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Part I Conference Schedule

Time: November 28 to 30, 2017

Location: International Asia-Pacific Convention Center Sanya
(三亚亚太国际会议中心暨三亚海航度假酒店), China

Date	Time	International Asia-Pacific Convention Center Sanya
Nov. 28	14:00-17:00	Registration
Date	Time	Macao Room(澳门厅)
Nov. 28	08:30-12:00	<p>Biomedical & Life Sciences & Engineering: Invited Speech Session 1: Prof. G. J. Sharma, Prof. Changwei Wang, Dr. Saddam Hussain, Prof. Siamak Shirani Bidabadi</p> <p>Chair: Prof. G.J. Sharma</p> <p>Coffee Break: 10:45-11:00</p>
	12:00	Lunch Asia Garden (亚洲缘中餐厅)
	Date	Time
Nov. 29	14:00-18:00	<p>Biomedical & Life Sciences & Engineering: Invited Speech Session 2: Prof. Takatoshi Ueno, Dr. Farzana Khan Perveen, Dr. M.S. Palaniswami, Dr. Md. Ruhul Amin, Dr. Mohsen Mohamad Ramadan</p> <p>Chair: Dr. Mohsen Mohamad Ramadan</p> <p>Coffee Break: 15:30-15:45</p>
	18:00	Dinner Asia Garden (亚洲缘中餐厅)
	Date	Time
Nov. 30	08:30-12:00	<p>Biomedical & Life Sciences & Engineering: Technical Session</p> <p>Chair: Dr. Mohsen Mohamad Ramadan</p> <p>Coffee Break: 10:45-11:00</p>
	12:00	Lunch Asia Garden (亚洲缘中餐厅)

Part II Invited Speeches

Biomedical & Life Sciences & Engineering: Invited Speech Session

Invited Speech 1: Propagation protocols and molecular profiling of *Acorus*

calamus Linn

Speaker: Prof. G.J. Sharma, Manipur University, India

Time: 08:30-09:15, Wednesday Morning, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Acorus calamus Linn. (Family: Acoraceae) commonly known as sweet flag or sweet grass is an important perennial littoral medicinal plant widely used in Indian System of Traditional Medicine since times immemorial. Four cytotypes, viz., diploid ($2n=2x=24$), triploid ($2n=3x=36$), tetraploid ($2n=4x=48$) and hexaploid ($2n=6x=72$) are found world-wide, of which, only two cytotypes, viz., diploid and triploid are found in Manipur, North-east India. Different cytotypes show great morphological variabilities and wide variations in chemical composition of essential oils in the rhizomes and leaves. These cytotypes, through literature survey, are used for their anti-spasmodic, anti-diarrhoeic, carminative, anti-helminthic, anti-depressant and CNS anxiolytic properties, as tonic, stimulant and aphrodisiac, for treating rheumatism, toothache and respiratory ailments. The aromatic oils are used for flavouring alcoholic beverages and as fragrances in perfumes and sacred oils. The crude extract can prevent acrylamide-induced limb paralysis, decreased glutathione content and glutathione transferase activity, and increased dopamine receptor in corpus striatum, possess anti-oxidant properties, prevent noise stress-induced changes in rat brain and significant hypolipidemic activities. Bioactive compounds present in *Acorus calamus* are acorin, α - and β -asarone, asaryldehyde, caryophyllene, isoasarone, methyl isoeugenol and safrol. Of the major components present in the essential oil, the content of β -asarone varies with ploidy level. Triploid accessions investigated from Manipur contain 7-7.85% β -asarone as against 73-88% in tetraploid accessions from other parts of India. Since the diploid cytotype is characterized by the absence of β -asarone which has known toxic effect and can cause chromosomal aberration, mutation and various types of cancer, it has attracted considerable interest in pharmaceutical industry. Traditional Chinese prescriptions suggest that *Acorus calamus* extracts possess beneficial effects on memory disorder, learning performance and anti-aging effect.

We have studied diploid ($2n=24$) and triploid ($2n=36$) cytotypes, and developed clonal propagation protocols using dual-phase culture system, and also produced microrhizome technology as potential propagation strategies which have great relevance in meeting conservational agenda as well as sustainable developmental priorities. *Acorus calamus* accessions across 19 different populations have been investigated on the basis of ploidy level. Randomly amplified polymorphic DNA

(RAPD) and inter specific sequence repeat (ISSR) molecular markers have been employed for revealing genetic variability of the species. Amplification of genomic DNAs using 32 primers yielded 238 bands of which 84 bands are polymorphic revealing 35.3% polymorphism. The average polymorphic information content obtained are 0.19 and 0.22 respectively. Marker index (RAPD 0.078; ISSR 0.106) and resolving powers (RAPD 0.22; ISSR 0.26) indicated that ISSR markers are more efficient than RAPD markers. Similarity matrix has been used to construct dendrogram based on UPGMA analysis and grouped accessions into two clusters. The dendrogram clusters the accessions as per the ploidy level. Some of these interesting insights shall be presented in detail.

Invited Speech 2: Cultivation and Medicinal Application of Mairei Yew (*Taxus wallichiana* Zucc var *mairei*)

Speaker: Dr. Changwei Wang, State University of New York, USA

Time: 09:15-10:00, Wednesday Morning, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

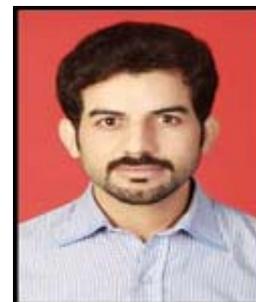
Taxus wallichiana Zucc var *mairei*, the fastest growing variants of genus *Taxus*, is endemic to China and now widely cultivated for both ornamental and medicinal purposes. Although it was used as herbal medicine in history to treat ailments like gastrointestinal disorders, respiratory problems and skeletal system disorders, yew tree was seriously in need only after taxol was released as a blockbuster anticancer drug in 1992. It has been so heavily exploited due to high demand for paclitaxel that Mairei Yew was listed as the first grade protected precious species in China. While persistent over-harvesting of the wild population has resulted in serious environmental problems, various efforts in commercial production of taxoids have been unsuccessful. It has, therefore, been widely accepted that large-scale cultivation of the plants offers the most practical approach to commercial production of taxoids via semi-synthesis. Therefore, Mairei Yew was heavily invested and cultivated in southeastern China, particularly in Fujian and Jiangsu provinces. Since the contents of taxanes in yew tree are significantly affected by various factors such as species, environment, season, age, tissue, storage and some chemical reagents, to increase the levels of valuable taxanes we have carried substantial amount of large-scale experiments in industry. It was found that the selection of elite clones, pretreatment with certain hormones and drying method of raw biomass are critical for the production. Now although paclitaxel and docetaxel have been extensively used in clinic for more than 20 years, active investigations for their clinical applications, particularly new formulation and combination therapy, are still ongoing and very promising due to the limits of immunotherapy. And their manufacturing and clinical use have been consistently activating the generic drug market, especially in developing countries such as China and India. The 2016 annual revenue of paclitaxel is still the No. 1 in the Chinese domestic market of anticancer drugs. Moreover, historically yew has been an important ornamental tree, especially in the west. Thus, the cultivation study of yew is extremely important for both pharmaceutical industry and horticulture.

Invited Speech 3: Rice seed priming modulated the leaf oxidative status and antioxidant responses under limited moisture and nutrient supply

Speaker: Dr. Saddam Hussain, Department of Agronomy, University of Agriculture, Pakistan

Time: 10:00-10:45, Wednesday Morning, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

With increasing frequency and episodes of extreme climatic events, the crop plants are sometimes exposed to multiple abiotic stress factors at the same growth stage. In the present study, we investigated the behavior of growth, reactive oxygen species and antioxidant defense system in primed (60 μ M selenium or 100 mg L⁻¹ salicylic acid priming) and non-primed rice seedlings to the combinations of drought stress and N-, P- or K-deprivation. Results indicated that drought stress as well as deprivation of any mineral nutrient severely hampered the seedling growth of rice. The N-deprivation alone or in combination with drought stress caused the maximum reduction in shoot length and biomass accumulation, although the N-deprived roots were longer. The beneficial effects of seed priming on shoot and root growth of rice were well indicated under drought stress and different nutrient management regimes. Drought as well as nutrient deprivation caused pronounced changes in the oxidative metabolism of rice leaves. The marked increase in the accumulation of ROS ($O_2^{\bullet-}$, $OH^{\bullet-}$, H_2O_2) and activities of ROS-producing enzymes under the individual as well as interactive effect of drought and N-, P-, or K-deprivation, led to higher lipid peroxidation. The interaction of drought stress and N-deprivation caused the maximum oxidative damage, and recorded poor antioxidant activity, suggesting that N-supply is more crucial under drought stress. The N-deprivation also significantly decreased the levels of non-enzymatic antioxidants (GSH, Vc, Ve), which are crucial for the drought tolerance of plants. The oxidative stress evoked by drought or/and nutrient deprivation, was effectively alleviated after seed priming. The leaves of rice seedlings emerged from primed seeds, recorded significantly lower accumulation of ROS and MDA, and lower activities of MAO and XOD. These attributes were well linked to priming-induced enhancements in the activities/levels of SOD, POD, GR, GPX, GSH and Vc in the rice leaves.

Invited Speech 4: Arbuscular mycorrhizal fungus inoculation improves photosynthetic efficiency and antioxidant responses of *Stevia rebaudiana* (Bert.) under salt stress

Speaker: Prof. Siamak Shirani Bidabadi, Isfahan University of Technology, Iran

Time: 11:00-11:45, Wednesday Morning, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Salinity as one of the important environmental factors limiting the productivity of crops is spreading in the arable lands day by day. A wide range of adaptations and mitigation strategies associated with efficient resource management and crop improvement has been used to overcome salinity stress. However, such strategies being long drawn and cost intensive, there is a need to develop simple and low cost biological methods for salinity stress management, which can be used on a short term basis. To investigate the possible role of arbuscular mycorrhizal fungi (AMF) in alleviating the negative effects of salinity on *Stevia rebaudiana* (Bert.), the regenerated plantlets in tissue culture was transferred to pots in greenhouse and inoculated with *Glomus intraradices*. Salinity caused a significant decrease in chlorophyll content and photosynthesis efficiency. The use of AMF in salt –affected plants resulted in improved all above mentioned characteristics. Malondialdehyde (MDA) contents increased in salt stressed plants while a reduction was observed due to AMF inoculation. CAT activity showed a significant increase up to 2 g/l and then followed by decline at 5 g/l NaCl in both AMF and non-AMF treated stevia, however, AMF inoculated plants maintained lower CAT activity at all salinity levels (2 and 5 g/l). Enhanced POX activities in salt- treated stevia plants were decreased by inoculation of plants with AMF. The addition of NaCl to stevia plants also resulted in an enhanced activity of SOD whilst, AMF plants maintained higher SOD activity at all salinity levels than those of non-AMF inoculated plants. AMF inoculation was capable of alleviating the damage caused by salinity on stevia plants by reducing oxidative stress and improving photosynthesis efficiency.

Invited Speech 5: Biodiversity, Farming-practice and Bio-indicator in Rice

Paddies

Speaker: Prof. Takatoshi Ueno, Institute of Biological Control, Faculty of Agriculture Kyushu University, Japan

Time: 14:00-14:45, Wednesday afternoon, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

I will present two lines of research that focuses on the relationship between functional biodiversity and farming practice in rice paddies; (1) revealing factors affecting functional biodiversity in paddy fields and (2) selecting bio-indicators reflecting both biodiversity and environmentally benign agricultural practices. Although biodiversity in cultivated land is generally poor, rice paddies in Asia sustain a relatively high level of biodiversity. Practicing environmentally friendly agriculture should enhance biodiversity. As the result, a high level of functional biodiversity, e.g., diversity of natural enemies of pest, will emerge, leading to the reduction of the pest populations or the risk of pest outbreak. By revealing factors affecting functional biodiversity in rice paddies, approaches to enhance the biodiversity will be discussed. Species diversity of natural enemies is often difficult to study because species identification is difficult and because hard work is required; by exploring index species or bio-indicators that reflect functional biodiversity, assessment of functional biodiversity can be an easier task. I will also discuss the usefulness of natural enemies like insect parasitoids and predators as bio-indicators in rice paddies and the perspectives for assessing and valuing environmentally benign practices in rice paddies.

Invited Speech 6: Lepidoptera

Speaker: Dr. Farzana Khan Perveen, Department of Zoology, Shaheed Benazir Bhutto University, Pakistan

Time: 14:45-15:30, Wednesday afternoon, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

The word Lepidoptera comes from the Latin word, equivalent to “lepid-” and from the ancient Greek words “lepis” and “pteron” mean scales and wings, respectively. Therefore, it stands for insects with scaly wings. It is the 2nd largest and diverse order in the class Insecta of Phylum Arthropoda. It is the most widespread and widely recognized insect’s orders in the world. Linnaeus (Karl von Linné, 1707-1778) divides it into 3 groups: 1) butterflies; 2) skippers; 3) micro- and macro-moths. It consists of 126 families and 46 super-families; however,

super-family is a taxonomic unit for grouping of genus. Moreover, the genus is taxonomic unit for related species. They can be differentiated base on visible morphological characters, scientific anatomical features and some behavioral ecological qualities. Further, 500,250 species of Lepidoptera are described, with 70,820 species of butterflies and 3,700 species of skippers globally. Furthermore, about 165,000 species of moths, including micro- and macro-moths are found up to now. In the United States of America (USA), ca 11,000 species of moths are found, although, in Pakistan, more than 5,000 species of insects including 400 species of butterflies and moths are reported. In nature, Lepidoptera regard as the symbol of beauty and grace. They are very beautiful creatures of nature. Diversity of colors and patterns on the wings of butterflies has caught the attention of evolutionary biologists. Their bright colors, marvelous shapes and graceful flight give pleasure to everyone. The scales cover their bodies, wings and proboscis. Sometime, they are modified into flattened hairs. Almost all species have some form of membranous wings. Except for a few that have reduced wings or are wingless forms. In several Lepidoptera, a period of suspended development, i.e., diapause is prolonged or extended, last more than a year. They are beneficial and harmful with great aesthetic and commercial values, and are subject for ecological significance. However, they are found in all environments and provide many essential and economically imperative services within terrestrial ecosystem. They act as bio-indicators, nutrients-recycling, pollinators, seed-dispersal and soil-formation. Additionally, they provide the best food-chain for natural-predators. For example, the blue tit, *Parus caeruleus* Linnaeus, 1758 (Paridae: Parinae) chicks consume 35 billion caterpillars per year in UK alone. Further, a growing pupal-industry rears them for supplying to butterfly houses across the world. Furthermore, the silkworm, *Bombyx mori* (Linnaeus, 1758) (Bombycidae: Bobycinae) has been cultured in order to provide silk. For researchers and scientists, they offer a model structure, precious to cram of biodiversity, conservation, ecology, ethnology, evolution genetics, and systematic. They open doors to establishment of chemical ecology as a scientific discipline for study research.

Invited Speech 7: MITIGATION STRATEGIES FOR SWEET POTATO

WEEVIL IN INDIA

Speaker: Dr. M.S. Palaniswami, Former PROJECT COORDINATOR, ICAR - CTCRI, INDIA

Time: 15:45-16:30, Wednesday afternoon, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Sweet potato crop is subjected to the depredation of a number of insect and non- insect pests. Among the pests that attack the crop, the most serious and ubiquitous one is *Cylas formicarius* F. (Curculionidae: Coleoptera). The origin of this weevil is reported to be India and was first recorded in 1792 from Tranquibar near Pondicherry. *C. formicarius* is a serious pest of sweet potato worldwide. Other related species like *Cylas brunneus* F., *C. puncticollis* Boh. and the West Indian weevil *Eusceps postfasiatus* De Geer, which are considered to be important elsewhere, have

so far not been recorded in India. Even though many pests are recorded on this crop, none of them will come near to the weevil in inflicting direct damage, yield loss and at times total destruction of the crop. Both adults and grubs cause damage to the crop both in field and in store. Economic damage is caused by grubs. The feeding causes a characteristic terpenoid odour and a bitter taste on cooking, thus rendering the tubers unsuitable for human consumption. Management includes cultural methods, pheromone and kairomone traps, and encouraging / augmenting parasitoids, use of entomo-pathogenic fungi and nematodes, use of organic and biotechnological approaches. The host resistance can be considered only in relative terms in sweet potato as purely resistant genotypes are not available. Cultural methods are basic needs to alleviate weevil incidence. Field sanitation is important in the management. Discarded as well as weevil infested tubers harbour weevil population and serve as inoculum for the next sweet potato crop, hence every effort should be taken to destroy material. Alternate hosts such as *Ipomoea* weeds need to be removed in and around the cropping areas. Several organic substances reported to have repellent or insecticidal action. Soil application of organic materials like *Calophyllum* cake and Mahwah cake (*Madhuka indica*) @2500 kg ha⁻¹, were found effective to reduce weevil infestation. Mulching with leaves of *Cymbopogon flexuosus*, *Clerodendron infortunatum* and *Chromolaena odorata* @3000 kg ha⁻¹ at 30 DAP at the base was found to reduce further weevil incidence by their repellent action and conservation of soil moisture. Paired rows of sweet potato and yam bean at 2:1 or alternate rows of sweet potato and yam bean or alternate rows of sweet potato and marigold effectively reduced the weevil damage. There was significant reduction in the weevil damage on sweet potato when crop rotation was adopted. There are a few naturally occurring parasitoids and pathogens recorded on different stages of weevil in India. Ecoparasitoids, *Rhaconotus menippus* Nixon and *Bracon* sp), entomopathogenic nematode *Heterorhabditis indicus* and fungus *Metarhizium anisopliae* Met. are potential biocontrol agents. Among the biotic agents, larval mortality factors contribute maximum especially parasitoids and EPN. The synthetic sex pheromone for the control of SPW was tried and Z(3)-dodecen 1-ol-E(2) butenoate pheromone attracting males was standardised. One mg was useful for mass trapping of adult weevils. Tubers attract adult weevils. Boehmeryl acetate molecule has been identified as the attractant (kairomone). Kairomone @100 mg was useful in attracting both female and male weevils. Ecologically and crop life table based Integrated weevil management with kairomone, sex pheromone, cultural methods and bio-control agents has been developed and is found to be a success against the weevil. Ecologically friendly weevil management strategies need to be propagated among sweet potato farmers worldwide as a social responsible practice in agriculture.

Invited Speech 8: CLIMATE CHANGE EFFECTS ON INSECTS: IMPLICATIONS FOR CROP PROTECTION AND FOOD SECURITY IN BANGLADESH

Speaker: Prof. Md Ruhul Amin, Bangabandhu Sheikh Mujibur Rahman
Agricultural University, Bangladesh

Time: 16:30-17:15, Wednesday afternoon, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building,
International Asia-Pacific Convention Center Sanya



Abstract

Bangladesh is a subtropical country having 160.3 million people in an area of 147570 km², surrounded by India, Myanmar and the Bay of Bengal. The country has summer monsoon from April to September and 80% of the annual rainfall is received in this time. The agriculture in Bangladesh is facing challenges due to climate change, which creates hindrance in producing cereal, fruit and vegetable crops to satisfy the nutrient requirements of the large size population in the country. The threat of climate change in Bangladesh is the fact of increasing temperature and more frequent severe drought and floods, moreover 30% yield loss is occurred in every year due to the infestation of insect and mite pests, and many of insects are the pest of crops, animals, household and stored products. Climate change causes declining the relative abundance of native insect pollinators and predators, change in biodiversity, species extinction, change in host shift and influence on the outbreaks of insect pests and their migration, and emergence of new pests or biotypes. Increased temperature and carbon dioxide due to climate change exerts in increasing problems with insect transmitted diseases. Farmers in Bangladesh are using bio-pesticides, natural enemies, resistant varieties and synthetic chemicals to mitigate the pest problems. But, the relative efficacy of many of these pest control measures is likely to change as a result of global warming. The changes of crop protection technologies incur higher expenditure and the marginal farmers fail to protect their crops timely, as a result yield losses occur and the country suffers from food security.

Invited Speech 9: Top Ten Weeds and Insect Pests Targeted for Biological Control Programs on the State of Hawaii and the Oriental Hawaii, Hainan Island

Speaker: Dr. Mohsen Mohamad Ramadan, State of Hawaii Department of Agriculture, Division of Plant Industry, Plant Pest Control Branch, USA

Time: 17:15-18:00, Wednesday afternoon, November 29, 2017

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Non-native noxious weeds and insect pests, have a huge influence on livelihoods, food production, natural ecosystems and biodiversity around the world. The introduction and release of specific natural enemies from the native regions of the pests provides a long term solution for reducing populations of invasive species and minimizes the use of chemical control. Top ten weeds and insects pests targeted for classical biological control in Hawaii and Hainan islands will be discussed with special reference to recent projects on fireweed, *Senecio madagascariensis* (Asteraceae), Erythrina gall wasp, *Quadrastichus erythrinae* (Hymenoptera: Eulophidae), and current collaboration with Hainan, Chinese Academy of Tropical Agricultural Sciences, on fruit flies, *Bactrocera* species (Diptera: Tephritidae).

Part III Technical Sessions

Biomedical & Life Sciences & Engineering: Technical Session

Session Chair: Dr. Mohsen Mohamad Ramadan

Macao Room(澳门厅)

08:30-12:00, Thursday morning, November 30, 2017

No.	Paper Title	Author	Affiliation
1-1 08:30-08:45	Model of plant productivity and a computer system for optimization of agro-technology using the method of exergetic analysis	Vilen Mudrik	Institute of Basic Biological Problems Russian Academy of Sciences
1-2 08:45-09:00	The assessment of soil quality on the arable land in Yellow River delta combined with remote sensing technology	Linlin Guo	Beijing Piesat Information Technology Co., Ltd.
1-3 09:00-09:15	Study and application of fruit bagging technology in muskmelon	Zigao Jiao	Institute of Vegetables and Flowers, Shandong Academy of Agricultural Sciences
1-4 09:15-09:30	Genome-wide identification and evolution analysis of WRKY family genes in three cucurbitaceae species (melon, cucumber, and watermelon) and assessment of the roles of CmWRKY in resisting to powdery mi	Chao Gao	Institute of Vegetables and Flowers, Shandong Academy of Agricultural Sciences
1-5 09:30-09:45	IRRIGATION OF ROMAINE LETTUCE (LACTUCA SATIVA) USING WASTEWATER TREATED BY NON-CONVENTIONAL TECHNOLOGIES	JOSE MARIA QUIROGA ALONSO	University of Cádiz
1-6 09:45-10:00	Influence of cadmium on Seed germination and physiological growth of various rice cultivars at seedling stage	Javaria Afzal	Huazhong Agriculture University
10:00-10:15	Coffee Break		
1-7 10:15-10:30	Effects of multi-frequency ultrasound pretreatment under low power density on the enzymolysis and the structure characterization of defatted wheat germ protein	Xue Yang	School of Food and Biological Engineering, Jiangsu University

1-8 10:30-10:45	Ecological suitability regionalization of Bupleuri Radix in the Hebei Province	Aipeng Liu	Hebei University of Chinese Medicine
1-9 10:45-11:00	Inhibition of metastatic activity of lung cancer A549 cells by an antibody against gicerin, a cell adhesion molecule	KOMEI AOYAMA	Kyoto Prefectural University
1-10 11:00-11:15	Recent ticks and tick-borne pathogens from animals in the Republic of Korea	Joonseok Chae	College of Veterinary Medicine, Seoul National University
1-11 11:15-11:30	Prothoracicotropic hormone signaling in Bombyx mori	Shi-Hong Gu	National Museum of Natural Science
1-12 11:30-11:45	Can ants control plant diseases?	Joachim Offenberg	Aarhus University
1-13 11:45-12:00	Characterization on Specific Characteristics of Sericin silkworm, and Physiological Genetics Analysis	Fu-sheng Chen	Institute of Sericulture, Anhui Academy of Agricultural Sciences

Part IV Abstracts

Biomedical & Life Sciences & Engineering : Technical Session

ID: IACT2017_10000

Title: Model of plant productivity and a computer system for optimization of agro-technology using the method of exergic analysis

Name: Vilen Mudrik

Affiliation: Institute of Basic Biological Problems
Russian Academy of Sciences

Email: vilenmudrik@gmail.com

Abstract:

A model of a potentially effective type of optimization of agro-technologies, based on the principle of hierarchy of synergies, and a reference computer system were established. The main feature of crop production is provided by the plants which themselves are self-organizing organisms. This allows us to adopt the principle of hierarchy of synergies as the basis of the model. The value of free energy at the input into plants, estimated by the rate of photosynthesis, is equal to the value of "radiation exergy for plant growth". Assessment of the use of radiation exergy is carried out based on the energy-transforming characteristics of plants, which were obtained in climate chambers under controlled conditions. We used the model based on the principle of hierarchy of synergies to develop common quantitative mutually agreed definitions of the main agroecological variables: Agroclimatic and meliorative potentials of lands, their fertility, and potential (maximum) productivity of plants under different environment conditions.

ID: IACT2017_10001

Title: The assessment of soil quality on the arable land in Yellow River delta combined with remote sensing technology

Name: Linlin Guo

Affiliation: Beijing Piesat Information Technology Co., Ltd.

Email: guoll@igsnr.ac.cn

Abstract:

Soil quality assessment is essential to improve the understanding of soil quality and make proper agricultural practices. However, soil quality assessments are extremely difficult to implement in a large-scale area, since they are time and labor consuming. Remote sensing technique gained more attention in plant and soil information monitoring recently for its high efficiency and convenience. But seldom studies tested the applicability of remote sensing techniques before implementing. This study conducted the soil quality assessment in a typical agricultural county in the Yellow River delta (Kenli). We found the soil quality in Kenli was dominantly in the low grade (71.85 %), with deficient nutrient (SOM and TN), poor structure (high BD) and high EC. Salinity is the primary limiting factor for soil quality in Kenli, and adjustment of soil salinization through suitable farming practices such as organic fertilizers application, irrigation for leaching, and salt-tolerant crop planting is the key point for soil quality improvement. We obtained the normalized difference vegetation index (NDVI) of the study area by remote sensing technique, and found the high correlation between NDVI and soil quality indicator (SOM, TN and EC) and yield. The NDVI can help to study the soil conditions as a soil quality assessment indicator. More studies about the application of remote sensing technique on soil quality detecting are expected.

ID: ICAH2017_10003

Title: Study and application of fruit bagging technology in muskmelon

Name: Zigao Jiao

Affiliation: Institute of Vegetables and Flowers, Shandong Academy of Agricultural Sciences

Email: zigaojiao5@163.com

Abstract:

Recently, the technology of fruit bagging has been widely applied in melon producing area of Shandong Province such as Shenxian and Shouguang with increasing requirement to the appearance of muskmelon fruit continuously. The present studies showed that the micro-environment was obviously improved during fruit developmental process through fruit bagging. Firstly, the surface temperature and air dampness of melon fruit were obviously increased. Meanwhile, the brown spot and grinding defect in fruit surface of melon were decreased. Furthermore, pesticide pollution and pest pollution were also avoided through fruit bagging technology. The surface of melon fruit with bagging was very smooth and delicate, and the pesticide residue was decreased markedly with a range of 37.2%-77.9%. The technical points of fruit bagging are as follows: Fruit bagging technology can be applied to muskmelons that were cultivated in spring, autumn and winter. White or colorless plastic bag, paper bag and double paper bag can be used. Most bags can be applied to muskmelons with yellow or white smooth surface, while plastic bags are unsuitable to muskmelons with reticular stripe in the fruit surface. Bags with a length of 35-45cm and a width of 25cm are more suitable to muskmelons and the corners at the bottom should be cut before bagging. Well-grown melons without disease are bagged when they were as big as an egg and the lanugo are completely fall off. After the bags were put in the little fruits, they should be sealed and tighten until the fruits were mature.

ID: ICAH2017_10004

Title: Genome-wide identification and evolution analysis of WRKY family genes in three cucurbitaceae species (melon, cucumber, and watermelon) and assessment of the roles of CmWRKY in resisting to powdery mi

Name: Chao Gao

Affiliation: Institute of Vegetables and Flowers, Shandong Academy of Agricultural Sciences

Email: gsuperman114@163.com

Abstract:

The WRKY proteins constitute a large family of transcription factors that are known to play a range of regulatory roles in many biological processes such as plant growth and development, signal transduction, metabolism, and various biotic and abiotic stress resistances. Over the past few years, many reports have focused on analysis of evolution and biological function of WRKY protein at the whole genome level in different plant species. However, little information is available about WRKY proteins in watermelon (*Citrullus lanatus* L.) and melon (*Cucumis melo* L.). The recent release of the draft genome sequences of watermelon and melon allowed us to perform a genome-wide investigation for watermelon and melon WRKY proteins, and to compare evolutionary relationship with their homologs in cucumber (*Cucumis sativus* L.). In the present study, a total of 56 and 55 proteins with complete WRKY domains were identified in melon and watermelon, respectively. A multiple sequence alignment and phylogenetic analysis using all predicted melon and watermelon WRKY domains, together with those from cucumber, indicated that these WRKY genes could be classified into three main groups (I-III). Besides, expression profiles of CmWRKY derived from real-time quantitative PCR analyses showed distinct expression patterns in various tissues, and the expression of 21 were altered following powdery mildew infection in melon. Our comparative genomic analysis provides a foundation for future functional dissection and understanding the evolution of WRKY genes in cucurbitaceae species and will promote powdery mildew resistance study in melon.

ID: ESAD2017_10002

Title: IRRIGATION OF ROMAINE LETTUCE (LACTUCA SATIVA) USING WASTEWATER TREATED BY NON-CONVENTIONAL TECHNOLOGIES

Name: JOSE MARIA QUIROGA ALONSO

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Abstract:

The aim of this study was to assess the capacity for reuse of wastewater treated in stabilisation ponds and subsequently reclaimed by means of different filtration systems at pilot scale.

An analysis of filtered water showed turbidity values of below 5 NTU, a total suspended solids (TSS) content of 7 mg/l, and Escherichia coli values of up to 1.6 log CFU/100 ml.

These results fall within the parameters stipulated in RD 1620/2007 Spanish Water Reuse Regulations governing the reuse of reclaimed wastewater for agricultural purposes.

The water reclaimed by means of filtration systems was used to irrigate Romaine lettuce (*Lactuca sativa longifolia*), comparing growth with that of the same variety irrigated with water from the supply network. The results showed a mean difference in lettuce growth of up to 300% in favour of the crop irrigated with reclaimed water.

ID: ESAD2017_10004

Title: Influence of cadmium on Seed germination and physiological growth of various rice cultivars at seedling stage

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Abstract:

Heavy metals contamination is one of the main reasons in reduction of plant growth. Seed emergence is an earliest physiological process in plant life cycle, seed germination is intensely sensitive to Cadmium (Cd)

stress. In the present study, we used 10 different rice cultivars, which are usually growing in Hubei, China. The germination of seeds under increasing levels of cadmium chloride (CdCl₂) (0, 50 and 100µM) in the growth medium. The application of Cd markedly decreased the seedling length, plumule, radicle length and vigour index in all cultivars. The maximum seedling length and rate of vigour index were recorded in Lu You 9803 and Qi Liang You 908. Moreover, fresh and dry mass decreased significantly with the increasing of Cd levels. While, Lu You 9803 and Qi Liang You 908 exhibited the lowest reduction in these parameters. The germination rate was significantly varied among all the cultivars under all Cd treatments, while, the seed germination rate of Guang Liang You 1298 and II Yu718 was increased at 50µM of Cd as compared to control. The cadmium concentration in seedlings were significantly ($P \leq 0.05$) different among all genotypes. The maximum uptake of Cd was recorded at 100µM of Cd in all cultivars. However, Lu You 9803 and Qi Liang You 908 accumulated lower Cd under 100 µM of Cd. In the present study, have been described the effect of Cd on early seedling growth was different among rice cultivars. The obtained results also can be used as indicator of Cd tolerance to some extent for cultivation of this species in Cd polluted sites. Moreover, the findings which is generated in the present study indicated that, Lu You 9803 and Qi Liang You 908 genotypes can survive while Wang 1298 and Wan 93 are most sensitive to Cd than the remaining genotypes. In metals polluted areas, further study is needed to examine the various levels of metals including Cd in the environment and different parts of the plants.

ID: FEB2017_10002

Title: Effects of multi-frequency ultrasound pretreatment under low power density on the enzymolysis and the structure characterization of defatted wheat germ protein

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Abstract:

Abstract: The effects of ultrasonic frequency mode, power density, pretreatment time and other parameters under low power density on the degree of hydrolysis of defatted wheat germ protein and angiotensin-I-converting enzyme inhibitory (ACE) activity of defatted wheat germ protein hydrolysate were studied in this research. Ultraviolet-visible spectra, free sulfhydryl, disulfide bond, surface hydrophobicity and hydrophobic protein content of ultrasound-pretreated protein and hydrophobic amino acid content of alcalase-hydrolysate of defatted wheat germ protein were measured under optimized ultrasonic condition. Results showed that all the ultrasonic pretreatment did not increase the degree of hydrolysis of defatted wheat germ protein significantly ($p>0.05$). The ACE inhibitory activity of defatted wheat germ protein hydrolysate presented higher ($p<0.05$) with dual-fixed ultrasonic frequency combination of 28/40 kHz compared with that of others. And all the ultrasonic frequencies or frequency combinations involving in 28 kHz showed higher ACE inhibitory activity, which indicated that 28 kHz might be a sensitive ultrasonic frequency for defatted wheat germ protein to prepare ACE inhibitory peptides. Under the dual-fixed frequency ultrasound mode of 28/40 kHz, ultrasonic power density of 60 W/L, pretreatment time of 70 min, temperature of 60°C and substrate concentration of 60 g/L, the ACE inhibitory activity of DWGP hydrolysate was the highest with its value of 74.75% (increased by 62.30% compared to control). The changes in Ultraviolet-visible spectra, free sulfhydryl, disulfide bond groups, surface

hydrophobicity and hydrophobic protein content indicated that the structure of defatted wheat germ protein unfolded after ultrasound pretreatment. The hydrophobic amino acid content of hydrolysate from the pretreated defatted wheat germ protein increased significantly ($p<0.05$). The results proved that ultrasound pretreatment loosed the protein structure and exposed more hydrophobic amino acid residues of protein to be attacked easily by alcalase. This resulted in the increase in the hydrophobic amino acid content which related to the ACE inhibitory activity.

ID: ASC2017_10003

Title: Ecological suitability regionalization of Bupleuri Radix in the Hebei Province

Name: Aipeng Liu

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Abstract:

Bupleuri Radix is identified in the 2015 edition of Chinese Pharmacopoeia as the dried root of *Bupleurum chinense* DC. or *Bupleurum scorzonerifolium* Willd.. Based upon their different characteristics, they are called “North Bupleurum” and “South Bupleurum”, respectively. Bupleuri Radix functions to reconcile exterior and interior, disperse stagnated liver qi for relieving qi stagnation, ascend yang qi, etc. Its primary active ingredients are saikosaponins and volatile oil. Saikosaponins are the standard of quality inspection as Bupleuri Radix. Modern pharmacological studies have shown that saikosaponins have various effects as a sedative, analgesic, anti-inflammatory, liver-protecting and anti-tumor factor. The pharmacological activities of saikosaponin a and d are stronger.

Bupleuri Radix is the traditional Chinese herbal medicine from the Hebei Province. *B. chinense* DC. is the main variety of Bupleuri Radix from Hebei Province, and it is also called Hardwood Bupleurum or Jin Bupleurum. Because the demand for Bupleuri Radix has increased, cultivation of Bupleuri Radix has increased in Hebei Province. However, the quality of

Bupleuri Radix is closely related to the ecological environment in which it is grown. Hebei Province is a vast territory with a complicated geography. From north to south and east to west, the terrain varies in height. The obvious regional differences are complemented by a mild climate. These environmental factors result in Bupleuri Radix cultivation being focused in Hebei Province. There are considerable differences in the quality of Bupleuri Radix produced in different areas. Therefore, we conducted a cultivation suitability analysis on the topography, climate, and soil in Hebei Province. We identified a relationship between the saikosaponin content in the plant and the environment. This study will help ensure that Bupleuri Radix cultivation occurs in the proper locations to maintain an excellent and stable plant quality.

Objective: After sampling 43 habitats from Hebei Province, we used high performance liquid chromatography (HPLC) to measure the content of saikosaponin a and saikosaponin d as indicators for quality control. This is in accordance with the 2015 edition of Chinese Pharmacopoeia. The relationship between the content of saikosaponins and the ecological environment was analyzed using a spatial analysis technique. Next, we examined the topography, climate, and soil conditions of the areas in Hebei Province where the plant is grown in order to examine the relationship between saikosaponin content and the environment in an effort to provide a basis for *B. chinense* DC. cultivation.

Methods:

1 **Sampling:** We collected 43 samples of *B. chinense* DC. from Hebei Province. The harvest date was August and September, 2016 and the harvest site was the dry root.

2 **Measurements of the content of saikosaponin a and d:** The concentrations of saikosaponin a and saikosaponin d in *B. chinense* DC. were determined by high performance liquid chromatography (HPLC).

3 **Examine the topographical, climatic, and edaphic factors for the suitability regionalization of *B. chinense* DC.:** (1) **Maximum entropy modeling:** The geographical information from 43 sampling points in

Hebei Province, the national three topographical factors data, nineteen climatic factors and eight edaphic factors were identified. Then, according to these factors, we used the maxent to calculate habitat suitability of *B. chinense* DC. (2) **Examine the topographical factors of suitability regionalization for Bupleuri Radix:** We used SPSS21.0 to perform a correlation analysis for the saikosaponin contents, altitude, slope and aspect. We used ArcGIS to regionalize Bupleuri Radix according to the suitability of topographical factors. (3) **Examine the climatic factors of suitability regionalization of Bupleuri Radix:** We used SPSS21.0 to perform a correlation and stepwise regression analysis of climatic factors. We selected the dominant climatic factors that impacted the content of saikosaponins, and analyzed the effect of the climatic factors. We used ArcGIS to regionalize Bupleuri Radix according to the suitability of climatic factors. (4) **Examine the edaphic factors for suitability regionalization of Bupleuri Radix:** We used SPSS21.0 to perform a correlation analysis for saikosaponin contents, acidity, alkalinity, soil cation exchange capacity, soil sediment concentration, soil clay content, soil subclass, available water content in the soil, soil texture classification, and organic carbon content. We analyzed the effect of these edaphic factors. We used ArcGIS to regionalize Bupleuri Radix according to the suitability of edaphic factors.

Results:

1 **Measurements of the content of saikosaponin a and d:** The content of saikosaponin a was 0.639 mg/g–2.658 mg/g. The content of saikosaponin d was 0.584 mg/g–2.482 mg/g.

2 **Determine the topographical, climatic, and edaphic factors affecting suitability regionalization of Bupleuri Radix:** (1) **Maximum entropy modeling:** We used Maxent to compute topographical, climatic, and edaphic factors separately. This was performed 1,000,000 times. We selected three topographic factors, eight climatic factors, and five edaphic factors that had the greatest effect on Bupleuri Radix habitat suitability. (2) **Determine the topographical factors of suitability regionalization for Bupleuri Radix:** When the altitude was greater than 600 m, the content of saikosaponins

was the highest. When the altitude was less than 200 m, the content of saikosaponins was the lowest. When the slope was 4.0–5.5°, the content of saikosaponins was the highest. When the slope was less than 2.5°, the content of saikosaponins was at its lowest. (3) Determine the climatic factors of suitability regionalization of Bupleuri Radix: Statistically significant climatic factors obtained after stepwise regression analysis were the wettest season average temperature and isothermal properties. When the wettest season average temperature was less than 21°C, the content of saikosaponins was the highest. When the wettest season average temperature was greater than 23°C, the content of saikosaponins was at a minimum. When the isothermal property was 30-31, the content of saikosaponins was highest. When the isothermal property was 26-27, the content of saikosaponins was at a minimum. (4) Determine the edaphic factors of suitability regionalization of Bupleuri Radix: The results showed that there was no correlation between edaphic factors and the saikosaponin content.

Conclusion:

1 This research indicates that the most suitable topographical and climatic conditions for the cultivation of Bupleuri Radix are as follows: altitude of 600 m high, slope of 4–5.5°, aspect to the sun, a wettest season average temperature of 21°C below, and an isothermal property of 30-31.

2 The most suitable areas to cultivate Bupleuri Radix were the Taihang Mountains and the Yanshan Mountains, including western Handan, Shijiazhuang, Baoding, Tangshan, Qinhuangdao, and most areas of Zhangjiakou and Chengde. In order to ensure cultivation of high-quality Bupleuri Radix, these environmental conditions should be selected for.

3 This topic examines the cultivation of Bupleuri Radix in Hebei Province in order to ensure quality production of this plant. The ecological suitability regionalization of Bupleuri Radix should be studied further in the future.

ID: CVM2017_10004

Title: Inhibition of metastatic activity of lung cancer A549 cells by an antibody against gicerin, a cell adhesion molecule

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Abstract:

Gicerin is an immunoglobulin superfamily cell adhesion molecule that plays an important role in development via its cell adhesive activities. In mature cells, the gicerin expression almost disappears in most organs, except for the muscle and endothelial cells. Interestingly, various tumor cells strongly express gicerin in their cell membranes, indicating a potential function in the development of malignancy. In the present study, we found the potential role of gicerin in the malignant progressions of human lung adenocarcinoma cells (A549). Gicerin was found to be expressed in the cell membrane of the A549 cell. In vitro cell adhesion activity of A549 was clearly promoted on gicerin proteins and gicerin positive HUVEC cells, a vascular endothelial cell line. Next, we injected A549 cells into nude mice tail vein in order to evaluate the effects of anti-gicerin antibodies in the pulmonary metastasis of A549 cells in vivo. Histopathologically, the metastasis of the A549 cells to lungs was suppressed by the administration with anti-gicerin antibodies compared with the pre-immune IgG.

ID: CVM2017_10007

Title: Recent ticks and tick-borne pathogens from animals in the Republic of Korea

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Abstract:

Along with climate change, vector-borne diseases, including tick-borne diseases, are seriously threatening livestock, wildlife and companion animals including humans in the Republic of Korea (ROK). Global warming has increasingly changed Korea's weather to a subtropical climate resulting in increased populations of wild animals in association with their ectoparasites. Warmer climate has resulted in higher populations of members of the Family Ixodidae (hard ticks). There are 6 Genera (Amblyomma, Boophilus, Dermacentor, Haemaphysalis, Ixodes and Rhipicephalus) in the Family Ixodidae, and with 35 species reported. Studies in the ROK over the past 15 years has resulted in the recognition of 3 Genera of Ixodidae (Haemaphysalis, Ixodes, Amblyomma) and 14 species (Amblyomma testudinarium, Haemaphysalis flava, H. formosensis, H. japonica, H. longicornis, H. phasiana, H. ornithophila, Ixodes granulatus, I. nipponensis, I. persulcatus, I. pomerantzevi, I. simplex, I. turdus, I. vespertilionis). A number of tick-borne pathogens, including Borrelia, Anaplasma, Ehrlichia, Rickettsia, Bartonella, Theileria, Babesia species, and severe fever with thrombocytopenia (SFTS) virus, tick-borne encephalitis (TBE) virus have been detected in ticks and animals collected from the ROK. These pathogens were also detected from companion (dog, cat and horse), domestic (cow, goat and pig) and wild (wild boar and Korean water deer) animals including humans. These pathogens are known to have vector and host-specificity, and in addition affect animal and human health. Taken together, the analysis of vectors and pathogen distributions is crucial for the development of diseased mitigation strategies, additional studies required to determine the distributions of vectors, animal and human hosts and

associated pathogens.

ID: SE2017_10006

Title: Prothoracicotropic hormone signaling in Bombyx mori

Name: Shi-Hong Gu

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Abstract:

Insect growth, molting and metamorphosis are regulated by ecdysteroids, which are synthesized and secreted by the prothoracic glands (PGs). The biosynthetic activity of the PG is stimulated by the prothoracicotropic hormone (PTTH), produced by the brain neurosecretory cells. Numerous studies have been conducted to examine the complex PTTH signaling network. PTTH activates PGs by binding to its receptor Torso, a receptor tyrosine kinase. Downstream of PTTH receptor activation, a complex signaling transduction network is activated. This network includes rapid increase of Ca²⁺, cAMP generation, and activation of protein kinase A (PKA), phospholipase C (PLC), protein kinase C (PKC), p70S6 kinase (S6K), ribosomal protein S6, and tyrosine kinase. Our recent studies further indicate that phosphoinositide 3-kinase (PI3K)/adenosine 5'-monophosphate-activated protein kinase (AMPK)/the target of rapamycin (TOR) signaling and reactive oxygen species (ROS) are involved in PTTH-stimulated ecdysteroid secretion in Bombyx mori PGs. In this presentation, we will review our current understanding on complex PTTH signaling network.

ID: SE2017_10004

Title: Can ants control plant diseases?

Name: Joachim Offenberg

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Abstract:

Ants are challenged with disease transmission and microbial hygiene due to a life in densely populated long-lived ant nests. To improve hygiene ants use different ways to reduce microbial growth. They groom their bodies with (i) antimicrobial excretions from their metapleural and poison glands, they (ii) associate with bacterial symbionts capable of producing antibiotics, or they (iv) eat microbial spores. These defenses extend beyond the individual ant, as ants may groom nest mates, food substrates or nesting material. Defenses may even extend beyond the nest and affect mutualistic partners. For example, ants in specialized myrmecophytic ant-plant interactions have been shown to reduce pathogen loads on their host plants. Here we tested if wood ants (*Formica polyctena*) used for biological control of insect pests in an apple plantation affected two fungal apple diseases. Two apple varieties were infected by brown rot (*Monilinia fructigena*) and four with apple scab (*Venturia inaequalis*). When comparing ant-trees with ant-free control trees, we found significantly more infected apples on the control

trees. According to variety, the number of apples with brown rot increased with 37 and 526 %, on control trees, whereas the number of apples with apple scab increased with 21, 47, 530 and -13 %, respectively. This is the first time the antimicrobial properties of ants are tested in an agricultural context. Further studies are needed to test its generality and applicability on a broader scale.

ID: SE2017_10005

Title: Characterization on Specific Characteristics of Sericin silkworm, and Physiological Genetics Analysis

Name: Fu-sheng Chen

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Abstract:

Sericin silkworm is a kind of gene mutant silkworm that can only synthesis and secrete sericin protein instead of fibroin protein. In this study, according to the knowledge of physiology and heredity, the reasons of this special phenomenon for the sericin silkworm were analyzed in order to explore the utilization clues in the production of natural sericin and product development.

Part V Instructions for Presentations

Oral Presentation

Devices Provided by the Conference Organizing Committee:

- Laptops (with MS-office & Adobe Reader)
- Projectors & Screen
- Laser Sticks

Materials Provided by the Presenters:

- PowerPoint or PDF files

Duration for each Presentation:

- Regular Oral Session: 10-15 Minutes for each Presentation(5 minutes for Q&A)
- Invited Speech: 40-45 Minutes (5 minutes for Q&A)

Part VI Hotel Information

About Hotel

International Asia-Pacific Convention Center Sanya is a five star standard luxury hotel, which locates beside the seashore, and is the ideal place for vacation and conference. The hotel has 254 luxury and comfortable rooms, and 16 conference rooms in different sizes. The conference rooms can accommodate people from 20-1000 and totally square 5400m2. Housing, dining, recreation facilities... everything needed is ready, Even National initiative seawater swimming pool, sea recreational centre and so on, which make you a pleasant vacation. High-speed net connectors are equipped in the houses and service of renting laptops is provided, all these give you a convenient office atmosphere while you are on vacation.

Address: No.17, Haipo tourism and economic zone, Sanya Bay, Sanya city, China

三亚市三亚湾海坡旅游经济开发区17横路

URL: www.iapccsanya.com

Tel: (86 898) 88332666

Fax: (86 898) 88332266

How to Get to the Hotel

Downtown of Sanya: 30 minutes ride

Sanya Phoenix Airport: 15 minutes ride

Sanya International Golf Club: 20 minutes ride

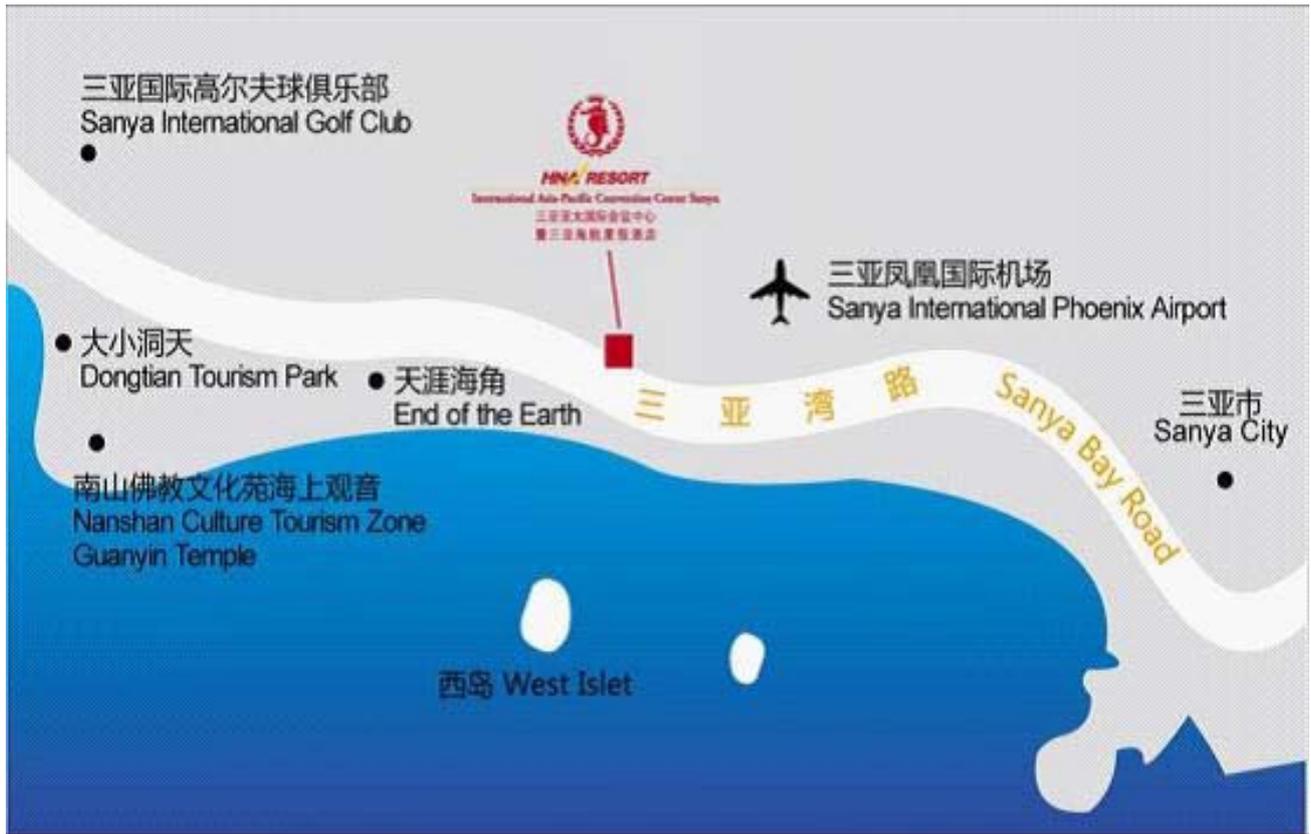
End of the Earth: 10 minutes ride

For non-Chinese author, please show the following info to the driver if you take

a taxi:

请送我到: 三亚市三亚湾海坡旅游经济开发区17横路

亚太国际会议中心暨三亚海航度假酒店



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