Keynote Forum
November 15, 2018

Plant Science 2018
Natural Medicine 2018





Joint Event
International Conference on
Plant Science
&
Natural Products, Medicinal Plants and Traditional Medicines
November 15-16, 2018 | Paris, France

DOI: 10.4066/2591-7897-C1-001

Apichart Vanavichit

Kasetsart University, Thailand

New insight into the induced mutation and the origin of genetic variation

When "Survival of the fittest" is well recognized as the key step of natural selection in evolution, the origin of genetic variation was not well understood. One of the most powerful generators of genetic variation is irradiation. Once the useful mutant is identified, new plant varieties can be readily developed via mutation breeding. New insight into induced mutation reveals patterns of natural genetic variation that were once lost. Understanding how irradiation copies natural genetic variation will pave ways to restore and broaden genetic variation.

Next-generation sequencing revealed irradiation affects genome stability and generates a high density of single nucleotide variation (SNV) of which over 80% was duplicated with spontaneous variation. By forward and reverse screening, valuable gain/lost-of-function mutants can be isolated, characterized and sequenced for functional analysis. Most of these selected mutants carried genomic changes and SNVs in duplication with those rare natural genetic variations. The hallmark is that, unlike non-functional mutations, all functional mutations are outcomes of unknown, non-random processes. It is possible that with intensive selection against instable genomic changes generated by irradiation rare genetic recombination may be fully enhanced by enabling "Survival of the fittest". Understanding how irradiation generation new genetic variation is the key to direct gene evolution towards more effective molecular breeding for cope with imminent climate changes.

Speaker Biography

Apichart Vanavichit has a M.Sc. in plant breeding and a Ph.D. in crop science. He was the lead Thai scientist in the team that sequenced the rice genome (IRGSP) with 9 other nations, and furthermore he established the Rice Gene Discovery and Rice Science Center to facilitate rice molecular breeding in Thailand. His centers have led in the discovery of genes for 2-acetyl-1-pyrroline (aromatic gene), Sub1C (flash flooding tolerance), Fe-toxic tolerance, waxy, and terpene synthase (brown planthopper resistance). Significant outcomes from his centers have established a high-through-put platform for breeding-by-pyramiding MAS to improve Thai Jasmine and low GI rice to withstand flash flooding, drought, heat, salinity, diseases and insects problems. He has pioneered a new research frontier in rice; by using fast neutron bombardment to understand how genetic variation can be induced leading to the discovery of undiscovered or novel gene functions. He is also a leader in the molecular breeding of environmentally friendly rice. His high nutrition rice which has enriched grain iron levels, a high level of antioxidants and a low glycemic index has become a new national product

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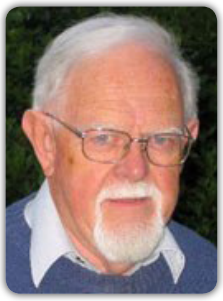
Peter J Leggo, Plant science & Natural Medicine 2018, Volume 2

DOI: 10.4066/2591-7897-C1-001



Peter J Leggo

Cambridge University, UK

The Organo-Zeolitic bio-fertilizer: A new approach to Plant Nutrition

It is now generally understood that natural porous materials that exhibit a negative surface charge adsorb metal cations, water (due to its dipole property) and other cations such as ammonium NH4+. The latter plays an important role in soil nitrification. Plant growth studies have shown that together with an organic component, either animal or plant waste, zeolitic tuff in particular can be used to great advantage as a biological plant fertilizer (bio-fertilizer). Experimental work has shown that ammonium ions produced during decomposition of the organic waste are adsorbed to the zeolite surface. On addition to the soil, the ammonium ions are back exchanged by potassium and oxidized by soil micro-organisms. Using molecular biological technology Crenarchaeota appear to be the main ammonium oxidizing organisms in the organo-zeolite-soil system. This process greatly sponsors nitrification. The high ion mobility of aqueous leachates suggests that hydrogen ions liberated by the ensuing enzyme activity ionize cations from the plant substrate providing elements in trace concentrations which are both essential and beneficial for plant growth. The organic material provides phosphorus but is not entirely clear how this element is ionized; most likely due to the activity of mycorrhizal fungi. Using activated carbon to replace zeolitic tuff in the bio-fertilizer has resulted in a growth enhancement of *Brassica napus*, within the experimental error of that grown with the organo-zeolitic bio-fertilizer. Current work with diatomite also appears to provide another alternative to the use of zeolitic tuff. The use of such alternatives will extend the range of natural materials required for the preparation of the bio-fertilizer and so avoid the over exploitation of zeolitic tuff, although world resources will be far from exhaustion in the near future.

When one considers the damage done to arable farmland due to the long and over use of chemical fertilizers it is time to use a more scientific approach and bio-fertilizers of the type described appear to be the answer to providing plant nutrition in the future.

Speaker Biography

Peter J Leggo after following an academic career in geology, ten years spent as a consultant in mineral resources. Returning to academic research in 1996 the current work on biological fertilizers was pursued. Having now retired from the Department of Earth Sciences, University of Cambridge further research in plant nutrition is conducted from a home base but still using the university laboratory facilities.

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Rosellen Roche, Plant science & Natural Medicine 2018, Volume 2
DOI: 10.4066/2591-7897-C1-001

Rosellen Roche

Heritage College of Osteopathic Medicine, USA

CAM therapies and conflict survivors: Could CAM therapies be part of Northern Ireland's recovery in mental injury from conflict

In 2000, the UK House of Lords Select Committee on Science and Technology's report on *Complementary and Alternative Medicine* indicated that the "Big 5" complementary and alternative medicine therapies, CAM therapies, including acupuncture, chiropractic, homeopathy, osteopathy and herbal medicine should work in cooperation within the UK National Health System. Following this decision, the Republic of Ireland followed suit with their own investigation of trends in CAM therapies and supporting integration of these. Northern Ireland, part of the UK, but physically located on the island of Ireland, has experienced daily violent conflict until the late 1990s and, more recently a coming-from-conflict environment in the early 2000s. Suicide, reported anxiety, and PTSD are on the rise in this recovering society. Although no continued and rigorous investigation of CAM therapies has been undertaken in Northern Ireland, work by McDonagh et al (2007) indicates a rise in CAM therapies that reflect trends in the UK and Ireland. In Northern Ireland, it was demonstrated that some of the most common health problems listed by users of CAM therapies were stress issues, mental health and depression. Furthermore, with the level of mental health disorders in the Northern Ireland Study of Health and Stress 2001 indicating the highest percentage of respondent for anxiety, mood, substance and impulse disorders in the category of those exposed to conflict, such therapies are worth considering. In recent studies, CAM therapies are increasingly being used and examined by the US Veterans Association health care matrix and other providers of health care to veterans and survivors suffering mental illness after exposure to conflict. This paper conjoins these arenas and hopes to start dialogue around the effective co-use of traditional and CAM therapies in conflict-experienced persons.

Speaker Biography

Rosellen Roche, MBBS/MD, PhD, FHEA is a social anthropologist and physician who has over 25 years of qualitative and quantitative research experience. Her areas of interest include social deprivation, trauma, conflict, war and the synergy of understanding these consequences in medicine and medical education. A dual US/UK citizen trained in social anthropology and medicine in the US and the UK, Roche is an Associate Professor of Primary Care in the Department of Family Medicine at Ohio University's Heritage College of Osteopathic Medicine at South Point Hospital, Cleveland Clinic Campus. Currently, she also serves as the Chair for the Research and Scholarly Activities Committee for the medical school.

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allied academies

Joint Event

Sharada Mallubhotla, Plant science & Natural Medicine 2018, Volume 2

DOI: 10.4066/2591-7897-C1-001

International Conference on

Plant Science

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Sharada Mallubhotla

Shri Mata Vaishno Devi University, India

Medicinal Plant Biotechnology in India

Therapeutic compounds derived from herbs have become a major part of medical prescriptions across the world. Today's medicinal plants are important to the global economy, as approximately 80% of traditional medicine preparations involve the use of plants or plant extracts. However, pharmaceutical industry cannot always depend on natural botanical sources of drugs due to limited availability, genetic instability and consequent fluctuation in the yield. In addition to this, indiscriminate use of plants for extraction of the valuable compounds can lead to mass destruction, even leading to loss of biodiversity. The plant secondary metabolites also referred to as phytochemicals are low molecular weight compounds which are generally organ, tissue and cell specific and are usually classified according to their biosynthetic pathways and possess a range of therapeutic properties, including antibacterial, anti-inflammatory, anti-carcinogenic, antioxidant and acetylcholinesterase inhibitory activities, hence their use in phytomedicine for centuries.

The use of plant cell, tissue and organ culture for the production of natural compounds is an area of intense research by virtue of its biotechnological and economic implications. Extensive efforts have been made in recent years for the production of phytochemicals from medicinal plants using *in vitro* techniques. The details of strategies being exploited including rapid multiplication, enhancement in the yield of drug component, and more importantly, metabolic engineering shall be discussed and presented using few indigenous medicinal model plants of India, viz. *Withania somnifera, Bacopa monnieri, Boerhaavia diffusa, Argyrolobium roseum, Crocus sativa, Kickxia ramosissima*, etc.

Speaker Biography

Sharada Mallubhotla PhD from Punjab University, Chandigarh, India, is presently Academic Coordinator for School of Biotechnology at Shri Mata Vaishno Devi University, India. She has authored 26 publications, two books well cited over 175 times, and is serving as editorial board member of reputed Journals. Her research interests include production and manipulations of bioactive phytochemical metabolites from cell and organ cultures, micropropagation, medicinal plant conservation Biotechnology, Genetic engineering of medicinal plant species and Orchid Biotechnology. Currently she is working on application of bioreactor systems for production of plant bioactives, value additions through biotic and abiotic elicitation in plant cultures.

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Abdul Aziz, Plant science & Natural Medicine 2018, Volume 2

DOI: 10.4066/2591-7897-C1-001

Abdul Aziz

University of Dhaka, Bangladesh

Azolla pinnata var. pinnata cultivation and use as a multipurpose crop

Azolla pinnata var. pinnata R. Brown, a heat tolerant (up to 41° C air and 42.5° C water temperature at 0.5 cm depth) native aquatic fern was grown in ponds (by foliar spray of 10 kg TSP and 5 kg MP in a solution/ha/day) without nitrogen input and harvested about 10% crop every day which was on an average 1 ton/ha/day with full sun-shine) round a year in tropical Bangladesh. Lowest yield (>800 kg/ha/day) obtained during spring has been attributed to low humidity (50-67%) and lower sun-shine, and highest (1200 kg/day/ha) in late summer with high humidity (>70%). Cost of production was about 12 US$/ton fresh Azolla/ha/day which was sold at about 25 US$. The net income over fish production was estimated to be about 1,800 US$. The low investment and good return every day was lucrative and cost effective. The organism has symbiotic N2 fixer *Anabaena azollae* that fixes about 600 kg N/ha/year like that of Rhizobia in legumes and contains about 3.5% N, rich in anthocyanin pigment, etc. These features made the organism an excellent feed for fish (production increased over 20%) and poultry (2% sun-dried Azolla granules as food supplement resulted better health and increased egg production by 45%), use as compost or as biofertilizer (Azolla as dual crop and pounding in to the soil before tiller and flower initiations) and raw material for biogas production. Integrated farming with *Azolla pinnata* var. pinnata could increase productivity, keeping clean environment.

Speaker Biography

Abdul Aziz has completed his PhD at the age of 33 years from Durham University, UK. He is the professor of Dhaka University, Bangladesh. Currently, working as a Consultant, Bangladesh Agricultural Research Institute, Bangladesh. He has over 115 publications that have been cited over 65 times and has been serving as an editorial board member of reputed Journals.

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