April 2024

ASSOCIATION OF APPLIED BIOLOGISTS

Newsletter

***President*: Prof. Mike Gooding, PhD**

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Our Mission

"to further the application of biology to the production of food, materials, and energy, and for the maintenance and improvement of the earth's environment"

AAB Quick Links

AAB Council

AAB Conference Calendar

AAB Conference Services

AAB Specialist Groups

AAB Early Career Professional members (AAB ECP) eligible for free online registration to *ANY* AAB-organised hybrid event.

AAB ECP Non-members will pay a nominal fee (£5) for access and also gain free membership for the remainder of the year.

Horticultural Science: From Discovery to Application

University of Reading, March 26-27

Meeting Report by **Dr Ciara O'Brien, Cranfield University**
ciara.obrien@cranfield.ac.uk

Meeting Highlights:

• The tour of the plant growth facilities in Reading sparked great interest, possibly leading to future collaboration and everyone leaving with ideas on how to improve our own glasshouses and controlled atmosphere setups.

• The evening drinks and dinner provided the perfect opportunity to network with the other attendees, getting to know more about their work and developing more personal connections.

• The high proportion of attendees from industry provided wonderful new perspectives for many academics (like me!) who usually only get feedback from within their institution, or from other academic researchers. A great way to see the potential applications in your work!

It was really beneficial to attend some smaller, UK-based conferences during my PhD, including this event and previous AAB meetings. Having fewer people (compared to many of the international conferences) facilitates more intimate discussions, and can make networking easier for early career people. Furthermore, having a network of local academics and industry researchers can lead to collaborations that don't carry the hefty price tag of international travel, or the hassle of moving samples across boarders!

The first day of the meeting was opened by Graham Clarkson, Head of Breeding at Edward Vinsons Ltd., who gave wonderful insights into how industry and academia can build relationships that bear fruitful research (pun intended). With many different pathways Edward Vinsons has taken, it was great to hear the benefits and limitations of different schemes including funded MSc studentships, Knowledge Transfer Partnerships (KTPs), and Innovate UK projects.

This was followed perfectly by Katia Zacharaki, who gave us a taste of what is yet to come from one of these Innovate UK project with Vertical Future Ltd. These collaborative projects really highlighted one of the key themes in the meeting: how academia and industry can collaborate to further our fundamental understanding of horticultural science, and utilise that knowledge in applied solutions.

After lunch, we had tours of the plant growth facilities at Reading University. It was great to have an outdoor break mid-conference, and even get a sneak peek at some ongoing work. The real star were the cocoa trees, which have been at home in Reading for many years, and were the perfect lead up to the Easter holidays!

After lunch, we heard more exciting results from across the UK, from detecting stress in potato (Luke Bell, Reading University), to inducing stress in Brassica (Ewan Gage, Cranfield University), and even how to harvest Arabidopsis (Lindsay Williams, University of Edinburgh).

Part of the impressive Cocoa Germplasm Collection

Not to be limited to one country, we also had great contributions from Oman, India, and the Philippines! Wrapping up the first day we heard about the different collections of plants available to researchers, and the many ways that they can be used, both from Sarah Trinder (UK Vegetable Genebank, University of Warwick) and Emily Hazell (Birmingham Botanical Gardens). It was refreshing to hear that Birmingham Botanical Gardens is so open to the research community (who never say no to some free samples!), and Sarah beautifully illustrated how many different impacts a collection can have over many years.

Day two was filled with superstar speakers invited by T**he Journal of Horticultural Science and Biotechnology**, as they celebrated the publication of 100 volumes in 2025. Geoffrey R. Dixon gave a wonderful history of the JHSB, from it's foundation in 1919, and how it evolved to include technology and international results. Simon Pearson (University of Lincon) presented the great possibilities and current limitations of robotics and artificial intelligence in agriculture, quickly followed by a warning on how war, pandemics, and evolving global relationships can challenge our food system by Tim Lang (City University of London). As with any emerging area of science, there was strong debate for and against the automation of agriculture, and the grey areas were explored by the experts and audience.

Joanna Trewern introduced the work of ProVeg

Joanna Trewern provided a positive message on how ProVeg has improved diets globally, incorporating more plant-based and regional dishes into school meals, supporting legislative changes, and educating the public on the health, economic, and environmental benefits of plants. Jim Giovannoni (Cornell University) showed how we can improve these benefits by leveraging genetic diversity and modification, from wild tomatoes to pink pineapples! These messages were supported by Gareth Redmond-King (Energy & Climate Intelligence Unit), sharing how the UK food system impacts the global climate. Ep Heuvelink (Wageningen University) gave the final talk of the meeting, with a hopeful message about how we have improved greenhouse horticulture and vertical farming productivity, and hopefully will continue to improve them in the future.

Overall, the event provided a wonderful mix of academia and industry, fundamental and applied research, reminders of great research done over the past several decades, and the ideas that will shape the future of horticulture. The best takeaway for me personally was the feedback and questions from such a wide audience after my presentation.

Ciara presents some of her PhD Research

As my presentation was on the applied side, it was encouraging to hear so many stakeholders in the food system take note of the ways we can reduce food loss and waste. It was also a huge boost to hear from other academics interested in applying the techniques into their area of expertise, allowing me to expand my network of potential collaborators and colleagues within plant science. As always, I left looking forward to the next AAB event!

Acknowledgements: Journal of Horticultural Science and Biotechnology, AAB Horticultural Quality and Food Loss specialist group.

Announcing the first Fellows of the Association of Applied Biologists

In 2024 AAB Council initiated the award of AAB Fellowship.

This award will provide Fellows with the option to add **F App Biol** after their name.

To be eligible for AAB fellowship current members must:

> Be AAB Members for at least seven years.

> Demonstrate a significant contribution to the field of Applied Biology.

> Members should submit an application form and short CV to AAB Exective Officer Dr Geraint Parry. (geraint@aab.org.uk).

> At the next AAB Council meeting, they will consider applications and reply to applicants soon afterwards with their decision.

Given their significant contribution to Applied Biology we encourage AAB event organisers to consider selecting Fellows when selecting invited speakers, session chairs or expert participants. Please ask Geraint Parry to obtain the contact information for any of the AAB Fellows.

Join about the AAB Fellows here:

https://www.aab.org.uk/specialist-groups/fellows-of-the-aab/

Upcoming Events in 2024

aab
ASSOCIATION OF APPLIED BIOLOGISTS
NEMATOLOGY GROUP

Hosted online and at Harper Adams, UK

6th Symposium of Potato Cyst Nematode Management

September 10-11 2024

Invited Speakers

James Price (JHI)

Sebastian Eves-van den Akker (Cambridge)

Misghina Teklu (WUR)

https://cvent.me/0OKzgB

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ASSOCIATION OF APPLIED BIOLOGISTS
NEMATOLOGY GROUP

Hosted online and at The Linnean Society, London

Advances in Nematology 2024

December 5th 2024

Confirmed Speakers:

- **Matthew Back;** *Harper Adams University, UK*
- **Alena Pance;** *University of Herts, UK*

Abstract Submission Deadline: Sept 23rd

Website: https://cvent.me/99Y4ok

ASSOCIATION OF APPLIED BIOLOGISTS
BIOCONTROL AND IPM GROUP

Hosted online and at University of Leicester

Biocontrol and IPM in Uncertain Climatic and Economic Environments

November 12th-13th 2024

Confirmed Speakers:

- **Robert Finger;** *ETH Zurich*
- **Tom Allen-Stevens;** *BOFIN*
- **Catherine Bradshaw,** *Met Office and University of Exeter*
- Representative from **CABI-Africa**

Abstract Submission Deadline: September 23rd

Website: https://cvent.me/zQAWxw

ASSOCIATION OF APPLIED BIOLOGISTS
APPLIED PLANT PATHOLOGY GROUP

British Society for Plant Pathology
BSPP

Hosted at the University of Oxford

AAB Workshop on 'Plant Pathogen Surveillance and Decision Support in Action'

at BSPP Plant Pathology

September 13th 2024

Abstract Submission open until May 1st

https://www.bspp.org.uk/abstract-submissions-for-plant-pathology-2024-and-ecpp2024-bspp-early-careers/?

Acrylamide and process formed contaminants: A supply chain approach

September 4th-5th 2024

The Museum of Natural Sciences Brussels

Event Webpage: *https://cvent.me/aOONKZ*

Confirmed Speakers:
Frans Verstraete
Benedikt Cramer
Manuel Coimbra
Andy Curtis
Franco Pedreschi
Zuzana Ciesarova
Vural Gokmen
Friedrich Longin
Christine Nowakowski
Jane Parker
Marco Arlorio
Marta Mesias
Elena Baldoni
Elena Bartkiene
Navneet Kaur

Abstract Submission for Oral Presentations is OPEN

ACRYRED
ILSI EUROPE
aab ASSOCIATION OF APPLIED BIOLOGISTS PLANT PHYSIOLOGY AND CROP IMPROVEMENT

Co-organised by the ACRYRED Cost Action, the International Life Sciences Institute and the Association of Applied Biologists.

Cereal Quality for Sustainable Production and Human Health

AAB President's Meeting

Hosted online and at University of Birmingham, UK September 17th-18th 2024

Rank Prize Lecture:
Professor Guy Poppy, *BBSRC Interim Executive Chair and University of Southampton*

Keynote Speakers:
Professor Martin Broadley, *Rothamsted Research Director of the Sustainable Soils and Crops Strategic Area*
Dr Cathrina Edwards, *Quadram Institute Research Lead to Optimise Nutrient Release from Plant-based Foods*
Professor Nigel Halford, *Gene Editing to Improve Cereal Quality, Rothamsted Research*
Dr Catherine Howarth, *Improving the Oat Crop for Sustainability and Quality, IBERS*
Professor Mike Gooding *(Convenor and President):* **Wheat Wars and Regenerative Agriculture**

Abstract Submission for Oral and Poster Presentations open until June 30th/ July 31st 2024

Website: *https://cvent.me/WPvk5G*

ASSOCIATION OF APPLIED BIOLOGISTS
CROPPING AND THE ENVIRONMENT

Hosted online and at University of Aberystwyth, UK

Biomass and Energy Crops VI
October 1st-3rd 2024

Abstract Submission is OPEN

Plenary Sessions at *University of Aberystwyth* and *Institute of Biological, Environmental and Rural Science* (IBERS)

Visits to IBERS Phenotyping Centre and Brignant Field Sites

Confirmed Speakers include:

Prof. Louisa Trindade (Wageningen University)

Dr Jeanette Whittaker (UK-CEH)

Prof. John Clifton-Brown (Giessen University)

Event website: *https://cvent.me/yKqGXw*

5th AAB-PLANTED CONGRESS
Agricultural Biotechnology in the Era of Genome Editing

aab PlantEd

29-31 October 2024

Location

Ondokuz Mayıs Üniversitesi, Atatürk Kültür ve Kongre Merkezi Atakum/SAMSUN

Contact

AAB council
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geraint@aab.org.uk

Ondokuz Mayıs Üniversitesi
Doç.Dr.Kubilay YILDIRIM
kubilay.yildirim@omu.edu.tr

www.aab-planted2024.com

https://cvent.me/1AOXZa

CRISPR applications and gene editing for

- **climate resilience in agriculture**
- **food and nutritional security**
- **pest and disease resistance in crops**
- **plant biotechnology**

Policy update, public perception and communication

Invited Speakers

GOETZ HENSEL
Centre for Plant Genome Engineering
Heinrich Heine University

SADİYE HAYTA
Genome editing of wheat
John Innes Centre

DENNİS ERİKSSON
Swedish Univ.of Agricultural Sciences

JOHNATHAN NAPİER
Rothamsted Research

Abstracts will be accepted after peer review made by the Congress Scientific Committee and will be published in Aspects of Applied Biology 149

Sponsors

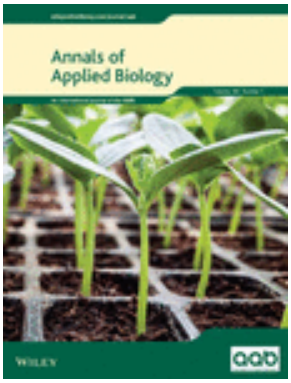
QBiyotek

Plant Biotechnology Journal

aab SEB

Annals of Applied Biology
An international journal of the aab

Update from Annals of Applied Biology



Annals is owned by the Association of Applied Biologists and as such all the journal revenue returns to the scientific community through organisation of events in relevant topic areas.

The May 2024 edition of Annals is now available

https://onlinelibrary.wiley.com/toc/17447348/2024/184/3

ORIGINAL ARTICLES

278 **Multivariate analysis of physical–chemical and biological parameters along wheat growth (*Triticum aestivum* L.) and the effects of a phosphorus-solubilizing bioinoculant**
N M P DE SOUZA, R E DILL, D G DOS S FAGUNDES, A CAGLIARI, A RIEGER

288 **Pomegranate's (*Punica granatum* L.) fruit quality and nutrient content are influenced by soil fraction × root architecture interaction**
F MURADOĞLU, E GÜLER, G AKKUŞ, İ BAŞAK, O A FAWOLE

300 **Tomato *PHYTOCHROME B1* mutant responses to drought stress during vegetative and reproductive phases**
C A SILVA-JUNIOR, F R R ALVES, L F PALARETTI, R DE OLIVEIRA, D D NASCIMENTO, R F CARVALHO

307 **Aspects of the biocontrol activity of *Aureobasidium* spp. strain against *Penicillium expansum* of apple**
R CIGNOLA, S ZUCCHINALI, G FIRRAO, A DI FRANCESCO

314 **Assessing gladiolus varieties for planting time using a phenological model based on agro-meteorological indices**
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326 **Eco-friendly chitosan polymer mitigates disease severity and mediates plant resistance against *Beet curly top Iran virus* in tomato**
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339 **Flock health planning: How to move from a plan to a reflective planning process in Northern Irish sheep flocks?**
P E CRAWFORD, K HAMER, F LOVATT, M C BEHNKE, P A ROBINSON

352 **Codification and description of phenological growth stages of taro (*Colocasia esculenta* var. *antiquorum*) according to the extended BBCH Scale**
V B S CHAUHAN, S N MALLICK, P MOHAPATRA, K PATI, H GOWDA, R ARUTSELVAN, A K VERMA, M NEDUNCHEZHIYAN

365 **Phenotypic characterization of Indian mustard using agronomic and quality traits under semi-arid climate**
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374 **Phenological coding of *Crambe abyssinica* Hochst. according to the BBCH system**
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382 **Phenological growth stages of sweet potato (*Ipomoea batatas* (L.) Lam.) according to the extended BBCH scale**
K PATI, R KALIYAPPAN, A K GIRI, V B S CHAUHAN, H GOWDA, R ARUTSELVAN, M NEDUNCHEZHIYAN, K LAXMINARAYANA

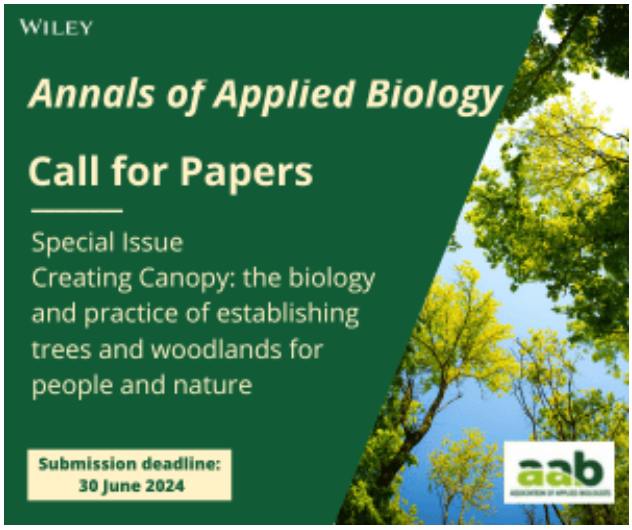
391 **Phenological growth stages of cardamom (*Elettaria cardamomum* Maton): Detailed identification and description using the extended BBCH scale**
H J AKSHITHA, M S SHIVAKUMAR, S J ANKEGOWDA

June 30th is the deadline for submissions for the Annals Special Issue on '**Creating Canopies**'.

This was launched in association with the November 2023 AAB meeting on the same topic.

We encourage anyone with a tree--themed manuscript to consider Annals for their submission.

Elisabeth Larsen (RHS Wisley) and John Vilasboa (University of Nottingham) are guest editors for the Special issue**.**



Royal Society of Biology Plant Health Conference 2024

The Royal Society of Biology (RSB) is delighted to invite you to attend the Plant Health Series: Summer Conference 2024. This event aims to highlight the ongoing work of emerging and established plant health professionals, and explore the various aspects of plant health.

https://my.rsb.org.uk/item.php?eventid=4293

Thursday 6th June
10:00-15:45 on Zoom.

Programme

The conference will feature keynote lectures, discussing topics such as the Nagoya Protocol and the importance of best plant health practice in nurseries. The event will also include a career panel discussion from a range of experts in the plant health sector, an update on the RSB plant health register, and a series of flash talks from those who took part in the RSB Plant Health Undergraduate studentship. A draft agenda is available to download ahead of the conference.

Audience

This event is open to all, but will be particularly relevant to scientists including those working in areas related to plant health.

Booking

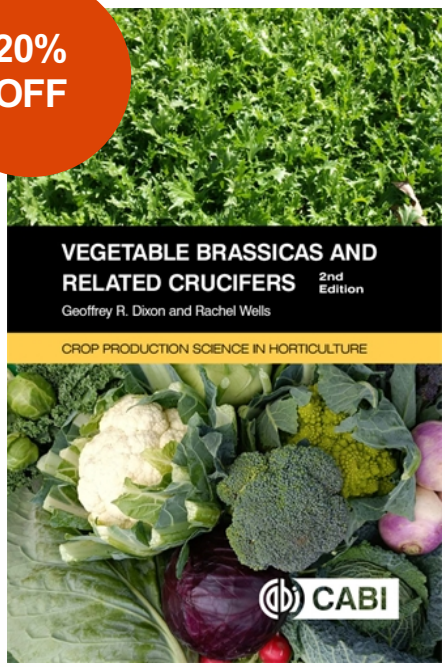
This event is free to attend, but advance registration is required. Please book your place on the event page and share with others in your network.

Continuing Professional Development (CPD)

This event is approved by the Royal Society of Biology for purposes of CPD and can be counted as 18 CPD points.

Register here: https://my.rsb.org.uk/item.php?eventid=4293

20% OFF



Vegetable Brassicas and Related Crucifers

2nd Edition

Geoffrey R Dixon, University of Reading, UK, **Rachel Wells**, John Innes Centre, Norwich, UK

Jan 2024 | 544pp

Series Name: Crop Production Science in Horticulture

Vegetable brassicas crops include broccoli, cauliflower, cabbage, kale and Brussel sprouts. This is an update of this popular title in the Crop Production Science in Horticulture series, originally published in 2006.

The *Brassica* genus contains diverse and economically important species and crops, for example, *Brassica oleracea* including cauliflower to kohlrabi, *B.rapa* including pak choi to mizuna, and aquatic crucifers such as watercress. These provide humankind with huge diversities of foods, promoting health and well-being.

This substantially expanded second edition reflects the significant advances in knowledge of plant breeding and crop production which have occurred since publication of the original book in 2006. Embracing new Brassicaceae research and concepts of sustainable and automated crop production, topics include:
Brassica evolution and transcontinental spread as the basis for crop breeding
Gene-editing, rapid sequencing, genetic markers and linkage mapping to enable efficient plant breeding
Seed development, F1 cultivars and rapid maturing crops for profitable cropping
Environmental impacts on pests, pathogens, crop reliability and quality
Soil health and fertility as agronomic principles
Environmental sustainability, biocontrol and integrated pest management
Vegetable brassicas as nutrient-rich foods for optimal health benefits

An invaluable resource for all those involved in *Brassica* production, this is essential reading for researchers and students in horticulture and plant science, growers, producers, consultants and industry advisors.

Apply 20% Discount Code at Checkout - CAB20

PB | 9781789249156 | ~~£70.00~~ £56.00 | ~~€85.00~~ €68.00 | ~~$95.00~~ $76.00
EBook | 9781789249163 | ~~£70.00~~ £56.00 | ~~€85.00~~ €68.00 | ~~$95.00~~ $76.00
EBook | 9781789249170 | ~~£70.00~~ £56.00 | ~~€85.00~~ €68.00 | ~~$95.00~~ $76.00

Introducing ‘Achieving sustainable cultivation of bananas – Volume 3: Diseases and Pests’

Burleigh Dodds Science Publishing are delighted to announce the publication of the final book in their three-volume collection on sustainable banana cultivation!
Achieving sustainable cultivation of bananas – Volume 3: Diseases and Pests, edited by Professor André Drenth, The University of Queensland, Australia and Professor Gert H. J. Kema, Wageningen University, The Netherlands is available now!

This book provides a comprehensive review of the major pests and diseases affecting global banana production including Tropical Race 4, black Sigatoka and banana streak virus.
The book also explores existing methods for pest/disease diagnosis and identification, current management strategies used to control and/or prevent outbreaks, as well as the development of disease-resistant cultivars and integrated pest and disease management programmes.
Find out more here: https://shop.bdspublishing.com/store/bds/detail/workgroup/3-190-109529

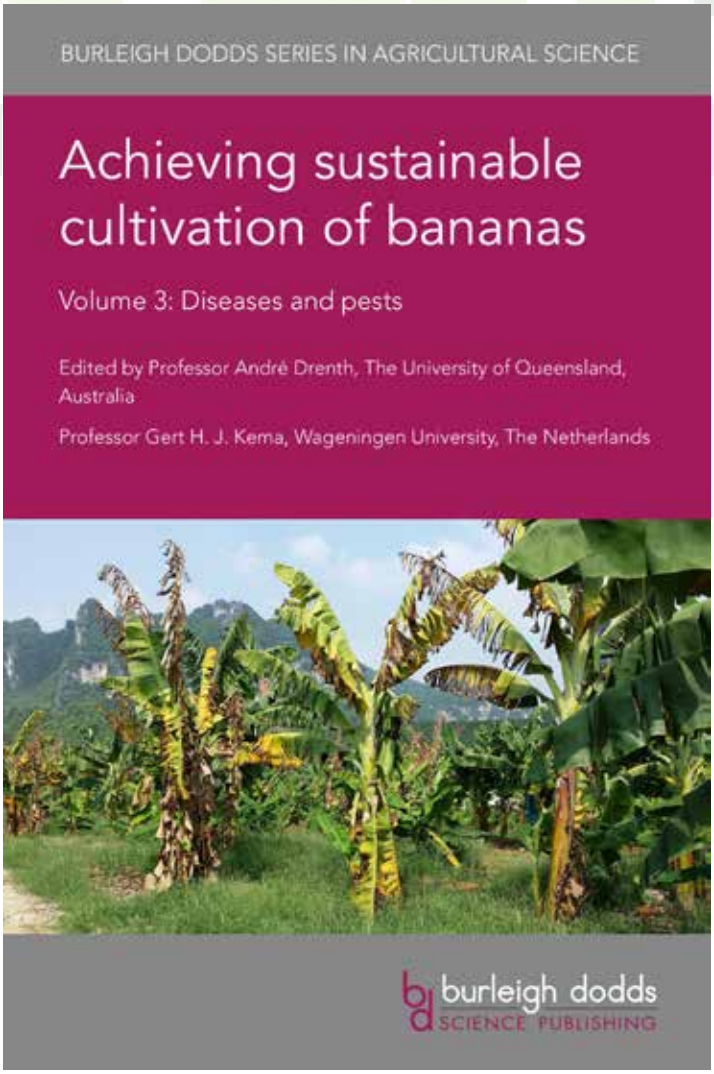
This title is accompanied by two companion volumes:

- Volume 1: Cultivation techniques
- Volume 2: Germplasm and genetic improvement

SPECIAL OFFER
Receive 20% off your order of ANY of the three books if purchased via the Burleigh Dodds website

Enter code **BANANA20** at checkout to redeem this discount.

Discount code expires 31st May 2024.



EFFICACY OF CONTACT HERBICIDES ON SMALL TARGET WEEDS

Nozzle choice plays a vital role in achieving effective weed control when they are at the cotyledon stage but is less important when they are at the two-leaf stage, revealed Dr David Nuyttens from the Flanders Research Institute for Agriculture, Fisheries and Food (ILVO), speaking at the International Advances on Pesticides Applications organised by the Association of Applied Biologists (AAB).

These results were from research performed in collaboration with Prof Benny De Cauwer of the University of Ghent (UGent), which evaluated the effect of nozzle choice on herbicide efficacy to treat black nightshade and fat hen in crops of spinach, beans and peas.

Weed control is particularly challenging in minor crops such as vegetables which rely on contact herbicides applied when the weeds are small, that is no later than the two-leaf stage. This means that growers get just one chance to control these weeds as they are not allowed to reapply because of legal requirements or a long pre-harvest interval.

As such, they need maximum efficacy, but drift reducing nozzles create coarser droplets which may reduce their efficacy at these early growth stages of the weeds because they can cause more misses, rebound and run-off.

David said: "Additionally, the number of herbicides in the toolbox is limited; and, for example spinach control of black nightshade in Belgium depends on just one active (Bentazone) while fat hen control in beans and peas is reliant on phenmedipham.

"In our trials, we looked at whether drift reducing nozzles negatively affect the performance of contact herbicides on small weed targets."

The team also evaluated the relationship between spray droplet size and herbicide efficacy. He explained that droplet sizes were bigger when the drift reducing fan or air induction nozzles were used, compared with the standard flat fan, while increasing spray pressure reduced droplet size. However, there was not much difference in the droplet size distribution from the different air induction nozzles.

Results showed that the relationship between nozzle and herbicide performance differed between the two contact herbicides; for example, nozzle type and spray pressure made only small differences in efficacy in bentazone applications whereas there were more significant differences with phenmedipham, he said.

Both black nightshade and fat hen were more sensitive to bentazone and phenmedipham at the cotyledon stage than at the two-leaf stage irrespective of nozzle–pressure combination. This could be because at the earlier stage the cuticle is thinner and less waxy. This implies that the earlier the application, the better, as long as conditions allow.

Cotyledon stage weed control

Bentazone and phenmedipham applications made with the coarse droplet Lechler ID3 air induction nozzles showed the lowest efficacy on the weeds, he reported, while treatments with higher pressures resulted in some increases in efficacy, he revealed.

"In this case, better efficacy means a better result with a lower dose rate, or a lower dose could be used for a similar control level."

The TeeJet XR standard flat-fan at 2.5 bar, i.e., the nozzle type–pressure combination with the largest portion of fine droplets, showed better phenmedipham performance on cotyledon stage plants of black nightshade.

David said: "One of the interesting results was that in black nightshade at the cotyledon stage, all the nozzles provided at least 90 percent control at rates lower than the authorised field dose with both phenmedipham and bentazone.

"This means that all the different nozzles with the field dose have effective control of black nightshade at the cotyledon stage. However, nozzles with finer droplets may permit a reduction in herbicide dose while still giving satisfactory control."

Two-leaf stage

Nozzle effects were more pronounced for fat hen treated with phenmedipham than for black nightshade, results showed. Those treated with phenmedipham showed no significant differences among nozzle–pressure combinations.

"At the two-leaf stage, most coarser droplet drift-reducing nozzles showed similar performance as XR standard flat-fan nozzle (which produces finer droplets) in controlling both black nightshade and fat hen," revealed David.

Results also showed that air induction flat-fan nozzles applied at 5.0 bar used at the two-leaf stage plants did not result in lower efficacy relative to the standard flat-fan nozzles at 2.5 bar, which was not the case for the air induction nozzles at 2.5 bar.

Summing up, he noted, nozzle choice also needs to depend on weather conditions such as wind and regulatory requirements. If there is low relative humidity, or the risk of spray drift because of wind speed, air induction nozzles producing coarse droplets should always be preferred over standard flat-fan nozzles.

Spray coverage

Water-sensitive paper used to measure spray coverage showed a significant decrease in coverage going from a standard flat fan to a drift reducing flat fan and an air inclusion flat fan, and there was also a significant effect of spray pressure, said David.

"In contrast to what we expected, we did not always observe an improvement with the higher pressure nozzles where the droplet size distribution decreased. This is probably because with increased pressure you have faster droplets which increases the possibility of droplets bouncing from certain leaf types when spray pressure is higher." ◆

Experiment design

Using 13,000 weed plants placed in 1344 pots, the experiments looked at two growth stages cotyledon and two leaf stage of fat hen and black nightshade.

As part of the investigation, David and the UGent team investigated droplet size and spray coverage of eight different nozzle-pressure combinations (2.5 and 5.0 bar). These included a standard flat fan, pre-orifice flat fan, two air induction flat fans, twin air induction dual flat fan all of ISO 03 nozzle size.

The herbicides trialled were bentazone + oil (Basagran + Actirob B) and phenmedipham (Astrix) applied at different doses with a water volume of 200 litres per hectare.

Efficacy was measured by drying and weighing the remaining green matter after 28 days and comparing it with the unsprayed control. This was done with all the nozzle-pressure combinations to identify the effective dose required for 90 percent biomass reduction.

Note: Phenmedipham was sold by UPL using the Astrix brand name in Belgium, but in GB they sell four brands with the same 160g/lit SC formulation – Beetup Flo, Betasana SC, Corzal SC and Jupiter.

For further information on the trials, go to https://www.mdpi.com/2073-4395/13/5/1342

The AAB News Hub

A dedicated section for generic news content which may be of interest to our members and associates. These articles may range from current events, blogs, or discussion topics right the way through to some professionally published content. We are more than happy to receive additional content from our readers. If you come across an article or a newspaper column which you think would be of interest to our members please feel free to send it to John (john@aab.org.uk)

- Climate change can disturb the accuracy of trees' biological clocks (New Scientist)
- Climate change: 'Uncharted territory' fears after record hot March (BBC)
- Total solar eclipse: The 4-minute window into the Sun's secrets (BBC)
- European court rules human rights violated by climate inaction (BBC)
- Climate change: Stroud Brewery uses climate-resilient hops (BBC)
- These photos show how a warmer climate is damaging Earth's waters (New Scientist)
- Nuclear fusion experiment overcomes two key operating hurdles (New Scientist)
- The incredible new tech that can recycle all plastics, forever (New Scientist)
- Robust optical clocks promise stable timing in a portable package (Nature)

ASSOCIATION OF APPLIED BIOLOGISTS

Association of Applied Biologists
Membership 2024

We are writing to encourage you to join AAB in 2024

Join a commmity of 1000+ like-minded professionals that also has significant financial benefits, especially for early career professionals (ECPs).

2024 Membership fees:

Regular members: £65
Early Career Professional members: £22
(anyone within 5 years of finishing full-time education; bachelor or graduate study including career breaks)
Retired members: £33.50

Membership benefits:

- Reduced fees for ALL AAB events. Regular members pay £100 and ECP members pay £50 **LESS** than equivalent non-members to attend AAB in-person events. ECP members can join events as an online delegate for free.

- 20% discount on Article Publishing Charges when publishing to Plant Biotechnology Journal

- ECPs are eligible for travel grants to any AAB event (up to £300)

- All members are eligible for Carer grants (up to £500)

- Eligibility to apply for Federation of European Society of Plant Biology short term mobility grants (up to €3000)

- Consideration for Fellowship of AAB (F Appl. Biol.) after seven years of continuous membership

- 30% discount for online purchase of 'Aspects of Applied Biology'

- Reciprocal 50% reduction in membership fees with the Royal Society of Biology

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