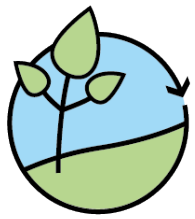


ASSOCIATION OF APPLIED BIOLOGISTS

President: Professor Christine Foyer



Legumes
Translated



ASSOCIATION OF APPLIED BIOLOGISTS
Cropping and the Environment Group



ÉCOLE SUPÉRIEURE
D'AGRICULTURES
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Legume Science and Practice 2

A three day virtual conference

on 1st-3rd September 2021



PROVISIONAL PROGRAMME

Association of Applied Biologists, Warwick Enterprise Park, Wellesbourne, Warwick CV35 9EF, UK

Registered Charity No. 275655; <http://www.aab.org.uk>

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Legume Science and Practice 2

A three day virtual conference on 1st-3rd September 2021

(9 BASIS Points have been awarded as follows: 3CP, 3E and 3PN)

Legumes have the potential to play a substantial role in sustainable agriculture, as a resource for pollinators and birds, in intercropping regimes, providing break crops in rotations, enhancing soil nitrogen levels, accessing soil phosphorous and promoting soil biodiversity. The overall GHG emissions associated with legume foods are low whilst products are highly nutritious and many raw legumes products can be readily stored for long periods without spoilage. As such their role in sustainable food production and security is growing.

This is the second Legumes conference organised by the AAB ‘**Cropping And The Environment (CATE)**’ specialist group. We have brought together delegates from a broad spectrum of disciplines to explore the role of legumes in sustainable agriculture, with an emphasis on ecosystem service. This is an extremely international event and we are delighted to host an entire day of talks on ‘Legumes in Africa’.

Excitingly, a special issue of ‘*Annals in Applied Biology*’ will be associated with this event. Offers of review, research or opinion papers are encouraged for publication in the January 2022 edition of *Annals*. This issue will be free-to-access so will maximise the visibility of your research. This edition will be guest-edited by experts, such as Kairsty Topp (SRUC, Edinburgh, UK), Christine Watson (SRUC, Aberdeen, UK) and Joëlle Fustec (USC LEVA, ESA, INRAE, France). Submissions are required by mid-September 2021 (Please highlight your submissions as ‘Legumes 2 Conference Paper’)

<https://mc.manuscriptcentral.com/aab>

PROVISIONAL PROGRAMME

WEDNESDAY 1st SEPTEMBER 2021

09:50 WELCOME and INTRODUCTION

JOËLLE FUSTEC (Ecole Supérieure d’Agricultures, Angers, France)

Session 1: Legumes in Europe

10:00 TBC

BERTRAND PINEL (Terrena, France)

10:25 How are legume crops valued in Europe? Insights from the analysis of several Value Chains case studies in the H2020 LegValue Project

T SMADJA & F MUEL (Terres Univia, Paris, France)

10:40 Scenarios for legume protein in European agricultural systems

IOANNA MOURATIADOU (Humboldt University of Berlin, Germany; Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany), QIRUI LI (Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany), FREDERICK STODDARD (University of Helsinki, Finland), NYNKE SCHULP (Vrije Universiteit Amsterdam, Amsterdam, The Netherlands), CHRISTINE WATSON (SRUC, Aberdeen, UK), SONOKO BELLINGRATH-KIMURA (Humboldt University of Berlin, Germany; Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany) & MORITZ RECKLING (Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany)

10:55 Translating knowledge for legume-based farming for food and feed (Legumes Translated)

D MURPHY-BOKERN (Kroge-Ehrendorf, Lohne, Germany), J DAUBER (Johann Heinrich von Thünen Institute, Braunschweig, Germany), L RITTLER, M KRÖN (Donau Soja, Vienna, Austria), J SCHULER, M RECKLING (Leibniz Centre for Agricultural Landscape Research (ZALF), Müncheberg, Germany), H WILLER (Research Institute of Organic Agriculture (FiBL), Frick, Switzerland), T HAASE (Hessen Department of Agricultural Affairs (LLH), Wiesbaden, Germany), C SCHAUMAN, K LINDSTRÖM (University of Helsinki, Finland), C ZIMMER (Schwaebisch Hall Producers (BESH), Wolpertshausen, Germany), R DEWHURST (Scotland's Rural College (SRUC), Aberdeen, UK), D BARKAS (NIREUS Aquaculture, Dimokritou, Greece), J RECKNAGEL (Agricultural Technology Centre Augustenberg (LTZ), Emmendingen, Germany), A IANCHEVA (AgroBioInstitute (ABI), Sofia, Bulgaria), K PETROVIC (Institute of Field and Vegetable Crops (IFVC), Novi Sad, Serbia), S ALVES (Agriculture and Food Development Authority (Teagasc), Carlow, Ireland), T O' DONOVAN (Arvum Seed Technology (AST), Waterford, Ireland), R ORESTIS (THESGI Farmers' Cooperative of Thessaly, Larissa, Greece) & C WATSON (Scotland's Rural College (SRUC), Aberdeen, UK)



11:20 Multi-criteria assessment of integrating legumes into cropping systems across Europe

INKA NOTZ (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany), SHEILA ALVES (Teagasc, Ireland), THORSTEN HAASE (Landesbetrieb Landwirtschaft Hessen (LLH), Germany), PAUL HARGREAVES (Scotland's Rural College (SRUC), UK), MICHAEL HENNESSY (Teagasc, Ireland), ANELIA IANTCHEVA (AgroBioInstitute, Bulgaria), JÜRGEN RECKNAGEL (Agricultural Technology Centre Augustenberg (LTZ), Germany), LEOPOLD RITTLER (Donau Soja, Austria), JOHANNES SCHULER (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany), KAIRSTY TOPP (Scotland's Rural College (SRUC), UK), MARJANA VASILJEVIĆ (Institute of Field and Vegetable Crops, Serbia), FRITZ WOLF (Landwirtschaftlicher Beratungsdienst Schwäbisch Hall e.V., Germany) & MORITZ RECKLING (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany)



11:35 COMFORT BREAK

Session 2: Soils, N₂ fixation

11:45 For an integrated strategy in agronomy of symbiotic nitrogen fixation and engineering of legume ecosystemic services

JEAN-JACQUES DREVON (French National Research Institute for Agriculture, Food and Environment (INRAE), France)

12:10 Increasing soybean productivity by inoculation with locally isolated Bradyrhizobium strains under cool growing conditions in Germany

RICHARD ANSONG OMARI (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany; Humboldt-University of Berlin, Germany), MORITZ RECKLING, MOSAB HALWANI (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany) & SONOKO D BELLINGRATH-KIMURA (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany; Humboldt-University of Berlin, Germany)

12:25 Comparing interactive effects of microbial symbionts and nutrients on biological nitrogen fixation, nutrition and yield of mung bean (*Vigna radiata*)

E C GOUGH, J P THOMPSON, R S ZWART & K J OWEN (University of Southern Queensland, Australia)

12:40 Modelling the key role of microorganisms in C and N cycles of a cereal-legume agrosystem

DIDIER BLAVET (French National Research Institute for Sustainable Development, (IRD) Montpellier, France), HATEM IBRAHIM (University El Manar Tunis, Tunisia), GHILÈS KACI (High National School of Agronomy, Algiers, Algeria), KAREL VAN DEN MEERSCHE, CÉLINE BLITZ-FRAYRET (CIRAD Montpellier, France), ABDESSATAR HATIRA (University El Manar Tunis, Tunisia), FREDERIC GÉRARD, JEAN-JACQUES DREVON (French National Research Institute for Agriculture, Food and Environment (INRAE) Montpellier, France) & MARC PANSU (French National Research Institute for Sustainable Development (IRD), France)

12:55 Symbiotic performance of indigenous soybean nodulating bradyrhizobia in European cropping systems

MOSAB HALWANI (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany; Humboldt-University of Berlin, Germany), MORITZ RECKLING (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany; Swedish University of Agricultural Sciences, Uppsala, Sweden), DILFUZA EGAMBERDIEVA (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany; National University of Uzbekistan, Tashkent, Uzbekistan), RICHARD ANSONG OMARI, SONOKO D BELLINGRATH-KIMURA (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany; Humboldt-University of Berlin, Germany), JOHAN BACHINGER (Leibniz Centre for Agricultural Landscape Research (ZALF), Germany) & RALF BLOCH (Eberswalde University for Sustainable Development, Eberswalde, Germany)

13:10 LUNCH

13:45 *Recorded short talks to introduce Poster Presentations*

1. Germination requirements to grow minor pulses in North Europe climates

SOUKEYE GADIAGA (UniLaSalle, Mont-Saint-Aignan, France) & ALICIA AYERDI GOTOR (UniLaSalle, Beauvais, France)

2. Strategies to enhance pollination in the field bean, *Vicia faba*

JAKE MOSCROP (University of Cambridge, UK), JANE THOMAS, TOM WOOD (NIAB, Cambridge, UK) & BEVERLEY GLOVER (University of Cambridge, UK)

3. **Symbiotic performance of Indigenous soybean-nodulating bradyrhizobia in north-eastern Germany**
MOSAB HALWANI (Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany), MORITZ RECKLING (Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany; Swedish University of Agricultural Sciences, Uppsala, Sweden), JOHANNES SCHULER (Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany), RALF BLOCH (Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany; Eberswalde University for Sustainable Development, Germany) & JOHANN BACHINGER (Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany)
4. **Taking organic soybean cultivation farther north: Agronomic performance of cultivars and irrigation treatments**
KATHLEEN KARGES, MORITZ RECKLING & SONOKO BELLINGRATH-KIMURA (Leibniz Centre for Agricultural Landscape Research (ZALF), Müncheberg, Germany)
5. **Growing field beans in Ireland: A survey to assess variability in growth and development**
MUIREANN COAKLEY, PAUL PANNETIER, KEVIN MURPHY, BRENDAN REID, DERMOT FORRISTAL & SHEILA ALVES (Teagasc, Carlow, Ireland)
6. **Wild pollinators of lupin and faba bean in The Netherlands, and their importance for yield potential**
WILLEMIJN CUIJPERS (Louis Bolk Institute, Bunnik, The Netherlands), BREIDENBACH, DE BOER (Bureau FaunaX, Gorredijk, The Netherlands), SCHEPER (Centre for Ecosystem Studies, Wageningen, The Netherlands), REEMER (European Invertebrate Survey, Leiden, The Netherlands) & PRINS (Louis Bolk Institute, Bunnik, The Netherlands)
7. **Rye-vetch mixtures – their potential as multifunctional crops**
CHRISTINE WATSON, JOHN BADDELEY (SRUC, Aberdeen, UK), CAIRISTIONA TOPP (SRUC, Edinburgh, UK) & ROBIN WALKER (SRUC, Aberdeen, UK)



Session 3: Pathogens

- 14:05 **TBC**
ALAIN BARANGER (French National Research Institute for Agriculture, Food and Environment, (INRAE), Rennes, France)
- 14:30 **Potential for improvement of resistance to downy mildew in pea (*Pisum sativum*) and faba bean (*Vicia faba*)**
J E THOMAS, T A WOOD (NIAB, Cambridge, UK), M VIGOUROUX, J CHEEMA, B STEUERNAGEL, G ROBINSON, C MOREAU & C DOMONEY (John Innes Centre, Norwich, UK)
- 14:45 **Identification of sources of partial resistance to foot rot caused by *Fusarium* spp. in *Vicia faba***
A WEBB, T A WOOD & J E THOMAS (NIAB, Cambridge, UK)
- 15:00 **Evidence that the faba bean pathogen, *Botrytis fabae*, reproduces sexually in the UK**
TOM REYNOLDS, ANNE WEBB, JANE THOMAS & THOMAS WOOD (NIAB, Cambridge, UK)

- 15:15 **Mechanisms and resistance sources of *Pisum* spp. collection against *Uromyces pisi***
SALVADOR OSUNA-CABALLERO, NICOLAS RISPAIL & DIEGO RUBIALES (Institute for Sustainable Agriculture (CSIC), Córdoba, Spain)
- 15:30 **Comparative amplicon sequencing to explore the relationship among land use history, plant health and disease management**
ASFAKUN SIDDIKA, NILOOFAR VAGHEFI, DANTE ADORADA (University of Southern Queensland, Toowoomba, Australia), KHONDOKER DASTOGEER (Tokyo University of Agriculture and Technology, Japan) & Prof GAVIN ASH (University of Southern Queensland, Toowoomba, Australia)
- 15:45 **COMFORT BREAK**

Parallel Session 4A: Physiology and Genetics

Both parallel sessions will be recorded and made available to all attendees on a private YouTube channel before the end of the event

- 16:00 **The importance of tertiary roots in young peas for future service legume selection**
LAURE BOEGLIN (Ecole Supérieure d'Agricatures, Angers, France), ANIS M LIMAMI (University of Angers, France) & JOËLLE FUSTEC (Ecole Supérieure d'Agricatures, Angers, France)
- 16:15 **Genetic variation for seed quality traits in pea: generating novel germplasm**
T RAYNER (John Innes Centre, Norwich, UK), P G ISAAC (IDna Genetics Ltd, Norwich, UK), R OLIAS, A CLEMENTE (Estación Experimental del Zaidín, Granada, Spain) & C DOMONEY (John Innes Centre, Norwich, UK)
- 16:30 **WHIRLY family in soybean (*Glycine max*): subcellular localisation and functional diversity**
BARBARA KARPINSKA (University of Birmingham, UK), SILVANA PINHEIRO DADALTO, AMANDA BONOTO GONÇALVES (Universidade Federal do Ceará, Fortaleza, Brazil), MURILO SIQUEIRA ALVES (Universidade Federal de Viçosa, Brazil), PATRÍCIA PEREIRA FONTESA, LUCIANO GOMES FIETT (Universidade Federal do Ceará, Fortaleza, Brazil) & CHRISTINE H FOYER (University of Birmingham, UK)
- 16:45 **Genetic variation in transpiration response to vapour pressure deficit (VPD) and possible physiological mechanisms regulating this trait in faba bean (*Vicia faba* L.)**
HEND MANDOUR, IAN C DODD & ELIZABETE CARMO-SILVA (Lancaster University, UK)
- 17:00 **Personal zoom rooms are open for discussion with poster presenters. Please ask the organisers if you would like to have a discussion with a poster presenter**
- 17:30 **END**

Parallel Session 4B: Legumes in Pasture

Both parallel sessions will be recorded and made available to all attendees on a private YouTube channel before the end of the event

- 16:00 **Mixed grass-legume sward nutritional quality improvement as a result of soil liming application**
ROSE BOYKO (Scotland's Rural College, Aberdeen, Scotland; University of Aberdeen, Scotland), ROBIN WALKER (Scotland's Rural College, Aberdeen, Scotland), GARETH NORTON, GRAEME PATON (University of Aberdeen, Scotland) & CHRISTINE WATSON (Scotland's Rural College, Aberdeen, Scotland)

- 16:15 **Multi-species grasslands stimulate productivity and resilience of a temperate crop-grassland rotation**
 GUYLAIN GRANGE (Teagasc, Crop, Environment and Land Use Research Centre, Wexford, Ireland; School of Statistics and Computer Science, Trinity College Dublin, Ireland),
 CAROLINE BROPHY (School of Statistics and Computer Science, Trinity College Dublin, Ireland)
 & JOHN A FINN (Teagasc, Crop, Environment and Land Use Research Centre, Wexford, Ireland)
- 16:30 **Positive legacy effect of previous legume proportion in a ley on the performance of a following crop of *Lolium multiflorum***
 A FOX (Agroscope, Forage Production and Grassland Systems, Zürich, Switzerland; Agroscope, Molecular Ecology, Zürich, Switzerland), M SUTER (Agroscope, Forage Production and Grassland Systems, Zürich, Switzerland), F WIDMER (Agroscope, Molecular Ecology, Zürich, Switzerland) &
 A LÜSCHER (Agroscope, Forage Production and Grassland Systems, Zürich, Switzerland)
- 16:45 **¹⁵N natural abundance and ¹⁵N leaf labelling methods provide similar magnitudes of nitrogen transfer from clover to associated grass**
 ANDREAS HAMMELEHLE, JOCHEN MAYER (Agroscope, Water Protection and Substance Flows, Zurich, Switzerland), ANDREAS LÜSCHER (Agroscope, Forage Production and Grassland Systems, Zurich, Switzerland), PAUL MÄDER (Research Institute of Organic Agriculture (FiBL), Frick, Switzerland) & ASTRID OBERSON (ETH Zurich, Institute of Agricultural Sciences, Group of Plant Nutrition, Lindau, Switzerland)
- 17:00 **Personal zoom rooms are open for discussion with poster presenters. Please ask the organisers if you would like to have a discussion with a poster presenter.**
- Both parallel sessions will be recorded and made available to all attendees on a private YouTube channel before the end of the event**
- 17:30 **END**

THURSDAY 2nd SEPTEMBER 2021

09:50 **WELCOME and INTRODUCTION**

Session 5: Legumes in Africa One

- 10:00 **Productivity and resilience merits of maize-legume rotation and intercrop systems in Eastern and Southern Africa**
 ISAIAH NYAGUMBO (CIMMYT, Mount Pleasant, Harare, Zimbabwe, Africa)
- 10:25 **TBC**
 REGIS CHIKOWO (University of Zimbabwe, Mount Pleasant, Harare, Zimbabwe, Africa)
- 10:50 **Integration of tropical legume species into smallholder conservation agriculture systems of southern Africa**
 CHRISTIAN THIERFELDER (CIMMYT, Mount Pleasant, Harare, Zimbabwe, Africa)
- 11:15 **Biogenic amines in African locust bean (*Parkia biglobosa*) fermented seeds**
 NADEGE T KONE, MICHEL Y ESSE, TAGRO GUEHI (Université Nangui, Côte d'Ivoire, West Africa), CAROLINE STRUB (Polytech Montpellier, France), NAWEL ACHIR (Institut Agro, IRC, Montpellier, France), JOEL GRABULOS, CHRISTIAN MESTRES & ELODIE ARNAUD (CIRAD Montpellier, France)

11:30 **Evolution of biochemical and nutritional compounds of African locust bean (*Parkia biglobosa*) seeds during their transformation in “Soumbala” in Côte d’Ivoire**
YAVO MICHEL OLIVIER ESSE (Université Nangui, Côte d’Ivoire, West Africa; CIRAD, Institut Agro, Montpellier, France), NAWEL ACHIR (Institut Agro, IRC, Montpellier, France), JOËL GRABULOS, GILLES MOREL, ERIC TARDAN, CHRISTIAN MESTRES (CIRAD, Montpellier, France) & TAGRO SIMPLICE GUEHI (Université Nangui, Côte d’Ivoire, West Africa)

11:45 **GENERAL DISCUSSION**

12:00 ***Recorded short talks to introduce Poster Presentations***

Personal zoom rooms are open for discussion with poster presenters. Please ask the organisers if you would like to have a discussion with a poster presenter

8. **Effect of foliar applications of FeSO_4 on chickpea (*Cicer arietinum* L.) under iron deficient conditions**
SHAMIM AKHTAR & MARYAM SADDIQA (University of Gujrat, Pakistan)
9. **Physiological and symbiotic behavior of N_2 -fixing common bean subjected to iron deficiency: A functional dissection**
ABDELMAJID KROUMA (Valorization and Optimization of Resource Exploitation (VOER), Faculty of Sciences and Techniques of Sidi Bouzid, Tunisia)
10. **Management of rust in faba bean by crop diversification**
ÁNGEL M VILLEGAS-FERNÁNDEZ, AHMAD AMARNA (Institute for Sustainable Agriculture, CSIC, Córdoba, Spain), JUAN MORAL (University of Córdoba, Spain) & DIEGO RUBIALES (Institute for Sustainable Agriculture, CSIC, Córdoba, Spain)
11. **Is the regulation of nodulation conserved between species at the cell type level?**
H WILKINSON & M L GIFFORD (University of Warwick, Coventry, UK)
12. **Identifying the research gaps in cereal-grain legume intercropping**
ROSA HOLT, CHRISTINE WATSON (SRUC, Aberdeen, UK) & CAIRISTIONA TOPP (SRUC, Edinburgh, UK)
13. **UK-grown potato bean (*Apios americana* Medik): Potential for diet diversification and revalorisation as well as suitability for larger scale production**
MADALINA NEACSU (Rowett Institute, University of Aberdeen, UK), ROBIN WALKER (SRUC, Aberdeen, UK), MANDY BARBER (Incredible Vegetables, Ashburton, Devon, UK), MAX COLEMAN (Royal Botanic Garden Edinburgh, UK), CHRISTINE WATSON (SRUC, Aberdeen, UK) & WENDY RUSSELL (Rowett Institute, University of Aberdeen, UK)
14. **Maximisation of production of intercropping pea/cereal crops**
CAIRISTIONA TOPP (SRUC, Edinburgh, UK), JOHN BADDELEY & CHRISTINE WATSON (SRUC, Aberdeen, UK)



15. **Machine Learning in the prediction of vining pea maturity and yield**
LEAH HOWELLS (Processors and Growers Research Organisation, Peterborough, UK)

12:25 **LUNCH**

Session 6: Legumes in Africa Two

13:30 **TBC**

KEN GILLER (Wageningen University & Research, The Netherlands)

13:55 **TBC**

FELIX DAPARE DAKORA (Tshwane University of Technology, South Africa)

14:10 **Panacea: Pathogenomics for enhancing food security in East Africa**

T A WOOD (NIAB, Cambridge, UK), P PAPARU (National Crop Resources Research Institute, Kampala, Uganda), A WEBB, B CORSI & J E THOMAS (NIAB, Cambridge, UK)

14:25 **Using functional traits to inform selection of multipurpose legumes for African smallholders**

BEN JACKSON (University of Edinburgh, UK), ERIC PATERSON (The James Hutton Institute, Dundee, UK), HANNAH COOPER, CRAIG STURROCK, SACHA MOONEY (University of Nottingham, UK), ALAN DUNCAN (University of Edinburgh, UK; International Livestock Research Institute, Nairobi, Kenya) & LIZ BAGGS (University of Edinburgh, UK)

14:40 **Closing the yield gaps of Ethiopian faba bean (*Vicia faba* L.) and common bean (*Phaseolus vulgaris* L.)**

KIFLEMARIAM Y BELACHEW (Department of Agricultural Sciences and Helsinki Institute of Sustainability Science, University of Helsinki, Finland; Bahir Dar University, Bahir Dar, Ethiopia; Department of Food and Nutrition, University of Helsinki, Finland)1,2,3, HENRY N MAINA (Department of Food and Nutrition, University of Helsinki, Finland) & FREDERICK L STODDARD (Department of Agricultural Sciences and Helsinki Institute of Sustainability Science, University of Helsinki, Finland)

14:55 **Development of marama bean (*Tylosema esculentum*), an orphan legume, as a crop**

CHRISTOPHER CULLIS (Case Western Reserve University, Cleveland, Ohio, USA), KARL KUNERT, JUAN VORSTER (University of Pretoria, South Africa) & PERCY CHIMWAMUROMBE (University of Science and Technology, Windhoek, Namibia, South West Africa)

15:10 **GENERAL DISCUSSION and NEW STEPS**

15:30 **Personal zoom rooms are open for discussion with poster presenters. Please ask the organisers if you would like to have a discussion with a poster presenter**

18:00 **END**

FRIDAY 3rd SEPTEMBER 2021

09:50 **WELCOME and INTRODUCTION**

Session 7: Ecosystem services and Intercropping

10:00 **Biomass accumulation dynamic in soybean-based intercrops: effects of species choice and spatial arrangement**

CHERIERE TIMOTHEE, LORIN MATHIEU & CORRE-HELLOU GUENAELE (Ecole Supérieure d'Agricultures, Angers, France)

- 10:15 **Choosing legume as service plant for intercropping with rapeseed based on plant-plant and plant-soil interactions**
 XAVIER BOUSSELIN (Agroscope, Nyon, Switzerland), NATHALIE CASSAGNE (Ecole Supérieure d'Agricultures (ESA) Angers, France), ALICE BAUX (Agroscope, Nyon, Switzerland), MURIEL VALANTIN-MORISON (French National Research Institute for Agriculture, Food and Environment, Thiverval-Grignon, France), MARIE HEDAN, MARIO CANNAVACCIUOLO, MATHIEU LORIN & JOËLLE FUSTEC (Ecole Supérieure d'Agricultures (ESA) Angers, France)
- 10:30 **Assessing the contribution of legume inclusion in crop rotations to soil health and ecosystem services: A case study from UK field trials**
 CATRIONA WILLOUGHBY, CHRISTINE WATSON (SRUC, Aberdeen, UK), KAIRSTY TOPP (SRUC, Edinburgh, UK), ROBIN WALKER, ALEX HILTON (SRUC, Aberdeen, UK), PAUL HALLETT, GRAEME PATON (University of Aberdeen, UK) & ELIZABETH STOCKDALE (National Institute of Agricultural Botany (NIAB), Cambridge, UK)
- 10:45 **Effect of legumes on soil biological activity characterised by soil nematofauna**
 CÉCILE VILLENAVE, CAMILLE CHAUVIN (ELISOL Environnement, Congenies, France), ANNE SCHNEIDER (Terres Inovia, Paris, France) & ANNE JIMENEZ (ELISOL Environnement, Congenies, France)
- 11:00 **Multispecies for multiple functions: Combining four grass and legume species enhances multifunctionality of sown grassland**
 MATTHIAS SUTER, OLIVIER HUGUENIN-ELIE & ANDREAS LÜSCHER (Agroscope, Forage Production and Grassland Systems, Zürich, Switzerland)
- 11:15 **Intercropping heritage and modern wheat varieties with grain legumes**
 MERLETTI ARIELE & STEFANO TAVOLETTI (Università Politecnica delle Marche, Ancona, Italy)
- 11:30 **GENERAL DISCUSSION**

12:00 **LUNCH**

Session 8: Yield increases and Benefits

- 13:00 **TBC**
 CHRISTINE WATSON (SRUC, Aberdeen, UK)



- 13:25 **Bridging the Gap – the Bean Yield Enhancement Network**
 CHARLOTTE WHITE, THOMAS WILKINSON (ADAS Gleadthorpe, Mansfield, UK), DANIEL KINDRED (ADAS Boxworth, Cambridge, UK), STEVE BELCHER, BECKY HOWARD (PGRO, Peterborough, UK) & ROGER SYLVESTER-BRADLEY (ADAS Boxworth, Cambridge, UK)
- 13:40 **Secondary agriculture perspectives zinc and iron bio-fortification in chickpea**
 GANAJAXI MATH, VIJAYA KUMAR AG & GURUPAD BALOL (AICRP on MULLaRP, University of Agricultural Sciences, Karnataka, India)
- 13:55 **Effect of high CO₂ on the growth and stress tolerance of soybean**
 CHRISTINE FOYER (University of Birmingham, UK)

- 14:10 **Forage legumes for future dry climates: Relative yield totals under drought conditions**
MARTIN KOMAINDA (Georg-August-University Göttingen, Germany), MANFRED KAYSER (Georg-August-University Göttingen, Germany; University of Vechta, Germany) & JOHANNES ISSELSTEIN (Georg-August-University Göttingen, Germany; Centre of Biodiversity & Sustainable Land Use, Göttingen, Germany)
- 14:25 **Impact of climate on grain legume yield stability**
MORITZ RECKLING (Leibniz Centre for Agricultural Landscape Research, Germany; Swedish University of Agricultural Sciences, Sweden), THOMAS F DÖRING (University of Bonn, Germany), FRANK-M CHMIELEWSKI (Humboldt-University of Berlin, Germany), INSA KÜKLING (Martin Luther University Halle-Wittenberg, Germany), CHRISTINE A WATSON (Swedish University of Agricultural Sciences, Sweden; SRUC, Aberdeen, UK), FREDERICK L STODDARD (University of Helsinki, Finland), LISA SAWADE (Martin Luther University Halle-Wittenberg, Germany) & GÖRAN BERGKVIST (Swedish University of Agricultural Sciences, Sweden)
- 14:40 ***In vitro* and *In vivo* screening through seed defense biopriming with PGPR, Trichoderma and Rhizobia for enhancing green pod quality, growth, production and health of *Phaseolus vulgaris* L. in mid-hill zone of Himachal Pradesh, India**
SHIVANGI NEGI, NARENDRA K BHARAT & HIMANSHU PANDEY (Dr. Y S Parmar University of Horticulture and Forestry, Nauni, Solan India)
- 14:55 **Potential global gains from using less pulse protein in livestock diets**
ROGER SYLVESTER-BRADLEY (ADAS Boxworth, Cambridge, UK), MICK HAZZLEDINE (Premier Nutrition, Rugeley, UK), RACHEL THORMAN (ADAS Boxworth, Cambridge, UK) & KAIRSTY TOPP (SRUC, Edinburgh, UK)
- 15:10 **GENERAL DISCUSSION and NEXT STEPS**
- 15:30 **END OF CONFERENCE**



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