture, fisheries, and human health.

Saprolmycins produced by the actinomycete *Streptomyces* sp. TK 08046 strain are angucycline antibiotics showing bioactivity against the oomycete *Saprolegnia parasitica*. In particular, saprolmycin E shows anti-*Saprolegnia parasitica* activity at a very low concentration of 0.0078 μg / ml, which is the minimum inhibitory concentration (MIC) for *Saprolegnia parasitica*, and it acts specifically. Regarding this specific action, the correlation between the structure and activity of saprolmycins suggests that two structures of rare sugar aculose are required. Therefore, we identified genes that transfer the aculose of rare sugar in saprolmycin biosynthesis, and are currently conducting research aimed at creating new specific anti-oomycete compounds with the addition of aculose using the gene.

To date, in order to investigate the function of the glycosyltransferase gene involved in the biosynthesis of saprolmycin, we have created strains that disrupted each of the three putative glycosyltransferase genes involved in the biosynthesis of saprolmycin using *Streptomyces lividans* TK23 strain (heterologous actinomycete host), into which a saprolmycin biosynthetic gene cluster was introduced. We are analyzing the functions of three glycosyltransferase genes by HPLC and LC-MS analysis of the angucycline metabolites accumulated by the gene-disrupted strains.

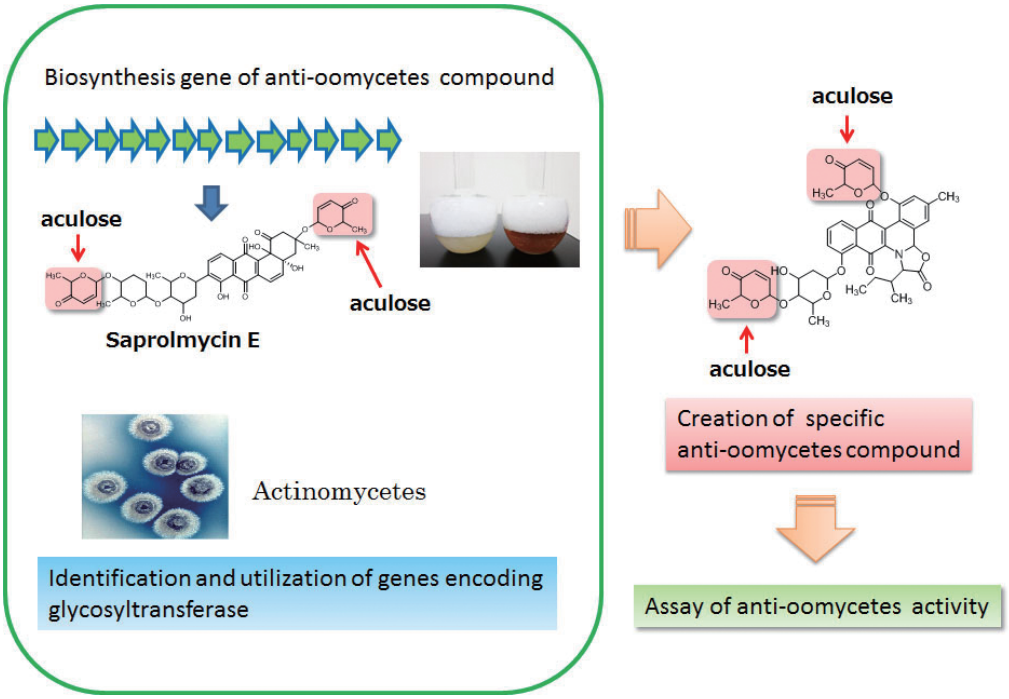


Fig. 1 Creation of highly specific anti-oomycetes compound

=RISH Mission Research Fellow=

The interrelationship between *Citrus exocortis viroid* and *Hop stunt viroid* in citrus plant

Dr. Chun-Yi Lin

Viroids, which are small, circular, single-stranded noncoding RNAs, are the smallest known agents infecting a broad range of plants. With a tiny genome size (246–401 nt) and simple structure, viroids do not encode proteins and must depend on host-encoded factors and enzymes for replication. In Taiwan, *Citrus exocortis viroid* (CEVd) and *Hop stunt viroid* (HSVd) are commonly found simultaneously infecting different citrus cultivars. A crucial question to be addressed is how accumulations of these two viroids affect each other in an infected plant. Here, I investigated the relationship between the two viroids at macroscopic and microscopic levels. The objectives were to assess the titer relationship of two viroids in a mixed infection, and to investigate corresponding viroid distribution patterns and population changes in the host.

CEVd and HSVd titers were examined using real-time RT-PCR in 17 plants of two citrus cultivars (blood orange and Murcott mandarin) every 3 months (spring, summer, fall and winter) for three years. Three nonparametric tests (the Spearman's rank correlation coefficient, Kendall rank correlation coefficient, and Hoeffding's inequality) were performed to test the correlation between CEVd and HSVd. Cellular and subcellular localizations of the two viroids were detected by digoxigenin- and colloidal gold-labeled *in situ* hybridization using light and transmission electron microscopy.

The two viroids were unevenly distributed in four different types of citrus tissues (rootstock bark, roots, twig bark and leaves). Compared with blood orange, Murcott mandarin was generally more susceptible to CEVd and HSVd infection. Both viroids replicated and preferentially accumulated in the underground tissues of the two citrus cultivars. Relative to concentrations under single-infection conditions, the CEVd population significantly increased under double infection during half of the 12 monitored seasons; in contrast, the population of HSVd significantly increased under double infection during only one season. At the cellular/subcellular levels, the two viroids showed similar localization patterns in four tissues and the cells of these tissues in the two citrus cultivars.

My findings of titer enhancement, similar localization, and lack of symptom aggravation under CEVd and HSVd double infection suggested that the two viroids have a positive relationship in citrus. The combination of molecular and cellular techniques provided evidence of titer correlation and localization of co-infecting viroids in the host. These methods may thus be useful tools for exploring viroid–viroid and viroid–host interactions.

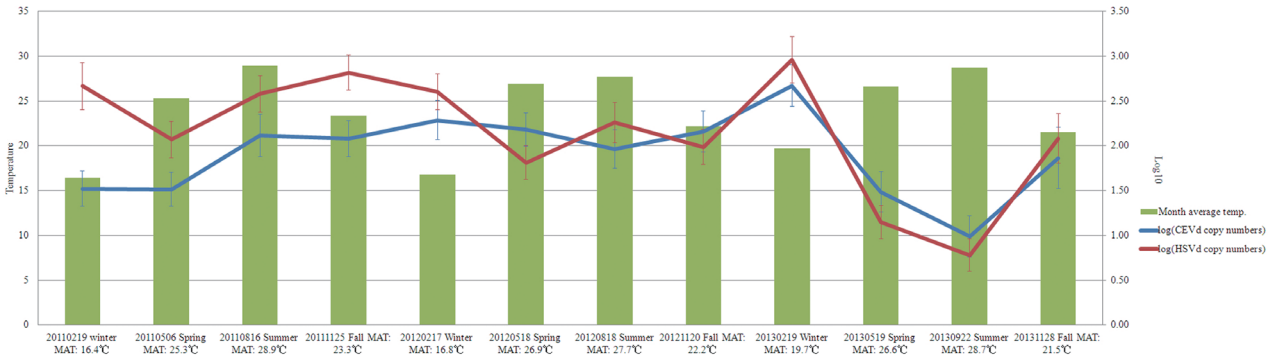


Fig. 1 Seasonal dynamics analysis of CEVd and HSVd in citrus plant

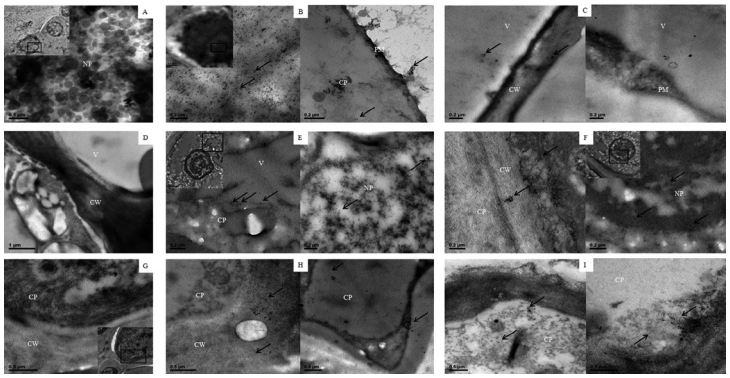


Fig. 2 Transmission electron micrographs showing subcellular localization of CEVd (10nm DIG-labeled) and HSVd (20nm biotin-labeled) in two citrus cultivars

Table1: List of International MOU in FY 2018

No.	Institution	Country
1	Nanjing Forestry University	China
2	Centre de Recherches sur les Macromolécules Végétales, Centre National de la Recherche Scientifique (CNRS)	France
3	National Institute of Aeronautics and Space of the Republic of Indonesia (LAPAN)	Indonesia
4	School of Biological Sciences, Universiti Sains Malaysia	Malaysia
5	VTT Technical Research Centre of Finland	Finland
6	Zhejiang A & F University	China
7	College of Atmospheric and Geographic Sciences, University of Oklahoma	U.S.A.
8	National Atmospheric Research Laboratory (NARL), Department of Space, Government of India	India
9	Institute of Mathematics and Informatics, Bulgarian Academy of Sciences	Bulgaria
10	Southwest Forestry University	China
11	College of Planning and Design, National Cheng Kung University	Taiwan
12	Faculty of Forestry, Tanjungpura University	Indonesia
13	Research Center for Biomaterials, Indonesian Institute of Sciences (LIPI)	Indonesia
14	Faculty of Science, Chulalongkorn University	Thailand
15	University of Riau	Indonesia
16	College of Forest and Environmental Sciences, Kangwon National University	Korea
17	Faculty of Civil Engineering and Planning, Islamic University of Indonesia	Indonesia
18	Material Science and Engineering College, Northeast Forestry University	China
19	Faculty of Mathematics and Natural Sciences, Andalas University	Indonesia
20	Indian Institute of Geomagnetism (IIG)	India
21	National Chung Hsing University	Taiwan
22	Khulna University	Bangladesh

Table2: Visiting Professor of RISH in FY 2018

	Name and Affiliation	Research Titles	Period
1	Danny Summers (Professor, Department of Mathematics & Statistics, Memorial University of Newfoundland, Canada)	Nonlinear wave growth effects on radiation belt particle fluxes	1 January 2018 – 30 June 2018
2	Laigeng Li (Professor, Institute of Plant Physiology and Ecology, Chinese Academy of Sciences, China)	Metabolic engineering of lignocellulose biosynthesis towards sustainable biomass production	1 February 2018 – 30 April 2018
3	Vishnu Thonglek (Assistant Professor, Faculty of Engineering Rajamangala University of Technology Lanna, Thailand)	Theoretical research of micro/nano bubbles for agricultural applications	1 March 2018 – 31 May 2018
4	Miroslav Horký (Assistant Professor, Department of Space Physics, Institute of Atmospheric Physics, Czech Academy of Sciences, Czech Republic)	Computer simulation of electromagnetic wave radiation from the plasmasphere	1 June 2018 – 31 August 2018
5	Chuchu Chen (Junior Associate Professor, College of Materials Science and Engineering, Nanjing Forestry University, China)	Gelation of Surface-deacetylated Chitin Nanofibers by Quinone Crosslinking Reaction	20 June 2018 – 20 September 2018
6	Hubert Luce (Associate Professor, Mediterranean Institute of Oceanography, University of Toulon, France)	Further investigations on atmospheric turbulence from data collected during the ShUREX and EAR campaigns (2015–2017)	15 July 2018 – 15 November 2018
7	Saip Nami Kartal (Professor, Faculty of Forestry, Istanbul University, Turkey)	Penetration of NaF, DOT and CuO in wood in remedial treatments: Effects of solution concentration, dipping time, heartwood-sapwood, wood species and conditioning duration	23 July 2018 – 23 October 2018
8	Bharati Kakad (Associate Professor, Indian Institute of Geomagnetism, India)	Investigation of electromagnetic ion cyclotron wave characteristics for understanding the particle dynamics in Earth's Radiation belts	1 November 2018 – 31 March 2019
9	Supachok Tanpichai (Junior Associate Professor, King Mongkut's University of Technology, Thailand)	Preparation of anti-bacterial paper with chitin nanofibers	15 January 2019 – 14 July 2019

Table3: International Symposium and School in FY2018

Theme	Place	Period
International Symposium on Utilization of Agricultural Residue (377th RISH symposium)	Ānhuī, China	15–16 June 2018
The 23rd International Symposium on Plant Lipid (ISPL2018): Session "Secondary metabolic lipids" (375th RISH symposium)	Osanbashi Hall, Yokohama, Japan	9 July 2018
The 3rd Asia Research Node Symposium on Humanosphere Science (373rd RISH symposium)	National Chung Hsing University, Taiwan	25–27 September 2018
The SPARC (Stratosphere-troposphere Processes And their Role in Climate) 2018 General Assembly (383rd RISH symposium)	Miyako Messe, Kyoto, Japan	30 September – 5 October 2018
Humanosphere Science School 2018 (HSS2018) /The 8th International Symposium for Sustainable Humanosphere (384th RISH symposium)	Medan, Sumatera, Indonesia	18–19 October 2018
Producing Biomass Energy and Material through Revegetation of Deteriorated Grass Fields (The 3rd SATREPS Conference of Producing Biomass Energy and Material through Revegetation of Deteriorated Grass Fields) (376th RISH symposium)	Kebun Raya Bogor, LIPI, Indonesia	22 November 2018
The 8th International Symposium of Collaborative Researches in Fukushima since the Great East Japan Earthquake (390th RISH symposium)	Fukushima, Japan	11–12 December 2018
Wood Culture and Science 18 Current state of Wood science and Xylarium in East Asia (391st RISH symposium)	Rakuyu Kaikan, Kyoto, Japan	21 February 2019
Bioengineering of lignocellulose for clean energy production: perspectives and opportunities (397th RISH symposium)	Uji Campus, Kyoto University, Japan	27–28 February 2019
1st International School on Equatorial Atmosphere (398th RISH symposium)	Bandung, Indonesia	18–22 March 2019

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