



INTERNATIONAL INSTITUTE
OF SUGAR BEET RESEARCH

ABSTRACTS OF PAPERS

77TH IIRB CONGRESS

**Maximising sugar beet performance
in a changing climate**

11 -12 February 2020

**Hotel Le Plaza
Brussels, Belgium**

Table of contents

Oral Presentations

Session 1 'Maximising sugar beet performance in a changing climate'

1.1	Carolyne Dürr: Will climate change affect sugar beet establishment of the 21 st century? Insights from a simulation study	1
1.2	Elisabeth Lacoste: Influence of changes in the availability of plant protection products on the sugar beet sector	2
1.3	Jan Sels <i>et al.</i> : Climate change drives upcoming challenges for sugar beet breeding – a perspective from SESVanderHave.....	3
1.4	Karin Fiedler-Wiechers <i>et al.</i> : Breeding for changing environments: Drought a challenge for sugar beet	4
1.5	Georgina Barratt <i>et al.</i> : Understanding sugar beet water use efficiency (WUE)	5
1.6	Barbara Manderyck: Weed control in a new climate	6
1.7	Paul Tauvel, Jean-Charles Germain: Changing ways of thinking to produce organic sugar beet	7

Session 2 'Tools and technologies'

2.1	Anne-Katrin Mahlein: IIRB Seminar 2019 on 'Sensors and digital technologies in sugar beet production'.....	8
2.2	Jake Richards <i>et al.</i> : Using X-ray computed tomography, electromagnetic resonance and thermal imagery to understand the effects of cover crops on soil structure and sugar beet growth	9
2.3	Bram Hanse, Arjen Buijze: Integrated management of foliar diseases in sugar beet.....	10
2.4	Céline Gouwie <i>et al.</i> : BETA'STAT: Understanding farming practice for accurate advice	11
2.5	Toby Townsend <i>et al.</i> : Benchmarking for improved sugar beet yields...	12

Session 3 'Maximising future establishment for sugar beet'

3.1	Didier Demilly <i>et al.</i> : Phenotyping of sugar beet genetic diversity for better germination and early growth in cold conditions	13
3.2	Debbie Sparkes <i>et al.</i> : Improving establishment in sugar beet	14
3.3	Heinz-Josef Koch: Sugar beet yield response to increasing row distance	15

Session 4 'Growing sugar beet in a post-neonic world'

4.1	Mark Stevens: Summary of Neonic workshop Leuven 03/2019	16
4.2	Anne Lisbet Hansen <i>et al.</i> : Effect of insecticides and strategies of insecticide applications on the control of <i>Atomaria linearis</i> and other soil borne pests	17
4.3	Frédéric Boyer <i>et al.</i> : Overview of aphid and virus yellows monitoring on sugar beet in Western Europe.....	18
4.4	Andre Wauters <i>et al.</i> : Testing for tolerance and resistance against yellowing viruses in sugar beet varieties	19
4.5	Elma Raaijmakers <i>et al.</i> : The effect of new insecticides and strategies of insecticide applications on the control of aphids and virus yellows .	20
4.6	Ralf Nauen <i>et al.</i> : A broad monitoring of <i>M. persicae</i> resistance status in Belgium, Netherlands, Denmark and Germany urgently calls for the implementation of resistance management strategies.....	21
4.7	Herbert Eigner <i>et al.</i> : Sugar beet weevil (<i>Bothynoderes punctiventris</i>) a threatening pest in the Pannonian sugar beet growing area	22

Session 5 'Controlling leaf diseases – Cercospora'

5.1	Rebecca E. Spanner <i>et al.</i> : Genome-wide association studies identify mutations associated with DMI resistance in the <i>Cercospora</i> leaf spot pathogen	23
5.2	Friedrich J. Kopsisch-Obuch <i>et al.</i> : Keeping sugar beet competitive with new strategies for <i>Cercospora</i> resistance.....	24
5.3	Daniel Laufer <i>et al.</i> : Effect of fungicide strategy and variety on <i>Cercospora</i> leaf spot epidemics in sugar beet.....	25
5.4	Frederike Imbusch <i>et al.</i> : Relation between <i>Cercospora beticola</i> spore flight and leaf spot de-velopment after fungicide application according to disease thresholds and/or spore flight	26

Session 6 'Panel 'Breeding for future challenges in sugar beet cultivation'

Session 7 'Open Session'

7.1	Rémy Duval <i>et al.</i> : Reduced tillage in sugar beet crop systems: synthesis of a 20 years field experiment	27
7.2	Silvia Madritsch <i>et al.</i> : Variety-specific molecular mechanisms in sugar beet during an extended storage time.....	28
7.3	Gunnar Kleuker <i>et al.</i> : Impact factors on the tissue strength, damage susceptibility and storability of sugar beets	29

Poster presentations

Agronomy

Nutrient supply

- 1.1 Giovanni Campagna *et al.*: Sugar Beet and other crops in rotation sustainability cultivation (Carbon footprint) in Italy..... 31
- 1.2 Philipp Götze, Heinz-Josef Koch: Effect of crop rotation and removal of beet leaves and tops on soil organic carbon stocks in the crop rotation experiment at Harste 32
- 1.3 Gernot Bodner *et al.*: EUF soil extraction for the determination of structure-relevant organic carbon fractions..... 33
- 1.4 Alexander Stracke, Heinz-Josef Koch: Above- and below-ground biomass and N-uptake of catch crops affecting soil N_{min} over winter... 34
- 1.5 Dietmar Horn, Gebhard Müller: Challenges of nitrogen and phosphorus fertilisation advice for sugar beets with regard to the implementation of the EU Nitrates Directive 35
- 1.6 Massimo Zavarella *et al.*: Survey on soil fertility in the COPROB beet communities: second contribution..... 36
- 1.7 Joakim Ekelöf: Decreasing soil P and K reserves – a hidden threat to improvements in sugar beet yields..... 37
- 1.8 Åsa Olsson Nyström *et al.*: Structure lime and ground lime stone in sugar beet rotations..... 38
- 1.9 Sakari Malmilehto: Structural liming in Finland..... 39
- 1.10 Susanna Muurinen: Survey of sulfur status of sugar beet in Finland 40

Tillage

- 1.11 Jacek Przybył *et al.*: Analysis of simplified tillage systems in sugar beet production in the aspect of yield quantity and quality 41
- 1.12 Natalia Mioduszevska *et al.*: Analysis of simplified tillage systems in sugar beet production in the aspect of soil physical properties..... 42
- 1.13 Rémy Duval, Vincent Tomis: Soil compaction in Northern France sugar beet crop systems: a collaborative study to give a clear picture of the situation and identify solutions 43

Seed quality, sowing and early establishment

1.14	Sylvie Ducournau, André Wauters: Testing <i>Beta vulgaris</i> seed quality in laboratory to predict field emergence	44
1.15	Jordan Long <i>et al.</i> : Improving young plant growth with seed technologies.....	45
1.16	Henning Ebmeyer, Christa Hoffmann: Reasons for the strong effect of drought stress in young sugar beet plants.....	46
1.17	Lucy Tillier: The impact of canopy architecture on radiation use efficiency and yield potential of sugar beet	47
1.18	Christa Hoffmann: Can yield of sugar beet varieties be assessed by the leaf canopy?	48
1.19	Massimo Zavanella <i>et al.</i> : Study on the possibility of autumn sowing in the sugar beet areas of COPROB (Northern Italy).....	49

Organically grown sugar beet

1.20	Massimiliano Cenacchi <i>et al.</i> : Organic sugar beet cultivation in Italy – first experience on field	500
1.21	Alice Lorriaux <i>et al.</i> : Challenges and opportunities of organic sugar beet seed production for SESVanderHave.....	511
1.22	Otto Nielsen: Three-year experience with organic sugar beets.....	52

Communication/Benchmarking

1.23	Christel Roß: Communication of data from a farm survey.....	53
1.24	Nicol Stockfisch: Comparison of indicators for pesticide use intensity	54

Digital technologies

1.25	François Joudelat <i>et al.</i> : Measuring vegetative heterogeneity of sugar beet varieties with drone and deep learning phenotyping	55
1.26	Tobias Ekblad: Automatic image analysis of sugar beet – a deep learning approach.....	56
1.27	Abel Barreto <i>et al.</i> : Proof of concept for the digital visual rating of Cercospora leaf spots using multispectral UAV images	57
1.28	Giovanni Campagna <i>et al.</i> : Monitoring water-nutritional and NDVI on sugar beet in Italy.....	58
1.29	Ulrike Wilczek: Development of a sensor system for low-damage sugar beet harvest – state and perspectives	59

Harvest, storage and beet quality

- 1.30 Agnieszka Andrusiak, Zdzisław Wyszynski: Evaluation of sugar beet yield depending on the method and harvesting date..... 60
- 1.31 Christine Kenter, Erwin Ladewig: Storability as a varietal characteristic of sugar beet?..... 61
- 1.32 Martijn Leijdekkers: Experiences with mechanical ventilation of sugar beet storage clamps in the Netherlands 62
- 1.33 Sakari Malmilehto: Fleece cover for sugar beets. Risk or possibility?... 63
- 1.34 Nelia Nause, Christa Hoffmann: Cambium rings and cell wall composition of sugar beet genotypes differing in root strength..... 64
- 1.35 William English *et al.*: In season texture analysis of sugar beets using a handheld penetrometer 65
- 1.36 Madeleine Nilsson *et al.*: Pressure mapping of sugar beets..... 66
- 1.37 Elke Hilscher *et al.*: Improving sugar beet quality lab sample measurement and analysis quality using the KWS Beetrometer®..... 67

2 Pests, diseases and weed challenges

Root rot diseases

- 2.1 Lars Persson, Åsa Olsson Nyström: Measurement of *Aphanomyces* root rot potential in soil 68
- 2.2 Juan Vegas *et al.*: Genetic study of charcoal rot (*Macrophomina phaseolina*) resistance in sugar beet using a diverse panel of commercial and non-commercial hybrids..... 69
- 2.3 Vera Stojšin *et al.*: Influence of NPK mineral nutrition and cultivar on sugar beet root rot 70
- 2.4 Aleksandra Stankov *et al.*: Characterisation of *Trichoderma* spp. for antagonistic activity against charcoal root rot *Macrophomina phaseolina* from sugar beet 71

Fungal leaf diseases

- 2.5 Dragana Budakov *et al.*: Influence of sugar beet cultivar and NKP nutrition on *Cercospora* leaf spot..... 72
- 2.6 Živko Čurčić *et al.*: Effect of different sowing dates on *Cercospora beticola* infection level 73
- 2.7 Maarten Vanderstukken *et al.*: An integrated breeding approach towards *Cercospora* resistant varieties – a perspective from SESVanderHave 74

2.8	Mohammed Khan, Giovanni Campagna: Strategic management of <i>C. beticola</i> using improved resistant cultivars of sugar beet	75
2.9	Maximilian Müllender <i>et al.</i> : Possible causes and mechanisms for alterations in the sensitivity of <i>Cercospora beticola</i> towards DMI fungicides.....	76
2.10	Thies Marten Heick <i>et al.</i> : Disease control and management of Qol resistance of sugar beet powdery mildew (<i>Erysiphe betae</i>) in Scandinavia	77
2.11	Hélène Yvanne <i>et al.</i> : Can we harness disease resistance by association directly in wild sea beet?	78

Beet pests

2.12	Giovanni Campagna, Alessandro Vacchi: <i>Lixus junci</i> and <i>Conorrhinchus mendicus</i> diffusion on Sugar Beet in Po Valley and control strategy	79
2.13	Martina Mayrhofer <i>et al.</i> : Sugar beet weevil (<i>Bothynoderes punctiventris</i>) – Investigations on the efficacy of insecticides in model trials	80
2.14	Zdzisław Klukowski, Jacek Piszczek: Biological aspects of sugar beet weevil control – Polish experience of 2014-2019 outbreak.....	81
2.15	Ghislain Malatesta, William Huet: Increase of the weevil population in France	82
2.16	Åsa Olsson Nyström <i>et al.</i> : Free living nematodes and root gall nematodes in sugar beet	83

Growing sugar beet in a post-neonic world

2.17	Cédric Royer <i>et al.</i> : The aftermath of the neonicotinoid ban in France: first lessons and new perspectives	84
2.18	Friedrich Kempl, Katharina Wechselberger: Efficacy of seed treatments with and without Neonicotinoids	85
2.19	Niels Wynant <i>et al.</i> : Breeding for insect tolerant varieties at SESVanderHave.....	86
2.20	Linda Frijters <i>et al.</i> : Testing alternative pesticides and monitoring systems for the control of pygmy mangold beetles (<i>Atomaria linearis</i>) under field conditions	87
2.21	Kathleen Antoons <i>et al.</i> : Optimizing of pest management in Belgium thanks to the observation and warning network	88
2.22	Roland H.M. Wouters <i>et al.</i> : Global diversity of the sugar beet aphid pest <i>M. persicae</i>	89

2.23	Elma Raaijmakers <i>et al.</i> : Monitoring of aphids in sugar beet fields and trial fields, a basic tool to understand virus yellow epidemics in the post-neonic era	90
2.24	Roxana Hossain <i>et al.</i> : Virus yellows in sugar beet – biology, occurrence and influence on yield parameters	91
2.25	Dragana Budakov <i>et al.</i> : Sugar beet virus diseases in Serbia.....	92
2.26	Živko Ćurčić <i>et al.</i> : Beet Yellow Virus a possible threat to sugar beet production in Serbia?	93

Virus resistance breeding, variety testing

2.27	Lucy James <i>et al.</i> : A novel pre-breeding strategy to reduce dependence on insecticides for virus yellows control in sugar beet – a final update	94
2.28	Alistair Wright <i>et al.</i> : Phenotyping varietal responses of sugar beet to virus yellows, beet cyst nematode and foliar diseases.....	95
2.29	Carolina Nilsson <i>et al.</i> : Successful breeding for resistance/tolerance to virus yellows at MariboHilleleshög.....	96
2.30	Kazuyuki Okazaki <i>et al.</i> : Resistance breeding to virus yellows in Japan.....	97
2.31	Nina Behnke, Werner Beyer: Breeding for virus yellows resistance – a new success story?	98
2.32	Yosuke Kuroda <i>et al.</i> : QTL analysis of resistance to Beet leaf yellowing virus (BLYV)	99
2.33	Margaret Rekoske <i>et al.</i> : Betaseed: 50 Years of innovation – a company looking to the future.....	100
2.34	Christine Kenter <i>et al.</i> : Effects of sample size and head rows on the precision of variety trials with sugar beet	101
2.35	André Wauters, Kathleen Antoons: Field testing for BMV tolerance in sugar beet with different inoculation techniques	102

Other pest and disease issues

2.36	László Potyondi: Challenges of non-renewal of approval of pesticides in Hungarian sugar beet production.....	103
2.37	Louise Holmquist <i>et al.</i> : Syndrome Basses Richesses (SBR) in sugar beet – crop robustness as a potential element for control.....	104
2.38	André Wauters: Silvering disease in sugar beet caused by <i>Curto-bacterium flaccumfaciens</i> pv. <i>betae</i> in Belgian sugar beet trial site....	105

Rhizomania

- 2.39 Claudia Chiodi *et al.*: Bacterial community composition in a soil carrying a resistance-breaking strain of the rhizomania virus BNYVV in comparison to standard soils 106
- 2.40 Sebastian Liebe *et al.*: Application of a reverse genetic system for *Beet Necrotic Yellow Vein Virus* to study *Rz1* resistance breaking in sugar beet..... 107
- 2.41 Veronika Wetzel, Mark Varrelmann: *Rz2* – a plant anti *Beet Necrotic Yellow Vein Virus* resistance protein derived from *Beta vulgaris* targets the viral movement-protein TGB1 as avirulence gene 108

Weed control

- 2.42 Daniel Laufer, Erwin Ladewig: Weed control in sugar beet without the active substances desmedipham and phenmedipham 109
- 2.43 Stefan Geyer *et al.*: Weed control missing des- and phenmedipham .. 110
- 2.44 Sjef van der Heijden *et al.*: Effectiveness of ALS-herbicides registered for cereals to control ALS-tolerant and ALS-non-tolerant weed beets 111
- 2.45 Carsten Stibbe *et al.*: CONVISO® SMART – two years farm scale experiences 112
- 2.46 Dirk Hyndriks: Performance of various CONVISO® SMART sugar beet varieties under different weed control strategies..... 113
- 2.47 János Kimmel: Experiences with CONVISO® SMART technology in field trials in Hungary..... 114
- 2.48 Marja Palomäki: Farmers' opinions about the CONVISO® SMART system in Finland..... 115
- 2.49 Marja Palomäki: Tips of the use of CONVISO® SMART in Finland 116
- 2.50 Mohammed Khan: Experiences and lessons learned from a decade of using herbicide tolerant sugar beet in the USA 117
- 2.51 Cédric Royer: Weeds resistant to chemical herbicide 118
- 2.52 Ronal Euben: How to use drift reducing spray nozzles and maintaining good weed control..... 119

2.26 ŽIVKO ĆURČIĆ¹, ŽELJKO MILOVAC¹, KSENIJA TAŠKI-AJDUKOVIĆ¹, ALEKSANDRA STANKOV², ANĐA RADONJIĆ³, OLIVERA PETROVIĆ-OBRAĐOVIĆ³, BRITT-LOUISE LENNEFORS⁴

¹ Institute of Field and Vegetable Crops, Maksim Gorki st. 30, RS – 21000 Novi Sad

² Faculty of Agriculture, University of Novi Sad, Dositej Obradović square 8, RS – 21000 Novi Sad

³ Faculty of Agriculture, University of Belgrade, Nemanjina street 6, RS – 11080 Zemun

⁴ MariboHilleshög Research AB, Säbyholmsvägen 24, S – 261 62 Landskrona

BEET YELLOW VIRUS A POSSIBLE THREAT TO SUGAR BEET PRODUCTION IN SERBIA?

There are three main yellowing viruses that damage the beet crop in Europe: *Beet yellows virus* (BYV), *Beet mild yellowing virus* (BMYV) and *Beet chlorosis virus* (BChV). Although not a true yellowing virus, *Beet mosaic virus* (BtMV) is found in sugar beet in Europe and can cause damage. The yellowing viruses are transmitted by aphids. The recent ban of neonicotinoids in the EU endangered sugar beet production in terms of crop protection against aphids. Since, Republic of Serbia agenda is to become member state of the EU, in order to do that it is necessary to completely synchronise legislation with the EU in all domains, including agriculture and crop protection. That is why it is expected that this ban of neonicotinoids will be implemented in the near future in Serbia also in sugar beet growing. Although earlier research classified Serbia as a country where damage might occur occasionally without significant yield loss, in the last two years (2018 and 2019), BYV presence was confirmed in the fields of the Institute of Field and Vegetable Crops, Novi Sad. During mid of May 2019, the presence of BtMV was confirmed, also transmitted by aphids. First BYV symptoms in 2019 occurred mid of June and the presence of BYV was confirmed by ELISA. Aphids monitoring during the 2019 vegetation period showed existence of over 50 different aphid species. The most dominant species were *Aphis fabae* and *Aphis spiraecola*. The presence of *M. persicae*, the most significant vector of yellowing viruses in Western Europe, was very low. Further studies will be done to examine possible vectors of viruses and to assess effect of yellowing viruses on sugar yield.