

# CHRONICA HORTICULTURAE

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A PUBLICATION OF THE INTERNATIONAL SOCIETY FOR HORTICULTURAL SCIENCE



## Horticultural Highlights

Essential Horticulture... • Breeding the Future: What Fruit Breeders Can Learn from Breeders of Cows and Chickens • Tertiary Agricultural Education Capacities in Africa – a Case Study on Horticulture • Mesoamerica Aesthetics: Horticultural Plants in Hair and Skin Care • Domesticating the Rainforest: Commercial Nuts from Rainforest Trees of Australia and the South Pacific

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All Africa Horticulture Congress • Royal Flora Ratchaphruek 2011-12 • ProMusa • Mechanical Harvesting and Handling Systems of Fruits and Nuts • Pyrethrum, the Natural Insecticide • Landscape and Urban Horticulture • Biotechnology of Fruit Species • Balkan Vegetables and Potatoes • Date Palm • Strawberry • Acclimatization and Establishment of Micropropagated Plants • Growing Media, Composting and Substrate Analysis

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Additional information can be viewed on the PubHort website [www.pubhort.org](http://www.pubhort.org).

**Cover photograph:** The Royal Pavilion was at the heart of the exhibition. Built on a raised mound and following the traditional Lanna architecture of the region, the entire structure was built without nails and relied on wooden pegs for its construction. The Royal Pavilion underscores the purpose of Royal Flora Ratchaphruek 2011 - to commemorate the achievements of the royal family in Thailand. Impressive landscaping provides a dramatic setting for this majestic building. See article p. 23.

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### Erratum

In the article 'Revelations from *Histoire Naturelle des Indes* known as *The Drake Manuscript: Horticulture and History*' (*Chronica Horticulturae* 52(1):14-22) there is an error in the caption for Fig. 2. It should be "...C. mamey, D. avocado, E. soursop, F. guava, G. annona, H. cacao."; I regret this error. Jules Janick



## I am a Geek

Yves Desjardins, ISHS Board Member Responsible for Publications

I must confess, I am a « Geek ». Yes, I am an avid follower and adopter of technology, computers and new media. Some say I have a devotion to technology that is beyond mainstream. Some also call me an « Apple » fan-boy, and I cannot deny it. My only regret is that I did not buy stock in this company when the price was \$100!

It is true; I have always been an early adopter. I recall being the first in the horticulture department at the University of Guelph to write my thesis on a 128 K IBM computer, using Wordstar. I was active on listserves when E-mail was only starting to be adopted, and I was among the first in my university to implement the Gopher protocol, the alternative to the World-Wide-Web in its early stages. I also recall with some nostalgia putting all my youthful savings towards buying the first Macintosh computer. Since then, I have remained on the cutting edge of technology; I always have the latest patch or software update and operating system improvement, and try to update my hardware as often as possible.

Now-a-days, I am still fervently committed to technology. Even though my office may not always show it, I try to live in a paperless world. I systematically scan all letters and documents to PDF and upload them to the "Cloud". I often share collaborative documents over "Google Docs" and use virtual file storage on "DropBox" to distribute documents and articles among the members of my laboratory. I take notes on "Evernote", communicate through "Skype" and "Go-To-Meeting" whenever possible, and use news readers and aggregators to read the latest news and views on different topics. I seldom read the newspaper on "paper" anymore and prefer using apps like "Flipboard" to stay informed without staining my fingers with black ink.

Lately, I have followed with interest, but at a distance, the surge in social media and have been dazzled by the explosion of social networking and collaborative tools in all realms of life. After at first resisting these new gizmos, I broke down, and slowly tamed social media. Like many of you, I am on "LinkedIn". I recognized the fantastic power of microblogging on "Twitter" and social networking on "Google+ ". Even though several of the new emerging internet services can be gadgety, some of them are revolutionizing the way we share knowledge and collaborate. They certainly deserve our attention, especially in the scientific domain.

Being responsible for publication on the Board, it was natural for me to bring my disposition for

technology to the forefront of the Society's interest. As mentioned by the President Monteiro in his last *Chronica* editorial, one of the key outcomes from the Board's strategic plan was the necessity of implementing Internet technologies (IT) in the workflow of the Society to ensure that ISHS continues to move forward in the social media arena. Yet, if it is easy for an individual to embrace technology, it is much more difficult at the level of an organization such as ISHS to endorse and deploy new IT tools. One has to be very knowledgeable about the existing available technologies, be clever enough to foresee their evolution and wise enough to choose those technologies that are here to stay, and which will provide tangible benefits and added value to ISHS membership. One should also keep in mind all the costs of adopting and maintaining a particular technological solution. We have to remember that major investments will be required for implementing the new IT services on the ISHS website. Our Society is very lucky to be in a sound financial position allowing these investments, but all options must be carefully evaluated in a realistic and pragmatic manner, especially in the "social" web scene, where the specific needs of the organization must first and foremost be considered.

The « *raison d'être* » of a scientific organisation like ISHS is to facilitate networking, collaboration and sharing of the newest, most up-to-date knowledge in the field of horticultural science. Currently our transactions are mediated through traditional communication methods including e-mail, newsletters, static web pages and the good old Gutenberg print on paper technology. But the landscape of communications media is swiftly changing and the ways that we were once doing things have gone forever. To stay on top of our trade we must be proactively implementing new IT in our day-to-day business. We now have the possibility to enlarge the scope and outreach of our activities by judiciously using technology. New IT tools have the potential to reinforce relationships among members and to extend our influence over industry stakeholders and the general public. Implementing the capability for social collaboration and networking will help members to share information and insight rapidly and efficiently and should stimulate the involvement of our community in providing access to tacit shared knowledge. Yet, underlying the willingness to adopt the "Social web", also coined the "participative web", is the term participation. In other words, technology is important, but we must be aware that regardless of how smart and innovative IT tools can be, if they are



Yves Desjardins

not supported by an active community of user members, the success or the 'return on investment' will be limited.

The question you may have at this time is how will IT affect and improve ISHS activities? In the real world, ISHS can readily benefit from IT tools in two main areas. The first is through a revamped web page, while the second is through improved *Acta Horticulturae* features. Apart from improved layout, better usability and user friendliness of the website, a number of attributes should also be included. The most obvious will be to share and delocalize the production and management of the content of the different pages among many contributors. Section/Commissions/Working Groups should be able and allowed to enter information onto the system without having to rely on a programmer or dedicated staff member to update content. Newsfeed and syndication should also be integrated throughout the website so the members can be informed of changes and updated content. *Chronica* articles, news and reports should be posted on the interactive website, and outreach tools like "Digg", a social news website service, "Delicious", a social bookmarking web service, and "Google+" and "Twitter" could be implemented. Specific spaces for blogging and exchange forum should be enabled.

For *Acta Horticulturae*, the web interface to deliver articles will have to be flexible enough to include a number of key features being increasingly offered by other large scientific organizations. For instance, ISHS will steadily move away from paper and print-on-line of PDF publications and implement XML-based digital and print-on-demand outputs. Our IT tools will offer ways to access additional data and eventually enable readers to work directly with data presented and interact with figures (e.g. see [www.gapminder.org](http://www.gapminder.org)). These tools will have to offer the capacity to include text hyperlinks using semantic marker language, and to link to third party information, including cross-referencing and linked references. Our IT systems will have to be flexible enough to one day allow video attachment in scientific papers (e.g. see [www.jove.com](http://www.jove.com)), pop-up menus providing relevant information and quotes from cited articles, and automatic translation into different languages. Finally, these tools will have to facilitate social networking in scholarly publishing and use

intelligent scientific social collaboration. For instance, the system may offer specific recommendations by “peers” belonging to our network (e.g. « your colleagues also downloaded the following articles from the web... »).

All in all, there will be great benefits for ISHS in adopting IT and using social networks. It may

appear “far-fetched” to some, but adoption of this technology will instead be “far-reaching”. The usefulness of these new technologies will be proven within a short time. You will soon see some of these capabilities being enabled in a new revamped version of the Society’s website. Moreover, based on a rigorous cost and benefit

analysis, we will enable other useful functions and services that will move ISHS into the next generation of scientific exchange and networking capabilities. ISHS, too, will become geeky... but in the best way.



## Postcard

Floriade 2012, the World Horticultural Expo taking place once every ten years, is now open to the public in Venlo, The Netherlands, until October ([www.floriade.com](http://www.floriade.com)). Visitors will experience how plants that produce flowers, vegetables and fruits or are used for many other purposes can improve our daily life. This exhibition, intended for the general public, aims at explaining the role of Horticulture in all realms of life, teaching how Nature and Industry actually complement each other very well and discovering the importance of

Horticulture as a major economic engine. I encourage ISHS members to visit Floriade 2012 and to speak about this extraordinary exhibition whenever there is an opportunity, as it will showcase our profession and the essential role plants play in our lives. Let’s understand and spread this excellent message.

António Monteiro, President of ISHS



## ISSUES

### FOREWORD TO ALAN TITCHMARSH’S ARTICLE FROM YVES DESJARDINS

Horticultural science in many parts of the world is in turmoil. Indeed, many countries are restructuring their agriculture departments and are either reducing them considerably or closing them altogether with loss of associated services. For example, the current Canadian Government has just announced that it will cut the budget of Agriculture Canada, withdrawing from breeding throughout the country and thus eliminating many professional positions. Consequently the breeding programs of small fruit, apple and other industrial crops will be dismantled.

At the same time, many universities have merged their horticulture departments into more generic plant science departments or have merged them with other departments such as natural sciences, soils or environment. By doing so they have lost their specificity, their link with industry, their relevance to the people they serve, and most of all, the knowhow and expertise in this field. This has led to a disaffection of the horticulture discipline altogether, a trend that has been reinforced by the poor classification of the horticulture curriculum to future employment opportunities where it has received low rankings compared with other degree programmes (see the following: [http://education.yahoo.net/articles/most\\_useless\\_degrees.htm?kid=1KWNU](http://education.yahoo.net/articles/most_useless_degrees.htm?kid=1KWNU)).

All in all, the importance of horticulture in most industrialized countries is being downgraded and considered to be accessory and even useless to society. Yet, as horticulturists, we all understand the paramount and essential role that our discipline plays in the nutrition, health, well-being and development of humankind. Increasingly we are hearing strong voices advocating the recognition and importance of horticulture. Many key spokespersons are now speaking loudly and fervently to promote and claim the importance of horticulture in our lives. This includes students themselves. I refer you to the appeal of Jasmine Dillon of “Farmer fight”, a student initiative to reconnect American society to the world

of agriculture (Watch on YouTube by typing ‘Farmer-fight – stand up’ in Google).

This call for action has also been heard from many ISHS members, who have asked the Board to advocate strongly for the future of horticulture science to our leaders and to the public. Under the leadership of Errol Hewett and Ian Warrington, the Board will soon release a publication both on line and in the form of a *Scripta Horticulturae* book entitled “**Harvesting the Sun**: a profile of world horticulture”. This publication strives to illustrate the importance of horticulture in all realms of our life and to demonstrate how science is being used to benefit humankind and improve the quality of our daily lives. “Harvesting the Sun” will be distributed shortly to all members of ISHS and will be made widely available to policy-makers, decision-makers and local authorities in all parts of the world. An accompanying brochure will also be widely distributed to school students and parents.

It is fundamentally important that we all “stand up” and defend horticulture and horticultural science because of its importance to the health and quality of human life. We must express ourselves passionately and change the popular perception of our profession. With this in mind, in the following pages, we are presenting the keynote speech that Mr. Alan Titchmarsh delivered at the Chelsea Flower show last year. Alan is a prolific author of many horticulture books, hosts a very popular horticulture TV show on the BBC, as well as being Vice president of the Royal Society for Horticulture in the United Kingdom. In this speech he presents a strong case for the crucial role of horticulture in our lives, the kind of pledge we must all make to promote our profession.

Yves Desjardins, ISHS Board Member Responsible for Publications



# Essential Horticulture...

Alan Titchmarsh

**M**adam President, my Lords, Ladies and Gentlemen; this is what they call a tough booking. For forty two years I've been coming to the Chelsea Flower Show – first as a student, then as a journalist reporting on its influence, and eventually as a TV pundit, reflecting its highlights to the millions who are not among the 157,000 who flock through the gates of the Royal Hospital each year in order to feel guilty about the state of their own gardens. But this is the first time that I have been asked to deliver the post-luncheon address. A tough booking.

I mean, what is it for? Do I use it as a platform to put across my own beliefs? I am, after all, following in the footsteps of an illustrious group of free-thinkers, from Prime Ministers to eminent scientists. But who wants to sit and listen to the rantings of a Yorkshire gardener who managed to clean up a bit and become a TV celebrity? Such a vacuous word – 'celebrity' – all style and no substance. But perhaps I could at least use that notoriety as a means of attracting your attention. (I did think about being lowered in by a crane but came to the conclusion that not all of you would be able to participate.)

I asked a friend for his advice. It was brief and to the point: 'Your speech should be like a mini-skirt', he said. 'Long enough to cover the essentials but short enough to keep them interested.' I'll do my best. Because I suppose what I do want to do today is to remind you, if you needed reminding, of the importance of gardeners and gardening. And there are those who tend to underestimate that.

In a recent speech relating to the Coalition Government's plans to allocate community work to the long-term unemployed, the Prime Minister grouped gardening as an unskilled activity along with litter picking. We've a long way to go.

In a conversation with a lawyer friend recently, he was bemoaning the cost of employing a gardener. 'Do you know', he said, 'I have to pay £15 an hour.'

'Is he skilled?' I asked.

'Well he knows his stuff. He's got an RHS certificate.'

'What's your hourly rate then?' I asked him.

He blustered a bit, but I persisted. Eventually he admitted - to £650 an hour.

'Can you grow a cabbage?' I asked him.

'No.'

I left it there. But you see that's the problem. Many perceive gardening as 'tidying up'. The same sort of thing that you do to your sock drawer once a year. But it's so much more than that.

I took another friend round my garden last week.

'Oh' she said. 'Isn't it wonderful. I love gardening; it's such an escape from reality.'

I had to disabuse her. 'No it's not', I said.

She looked puzzled.

I told her that as far as I was concerned gardening was reality. Plants come into leaf – magically – each spring. Every spring. The garden blooms; the leaves fade and fall – nature's grand clean-up. Wonderful. What she considered to be 'the real world' was one manufactured by man and whose self-inflicted problems were what amounted to reality. Sad that the world's come to that way of thinking.

You could accuse me of being fanciful, of course, that the real world is that found in the pages of the newspapers and news bulletins, and that my Pollyanna outlook is 'head in the sand'.

But it's not that I'm denying the existence of the world's troubles; I'm just trying to put them into perspective and on this particular occasion to express my passion for growing things and what good that can achieve.

It has been a tough spring: very little rainfall in March, April and May, and temperatures that have resulted in a lot of Chelsea's floral regulars fading all too quickly. But gardeners are a resourceful bunch and you'll find no sign of stress and strain among the exhibits. Quite the reverse; Chelsea is about excellence of finish and each year it provides it in spades.

Farmers always say that if you think this year is bad; wait until you see what next year has to offer. Gardeners, bless 'em, always believe that next year will be better. And don't you believe it when folk tell you it's never been as bad as this. The Reverend Gilbert White, my near neighbour in Hampshire, noted that in 1776 "till the 30th May the fields were burnt up and naked, and the barley not half out of the ground." But that after what he called "ten days of dripping weather" in June, the transformation was difficult to believe and there was "an agreeable prospect of plenty". Gardeners have learned to be sanguine about the vagaries of the weather.

There is a tendency to think that the Chelsea Flower Show is all about lavish designs and expensive make-overs. It's those, after all, that grab the headlines. But more than anything it is here to demonstrate the skills that the men and women out there have at growing plants from all over the world. Growing things. Gardening. Husbandry. Land stewardship – words that have fallen out of general use since the onset of the Industrial Revolution getting on for two hundred years ago.

But the Prime Minister – and others – should step back and consider just what part gardening



Alan Titchmarsh

– growing things – can play in society. It impacts on those big three electioneering issues – law and order, education and health. People who cultivate the soil, who spend time in outdoor activities on the land, occupying themselves and diverting their energies into productive pursuits are, it's proven, much less likely to offend. The Leyhill Prison gardens that we've seen here at Chelsea reflect the rehabilitative properties of gardening.

Learning how things grow – from an early age – (and here the RHS Campaign for School Gardening comes to the fore) gives children a greater understanding of the wider environment and a greater responsibility for it. They will grow up with some affinity with the countryside, rather than a fear of it that comes from living a life glued to the screens of mobile phones, x-boxes and computers. They tell me that some Universities even have virtual field trips now, rather than the real thing. Heaven forbid! Children should be encouraged to get out there, get dirty, pick and press common wild flowers and get to know their names. That way they will feel a part of the countryside and rejoice in it.

I recently took part in a day at the Royal Junior School in Hindhead where two hundred four to eleven-year-olds came and potted up busy-lizzies, went on a nature trail, took part in pond dipping and looked for mini-beasts. Their attention span was miraculous – it lasted for three hours. You wouldn't believe the elation in the letters that followed.

They all went away dirty but glowing – a healthy rosiness in their cheeks.

I can't help but hope that the raising of University tuition fees might have a beneficial side effect. That we will realise that a university education is not the be-all and end-all in life. We need skilled craftsmen as well as academic brilliance, and we need to value those skills. Apprenticeships should be more readily offered, and we should pay a decent wage to the skilled trades, including gardeners.

I'm told that tonight at the Gala evening, more big business is done among the top city movers and shakers than at any other event during the year. Deals are brokered among the delphiniums. Hedge fund managers come face to face with their counterparts in box and yew. Chelsea gets gardening noticed, and the breathtaking works of art created by our top designers inspire massive coverage in the newspapers.

I'm not at all against the hoopla – the celebrities who pose among the peonies and pelargoniums. This is our shop window; our chance to attract attention. But gardening is about more than that. Gardeners are the only truly interactive naturalists – we don't just observe, we sow and plant and grow. We need to encourage more young people to make horticulture their career.

How do we do that? By actually considering that it is a career. Perhaps you can offer an apprenticeship to a young and aspiring gardener. They may not stay with you forever; nowadays gardeners don't have to be like Mr McGregor, old and grumpy and glowering in the potting shed. They are vital young folk who will serve you well and move on up the horticultural ladder passing on their skills to others. You'll find them out there – making gardens and growing plants; supplying the nation with food, if you'll buy their home-grown produce rather than cheap imports that have travelled countless air miles to get to you.

The rehabilitation value of growing things is beyond dispute. A former head teacher who suffers from bipolar disorder believes that garden-

ing saved his life. His wife and daughters agree. He and his Yorkshire garden have just won a Gardening Against the Odds Award. An expert horsewoman who thought her life was over when she broke her back found that her garden in Somerset allowed her to find a reason for carrying on. And there are now many young ex-servicemen who find that the 'Gardening Leave' scheme run in association with Combat Stress is quite literally turning round their lives.

It has certainly turned round mine. As a fifteen-year-old school leaver who failed the eleven plus and with just one O-level in art in my back pocket, I went to work as an apprentice at the local parks department nursery. I have never regretted going into horticulture, even if it has meant taking digs about decking.

Gardening really does change lives. Take Willy – our Irish navy on 'Ground Force'. We were musing after one programme, when the series had established itself as a roaring success, second only in the BBC1 ratings to *EastEnders*. (I offer it only to put things in perspective, you understand, not as a boast).

Well, while we were chatting a lorry load of turf went down the road – you know, the Ro-lawn Swiss rolls. 'Would you look at that', he said. 'That's what I'm going to do when I get a lot of money.'

'What's that?' I asked.

'Send me lawn away to be cut.'

We all aspire to that. But in the meantime we need to work a little harder at raising the profile of proper gardening, not just of grand designs but of growing things and handing on our skills to those who follow.

A friend, Alan Bennett, sums it up nicely in his play 'The History Boys', in which the history teacher Hector is explaining to his pupils what education is all about. There is a note of desperation in his voice as he delivers his valediction at the end of the play. He says:

"Pass the parcel. That's sometimes all you can do. Take it, feel it and pass it on. Not for me, not for you, but for someone, somewhere, one day. Pass it on boys. That's the game I want you to learn. Pass it on."

Promise me, please, that you will do the same. Take your own gardening knowledge – however slight – and pass it on. Only then will the importance and joy of growing things rub off on those that follow. And without even mentioning carbon footprints, global warming, sustainability and environmental awareness, we can be secure in the knowledge that our children will grow up with a greater respect for and love of the tremendous natural riches that surround them in a country that can boast the best gardens and the longest gardening tradition in the world.

Thank you.

## ABOUT THE AUTHOR

Alan Titchmarsh was born and brought up on the edge of Ilkley Moor. He left school at fifteen and became an apprentice gardener in the local nursery, following this with full-time training at horticultural college and the Royal Botanic Gardens, Kew. Alan presents the BBC's coverage of *The Chelsea Flower Show*, his own daytime ITV television show and the new series *Love Your Garden*. He has written four volumes of memoirs, over fifty gardening books and eight novels, and contributes regularly to *BBC Gardeners' World Magazine*, the *Daily Express*, *Sunday Express* and *Country Life*. Alan was appointed MBE in 2000, a Deputy Lieutenant of Hampshire in 2001, when he was also immortalised by Madame Tussaud's, and in 2004 received the Victoria Medal of Honour, the highest accolade in the British gardening world. In 2009 he became a Vice President of the Royal Horticultural Society.



# Breeding the Future: What Fruit Breeders Can Learn from Breeders of Cows and Chickens

Raffaele Testolin

**H**ave you ever asked yourself how a breeder creates a new cultivar? The process is simple: he finds parents with the desired characters, crosses them, and waits to see the results. This is what some geneticists refer to as a 'cross & pray' approach in analogy with the better-known 'spray & pray' approach used by some plant scientists. The expression is rather rude but it is nonetheless not too far from reality; this is what fruit breeders have done over the past century, admittedly with remarkable success. Conventional breeding in many

instances is considered more a craft than a real science, since many of the underlying principles explaining interactions between genes have yet to be understood.

Teams involved in the breeding of agronomic and horticultural crops, as well as those breeding animals, have struggled with polygenic traits and have relied on the quantitative approaches based on Fisher's theories for selection purposes. Even though quantitative genetics dates back to the 1920s, it has still yielded spectacular results; think of the green

revolution and other remarkable achievements obtained in other industrial and horticultural crops.

That said, fruit breeders have never seriously exploited quantitative genetical approaches, using as an excuse that woody species have long generation times and are mostly cross-pollinated. There is some truth in the fact that these species are not well suited to the creation of inbred lines. Concepts such as 'heritability of traits', 'combining ability', 'progeny test', 'gain from selection' are rarely



mentioned in the fruit breeding literature of the past century and books such as the one by Hansche (1983) on breeding methods have probably had few readers. Experimental mating designs such as 'diallelic' or the 'North Carolina Model 2' (NCM2) are likely still unknown to many fruit breeders, both young and old.

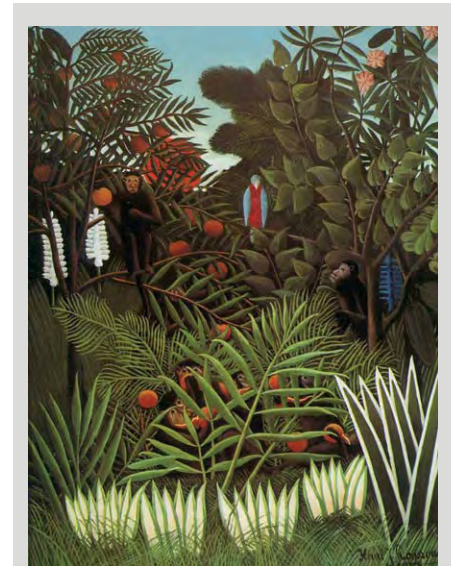
Recently, marker-assisted selection (MAS) has gained credence as a powerful tool to efficiently breed plants. This approach is being used for the early selection of Mendelian traits under monogenic control, such as colour, disease resistance and a few other characters. One can easily tell why there is so much excitement around this methodological advance; breeders are able for the first time ever to base their selection on objective markers rather than characters. These molecular markers are detectable at any stage of the plant's life, including as a seedling, or as a young plantlet with two or three leaves, and can thus be very useful in hastening the breeding process. This is particularly valuable in fruit breeding as traits related to production become visible only after the plant has overcome juvenility, which can last as long as two to ten years in some fruit crops. For this reason, fruit breeders are seriously considering using, or have already started to use, MAS to select for quantitative traits. One can imagine that they could readily use a toolbox of dozens of markers, designed to select plants for improved sugar content, acidity, fruit size and other quality traits. Yet, venturing in this direction may not be the best way to improve fruit trees: indeed, this approach may be entirely inappropriate and could lead to inconsistent results. Since selectable markers are surrounded by many other interacting genes, which are often not

considered, it might be naïve, in spite of the apparent robustness of the technique, to blindly follow this route. One should candidly and in a forthright manner look at other solutions to efficiently breed fruits. Such a solution has already been explored by our colleagues in animal genetics. Indeed, GENOME-WIDE ESTIMATE OF BREEDING VALUE (GWEBV) of individuals could be a promising approach to ameliorate the breeding process. But what exactly is GWEBV?

Molecular techniques have made spectacular strides over the last few years and breeders can now obtain large arrays of molecular markers at a very low cost. Currently, SNPs (single nucleotide polymorphisms) are the markers of choice as they allow the whole genome of a species to be precisely analysed. One must however make an intelligent use of the newly obtained information.

A genome-wide dense SNP array allows the simultaneous mapping of genes and QTLs controlling all traits targeted by a breeder (Goddard and Hayes, 2007; Heffner et al., 2009). Using this technique, the effect of SNPs on linkage disequilibrium, with all functional variants affecting the trait, can simultaneously be estimated making the approach suitable for quantitative traits under polygenic control. What is amazing in this approach is that no knowledge of the association between markers, traits or genes is required!

Actually GWEBV may be a revolutionary concept in breeding. In fact, it might replace the need for the mapping of the genetic determinants of traits, and their associated markers, by the study of a so-called 'training population', a reduced set of individuals from the population within which the selection will be



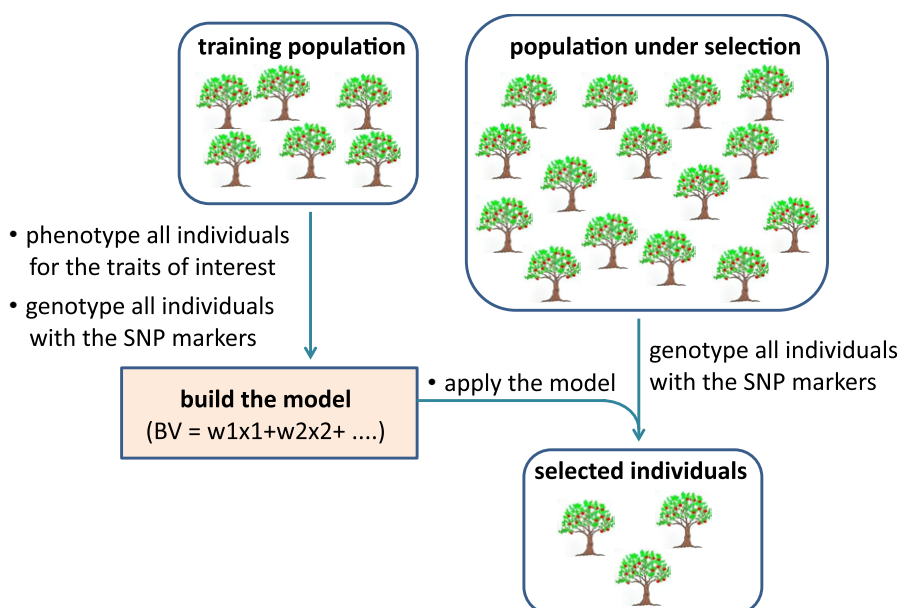
*Breeders working with plants and animals, in spite of the genetic distance of their breeding objectives, can share most modern tools and approaches to breeding (Henry Rousseau - Exotic Landscape, 1908).*

carried out. The idea is to obtain a signature of the best marker profile associated to the searched phenotype, that is an ideal archetypal individual that possesses the traits of interest. Once this signature is obtained, the breeder can genotype any individual related to the original population, including the offspring generations. In short, one can analyse the marker profile of an individual and derive its breeding value for the characters at stake.

This new breeding process therefore involves two phases. The first is the elaboration of a predictive model (Fig. 1) whereby individuals belonging to the training population are both genotyped using many molecular markers and phenotyped in replicated plots. The genome scan of marker effect is then carried out using statistical approaches such as least-squares, BLUP (best linear unbiased prediction) or by Bayesian analysis. The basic mathematics behind this are complex and belong to the realm of bioinformatics, but the concepts are now-a-days well mastered and software packages are available to perform the analysis. Even if a breeder does not understand completely the algorithms on which the process relies, he can be assisted by a bioinformatician to understand and use this rather obscure 'black box'.

The final output of the analysis provides a model (a signature) that can be applied to the population to be bred, for which only a set of molecular data needs to be collected (Fig. 1). For people who wish to learn more about this approach, I would suggest consulting the seminal paper of Meuwissen et al. (2001).

**Figure 1. Schematic representation of genomic selection (adapted from Goddard and Hayes, 2007).**



Until now only a few papers have been published on this concept, but many breeders working with husbandry animals like cows, chickens or pigs are quickly adopting such an approach for the evaluation of the breeding value of individuals, whether they are parental lines or offspring. A few fruit breeding programs are now exploring this new breeding approach (Varshney et al., 2005). For instance, scientists from New Zealand and The Netherlands (Kumar et al., 2012) are adopting this new strategy in their apple breeding programs.

Breeders of horticultural plants have lost their edge over time and for many reasons are lagging behind breeders of agronomic crops and animals in the adoption of recent molecular genetic tools. We are now in a position to take a giant leap forward and make a historical jump in this field. These new breeding strategies can enable the horticultural breeders to move once again at the cutting edge of molecular genetics. Let's follow them.

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# Tertiary Agricultural Education Capacities in Africa – a Case Study on Horticulture

Rémi Kahane and Didier Pillot

This paper is based on a preliminary assessment of the horticultural education capacities in Africa. The survey is still on-going and takes into account information received from newly listed education or training institutions, or up-dating data on a country basis. The results gathered after two months were presented during the international workshop on Tertiary Agricultural Education in Africa (TAE-Africa, 26-28 March 2012, Wageningen, The Netherlands), co-organized by the World Bank and Wageningen International. The objective of this thematic presentation was not to support the horticulture sector but rather to use a value chain approach to characterize the tertiary education capacities from national to continental level. The opportunity to appraise horticulture education had already been discussed during a side event at the All Africa Horticulture Congress in South Africa (15-20 January 2012), and GlobalHort was asked to implement it. The networks of ANAFE (African Network for Agriculture, Agroforestry and Natural Resources Education), RUFORUM (Regional Universities Forum for Capacity Building in Agriculture), FARA (Forum for Agricultural Research in Africa)

and GlobalHort have worked together to produce and send out a questionnaire focusing on existing tertiary education and professional training on horticulture in Africa (THEA).

## PURPOSE OF THE QUESTIONNAIRE

Only two questions were asked in the survey: describe the staff and describe the employment of graduates. Two components were investigated:

1. Existing education capacities: In the coming 5 years, who and where are the human resources active in the field of horticulture at the university, the college or at the professional training levels in your country?
2. Employment of graduates: What are most of the trained students doing 5 years after their last degree in horticulture obtained in your country?

The questionnaire was elaborated in two languages, French and English. The absence of a version in Portuguese could explain the poor response from Lusophone countries. A trans-

lation of the questionnaire will be done to overcome this constraint, and sent out again to Angola, Cape Verde, Guinea Bissau and Mozambique.

## LIMITS OF THE SURVEY

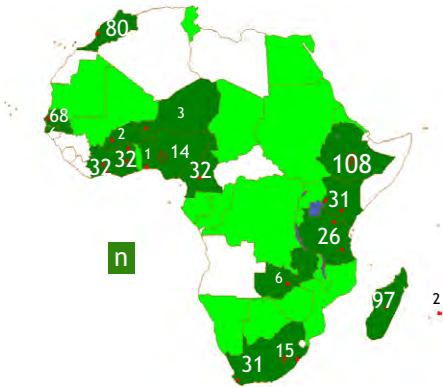
GlobalHort rapidly faced two difficulties when starting the survey. The first difficulty related to the specificity of horticulture, which is less and less considered as an academic science and hence is disappearing from the curricula (sometimes found under Agronomy, Botany, Plant or Crop Science in faculties of agriculture). Horticulture is often a short specialty in crop production, postharvest or crop protection training programs, with internships abroad in countries with a higher reputation. The second difficulty was due to the lack of information among those involved in the sector, between institutions of the same country, sometimes within the same institution. Therefore, it was challenging to even formulate a list of all institutions with such specialization and competences to send out the questionnaire. As such, the updated list of respondents is already an



**Figure 1.** Distribution of the questionnaire (countries in green) on tertiary horticultural education in Africa and respondents (red dots in dark green countries).



**Figure 2.** Total number (n) of staff identified as specialized in horticulture.



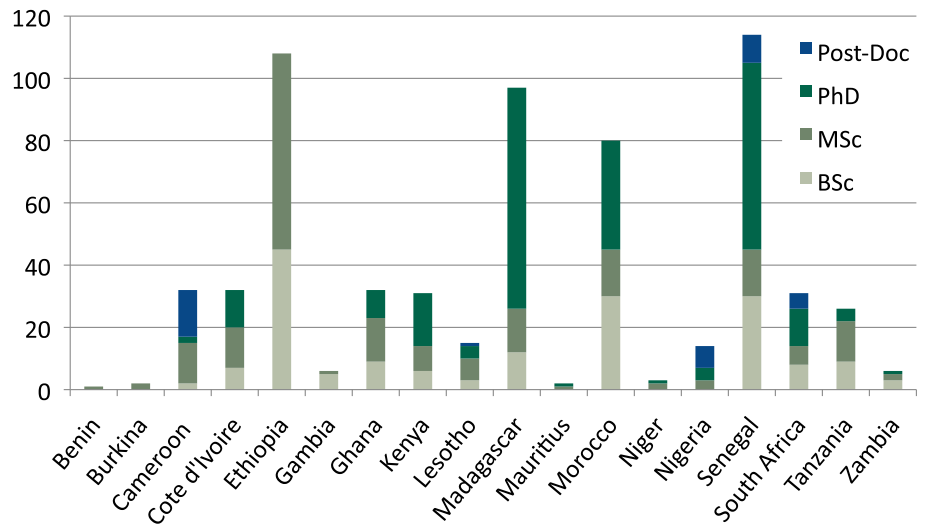
original output that can be a guide to further networking.

With 30 respondents from 19 countries out of 36 targeted countries (Fig. 1), these data provide only an incomplete picture of the whole tertiary horticulture education capacities in Africa. In particular, we have not yet received the filled questionnaires from Egypt, Mali, or from Uganda. However, we believe that there are already some lessons to be learned from this preliminary assessment.

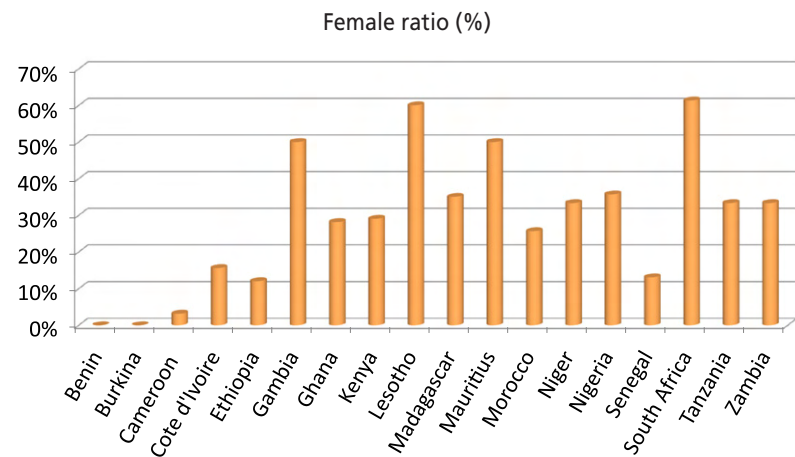
## CAPACITIES IN FIGURES AND MAPS

The first obvious information received from the assessment is the presence of numerous horticulture capacities, concentrated in a few countries over the continent (Fig. 2). The distribution of these capacities is often coupled with traditional cash crops and export activities (cut flowers and fruits in Morocco, Senegal, Cote d'Ivoire, Ghana, Ethiopia, Kenya, South Africa) but also with increasing domestic and regional markets (Nigeria, Cameroon, Madagascar). The characterization of the staff involved in tertiary horticultural education in Africa (THEA) has been facilitated by the recent or on-going har-

**Figure 3.** Distribution of qualification degree among the tertiary horticultural education staff in several African countries (cumulated number in Y axis).



**Figure 4.** Gender balance among the tertiary horticultural education staff in several African countries.



monization of curricula in all universities, with corresponding Anglophone (BSc-MSc-PhD) and Francophone (L-M-D) systems (3-5-8 years of post-graduate studies respectively).

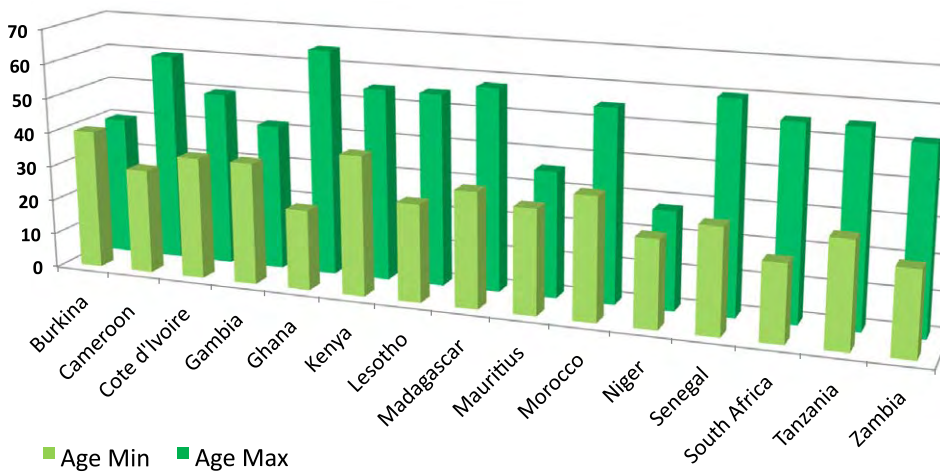
Very few staff have a post-doctoral degree (Fig. 3) but in a few countries the proportion of Post-Doc was rather high (Cameroon, Nigeria, South-Africa), possibly related to institutional linkages established with American or British institutions. Except in Madagascar, Nigeria and Senegal, the PhD level in THEA covers less than half of the staff, and about half in Cameroon, Kenya and South Africa. Cote d'Ivoire and Ghana have a well distributed degree pattern whereas in Ethiopia many staff members lack a PhD. The gender ratio among THEA is strongly male-dominated (Fig. 4), with an increasing female gradient from Western to Eastern Africa and stronger from Northern to Southern Africa. The majority of women in horticulture in Africa are involved either for cultural reasons (Lancaster, 1976) or for adaptation to the modern markets (exports: Tallontire et al., 2005; urban markets: Weinberger et al., 2011).

It is therefore important to count women as education staff to answer the real questions and pass on the right messages. The age of THEA staff, when available (Fig. 5), provides some clues as to how old the institution is in horticultural education or training (maximum age), and how vibrant it is with new recruited staff (minimum age). So far, Burkina Faso, Cote d'Ivoire, Gambia, Mauritius and Niger seem rather active although the staff size is rather small.

## GRADUATES IN FIGURES AND MAPS

The number of graduates in horticulture per degree depends on the type of institution that responded. Only universities deliver PhD degrees, whereas both polytechnic schools and universities deliver MSc or equivalent degrees, and training institutions deliver a diploma equivalent to the BSc. In addition, many universities are not sufficiently specialized at the BSc level to mention graduates in horticulture. The fact remains that BSc graduates are most

**Figure 5. Distribution of maximum and minimum age of tertiary horticultural education staff in several African countries. In light green = age min, and in dark green= age max.**



numerous in Morocco, Senegal, Cote d'Ivoire, Ghana, Cameroun, Kenya and Ethiopia (Fig. 6), whereas MSc graduates are most numerous in Niger and Madagascar. PhD degrees are delivered in very low numbers, the highest being in Senegal and Cote d'Ivoire, but the highest proportion of MSc graduates were in Nigeria and South Africa.

Data on the employment of graduates up to 5 years after their graduation in horticulture did not consider unemployment or further studies in the possible choice of responses; however, no comment from the respondents mentioned these possibilities. Some responses were very detailed and accurate; others were more in the way of estimates, highlighting the absence of follow-up and up-dating of the alumni in most cases. Nevertheless, through the colored gradient from public to private sector, farming entrepreneurship being placed in the middle (in yellow in Fig. 7), it was possible to distinguish some trends between countries, or between

institutions within a country. In most of the countries horticulture graduates work in the public sector, mainly in education and research (white) or in development (light blue). Burkina Faso, Lesotho and Zambia are at one end of the spectrum with 90% of their graduates working in the public sector. In Ghana, no clear distinction was made between two universities although one clearly favoured development (in Tamale). Next to Ghana, in Cote d'Ivoire, the distinction was noticeable between the university (mainly white in color) and two engineering schools (blue and yellow). The proportion of graduates becoming farmers was rather low, even among professional training centers. In Senegal (CFPH) the figure reached 60%, but it was not more than 15% in Tanzania (Horti-Tengeru). Clearly, a diploma led more often to becoming a trainer than an entrepreneur, with the notable exceptions of South Africa (RSA, 90% private sector), and Morocco and Madagascar at a lower level (60%).

## LESSONS TO BE LEARNED...

From these preliminary and partial results, and from the comments collected we can already draw some lessons. We have also distinguished between what was implied but not clearly stated in the data and what needs quantification to be clearly understood and supported.

*What the data say* - No directory exists at the country level on capacities for THEA. This is required for any baseline assessment against which a strategy can be formulated for change and improvement. Indeed, almost no information exists at the regional level about an agriculture specialization like horticulture, and very few statistics are available on graduates and alumni. In several countries, technical and academic training co-exist without formal relationship, either in the curricula or between educators. From the data, we can assume that those individuals with a technical diploma find jobs more easily than those with an academic degree.

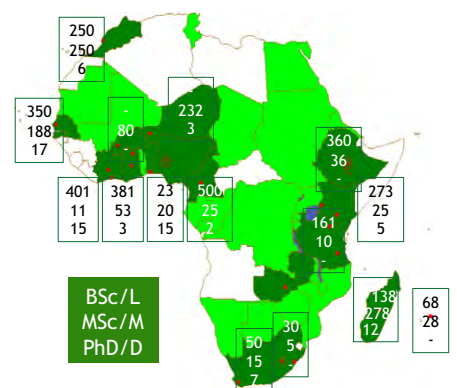
*What is said besides the data* - This assessment was warmly welcomed and generated great interest from the respondents, since they considered it a good opportunity to learn about horticultural education capacities at the sub-regional or the continental level. Several respondents wished to have a program specialized in horticulture in their faculty, namely Benin, Burundi, Cote d'Ivoire, Niger, and Togo. They intend to use the opportunity of the L-M-D harmonization of universities to create such curricula. Paradoxically, other respondents mentioned difficulties attracting students to existing specialized curricula. Generally speaking, agriculture is not attracting students and this trend is similar to that observed in Northern countries. When a student wants to specialize in horticulture, he is often directed for training to some "hub" with a good reputation in Kenya, South Africa or Senegal.

*What is implied in the data* - Some qualitative information could be derived from the data in the questionnaire, mainly about topics taught at the MSc level. Where horticulture is present as a specialization in TAE, the main

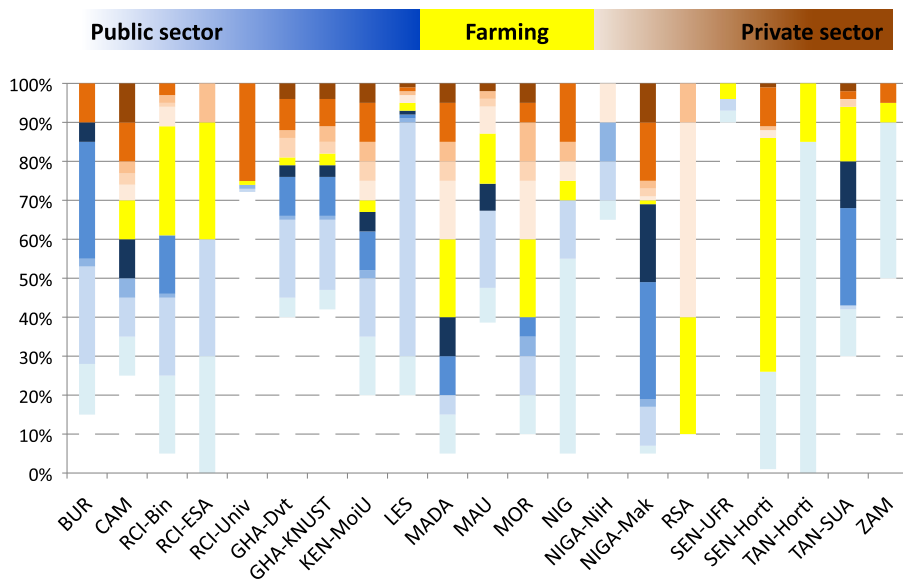
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: Sokoine University of Agriculture, Horticulture Unit in 2008. Photo by R. Kahane, GlobalHort.



**Figure 6. Geographic distribution of graduates in horticulture in the last 5 years.**



**Figure 7. Characterization of graduates' employment after their last graduation in horticulture.**



topic areas are crop intensification, integrated pest management, postharvest and marketing. However, there was no mention of how education programs were adapted to the needs of employers, or to any existing strategy at a sub-regional level.

*What needs substantiation* – Since a large number of institutions and even countries have not yet contributed to the survey, we cannot assume that we now have a definite overview of the situation of THEA. However, the information gathered is interesting since it is original and for the first time describes the situation on a continental scale. Not all institutions had time to respond, and GlobalHort and its partners are keeping the survey running, in particular with a Portuguese translation of the questionnaire. Most stakeholders in horticulture are ready to provide more information in order to get feedback that would help them set up priorities or public-private partnership strategies in particular. So far, information sharing is the best way to define successful strategies that will:

- Respond to the needs of the countries
- Anticipate future needs (in nutrition, for secure and safe food supply to the cities)
- Avoid duplicating efforts
- Encourage complementarities and synergies

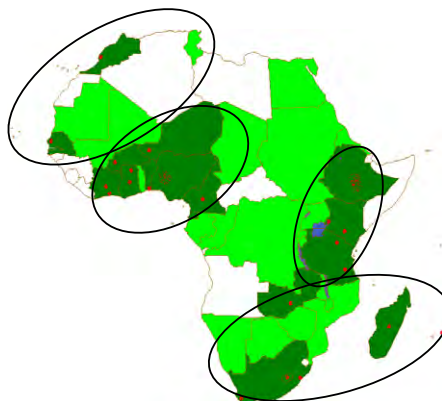
### ... FOR A BRIGHT FUTURE IN AFRICA

One can easily foresee that regional horticulture knowledge hubs (four large regional ensembles are apparent in Fig. 8) organized around dynamic leaders, could be created to meet the needs for training specialized competencies and provide adequate laboratory equipment that are not available in every country or university. This is true in key scientific domains such as

biotechnology, genomics and plant breeding applied to horticultural species, fundamental ecology and entomology of pests and parasites, and postharvest physiology. Such integrated knowledge would be better provided at the regional level and could better target professional levels through the training of trainers. Beside the choice of these hubs, mechanisms to facilitate mobility of staff and students to and from these hubs would still need to be organized at the masters, doctoral and postdoctoral levels.

Considering the immense need for well-trained personnel in horticulture in Africa, the creation of four regional hubs may not be sufficient. At the professional level (BSc and below) the need is probably even higher. Excellence in professional horticulture involves the capacity to understand and take into account local cropping practices, allocation of resources (especially land and water) and organization of the value chain. One has to link capacity building to the needs of the local economy. Obviously,

**Figure 8. From regional concentration to regional specialization and competitive hubs.**



the national or local level is better positioned to face this need.

Finally, the future picture of THEA within the next 20 years might be 4 to 6 strong regional scientific poles articulated into a network of national training partners (universities, research and professional training centers) who would be themselves strongly connected to the socio-economic and environmental world through the stakeholders of the horticultural value chain. Beyond horticulture, it is reasonable to imagine that each region would have access to different hubs in various domains, steered by strong leaders who would address the issues of other value chains (e.g. textile and fibers) and tackle global challenges (e.g. climate change).

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# Mesoamerica Aesthetics: Horticultural Plants in Hair and Skin Care

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and Jalal Ghaemghami

On October 19 of 1492, surprised by the tropical flora of the New World, Columbus wrote in his ship's log about the diversity among many of the plants and trees, which must "yield great value in Spain for obtaining dyes, medicines, and spices" (Regueiro y González-Barros, 1982). With this observation, Columbus became the first witness to natural history in America, which until that point in history had remained unknown. Later, in 1570, Philip II enlightened Francisco Hernández about the type of information that he desired to be collected in New Spain (Mexico) when he instructed him to report on all people knowledgeable in medicine or medicinal plants, in all the places where he traveled (Tomás, 2003). The basic sources of information for Hernández were therefore Mesoamerican people who were dedicated to herbal medicine and cosmetics in New Spain (Tomás, 2003). This goal of recording medicinal and cosmetic knowledge was also replicated by other European travelers and settlers to New Spain.

On November 21 of 2011, an ISHS symposium was convened in Antigua-Guatemala of Guatemala, C.A., to foster conversation among experts involved in medicinal and aromatic plants research while considering Mayan use of plants in the past. Many conversations focused on present research practices aiming to identify specific chemicals, essential oil or others with medicinal properties. This stands in full contrast with Mayan practices that used fruits, leaves or seeds for medicinal purposes as well as cosmetic use. This article attempts to describe known and documented use of plants by Mayan society that in today's language could be defined as an integrated approach utilizing horticultural knowledge for cultural and personal applications.

Mesoamericans aesthetically and aseptically cared for their bodies. This, along with Mesoamerican documents concerning knowledge about medicinal plants, trees, and herbs, now considered as horticultural plants, have become the corpus of what is known about the practices that Mesoamericans used to beautify and groom themselves. These practices made use of many horticultural plants and this wisdom has somewhat been lost since those times. These documents describe how the hair's appearance was held in such high regard that it constituted a major element of the overall presentation of a Mesoamerican's looks. They

even describe how native people paid attention to "split-ends," dry hair, lack of sheen, thinning hair, and hair coloring. The records describe also how the Mesoamerican people attended to chapped lips and canker sores. They explain how the natives' facial skin was considered healthy and presentable only if it was soft, smooth, and had a balanced complexion, without spots or discoloration (Fuentes y Guzmán, 1932; Hernández, 1942a, 1959a).

The ethnohistorical documents that record this collection of plants according to their medicinal and cosmetic uses not only reveal the European interest in recording the diversity of resources in New Spain, Yucatan and other parts beyond, but also include the registration of knowledge related to their applications in the Mesoamerican practices of body care. Even if the (European) records should be considered with caution due to the implied cultural value judgments (social and religious) of those who made the records, these texts remain a window for viewing the ancient world of Mesoamerican plants and their properties, which were exploited for medical, hygienic, and cosmetic purposes.

## HAIR CARE

Many plants and their preparations were used by Mesoamericans for the hair. Some were aimed at avoiding hair loss and promoting hair growth. The *xiuhamolli* plant (*Ipomoea murucoides* Roem. & Schult. or *Ipomoea* sp.) (Fig. 1) was crushed, mixed with other animal products and cooked to create a solution which was then applied when cleaning and washing hair to avoid hair loss or regain it (de la Cruz, 1996).

Today, the *xiuhamolli* plant is popularly known as "cazahuate blanco" and the modern inhabitants of Central Mexico and Morelos decoct the plant and massage the resulting liquid onto the hair after it is washed to avoid hair loss (BDMTM, 2009). Some records indicate how plants and preparations served to produce abundant, soft and shiny hair. Crushed seed pods of the red mamey plant (*Pouteria sapota* Jacq., *Calocarpum mammosum* L., *Calocarpum sapota* Jacq.) (Fig. 2) were prepared as a poultice, and applied to the hair to enhance shine (Hernández, 1942b), while crushed leaves of the *quamiahoatl* plant (*Lycopodium dichotomum* Jacq.) were used to make hair thicker and more lustrous (Hernández, 1942c).

Oil extracted from the seeds of red mamey fruit keeps hair lustrous and beautiful and also makes it grow (Anonymous, 1997). Modern use of red mamey fruit seed preparations for hair care has been documented in areas of Mexico and Central America (BDMTM, 2009; Martínez, 1990). The powder obtained from crushing its seeds is used to create an ointment that prevents hair loss and makes hair soft. It is also used in preparations of soap for embellishing the hair. Today, many herbal shampoos available in the market contain extracts or products made from *Calocarpum mammosum* (L.) Pierre, which is a Mexican fruit of high commercial value.

Figure 1. The *xiuhamolli* (*Ipomoea murucoides* Roem. & Schult.) flower and tree.

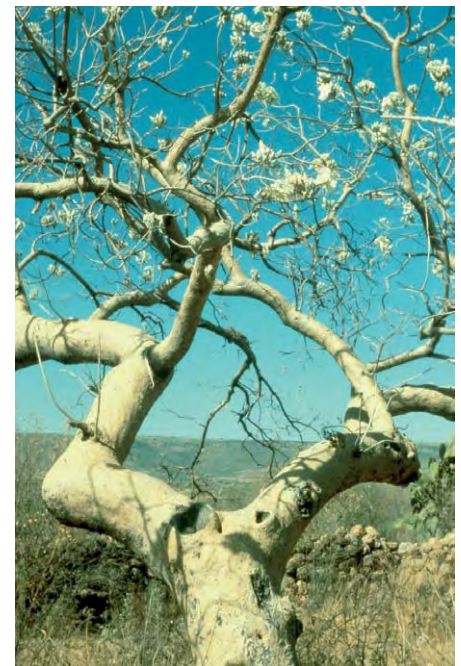


Figure 2. Red mamey (*Pouteria sapota* Jacq.) tree and fruit.



To grow hair and get long hair, a plaster was prepared with water and crushed seeds of the plant called *chatalhuich* (unidentified plant), which was applied using a comb (Hernández, 1959b). Although Martínez (1990) identifies the *chatalhuich* as a “retama” plant or a “duerme de noche” plant (*Cassia laevigata* Willd., arsenic bush, buttercup bush, smooth senna, yellow shower), he also clarifies that the description of this plant made by Hernández did not match perfectly with the “retama.” In Ximénez version of Hernández (1615), the priest recorded that peel from the fruit of this plant was used in bathing in order to fortify brittle hair and encourage its growth, so the two accounts support one another.

Using the seeds of “zacapolin” or “*pasto glutinoso*” plant (*Cenchrus tribuloides* L.), a poultice was made to encourage the hair’s growth and avoid baldness (Hernández, 1942d). The Biology Institute of UNAM (IBUNAM) recorded in Hernández’s 1942 publication that “*pasto glutinoso*” is currently known as *huicapole*, *cadillo* or *rosetilla* (sandunne, sandbur, sand burgrass, sand spurs). However, BDMTM (2009) identifies “*cadillo*” as *Pavonia schiedeana* Steudel. There are two species with the same common name and similar uses. “*Cadillo*” plant is used today for the same purposes (plus dandruff) reported by Hernández in the area near Puebla and Veracruz, Mexico (BDMTM, 2009; Hernández, 1942d).

Several types of plants were used for preparing ointments and plasters that were used to solve the problems of brittle hair, and prevent the appearance of split-ends. *Hoixachinquahuitl* pods (*Pithecellobium albicans* (Kunth) Benth.), prepared in decoction and mixed with a kind of mud, or *palli*, were applied for four days each month in order to avoid cracks in the hair strands or any other disease (Hernández, 1942d). Seeds of the red mamey were also crushed, blended with cocoa, and applied to the hair in order to prevent brittleness (Hernández, 1942b). Hernández indicated in this section that the plant was also applied to *xícaras* (shells of the calabash fruit dried and made into vessels) and wood to enhance the color.

Among these plasters, ointments, and powders, ethnohistoric documents also mention the use

of “*on*” (avocado) oil to correct and prevent brittle hair (Hernández, 1942e). Currently, in Mexico and Central America, ethnobotanical and anthropological records confirm that in order to avoid or stop hair loss, leaves or seeds from the avocado fruit (*Persea americana* L.) are crushed and mixed with water in conjunction with other oils to prepare an ointment for application and wearing overnight in the hair,

or alternatively for fifteen minutes before bathing (BDMTM, 2009; Martínez, 1990). Today, it is unlikely that people have not heard of the benefits of using avocado oil in beauty and hair care. Early twentieth-century studies highlight the high concentration of vitamin B in avocado oil (Martínez, 1990). Other equally beneficial species of avocado found in Mesoamerica include *Laurus persea* L., *Persea gratissima* Gaertn. and *Persea persea* (L.) Cockerell (BDMTM, 2009).

Mesoamericans were concerned with clean, long, bright and healthy hair, but also to maintain beautiful color. While ethnohistoric documents denote only two hues, black and blond, used as hair dyes by Mesoamerican people, the probability of the use of other colors is supported by Mesoamericans for other purposes, such as art and fashion. Undoubtedly, the most famous dye used to achieve black-bluish hair was powdered indigo or *añil* (*Indigofera suffruticosa* Mill.) (Figs. 3 and 4). More information is known about the *añil* plant due to its importance as a source of blue dye, which was sold during and

Figure 3. Indigo or añil (*Indigofera suffruticosa*) flower.



Figure 4. Image from a polychrome Maya vase. The image represents a Ruler in a conversation with a scribe, while a woman approaches with a pedestal vase in her hand. It is important to note hair dyed in black (probably with indigo), along with body painting, headdresses used to enhance the body’s appearance of Maya’s Royalty.



after the colonial period in Central America (Hernández, 1959c; Rubio, 1976; Turok, 1996; Ximénez, 1968). The *Chilam Balam*, which are handwritten scripts probably by priests, provide the fullness of 18th-century Yucatec-Mayan spiritual life. In those books, the spiritual nature of an ill character is portrayed with his body painted blue (something that has been corroborated in several pre-Hispanic murals, such as the *Paradise of Tlaloc from Teotihuacan*, wherein the deaths related to water-borne diseases are depicted by blue paint) (Bricker and Miram, 2002 ; Rubio, 1976).

Diego de Landa (Landa, 1985) also included descriptions of participants in fertility rites smearing the body with blue paste, called *ch'oh*, which is the name still given to the plant that produces this color in the Maya Yucatec language (Rubio, 1976).

In order to lighten, or dye the hair blond, various crushed, powdered or burnt plants were mixed with water and decocted or macerated before application. There were three plants used for this purpose: *temcozahuilia* (unidentified), *cozticquahuil* (unidentified) and *mazacaxocotl* (*Spondias purpurea* L.) (Hernández, 1959d, 1942f, g). Regarding *cozticquahuil*, Martínez includes a tree called *costicpatli* (*Thalictrum hernandezii* Tausch ex J. Presl), whose roots when chewed, turn saliva yellow. It is assumed that these are the same plant and that the yellow dye was the principle for coloring blond hair, according to Hernández (Martínez, 1990).

## SKIN CARE

Some plants and preparations were used for cleaning the face as well as enhancing beauty (vanishing scars, blemishes and other defects) and for healing cracked skin and chapped lips. Among these types of plants, coconut water (*Cocos nucifera* L. – coconut, *Erythea edulis* S. Wats – palm) has the ability to clean the skin (Hernández, 1942h).

In another treatment, crushed *huitzitzillacotl* plant (rubbed on) produces cleaning of the face and provides relief from chafing (Hernández, 1959e). To this day, the bulb of the *huitzitzillacotl* plant (*Zephyranthes* sp.) (Fig. 5) is used for

the same purpose: washed and sliced on one edge, then rubbed gently on the face to treat blemishes. It is necessary to apply it daily in the evening, or before bedtime, for a period of one to two months, or until the condition disappears. This preparation was especially useful for pregnant women, who usually manifested facial spots, but it was also prescribed for men who suffered blemishes due to the effects of poor nutrition, or as a symptom of another disease (BDMTM, 2009).

Amongst the ancestral Mesoamericans, there were three forms for softening the face. In the first, the face needed to be washed (using an infusion) with the herb *azpanxiuitl* (not identified) to eliminate rough skin; the second used the same plant but the stem was rubbed over the face to soften the skin; the third one used applications of *chilcoztli* (yellow pepper) powder, with the face being washed, before and after, with warm urine. *Tzontecomatl tzopilotl* or mahogany (*Swietenia mahogani* L.) oil was also used to soften and clean a woman's face (Hernández, 1942f), and the milky distillate of the *red mamey* tree trunk served to improve the appearance of the skin because it is caustic (Anonymous, 1997).

These uses of phyto-cosmetic and hygienic products reflect the intricate way in which plants and their preparations were woven into Mesoamerican society and culture. As cultural material these cosmetic and care products allow a glimpse of how body care, decoration, and personal presentation were envisioned, and how the inhabitants of this geographic area constructed their ideas about body practices.

Ethnohistorical documents show great diversity in the plants described for use as raw materials from which a large variety of products were created to fill the social needs of curing, correcting, embellishing, and aromatizing the body in Mesoamerica, some of which are considered now-a-days as horticultural plants. In their formulation, those phyto-cosmetic and hygienic preparations were made to be applied as topical liquids, plasters, oils, and ointments, or consumed in a solid form, or as beverages.

Currently, preparing cosmetic formulas is an important part of pharmaceutical research and development, particularly if natural and active principles are used. These formulas are more specialized than most, and are more challenging to formulate, because of the number of complex ingredients involved, which can have tremendous beneficial reactions on the body surfaces to which they are applied. However, it is interesting to note that Mesoamerican specialists in phyto-cosmetics, hygienic preparations, and medicinal products, were able to find a way to apply these various products without adverse effects being recorded in the ethno-documents (or when this happened, it is advised).

When Landa Bishop refers to the beauty of the Maya women, it is possible to envision an

ancient Mesoamerican woman wearing colorful robes, scented with a pleasant aroma from the perfumed oils and floral ointments she has applied, and possessing bright, rich, blue-black hair dyed with a mixture of indigo and red mamey seed oil (Landa, 1985). She would appear beautiful, voluptuous, and healthy with firm, lustrous lips without cracks, and skin browned by the sun but spotless, bright, and smooth. This is the cultural, sociological, and cosmological view of health and beauty that was an essential part of Mesoamerican daily social life.

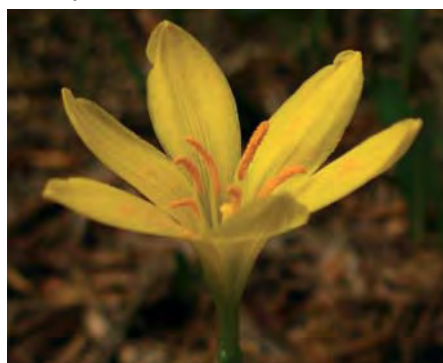
## ACKNOWLEDGEMENTS

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**Figure 5.** Huitzitzillacotl (*Zephyranthes* sp.) flower.







# Domesticating the Rainforest: Commercial Nuts from Rainforest Trees of Australia and the South Pacific

Helen Wallace

Nuts have been found to have many health benefits such as reducing the risk of cardiovascular disease and diabetes (Allen, 2008). They also have huge potential to improve the livelihood of the rural poor in developing countries and meet the Millennium Development Goal to eradicate extreme poverty and hunger. Nuts often have a high protein and oil content, giving them excellent nutritional value. They can be processed and stored for long periods and therefore can improve food security. Packaged nuts can be sold for cash, processed and exported to distant markets, thus helping the rural poor to participate in the cash economy.

Only a few of the world's 250,000 species of flowering plants have been domesticated, and as few as 100 plant species provide 90% of the world's food supply (Prescott-Allen and Prescott-Allen, 1990). The world trade in tree nuts is in excess of \$US 2 billion and just four species, walnuts, hazelnuts, pistachios, and almonds, make up more than 80% of this trade (USDA, 2004, 2008). Many other species of edible nuts have potential to be domesticated and sold commercially. Two rainforest trees, *Macadamia* and *Canarium*, have been the focus of efforts to domesticate and create new nut industries in Australia and the South Pacific.



tivar selection program from its establishment in 1900. Hawaiian cultivars formed the basis for an industry in Hawaii in the 30s, 40s and 50s and many of the popular and widely grown cultivars worldwide still bear the prefix, HAES. In Australia, two HAES cultivars, '344' and '741', are the most widely grown. In the 1980s, two new cultivars selected for Australian conditions, 'Hidden Valley A4' and 'Hidden Valley A16', were released by Henry Bell, a pioneer of the Australian macadamia industry. Macadamia is still relatively "wild" compared to other crops as it has had very few generations of selection and breeding. Further breeding and selection is likely to produce major gains in nut production and quality.

Commercial macadamia cultivars are usually propagated by cuttings or grafting and grown

## THE MACADAMIA INDUSTRY

The macadamia industry is an excellent model for domestication of a new nut crop. The macadamia nut (Fig. 1) is the only Australian plant that has been domesticated on a commercial scale as a food crop. In Australia, macadamia nut production has grown from a modest 4,400 tons in 1987 to an estimated 35,500 tons in 2010. Macadamia is also grown commercially in South Africa, The United States, Kenya, and Brazil with emerging industries in Malawi, Paraguay and other countries.

Figure 1. The edible kernel of the macadamia nut.



## MACADAMIA IN THE WILD

Macadamia is a member of the predominantly Southern Hemisphere family, *Proteaceae*, an ancient plant family remnant from the Gondwanan supercontinent. There are four species of *Macadamia*, and all occur in subtropical rainforests along the east coast of Australia. The rainforests have been mostly cleared for agriculture in the last 200 years and the wild species of *Macadamia* are now vulnerable to extinction. Commercial macadamia cultivars were developed from the two edible species, *Macadamia integrifolia*, *M. tetraphylla* and their hybrids. The commercial macadamia cultivars are very different from their tall, multi-stemmed wild relatives that grow in the deep shade of the rainforest. Commercial cultivars are small, single stemmed trees, grown in full sun. The other two species, *M. ternifolia* and *M. janseni*, are inedible as they contain cyanogenic glycosides. *M. janseni* is now critically endangered with less than 50 individuals known in the wild.

## MACAMIA DOMESTICATION AND CULTIVATION

Hawaii laid the foundations for domesticating macadamia. A handful of seeds were taken to Hawaii in 1881 and the Hawaii Agricultural Experimental Station (HAES) commenced a cul-

Figure 2. A commercial macadamia orchard.



**Figure 3. A) Flowers of macadamia showing *Trigona carbonaria* collecting pollen, B) mature fruit of macadamia.**



in large, intensively managed orchards (Fig. 2). Macadamia flowers in spring and requires cross pollination to produce a heavy crop (Trueman and Turnbull, 1994; Wallace et al., 1996). The most efficient pollinators are honeybees, *Apis mellifera*, and, in Australia, the stingless bee, *Trigona carbonaria* (Fig. 3a). Macadamia fruits mature 6-7 months after flowering (Trueman et al., 2000) and fall to the ground naturally (Fig. 3b). They are harvested mechanically and the fibrous pericarp is removed by a mechanical dehusker. Nuts-in-shell (botanically, the seeds) are then dried to around 10% moisture content in silos, transported to the factory, further dried to 3% moisture content, cracked and processed. The kernel has an oil content of 70-80% (Trueman et al., 2000). Management practices to improve yield and quality have been extensively researched in the last 30 years, focussing on nutrition, canopy management, fruit set, pollination, pests, diseases, and yield (Nagao and Hirae, 1992; Huett, 2004). Recently, nut quality and postharvest processing have become major issues for the industry as quality may be affected at any stage of harvesting and processing (Walton and Wallace, 2005a, b, 2008, 2009). Macadamia nuts are a rich source of monounsaturated fats and regular consumption can reduce cholesterol and help to reduce the risk of coronary artery disease (Garg et al., 2007).

### THE CANARIUM INDUSTRY

In contrast to macadamia, the canarium industry is still small in world terms. Estimates of the market value for packaged nuts in Vanuatu and Papua New Guinea in 2004 were \$US1 million per year. Canarium nuts are mostly traded fresh in roadside and village markets, either as nut-in-shell or as dried kernels. The trade is based on unimproved populations in Papua New Guinea, the Solomon Islands and Vanuatu of around 2.2 million trees. Women conduct the majority of farming and trading activity in the South Pacific,

and women's activities include nut cultivation, handling, processing and selling, but many women simply sell the raw product wrapped in banana leaves at markets. There is huge potential for expansion of the domestic and export market in Pacific Island countries, and a strong industry would improve the livelihoods of rural households (Nevenimo et al., 2007). One processor in Vanuatu, South Pacific Nuts, sells processed canarium nuts (Fig. 4) to the domestic and tourist markets, and cannot meet the demand for this product.

### CANARIUM BOTANY, DOMESTICATION AND CULTIVATION

The genus *Canarium* (*Burseraceae*) contains approximately 100 species, mostly found in tropical Asia and the Pacific. Eight species in Southeast Asia, Australia and the Pacific have edible kernels. In the Pacific, *C. indicum* is the most widely utilized for its edible nuts and timber.

*C. indicum* is a rainforest tree that occurs in the lowlands up to 600 m elevation in Eastern

**Figure 4. Processed *Canarium* nuts for sale in Vanuatu.**



Indonesia, Papua New Guinea, Vanuatu, and the Solomon Islands. The tree can grow up to 40 m and has been domesticated in traditional agricultural systems (Fig. 5). In Melanesian society, trees are selected, tended and cultivated around coastal villages and it is a very important food and ceremonial tree. There is evidence the tree has been used for over 6000 years in Papua New Guinea (Matthews and Gosden, 1997). The fruit are purple when ripe (Fig. 6a) and fall

**Figure 5. *Canarium indicum* trees in Papua New Guinea.**



**Figure 6. A) *Canarium indicum* fruit, B) nut in shell.**



from the tree. The harvesting of fruits is of great importance and rights to harvest are traded within and among clans (Thomson and Evans, 2006). The fruit contains an endocarp (Fig. 6b) with an edible kernel and testa, and the kernel has an oil content of 67-75% (Leakey et al., 2008). The oil has traditionally been used to treat arthritis, and a patent was recently issued for this purpose, leading to vigorous debate about ownership of intellectual property (Nevenimo et al., 2007).

Currently *Canarium indicum* is grown mostly in smallholder blocks, or harvested from the wild. Some plantation trials have shown that canarium trees are very successful in mixed cropping systems with cocoa and coconut (Fig. 7). Canarium trees have great potential to replace *Gliricidia*, a legume that is used to shade cocoa in mixed agroforestry systems.

## GROWING THE NEW NUT INDUSTRIES

Macadamia has made substantial inroads as a world industry and continues to benefit from investment in research programs in previous decades on selection, breeding, physiology, fruit production and postharvest processing. A challenge for the industry is to rebuild its skill base and human capital, as many researchers have now left the industry.

Canarium is an industry in its infancy and needs coordinated efforts to select and breed commercial cultivars, develop processing techniques, encourage investment, develop new markets, and create the appropriate socio-economic structures for the industry to flourish. Several projects are addressing these issues using partnerships between researchers in

Australia, Papua New Guinea and Vanuatu, and the macadamia industry, with funding from the Australian Centre for International Agricultural Research and the European Union.

Both species need a concerted effort to conserve wild resources for future breeding and selection. This is now critical for macadamia as the industry is based on a narrow genetic base

and the wild plants are vulnerable to extinction. The Australian macadamia industry has responded to this urgent need by establishing the Macadamia Conservation Trust, a not-for-profit organisation to conserve wild macadamia trees. Both industries will benefit from the new partnerships being forged between countries and industries.

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**Figure 7. A mixed cropping system with cocoa (understorey), *Canarium indicum* (midstorey) and coconut (overstorey).**



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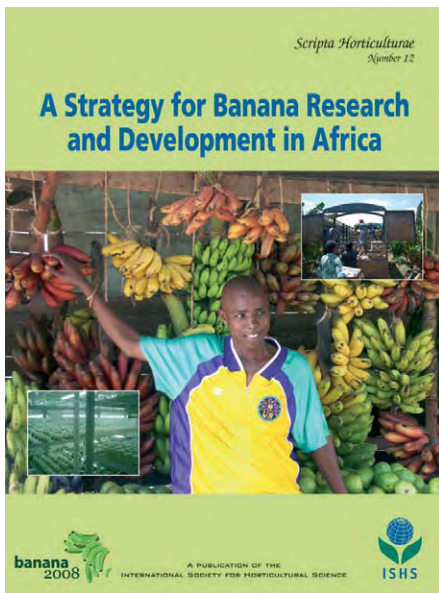




# New Books, Websites

## BOOK REVIEWS

**A Strategy for Banana Research and Development in Africa.** Fen Beed, Thomas Dubois and Richard Markham. 2012. *Scripta Horticulturae* 12. A publication of the International Society for Horticultural Science. 93p. ISBN 978-90-6605-664-0. € 30. Available from the ISHS Secretariat ([www.ishs.org/pub/scripta.htm](http://www.ishs.org/pub/scripta.htm)).



The International Institute of Tropical Agriculture (IITA), in partnership with Bioversity International, the Forum for Agricultural Research in Africa (FARA), the International Society for Horticultural Science (ISHS) and the Kenyan Agricultural Research Institute (KARI) organized the International Banana Conference in Mombasa, Kenya, October 5-9, 2008 ([www.banana2008.com](http://www.banana2008.com)).

The conference actively solicited and successfully harnessed inputs for the first time from such a truly diverse range of stakeholders including farmers and their representatives, scientists, trade specialists, policy makers and the private sector. A major output was the development of a strategy to exploit banana as an economic driver for Africa through strengthening research partnerships towards overcoming key challenges in production, emerging markets, trade networks and innovation systems.

The full strategy document, entitled 'A Strategy for Banana Research and Development in Africa' has now been published as *Scripta Horticulturae* Number 12. The document is authored by Fen Beed, Thomas Dubois and Richard Markham and is available for download

from [www.ishs.org/pub/scripta.htm](http://www.ishs.org/pub/scripta.htm) and [www.banana2008.com](http://www.banana2008.com). At the latter website all 95 peer-reviewed publications from the proceedings, published as *Acta Horticulturae* 879, can also be found.

**The books listed below are non-ISHS-publications. For ISHS publications covering these or other subjects, visit the ISHS website [www.ishs.org](http://www.ishs.org) or the Acta Horticulturae website [www.actahort.org](http://www.actahort.org)**

**Blueberries.** Jorge B. Retamales and James F. Hancock. 2012. *Crop Production Science in Horticulture Series No. 21.* CABI Publishing, UK and USA. 336p. ISBN 978-1-84593-826-0 (soft cover). £45 / US\$85 / €60. [www.cabi.org](http://www.cabi.org)



This is a new book in the Crop Production Science in Horticulture Series where previous volumes have covered a wide range of ornamental, vegetable and fruit crops across both temperate and tropical climates. The series is targeted at researchers, extension workers, academics, breeders, students and growers.

Blueberry production has expanded rapidly over the past two decades and production has shifted into many new regions globally. It is timely, therefore, that such a publication that brings together knowledge on most facets of blueberries is prepared and published. The topics covered include botany, physiology, nutrition, growth regulation, photosynthesis, envi-

ronmental responses, weed, pest and disease control and postharvest management.

This is a very well written text. Each subject is supported with a background that outlines the basic principles that are being discussed, followed by sections that specifically focus on blueberries – including highbush, lowbush, rabbiteye and hybrid types. This approach is particularly important given the particular requirements of blueberries that are associated with acid soils, chilling requirements, pollination and so on. Each chapter has an extensive bibliography that will be a helpful source of additional information for those who seek to enquire further.

The introduction to the book indicates that each chapter was reviewed by an independent specialist, which has, no doubt, improved the content to the high standard that has been achieved.

The book is also characterised by a large number of tables which are clearly set out and provide excellent information that complements the text. There is only, however, one black and white photo, no coloured photos and only around 26 graphs and diagrams in the entire text. This is disappointing, especially for a text that is to be used to support teaching. The omission is no doubt due to the policies of the publisher where costs are being minimised in order to constrain the retail price of the publication. Nonetheless, horticultural crops and their management are often reliant on visual identification of cultivar types, disease and pest identification, nutrient deficiency management, pruning and training options and the identification of postharvest disorders. Well-prepared and accurate line drawings are also valuable additions to such a text but require resourcing to manage well. Books in this series should be supported in such a way if their excellent texts are to be fully understood by readers and utilized by teachers and extension agents. Perhaps placing such material on an associated website would achieve the desired constraint on publication costs but provide access to such critical visual material?

Reviewed by Ian Warrington, Massey University, New Zealand

# Courses and Meetings

The following are non-ISHS events. Make sure to check out the [Calendar of ISHS Events](#) for an extensive listing of all ISHS meetings. For updated information log on to [www.ishs.org/calendar](http://www.ishs.org/calendar)

Sustainable Fruit Growing: From Plant to Product, 22-24 August 2012, Riga-Dobele, Latvia. Info: Latvia State Institute of Fruit-Growing, Graudu 1, Dobele, LV-3701, Latvia, Phone: + 371 63722294, Fax: +371 63781718, Email: [laila.ikase@lvai.lv](mailto:laila.ikase@lvai.lv)

9th Solanaceae Conference, From the Bench to Innovative Applications, 26-30 August 2012, Neuchâtel, Switzerland. Info: SOL2012, University of Neuchâtel, Institute of Biology, Emile-Argand 11, CH-2000 Neuchâtel, Switzerland, Phone: +41 (0) 32 718 2504 / 2502, Fax: +41 (0) 32 718 3001, Email: [sol.2012@unine.ch](mailto:sol.2012@unine.ch), Web: [www.sol2012.ch](http://www.sol2012.ch)

XII International Citrus Congress, 18-23 November 2012, Valencia, Spain. Info: Prof. Luis Navarro, President of the International Society of Citriculture and Chairman of the Congress, Email: [lnavarro@ivia.es](mailto:lnavarro@ivia.es), and Technical Secretariat Citrus Congress 2012, Viajes El Corte Inglés S.A., División de Congresos, Convenciones e Incentivos, Gran Vía Fernando el Católico, no. 3 bajo, 46008 Valencia, Spain, Phone: +34.963.107.189, Fax: +34.963.411.046, Email: [citruscongress2012@viajeseci.es](mailto:citruscongress2012@viajeseci.es), Web: [www.citruscongress2012.org](http://www.citruscongress2012.org)

3rd International Symposium on Medicinal Plants, Their Cultivation and Aspects of Uses, 21-23 November 2012, Petra, Jordan. Info: Dr. Mohammad Sanad Abu-Darwish, Shoubak University College, Al-Balqa' Applied University, Al-Salt 19117, Jordan, Phone: +96232165082, Mobile: +962795171140, Fax: +96232164035, Email: [Maa973@yahoo.com](mailto:Maa973@yahoo.com), [confismpasbst@yahoo.com](mailto:confismpasbst@yahoo.com), [Maa973@bau.edu.jo](mailto:Maa973@bau.edu.jo)

International Symposium on Tree Product Value Chains in Africa: Sharing Innovations that Work for Smallholders, 26-28 November 2012, Yaounde, Cameroon. Info: ICRAF-West and Central Africa, P.O. Box 16317, Yaounde, Cameroon, Phone: (237) 22 21 50 84, Email: [aftp-symposium@cgiar.org](mailto:aftp-symposium@cgiar.org), Web: [www.aftp-symposium.org](http://www.aftp-symposium.org)

Crop Protection in Southern Britain 2012, 27-28 November 2012, Peterborough, UK. Info: Association of Applied Biologists, Warwick Enterprise Park, Wellesbourne, Warwick, CV35 9EF, UK, Phone: +44 (0) 2476 575012, Fax: +44 (0) 1789 470234, Email: [bernadette@aab.org.uk](mailto:bernadette@aab.org.uk), Web: [www.aab.org.uk](http://www.aab.org.uk)



## SYMPOSIA AND WORKSHOPS

# Second All Africa Horticulture Congress

Group photo of Congress delegates.

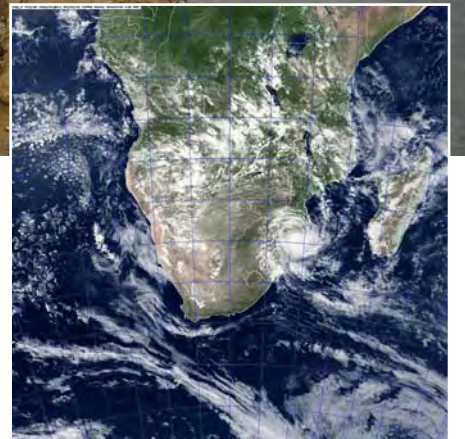


**A**fter successfully winning the bid to host the 2nd All Africa Horticulture Congress, the Southern African Society for Horticultural Science, under the aegis of the International Society for Horticultural Science, played host to over 250 delegates from 30 countries around the world. With the theme "Horticulture for Humanity", 138 scientific oral presentations, 58 poster presentations, 4 workshops (Biotechnology, Genetic Resources and Genebanks, Technology Incubation for Agri-Business Development, and Horticulture in Higher Education), 3 FAO side events focusing on Nutrition and Food Security and related topics as well as various technical tours to industries and projects in the Lowveld Region, were held at the Nobolo Mdluli Conference Centre at Skukuza in the Kruger National Park (South Africa) from 15-20 January 2012. The Congress was unique in that contributions by delegates combined scientific innovation with socio-economic issues, addressing horticultural challenges facing the African Continent and its people. It was also extremely gratifying to see so many students presenting their research results as they are the backbone of the future of horticultural development and research. The development of innovation in horticulture is essential, and investment in world-class agricultural research delivers benefits to the economy, food security, household nutrition and competitiveness on international markets.

The programme featured plenary sessions each morning, followed by the scientific sessions that ran throughout the day together with the FAO side events and poster sessions. The technical tours included visits to various projects and industries in the area, including subtropical fruit and nut production, cut flower and foliage production, agri-business



Delegates take a 'walk on the wild side' to waiting vehicles by returning across a bridge damaged by the floods and thereby cutting off Skukuza Rest Camp, venue of the Congress.



Tropical Storm Dando hit landfall on 18 January 2012 when more than half the delegates were participating in the Technical Tours!

development for small-scale farmers using incubation principles, as well as a visit to school and community vegetable gardens close to the Kruger National Park. Tropical storm Dando made landfall on the day of the technical tours resulting in some swift changes in plans to ensure the safety of delegates since the Kruger National Park was cut off from the 'outside world'. Delegates returned

to Skukuza the following morning and after a hearty lunch, the scientific programme continued, albeit slightly later than scheduled!

Welcome address by the Honourable MEC and Platinum Sponsor. From left to right: Karin Hannweg (SASHS President and Convener), Dr. Shadrack Moeophuli (President and CEO of Agricultural Research Council, Platinum Sponsor), the Honourable MEC Ms. Candith Mashego-Dlamini (Department of Rural Development and Land Administration) and Dr. António Monteiro (ISHS President).



Delegates learning more about processing and packaging on one of the Technical Tours.



Delegates were welcomed by Kruger National Park Head of Scientific Services, Dr. Stefanie Freitag-Ronaldson, at the Welcome Function on Sunday and on Monday morning by Agricultural Research Council (ARC) President and CEO, Dr. Shadrack Moephuli, the ARC being the Platinum Sponsor of the Congress. The Congress was officially opened by the Department of Rural Development and Land Administration's Minister of the Executive Committee (MEC), the Honourable Candith Mashego-Dlamini. The MEC outlined the value of all role-players in ensuring the development of horticulture and the importance of horticultural research in the development of the Continent before declaring the Congress open and allowing the first of several scientific sessions to continue. With the extensive horticultural research activities being carried out and addressing the needs and challenges of the Continent, a diverse range of thematic sessions was offered to delegates in three or four parallel sessions each day. There was also a great deal of interaction amongst delegates during the poster sessions. The full papers are to be published in a special volume/s of *Acta Horticulturae*. In conjunction with the parallel thematic sessions, the FAO side events focussed on fruit and vegetable consumption for health, horticultural biodiversity and its contribution to food and nutrition security and urban food supply. The workshops focussed on presentations and discussions around agribusiness development through technology incubation, biotechnology tools for horticultural crop development, genebanks and genetic resources, as well as an additional workshop on higher education and opportunities for horticulture in Africa.

The Southern Africa Society for Horticultural Science traditionally confers various awards (Best Published Paper Award, Best Poster Presentation, Best Open Presentation, Best MSc and Best PhD Oral Presentations, Best Student Oral Presentation Travel Award) to deserving delegates at its annual Congress and 2012 was no different. Since students are the future of horticultural development and research, a Student travel bursary, sponsored by the SASHS, and Registration fee of an ISHS symposium or IHC2014 in Brisbane, sponsored by the ISHS, was awarded to the best Oral Presentation by both a South African and a non-South African student!

After bid presentations delivered by representatives of Ghana and Nigeria were made, it was recommended that the Third All Africa Horticulture Congress be organised and hosted by Nigeria in 2016.

## A SUMMARY OF THE RESOLUTIONS OF THE CONGRESS

### Progress of the AAHC

1. The SASHS and ISHS are acknowledged for having fulfilled the first resolution from 2009 and making successful and sustainable such a continental event. The organizers in charge of the last AAHC in Nairobi, 2009 are pleased to see such continuity and proud to hand over a significant financial contribution for the *Acta* of AAHC 2012.
2. The organizers in charge of the next AAHCs every 4 years shall consult with other regional organizations and agencies (e.g. SHE in Europe) to avoid overlapping events.
3. In between the AAHCs and during the IHCs, Africans should report on the past AAHC and advertise the next AAHC.
4. Candidates for hosting an AAHC shall receive the mandate from the participants, and legitimacy from ISHS, keeping the network alive and even stronger and larger after time and providing equal chances to countries and/or regions and/or agencies.
5. Candidature of Nigeria to organize the next AAHC in 2016 on behalf of the Horticultural Society of Nigeria has been agreed by the floor.

### African Horticulture Journal

1. While it was confirmed that it is necessary to link with partners between AAHCs, it is also seen as dangerous to duplicate or compete with already existing journals or with *Acta Horticulturae*. Instead of creating a new, costly and restricted African journal on horticulture, it is preferable to strengthen the relationship with the Journal of the African Crop Science Society, the African Journal for Food, Agriculture, Nutrition and Development, the journal Fruits and the South African Journal of Plant and Soil.
2. During the years between AAHCs networking shall be maintained through side events hosted by African partners like the ACSS or the general assembly of a national society for horticulture. FAO and GlobalHort will support the organization of such side events, such as the UPA side event at the Xth ACSS conference, Maputo in 2011.
3. Between two AAHCs networking shall be maintained through a newsletter coordinated by the organizers of the coming AAHC. The ISHS is ready to assist in the production and dissemination of such a newsletter.

### AAHC Inclusivity and Affordability

1. Language: scientists shall make presentations in English for both scientific and financial reasons. However, following the ISHS standards and guidelines for publication in *Acta*, the full papers can be in French or in

Spanish (with extended abstract in English).

2. Affordability: the basic registration fee shall include only basic services.
3. Affordability shall be met by organizing events with universities and agencies, for instance students can be involved as motivated local assisting forces.

### Sensitization and Advising Policy Makers

1. In reference to the previous resolutions from 2009, GlobalHort is acknowledged for its role in promoting horticulture in Africa, and the AAHC in particular, at the highest level possible: FAO, GFAR, and NEPAD. GlobalHort shall continue in the future as agreed by the participants.
2. International agencies will enhance the promotion of such events and communities on horticulture through documents to disseminate to policy makers. The ISHS will release to country members a booklet, a leaflet and a poster advocating horticulture.
3. The outcomes from side events convened by FAO on Horticulture and health, Horticulture and biodiversity, and Horticulture for city supply of food will be included in the respective FAO initiatives PROFEL-PROFAV, Save and Grow, and Growing Greener Cities, with a facilitation role from GlobalHort.

### Acknowledgement to the Local Organizers for Their Excellence

1. The participants would like to express their deep gratitude to the Organizing Committee for their excellent work in the preparation and implementation of the 2nd AAHC. Karin Hannweg and Mark Penter are specially acknowledged and will forward these congratulations to all their collaborators from SASHS and ARC.
2. Considering the additional stress generated by the heavy rains, the flood and the bridge broken down at the gate of the park during the field visit day, considering the difficulty in organizing the AAHC in such a remote, wild and marvelous place and considering the tight agenda of this full week of international and local transportation, the participants and organizers would like to express their deep appreciation to Ethne Cameron and Susie Prangle (Going Africa Conferencing) for their professionalism, enthusiasm and kindness.

Karin Hannweg, President Southern African Society for Horticultural Science

## CONTACT

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# Royal Flora Ratchaphruek 2011-12

The International Society for Horticultural Science was again proud to be partners in Royal Flora Ratchaphruek that was held in Chiang Mai, Thailand from December 2011 until March 2012. This international floricultural exhibition attracted around 2.5 million visitors during the three months that it was open. Covering more than 80 ha, exhibits included display gardens from over 25 countries, a major orchid pavilion, a large hydroponics greenhouse, a very big display of shade plants in a large shade house, and many indoor and outdoor exhibitions over a beautifully landscaped site. A number of Thai companies, including the CP Group, had very spectacular displays. The exhibition was coordinated and managed by the Thai Ministry of Agriculture and Cooperatives, the Thai Department of Agriculture, the Highland Research and Development Institute and the Horticultural Science Society of Thailand.

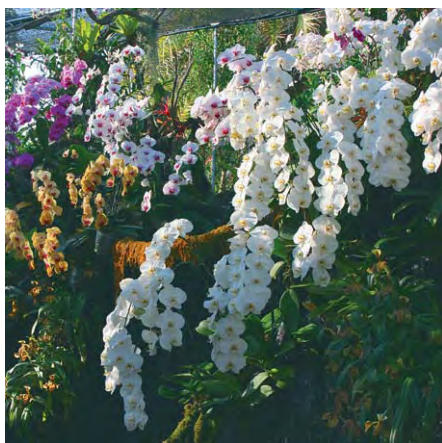
The theme of Royal Flora was "Greenitude" with its three G's (generation, garden and greenitude) and three R's (reuse, reduce and recycle). A deliberate focus on children and youth to engender a sense of appreciation and responsibility, through opportunities that are typically and uniquely presented in horticulture, was inspired and was followed through with appropriate displays and interactive exhibits.

The Thai Horticultural Science Society had a major display that embraced the theme of the exhibition with a focus on aspects of recycling and sustainability. Displays of vegetables, fruits and ornamental plants were set within large woven bamboo dome enclosures, linked together with bamboo tunnel walkways. The structures and displays attracted huge interest



• **The Horticultural Science Society of Thailand's garden exhibition. This major complex, constructed entirely of bamboo to emphasise the use of natural products and sustainability, housed a number of displays of ornamental, fruit and vegetable plants.**

• **Spectacular *Phalaenopsis* orchids. Displays of orchids were a strong feature of the exhibition. This is a major crop for Thailand and there are many different species under cultivation.**



• **Creative use of trees, bedding plants, and turfgrass in contoured plantings created an impressive display with contrasting textures, colours and shapes.**

from the public. It went on to win the overall Supreme Award for the exhibition.

In conjunction with the major field site and exhibition, four ISHS symposia were held in Chiang Mai during a three-month period – with field trips to relevant sites in the region as well as a tour of Royal Flora. These ISHS symposia included Medicinal and Aromatic Plants, Papaya, Tropical and Subtropical Fruits, and Orchids and Ornamental Plants. These were all well attended with around 200-300 registrants

at each. In addition, the Royal Flora organizers also arranged a symposium on Banana. The ISHS symposia proceedings will be published in *Acta Horticulturae*.

The decision by the ISHS Board to be involved with such activities has been indicated by the strong support shown for the four very successful scientific meetings that were held in parallel with the public events, the exposure of the ISHS to a wider community, the commitment of the ISHS to events in Asia, and the associations achieved with other organizations such as the International Association of Horticultural Producers (AIPH) and the World Flower Council. The opportunity to advocate the importance of all facets of horticulture and of horticultural science to the public, many of whom were young people, teachers and school children, was also invaluable in terms of educating a new generation about the sources of the food that they eat and the green spaces that enrich their lives.

Ian Warrington

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# Section Banana and Plantain

## Fourth Int'l ISHS-ProMusa Symposium

The First ISHS-ProMusa Symposium ended with Richard Markham, then Chair of the ISHS Section on Banana and Plantain, reminding participants "of our limited success over the past 20 years in providing workable solutions to the major crop protection problems of farmers". We all know what these problems are: leaf spot diseases, Fusarium wilt, bacterial wilts, viruses, nematodes and weevils. This fourth symposium, held on October 10-14, 2011 in Salvador, Brazil and hosted by Embrapa under the aegis of ISHS and ProMusa, similarly provided sobering accounts of the challenges scientists still face in addressing these problems. And rightly so. We should not underestimate the scale of the task at hand. But symposia also play a non-negligible role in lifting our spirits by reminding us that the steady progress of science is also punctuated by the occasional leap.

After years of being told about the limitations of conventional breeding, it was refreshing to hear that evolutionary-inspired strategies were overcoming the legendary low fertility of bananas. The symposium was also the occasion for celebrating, not only the forthcoming release of the first reference genome sequence of banana, but also the choice of DH Pahang, when it was announced that the *Musa acuminata* ssp. *malaccensis* accession used to generate DH Pahang is resistant to Tropical Race 4 of Fusarium wilt. Meanwhile, the results obtained with plants genetically modified to express genes that inhibit programmed cell death suggest that it may one day be possible to make any banana cultivar resistant to any Fusarium wilt race.

As heartening as they are, these scientific advances, along with others that will be in the proceedings of the symposium, are not the whole story. Interactions between scientists and other players along the banana chain are critical in making the banana sector as a whole more sustainable, from an environmental, economic and social perspective. The opening and closing keynotes also emphasized the importance of inter-institutional collaborations and knowledge-sharing to make the most of research efforts and ensure that they have an impact on farmers. These appeals to our better nature set the scene for the workshops that followed the scientific presentations. Aptly enough, the first workshop was on the development of a trustworthy knowledge resource on bananas on the ProMusa website. The trustworthiness will come from experts providing and reviewing contents. We are lucky in the ProMusa community to have a lot of expertise 'in-house'. In the other two workshops, the participants were invited to brainstorm on how to model the impact of climate change on the crop's pests and diseases, and on how to ensure that the data and knowledge generated by geneticists and genomic scientists meet the needs of breeders. Expect to hear more about these initiatives in the coming years.

The field trip is also one of the high points of any symposium. This year the participants were offered the choice of two destinations. One was Sitio Barreiras, to visit a farming system that enables the traceability of the entire production process from the practices used to grow the bananas to the technology deployed



Symposium Convener Dr. Edson Perito Amorim of the Embrapa Cassava and Fruits program. Photo: Hitanêz Freitas.

to put the fruits on supermarket shelves in less than 24 hours after harvest. I joined the group that went to the Embrapa research station at Cruz das Almas. We were given a tour of the facilities where had been bred the hybrids that participants had been tasting throughout the week – a selection of which will be shared with the International Transit Centre for global evaluation as was announced by Embrapa during the symposium – as well as the strikingly beautiful ornamental bananas that decorated the symposium venue.

Of course, beyond the scientific programme, what brings people to symposia is also the prospect of exchanging with colleagues in their free

Field trip, visit to the Embrapa banana collection. Photo: Inge Van den Bergh.



Janay Serejo explaining her research on ornamental banana during the Embrapa field trip. Photo: Inge Van den Bergh.





time. Throw in the socializing and sampling of local sights and delicacies, and you have all the ingredients for another memorable symposium!

I take this opportunity to announce that the next ISHS-ProMusa symposium will take place in 2014 as part of the International Horticultural Congress in Brisbane. I look forward to seeing you all there!

Inge Van den Bergh

## CONTACT

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For further information and pictures visit [www.pro-musa.org/tiki-view\\_blog\\_post.php?postId=108](http://www.pro-musa.org/tiki-view_blog_post.php?postId=108)

Participants rating the flavor of new banana hybrids. Photo: Hitanêz Freitas.

# Section Citrus International Symposium on Mechanical Harvesting and Handling Systems of Fruits and Nuts

The International Symposium on Mechanical Harvesting and Handling Systems of Fruits and Nuts was held April 2-3, 2012 at the UF/IFAS CREC in Lake Alfred, FL USA. This conference was a unique opportunity for Florida citrus researchers and growers to meet and network with the main players in world-wide mechanical harvesting systems for a diversity of fruit crops. The 150 registrants enjoyed great interactions through oral presentations, posters and social events. Participants came from Australia, Argentina, Brazil, Chile, Japan, South Africa, Spain and the US. There were keynote presentations on **Mechanical Harvesting of Olives** by speakers from Australia and Spain and **Consumer Acceptance of Mechanically vs. Hand-Harvested Table Olives** by a speaker from California. **Harvesting Florida Citrus Orchards** of the future and the use of **Abscission Aids** were well represented by Florida growers and researchers. Other highlights included achievements in **Mechanical Harvesting of Berries** in Sweden, **Apples and Pomegranates** in Israel, **Robotic Harvesting and Sorting** in Japan as well as **Machine Harvesting of Apples** in Washington and Pennsylvania. Abstracts of all presentations can be seen at the Mechanical Harvesting link at <http://www.crec.ifas.ufl.edu/>. Proceedings from the symposium will be published through ISHS

Participants of the symposium.





in ActaHort; ISHS was represented by Dr. Gene Albrigo. Attendees agreed that a meeting of this scope should be held again in 3 years, and researchers from Washington State have volunteered to host such a meeting. Seventy enthusiastic people attended an all-day field trip on the 3rd day to visit the Mosaic phosphate mine and facilities and to see ongoing citrus mechanical harvesting in central Florida.

Jim Syvertsen

## CONTACT

Dr. Jim Syvertsen, Convener, University of Florida, IFAS, CREC, 700 Exp. Stn. Rd., Lake Alfred, FL, 33850, USA, email: jmsn@ufl.edu

From left to right, Dr. Jim Syvertsen and Ms. Barbara Hyman being thanked by Dr. Gene Albrigo, Vice Chair of ISHS Section Citrus, for organizing an outstanding symposium on Mechanical Harvesting and Handling of Fruits and Nuts in April 2012 at Lake Alfred, FL (USA).

# Section Medicinal and Aromatic Plants – Commission Plant Genetic Resources – Commission Plant Protection

## First Int'l Symposium on Pyrethrum, the Natural Insecticide



Bill Casey, Botanical Resources Australia, with some of the Papua New Guinea delegates in a pyrethrum field. Crop at the flower bud stage of growth.

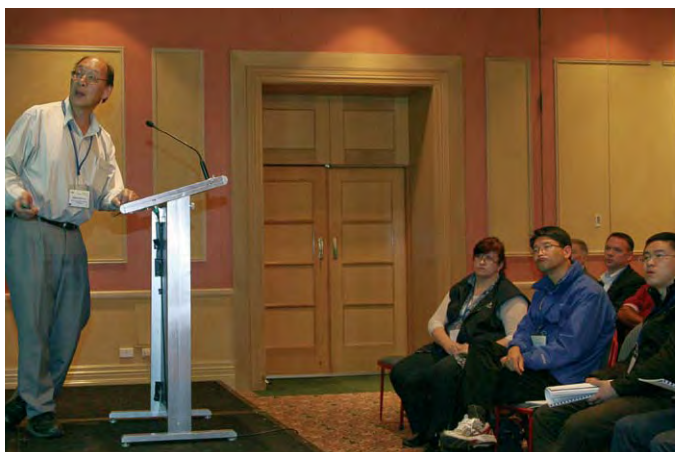
The 1st International Symposium on Pyrethrum, the Natural Insecticide “Scientific and Industrial Developments in the Renewal of a Traditional Industry” was held in Launceston, Tasmania, Australia from 2-4 November 2011. This symposium was organised by Botanical Resources Australia Pty Ltd, a major world producer of pyrethrum products, and held under the auspices of the International Society for

Horticultural Science (ISHS) with support from Horticulture Australia Limited (HAL). One hundred and forty-one participants from 16 countries attended together with 35 participants from Botanical Resources Australia. Participants included pyrethrum producers, pyrethrum formulators and marketers, researchers and other industry supply chain partners such as freight forwarders. The USA, Papua New Guinea, India,

and the EU countries were strongly represented, whilst delegates from Africa, China, New Zealand and Thailand also attended.

This was the first major gathering of participants from the whole pyrethrum production and supply chain since 1983. It gave the participants the opportunity to exchange and discuss new results, opportunities and new approaches with the common objective of promoting the reliabil-





• Brian Chung outlining the program for the symposium.



• Delegates inspecting the Botanical Resources Australia manufacturing site - pelletiser at Ulverstone, Tasmania.

ity of supply and use of pyrethrum products. A Welcome Reception was held on the afternoon of Day 1 and a Study Tour for all participants was held on Day 2. This Study Tour visited the Botanical Resources Australia factory facilities to view the new developments in pyrethrum crop processing, pyrethrum fields where the crops were at the early flower bud stage of growth, and viewed vegetable crops such as potato, onions and broccoli, which are grown in rotation with pyrethrum. A highlight of the Study Tour was the BBQ lunch at a local native animal park, where the participants enjoyed lunch and had the opportunity to view native and unique Australian animals such as kangaroos, koalas, wombats as well as the endangered "Tassie Devils". A full day of scientific presentations was held on Day 3 when 17 invited oral papers and 15 poster papers were presented. A well-attended Partners Tour visited local tourist sights and participants enjoyed a sumptuous lunch at a local vineyard. The symposium dinner held during the evening of Day 3 provided an opportunity for all delegates to interact in a social environment while a small number of participants took part in the post symposium study tour of Tasmania.

The symposium was officially opened by Ian Folder, the Managing Director of Botanical Resources Australia, and Professor Peter Oppenheim provided an overview of the International Society for Horticultural Science. The invited oral presentations were on Production and Development of the Pyrethrum Industry, Regulatory Review - Update of Progress in the USA and EU, Product and Market Review, and Science in Pyrethrum Development. Updates on the current status of pyrethrum crop production were provided by Botanical Resources Australia, the Pyrethrum Company of Tanzania and the Pyrethrum Board of Kenya. These reports provided a useful overview of pyrethrum cropping in the world, ranging from the traditional hand harvesting practices of east African producers to the mechanised produc-

tion in Australia and the varied opportunities and challenges associated with the production of the pyrethrum crop. The vagaries of weather, socio-economic factors such as competition from other crops and business management, local politics and technological developments were highlighted as factors that have significant impact on pyrethrum crop production.

Papers on the current status of the regulatory environment in the USA and EU highlighted the very high costs associated with the on-going registration requirements for all pesticide products and especially for a natural product such as pyrethrum that has a very broad range of uses, but a very small share of the overall world pesticide market. There are on-going data requirements from all government regulatory authorities such as the Environment Protection Authority in the USA where industry has to conduct expensive and time consuming studies to provide data to support the continued sale of pyrethrum products. The focus of regulatory requirement for many pesticides has shifted to broader concerns such as environmental impact and longer-term health checks. At this time, pyrethrum has achieved regulatory approval for sale in all countries, including the USA, EU and Australia and strong and active industry based task forces are continuing to undertake the costly and time consuming studies requested by the regulatory authorities.

The product and market review presentations highlighted the continuing developments of new products based on pyrethrum and the renewed consumer interest in pyrethrum products, thus highlighting a renewal and growth of pyrethrum, one of the original and traditional insecticides available to the community. A study conducted in Tasmania has provided data that shows pyrethrum crop production in Tasmania has a lower carbon footprint compared with other rotational crops such as potato and onions. Delegates were very interested to hear of recent research on the development of uses

for pyrethrum in the management of resistant insect pests and of on-going physiological studies on the pyrethrum plant in Japan, The Netherlands and India.

One of the highlights of this symposium was the opportunity for all segments of the pyrethrum industry from many countries to meet for the first time. Pyrethrum producers from Africa and Papua New Guinea had the opportunity to meet with Australian producers, whilst large and small formulators and manufacturers from the USA, EU, South Africa, India and Australia also had the opportunity to exchange views and develop ongoing contacts. Of particular interest was the attendance of two of the original "pioneers/veterans" of the pyrethrum industry. Dr. Stafford Head and Mr. Alexander Dalgety have worked for many, many years with the pyrethrum industry in Kenya, in other countries in East Africa and in Papua New Guinea and it was a highlight for Stafford and Alexander to view the on-going growth and development of an industry they had worked so hard and for so many years to establish during their lifetime. As many delegates know, pyrethrum is such a challenging and frustrating, but rewarding crop/product to be involved with. Many of us have acquired/developed the "pyrethrum bug" and like Alexander and Stafford, it is an interest and "obsession" that will be with all of us for a long, long time!!!!

Brian Chung

**CONTACT**

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# Section Ornamental Plants – Third Int'l Conference on Landscape and Urban Horticulture



Participants of the conference.

From June 29 to July 3, 2011, the Third International Conference on Landscape and Urban Horticulture was successfully held in Southeast University in Nanjing, Jiangsu Province, P.R. China. Scientists and experts gathered in Nanjing for this symposium with two optional technical tours on July 1 and July 3. The conference was hosted by Southeast University and the Institute of Tourism and Landscape Architecture under the aegis of ISHS. The objective of the conference was to provide a unique opportunity for scientists and scholars from all over the world to meet each other and to promote future multidisciplinary development in landscape architecture, urban horticulture, architecture and the arts in all related fields.

The symposium was attended by 95 people representing 21 countries. The meeting was presided over by the Organizing Committee Chairman, Professor Zhou Wuzhong from the Southeast University, School of Art, who welcomed the participants. During the opening ceremony, the Chair of the Southeast University, Professor Pu Yuepu, officially opened the meeting. After the opening speech of the Convener,

Prof. António Monteiro, ISHS President, gave a keynote lecture during the opening ceremony.



Professor António Monteiro, ISHS President, gave a keynote lecture on "Horticulture and People in the City".

The conference attracted dozens of experts and scholars from around the world, including from the University of Sheffield (UK), the Berlin University of the Arts (Germany) and the University of Queensland (Australia), to discuss the future of landscaping, gardening, art, ecology, architecture and other multi-disciplinary areas. Scientists gave 58 oral and poster presentations within 3 days. The conference focused on themes related to "Green and Art for the Enhancement of Urban Life Quality", and the discussion topics included organic food production in urban environments, plant use and sustainable development in cities, ecophysiology management in urban areas, urban horticulture and urban leisure travel, history and theory of urban horticulture, garden culture and open space development, and many more. Five invited speakers from four countries (Canada, Germany, UK, Australia) gave excellent summaries of up-to-date scientific achievements on landscape and urban horticulture. The sym-

posium atmosphere was wonderful with high quality presentations.

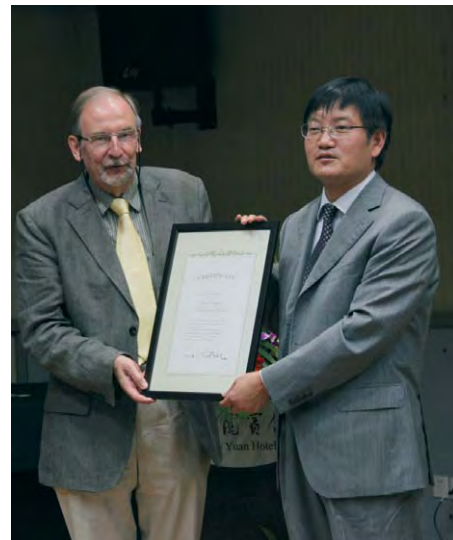
Many social events took place during the symposium. The conference dinner, complete with Chinese traditional food and music, was a perfect opportunity for all the participants to better know each other. On July 2, during the closing ceremony, Professor Gert Groening, Chairman of the ISHS Commission on Landscape and Urban Horticulture, delivered a special award certificate to the Convener of the Symposium, Professor Zhou Wuzhong. All participants and accompanying persons enjoyed several thematic evenings featuring a variety of wonderful Chinese food and traditional music that created a relaxing atmosphere conducive to informal exchanges and personal relationships. The social program was a unique opportunity for participants to learn more about Chinese traditional culture.

The first technical tour (July 1) was a trip in Nanjing. It was informative and enjoyable and participants were exposed to aspects of Chinese

traditional culture and history. Nanjing city is the capital of Jiangsu Province and is one of the most enjoyable Chinese cities, known as the Capital City of Six or Ten Dynasties in China's history, with a variety of historical and cultural heritage. The tour included visits to the imperial mausoleums, old temples, traditional garden buildings and museums. The second tour (July 3) was a trip in Yangzhou. Yangzhou is a proud retainer of ancient Chinese architecture, art, culture, traditional gardens and parks, cuisine, leisure, and commerce in a beautiful mixture of modernity blended with its rich 2500 year history. All the participants enjoyed and also learnt a lot about Chinese traditional garden art during this trip. It was a wonderful cultural experience for the tour participants.

Participants enjoyed the symposium and their short stay in Nanjing. They praised the exceptional quality of the Chinese traditional gardens and the hospitality of the Nanjing people.

Finally, we would like to thank all those who trusted us. We wish to thank the Scientific



Prof. Gert Groening, Chair ISHS Commission Landscape and Urban Horticulture, delivered a special award certificate to Prof. Zhou Wuzhong, Symposium Convener.

Committee members and all other people and institutions who made this event a great success. We believe the symposium achieved all of its objectives. We would like to especially thank the graduate students from Southeast University who worked so hard to help everyone during the symposium.

Zhou Wuzhong



Vist to Sun Yat-sen's mausoleums in Nanjing.

## CONTACT

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# Section Pome and Stone Fruits – **Second Int'l Symposium on Biotechnology of Fruit Species** Commission Molecular Biology and In Vitro Culture



Participants of the symposium.

**B**iotechfruit 2012 – the Second International Symposium on Biotechnology of Fruit Species – took place in Nelson, New Zealand from 25th – 29th March 2012. The symposium included a technical visit to the host organisation Plant & Food Research's local research orchard and a gala dinner.

Over 100 people attended the symposium from more than 20 countries around the world. The symposium included oral presentations from 54 people and 22 posters, covering all aspects of fruit biotechnology from fundamental science in model crops to the application of research for the horticultural industry.

The symposium was opened with a traditional New Zealand Maori welcome, or Mihi Whakatau, and each attendee was invited to exchange a hongi, a traditional greeting where the noses and foreheads are pressed together, with the local Maori representatives. Peter Landon Lane, Chief Executive of Plant & Food Research, formally welcomed all the attendees to the symposium, before Nahla Bassil conveyed good wishes for the meeting from the ISHS. Cathie Martin of the UK's John Innes Centre made the opening keynote presentation on her research identifying the molecular controls of health compounds in Sicilian blood oranges.

Sessions focused on the molecular controls of important traits – pest/disease resistance, health, flavour, plant development and ripening. Crops included apple, kiwifruit, citrus, raspberry, hops, pomegranate and tomato, as well as tropical crops such as dates, papaya

and watermelon, and model crops such as Arabidopsis. Topics covered the range of biotechnology – from genome sequencing and transcriptome analysis to gene identification, molecular markers, genome wide selection, and finished with inspiring stories on the transgenic papaya from Dennis Gonsalves and a close-to-release transgenic apple from Neal Carter. Breaks provided opportunities for participants to discuss their research further with research partners and potential collaborators.

On the third day of the symposium, attendees were invited to visit Plant & Food Research's Motueka Research Station. Here, the group toured the laboratories and the orchard, and listened to short talks by local scientists on Plant & Food's fruit research programmes. After the visit, a BBQ at the local Riwaka Rugby Club allowed attendees to network and enjoy the last of the New Zealand summer.

Another highlight of the event was the Gala Dinner, held at the World of WearableArt™ and Classic Car Museum. Attendees were invited to view the WearableArt Gallery, a display of unique garments designed to showcase New Zealand creativity. The dinner celebrating the success of the symposium was held in the Classic Car Gallery, surrounded by a collection

Nahla Bassil (right) thanks Symposium Conveners Roger Hellens (left) and Sue Gardiner (center) on behalf of ISHS.





Massey University, ZESPRI® Group Limited, Verified Lab Services, Deutsches Obstsorten Konsortium, New Zealand Genomics Limited, Roche, Genomnz™, the Australian Genome Research Facility and The Tree Lab – for their support.

Emma Timewell

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Plant & Food Research's Ron Beatson describes some of the research taking place on hops during a site visit to the Institute's Motueka site.

of some of the most sought after models of classic cars and motorbikes.

The Organising Committee wishes to acknowledge and thank all presenters and attendees for their enthusiasm during BiotechFruit 2012,

and hopes that everyone enjoyed their stay in New Zealand. We would also like to thank Plant & Food Research for their contribution to the organisation of the event, and the other sponsors of Biotechfruit 2012 – Illumina,

## Fifth Balkan Symposium on Vegetables and Potatoes

Section Root and Tuber Crops –  
Section Vegetables – Commission  
Protected Cultivation



Participants of the symposium.

The 5th Balkan Symposium on Vegetables and Potatoes was organized in Tirana, capital of Albania, from 9 to 12 October, 2011. It is one of the most important activities of the

International Society for Horticultural Science (ISHS) in South East European countries. The symposium was co-organized with Agricultural University of Tirana and Albanian Horticultural

Association. The symposium venue was Hotel Tirana International, one of the best hotels in Albania, and situated right in the center of Tirana.



■ Visiting a modern vegetable nursery.



■ Visiting the field trials of cabbage crops in Divjaka.

The main theme of the symposium was the transfer of knowledge and discussion of the main aspects of vegetable and potato production in the light of current research work that targets increased productivity in harmony with agronomic, environmental and socio-economic sustainability. The main research topics of the symposium were: Plant Genetic Resources Collection, Evaluation and Sustainable Use; Vegetable Breeding and Seed Production; Plant Propagation; Production Technologies and Plant Protection; Production Quality and Consumer Protection; Consumer Preferences and Market Orientations; Marketing and Production Efficiency of Vegetable Produce, etc.

The symposium was strongly supported by the Ministry of Education and Science and Albanian Academy of Science, as well as other sponsors, including FAO and USAID and several international (Syngenta, Bayer Crop Science) and local companies (Agroblend, AgroHelp, AgroKoni, EcoGreen and Bruka Seedlings). Thanks to the presence of participants from different sectors, the symposium was a good opportunity for building beneficial relations among scientists, technicians, producers, industry and consumers. Due to that, it was much more than a meeting of scientists.

The opening ceremony of the symposium was attended by Minister of Agriculture, Food and Consumer Protection, Prof. Genc Ruli, the Chairman of Albanian Academy of Science, Prof. Gudar Beqiraj, the Chair of the ISHS Section Vegetables, Prof. Silvana Nicola, and the Rector of Agricultural University of Tirana, Prof. Fatos Harizaj. Minister of Education and Science, Prof. Myqerem Tafaj, addressed a welcome speech to the symposium participants in the afternoon session of the first day.

The symposium was attended by 128 people, from 20 countries: Albania, Bosnia-Herzegovina, Bulgaria, Cyprus, Croatia, Czech Republic, Estonia, Germany, Greece, Kosovo,

Macedonia, New Zealand, Italy, Iran, Poland, Romania, Slovenia, Serbia, Turkey, USA. In two successive days, the symposium participants presented their most recent research findings on different topics regarding vegetable and potato crops. There were 47 oral presentations and 64 posters. Attendees also enjoyed the high performance presentation of three keynote speakers, Mike Nichols (New Zealand), Eva Thorn (Sweden) and Silvia Rondon (USA), who presented their comprehensive views regarding methods and tools to increase the efficiency of vegetable production, the appropriate use of vast Balkan natural plant genetic resources and current trends in integrated pest and disease management.

The 5th Balkan Symposium on Vegetables and Potatoes was also a good opportunity for the organization of the third Coordinating Meeting of the Regional Working Group on Greenhouse Crop Production in the SEE Countries. The objectives of this meeting were:

- Discussions on the current situation of greenhouse crop sector in the SEE countries,
- Foreseeing the creation of a regional technical cooperation project, designation of a road map and identification of leading authors for the development of GAP guidelines for greenhouse production in SEE countries,
- Formulation of project proposals that would generate resources for the WG to carry out applied research and demonstration.

Furthermore, the symposium was a good opportunity for the promotion of Hortivar, an FAO data base for the performance of horticultural cultivars. Hortivar pamphlets and poster were displayed in the symposium venue and using a number of computers online Hortivar training sessions were provided to participants interested in the use of Hortivar to safeguard and share information on the performance of different cultivars.

At the end of the second day, a discussion on the organization of the Sixth Balkan Symposium on Vegetables and Potatoes was held. There were expressions of interest from Serbia and Croatia. Milan Zdravkovic from Serbia and Bozidar Benko from Croatia presented to the participants the interest of their institutions to organize the next symposium and the facilities they could offer. A ballot was organized and after counting the votes, Croatia was elected as the next organizer.

Parallel to the scientific program, were the social and cultural components of the symposium. The warm and friendly atmosphere was the most enjoyable part of the symposium for everyone who attended. At the end of the second day, a farewell party was organized in one of the most famous Tirana restaurants. A combination of delicious traditional and European style cooking, as well as traditional dancing by a group of professional dancers created an exciting atmosphere, which would be remembered for a long time.

The last day was dedicated to a professional visit to some of the most important vegetable production sites of Albania and a sightseeing tour to the ancient city of Berat.

The first stop was in Divjaka, which is well known for its national park and lagoon. Divjaka National Park is a preserved territory in the western part of Albania, and Karavasta lagoon is the biggest lagoon and wetland system in Albania and among the largest in the Mediterranean. A rare species of pelican lives there and its local population represents 5% of the world population.

As well as its natural beauty, Divjaka is one of the most important agricultural sites in Albania. It is famous for early watermelon and potato production and high quality carrots, cauliflowers, cabbages, broccoli and other vegetable crops. Actually, the Divjaka region is the main vegetable export site in Albania. Symposium

participants were welcomed and hosted by Bruka Seedling Company. An overview of the agriculture history, potential and current production and export trends were elaborated by the host and modern, open field vegetable production practices were viewed by participants for a number of in-season vegetable crops. The visit to a modern vegetable seedlings nursery was the next step, followed by free discussions while enjoying the hospitality of the host with some delicious homemade foods.

The next visit was to the 2400-year-old city of Berat, where traces of the Illyrian, Roman, Byzantine and Ottoman periods can be found in old churches with wonderful wall paintings, icons and wood engraving. Its innumerable

monuments and its beautiful and characteristic architecture are the reason Berat has been proclaimed a museum town.

On the way back to Tirana, one of the most famous wineries in Albania was the last visit of the day. People enjoyed the traditional style of building and in-depth explanations about the history of the winery. Current trends of wine production and agro tourism in Albania were also discussed. Wine testing of some of the best brands of the winery, accompanied with traditional foods and served in a beautiful orchard concluded the long day.

Overall the aims of the symposium were achieved. Some greetings and appreciations were forwarded to the Organizing Committee

on the way back to Tirana. The participants are looking forward to the Sixth Balkan Symposium on Vegetables and Potatoes, believing there will be even more people getting together.

Astrit Balliu

## CONTACT

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# Section Tropical and Subtropical Fruits First Int'l Symposium on Date Palm



Participants of the symposium.

The First International Symposium on Date Palm under the aegis of the ISHS was held in Algiers, Algeria on the 13th and 14th of November 2011, and was organized by the Laboratory for Research on the Dry Areas (LRZA), University of Science and Technology Houari Boumediene (USTHB) in partnership with the National Institute of Agricultural Research Algeria (INRAA) under the patronage of the Minister of Higher Education and Scientific Research and the Minister of Agriculture and Rural Development. The venue of the symposium

was the INRAA and many personalities attended the opening ceremony, namely the General Secretary of Ministry of Agriculture and Rural Development, the Vice Rector for External Relations on behalf of the USTHB Rector, the President of the ISHS, the Director of INRAA, and the Assistant Director of General Directorate for Scientific Research and Technologic Development.

The symposium "The Date Palm: 50 Year Work Review - what research for its preservation, improvement and development?" was an

opportunity to share and evaluate the results obtained during the last half-century from research conducted not only by the LRZA, research groups of the Algerian universities, the INRAA, and other national research, but also from different researchers around the world working on date palm.

The symposium was funded by LRZA, USTHB and INRAA, and the main sponsors were Elecom, Merinal, Bayer and Agence Nationale pour le Développement de la Recherche Universitaire (ANDRU). The symposium was attended by a

total of 150 attendees. Sixty-two participants from Algeria and 34 international participants (United States, Australia, India, Pakistan, France, Italy, Spain, Portugal, Saudi Arabia, Egypt, Jordan, Iraq, Tunisia, Morocco, Mauritania, Djibouti, Kuwait, United Arab Emirates) presented either oral or poster communication.

## WHY DATE PALM?

Date palm (*Phoenix dactylifera*) is a plant that has major socio-economic importance and impact in Algeria, North Africa and the Middle East. It provides a source of financial income for the oasis populations and also allows the establishment of trading and commercial exchange with the Sahel countries where the fruit is swapped for sugar, meat, tea and other goods. The date palm tree is also a source of raw materials that generate a variety of activities such as cooking, crafts, carpentry and so on.

Research on date palm has expanded following the appearance of some diseases, the most important ones being the Bayoud (*Fusarium oxysporum* f.sp. *albedinis*) in Morocco, Algeria and Mauritania, the brittle leaf disease in Tunisia and Algeria, and more recently, red palm weevil in Egypt and the Middle East, which destroyed millions of date palm trees, causing yield reduction and affecting oasis ecosystems.

The symposium consisted of a plenary session after the opening ceremony followed by three talks. The four sessions of the symposium focussed on the following topics:

Session 1: Botany and Agronomy

Session 2: Technologies and Commercialization

Session 3: Biology, Biotechnology and Genetics

Session 4: Stresses, Pests, Diseases and their Management

Beside the 53 oral presentations, 13 posters of Sessions 1 and 2 were displayed on the first day of the symposium, and 30 posters of Sessions 3 and 4 were presented on the second day, totaling 43 posters.

The contributions of the participants highlighted the progress of research and results. This body of work formed a foundation from which strategies could be planned to rehabilitate the oasis system, to expand palm plantations and promote date production.

During the discussion, different topics were raised and the importance of research in each area was highlighted, focussing on progress and future development. The main future goals that raised interest were to:

- Bring new elements to the origin and history of the domestication of date palm,
- Update biotechnology techniques, particularly those relating to in vitro culture and genetic diversity, by using molecular markers and chloroplast DNA by SSR or the RNA (EST),
- Update mapping of the progression of diseases of date palm worldwide,



Opening ceremony.

- Highlight problems of the date fruits sector in Algeria (marketing, role in national and international economy),

- Develop new technological processes at laboratory level to recycle low-value market date fruits by producing by-products such as vinegar, yeast, and dates syrup.

One of the special features of this symposium was an exceptional attendance by date palm growers and the Tazdait association. In their contribution, they reported the fact that the results of the work carried out on date palm are not readily available to the oasis communities to help them in their activities. In addition, date palm growers noted the shortage of labor and safety conditions for harvesters (skilled climbers)

ISHS President Dr. António Monteiro officially handing out the ISHS medal to Convener Dr. Nadia Bouguedoura.



because these harvesters tend to disappear.

Therefore, it is necessary to:

- Create a link between researchers, local authorities and date palm growers,
- Highlight the importance of field experiences,
- Consider the problems raised by date palm growers and provide practical answers to the problems they face in the palm grove,
- Build a national strategy for the conservation and protection of genetic resources of the date palm tree,
- Assess the impact level of the decline in genetic resources in the different cropping areas,
- Identify the cultivars tolerant to diseases,
- Establish scientific and technical data bases on date palm cropping and handling,
- Define the impact of climate change on the physiological cycle, the decline in fruit quality, and lastly, on the bio-ecology of the biological enemies of the date palm tree.

During the closing ceremony of the symposium, different topics were debated, and the following recommendations were made and agreed on by the participants:

1. Identify new research directions focusing on collaborative research between date palm growers for the development of the oasis ecosystems.
2. Restart the national network on date palm. For this, a note was drafted by a group of INRA-Algiers researchers in which the objectives, issues and research program of the network were defined.
3. Organize an International Symposium on Date Palm under the aegis of the ISHS every three years.
4. The Second International Symposium on Date Palm will be held in Morocco during 2013.



Post symposium visit to Ghardaia oasis.



During the two days of the symposium, many cultivars of dates from the area of Ghardaia were exhibited and issues facing associations concerned with the palm and the environment (Réseau Associatif de Développement Durable des Oasis, RADD0) were presented.

A post symposium tour was also organized from 15 to 17 November 2011 in the M'Zab Valley (600 km south of Algiers) in collaboration with APEB (Association of Environmental Protection of Beni Isguen), Tazdait (Association of Beni Isguen palm growers) and Elphoeden (Association of Beni Isguen farmers), and 27

participants from different nationalities joined this lovely tour. The visit was a good opportunity for the participants to meet date palm growers, and proposals were discussed on how to develop the oases. This visit was also an excellent opportunity to bring together researchers and producers. This allowed the researchers to become aware of grower's specific needs for research and to appreciate that development of date palm knowledge and expertise must be made accessible to farmers, associations and local authorities.

Nadia Bouguedoura

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# Section Vine and Berry Fruits – Seventh Int'l Strawberry Symposium Commission Plant Genetic Resources

The 7th International Strawberry Symposium was held successfully from the 18th to the 22nd of February, 2012, in Beijing, China. This event was hosted by the International Society for Horticultural Science (ISHS), the Ministry of Agriculture of the People's Republic of China, the People's Government of Beijing Municipality, the Chinese Academy of Engineering (CAE) and the Chinese Society for Horticultural Science (CSHS). It was organized by the Beijing Academy of Agriculture and Forestry Sciences, the People's Government of Changping District, the Beijing Division of Agriculture, CAE and the Strawberry Section of the CSHS. The theme of this symposium was "Green, Freshness, Health and Development".

About 1,500 people attended the opening ceremony, including the Chinese Vice Premier, Liangyu Hui, and other officials from China, the ISHS President, Dr. António Monteiro, and the ISHS Vice-President, Dr. Kim Hummer. The

Opening ceremony. From left to right: Vice Chairman of the Standing Committee of National People's Congress Ms. Zhili Chen, the Party Secretary of Beijing Mr. Liu Qi, the Chinese Vice Premier Liangyu Hui, the ISHS President Dr. António Monteiro and the Vice President of CPPCC Mr. Fuhe Luo launching the 7th ISS.





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 : ISHS President Dr. António Monteiro (second from left), former  
 : President Dr. Norman Looney (first from left), and Vice President Kim  
 : Hummer visited the Institute of Forestry and Pomology.  
 : .....



.....  
 : ISHS President Dr. António Monteiro (left) and Vice President Dr. Kim  
 : Hummer (second from left) handing out the ISHS medal and certificate  
 : to the Convener of the 7th ISS, Dr. Yuntao Zhang (right).  
 : .....

former ISHS President, Dr. Norman Looney, also attended the opening ceremony.

One thousand, one hundred and thirty-six representatives from 60 countries and regions attended the symposium. Four hundred abstracts were received, including 15 invited lectures, 115 oral presentations, and 254 posters. During the symposium, a wide range of topics was discussed, including the world situation of the sector, genetics and breeding, wild germplasm conservation and utilization, biotechnology, physiology, production techniques, plant nurseries, crop protection, soil disinfections, organic production, soilless and cubic culture, postharvest, processing, nutrition, industry, quality and others.

The 7th China Strawberry Culture Festival & Chinese Finest Strawberry Challenge Cup was also organized as part of the symposium. More than 20 provinces and autonomous regions in China entered the competition and 600 strawberry samples were received for the competition. Seventeen internationally renowned experts were invited to be the judges and scored the samples. As a result, 8% of the samples won a gold medal, 10% won a silver medal and 15% won a bronze medal. The domestic cultivar 'Hongxiutianxiang' won the Great Wall

Cup and 10 samples won the Most Popular Award. This event played an important role in promoting the integration of strawberries and culture in China.

During technical tours, participants visited the Institute of Forestry and Pomology, Beijing Academy of Agriculture and Forestry Sciences. The visit included the National Strawberry Germplasm Repository, field observation station, storage and processing laboratory, Quality Control and Test Center and the major laboratory of fruit seedlings, as well as a demonstration of new cultivars and new techniques (Yuxiang Garden in Fragrant Hill). Participants also visited Beijing Tianrunyuan Strawberry Cooperative and Beijing Tianyi Strawberry Ecological Farm, which covers 200 hectares, has 1,800 standard solar greenhouses and is the largest solar greenhouse strawberry production base in China. Dozens of strawberry cultivars are grown here. These cultivars have a wide variety of characteristics and flavors.

The Expo Garden was built especially for the symposium. This exhibition complex covers an area of about 67 ha and was divided into an Eastern and Western section. It included a "Training and Demonstration Center", a "Processing and Distribution Center", and

44,000 m<sup>2</sup> of multi-span greenhouses and high standard solar greenhouses.

The Strawberry Expo Garden was the venue for comprehensive exhibitions, including the International Strawberry Industry Exhibition Area, the International Strawberry Artistic Exhibition Area, the Strawberry Popular Science and Culture Exhibition Area, and the Chinese Strawberry Science and Technology Exhibition Area. The total exhibition area is more than 100,000 m<sup>2</sup>. Seventeen cultivation modes and 135 cultivars (strains) were on display in this area.

An Industry and Economic Forum was also held during the symposium. Twenty-six lectures were presented on the following topics: Ecological Agriculture and Sustainable Development, Development Trend of International Strawberry Industry, Modern Agricultural Machinery and Modern Agricultural Greenhouse Facilities. Twenty-eight companies participated in this event.

The Convener, Dr. Yuntao Zhang, was awarded a medal and certificate by the ISHS President, Dr. António Monteiro, for his excellent work and the efforts he made to organize this wonderful symposium.

.....  
 : Traditional art show.



.....  
 : The venue for the Chinese Strawberry Challenge Cup.





Among the highlights of the symposium was the gala dinner attended by close to 1300 participants.

At the closing ceremony, Dr. Yuntao Zhang extended his thanks to all the participants and officials from ISHS as well as everyone who contributed to the organization of the symposium. Five post symposium tours were organized. They were as follows:

PT-1 Beijing - Xi'an - Beijing

PT-2 Beijing - Nanjing - Shanghai

PT-3 Beijing - Hangzhou - Shanghai

PT-4 Beijing - Hefei (Chang Feng County) - Shanghai

PT-5 Beijing Local Tours - Capital Museum - Lunch - Beijing Zoo

This symposium was an outstanding platform for people from different countries to exchange ideas and learn from each other. Through this event, we established relationships with people from around the globe, and future cooperative projects were discussed. It also promoted the sale of strawberries in the country and boosted government awareness of the importance of continued funding of research. The symposium was a milestone for the development of the strawberry industry in China and in the world.

In many respects, it was really the Strawberry Olympics.

Yuntao Zhang

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# Fifth Int'l Symposium on Acclimatization and Establishment of Micropropagated Plants (5th ISAEMP)

The 5th ISAEMP participants gathered for a group photo on the steps of the Lied Lodge and Conference Center. Holding the ISHS banner are Co-Conveners Paul Read (left) and John Preece (right).



Co-Conveners Paul Read, University of Nebraska, and John Preece, National Clonal Germplasm Repository (USDA-ARS, Davis, CA), greeted over 50 enthusiastic participants attending the 5th International Symposium on Acclimatization and Establishment of Micropropagated Plants held October 16-19, 2011, in Nebraska City, Nebraska, USA. Held in the unique and beautiful Lied Lodge and Conference Center, attendees agreed that it was a perfect venue for the symposium. The Lied Lodge is a subsidiary of the National Arbor Day Foundation whose mission is focused on encouragement of tree planting, which was in perfect concert with the purposes of the 5th ISAEMP.

Keynote Lectures were presented by outstanding researchers in the world of plant tissue culture and related sciences. Following a Welcome Reception on Sunday evening, the first scientific session was opened by Co-Convenor Paul Read, with stimulating Welcome comments by Dr. Archie Clutter, University of Nebraska, Dean of the Agricultural Research Division.

The First Keynote Lecture was delivered by Dr. Anabela Romano from the Center of Genomics and Biotechnology, University of Algarve (Portugal) and Convener of the 3rd ISAEMP held in Portugal. Her title was "Micropropagation for the Production of High Quality Phytochemicals". This topic embraced a diversity of applied biotechnology principles and applications with focus on native and endangered species. This talk set a high standard for the oral and poster presentations that followed.

Dr. Jeff Adelberg, School of Agriculture, Forestry and Environmental Sciences, Clemson University, presented the afternoon session Keynote, "Physiology and Practical Bioreactors for Plant Propagation". This was followed by several related presentations including one by

Dr. Margareta Welander that generated much interest, "Technical Improvement of a New Bioreactor for Large Scale Micropropagation and Basic Research".

Later in the afternoon, a special treat was in store for the participants, when Dr. Athanasios Economou, Aristotle University and Convener of the 1st ISAEMP held in Greece in 2001, presented a detailed historical overview and projections for the future of this exciting scientific endeavor. His title was, "From Microcutting Rooting to Microplant Establishment: Key Points to Consider for Maximum Success in Woody Plants".

The Tuesday program featured two day-long excursions. The Scientific Tour highlights included visits to the George W. Beadle Center for Biotechnology and the Ken Morrison Center for Virology and Biological Research, while the Scenic Tour included visits to the Arbor Lodge State Historical Park, the Missouri River Basin Visitors Center and the Lewis and Clark Center. Both tours were treated to beautiful scenery and agricultural vistas in route to Whiskey Run Creek Vineyard and Winery where a tasting of local wines was provided. The day concluded with a ride down the Missouri River combined with dinner on the Spirit of Brownville historic riverboat.

All-day scientific sessions were held on Wednesday beginning with the morning Keynote Address presented by Dr. Maurizio Lambardi, IVALSIA, CNR, Italy and Chair, ISHS Commission Molecular Biology and In Vitro Culture. His title was "Advances in the Safe Storage at Low Temperatures of Micropropagated Plants", a topic which engendered much discussion. An additional special feature of the morning session was John Bushoven and his California State University-Fresno students presenting, "Development



Maurizio Lambardi (center) presenting the certificates and medals to Co-Conveners Paul Read (left) and John Preece (right).

of Undergraduate Student Research Skills - Embryo Culture, Somatic Embryogenesis and Acclimatization of *Pseudotsuga menziesii* Culture as a Model System".

The Wednesday afternoon session featured Rod Drew, Griffith University (Australia) and Past Chair ISHS Commission Molecular Biology and In Vitro Culture. His topic, "Micropropagation of Tropical Tree Species", led nicely into the several presentations that followed, including "The Role of Plant Propagation at Clonal Genebanks" by John Preece and Paul Read's discussion "Tough Nuts to Crack: Advances in Micropropagation of Woody Species".

A Business Meeting of the ISHS Commission Molecular Biology and In Vitro Culture was conducted by Paul Read and Maurizio Lambardi. Dr.

Dr. Athanasios S. Economou, Co-Convenor of the 1st ISAEMP held in Greece in 2001, presented a historical overview and prospects for the future of the tissue culture and applied biotechnology industry.



Dr. Anabela Romano, Convener of the 3rd ISAEMP, answering questions about her keynote lecture.



Lambardi up-dated the group on Commission activities which included plans for an ISHS Symposium on Micro and Macro Propagation to be held in Florence in 2013. Rod Drew also provided a presentation inviting the attendees to consider participating in the 29th International Horticultural Congress to be held in Brisbane, Australia, August 17-24, 2014. As a further part of the Business Meeting, Dr. Margherita Beruto formally proposed that the 6th ISAEMP take place in San Remo, Italy in 2015. This proposal was unanimously approved and Dr. Beruto was elected to succeed Paul Read as Chair of this symposium. More details on this symposium will be forthcoming in the near future. At the end of the Business Meeting Dr. Lambardi pre-

sented Paul Read and John Preece Certificates of Appreciation and medals to thank them for their work in convening the 5th ISAEMP.

The 5th ISAEMP was concluded with a "Farewell Dinner", a sumptuous repast indeed. As an added treat, many in attendance at the dinner presented spirited renditions of one or more folk songs from their native countries. A good time was had by all. Many commented on the great value of the intimate setting for the 5th ISAEMP and opportunities to interact and get to know each of the participants. Now we eagerly look forward to the 6th Symposium in 2015.

Paul E. Read and John E. Preece

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# Int'l Symposium on Growing Media, Composting and Substrate Analysis

The International Symposium on Growing Media, Composting and Substrate Analysis was held on 17-21 October, 2011 in Barcelona (Spain) at the facilities of the *Universitat Politècnica de Catalunya* (Barcelona Tech). The symposium was organized under the auspices of the International Society for Horticultural Science and co-sponsored by the International Peat Society, with support of the ISHS Commission Plant Substrates and Soilless Culture and the Working Groups on Growing Media, Composting for Horticultural Applications and Substrate Analysis. The UPC-institutions hosting the symposium were the *Escola Superior d'Agricultura de Barcelona* (ESAB) and the *Departament d'Enginyeria Agroalimentària i Biotecnologia* (DEAB). The ESAB celebrates the centenary of its foundation in the academic year 2011-12, and the symposium was included as a special event of this celebration.

The symposium covered a range of topics that are relevant to the development of technological advances in growing media, analytical methods and composting for horticultural uses, focusing on the sustainability of the involved processes, resources, products and management practices.

Despite the economic crisis affecting the entire world, the symposium was attended by over 152 participants from 30 countries of the 5 continents. During five intensive days, eight invited speakers gave state-of-the-art presentations on diverse topics. The programme was divided into six sessions, a special conference and a technical visit. A total of 49 oral presentations and 62 posters were presented. The abstracts of all presentations can be found at the following link: <https://www.upc.edu/growingmediacomposting2011/book-of-abstracts>.



Participants of the symposium.

The symposium was opened by Mrs. Maria Teresa Martí, General Secretary of the Catalan Department of Agriculture, Fisheries, Food and Natural Environment; Mr. Luis Orodea, Vice-General Director of Production Media of the Spanish Ministry of Environment, Rural Development, Fishing and Coasts; Mr. Francesc Giró, Assistant Manager of the Catalonian Waste Agency; Dr. Ana Isabel Pérez, Research Vice-Rector of Barcelona Tech (UPC); Dr. Bill Carlile, Chairman of the Commission Plant Substrates and Soilless Culture of the ISHS; Dra. Silvia Burés, Chairperson of the Working Group on Growing Media of the ISHS; and the Convener of the Symposium, Prof. Dr. F. Xavier Martínez (UPC).

The OPENING SESSION included the lecture "Challenges of composting for growing media purposes in Spain and Mediterranean area"

delivered by Prof. Dr. Raúl Moral from the Miguel Hernández University (Spain). He highlighted the strategies for obtaining more efficient composts from Mediterranean organic raw materials to replace peat and perlite in soilless culture.

In session 1, ADVANCES IN ANALYTICAL TECHNIQUES FOR GROWING MEDIA AND COMPOSTING, four oral communications and six posters were presented. The invited lecture, "European standardisation of growing media - A critical review", was given by Dr. Andreas Baumgarten from the Institute for Soil Health and Plant Nutrition of Vienna (Austria) and Chairman of the ISHS Working Group on Substrate Analysis. He emphasised the important work done by the European Committee for Standardization (CEN) in recent years. In his opinion, growing media normalisation



Opening session attended by different authorities during the welcome speech of the Symposium Convener Prof. Dr. F. Xavier Martínez (right).



Visit to AGROMILLORA, a high tech in vitro nursery.

would receive a major boost if the European Commission established a specific regulation about growing media declarations.

Session 2, NOVELTIES IN MATERIALS, USES AND PROPERTIES OF GROWING MEDIA, included ten oral communications and seven posters. It was introduced by Dr. Silvia Burés, owner of Buresinnova S.A. (Spain), with her lecture "A view beyond traditional growing media uses". Her interesting presentation was illustrated with valuable pictures highlighting applied research challenges to solve technological problems for new applications of growing media in the context of sustainability and quality of life.

Session 3, NEW DEVELOPMENTS IN COMPOSTING AND COMPOST PRODUCTS, with nine oral presentations and ten posters, was conducted by Prof. Dr. Michael Raviv, Chairman of the ISHS Working Group on Composting for Horticultural Applications, Professor of the Hebrew University of Jerusalem

(Israel) and researcher of the Neve Ya'ar Center. His remarkable presentation, "SWOT analysis of compost as growing media component", gave a detailed analysis of the strengths and weaknesses of the use of compost in the formulation of substrates, comparing composts with peat, as well as the opportunities related to the social need to recycle wastes and the threats that stem mainly from potential zoonotic pathogens.

In session 4, WATER AND NUTRITION MANAGEMENT IN SOILLESS CULTURE, nine oral communications and ten posters were presented. In his lecture, "State of the art and new trends of the soilless culture in Spain and in emerging countries", Prof. Dr. Miguel Urrestarazu from the University of Almería (Spain) gave an overview of many years of soilless culture in Spain and analysed the implementation of this technology in Mexico, North Africa and China. Finally, he noted the intro-

duction of advances in soilless culture from an environmental point of view.

In session 5, HORTICULTURAL PRODUCTION: SUSTAINABLE USES OF GROWING MEDIA AND COMPOST, with twelve oral communications and eighteen posters, Dr. Bill Carlile from Bord na Móna (Ireland) presented the lecture "Towards sustainability in growing media", in which he introduced the three axes of sustainability (environmental, economic and social), applying them to the substrates. He analysed the role of peat and peatlands in the context of sustainability in the UK. In a personal examination, he questioned the view that the use of peat as a substrate is unsustainable and showed other alternatives. His conclusions were based on detailed analysis of the life cycle of peat, compost and other materials used as growing media.

The last session 6, BIOLOGICAL INTERACTIONS AND PLANT PROTECTION, included five oral

Visit to BURES SAU, company of green waste composting and production of substrates.



Some of the participants attending the Convener's explanations at SALA GRAUPERA nursery.



presentations and eleven posters. This session was conducted by Prof. Dr. Joaquín Moreno from the University of Almería (Spain), who stated in his lecture "Recent advances in microbial aspects of compost production and use" the biological principles of the composting process, detailing the activity of microbial populations and the effects on the same environmental factors. He also emphasized the main effects of compost microbiota, which give biostimulation, bioprotection and biofertilization properties to the final product. These are topics of great interest in agriculture and environment preservation.

In the SPECIAL SESSION, Prof. Dr. Bilderback from North Carolina State University (USA) presented the lecture "Strategies for sustainability in nursery production", noting the importance of stability of physical properties to maintain acceptable air/water relations for long-term woody cultures. He also showed an overview

of the research carried out in USA focused on identifying and evaluating regionally viable alternative soilless substrate components.

The symposium included other activities, such as a technical tour and a visit to three companies: SALA-GRAUPERA, a nursery specialized in the reproduction and growing of bushy and ornamental plants for sustainable gardening in the Mediterranean area; AGROMILLORA, an international High Tech in vitro nursery specialized in the production and marketing of plantlets and young trees of high quality (genetic and sanitary); and BURÉS SAU, a company dedicated to green waste composting and production of substrates and gardening soil, landscaping and horticulture.

In addition to scientific and technical activities, other social events were: a reception by the Hosting Institutions in the Mediterranean Technology Park (Barcelona Tech) and an official reception in the City Hall of Barcelona followed

by the symposium dinner in a splendid modernist building.

Finally, the Convener wishes to express his thanks to the staff and students who generously helped run the symposium, to the Organizing and Scientific Committees for their kind help in selecting speakers and abstracts, and to the sponsors for their financial support.

F. Xavier Martínez

## CONTACT

F. Xavier Martínez, Escola Superior d'Agricultura de Barcelona, Campus del Baix Llobregat, Universitat Politècnica de Catalunya, Esteve Terradas, 8 (D4), 08860 Castelldefels, Barcelona, Spain, email: xavier.martinez-farre@upc.edu



FROM THE SECRETARIAT

# New ISHS Members

ISHS is pleased to welcome the following new members:

## NEW INDIVIDUAL MEMBERS:

**Argentina:** Mr. Oscar Herrera, Mr. Gonzalo Villena; **Armenia:** Mr. Sergey Virabyan; **Australia:** David Adel, Dr. Audrey Gerber, Mr. Robert Hampton, Mr. Warren Huston, Michelle Ms. Jones, Ms. Emily Rigby, Mr. John Verdegaal, Mr. Corey Walcer; **Bangladesh:** Habibur Rahman Howlider; **Belgium:** Mr. Georges Ramaekers, Mr. Nico Vergote, Mr. Chris Vermeire; **Bermuda:** Philip Mason; **Brazil:** Dr. Antonio Bliska Júnior, Mr. Luiz Geraldo de Carvalho Santos, Prof. Dr. Regis Ferreira, Jaydee jepsen; **Canada:** Lewis Farrell, Mr. thierry houillon, Jacques Madison, Mr. Angel Valerio, Dr. Yaolin Zhang; **Chile:** Mr. Jose Antonio Prado, Ms. Judith Villafaña; **China:** Mr. Azam Ali; **Chinese Taipei:** Mr. Hung-Sheng Peng; **Costa Rica:** Dr. Karen Masters; **Croatia:** Prof. Dr. Snjezana Bolaric, Sanja Stubljar; **Czech Republic:** Petr Varadi; **Denmark:** Dr. Karl Kaack, Dr. Michelle Williams; **Ecuador:** Ana Bravo; **France:** Ms. Ellen Bouty, Ms. Emeline Defossez, Dr. Helene Gautier, Mr. Nicolas Jegouic, Jérôme Lambion, Ms. Lauriane Menard, Mr. Eric Miannay, Nicolas Sinoir; **Ghana:** Francisca Anshah; **Haiti:** James Kishlar; **Hungary:** Dr. Péter Honfi, Sándor Szügyi, Dr. Andrea Tilly-Mándy, Vanda Villányi; **India:** Dr. Nilay Borah, Ms. Dianne Hooper, Mr.

Vivek Magar, Mr. Gideon Peleg, Mr. Neel Shah, Dr. Dr. Sharma, Mr. Prasad Yadavali; **Ireland:** Jessica Cooper, Mr. Philip Marie Moreau; **Israel:** Asaf Eylon, Yuval ezra, Dr. Meirav Fleischer, Joseph Halberstamm, Dr. Bruria Heuer, Yafit Moyal; **Italy:** emanuela gaia forni, Dr. Vittorio Latorrata, Dr. Giorgio Murri, Prof. Ezio Portis, Dr. Alisea Sartori; **Japan:** Tsutomu Fukuda, Kaori Itagaki, Maya Kaneko, Prof. Dr. Michio Shibata, Dr. Jaime Teixeira da Silva, Morikawa Toshiyuki; **Kenya:** Dr. Dirk Schrauwen; **Korea (Republic of):** Mr. Sung Wook Choi, Prof. Dr. Tae-Myung Yoon; **Malaysia:** Prof. Dr. Abdul Manaf Ali, Ms. Pee Win Chong, Mr. Jefri Efendi Mohd Salih; **Mexico:** Miguel Mexia, Mr. Roberto Meza; **Nepal:** Mr. Parikshit Khemka; **Netherlands:** Dr. Hendrik-Jan van Telgen, Mr. j zeelenberg; **New Zealand:** Ms. Cara Norling, Mr. Andrew Stewart, Ms. vonda windley; **Philippines:** Ms. Ma. Clarissa Ms. Mabitazan; **Poland:** Mr. Pawel Strauchmann; **Portugal:** Daniel Montes; **Romania:** Mr. Marin Mitra Amza; **Russian Federation:** Dr. Evgeniy Strelkov; **Senegal:** Prof. Dr. Karamoko Diarra; **Slovenia:** Dr. Jana Murovec; **South Africa:** Prof. Dr. Mudau N. Fhatuwani, Mr. Lodi Muller; **Spain:** Dr. Jordi Giné Bordonaba, Mr. Francisco Palomo, Mr. Eduardo Pardo, Mr. Esteban Sinde; **Switzerland:** Mr. David Gnaegi, Martin Koller; **Thailand:** Mr. Worapat Pattarayanon; **Turkey:** Mr. Oguz Dalkilinc, Mr. Emre Saribas, Mr. Goksel Tan, Mr. Faik Murat

Unel, Dr. Isilay Yildirim; **United Kingdom:** Ms. Emma Collings, Mr. Christopher Dennis, Mr. Andrew Hiron, Fifi Madhoush, Mr. Max McMullen, Mr. Peter Steward, Dr. Sarah Witts; **United States of America:** Athan Andrews, Peter Boches, Dr. Yongjian Chang, Casey Crim, James Giovannoni, Jennifer Izzo, Mr. Benjamin Konantzknology, Mr. Paul LeBlanc, Jeffrey McElroy, Dr. Dennis Mitchell, Ms. Eva Monheim, Terry Montlick, Julie Nord, Ass. Prof. Mathews L. Paret, Dr. Greg Peck, Galen Peiser, Mr. Charles Peters, John Rhyner, Mr. Mark Richard, Mr. Charles Scouten, Dave Small, David Smith, Dr. William Smith, Gary Thornton, Ken Volk, Dr. Colleen Warfield.

# Calendar of ISHS Events

For updates and more log on to [www.ishs.org/calendar](http://www.ishs.org/calendar). To claim the reduced registration for ISHS members make sure to mention your membership number when registering and ensure your ISHS membership is current. If in doubt: check your membership status online at [www.ishs.org/directory/](http://www.ishs.org/directory/)

## YEAR 2012

- June 9-11, 2012, Beijing (China): **XII International Symposium on the Processing Tomato - X World Congress on Processing Tomato**. Info: Dr. Guitong Li, China Agricultural University, CAU, West Road of Yuanmingyuan, Beijing, China. Phone: (86)1062732963, Fax: (86)1062733596, E-mail: lgtong@cau.edu.cn or Prof. Dr. Montaña Cámara, Dpto. Nutrición y Bromatología II, Facultad Farmacia. UCM, Plaza Ramón y Cajal sn, 28040 Madrid, Spain. Phone: (34) 913941808, Fax: (34) 913941799, E-mail: mcamara@farm.ucm.es Web: <http://www.worldtomatocongress.com/>
- June 17-22, 2012, Maastricht (Netherlands): **X International Symposium on Vaccinium and Other Superfruits**. Info: Prof. Dr. Fred Brouns, Maastricht University, NUTRIM, PO Box 616, 6200 MD Maastricht, Netherlands. Phone: (31)433881466, Fax: (31)433670976, E-mail: fred.brouns@maastrichtuniversity.nl E-mail symposium: i.vermeeren@pauwelspc.nl Web: <http://www.vaccinium2012.com/>
- June 18-22, 2012, Guangzhou (China): **V International Symposium on Tropical and Subtropical Fruits**. Info: Prof. Dr. Jiang Zongyong, Guangdong Academy of Agric. Sci., Guangzhou, Guangdong, 610640, China. Phone: (86)2087596262, Fax: (86)2087503358, E-mail: jiangz38@hotmail.com or Prof. Dr. Ganjun Yi, Fruit Tree Research Institute, Guangdong Academy of Agricultural Sciences, Wushan, Guangzhou Guangdong 510640, China. Phone: (86)2038765869 or 13302200898, Fax: (86)2038765626, E-mail: yiganjun@vip.163.com Web: <http://www.istsf2012.com/>
- June 18-21, 2012, Leavenworth, WA (United States of America): **II International Organic Fruit Symposium**. Info: David Granatstein, Sustainable Agriculture Specialist, Ctr. for Sust. Agric. & Natural Res., WSU, 1100 N. Western Ave., Wenatchee, WA 98801, United States of America. Phone: (1)509-663-8181x.222, Fax: (1)509-662-8714, E-mail: granats@wsu.edu or Prof. Dr. Preston K. Andrews, Department of Horticulture, Landscape Architecture, Washington State University, Pulmann, WA 99164-6414, United States of America. Phone: (1)509-335-3603, Fax: (1)509-335-8690, E-mail: andrewsp@wsu.edu Web: <http://www.tfrec.wsu.edu/pages/organicfruit2012/>
- June 24-29, 2012, Ski and Grimstad (Norway): **XIII International Symposium on Virus Diseases of Ornamental Plants - ISVDOP13**. Info: Dr. Dag-Ragnar Blystad, The Norwegian Crop Research Institute, Plant Protection Center, Høgskoleveien 7, N-1432 Aas, Norway. Phone: (47)6494 9261, Fax: (47)6494 9226, E-mail: dag-ragnar.blystad@bioforsk.no E-mail symposium: isvdop13@bioforsk.no Web: <http://www.bioforsk.no/ISVDOP13>
- June 25-29, 2012, Kuala Lumpur (Malaysia): **VII International Postharvest Symposium**. Info: Mr. Abdullah Bin Hassan, Horticulture Research Centre, MARDI, GPO Box 12301, 50774 Kuala Lumpur, Malaysia. Phone: (60)389437810, Fax: (60)389422906, E-mail: abhassan@mardi.gov.my E-mail symposium: abhassan53@gmail.com Web: <http://postharvest2012.mardi.gov.my/>
- June 27-29, 2012, Piacenza (Italy): **I International Workshop on Vineyard Mechanization and Grape and Wine Quality**. Info: Prof. Stefano Poni, Director Istituto di Frutti-Viticultura, Università Cattolica del Sacro Cuore Piacenza, via Emilia Parmense 84, Piacenza, Italy. Phone: (39)0523599271, Fax: (39)0523599268, E-mail: stefano.poni@unicatt.it Web: <http://meetings.unicatt.it/ishs/>
- July 1-5, 2012, Angers (France): **II International Symposium on Horticulture in Europe - SHE2012**. Info: Prof. Jean-Claude Mauget, AGROCAMPUS OUEST - Centre d'Angers (INHP), Dept. STPH, 2, rue Le Nôtre, 49045 Angers, France. Phone: (33)241225428, Fax: (33)241225515, E-mail: jean-claude.mauget@agrocampus-ouest.fr Web: <https://colloque.inra.fr/she2012>
- July 1-5, 2012, Brasília (Brazil): **VI International Symposium on Seed, Transplant and Stand Establishment - SEST2012**. Info: Dr. Warley Marcos Nascimento, EMBRAPA - Vegetables, C. Postal 218, Brasília - DF 70359-970, Brazil. Phone: (55)6133859125, Fax: (55)6135565744, E-mail: wmn@cnph.embrapa.br E-mail symposium: sest2012@cnph.embrapa.br Web: <http://www.sest2012.com/english/sest2012-home.html>
- July 1-4, 2012, Ghent (Belgium): **II International Symposium on Woody Ornamentals of the Temperate Zone**. Info: Dr. Johan Van Huylenbroeck, ILVIO- Plant Unit, Applied genetics & breeding, Caritasstraat 21, 9090 Melle, Belgium. Phone: (32) 9-2722862, Fax: (32) 9-2722901, E-mail: johan.vanhuylenbroeck@ilvo.vlaanderen.be E-mail symposium: woodyornamentals@ilvo.vlaanderen.be Web: <http://www.ilvo.vlaanderen.be/woodyornamentals2012>
- July 4-7, 2012, Cebu (Philippines): **IV International Symposium on Improving the Performance of Supply Chains in the Transitional Economies**. Info: Dr. Peter J. Batt, Horticulture, Curtin University of Technology, GPO box U1987, Perth, WA 6845, Australia. Phone: (61)8 9266 7596, Fax: (61)8 9266 3063, E-mail: p.batt@curtin.edu.au or Dr. Sylvia B. Concepcion, University of the Philippines, Mindanao, Davao City, Mindanao, Philippines. Fax: (6382) 2270750, E-mail: sbconcepcion@yahoo.com Web: <http://www.business.curtin.edu.au/business/ISHSymposium>
- July 9-12, 2012, Valencia (Spain): **I International Symposium on Computational Fluid Dynamics (CFD) Applications in Agriculture**. Info: Dr. Florentino Juste, IVIA, Ctra. Moncada-Náquera, Km. 4, Moncada, 46113 Valencia, Spain. Phone: (34)963424000, Fax: (34)963424001, E-mail: juste\_flo@gva.es or Dr. Ricardo Suay Cortés, Ctra Moncada-Náquera, Km 4,5, Centro de Agroingeniería - IVIA, 46113 Valencia Moncada, Spain. Phone: (34) 96 3424000, Fax: (34) 96 3424001, E-mail: rsuay@ivia.es Web: <http://cigr.ageng2012.org/>
- July 16-20, 2012, Beijing (China): **International Conference on Germplasm of Ornamentals**. Info: Prof. Qi Xiang Zhang, College of Landscape Architecture, Beijing Forestry University, No.35, Qinghua East Road-Haidian Dist., Beijing 100083, China. Phone: (86)1062338005, Fax: (86)1062336126, E-mail: zqx@bjfu.edu.cn or Dr. Guijun Yan, School of Plant Biology MO84, The University of Western Australia, 35 Stirling Hwy, Crawley WA 6009, Australia. Phone: (61) 8 6488 1240, Fax: (61) 8 6488 1108, E-mail: guijun.yan@uwa.edu.au Web: <http://www.flora2012.org/>
- July 16-20, 2012, Geisenheim (Germany): **VII International Symposium on Irrigation of Horticultural Crops**. Info: Prof. Dr. Peter Braun, Research Centre Geisenheim, Dept. of Pomology, Von Lade Str. 1, D-65366 Geisenheim, Germany. Phone: (49)6722502566, Fax: (49)6722502561, E-mail: braun@fa-gm.de Web: <http://www.irrigation2012.de>
- August 31 - September 2, 2012, Mymensingh (Bangladesh): **I International Symposium on Jackfruit and other Moraceae**. Info: Prof. Dr. Mohammad Abdur Rahim, Bangladesh Agricultural University, Department of Horticulture, Mymensingh, Mymensingh 2202, Bangladesh. Phone: (880)9162714 or 9154703, Fax:

NEW



(880)9155810 or 9162714, E-mail: marahim1956@yahoo.com or Prof. Dr. Masum Ahmad, Department of Entomology, Bangladesh Agricultural University, 2202 Mymensingh, Bangladesh. Phone: (880)9162714, Fax: (880)9161510, E-mail: masum\_bau2006@yahoo.com

- September 2-5, 2012, Warsaw (Poland): **XXIV Eucarpia Symposium on Ornamentals - Ornamental Breeding Worldwide**. Info: Dr. Teresa Orlikowska, Research Institute of Horticulture, Konstytucji 3 Maja 1/3, 96-100 Skierniewice, Poland. Phone: (48)468332041, Fax: (48)468333228, E-mail: teresa.orlikowska@insad.pl E-mail symposium: dariusz.sochacki@insad.pl Web: <http://www.ornamentalbreeding2012.pl/>
- September 4-8, 2012, Shepherdstown, WV (United States of America): **V International Chestnut Symposium**. Info: William MacDonald, 1090 Ag. Science Building, West Virginia University, Morgantown, WV 26506-6108, United States of America. Phone: (1)304 293 8818, Fax: (1)304 293 2960, E-mail: macd@wvu.edu Web: <http://chestnutsymposium.wvu.edu/>
- September 6-8, 2012, Venlo (Netherlands): **XI International People Plant Symposium**. Info: Ms. Annette Beerens, Oude Graafseweg 50, 6543 PS Nijmegen, Netherlands. Phone: (31)615647097, E-mail: growingfoundation@gmail.com Web: <http://www.ipps2012.com/>
- September 9-14, 2012, Zatec (Czech Republic): **III International Humulus Symposium**. Info: Dr. Josef Patzak, Hop Research Institute Co, Ltd., Kadanska 2525, Zatec, 434 46, Czech Republic. E-mail: j.patzak@telecom.cz or Dr. Anthony Koutoulis, he University of Tasmania, Private Bag 55, Hobart TAS, 7001, Australia. E-mail: anthony.koutoulis@utas.edu.au Web: <http://www.chizatec.cz/shs-2012/?arc=8>
- September 18-20, 2012, Bogor (Indonesia): **II Asia Pacific Symposium on Postharvest Research Education and Extension: APS2012**. Info: Prof. Dr. Hadi K. Purwadaria, Faculty of Agricultural Engineering, Bogor Agricultural University, PO Box 220, 16002 Bogor, Indonesia. Phone: (62)8129579098, Fax: (62)2518623026, E-mail: tpphp@indo.net.id E-mail symposium: aps2012@ipb.ac.id Web: <http://aps2012.ipb.ac.id>
- September 25-29, 2012, San Juan (Argentina): **VII International Symposium on Olive Growing**. Info: Dr. Carlos Alberto Parera, INTA, Acc. Sur y Aráoz, Luján de Cuyo, Mendoza 5507, Argentina. Phone: (54)2614963500, Fax: (54)2614963500, E-mail: parera@correo.inta.gov.ar or Prof. Facundo Vita Serman, Coordinador Proyecto Regional Olivo, EEA San Juan del INTA, Calle 11 y Vidart, Pocito, 5427, San Juan, Argentina. Phone: (54)2644921079, Fax: (54)2644921191, E-mail: fvita@sanjuan.inta.gov.ar E-mail symposium: oliveargentina2012@sanjuan.inta.gov.ar Web: <http://www.olivesymposium2012.com.ar/>
- October 14-19, 2012, Aracaju (Sergipe) (Brazil): **III International Symposium on Medicinal and Nutraceutical Plants and III Conference of National Institute of Tropical Fruits**. Info: Prof. Dr. Narendra Narain, Departamento de Engenharia CCET, Univ Federal de Sergipe, Cidade Universitaria, 49100-000 Sao Cristovao-Sergipe, Brazil. Phone: (55)79 2105 6677, Fax: (55)79 2105 6679 E-mail symposium: 3ismnp@gmail.com Web: [http://www.3ismnp.com.br/index\\_en.htm](http://www.3ismnp.com.br/index_en.htm)
- October 15-18, 2012, Wageningen (Netherlands): **VII International Symposium on Light in Horticulture**. Info: Dr. Silke Hemming, Wageningen UR, Plant Research International, PO Box 16, 6700 AA Wageningen, Netherlands. Phone: (31)317 4 86921, Fax: (31)317 423110, E-mail: silke.hemming@wur.nl E-mail symposium: info@lightsym2012.com Web: <http://www.lightsym2012.com/>
- October 16-19, 2012, Porto de Galinhas, Pernambuco (Brazil): **X International Symposium on Postharvest Quality of Ornamental Plants**. Info: Prof. Fernando Luiz Finger, Depto.

de Fitotecnia, UFV, 36570-000 Viçosa, MG, Brazil. Phone: (55)3138991128, Fax: (55)3138992614, E-mail: ffinder@ufv.br E-mail symposium: isppop\_2012@yahoo.com.br Web: <http://www.isppop2012.ufv.br/>

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- October 16-20, 2012, Yerevan (Armenia): **Eurasian Symposium on Vegetables and Greens**. Info: Dr. Alvina Avagyan, Fruit Armenia OJSCo, 74, Teryan Street, Yerevan, Armenia. Phone: (374)93 40415037, Fax: (374)10202834x121, E-mail: alvinaav@hotmail.com or Dr. Aleksandr Kalantaryan, Head of Development Division, Raed Piu, 37 Mamikonyants street. ap.49, 00010 Yerevan, Armenia. Phone: (374)94 237805, E-mail: alikjan@gmail.com E-mail symposium: info@armsvg.com Web: <http://www.armsvg.com/>
- October 20-26, 2012, Wuhan, Hubei Province (China): **V International Symposium on Persimmon**. Info: Prof. Dr. Zhengrong Luo, Department of Pomology, Key Lab of Horticultural Plant Biology, Huazhong Agricultural University, Shizishan, Wuhan, Hubei 430070, China. Phone: (86) 27 8728 2677, Fax: (86) 27 8728 2010, E-mail: luozhr@mail.hzau.edu.cn E-mail symposium: persimmon@mail.hzau.edu.cn Web: <http://persimmon2012.hzau.edu.cn/english/>
- October 22-25, 2012, Srinagar (Kashmir) (India): **IV International Symposium on Saffron Biology and Technology**. Info: Prof. Dr. F.A. Nehvi, Sher-e-Kashmir Univ.of Agric., K.D. Research Station, Old Ariport - PO Box 905, GPO Srinagar, J&K, 190001, India. Phone: (91)1942305084, Fax: (91)1942305084, E-mail: f.nehvi@rediffmail.com or Dr. Shafiq Wani, Sher-e-Kashmir Univ.of Agric., K.D. Research Station, Old Ariport - PO Box 905, GPO Srinagar, J&K, 190001, India. Phone: (91)1942463255, Fax: (91)1942461103, E-mail: shafiqwani@gmail.com
- November 4-6, 2012, Naples (United States of America): **XXI International Pepper Conference**. Info: Mr. Gene McAvoy, University of Florida, IFAS, PO Box 68, Labelle, FL 33975, United States of America. Phone: (1)8636744092, Fax: (1)8636744097, E-mail: gmcavoy@ifas.ufl.edu E-mail symposium: bmt@ufl.edu Web: <http://www.conference.ifas.ufl.edu/pepper2012>
- November 4-8, 2012, Nanjing (China): **HortiModel2012: Models for Plant Growth, Environmental Control and Farm Management in Protected Cultivation**. Info: Prof. Dr. Weihong Luo, College of Agriculture, Nanjing Agricultural University, No1 Rd Weigang, Nanjing, Jiangsu 210095, China. Phone: (86)25-84399100, Fax: (86)25-84399100, E-mail: lwh@njau.edu.cn E-mail symposium: hortimodel2012@njau.edu.cn Web: <http://hortimodel2012.njau.edu.cn/>
- November 6-10, 2012, Dharwad (India): **V International Symposium on Human Health Effects of Fruits and Vegetables**. Info: Dr. Mahadev Chetti, University of Agric. Sciences, College of Agriculture, 58005 Dharwad, India. Phone: (91)9448495309, Fax: (91)8362445288, E-mail: mbchetti\_uas@rediffmail.com
- November 12-16, 2012, Catania (Italy): **VI International Symposium on Brassicas and XVIII Crucifer Genetics Workshop**. Info: Prof. Dr. Ferdinando Branca, DISPA, Università di Catania, Via Valdisavoia 5, 95123 Catania, Italy. Phone: (39)095234307, Fax: (39)095234329, E-mail: fbranca@unict.it E-mail symposium: info@brassica2012.it Web: <http://www.brassica2012.it/>
- November 18-23, 2012, Valencia (Spain): **2012 International Citrus Congress**. Info: Prof. Luis Navarro, Head Tissue Culture Department, IVIA, Apartado Oficial, 46113 Moncada, Valencia, Spain. Phone: (34)961391000, Fax: (34)961390240, E-mail: lnavarro@ivia.es E-mail symposium: citruscongress2012@viajeseci.es Web: <http://www.citruscongress2012.org/>
- November 26-29, 2012, Strasbourg (France): **I World Congress on the Use of Biostimulants in Agriculture**. Info: Jean Pierre

Leymonie, Editorial Director, New AG International, 12 rue du Hagueneck, 68000 Colmar, France. Phone: (33)3 89 30 51 20, Fax: (33)3 89 30 51 34 E-mail symposium: [biostimulants@newaginternational.com](mailto:biostimulants@newaginternational.com) Web: <http://www.biostimulants2012.com/>

- December 2-6, 2012, White River (Kruger National Park) (South Africa): **IV International Symposium on Lychee, Longan and Other Sapindaceae Fruits.** Info: Mr. Derek Donkin, SA Lychee Growers' Association, PO Box 866, 0850 Tzaneen, South Africa. Phone: (27)153073676, Fax: (27)153076792, E-mail: [derek@subtrop.co.za](mailto:derek@subtrop.co.za) E-mail symposium: [ethne@goingafricaconferencing.com](mailto:ethne@goingafricaconferencing.com) Web: <http://www.lychee2012.com/>
- December 3-6, 2012, Stellenbosch (South Africa): **X International Symposium on Integrating Canopy, Rootstock and Environmental Physiology in Orchard Systems.** Info: Prof. Karen I. Theron, Department of Horticulture, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa. Phone: (27)218084762, Fax: (27)218082121, E-mail: [kit@sun.ac.za](mailto:kit@sun.ac.za) E-mail symposium: [reventer@netactive.co.za](mailto:reventer@netactive.co.za) Web: <http://www.orchardsystems2012.co.za/>
- December 3-6, 2012, Quito (Ecuador): **International Symposium on Medicinal Plants and Natural Products.** Info: Dr. Jalal Ghaemghami, PO Box 320172, West Roxbury, MA 02132, United States of America. Phone: (1)3393683868, Fax: (1)3393686838, E-mail: [jalal@shmen.org](mailto:jalal@shmen.org) E-mail symposium: [antigua-ishs@shmen.org](mailto:antigua-ishs@shmen.org) Web: <http://www.ecuadorishs.org>
- December 9-12, 2012, Baqa' (Jordan): **International Workshop on Good Agricultural Practices (GAP) for Greenhouse Vegetable Production in the Mediterranean Region.** Info: Dr. Muien Qaryouti, Nat'l Ctr. Agric.Res.& Technology Transfer, NCARTT, PO BOX 639, 19381 Baqa', Jordan. Phone: (962)64725071, Fax: (962)64726091, E-mail: [qaryouti@ncare.gov.jo](mailto:qaryouti@ncare.gov.jo) or Dr. Faisal Awawdeh, Nat'l Ctr.for Agric.Res.& Extension NCARE, Amman - Jerash Street, PO Box 639, 19381 Baqa', Jordan. Fax: (962)64726099, E-mail: [director@ncare.gov.jo](mailto:director@ncare.gov.jo) E-mail symposium: [GAP-greenhousevegetables@ncare.gov.jo](mailto:GAP-greenhousevegetables@ncare.gov.jo) Web: <http://www.ncare.gov.jo/MoenQar/Index.htm>

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## YEAR 2013

- April 21-26, 2013, Santiago (Chile): **IX International Symposium on Grapevine Physiology and Biotechnology.** Info: Dr. Manuel Pinto, Instituto de Investigaciones Agropecuarias, Centro La Platina, Santa Rosa 11610, Santiago, Chile. Phone: (56) 27575164, Fax: (56) 27575164, E-mail: [mpinto@inia.cl](mailto:mpinto@inia.cl) Web: <http://www.grapevinechile2013.cl/en/>
- April 24-27, 2013, Kusadasi (Turkey): **II International Symposium on Discovery and Development of Innovative Strategies for Postharvest Disease Management.** Info: Dr. Pervin Kinay, Ege University Faculty of Agriculture, Department of Plant Protection, 35100 Bornova IZMIR, Turkey. Phone: (90)232-388 4000, Fax: (90)232-374 48 48, E-mail: [pervin.kinay@ege.edu.tr](mailto:pervin.kinay@ege.edu.tr) or Dr. Samir Drobny, Aro, The Volcani Center, P.O.Box 6, 50250 Bet Dagan, Israel. E-mail: [samird@volcani.agri.gov.il](mailto:samird@volcani.agri.gov.il) or Dr. Michael Wisniewski, Usda-Ars, 2217 Wiltshire Road, Kearneysville, WV 25430, United States of America. E-mail: [michael.wisniewski@ars.usda.gov](mailto:michael.wisniewski@ars.usda.gov)
- [Update: April 19, 2012] Due to the political instability in the region the symposium convener suggested for the meeting to be rescheduled to take place in another country - check back for more details May 14-16, 2013, Giza (Egypt): **V International Symposium on Cucurbits.** Info: Dr. Ahmed Glala, Horticultural Crops Technology Department, Agriculture Research Division, National Research center, Dokky, 12622 Giza (El-Bhoos Street), Egypt. Phone: (20)122963894, Fax: (20)237601877, E-mail: [aaa\\_glala@yahoo.com](mailto:aaa_glala@yahoo.com)
- May 27-31, 2013, Murcia (Spain): **VI International Symposium on Almonds and Pistachios.** Info: Dr. Federico Dicenta, CEBAS-CSIC, PO Box 164, 30100 Espinardo (Murcia), Spain. Phone:

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(34)968 396 339, Fax: (34)968 396 213, E-mail: [fdicenta@cebas.csic.es](mailto:fdicenta@cebas.csic.es) E-mail symposium: [almond.pistachio.2013@cebas.csic.es](mailto:almond.pistachio.2013@cebas.csic.es) Web: [http://www.cebas.csic.es/almond\\_pistachio\\_2013/](http://www.cebas.csic.es/almond_pistachio_2013/)

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- June 2-6, 2013, Bari (Italy): **V International Symposium on Fig.** Info: Mr. Paolo Resta, Università di Bari, Dip.Biologia e Chimica Agrofor. e Ambient., via Amendola, 165/A, 70126 Bari, Italy. Phone: (39)0805442997, Fax: (39)0805442200, E-mail: [restap@agr.uniba.it](mailto:restap@agr.uniba.it)
- June 2-7, 2013, Coimbra (Portugal): **VIII International Symposium on In Vitro Culture and Horticultural Breeding.** Info: Prof. Canhoto Jorge, Departamento De Botanica, Universidade De Coimbra, Arcos Do Jardim, 3049 Coimbra, Portugal. Phone: (351)239855210, Fax: (351)239855211, E-mail: [jorgecan@ci.uc.pt](mailto:jorgecan@ci.uc.pt)
- June 3-7, 2013, Bari (Italy): **XI International Controlled and Modified Atmosphere Research Conference.** Info: Dr. Giancarlo Colelli, Dip. Pr.I.M.E. Univ. Di Foggia, Via Napoli 25, 71100 Foggia, Italy. Phone: (39) 320 4394535, E-mail: [g.colelli@unifg.it](mailto:g.colelli@unifg.it)
- June 9-14, 2013, Columbia, Missouri (United States of America): **I International Symposium on Elderberry.** Info: Mr. Andrew Thomas, Southwest Research Center, 14548 Highway H, Mt. Vernon, MO 65712, United States of America. Phone: (1)417-466-2148, Fax: (1)417-466-2109, E-mail: [thomasal@missouri.edu](mailto:thomasal@missouri.edu) Web: <http://muconf.missouri.edu/elderberrysymposium>
- June 13-16, 2013, (Turkey): **I International Mulberry Symposium.** Info: Prof. Dr. Sezai Ercisli, Ataturk University Agricultural Faculty, Department of Horticulture, 25240 Erzurum, Turkey. Phone: (90) 442-2312599, Fax: (90) 442 2360958, E-mail: [sercisli@atauni.edu.tr](mailto:sercisli@atauni.edu.tr) E-mail symposium: [sercisli@hotmail.com](mailto:sercisli@hotmail.com) Web: <http://www.mulberry2012.org>
- June 17-19, 2013, Montreal, Quebec (Canada): **International Symposium on Medicinal Plants and Natural Products.** Info: Dr. Jalal Ghaemghami, PO Box 320172, West Roxbury, MA 02132, United States of America. Phone: (1)3393683868, Fax: (1)3393686838, E-mail: [jalal@shmen.org](mailto:jalal@shmen.org) or Prof. Dr. Alain Cuerrier, 4101, rue Sherbrooke Est, Montréal Québec, Canada. E-mail: [alain\\_cuerrier@ville.montreal.qc.ca](mailto:alain_cuerrier@ville.montreal.qc.ca) E-mail symposium: [antigua-ishs@shmen.org](mailto:antigua-ishs@shmen.org)
- June 17-20, 2013, Matera (Italy): **VIII International Peach Symposium.** Info: Prof. Cristos Xiloyannis, Dip. Scienze dei Sistemi Colt., For., Amb., Viale dell'Ateneo Lucano, 10, 85100 Potenza, Italy. Phone: (39)3293606262, Fax: (39)0971205378, E-mail: [cristos.xiloyannis@unibas.it](mailto:cristos.xiloyannis@unibas.it) or Prof. Dr. Paolo Inglese, Department DEMETRA, Università degli Studi di Palermo, Viale delle Scienze, ED. 4, 90142 Palermo, Italy. Phone: (39)09123861234, Fax: (39)09123860820, E-mail: [paolo.inglese@unipa.it](mailto:paolo.inglese@unipa.it) Web: <http://www.unibas.it/peach2013/home.html>
- June 17-21, 2013, Leiden (Netherlands): **International Symposium on Growing Media and Soilless Cultivation.** Info: Erik Van Os, Aan de Rijn 2, 6701 PB Wageningen, Netherlands. Phone: (31)317483335, Fax: (31)317425670, E-mail: [erik.vanos@wur.nl](mailto:erik.vanos@wur.nl) or Wim Voogt, WUR, PO Box 20, 2665 ZG Bleiswijk, Netherlands. Phone: (31)174636700, Fax: (31)174636835, E-mail: [wim.voogt@wur.nl](mailto:wim.voogt@wur.nl) or Mr. Chris Blok, Applied Plant Research, Glasshouse Crops, Naaldwijk, Carneoolstraat 23, 2332, KA Leiden, Netherlands. Phone: (31)715760246 or 174636790, E-mail: [chris.blok@wur.nl](mailto:chris.blok@wur.nl) E-mail symposium: [Groschi2013.symposium@wur.nl](mailto:Groschi2013.symposium@wur.nl) Web: <http://www.groschi2013.wur.nl/>
- June 22-26, 2013, Plasencia (Spain): **VII International Cherry Symposium.** Info: Dr. David González-Gómez, Instituto Tecnológico Agroalimentario, Ctra. de Cáceres SN, 06071 Badajoz, Spain. Phone: (34)924012699, Fax: (34)924012674, E-mail: [david.gonzalezgo@juntaextremadura.net](mailto:david.gonzalezgo@juntaextremadura.net) or Dr. Maria Josefa Bernalte García, INTAEX, Carr. de Cáceres sn, 06074 Badajoz, Spain. Phone: (34)924012699, Fax: (34)924012674, E-mail: [bernalte@unex.es](mailto:bernalte@unex.es) E-mail symposium: [cherrysymposium2013@gmail.com](mailto:cherrysymposium2013@gmail.com) Web: <http://www.cherry2013.com/>



- July 1-5, 2013, St. Augustine (Trinidad and Tobago): **III International Conference on Postharvest and Quality Management of Horticultural Products of Interest for Tropical Regions.** Info: Dr. Majeed Mohammed, 22 Pine Drive, Homeland Gardens, Cunupia, Trinidad and Tobago. Phone: (1)868-671-2332, Fax: (1)868-645-0479, E-mail: mohd2332@hotmail.com
- July 17-20, 2013, College Station, TX (United States of America): **I International Symposium on Pecans and Other Carya in Indigenous and Managed Systems.** Info: Dr. L.J. Grauke, USDA ARS, Pecan Breeding & Genetics, 10200 FM 50 Rd., Somerville, TX 77879-5764, United States of America. Phone: (1)979-272-1402, Fax: (1)979-272-1401, E-mail: lj.grauke@ars.usda.gov or Dr. Leonardo Lombardini, Department of Horticultural Sciences, Texas A&M University, College Station, TX 77843-2133, United States of America. Phone: (1)9794588079, Fax: (1)9798450627, E-mail: l-lombardini@tamu.edu
- July 20-23, 2013, Taiyuan, Shanxi Province (China): **VII International Walnut Symposium.** Info: Prof. Jianbao Tian, Pomology Institute of Shanxi, Academy of Agricultural Sciences, Shanxi, Taigu, 030815, China. Phone: (86)0354-6215006, Fax: (86)0354-6215001, E-mail: tianjb-001@163.com
- August 5-8, 2013, Pattaya (Thailand): **I International Symposium on Tropical and Subtropical Ornamentals.** Info: Dr. Mantana Buanong, Division of Postharvest Technology, School of Bioresource and Technology, King Mongkut's Univ. of Technology Thonburi, Bangmod, Bangkok 10140, Thailand. E-mail: mantana.bua@kmutt.ac.th
- August 5-8, 2013, Pattaya (Thailand): **International Symposium on Quality Management of Fruit and Vegetables for Human Health.** Info: Dr. Sirichai Kanlayanarat, King Mongkut's University of Technology, Thonburi, Division of Postharvest Technology, Thungkhru, Bangkok 10140, Thailand. Phone: (66)2 470 7720, Fax: (66)2 452 3750, E-mail: sirichai.kan@kmutt.ac.th
- August 5-8, 2013, Pattaya (Thailand): **IV International Symposium on Ornamental Palms.** Info: Dr. Sirichai Kanlayanarat, King Mongkut's University of Technology, Thonburi, Division of Postharvest Technology, Thungkhru, Bangkok 10140, Thailand. Phone: (66)2 470 7720, Fax: (66)2 452 3750, E-mail: siri-chai.kan@kmutt.ac.th
- August 19-21, 2013, Portland, OR (United States of America): **I International Symposium on Marketing and Consumer Research in Horticulture.** Info: Dr. Jennifer Dennis, 625 Agriculture Mall Dr., 320 Horticulture Building, West Lafayette, IN 47906, United States of America. Phone: (1) 765-494-1352, Fax: (1) 765-494-0391, E-mail: jhdennis@purdue.edu Web: <http://www.hort.purdue.edu/fruitveg/events/ismcrh1announce.pdf>
- August 25-30, 2013, Hannover (Germany): **VI International Symposium on Rose Research and Cultivation.** Info: Prof. Dr. Thomas Debener, Leibniz University of Hannover, Institute for Plant Genetics, Herrenhäuser Straße 2, 30419 Hannover, Germany. Phone: (49)5117622672, Fax: (49)5117629292, E-mail: debener@genetik.uni-hannover.de E-mail symposium: roses2013@genetik.uni-hannover.de Web: <http://www.rosesymposium2013.uni-hannover.de/>
- September 2-5, 2013, Cranfield (United Kingdom): **VI International Conference on Managing Quality in Chains MQUIC2013.** Info: Dr. Leon Terry, Plant Science Laboratory, Cranfield University, Bedfordshire, MK43 0AL, United Kingdom. Phone: (44) 7500766490, Fax: (44) 1525 863277, E-mail: l.a.terry@cranfield.ac.uk E-mail symposium: mquic-2013@cranfield.ac.uk Web: <http://www.mquic2013.com>
- September 9-13, 2013, Naivasha (Kenya): **I International Symposium on Ornamentals in Africa.** Info: Dr. Arnold Opiyo, Horticultural Association of Kenya (HAK), PO Box 562, 20100 Nakuru, Kenya. Phone: (254)723119044, Fax: (254)51211113, E-mail: aopiyo@hotmail.com
- September 20-24, 2013, Taian (Shandong Province) (China): **III International Symposium on Pomegranate and Minor Mediterranean Fruits.** Info: Prof. Zhaoho Yuan, Shandong Institute of Pomology, 64 Longtan Rd., Tai'an, Shandong, 271000, China. Phone: (86)13953817188, Fax: (86)538-8266350, E-mail: zhyuan88@hotmail.com
- September 22-27, 2013, Jeju (Korea (Republic of)): **Greensys 2013 - New Technologies for Environment Control, Energy-saving and Crop Production in Greenhouse and Plant Factory.** Info: Prof. Jung-Eek Son, Department of Plant Science, Seoul National University, Silim-dong, Gwanak-gu, Seoul 151-921, Korea (Republic of). Phone: (82)28804564, Fax: (82)28732056, E-mail: sjeenv@snu.ac.kr
- October 9-12, 2013, Debrecen (Hungary): **II European Congress on Chestnut.** Info: Dr. Mihai Botu, Fruit Growing Research & Extension Station, Valcea, Str. Calea Traian n. 464, 240273 Rm. Valcea, Romania. Phone: (40)250740885, Fax: (40)250740885, E-mail: stpomvl@onix.ro or Milan Bolvansky, Inst.For.Ecol. SAS Zvolen, Branch Woody Plants Biology, Akademická 2, Nitra 949 01, Slovak Republic. E-mail: milan.bolvansky@savzv.sk or Dr. László Radócz, 138 Böszörményi Street, 4032 Debrecen, Hungary. Phone: (36)52508459, Fax: (36)52508459, E-mail: radocz@agr.unideb.hu
- October 15-17, 2013, Avignon (France): **II International Symposium on Organic Greenhouse Horticulture.** Info: Nicolas Sinoir, ITAB, 149 rue de Bercy, 75595 Paris Cedex 12, France. Phone: (33)467062370, E-mail: nicolas.sinoir@itab.asso.fr or Jérôme Lambion, GRAB, BP 11283, 84911 Avignon Cedex 9, France. Phone: (33)490840170, Fax: (33)490840037, E-mail: jerome.lambion@grab.fr
- October 20-25, 2013, Valparaíso (Chile): **II International Symposium on Organic Matter Management and Compost Use in Horticulture.** Info: Dr. Rodrigo Ortega, Avenida Santa Maria 6400, Vitacura, Santiago, Chile. Phone: (56)2-3531330, Fax: (56)2-3531228, E-mail: rodrigo.ortega@usm.cl E-mail symposium: ishs2013chile@usm.cl
- December 1-2, 2013, Nanchang (China): **XIII International Asparagus Symposium.** Info: Prof. Chen Guangyu, Jiangxi Academy of Agricultural Sciences, 330200 Nanchang, Jiangxi Province, China. Phone: (86)7917090308, Fax: (86)7917090001, E-mail: genebksh@gmail.com

## YEAR 2014

- March 17-20, 2014, Wuhan, Hubei Province (China): **I International Symposium on Vegetable Grafting.** Info: Prof. Zhilong Bie, Huazhong Agricultural University, College of Horticulture & Forestry, Wuhan 430070, Hubei Province, China. Phone: (86)27-87286908, Fax: (86)27-87282010, E-mail: biezhilong@hotmail.com
- April 7-12, 2014, Baku (Azerbaijan): **II International Symposium on Wild Relatives of Subtropical and Temperate Fruit and Nut Crops.** Info: Dr. Zeynal Akparov, Genetic Resources Institute ANAS, 155 Azadlig Ave, 1106 Baku, Azerbaijan. Phone: (994)125639171, Fax: (994)124499221, E-mail: akparov@yahoo.com
- June 10-13, 2014, Lemesos (Cyprus): **V International Conference Postharvest Unlimited.** Info: Dr. George A. Manganaris, Athinon & Anexartias Corner, P.O. Box 50329, 3603 Lemesos, Cyprus. Phone: (357)25002307, Fax: (357)25002804, E-mail: george.manganaris@cut.ac.cy or Dr. Panagiotis Kalaitzis, Mediterranean Agronomic Inst. Of Chania, 85, Macedonia Str. P.O. Box 85, 73100 Chania, Greece. E-mail: panagiot@maich.gr
- July 13-18, 2014, Torino (Italy): **VIII International Symposium on Chemical and Non-Chemical Soil and Substrate Disinfestation.** Info: Prof. Maria Lodovica Gullino, Univ.delgi Studi di Torino,

Patologia Vegetale, Via Leonardo da Vinci 44, 10095 Grugliasco (TO), Italy. Phone: (39)0116708539, Fax: (39)0116708541, E-mail: marialodovica.gullino@unito.it or Prof. A. Garibaldi, Univ. degli Studi di Torino, Patologia Vegetale, Via Leonardo da Vinci 44, 10095 Grugliasco (TO), Italy. Phone: (39)0116708539, Fax: (39)0116708541, E-mail: angelo.garibaldi@unito.it E-mail symposium: SD2014@unito.it Web: <http://www.sd2014.org>

- July 28 - August 8, 2014, Beijing (China): **XI International Conference on Grapevine Breeding and Genetics**. Info: Dr. Li Shao-Hua, Institute of Botany, Chinese Academy of Sciences, Beijing, 210095, China. Phone: (86)0162836026, Fax: (86)0162836026, E-mail: shhli@ibcas.ac.cn or Dr. Chen Zong-Ming, Institute of Botany, Chinese Academy of Sciences, Beijing, 210095, China. Phone: (86)0162836026, Fax: (86)0162836026, E-mail: zmc@njau.edu.cn
- August 17-22, 2014, Brisbane (Australia): **XXIX International Horticultural Congress: IHC2014**. Info: Prof. Dr. Roderick A. Drew, Griffith University, Nathan Campus, Nathan Q4111, Australia. Phone: (61)737357292, Fax: (61)737357618, E-mail: r.drew@griffith.edu.au E-mail symposium: info@ihc2014.org Web: <http://www.ihc2014.org/>
- September 18-22, 2014, Xian city, Shaaxi Province (China): **VIII International Symposium on Kiwifruit**. Info: Prof. Dr. Hongwen Huang, Director South China Inst. of Botany, Chinese Academy of Sciences, Xingke Road #723, Tianhe District, Guangzhou 510650, China. Phone: (86)20-37252778, Fax: (86)20-37252711, E-mail: huanghw@mail.scbg.ac.cn

## YEAR 2015

- April 21-24, 2015, Izmir (Turkey): **II International Workshop on Bacterial Diseases of Stone Fruits and Nuts**. Info: Prof. Dr. Hatice Özaktan, University of Ege, Faculty of Agric., Dept. Plant Protection, 35100 Bornova-Izmir, Turkey. Phone: (90)232 3884000, Fax: (90)232 3744848, E-mail: hatice.ozaktan@ege.edu.tr
- May 31 - June 3, 2015, Alnarp (Sweden): **XVIII International Symposium on Horticultural Economics and Management**. Info: Dr. Lena Ekelund Axelson, Dept. of Work Science, Business Econ., Environmental Psychology, Box 88, S-230 53 Alnarp, Sweden. Phone: (46)40-415000, Fax: (46)40-415076, E-mail: lena.ekelund@ltj.slu.se
- June 29 - July 3, 2015, Shenyang City (Liaoning Province) (China): **XVI International Symposium on Apricot Breeding and Culture**. Info: Dr. Weisheng Liu, Liaoning Inst. of Pomology, Xiongyue Town, Yingkou City Liaoning 115009, China. Phone: (86)417-7032822, E-mail: weishengliu@yahoo.com.cn
- September 16-18, 2015, Belgrade (Serbia): **III Balkan Symposium on Fruit Growing**. Info: Dr. Dragan Milatovic, Faculty of Agriculture, Nemanjina 6, 11080 Beograd - Zemun, Serbia. Phone: (381)11-2615345, Fax: (381)11-2193659, E-mail: mdragan@agrif.bg.ac.rs

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## II International Symposium on Horticulture in Europe (SHE2012)

July 1-5, 2012

Angers, France

[colloque.inra.fr/she2012](http://colloque.inra.fr/she2012)





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