GCIRC News

Global Council for Innovation in Rapeseed and Canola

"Building a World community for Innovation on Rapeseed and Canola"

N° 14, February 2023

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Editorial

Greetings and welcome to GCIRC Newsletter #14, February 2023.

Welcome to our first newsletter for 2023, and begin by expressing how extremely important it is to remember the people of Ukraine on this the 1st anniversary of the war. It is hard to comprehend the devastation, destruction to cities and vital infrastructure let alone the injuries and loss of so many lives. Our thoughts are with our colleagues in Ukraine who are resiliently maintaining supply chains for oilseeds and veg oils under the most challenging conditions in that region.

Sadly, the Board has been advised of the recent passing of Prof Krzymanski. To his family, friends, and colleagues, we the Board and members of GCIRC pass on our sincere condolences.
Prof Krzymanski was a highly regarded scientist, who in 2003 received a GCIRC Rapeseed Award for his lifelong achievements including the attached paper 'Rapeseed breeding for better oil and meal quality in Poland'.

With the ever-changing weather conditions globally, whether it be drought in one region or floods in another oilseed production will be monitored closely in 2023. That said I look forward to reviewing country crop forecasts, both area and production numbers in this newsletter.

At the February 13th GCIRC board meeting, discussion about the next technical meeting was held with a call for application submissions to host the 2025 Technical meeting be available for voting at the

Sydney board meeting. India and the US have indicated they are interested, so look forward to hearing more shortly.

Finally, remember to register for IRC-16 in Sydney where I look forward to seeing as many of you as possible in September.

Robert Wilson, GCIRC President

Activity/ News of the association:

IRC-16 Sydney 2023 – September 24-27, Australia

How time flies - only 30 weeks until IRC-16 Congress and already registrations are flowing in. Many regular IRC attendees are taking advantage of the early bird rate and have already registered, which is particularly encouraging. The Call for Abstracts opened this week, we look forward to these also starting to flow in as well in the lead up to the Congress.

All details for registration, abstract submission and draft program are available on the https://www.ircsydney2023.com/ website. We are also very pleased to report that sponsorship support has been very strong with many of the high level, high exposure sponsorship opportunities already taken. BASF is the sole Diamond sponsor; Syngenta has taken a Gold sponsorship, while Nuseed has agreed to sponsor the Congress dinner. All sponsors are listed on the website, and there are still many more sponsorship opportunities available. Contact the organisers at ircsydney2023@australianoilseeds.com if you are interested in gaining exposure for your business or research institution through adding your name to the list of prestigious sponsors.

The Congress theme of *'Global Crop – Golden Opportunities'* will recognise and highlight the outstanding opportunities canola/rapeseed and the scientific committees are already locking in keynote and plenary speakers, and these will be notified progressively on the website as they are secured in the weeks ahead. Thank you to those of our international colleagues who have agreed to participate on a committee.

The Congress scientific program will run over 3 days and organised under 6 Core Themes:

- Genetics, Genomics and Breeding
- Agronomy, Physiology and Simulation
- Crop Protection

- Products and Quality
- End Uses
- Economy and Markets

The Themes will run as Concurrent Tracks with opportunities for up to 40 contributed talks in each Track over the 3 days.

Each day will commence with a plenary session of invited keynote talks of general interest to all delegates presented by global leaders in their fields.

The Congress Organising Committee is engaging the Keynote Speakers, and these will be notified progressively on the website as they are secured in the weeks ahead.
Preceding the Congress will be our 3-day Field tour, beginning Friday 22nd, visiting one of Australia's leading centres of canola breeding and research at Wagga Wagga in the heart of canola country.

The Tour will include visits to research trials, Australia's newest oilseed crushing plant, a live sheep shearing demonstration, plus more!

The Tour also includes return transfers to Sydney beginning Saturday traveling via the nation's capital Canberra en route, arriving back in Sydney on Sunday afternoon, in time for some sight-seeing or the pre-arranged Clubroot workshop or the GCIRC board meeting or some rest before the Welcome Reception!

We will be asking participating delegates to make their own way to Wagga Wagga to commence the Field Tour, as most international air tickets can include a more cost-effective add-on flight to Wagga Wagga. Bus and train options are also available, and details will be provided to assist with your logistics.

<u>Call for Abstracts: Opened last week (21st February) – watch your inbox for notifications.</u>

<u>Pre-congress Field Tour Committee</u> – Core members engaged, planning underway.

When booking your registration remember to also book the field tour which is separate and not included in the Congress registration and finally also arrange the necessary arrival documents such as your Visa to enter Australia.

We look forward to welcoming as many friends and colleagues as possible to Australia in September 2023. Remember, Sydney ***– "it's closer than you think".***

For further info go to https://www.ircsydney2023.com

<u>Congress Executive Progress report</u> - meeting regularly, hitting timelines for activities.

- ✓ Congress venue booked.
- ✓ Congress Dinner venue booked.
- ✓ Key major Sponsors secured along with supporting sponsors.
- ✓ Registration opened late 2022 already have good uptake on Early-Bird offer.
- ✓ Budget (ongoing)

- ✓ Plenary and Keynote speakers being assembled.
- ✓ Call for Abstracts opened late February.
- ✓ Pre-congress field tour finalised, and activities started.
- ✓ Website live.
    - https://www.ircsydney2023.com & IRC Program/Itinerary

Professor Jan Krzymański

We are deeply saddened to inform of the passing of Prof Jan Krzymański, and express our sympathy to his family, friends, and colleagues.

Prof Jan Krzymański greatly contributed to rapeseed research and development. His involvement and the excellence of his work were recognised through the Rapeseed Award in 2003, in Copenhagen.

Prof Jan Krzymański receiving the Award during the 11th IRC in Copenhagen, in 2003.

Prof Jan Krzymański was one of the first members of the GCIRC, having joined the association in 1978 (the GCIRC constitution was adopted in November 1977, after 5 years of discussions) and participated actively to the GCIRC Board until 2005. He was president of GCIRC and chaired the 7th IRC in Poznan, in 1987.

He played a key role in the elaboration of the first varieties of low erucic and low glucosinolates winter rapeseed, at the basis of cultivars grown in Europe until today.

We give here a summary of his history, extract from an article written by Prof Krzymański himself for the 4th IRC, in Giessen, Germany, in 1974. It illustrates his personal role and also the importance of international collaborations, and the progress of knowledge on rapeseed genetics in the 1960ies and 70ies:

<<The lower seed value of rape is determined mainly by two factors – high erucic acid content in oil and toxic properties of thioglucosides (glucosinolates) which occur in meal. These two undesirable factors can be changed only in small degree by modifications in oil industry technology. It looks now the best solution of the problem can be obtained with genetical means breeding of new varieties of rape with improved chemical composition. Especial research project was made [in Poznan, Poland] by Oil Crop Department of Institute of Plant Breeding and Acclimatization (IHAR) .
Elaboration of method for fatty acid composition analysis by quantitative paper chromatography (KKrzymański, 1961, 1965) allowed to undertake genetical researches and rape breeding for low erucic acid content in seed oil. This method was replaced later by gas chromatography (Byczynska & Krzymański, 1968, Krzymański and Downey, 1969). Works on thioglucoside required also certain and proper analytical method. Different methods were examined and a new modification of Youngs-Wetter's methods were proposed (Byczynska, 1974).
This method , based on gas chromatography, makes possible the estimation of individual isothiocyanates and individual oxazolidinethiones in seed meal. It is well adapted for needs of breeding and genetic investigation. Oil content in seeds is not analyzed now by destructive and quick method based on nuclear magnetic resonance measurement (Krzymański, 1970).
Survey of all varieties and strains of winter rape in our collection showed that we had none winter form low in erucic acid or thioglucoside content (Byczynska 1974, Krzymański 1965). For this reason, it was necessary to use spring forms for obtaining essential genetic variability. The following lines were genetical sources of desired traits in our researches and breeding works:

1. Zero erucic line selected from 'Liho" variety of spring rape in Canada (Stephansson et al., 1961)
2. Low erucic line selected from "Bronowski" variety of spring rape in Poland (Krzymański, 1966, Krzymański et al 1967)
3. Lines with very low thioglucoside content selected from "Bronowski" variety of spring rape (Finlayson et al, 1973; Krzymański, 1970)

Investigation was realized on inheritance of erucic acid content in rapeseed oil (Krzymański et al 1967; Krzymański & Downey, 1969; Krzymański 1970) and on inheritance of thioglucoside content in rape seed (Krzymański et al 1970). The results obtained were conformable to the published data of other authors (Harvey & Downey, 1964; Kondra & Stefansson 1965, 1970) (based on these results it can be concluded:

1. Erucic acid content in rape seed oil is a hereditary trait controlled by embryo genotype;
2. Erucic acid content is controlled by one or two pair system – the zero or low erucic forms represents ¼ or 1/16 of the F2 generation depending on cross combination;
3. There are alleles or pseudoalleles controlling different levels of eruci acid acting in an additive manner without distinct domination;

4. *Thioglucosides content in rapeseed is controlled mainly by the maternal plant genotype in respect of both quantity and quality;*
5. *The trait of high thioglucoside content is a dominant one in reference to total content of these compounds, but for individual thioglucosides different results were obtained. Overdominancy was observed in the case of pentenyl isothiocyanate, dominance for butenyl isothiocyanate and incomplete dominance for oxazolidinethiones.;*
6. *A differentiation in thioglucosides composition was also observed in segregating generations of hybrids.*

Low erucic or low thioglucosides strains of winter rape were obtained by crosses between winter varieties of rape and above-mentioned lines of spring rape. But these desired traits were strongly linked with many other traits typical for spring forms. These traits were usually unfavourable and caused the new strains had much lower agricultural value than normal old varieties which have been cultivated till now. These strains make only a raw material which needs further improvement especially for better vigour, higher yielding ability and better winter hardiness. We try to achieve this goal by using breeding methods based on backcrossing and intensive selection in segregating conditions… >>

The full article and many others of that time are available on the GCIRC website (https://www.gcirc.org/publications/archives/irc-proceedings-until-2015)

Welcome to New GCIRC members

Since last October we have welcomed four new members:

ZHANG Liangxiao	Chinese Academy of Agricultural Sciences	CHINA
HILTPOLD Ivan	AGROSCOPE	SWITZERLAND
GREEN Allan	AGRENEW Pty Ltd	AUSTRALIA
FALAK Igor	Corteva	CANADA

You may visit their personal pages on the GCIRC website directory, to better know their fields of interest. We take this opportunity to remind all members that they can modify their personal page, especially indicating their fields of interest in order to facilitate interactions.

Value chains and regional news

Global rapeseed market: UFOP publishes updated Report on Global Market Supply 2022/2023

"In more than 50 pages, the UFOP Report on Global Market Supply provides detailed information on the current state of global grain, oilseed and vegetable oil production, main uses in human and animal nutrition and use as a renewables feedstock in biofuels production." See: Ufop news: https://www.ufop.de/english/news/ufop-publishes-updated-report-global-market-supply-20222023/ and the report available to download at: https://www.ufop.de/index.php/download_file/12108/

Australian Canola Crop Summary

2022 Season:

The season surprised even the most experienced pundits, with another record crop produced for Australia of close to 7.8mmt. This result was despite very wet conditions in the states of NSW and Victoria with heavy rain and floods affecting many crops towards the end of the season. Resilient crops, with maturing seeds pods were able to withstand these conditions in most cases. Very large biomass created challenges for harvest, as many fields were too wet to access for swathing/ windrowing forcing farmers to resort to direct heading/harvesting, which is unusual in Australia.

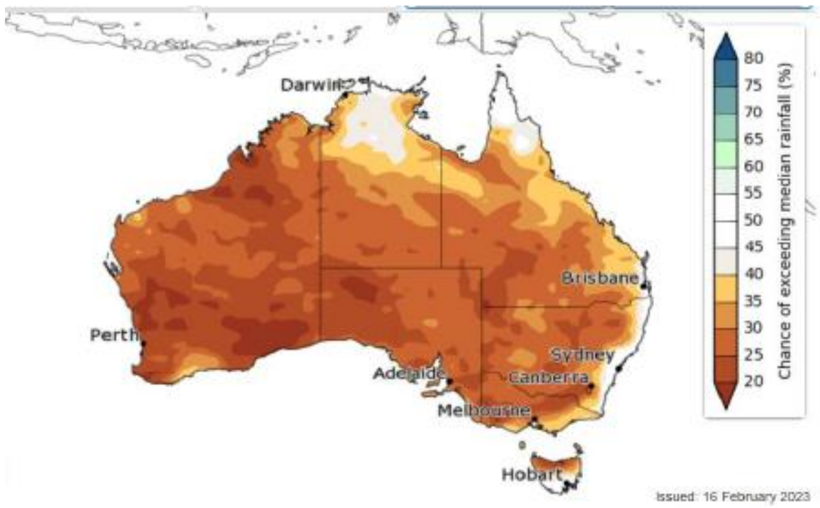
In the other canola producing states of South Australia and Western Australia, conditions with ideal, with record crops recorded on both those states. Western Australia, at 4.25mmt achieved what would be regarded only a few years ago as a good national crop.

2022/23	AREA	YIELD	PROD'N
NSW	856	1.76	1,507
VIC	630	2.17	1,367
SA	307	2.14	657
WA	1,986	2.14	4,250
AUS	3,779	2.06	7,781

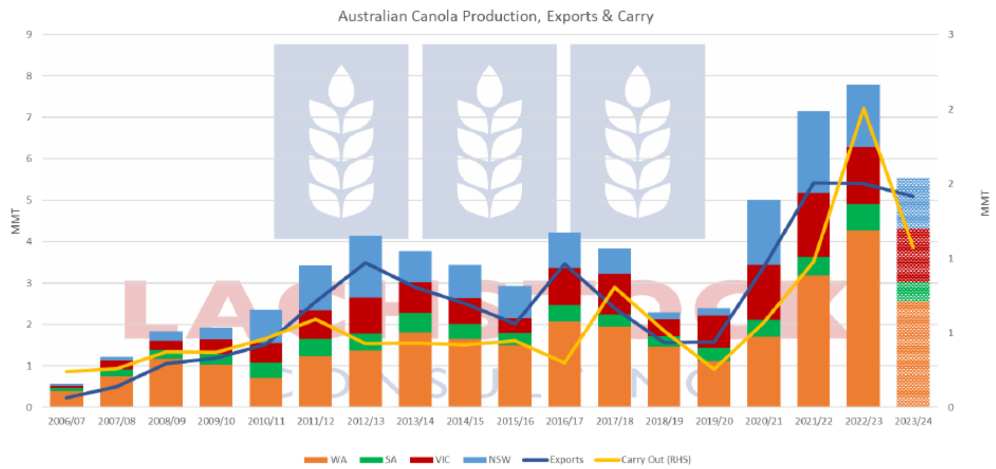
2023 Season:

The upcoming season is expected to see a return to the longer-term trend in terms of area to be sown (in April) and expected yield. While there is good subsoil moisture throughout the Eastern states of NSW and Victoria, and no indication Western Australia won't receive its usual May seasonal break (rain), the overall trend is towards El Niño conditions, which would tend to result in below-average rainfall. Heavy canola rotations over the last 2 years, combined with a softening price and still relatively high input costs will also temper grower enthusiasm to go very strong on canola.

The forecast is for only 20-35% chance of exceeding median rainfall during the seeding and establishment phase, (April-June) which will mean that the crops will rely on accessing deeper soil moisture during the critical biomass production stage leading up to flowering. If El Niño conditions continue through to pod and seed development, yields and oil content will be impacted.



Early indications are for an area sown to be down around 10% on last year with yields closer to the national long-term average of around 1.6t/ha. This will deliver a national production volume of 5.5mmt, with as much as 2 million tonnes carry over from the last harvest.



European Union: mutagenesis and GMO

In a ruling published on 7 February, the Court of Justice of the European Union ruled that organisms obtained by "in vitro" random mutagenesis are excluded from the scope of the 2001 Directive on the deliberate release of GMOs or their placing on the market.

For more information: the original text of the Court of Justice at https://curia.europa.eu/jcms/upload/docs/application/pdf/2018-07/cp180111en.pdf

And for comments on context: https://www.euractiv.com/section/agriculture-food/news/eu-court-exempts-gene-modification-technique-from-stricter-rules/

This decision comes as the European Commission plans to clarify the regulation of new genomic techniques (directed mutagenesis, intragenesis and cisgenesis). It is expected to present a draft regulation on new GMOs by the end of the first quarter of 2023.

Highlights from Canada's Canola Week

The Canola Council of Canada co-hosted Canola Week December 6-9, 2022, in Saskatoon, Saskatchewan, host city of the 2015 International Rapeseed Congress. Here are a few market opportunities, productivity enhancements and new technologies.
By Jay Whetter

The aquaculture opportunity for canola meal. Data from the Food and Agriculture Organization of the United Nations show wild caught and farmed fish neck and neck in terms of supply in 2020, with aquaculture trending upward quickly and wild caught trending downward. Brittany Wood, director of communications for the Canola Council of Canada, says aquaculture – fish farming – "plays to canola meal's strengths." Carp, catfish, tilapia, and salmonids are the top four farmed fish. Shrimp are also farmed in large quantities. Standard canola meal is a great fit for tilapia and carp farms, common in China. Specialty canola meal, like the high-protein, low-fibre product from Botaneco, a Canadian company, works for farmed salmon and shrimp.

Ag and petroleum companies partner on renewable diesel. In Canada, Saskatchewan-based food company AGT is working with Federated Co-op on a renewable diesel and canola protein meal project. This is just one example of new relationships forming between agriculture companies and petroleum companies. In the U.S., ADM food company and Marathon fuel company have a joint project in North Dakota, Bunge and Chevron are working together in Louisiana and Illinois, and Shell Rock Soy Processing and P66 in Iowa.

Fix or set aside unprofitable acres? Land is not going to fix itself, says Jason Casselman, Canola Council of Canada agronomy specialist. "With data analysis and mapping technology, farmers now have the opportunity to not only identify areas of low productivity, but also see how deep the problem is when they look at the bottom line," Casselman says.
–Fix: Moving topsoil back to hilltops. Marla Riekman, soil management specialist with Manitoba Agriculture, cites Manitoba studies showing that topsoil added back to hilltops increases yields significantly, while having minimal effect on yield in low-lying areas where soil was removed.
–Fix: Strategic tile drainage. Tile drainage removes water that exceeds the holding capacity of the soil. This excess water impedes root function and limits field activities. By removing this water, tile drainage can improve plant health and plant uniformity and allow farmers to get on fields faster in the spring or after a big rain.
–**Set aside: Convert unfixable acres to grass.** Mark McConnell, assistant professor and upland birds' specialist at Mississippi State University, uses field profit maps to show chronically unprofitable areas.

Given the shape of these areas, it may not be practical to take them all out of production, but he says it can make sense to set aside some field edges with grasses and forages. In a published research paper, McConnell wrote: "I suggest targeted conservation be defined as the application of conservation practices only where they increase profitability to the producer."

Technology that excites. Joy Agnew moderated a Canola Discovery Forum panel on precision agriculture technology. Agnew is associate vice president, applied research, at Olds College of Agriculture & Technology in Olds, Alberta. She asked her three panelists, what upcoming technology most excites you?

–**Bonnie Mandziak, product marketing manager with Climate FieldView:** "If we can use data and digital tools to help farmers answer spray questions – Do I spray? When should I spray? And where should I spray? – we can help them make better more informed decisions."

–**Christian Hansen, small grains corporate agronomist with John Deere:** "I'm excited for Innerplant, which is a company inserting fluorescent proteins into plants that can make them signal certain stressors throughout their life cycle. While Innerplant is at a very early stage, the commercial application of this tech is limitless to help agronomists and growers make proactive decisions on their farms. It could be used to signal fields that are at high risk for disease infection, insect infestations, nutrient deficiencies or even water stress."

–**Garth Donald, manager of agronomy with Decisive Farming by Telus Agriculture: "**Hyperspectral imaging. With this technology, one will be able to identify plant diseases before the human eye can see them. That way one can be more proactive than reactive." Hyperspectral imaging captures wavelengths beyond visible light to show things the eye can't see. Low earth orbit satellites, once launched, will capture these high-resolution images at a broad regional scale.

(Jay Whetter is the editor of Canola Digest. Read the magazine online at canoladigest.ca. Read his insightful column at canoladigest.ca/department/the-editors-desk/)

India

India is the fourth-largest contributor of oilseeds in the world, Indian rapeseed and mustard contribute for about 28.6% of total oilseeds production. Rapeseed–mustard crops in India are grown under diverse agro climatic conditions, e.g. north-eastern / north western hills to down south under irrigated/rainfed, timely/late sown, saline soils and mixed cropping. During 2021-22, the all-time highest production of 11.75 MT was 13 percent higher than the one of 2020-21 year (10.21MT). Area under mustard in the current post-rainy (rabi) season has been reported at a record 9.4 million hectare (MH) which is 49% more than last five years' average sown area of 6.3 MH.

International Conference on Vegetable Oils (ICVO) 2023 at Hyderabad, India

Indian Council of Agricultural Research, ICAR-Indian Institute of Oilseeds Research (IIOR), and Indian Society of Oilseeds Research (ISOR) in collaboration other ICAR oilseed institutes and the societies engaged with vegetable oil research were jointly organized the International Conference on Vegetable Oils (ICVO) 2023 during January 17- 21, 2023 at Hyderabad, India. The conference was envisaged to be a convergent point for priority persuasion and provided a platform to deliberate on research strategies, infrastructure developmental needs, trade and value chain ecosystems, and policy perspective to promote increased vegetable oil production on short-, medium- and long-term basis at global as well as national levels. Several invited talks, plenary talks, contributory oral as well as poster presentations and technology exhibitions were organised during the International conference. Also, five satellite symposia dedicated to specific issues of major vegetable oil crops were held during the conference, including Satellite symposium on Rapeseed-mustard.

Inauguration of ICOV 2023

During satellite symposium on Rapeseed-mustard, Dr. PK Rai Director, ICAR-DRMR, Bharatpur, presented the current status and future development strategies in rapeseed-mustard for nutritional security. Dr. SR Bhat presented a talk on Pre-breeding for genetic enhancement of oilseed Brassica. Dr. Etienne Pilorgé, Terres Inovia, and Secretary GCIRC, France, made a presentation on integrated management to enhance productivity of rapeseed, through online mode. Dr. HC Sharma made presentation on new paradigms in insect-pest management in oilseed Brassica. Dr. Samantha Cook, Rothamsted Research, UK made a talk on IPM strategies for insect pests in European rapeseed, through online mode. Five presentations were made on different aspects by Drs. VV Singh, Pankaj Sharma, AK Sharma, RS Jat and H.K. Sharma, ICAR-DRMR. Symposium was chaired by Dr. Arvind Kumar, co-chaired by Dr. P.K. Rai and coordinated by Dr. Pankaj Sharma. Later a panel discussion was also held under chairmanship of Dr. S.R. Bhat.

Scientific news

Rapeseed research through a bibliometric study

An interesting bibliometric study on rapeseed research, showing the main countries making efforts on rapeseed, in which names of several GCIRC members appear, and many others that GCIRC would welcome with pleasure.

Zheng, Q., & Liu, K. (2022). Worldwide **rapeseed** *(Brassica napus L.)* **research**: A **bibliometric analysis** during 2011–2021. Oil Crop Science, 7(4), 157-165. https://doi.org/10.1016/j.ocsci.2022.11.004

Bioengineering to increase the yield of vegetable oil from plants

In November 2022, the ScienceDaily website (University of Singapore) reported results showing, in the laboratory, the possibility to increase the yield of oil production by a plant. This method is patent pending. Scientists have successfully bioengineered an important protein in plants to increase the yield of oil from their fruits and seeds -- a holy grail for the global agri-food industry. Their patent-pending method can increase oil content in seeds by 15 to 18 per cent, which is a significant improvement that could be applied to numerous oilseeds. This innovation can help the world in its quest for sustainability, helping to reduce the amount of arable land needed for oil-yielding crops while increasing the oil yield to meet the world's growing demand for vegetable oil.

Read more at https://www.sciencedaily.com/releases/2022/11/221109124301.htm and original article at https://doi.org/10.1126/sciadv.abq1211

Publications:

To the authors: we identify publications through research with 2 key words only: "rapeseed" and "canola". If a publication does not contain one of these two words, but for example only Brassica napus or terms implicitly linked to rapeseed/canola (for example names of diseases or insects or genes, etc.…), it will not be detected.

GENETICS & BREEDING

Orantes-Bonilla M, Makhoul M, Lee H, Chawla HS, Vollrath P, Langstroff A, Sedlazeck FJ, Zou J and Snowdon RJ (2022) Frequent spontaneous structural rearrangements promote rapid **genome diversification** in a *Brassica napus* F1 generation. *Front. Plant Sci.* 13:1057953. https://doi.org/10.3389/fpls.2022.1057953

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Upcoming international and national events

April 30-May 3, 2023, Denver, Colorado/USA: AOCS Annual Meeting and Expo
https://annualmeeting.aocs.org/program-session-topics

2023 AOCS Annual Meeting & Expo

April 30–May 3, 2023, Colorado Convention Center, Denver, Colorado, USA

22-23 May 2023, Wageningen, The Netherlands: 3rd International Conference on Lipid Droplets & Oleosomes
https://lipiddropletsoleosomes.org/

2-5 July 2023, Nantes, France: 15th International Congress ISSFAL International Society for the study of Fatty Acids and Lipids
https://www.issfalcongress.com/

3-7 July 2023, Paris, France: biennial International Society for Seed Science (ISSS) Conference. https://isss2023.sciencesconf.org/

17-20 September, 2023, Poznan, Poland: 19th Euro Fed Lipid Congress and Expo
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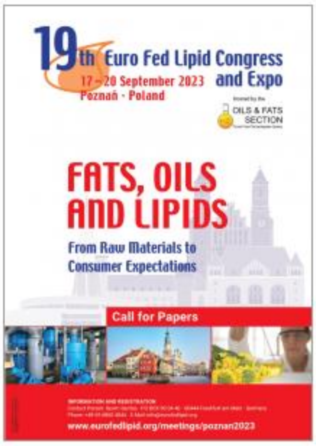

24-27 September, 2023: 16th International Rapeseed Congress, Sydney, Australia
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