

A model-based approach to assist variety assessment in sunflower crop

Pierre Casadebaig, Philippe Debaeke, Emmanuelle Mestries

▶ **To cite this version:**

Pierre Casadebaig, Philippe Debaeke, Emmanuelle Mestries. A model-based approach to assist variety assessment in sunflower crop. iCROPM2016 International Crop Modelling Symposium "Crop Modelling for Agriculture and Food Security under Global Change, Mar 2016, Berlin, Germany. hal-02738872

HAL Id: hal-02738872
https://hal.inrae.fr/hal-02738872

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



15-17 March 2016, Berlin, Germany

iCROPM2016

MACSUR and AgMIP jointly present the International Crop Modelling Symposium

Crop Modelling for Agriculture and Food Security under Global Change







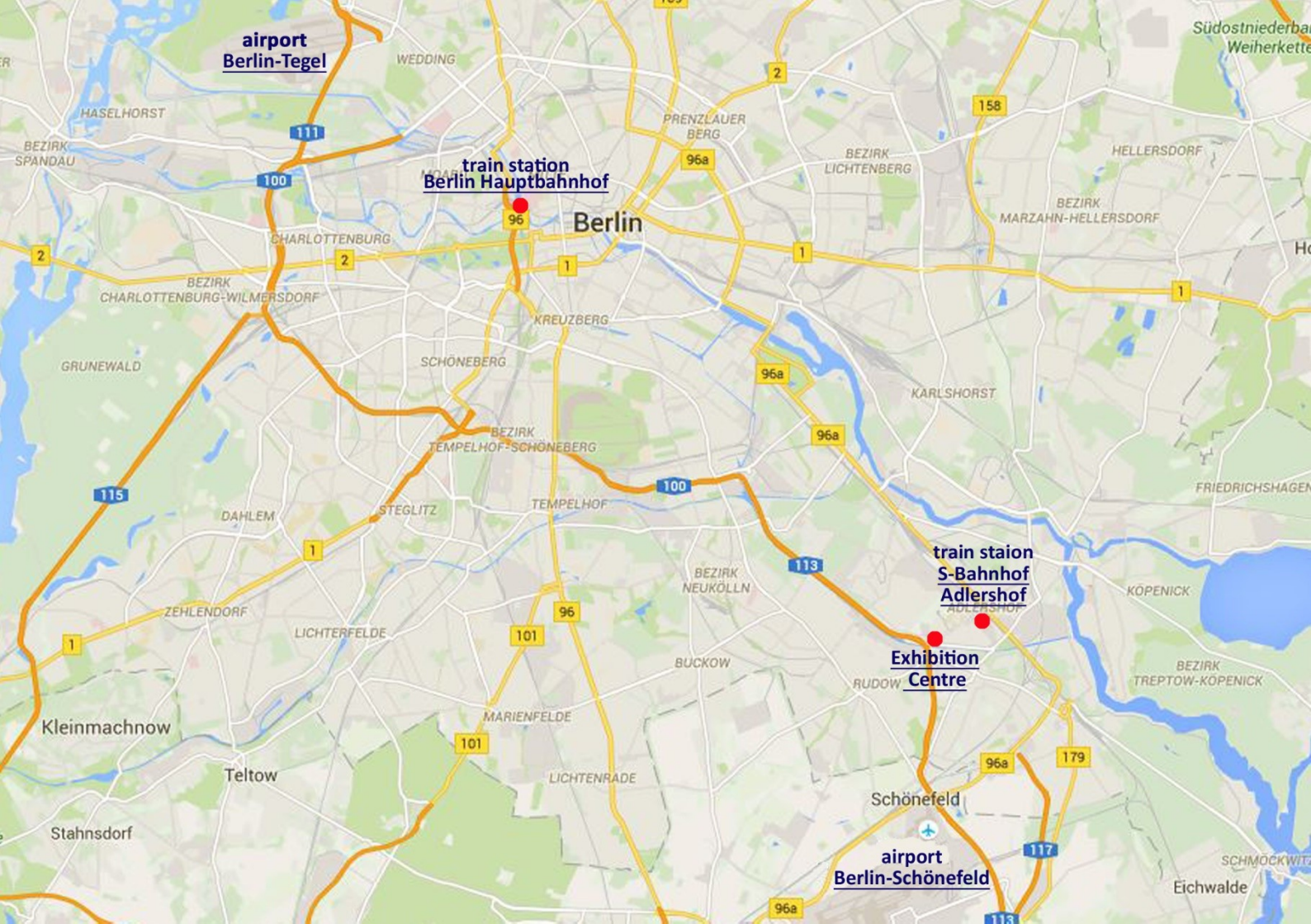




MACSUR

AgMIP

PROGRAMME


airport
Berlin-Tegel
train station
Berlin Hauptbahnhof
train staion
S-Bahnhof
Adlershof
Exhibition
Centre
airport
Berlin-Schönefeld
Berlin
WEDDING
HASELHORST
BEZIRK SPANDAU
PRENZLAUER BERG
BEZIRK LICHTENBERG
HELLERSDORF
BEZIRK MARZAHN-HELLERSDORF
CHARLOTTENBURG
BEZIRK CHARLOTTENBURG-WILMERSDORF
KREUZBERG
SCHÖNEBERG
GRUNEWALD
KARLSHORST
BEZIRK TEMPELHOF-SCHÖNEBERG
FRIEDRICHSHAGEN
DAHLEM
STEGLITZ
TEMPELHOF
BEZIRK NEUKÖLLN
KÖPENICK
ZEHLENDORF
LICHTERFELDE
BUCKOW
RUDOW
BEZIRK TREPTOW-KÖPENICK
Kleinmachnow
MARIENFELDE
Teltow
LICHTENRADE
Schönefeld
Stahnsdorf
SCHMÖCKWITZ
Eichwalde
111
100
96
96a
158
2
1
115
113
101
179
117

Conference Organisers…… 2

Welcome Note Conference…… 3

General Information…… 4

Floor Plan…… 10

Oral Presentations

Tuesday, March 15, 2016…… 11

Wednesday, March 16, 2016…… 17

Thursday, March 17, 2016…… 22

Poster Presentations

Tuesday, March 15, 2016…… 26

Wednesday, March 16, 2016…… 30

Symposium Organiser
Frank Ewert (University of Bonn, DE, and ZALF, DE) – Chair
Kenneth J. Boote (University of Florida, US) - Chair
Reimund P. Rötter (Luke, FI) - Chair
Peter Thorburn (CSIRO, AUS) - Chair
Claas Nendel (ZALF, DE) - Local Host

Scientific Committee members
Senthold Asseng (University of Florida, US)
Andy Challinor (University of Leeds, UK)
Melanie Correll (University of Florida, US)
Delphine Deryng (University of East Anglia, UK)
Katrien Descheemaeker (Wageningen University, NL)
Michael Dingkuhn (International Rice Research Institute, PH)
Marcello Donatelli (Agricultural Research Council, IT)
Graeme Hammer (University of Queensland, AU)
Mario Herrero (CSIRO, AU)
Cesar Izaurralde (University of Maryland, US)
Pierre Martre (INRA, FR)
Claas Nendel (ZALF, DE)
Jørgen Olesen (Aarhus University, DK)
Matthew Reynolds (CIMMYT, MX)
Claudio Stöckle (Washington State University, US)
Francois Tardieu (INRA, FR)
Phillip Thornton (CCAFS, KE)
Yan Zhu (Nanjing Agricultural University, CN)

Local Organising Committee
Claas Nendel
Katharina Brüser
Marcos Lana
Heike Schäfer
Anne-Katrin Prescher
Karin Luzi
Carola Voigt
Dieter Sowa

Conference Organisation
Veranstaltungsservice
Adlershof con.vent.
Heidrun Wuttke / Linda Jentsch
Rudower Chaussee 17
12489 Berlin
Phon +49 30 6392 2208
Fax +49 30 6392 3505
service@wista.de

Welcome

It is with pleasure that we welcome the international crop and agro-ecosystem modelling community and scientists from related disciplines to the International Crop Modelling Symposium 2016, in Berlin.

The past decade has seen a number of research initiatives launched to advance crop modelling and related research. Among these initiatives, The European Knowledge Hub MACSUR (Modelling European Agriculture with Climate Change for Food Security, http://macsur.eu/) and the international AgMIP project (Agricultural Model Intercomparison and Improvement Project, http://www.agmip.org/) stand out in terms of the breadth of their research scope. A large and important part of the activities in both projects is comprised of the improvement, comparison and application of crop models for climate change impact and risk assessment for food security in Europe (MACSUR) and further (AgMIP). These projects have brought together a large number of scientists from around the world and produced a substantial body of novel results. The international MACSUR symposium on crop modelling in Oslo in 2014 and the annual Global Workshops of AgMIP have provided forums to exchange some of these results and have been initial and important events towards this symposium. The increasing interest from within and beyond the crop modelling community for a more comprehensive forum for the exchange of results ultimately motivated representatives of MACSUR and AgMIP to organise this symposium, reflecting the successful and joint work of both projects including successful interaction with other international networks.

The overwhelming interest in participation in this symposium has exceeded original expectations. From the large number of submitted papers, it was possible to develop what we, the Symposium Chairs, hope is an exciting programme of oral and poster presentations combined with a range of internationally recognised keynote speakers. The workshop structure follows the main activities related to model improvement and model application, as well as anticipating improvements in genetics, and links between crop and related modelling fields such as grassland and vegetation modelling, and functional structural plant modelling. Accordingly, four sessions have been organised:

- Session 1: Improvement of crop models and modelling approaches
- Session 2: Linking crop models and genetics
- Session 3: Crop modelling for risk/impact assessment
- Session 4: Expanding and supporting modelling activities

The organisation of this symposium was only possible due to the help of several people. Special thanks go to the Session Chairs and the Scientific Committee Members for supporting the development of the symposium programme. We are particularly grateful for the effort of the local host ZALF (Centre for Agricultural Landscape Research) for organising the venue, registration, website and logistics of the programme. The financial and in-kind support from the Research Council of Norway through MACSUR, CSIRO, AgMIP, University of Bonn, Luke and the University of Florida are likewise gratefully acknowledged.

We wish all participants a very fruitful and inspiring symposium and we look forward to the many interesting keynotes, oral and poster presentations. We also hope to have the chance to interact with many of you during the course of the symposium and that the symposium may help to support ongoing and initiate new collaborations to further advance research on crop modelling.

Frank Ewert

On behalf of the Symposium Chairs, Kenneth J Boote, Peter Thorburn and Reimund Rötter, and the local host at ZALF, Claas Nendel.

Travel

Transportation by car
Vehicles drive on the right side of the road. The use of safety belts is compulsory; children under 12 must use safety seats. Speed limits for cars are: 50 km/h (urban); 100 km/h (rural highways); 130 km/h (recommended for motorways).

Airport connection
From Tegel Airport (TXL) take the bus TXL towards S+U Alexanderplatz. Leave the bus at the stop SBeusselstrasse. Go downstairs to the S-Bahn Platform and take the train S41 (towards Südkreuz Bhf). Leave the train at the SOstkreuz Station. From there, you have two options: S8 (towards SGrünau) or S9 (to SFlughafen Schönenfeld). Leave the train at SAdlershof Station. Ticket (Berlin AB Ticket, 2.70 EUR single journey) can be obtained at the Airport.
From Schönefeld Airport (SXF) you have two options: the S9 (towards Pankow) or S45 (towards S+U Bundesplatz). Leave the train at SAdlershof Station. Tickets (Berlin ABC Ticket, 3.30 EUR single journey) can be obtained at the SStation.

From the SAdlershof Station follow the Rudower Chaussee until you reach the Venue (Rudower Chaussee 17, about 10 min. walk).

Transportation by train
There are fast train (ICE or EC) connections from major German and European cities to Berlin. Participants from Prague, Budapest, Amsterdam and air travellers arriving at other German airports may consider the train as an alternative.

Taxi
Non-stop dispatcher service. Base fare 3.40 EUR, fare per kilometer 1.28 EUR – 1.79 EUR
Order

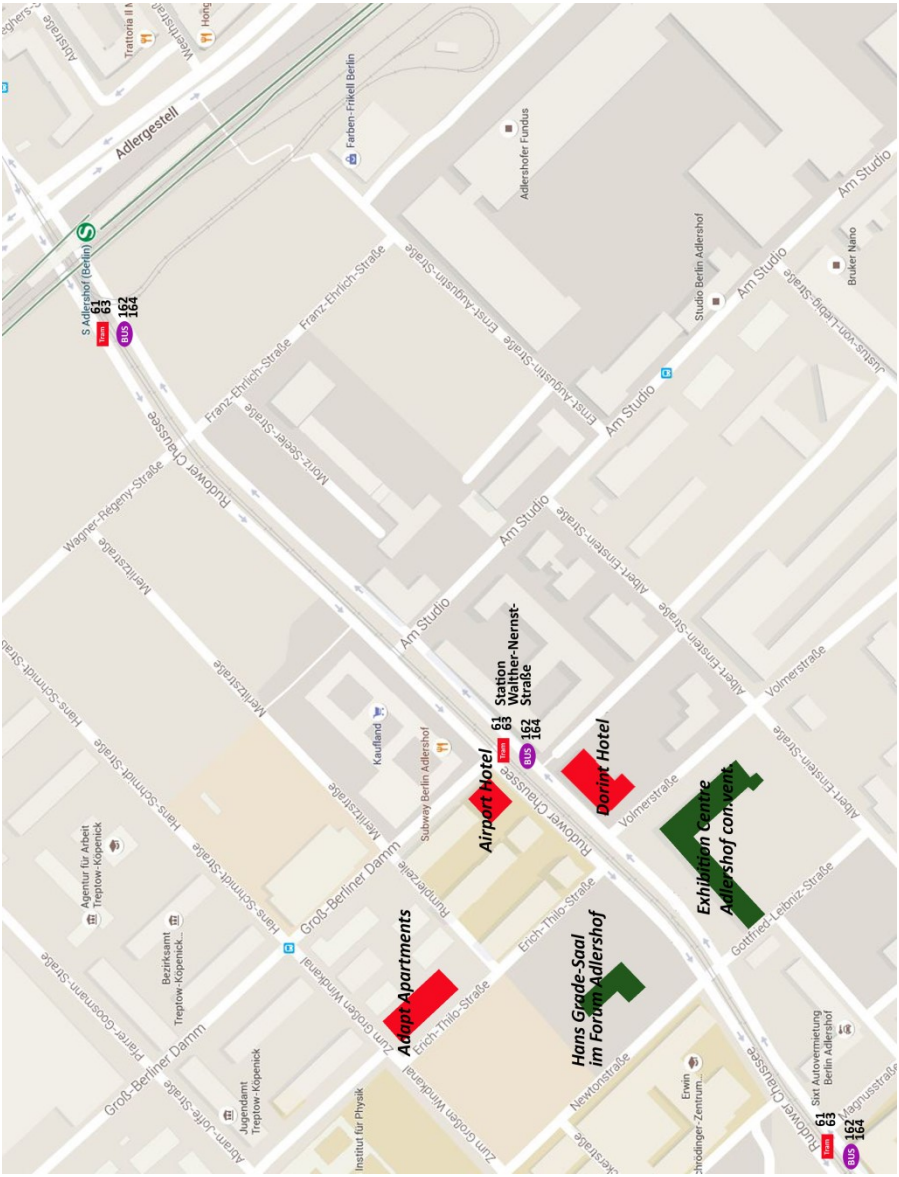
Taxi Funk Berlin	(030) 44 33 22	Quality Taxi	(030) 26 3000
Würfelfunk	(030) 21 01 01	Cityfunk	(030) 21 02 02
Taxi Berlin	(030) 20 20 20	WBT	(030) 26 10 26

Taxi apps available in Berlin: My Taxi and Taxi.eu.

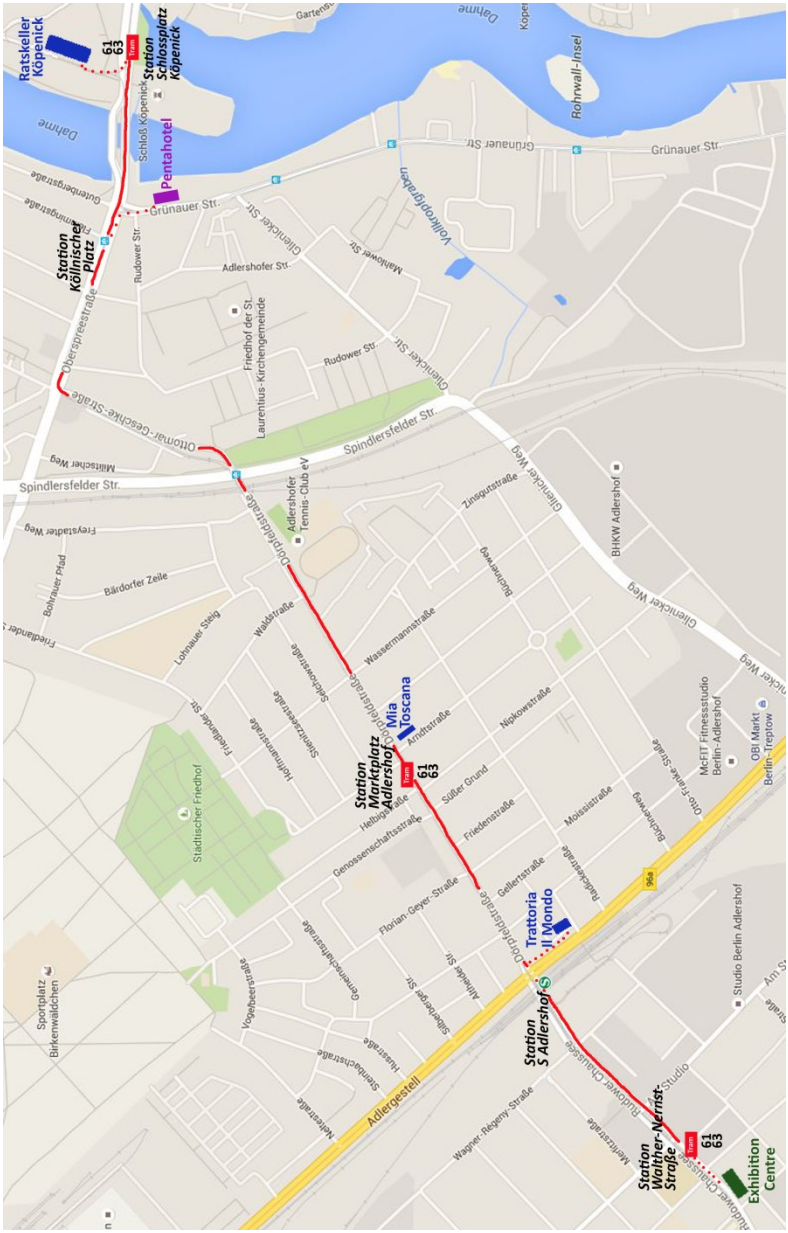
Public transportation (BVG)
There is a wide network of public transportation in Berlin, you can choose between buses, electric trams and rapid transit trains (U U-Bahn, S S-Bahn). Single fare within the city centre (tariff AB) is 2.70 EUR, all-day pass is 6.90 EUR. For more details please see "http://www.bvg.de/en" or find information provided at the ticket vending machines at the stations. Machine-printed tickets must be validated using the red or yellow validator boxes before entering the train, tram or bus!



Directions to Exhibition Centre



Map Exhibition Centre and hotels


Ratskeller Köpenick
61
63
Tram
Station Schlossplatz Köpenick
Schloß Köpenick
Pentahotel
Dahme
Rohrwall-Insel
Grünauer Str.
Grünauer Str.
Gutenbergstraße
Station Kölnischer Platz
Rudower Str.
Glienicker Str.
Adlershofer Str.
Mahlower Str.
Volkmannstraße
Oberspreestraße
Friedhof der St.
Laurentius-Kirchengemeinde
Rudower Str.
Dörpfeldstraße
Ottomar-Geschke-Straße
Spindlersfelder Str.
Müllroser Weg
Spindlersfelder Str.
Adlershofer Tennis-Club e.V.
Zinnowitzer Straße
Glienicker Weg
BHKW Adlershof
Glienicker Weg
Freystadter Weg
Bohrauer Pfad
Bärdorfer Zeile
Lohmaner Steig
Waldstraße
Wassermannstraße
Buchenweg
Dörpfeldstraße
Mia Toscana
Station Marktplatz Adlershof
61
63
Tram
Arndtstraße
Nipkowstraße
Südost-Passage
McFIT Fitnessstudio Berlin-Adlershof
OBI Markt Berlin-Treptow
Südost-Passage
Südost-Passage
Friedlander Str.
Schöneweidenstraße
Stadtischer Friedhof
Helbigstraße
Genossenschaftsstraße
Südost-Passage
Südost-Passage
Südost-Passage

Directions from Exhibition Centre to Trattoria Il Mondo

Station: Walther-Nernst-Straße Bus 162 or 164 to station: S-Adlershof (6 minutes), then by foot (5 minutes) to Trattoria Il Mondo.
or…
Station: Walther-Nernst-Straße Tram 61 (direction Rahnsdorf/Waldschänke) or 63 (direction Mahlsdorf-Süd) to Station: S-Adlershof (6 minutes), then by foot (5 minutes) to Trattoria Il Mondo.
or…
900m (11 minutes) by foot on Rudower Chaussee direction S-Adlershof.

Directions from Exhibition Centre to Mia Toscana

Station: Walther-Nernst-Straße Tram 61 (direction Rahnsdorf/Waldschänke) or 63 (direction Mahlsdorf-Süd) to Station: Marktplatz Adlershof (2 stations), then by foot (1 minutes) to Mia Toscana.
Return: Tram 61 (direction Adlershof, Karl-Ziegler-Straße) or Tram 63 (direction Mahlsdorf-Süd)

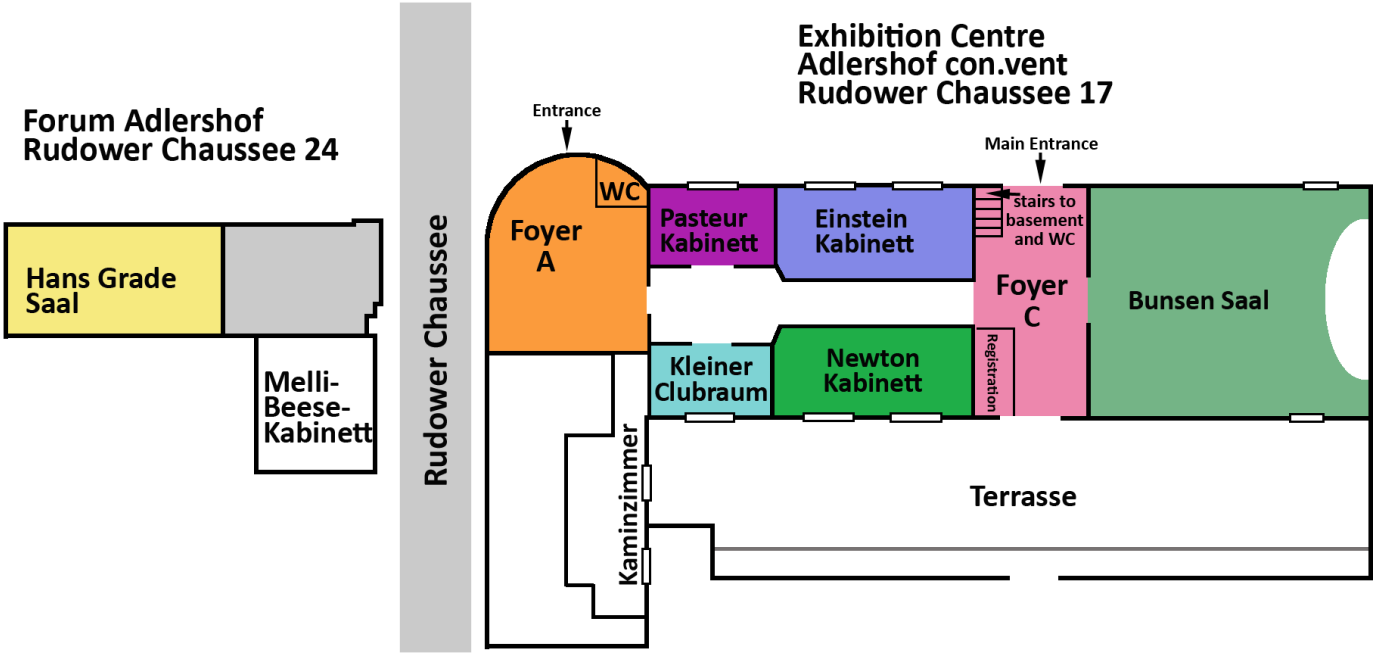
Directions from Exhibition Centre to Ratskeller Köpenick

Station: Walther-Nernst-Straße Tram 61 (direction Rahnsdorf/Waldschänke) or Tram 63 (direction Mahlsdorf-Süd) to station: Schlossplatz Köpenick (7 stations), then 3 minutes by foot to Rastkeller Köpenick.
Return: Tram 61 (directionAdlershof, Karl-Ziegler-Straße) or Tram 63(direction Adlershof, Karl-Ziegler-Straße)

Directions from Exhibition Centre to Pentahotel

Station: Walther-Nernst-Straße Tram 61 (direction Rahnsdorf/Waldschänke) or Tram 63 (direction Mahlsdorf-Süd) to station: Köllnischer Platz (6 stations), then 2 minutes by foot to Pentahotel.
Return: Tram 61 (direction Adlershof, Karl-Ziegler-Straße) or Tram 63 (direction Adlershof, Karl-Ziegler-Straße)

	How to get there from iCROPM?	What is it?
Restaurants		
Ratskeller Köpenick	Tram 63, 20 min Alt-Köpenick 21, 12555 Berlin	Traditional German restaurant
Albert Speisemanufaktur	Walk, 10 min Johann-Hittorf-Straße 8,12489 Berlin	Modern restaurant with international dishes
Trattoria Il Mondo	Walk, 15 min Platz der Befreiung 1, 12489 Berlin	Italian restaurant
Esswirtschaft	Walk, 2 min Rudower Chaussee 24, 12489 Berlin	International and vegetarian dishes
Mensa HU Oase	Walk, 5 min Rudower Chaussee,12489 Berlin	Canteen of Humboldt University
Restaurant Krokodil	Tram 63, 30 min Gartenstraße 46-48, 12557 Berlin	German dishes served at the river side
Bars		
Schalander Hausbrauerei	S9 to Frankfurter Allee, 30 min Bänschstraße 91, 10247 Berlin	Small brewery and German food
The Double Inn	S 46, Tram M17, 20 min Wilhelminenhofstraße 89, 12459 Berlin	Irish Pub
Duke Bar	Tram 63, 20 min Freiheit 15, 12555 Berlin	Classy Jazz bar with a nice view
Find several Bars at S Ostkreuz (S8 & S9 to Ostkreuz, 30 min)		
Sightseeing beyond tour guides		
Berlin Wall Walk	starting at U Bernauer Str. and go to S Nordbahnhof direction	Follow the Berlin wall
Sowjet Memorial	S Treptower Park	Take a restorative walk in the Treptower Park and explore a piece of history
The Old and the New Berlin	S+U Jannowitzbrücke to S+U Hauptbahnhof	Walk along the Spree and see the old and new Berlin (5 km)
Observing Urban Succesion	S+U Yorckstraße	Take a walk in Gleisdreieck park and see how nature reconquers the city
Berlin Underworld	all over Berlin, check out www.berliner-unterwelten.de	Guided tours to underground structures of Berlin



Wardrobe and lavatories are located in the basement, downstairs from Foyer C (Main Entrance). Poster sessions are held in the Zuse Saal (Basement), in the Bunsen Saal and in Foyer A. Refreshments are available during breaks. Lunch is served in the Pasteur Kabinett, Kleiner Clubraum and the Newton Kabinett. The Hans Grade-Saal is located in the "Forum". To find it, exit the Centre, turn left, cross the main road "Rudower Chaussee" and follow the event signs.

Tuesday 15th March

Registration opens at 8:00 in Foyer C				
		Chair	Time	Room
Welcome	Claas Nendel, Frank Ewert		9:00	Bunsen Saal
Plenary Keynote Session I	James Jones / Toward a next generation of crop models	Peter Thorburn	9:15	Bunsen Saal
Plenary Keynote Session IV	Serge Savary / Models for crop diseases: an overview of approaches and scales to design a research agenda	Peter Thorburn	9:45	Bunsen Saal
Session I - Improvement of crop models and modelling approaches				
Author (Speaker)				
E. Wang, H. Webber, A. Maiorano, T. Li, K. J. Boote		Senthold Asseng	10:45 -12:30	Hans Grade Saal
J. I. Lizaso, B. Liu (S. Asseng), J. B. Naab, A. de Wit		Senthold Asseng	14:00 -15:20	Hans Grade Saal
G. S. McMaster, M. Dingkuhn, A. M. Ratjen, R. Barillot, Y.-C. Pao, J. Zhu		Michael Dingkuhn	15:50 -17:20	Hans Grade Saal
Introduction to Poster Session			**17:20**	Hans Grade Saal
Session III - Crop modelling for risk/impact assessment				
Author (Speaker)				
J. Elliott, A. Gobin, A. C. Ruane, F. M. Vanwindekens), T. Karimi (C. O. Stöckle)		Claas Nendel	10:45 -12:30	Bunsen Saal
D. Wallach, M. Berg, E. Teixeira, K. Nicklin		Heidi Webber	14:00 -15:20	Bunsen Saal
G. Fischer (L. Sun), B. Liu (S. Asseng), P. C. Sentelhas, B. Singh, Z. Tian, I. Öztürk		Delphine Deryng	15:50 -17:20	Bunsen Saal
Introduction to Poster Session			**17:20**	Bunsen Saal
Session IV - Expanding and supporting modelling activities				
Author (Speaker)				
S. Fronzek, J. de Vries, P. Korhonen, J. Caubel (M. Launay), S. Jennings		Katrien Descheemaeker	10:45 -12:30	Einstein Kabinett
H. Brown, M. Donatelli, C. Porter, T. A. M. Pugh,		Taru Palosuo	14:00 -15:20	Einstein Kabinett
M. van Ittersum, U. Schulthess, K. Verburg, B. Sharif, H. Mielenz, E. Haas		Jørgen E. Olesen	15:50 -17:20	Einstein Kabinett
Introduction to Poster Session			**17:20**	Einstein Kabinett
Poster Session			**17:30**	Bunsen Saal Zuse Saal (Basement)

Tuesday 15th March

09:00 **Welcome: Claas Nendel, Frank Ewert** *Bunsen Saal*

09:15 **Plenary Keynote Session I:** James Jones / Toward a next generation of crop models

Chair Peter Thorburn *Bunsen Saal*

09:45 **Plenary Keynote Session IV:** Serge Savary / Models for crop diseases: an overview of approaches and scales to design a research agenda

Chair Peter Thorburn *Bunsen Saal*

10:15 **Break**

Session I - Improvement of crop models and modelling approaches

Chair **Senthold Asseng** *Hans Grade Saal*

10:45 E. Wang / Inter-comparison of wheat models to identify knowledge gaps and improve process modeling

11:10 H. Webber / Canopy temperature for simulation of heat stress in irrigated wheat in a semi-arid environment: a multi-model comparison

11:30 A. Maiorano / Model improvements reduce the uncertainty of wheat crop model ensembles under heat stress

11:50 T. Li / Improving rice models for more reliable prediction of responses of rice yield to CO_2 and temperature elevation

12:10 K. J. Boote / Modeling sensitivity of grain yield to elevated temperature in the DSSAT crop models for peanut, soybean, bean, chickpea, sorghum, and millet

12:30 **Lunch**

Chair **Senthold Asseng** *Hans Grade Saal*

14:00 J. I. Lizaso / Improving CSM-IXIM maize model in DSSAT to simulate impact of elevated temperatures

14:20 B. Liu (Asseng) / Testing and improving the responses of wheat models to heat stress at anthesis and grain filling

14:40 J. B. Naab / Modelling sorghum yield response to heat stress and irrigation: a comparison of three crop growth models

15:00 A. de Wit / Simulating the impact of winter conditions on the survival and yield potential of winter wheat

15:20 Coffee break

Chair Michael Dingkuhn *Hans Grade Saal*

15:50 G. S. McMaster / Estimating winter wheat phenological parameters: implications for crop modeling

16:05 M. Dingkuhn / SAMARA: a crop model for simulating rice phenotypic plasticity

16:20 A. M. Ratjen / Field data based derivation of process descriptions in crop growth models. Is there still room for improvement?

16:35 R. Barillot / A wheat model with detailed account of C and N metabolism

16:50 Y.- C. Pao / Optimal photosynthetic nitrogen partitioning in cucumber leaves for maximizing canopy photosynthesis

17:05 J. Zhu / Integrating xylem and phloem fluxes into whole-plant models for simulating fleshy fruits

17:20 Introduction to Poster Session *Hans Grade Saal*

17:30 Poster Session *Zuse Saal (Basement), Bunsen Saal*

Session III - Crop modelling for risk/impact assessment

Chair	**Claas Nendel**	*Bunsen Saal*
10:45	J. Elliott / Past and future weather-induced risk in crop production	
11:10	A. Gobin / Meteorological risks and crop yield modelling	
11:30	A. C. Ruane / The AgMIP Coordinated Climate Crop Modeling Project (C3MP) – uncertainty in climate response across 1100+ crop modeling sets	
11:50	F. M. Vanwindekens / Assessing agroecosystems' vulnerability and risk regarding extreme weather events	
12:10	T. Karimi (C. O. Stöckle) / Climate change and dryland wheat systems in the US Pacific Northwest	
12:30	**Lunch**	
Chair	**Heidi Webber**	*Bunsen Saal*
14:00	D. Wallach / A framework for evaluating uncertainty in crop model predictions	
14:20	M. Berg / Handling uncertainties with multiensemble and multi-model simulations in the LandCaRe-DSS	
14:40	E. Teixeira (H. Brown) / Uncertainty due to genotype and management in wide-area maize simulations	
15:00	K. Nicklin / Addressing uncertainty in model input and evaluation data	
15:20	**Coffee break**	
Chair	**Delphine Deryng**	*Bunsen Saal*
15:50	G. Fischer (L. Sun) / Shift in China's agro-climatic resource inventory under climate change	

16:05 B. Liu (S. Asseng) / Comparison of methods and aggregation approaches to assess temperature impacts on global wheat production

16:20 P. C. Sentelhas / Sugarcane yield gap in Brazil: magnitude, causes and strategies to its mitigation

16:35 B. Singh / Risk analysis and yield potential of dry-seeded rice in Bihar, India

16:50 Z. Tian / Balance the trade-off between food security and GHG emission for paddy field in China based on the coupling of DNDC, DSSAT and AEZ models

17:05 I. Öztürk / Analyzing the effect of catch crops on nitrate leaching in a maize cropping system under climate change using a response-surface approach

17:20 Introduction to Poster Session *Bunsen Saal*

17:30 Poster Session *Zuse Saal (Basement)*

Session IV - Expanding and supporting modelling activities

Chair Katrien Descheemaeker *Einstein Kabinett*

10:45 S. Fronzek / Classifying simulated wheat yield responses to changes in temperature and precipitation across a European transect

11:10 J. de Vries / A promising tool to model heterogeneity in crop systems: functional-structural plant modelling

11:30 P. Korhonen / Intercomparison of timothy models in northern countries

11:50 J. Caubel (M. Launay) / A generic coupled crop-disease model to analyze climate change effects on leaf rust of wheat

12:10 S. Jennings / The abiotic and biotic impacts of climate change on potato agriculture

12:30 Lunch

Chair **Taru Palosuo** *Einstein Kabinett*

14:00 H. Brown / APSIM next generation, an improved environment for crop model development

14:20 M. Donatelli / Modelling agricultural management in multi-model simulation systems

14:40 C. Porter / Framework to Advance Climate, Economic, and Impact Investigations with Information Technology (FACE-IT)

15:00 T. A. M. Pugh / Widespread vulnerability of current crop production to climate change demonstrated using a data-driven approach

15:20 **Coffee break**

Chair **Jørgen E. Olesen** *Einstein Kabinett*

15:50 M. van Ittersum / Filling caveats in yield gap analysis

16:05 U. Schulthess / Use of remote sensing data to determine stress factors for the SALUS model

16:20 K. Verburg / Model-based functional uncertainty analyses to inform required accuracy of PAWC estimation methods

16:35 J. E. Olesen (B. Sharif) / Comparison of wheat models and their sensitivity towards tillage and N fertilization with different calibration approaches

16:50 H. Mielenz / Advances in representing the role of water content in modelling nitrous oxide emissions

17:05 E. Haas / Simulation of the landscape scale nitrogen cycling and redistribution with the coupled hydrology biogeochemistry model CMFLandscapeDNDC

17:20 **Introduction to Poster Session** *Einstein Kabinett*

17:30 **Poster Session** *Bunsen Saal*

18:30 ***End of the Day***

Wednesday 16th March

		Chair	Time	Room
Plenary Keynote Session II	Graeme Hammer / Integrating crop physiology and modelling with genetic improvement	Kenneth Boote	9:00	Bunsen Saal
Plenary Keynote Session III	Andrew J. Challinor / What does the Paris agreement mean for crop-climate modelling?	Kenneth Boote	9:30	Bunsen Saal
Session I - Improvement of crop models and modelling approaches				
Author (Speaker)				
K. Delusca, E. Vanuytrecht, L. D. Emberson, B. T. Kassie, D. Timlin		Senthold Asseng	10:30 -12:15	Hans Grade Saal
Poster Session			13:45 -15:05	Bunsen Saal/ Zuse Saal/ Foyer A
M. Corbeels, C. Nendel, M. Adam, B. Carlson (R. Sommer), N. Gaudio		Kenneth Boote	15:35 -17:15	Hans Grade Saal
Session II - Linking Crop Models and Genetics				
Author (Speaker)				
C. D. Messina, S. Lacube, A. Singels, A. Wu, A. Dambreville		Pierre Martre	10:30 -12:15	Einstein Kabinett
Poster Session			13:45 -15:05	Bunsen Saal/ Zuse Saal/ Foyer A
M. A. Semenov (P. Stratonovitch), F. Tao, J. Ramirez-Villegas, K. Chenu, A. M. Radanielson		Matthew Reynolds	15:35 -17:15	Einstein Kabinett
Session III - Crop modelling for risk/impact assessment				
Author (Speaker)				
H. Webber (T. Gaiser), J. Jägermeyr, G. Zhao (M. Hoffmann), P. Calanca, X. Yin		K. Christian Kersebaum	10:30 -12:15	Bunsen Saal
Poster Session			13:45 -15:05	Bunsen Saal/ Zuse Saal/ Foyer A
M. Ruiz-Ramos, A. Holzkämper, P. Reidsma, K. Descheemaeker, W. Durand		Andy Challinor	15:35 -17:15	Bunsen Saal
Conference Dinner			**19:00 19:30**	**Welcome Drinks Bunsen Saal**

Wednesday 16th March

09:00 **Plenary Keynote Session II:** Graeme Hammer / Integrating crop physiology and modelling with genetic improvement
Chair Kenneth Boote *Bunsen Saal*

09:30 **Plenary Keynote Session III:** Andrew J. Challinor / What does the Paris agreement mean for crop-climate modelling?
Chair Kenneth Boote *Bunsen Saal*

10:00 Break

Session I - Improvement of crop models and modelling approaches

Chair Senthold Asseng *Hans Grade Saal*

10:30 K. Delusca / Do maize crop models catch the impact of future CO_2 on maize yield and water use

10:55 E. Vanuytrecht / Crop responses to atmospheric CO_2 concentrations: diversity, parameterization and validation in crop models

11:15 L. D. Emberson / The development of crop modeling methods to assess the combined threat of ozone and climate extremes on crops in South Asia

11:35 B. T. Kassie / Simulating the impact of source-sink manipulations in wheat

11:55 D. Timlin / Assessment and comparison of leaf area modeling approaches for maize

12:15 Lunch

Lunch Presentation: A. Ruane / The AgMIP coordinated global and regional assessments of climate change impacts on agriculture and food

13.45 Poster Session *Bunsen Saal / Zuse Saal (Basement)*

15:05 Coffee Break

Chair **Kenneth Boote** *Hans Grade Saal*

15:35 M. Corbeels / The SoilC&N model: simulating short and long-term soil nitrogen supply to crops

15:55 C. Nendel / Soil nitrogen mineralisation simulated by crop models across different environments and the consequences for model improvement

16:15 M. Adam / Linking a phosphorus module to CSMCERES-Sorghum and evaluating it for West African conditions

16:35 B. Carlson (R. Sommer) / Enhancing CropSyst for intercropping modeling

16:55 N. Gaudio / Evaluation of the STICS soil-crop model for modelling arable intercrops

17:15 **Break**

19:00 ***Welcome Drinks*** ***Foyer C***

19:30 ***Conference Dinner*** ***Bunsen Saal***

Session II - Linking Crop Models and Genetics

Chair **Pierre Martre** *Einstein Kabinett*

10:30 C. D. Messina / Towards workable solutions for phenotypic prediction within complex GxExM systems: integrating crop growth models (CGM) with whole genome prediction (WGP)

10:55 S. Lacube / Introducing the genetic variability in crop models by combining phenotyping with modelling

11:15 A. Singels / Sugarcane genetic trait parameter estimation

11:35 A. Wu / Improving crop models by incorporating photosynthetic biochemistry to support crop yield improvement

11:55 A. Dambreville / Modelling the genetic variability and genotype by environment interactions for leaf growth and senescence in wheat

12:15 **Lunch**

Lunch Presentation: A. Ruane / The AgMIP coordinated global and regional assessments of climate change impacts on agriculture and food

13.45 **Poster Session** *Bunsen Saal / Zuse Saal (Basement)*

15:05 **Coffee Break**

Chair **Matthew Reynolds** *Einstein Kabinett*

15:35 M. A. Semenov (P. Stratonovitch) / Designing wheat ideotypes for a changing climate

15:55 F. Tao / Using crop model ensembles to design future climate-resilient barley cultivars

16:15 J. Ramirez-Villegas / Towards a genotypic adaptation strategy for Indian groundnut cultivation using model ensembles

16:35 K. Chenu / From a global sensitivity analysis of a crop model to wheat improvement in the field

16:55 A. M. Radanielson / Modelling adaptive traits to screen for salinity tolerance in rice

17:15 **Break**

19:00 ***Welcome Drinks*** ***Foyer C***

19:30 ***Conference Dinner*** ***Bunsen Saal***

Session III - Crop modelling for risk/impact assessment

Chair **K. Christian Kersebaum** *Bunsen Saal*

10:15 H. Webber (T. Gaiser) / Uncertainty in future European irrigation water demand

10:55 J. Jägermeyr / Integrated crop water management might sustainably halve the global food gap

11:15 G. Zhao (M. Hoffmann) / Vulnerability of grain maize yield under meteorological droughts: a comparasion of commercial and subsistence farms in South Africa

11:35 P. Calanca / Simulating the effects of water stress on grassland dynamics – a challenge for current grassland models

11:55 X. Yin / Uncertainty in simulating N uptake and N use efficiency in the crop rotation systems across Europe

12:15 Lunch

Lunch Presentation: A. Ruane / The AgMIP coordinated global and regional assessments of climate change impacts on agriculture and food

13.45 Poster Session *Bunsen Saal / Zuse Saal (Basement)*

15:05 Coffee Break

Chair Andy Challinor *Bunsen Saal*

15:35 M. Ruiz-Ramos / An ensemble of projections of wheat adaptation to climate change in Europe analyzed with impact response surfaces

15:55 A. Holzkämper / Climate impacts on grain maize in Switzerland – do the results from three different modelling approaches agree?

16:15 P. Reidsma / Assessing uncertainty in bio-economic farm models: the importance of simulated crop yields and price changes on farm plans and gross margins

16:35 K. Descheemaeker / Effects of climate change and adaptation on crops and livestock in mixed farming systems in southern Africa

16:55 W. Durand / Using earth observation and ancillary data sources as alterative to household surveys for regional integrated assessments

19:00 *Welcome Drinks* ***Foyer C***

19:30 *Conference Dinner* ***Bunsen Saal***

Thursday 17th March

		Chair	Time	Room
Plenary Keynote	Achim Dobermann / How do we become champions for transforming agri-food systems?	Reimund Rötter	9:00	Bunsen Saal
Plenary Keynote	Brian Keating / Modelling crops and cropping systems – evolving purpose, practice and prospects	Reimund Rötter	9:30	Bunsen Saal
Session I - Improvement of crop models and modelling approaches				
Author (Speaker)				
C. Folberth, H. Hoffmann, M. Kuhnert		Claudio Stöckle	10:30 -11:15	Hans Grade Saal
Session II - Linking Crop Models and Genetics				
Author (Speaker)				
V. Vadez, X. Yin, S. Chapman		Graeme Hammer	10:30 -11:15	Einstein Kabinett
Session III - Crop modelling for risk/impact assessment				
Author (Speaker)				
D. H. Fleisher, D. Leclère, C. Müller		César Izaurralde	10:30 -12:15	Bunsen Saal
Plenary Keynote: M. Kropff / The role pf crop modelling in agricultural research		Frank Ewert	11:35	Bunsen Saal
Final Plenary		Frank Ewert	12:05	Bunsen Saal
End of the Symposium			**12:45**	
Lunch or travel package			**12:45**	Newton Kabinett / Foyer C

Thursday 17th March

09:00 **Plenary Keynote:** Achim Dobermann / How do we become champions for transforming agri-food systems?
Chair Reimund Rötter *Bunsen Saal*

09:30 **Plenary Keynote**: Brian Keating / Modelling crops and cropping systems – evolving purpose, practice and prospects
Chair Reimund Rötter *Bunsen Saal*

10:00 Break

Session I - Improvement of crop models and modelling approaches

Chair Claudio Stöckle *Hans Grade Saal*

10:30 C. Folberth / Impacts of parameterization and input data on simulated yields in global gridded crop model frameworks

10:55 H. Hoffmann / Analysing data aggregation effects on large-scale yield simulations

11:15 M. Kuhnert / Impacts of soil and weather data aggregation in spatial modelling of net primary production of croplands

Session II - Linking Crop Models and Genetics

Chair Graeme Hammer *Einstein Kabinett*

10:30 V. Vadez / Integrated crop-systems research: a trait-based breeding pipeline

10:55 X. Yin / Bringing genetics and biochemistry to crop modelling, and vice versa

11:15 S. Chapman / Integration of crop models into breeding programs

Session III - Crop modelling for risk/impact assessment

Chair **César Izaurralde** *Bunsen Saal*

10:30 D. H. Fleisher / Assessing regional food security in the U.S. using crop models

10:55 D. Leclère / Towards systematic evaluation of crop model outputs for global land-use models

11:15 C. Müller / Global gridded crop model evaluation: benchmarking, skills, deficiencies and implications

Chair **Frank Ewert** *Bunsen Saal*

11:35 Plenary Keynote:
Martin Kropff / The role of crop modelling in agricultural research

12:05 **Final Plenary** **Frank Ewert** *Bunsen Saal*

12:45 ***End of the Symposium***

12:45 ***Lunch or travel package**** *Newton Kabinett / Foyer C*

****Lunch packages available for participants leaving the Symposium***

Tuesday 15th March 17:30 – 18:30

	Session I	
PS I-1	**Modelling environmental impacts** *Chair: Allard de Wit*	**Zuse Saal (Basement)**
1	**Kupisch** / Analysis and modelling of spatio-temporal patterns of CO_2 and H_2O fluxes in relation to crop growth under field conditions	
2	**Zare** / Assessment of DSSAT and WOFOST sensitivity to temperature derived from AgMERRA	
3	**Heinlein** / Determination of the water balance of maize plants on lysimeters by means of sap flow measurement and plant growth models	
4	**Malik** / DSSAT model as a tool for water and nitrogen management in intensive irrigated areas: I-Calibration and validation	
5	**Luig** / Towards simple model for winter wheat's grain filling dynamics considering heat effects	
6	**Wegehenkel** / The effect of using different soil hydraulic parameters on the outputs of a simple crop growth model	
7	**Jabloun** / Sensitivity analysis of the DAISY model applied to winter wheat - summer maize rotation in the North China Plain	
8	**Gou** / Potential growth of wheat-maize intercrop: model description and Bayesian parameter estimation	
9	**Klein** / Modelling energy fluxes in heterogeneous cropland employing a mosaic approach	
10	**Kroes** / Disentangle mechanisms of nitrogen and water availability on soybean yields	

	Session I	
PS I-2	**Modelling non-main crops** *Chair: Jon Lizaso*	**Bunsen Saal**
1	**Roux** / Delimiting the validity domain of a crop model with uncertainty analysis: the case of a vineyard model with a run-off module	
2	**Weymann** / Describing dry matter and N distribution of winter oilseed rape by organ specific approaches to improve simulated crop response to N deficiency	
3	**Moualeu Ngangue** / Influence of stomatal behaviour on cucumber leaf water-use efficiency	
4	**Moreno Cadena (Ramirez)** / Cassava: an indeterminate challenge	
5	**Khasanah** / Intercropping oil palm: a tree-soil-crop interactions model	
6	**Sesermann** / Modelling of the tree yield in an alley cropping system	

7	**Qian** / Adapting the CSM-CROPGRO-Canola model for spring canola in Eastern Canada
8	**Dias (Sentelhas)** / Performance of DSSAT-CANEGRO and FAO-Agroecological Zone Models under operational Brazilian sugarcane conditions
9	**Costa (Fraga)** / Calibration of the STICS crop model for the Portuguese grapevines

	Session II	
PSII-1	**Model applications for breeding** *Chair: Pierre Martre*	**Bunsen Saal**
1	**Loison** / Design of African rainfed cotton ideotypes using DSSAT CROPGRO-Cotton	
2	**Manderscheid** / Effects of free air CO_2 enrichment and drought on canopy development and biomass production of different sorghum genotypes as compared to maize	
3	**Ababaei** / Typologies of drought and heat stress scenarios at European level for wheat	
4	**Herrera** / Genotypic predictions and environmental characterization by coupling climate suitability and ridge regression-BLUP models	
5	**de Swaef** / Identifiability analysis of a grass growth model	
6	**Chenu** / Heat, frost and drought – what are the trends?	
7	**Chenu** / Using crop modeling to get better field data	

	Session IV	
PS IV-1	**Modelling crops and responses to stresses** *Chair: Jørgen E. Olesen*	**Bunsen Saal**
1	**Osborne** / Crops and ozone: modern soybean cultivars are more sensitive to ozone pollution than older cultivars, and sensitivity depends on geographic location	
2	**Rötter (Haakana)** / Analysis of crop yield variability and yield gaps for maize and wheat in diverse climatic zones canopy development and biomass production of different sorghum genotypes as compared to maize	
3	**Savary (Willocquet)** / "Simulation Modelling in Botanical Epidemiology and Crop Loss Analysis": an online course in The Plant Health Instructor, the APSnet Education Center	
4	**Nogueira Júnior** / Simulation modelling of yield losses caused by multiple diseases in American grapevine (Vitis labrusca L.)	

5	**Artru** / Do crop models based on daily incoming global light efficiently simulate crop growth under dynamic shade?
6	**Feike** / Adapting the CSM-CROPGRO to simulate Chinese cabbage
7	**Dier** / Interactive effects of CO_2 enrichment and N fertilization on grain N acquisition and grain protein concentration in wheat
8	**Kamali (Zand-Parsa)** / Estimation of sugar beet yield and its partitioning under differently applied water and nitrogen
9	**Mechiche-Alami** / Climate impact response surface analysis for maize in Africa
10	**Sharif** / Sensitivity of winter oilseed rape production in Denmark towards climate change using regression techniques
11	**Liu (Tang)** / Does rising temperature reduce the winter wheat production?

	Session III	
PS III-1	**Risk and uncertainty** *Chair: Anne Gobin*	**Zuse Saal (Basement)**
1	**Porwollik** / Uncertainty of crop yield aggregations	
2	**Marin** / A stochastic model for simulating sugarcane production and uncertainty	
3	**Mulder** / Uncertainty and global sensitivity analysis of actual evapotranspiration and crop yield using SWAP-WOFOST	
4	**Masikati (Descheemaeker)** / Impacts of climate change: a sensitivity analysis to understand the role of soil fertility and water on maize production in the face of climate uncertainty, northwest Zimbabwe	
5	**Traore** / Use of crop modelling to assess climate risk management for family food self-sufficiency in southern Mali	
6	**Bregaglio** / Identifying trends and sources of uncertainty in potential rice productions under climate change in Mediterranean countries	
7	**Cammarano** / Uncertainties of different weather data input on three multi-models simulations of yield and water use	
8	**Parker** / Simulated wheat yield sensitivity to root biomass partitioning under projected climate	
9	**Vellingiri** / Evaluation of cascading uncertainty in climate and crop models in assessing the impact of climate change on rice	
10	**Deryng** / Assessing crop model performance in a critical food insecure region, southern Africa, for improved modelling of climate risks to food security	

	Session III	
PS III-2	**Weather and extremes** *Chair: Joshua Elliot*	**Zuse Saal (Basement)**
1	**Schauberger** / Understanding the effect of extreme heat on crop yields	
2	**Mills** / Quantifying the threat to global wheat production and quality from ozone pollution	
3	**Caubel (de Noblet)** / When and what meteorological stresses will maize and winter wheat crops meet in the future in France?	
4	**Kersebaum** / Modelling cover crop effects in a corn-soybean rotation in Iowa on water and nitrogen tile drain fluxes	
5	**Gaydon** / Increasing Boro rice production in saline coastal Bangladesh	
6	**Ceglar (de Sanctis**) / Detecting meteorological drivers behind inter-annual crop yield variability in France	

	Session III	
PS III-3	**Scaling and spatial variability** *Chair: Henrik Eckersten*	**Zuse Saal (Basement)**
1	**Eyshi Rezaei** / Data aggregation does not reduce signals of heat and drought stress in large area yield simulations	
2	**Baranowski** / Multifractal properties of spatially aggregated meteorological data – a regional study	
3	**Coucheney (Eckersten)** / The role of spatial pattern of soil types for data aggregation effects in crop modelling	
5	**Ruget** / Regional variability of the climate change effect on grassland production	
6	**Yao** / Evaluating the potential of rice production in Taiwan by using DSSAT and the statistical downscaling model to generate future climate data	

Wednesday 16th March 13:45 – 15:05

	Session I	
PS I-3	**Modelling phenology and growth** *Chair: Michael Dingkuhn*	**Bunsen Saal**
1	**Ruget** / Parameterization of a crop model using a regional agronomical database: rice in Camargue with STICS	
2	**Zhou** / Simulation of potato dry matter production under split-N fertigation and sandy soil conditions	
3	**Peltzer** / Comparison and validation of three soybean phenology models	
4	**Lana** / Effect of different levels of calibration in rotation schemes simulated in five European sites in a multi-model approach	
5	**Berger** / Wheat post-anthesis nitrogen uptake, grain yield and protein content simulated with PYG model	
6	**Azevedo** / Potential substitution of mineral P fertilizer by manure: EPIC development and implementation	
7	**Yun (Kim)** / Improving phenology predictions with a multi-model ensemble	
8	**Ferrise** / Fuzzy-logic based multi-site crop model evaluation in Europe	

	Session II	
PS II-2	**Model enhancement for breeding** *Chair: Melanie Correll*	**Location** **Bunsen Saal**
1	**Singels** / Modelling impacts of stomatal drought sensitivity and root growth rate on sugarcane yield	
2	**Singh (van Oosterom)** / Quantification of high temperature risks and potential effects on sorghum productivity in eastern Australia	
3	**Soufizadeh** / Developing algorithms for modelling the dynamics of N balance in maize in a gene-to-phenotype context	
4	**Le Bris (Soenen)** / "CHN": a crop model to add value to phenotyping and approach genetic variation for RUE and WUE	
5	**Casadebeig (Debaeke)** / A model-based approach to assist variety assessment in sunflower crop	
6	**de Sanctis** / Heat waves during number of grain determination reduce yield in different cultivars of durum wheat	

	Session III	
PS III-4	**Yield gap analysis** *Chair: Paulo César Sentelhas*	**Zuse Saal (Basement)**
1	**Sinabell** / Yield potentials and yield gaps of soybeans in Austria – a biophysical and economic assessment	
2	**Luettger (Feike)** / Agro-climatic indices explaining yield variations in major crops in Germany	
3	**Chen** / Characterizing the yield variability, yield gaps and yield loss risk of winter wheat in northern China	
4	**Lilley** / Estimating canola yield gaps in Australia	
5	**Soufizade (Mirebrahim)** / Quantifiction of forage maize yield gap in the Alborz province of Iran by help of crop simulation modelling	
6	**Manevski** / Can crop yields be doubled and environmental impact halved in the Danish agriculture?	
7	**Meister** / Desert agricultural systems at the Early Bronze Age settlement of Jawa, northern Jordan – efficiency & potential crop yields	
8	**Monteiro** / Sugarcane spatial variability in Brazil: potential, best farmer's and actual yields	
9	**Gornott** / Yield gap analysis for Tanzania - the impact of water supply and fertilization on maize yields	

	Session III	
PS III-5	**Climate change Impact Assessment** *Chair: Phillip Parker*	**Zuse Saal (Basement)**
1	**Singh** / Mapping rainfed rice cultivation under future climate change scenarios	
2	**Büker (Feike)** / Variation in rain-fed rice yields in India under a changing climate	
3	**Durand** / Integrated assessment of climate change impacts on crop productivity and poverty rates: case study of the Bethlehem district in South Africa	
4	**Mtongori** / Impacts of climate change and variability on yields for selected maize cultivars grown in southern Tanzania	
5	**Rusinamhodzi (Corbeels)** / Challenges of modelling climate change impact on smallholder agricultural systems in Africa	
6	**Ahmadi** / Monitoring & prediction of climate changes for maize yield using the AQUACROP model and CMIP5 data	
7	**Ebrahimi** / Modelling the sowing date of winter wheat in response to climate change for eastern Austria	

8	**Chaki (Gaydon)** / Productivity of dry season rice as affected by climate scenarios and its adaptations in Bangladesh
9	**Fraga** / Modelling climate change impacts for grapevine yield in Europe using the STICS crop model
10	**Srivastava** / Climate change impact under climate scenarios on maize yield in Ghana
11	**Ahmed (Stöckle)** / Assessment of climate change impacts on winter wheat in the US Pacific Northwest using a multimodel ensemble approach

	Session III	
PS III-6	**Management options for climate change adaptation** *Chair: Margarita Ruiz-Ramos*	**Zuse Saal (Basement)**
1	**Armas-Herrera (Beaudoin)** / Modeling with STICS the effects of no-tillage vs. tillage in cropping systems under contrasting pedoclimatic conditions	
2	**Kirschbaum** / Modelling changes in soil carbon stocks in New Zealand's grazed pastures in response to variations in management and environmental factors	
3	**Topaj** / Comparative model analysis of various sparing measures intended to crop production sustainability by "APEX-AGROTOOL" simulation system	
4	**Vermue** / Climate-cafe: first results of the cropping systems simulations with the model STICS	
5	**Constantin** / Impact of maize management variability modelled as decision rules on yield and drainage at the regional scale	
6	**Heinemann** / Environmental characterization for improving breeding strategies in Brazilian rainfed drybean	
7	**Onawumi** / Site-specific fertilizer recommendation for maize production in the transition zone of Ghana	
8	**Archontoulis** / In-season forecast of crop yields, soil water-nitrogen, and weather using APSIM and WRF models in Iowa, USA	
9	**Tribouillois (Constantin)** / Simulation of ecosystem services of nitrogen management produced by bispecific mixtures of cover crops using the STICS soil-crop model	
10	**van Oort** / Intensification options for rice-based systems in Senegal	
11	**Blazy** / A modelling approach for assessing environmental and economic impacts of agri-environmental schemes to enhance soil C sequestration and reduce pollution risks	

	Session III	
PS III-7	**Models, tools and decision support** *Chair: David Fleisher*	**Zuse Saal (Basement)**
1	**Luedeling** / Decision analysis principles can guide the modelling of complex agroforestry systems	
2	**Oosthuizen** / Crop Critical Climate Threshold (CCCT) modelling as an alternative modelling technique to determine the financial impact of climate change on crop yield and quality – a South African case-study	
3	**Mirschel** / YIELDSTAT – a regional yield model for agricultural crops applicable for East-Germany	
4	**Li** / Integrating C4 photosynthesis into the ORYZA crop simulation model for virtual assessment of C4 rice	
5	**Kadiyala** / Linking satellite imagery and crop modelling for integrated assessment of climate change impacts on chickpea yields in Southern India	
6	**Battisti** / Comparison of five soybean crop growth models for yield estimation in southern Brazil	
7	**Shelia (Hoogenboom)** / CRAFT: A Multi-scale and multi-model gridded framework for running crop simulation models	
8	**Fodor** / AGRAGiS: Extending the NAGiS database within the agriculture sector	
9	**Santos (Fraga)** / Modelling climate change impacts on grapevine phenology in Portugal: a statistical approach	
10	**Potopová** / CROPGRO-Tomato model for simulated growth parameters of field-grown tomato in the Elbe lowland conditions	
11	**Sharp** / Application of a systems model to spatially complex irrigated agricultural systems	

	Session IV	
PS IV-2	**Integrating crop, soil, climate and management** *Chair: Marcello Donatelli*	**Foyer A**
1	**de Noblet** / Modelling the impacts of climate change on agrosystems' functionning: how can we make the best use of both large-scale vegetation and plot-scale process-oriented models?	
2	**Buis** / Multicriteria evaluation of the STICS soil-crop model and implementation of an automated evaluation system	
3	**Stella** / Development of a modelling solution targeting the simulation of rice cropping system: the role of model composition	
4	**Danuso** / An ontology for cropping system data management and modelling, based on system dynamics principles	

5	**Kim** / Reengineering of the CERES-Rice model for facilitation of parallel crop yield simulation using the CORDEX data
6	**Auzoux** / ECOFI: a generic agronomic database to facilitate analysis and crop modelling
7	**Mashaba** / Investigating the influence of temperature variability on wheat in Bloemfontein using Landsat 8 data
8	**Topp** / Spring barley mixtures – do they outperform single varieties?
9	**Dumont** / Crop yields, soil organic carbon and soil nitrogen content change under climate change
10	**Mehdi** / Does crop type matter for simulating water quality?
11	**Yang** / Simulation of real-time nitrogen leaching for better crop nitrogen fertilizer management
12	**Bennetzen (Porter)** / Identity-based analysis of GHG emissions from agriculture
13	**Haas** / Responses of soil nitrous oxide emissions and nitrate leaching on climate, soil and management input data aggregation: a biogeochemistry model ensemble study
14	**Dorey** / Pineapple cropping system design with the simpiña modelling framework


MACSUR


AgMIP


Luke
NATURAL RESOURCES
INSTITUTE FINLAND


CSIRO


UF
UNIVERSITY of
FLORIDA


universitätbonn


The Research Council
of Norway


zalf
Leibniz-Zentrum für
Agrarlandschaftsforschung
(ZALF) e.V.