



SOUTH AFRICA GROWER WORKSHOP ON

NURSERY IRRIGATION

An outreach event supported by the US Multi-State Agricultural Experiment Station "NC1186: Project on Water Management and Quality for Specialty Crop Production and Health"





WELCOME

A warm welcome to all of you at this Nursery Irrigation Workshop. For those of you unfamiliar with this part of the world, enjoy all the lovely scenery and perhaps a visit to a vineyard or two.

A special word of welcome to all our friends from America, who have made this event possible. The quality of the speakers promises a very informative couple of days. I want to thank Fall Creek Nursery for being willing to accommodate us during the hands on demonstrations and the activities of Thursday afternoon.

We are delighted to have a number of exhibitors who will be available for consultations and discussions at Stias on Friday. It is always so important to have access to new information and technology and they won't disappoint.

Without the generous sponsorship of all supplier companies this event couldn't have happened. The committee thanks all the following sponsors. Glencairns, Vegtech, Ellepot South Africa, Shadowlands and Nutrigo

SGASA conferences always boast successful networking opportunities and we know this event will be the same with much knowledge shared.

Kind regards
Ant Baird, SGASA Chairman

MESSAGE FROM THE ORGANISERS

Professor Paul Fisher is a long-standing friend of SGASA, and when we discussed the possibility of organising a workshop in the Cape when Paul and his fellow presenters were visiting, it was an opportunity not to be missed. First and foremost, a big thank you to the presenters for the time they have invested in this workshop as part of their Outreach program. It is a rare opportunity to have some of the leading horticultural experts share their knowledge & skills with our South African Growers. Aside from the knowledge gained over the two days, it is a great networking opportunity which will benefit the attendees in the years to come.

We would also like to thank Fall Creek for making their impressive facility available to us and assisting us with organising Thursday afternoon's activities. Andries, Maret and Elsa, we appreciate your hospitality.

The Seedling Growers Association of South Africa (SGASA) has a rich history of playing an active role in improving the knowledge and standard of its members, and this workshop is a great example of that aim. Thank you for joining us at a busy time of the year, especially those that have travelled from other provinces.

We hope you enjoy the two days, and please don't hesitate to contact Jean or myself if you have any questions.

With thanks,
Shaun Biggs & Jean Allen, SGASA Organisers



MESSAGE FROM THE SPEAKERS

Our team of speakers for the Nursery Irrigation Workshop are grateful for this opportunity to interact with South African growers on water conservation and quality issues. Our group includes experts on irrigation and container substrate from universities and the Department of Agriculture in the US. We are also joined by plant pathology professor Dr. Adele McLeod from Stellenbosch University, who has experience solving plant health issues for SA nursery growers.

The US team has a lot of experience working together in national collaborative projects including “NC1186 Water Management and Quality for Specialty Crop Production and Health” (see nimss.org/projects/view/mrp/outline/18690) and a grant-funded

project called Clean Water3 (see cleanwater3.org). We look at irrigation water in terms of opportunities to Reduce (conserving water and more efficient irrigation scheduling and application), Remediate (treat contaminants in water), Recycle (capture runoff, treat, and reuse), and reduce Risk (ensuring security of water supplies into the future).

In the workshop we will include both demonstration stations at a local leading operation, Fall Creek Nursery, and presentations. You will have an opportunity to ask questions relevant to your own nursery, and we in turn can learn about your experiences and issues.

PROGRAM AGENDA

THURSDAY: 2 FEB

Fall Creek Nursery, Paarl

12:30 Workshop registration

13:00 Welcome and nursery tour

14:30 15 minute break and drinks

14:45 Hands-On Demo Stations

15 mins per station.

15 minute break after 1 hour.

- Jim Owen: In-house characterization of your growing medium
- James Altland: Application of stratified substrates
- John Lea-Cox: Sensing substrates for real-time (automated) irrigation scheduling
- Amy Fulcher: Leaching fraction
- Paul Fisher: Monitor irrigation water for filtration and chlorination
- Adele McLeod: Sampling plant pathogens in water and tissue
- Raul Cabrera and Sarah White: T Test and interpret irrigation water EC, pH and alkalinity
- Tom Fernandez and Loren Oki: Test and interpret substrate pH and EC

17:00 Sponsored Networking, Drinks & cocktail snacks

PROGRAM AGENDA

FRIDAY: 3 FEB

Stias Conference Centre, Stellenbosch

08:00 Registration & tea/coffee

08:45 SGASA Chairman and Paul Fisher: Welcome (15 mins)

09:00 Plant pathogens

- Adele McLeod, Stellenbosch University - Biology of waterborne pathogens
- Paul Fisher, University of Florida – Filtration and chemical water treatment for pathogens

10:00 Tea / coffee break

10:30 Reservoirs and ecological water treatment

- Sarah White, Clemson University – Reservoir design and ecological water treatment for pathogen management
- Loren Oki, University of California at Davis – Slow sand filtration

11:30 Ions and pesticides

- Raul Cabrera, Rutgers University – Managing ions and alkalinity in irrigation water
- Tom Fernandez, Michigan State University – Managing pesticide transport in the nursery and removing pesticides and nutrients with a woodchip bioreactor

12:30 Lunch

13:45 Irrigation

- John Lea-Cox, University of Maryland – Connecting the Dots: Integrating substrate, plant and atmospheric water demands, to enable precision irrigation and nutrient management
- Amy Fulcher, University of Tennessee - The Weight of Water: Simple Calculations to Improve Irrigation Efficiency

14:45 Tea / coffee break

15:00 Substrates & weeds

- Jim Owen, USDA-ARS - Getting the most out of your Rand: Irrigation, fertilizer, & your growing medium
- James Altland, USDA-ARS – Managing weeds in the nursery

16:00 Wrap Up

- Paul Fisher - Online resources available for South African growers (10 mins)
- Shaun Biggs - Questions and follow up (15 mins)
- Program Evaluation (5 mins)

16:30 Sponsored Networking, Drinks and Snacks

OUR SPEAKERS



Adele McLeod

Adele McLeod is a plant pathologist who specialises in the biology and management of soilborne pathogens. Her research has mainly been focused on apple replant disease and Phytophthora root rot on apple. In 2013, she also started research projects on Phytophthora diseases on avocado and macadamia.

Adele started her career at the Agricultural Research Council in South Africa (ARC) at the Vegetable and Ornamental Institute in Pretoria and Elsenburgh, where she conducted research on potato diseases for 5-years. Thereafter, she moved to Stellenbosch University where her teaching and research career started as a senior lecturer in 2004, with a promotion to an associate professor position in 2015.



Paul Fisher

Professor and Floriculture Extension Specialist at the Environmental Horticulture Dept., University of Florida, Gainesville Florida USA. Over 30 years experience in applied research and farm advising for the commercial greenhouse and controlled environment industry, including

- Director of the Floriculture Research Alliance at University of Florida (FloricultureAlliance.org), a university/industry group focused on greenhouse propagation and production efficiency.
- Director of Greenhouse Training Online which provides certificate courses for grower professional development.
- Outreach lead of CleanWaterR3.org, a multi-university group solving problems in irrigation water quality and conservation.
- Co-author of books on pH Management and Greenhouse Lighting, and over 350 articles on floricultural crops in the trade press and scientific journals.
- Consultant for horticulture-related companies in the U.S. and internationally.

B.Sc. in Ecology from University of Auckland, New Zealand; Master of Applied Science from Lincoln University, New Zealand; Ph.D. in Horticulture from Michigan State University, U.S.



Sarah White

Dr. Sarah White is the Nursery Extension Specialist at Clemson University and is a Professor in the Department of Plant and Environmental Sciences. Sarah has 15 years of experience developing and optimizing nature-based treatment technologies growers can use to clean water. Her lab is currently investigating the applications of vegetation-based technologies (constructed wetlands, floating treatment wetlands, and vegetated buffers) for cleansing agrichemical and plant disease contaminants from production runoff to encouraging water reuse and conservation and evaluating reservoir design and management to enhance water security.

OUR SPEAKERS



Loren Oki

Loren has been a member of the faculty at UC Davis since 2002 and serves as the Cooperative Extension Specialist in Environmental Horticulture. This appointment is with the Department of Plant Sciences (80%) and the Landscape Architecture Program in the Department of Human Ecology (20%). He is Co-Director of the UC Nursery and Floriculture Alliance that provides outreach and technical training to greenhouse and nursery growers. He is also Co-Chair of the UC ANR Nursery & Floriculture Workgroup, a member of the California Department of Food and Agriculture Nursery Advisory Board, Department of Water Resources Landscape Stakeholder Advisory Group, and serves on the Statewide UC Master Gardener Advisory Committee.



Raul Cabrera

Raul has a BS in Horticulture from Universidad Agraria "Antonio Narro" (Saltillo, México), and MS in Plant Physiology and PhD in Plant Biology from the University of California at Davis. He has worked as Extension Specialist, Researcher and Lecturer in nursery/greenhouse crops and landscape horticulture at Rutgers University and Texas A&M University. His areas of expertise and interest focus on the applied biology, mineral nutrition, water use and overall management of ornamental crops and plants (floriculture, nursery and landscape) and industrial hemp.



Tom Fernandez

Professor, Department of Horticulture, Michigan State University

B.S. 1986, M.S. 1989, University of Florida, Fruit Crops Department

Ph.D. 1992, Michigan State University, Department of Horticulture

- Responsibilities: 45% Research, 30% Teaching, 25% Extension

My research and extension programs focus on water quality and management for container nursery production. We investigate methods to conserve water and remediate agrichemicals from irrigation runoff and recycled water. My program also investigates agrichemical transport in container production systems and methods to reduce movement. We are also investigating the use of RFID to facilitate precision agriculture practices for container production. I teach Landscape Plant Identification (HRT 211) and Nursery Management (HRT 310).



Amy Fulcher

Dr. Amy Fulcher is a Professor at the University of Tennessee where her lab focuses on irrigation and pesticide application technology. Her team recently developed a leachate sensor that when used to schedule irrigation, reduced water use by more than 65%. She is also part of a multi-disciplinary team that developed, evaluated, and commercialized a laser-guided, variable-rate spray system, which helped nursery producers and orchardists reduce pesticide spray volume by as much as 74% and drift up to 99%. She also coordinates 2 professional development programs for the nursery industry, the Tennessee Master Nursery Producer (TMNP) program and the Advanced TMNP program.

OUR SPEAKERS



John Lea-Cox

As a Professor, researcher and extension specialist in the Department of Plant Science and Landscape Architecture at the University of Maryland, Dr. John Lea-Cox has specialized in water, nutrient and pathogen management of intensive ornamental and crop production systems since 1993.

He strives to find ways to provide farmers and urban managers with their own production and environmental information, utilizing sensor networks and intelligent software. His goal is to help people to make better decisions, conserve resources, improve their profitability and reduce the environmental impact of their crop production practices.

John was the Principal Investigator of the SCRI-MINDS project (www.smart-farms.net) from 2009-14 which focused on improving irrigation and nutrient management efficiency in the nursery and greenhouse industry.



Jim Owen

Jim Owen is currently a USDA-ARS Research Horticulturist located at the Application Technology Research Unit in Wooster, OH. Jim received his B.Sc. in Plant and Soil Science at the University of Kentucky, his M.Sc. in Environmental Science at the University of Rhode Island, and Ph.D. at North Carolina State University with a major in Horticultural Science and minor in Soil Science. Jim's professional experience includes being an instructor at Univ. of Rhode Island, Asst. Prof. at Oregon State Univ., and a rise from Assist. to Assoc. Prof. at Virginia Tech. Jim's current research investigates horticultural production systems, with a focus on the nexus of water-agrochemicals-substrate and the subsequent physiological impact on crops within controlled environment agriculture including nurseries and greenhouses. Jim's aim is to increase resource efficiency, minimize environmental impact, and maximize profitability.



James Altland

Dr. James Altland is a Research Horticulturist with USDA-ARS. He specializes in container substrate formulations for optimizing crop production and minimizing weed growth. His research has addressed herbicide efficacy in container crops, as well as cultural practices that impact weed establishment and persistence with or without herbicide use. His presentation will address common characteristics of weeds that proliferate in containers, cultural practices to limit weed establishment, and best practices for incorporating herbicides in a weed management program.

The Seedling Growers Association of South Africa was established in 1982 to find solutions for common industry problems through research, befitting its members and growers alike.

This has been very successful and over the years many research projects have been tackled by university students. The results are available to paid up members. The association continues to go from strength to strength and serve the industry.

**Jean Allen - SGASA Director of Operations:
072 204 9338 | admin@seedlinggrowers.co.za**

**Shaun Biggs - SGASA Committee Organiser:
082 555 2201 | shaun@ellepot.co.za**

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