Sunday Evening News No. 99

Week 42 (2018-10-15 / 10-21)

Selected and edited by ***BGF*** Jany

Dear all,

here again my subjective selection of press releases and publications.

Certainly. you remember the much-publicized transparency offensive by the EU Commission for the safety assessment of plant protection products and GM crops by the EFSA!
Michalopoulos S.**: New food transparency rules risk falling victim to EU institution spat**
The future of new proposed rules on food transparency is unclear, as the European Parliament and the Commission disagree on the timeframe to move the discussion forward.
https://www.euractiv.com/section/agriculture-food/news/new-food-transparency-rules-risk-falling-victim-to-eu-institution-spat/
Please have also a look at: https://www.biotech-gm-food.com/aktuelles/transparenz-risikobewertung-efsa

Ukraine open for business: **SOYBEAN HARVEST IN UKRAINE COULD BE 4.2 M LN TONNES IN 2018 – DONAU SOJA**
According to Tymchenko, soybean export is complicated by the logistics problems of Ukrzaliznytsia. Prosolenko also said that although officially the cultivation of genetically modified soybeans in Ukraine is not allowed and does not officially exist, but in fact, 60-70% of soybeans are modified. It also complicates exports, the expert said.
https://open4business.com.ua/soybean-harvest-in-ukraine-could-be-4-2-mln-tonnes-in-2018-donau-soja/
so far gm-free soybeans “Donau-Sojabohnen”

Calyxt: **First ever gene-edited wheat that produces high fiber flour could hit the market by 2020**
https://geneticliteracyproject.org/2018/10/15/first-ever-gene-edited-wheat-that-produces-high-fiber-flour-could-hit-the-market-by-2020/
and
http://www.calyxt.com/calyxt-harvests-high-fiber-wheat-field-trials/

NEUN-PUNKTE-PLAN GEGEN DAS INSEKTENSTERBEN –DIE PERSPEKTIVE DER WISSENSCHAFT
https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjjy7S89pXeAhX4wAIHHQlmDKAQFjAAegQICBAC&url=https%3A%2F%2Fcache.pressmailing.net%2Fcontent%2F5460762e-6b68-46dd-abfe-98c47f803df9%2F9-Punkte%2520Plan%2520gegen%2520das%2520Insektensterben.pdf&usg=AOvVaw3umkcGvcMbAvF95vMPzMZl

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Crispr/Cas

McEwan G.: **CRISPR ruling "will hit Europe's smaller breeders"**
A recent change in EU law will restrict European crop breeders' use a gene-editing technique called CRISPR-Cas which can speed up varietal development, it has been claimed.
https://www.hortweek.com/crispr-ruling-will-hit-europes-smaller-breeders/fresh-produce/article/1496734

Matz M.: **Opinion: The EU Gene-Editing Decision: Parliament Should not let it Stand**
The European Union Court of Justice’s (ECJ) recent decision that new gene-editing techniques must go through the same lengthy approval process as traditional transgenic genetically modified (GM) plants has sent shock waves around the world and its greatest impact will be on those who are hungry and food insecure.
https://www.agri-pulse.com/articles/11547-opinion-the-eu-gene-editing-decision-parliament-should-not-let-it-stand

Miller H., Cohrssen J.: **Viewpoint: It’s time to replace our fear-based genetic engineering regulations**
https://geneticliteracyproject.org/2018/10/17/viewpoint-its-time-to-replace-our-fear-based-genetic-engineering-regulations/

Philip Banse: **Noch nicht bereit für CRISPR**
Ende Juli hat der Europäische Gerichtshof entschieden: Pflanzen, deren Erbgut mit dem neuen Gentechnik-Werkzeug „CRISPR/Cas“ modifiziert wurde, gelten als gentechnisch verändert. Die Frage nach der Kontrolle solcher Lebensmittel bringt das Bundeslandwirtschaftsministerium allerdings immer noch in Verlegenheit.
https://www.deutschlandfunk.de/gentechnik-noch-nicht-bereit-fuer-crispr.697.de.html?dram:article_id=430854

Ensser: **Einseitige Angriffe und eine voreingenommene Berichterstattung zum EuGH Urteil über neue Gentechnikmethoden entlarven ein anmaßendes und unaufgeklärtes Wissenschafts- Demokratie- und Rechtsverständnis**
https://ensser.org/publications/publications_2018/einseitige-angriffe-und-eine-voreingenommene-berichterstattung-zum-eugh-urteil-uber-neue-gentechnikmethoden-entlarven-ein-anmassendes-und-unaufgeklartes-wissenschafts-demokratie-und-rechtsverstandni/

As always you will find the weekly overview of the press releases at: https://www.biotech-gm-food.com/presse

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Publications

Crispr/Cas – Genome editing

Hucho F., Diekämper J., Fangerau H., Fehse B., Hampel J., Köchy K., Könninger S., Marx-Stölting L., Müller-Röber B., Reich J., Schickl H., Taupitz J., Walter J., Zenke M., Korte M. (Sprecher) (Hrsg.): **Vierter Gentechnologiebericht. Bilanzierung einer Hochtechnologie.** Baden-Baden: Nomos. 1. Auflage 2018. ISBN print: 978-3-8487-5183-9, ISBN online: 978-3-8452-9379-0, DOI: 10.5771/9783845293790.
https://www.nomos-elibrary.de/10.5771/9783845293790/vierter-gentechnologiebericht.
Eine Kurzfassung des Berichts finden Sie hier:
http://www.gentechnologiebericht.de/bilder/BBAW_Broschure-Inhalt_IV-Gentochnologiebericht_PDFA-1b.pdf

Eriksson, D. (2018): **The evolving EU regulatory framework for precision breeding.** Theor Appl Genet; https://doi.org/10.1007/s00122-018-3200-9
Plant breeding has always relied on progress in various scientific disciplines to generate and enable access to genetic variation. Until the 1970s, available techniques generated mostly random genetic alterations that were subject to a selection procedure in the plant material. Recombinant nucleic acid technology, however, started a new era of targeted genetic alterations, or precision breeding, enabling a much more targeted approach to trait management. More recently, developments in genome editing are now providing yet more control by enabling alterations at exact locations in the genome. The potential of recombinant nucleic acid technology fueled discussions about potentially new associated risks and, starting in the late 1980s, biosafety legislation for genetically modified organisms (GMOs) has developed in the European Union. However, the last decade has witnessed a lot of discussions as to whether or not genome editing and other precision breeding techniques should be encompassed by the EU GMO legislation. A recent ruling from the Court of Justice of the European Union indicated that directed mutagenesis techniques should be subject to the provisions of the GMO Directive, essentially putting many precision breeding techniques in the same regulatory basket. This review outlines the evolving EU regulatory framework for GMOs and discusses some potential routes that the EU may take for the regulation of precision breeding.
https://link.springer.com/content/pdf/10.1007%2Fs00122-018-3200-9.pdf
http://www.ask-force.org/web/Genomics/Eriksson-Evolving-EU-regulatory-framework-precision-breeding-2018.pdf

Eriksson, D. (2018): **Recovering the Original Intentions of Risk Assessment and Management of Genetically Modified Organisms in the European Union.** Front. Bioeng. Biotechnol.| https://doi.org/10.3389/fbioe.2018.00052
https://www.frontiersin.org/articles/10.3389/fbioe.2018.00052/full
http://www.ask-force.org/web/Regulation/Eriksson-Recovering-Original-Intentions-Risk-Assessment-2018.pdf

Eriksson, D., de Andrade, E., Bohanec, B., Chatzopolou, S., Defez, R., Eriksson, N. L., van der Meer, P., van der Meulen, B., Ritala, A., Sagi, L., Schiemann, J., Twardowski, T. and Vanek, T. (2018): **Why the European Union needs a national GMO opt-in mechanism** Nature Biotechnology 36 (1), 18-19
https://www.nature.com/articles/nbt.4051
http://www.ask-force.org/web/Regulation/Eriksson-Why-European-Union-needs-national%20GMO-opt-in-mechanism-2018.pdf
and
Should GM crops be grown in the EU? Let the countries decide for themselves
https://www.slu.se/en/ew-news/2018/1/should-gm-crops-be-grown-in-the-eu-let-the-countries-decide-for-themselves/

Emons H., Broothaerts W., Bonfini L., Corbisier P., Gatto F., Jacchia S., Mazzara M., Savini C., **Challenges for the detection of genetically modified food or feed originating from genome editing**, EUR 29391 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-96398-8, doi:10.2760/732526.
In the absence of prior knowledge on the genome-edited changes, it is likely that nonauthorized genetically modified food and feed products obtained by genome editing would enter the EU market undetected. The EU control system for GMOs and corresponding food and feed products may not function as efficiently for unauthorised genome-edited products compared to transgenic GMOs. In particular, the principle of zero tolerance for unauthorised GMO on the EU market is more difficult to maintain.
Not yet public available

For reminder:
Wayne P. (2018): **Outlaws, old laws & no laws: the prospects of gene editing for agriculture in the USA.** Physiologia Plantarum,
https://onlinelibrary.wiley.com/doi/pdf/10.1111/ppl.12756
http://www.ask-force.org/web/Regulation/Parrott-Outlaws-Oldlaws-Nolaws-2018.pdf

BVL (2017): **Opinion on the legal classification of New Plant Breeding Techniques, in particular ODM and CRISPR-Cas9.**
http://www.ask-force.org/web/Genomics/BVL-Opinion-on-the-legal-classification-of-New-Plant-Breeding-Techniques-20170228.pdf
However, this opinion is still right but no longer valid, due to the CJEU-ruling from August 25, 2018

Koltun A., Erpen-Dalla Corte L.,Mertz-Henning L.M., Gonçalves L.SA.(2018): **Genetic improvement of horticultural crops mediated by CRISPR/Cas: a new horizon of possibilities.** Hortic. Bras..36 no.3, http://dx.doi.org/10.1590/s0102-053620180302
The burden of the current global challenge involving food security lies in the need to improve crop production. In this regard, biotechnology stands out as an essential tool to generate plants able to cope with pests, diseases, and harsh climatic conditions, and more efficient in the use of natural resources. An advanced approach to create genetic variability in a precise and targeted way, the genome-editing technique CRISPR/Cas (clustered regularly interspaced short palindromic repeats/CRISPR associated proteins), has drawn the attention of breeders. The genome editing CRISPR/Cas system relies on a guiding RNA that directs a nuclease to generate a double-strand break (DSB) at a target DNA, activating the cell repair systems and eventually leading to deletions or insertions of nucleotides. Therefore, CRISPR/Cas is a toolbox to achieve many goals, from basic science investigations to the development of crops with improved agronomic traits, with potential to bring innovative solutions to food production. The CRISPR/Cas system has been applied in a large number of plants, including some horticultural species. In this review, we present details of the CRISPR/Cas natural and artificial systems, its possibilities as a biotechnological tool, advantages over other breeding techniques, regulatory issues, and its applicability in horticultural crops, as well as future challenges.
http://www.scielo.br/pdf/hb/v36n3/0102-0536-hb-36-03-290.pdf

Enebe, M.C. & Babalola, O.O. (2018): **The impact of microbes in the orchestration of plants' resistance to biotic stress: a disease management approach**. Appl Microbiol Biotechnol (2018). https://doi.org/10.1007/s00253-018-9433-3
The struggle for survival is a natural and a continuous process. Microbes are struggling to survive by depending on plants for their nutrition while plants on the other hand are resisting the attack of microbes in order to survive. This interaction is a tug of war and the knowledge of microbe-plant relationship will enable farmers/agriculturists improve crop health, yield, sustain regular food supply, and minimize the use of agrochemicals such as fungicides and pesticides in the fight against plant pathogens. Although, these chemicals are capable of inhibiting pathogens, they also constitute an environmental hazard. However, certain microbes known as plant growth-promoting microbes (PGPM) aid in the sensitization and priming of the plant immune defense arsenal for it to conquer invading pathogens. PGPM perform this function by the production of elicitors such as volatile organic compounds, antimicrobials, and/or through competition. These elicitors are capable of inducing the expression of pathogenesis-related genes in plants through induced systemic resistance or acquired systemic resistance channels. This review discusses the current findings on the influence and participation of microbes in plants' resistance to biotic stress and to suggest integrative approach as a better practice in disease management and control for the achievement of sustainable environment, agriculture, and increasing food production.
https://link.springer.com/content/pdf/10.1007%2Fs00253-018-9433-3.pdf

Li Z. et al. (2019): **Responses of soil enzymatic activities to transgenic Bacillus thuringiensis (Bt) crops - A global meta-analysis**. Science of the Total Environment 651 (2019) 1830–1838; https://doi.org/10.1016/j.scitotenv.2018.10.073
Transgenic Bacillus thuringiensis (Bt) crops have beenwidely planted, and the resulting environmental risks have attracted extensive attention. To foresee the impacts of Bt crops on soil quality, it is essential to

understand how Bt crops alter the soil enzymatic activities andwhat the important influencing factors are.We compiled data from 41 published papers that studied soil enzymatic activitieswith Bt crops and their non-Bt counterparts. The results showed that dehydrogenase and urease significantly increased, but neutral phosphatase significantly decreased under Bt crop cultivationswithout Bt residues incorporation. The activities of dehydrogenase, β-glucosidase, urease, nitrate reductase, alkaline phosphatase, and aryl sulfatase significantly increased under Bt crop cultivation with Bt residues incorporation. The response ratios of other enzymes were not significantly changed. Generally, the response ratios of soil enzymeswere greaterwith Bt residues incorporation than those of Bt crop cultivations without Bt residues incorporation. Further, the response ratios of soil enzymes varied with Bt crop types and growth periods. It was the strongest under Bt cotton among Bt crops, and the significant responses usually appeared in the middle growth stages. The responses of soil enzymes ascribed more to the properties of Bt crops than to soil properties across sites. Given - significant responses of some soil enzymes to Bt crops, we recommended that soil environmental risks should be carefully evaluated over the transgenic crops.
https://www.sciencedirect.com/science/article/pii/S0048969718339469 pdf-file available

Shukla S.P. et al. (2018): **Microbiome-assisted carrion preservation aids larval development in a burying beetle.** *PNAS* (2018). www.pnas.org/cgi/doi/10.1073/pnas.1812808115
The ability to feed on a wide range of diets has enabled insects to diversify and colonize specialized niches. Carrion, for example, is highly susceptible to microbial decomposers, but is kept palatable several days after an animal's death by carrion-feeding insects. Here we show that the burying beetle *Nicrophorus vespilloides* preserves carrion by preventing the microbial succession associated with carrion decomposition, thus ensuring a high-quality resource for their developing larvae. Beetle-tended carcasses showed no signs of degradation and hosted a microbial community containing the beetles' gut microbiota, including the yeast *Yarrowia*. In contrast, untended carcasses showed visual and olfactory signs of putrefaction, and their microbial community consisted of endogenous and soil-originating microbial decomposers. This regulation of the carcass' bacterial and fungal community and transcriptomic profile was associated with lower concentrations of putrescine and cadaverine (toxic polyamines associated with carcass putrefaction) and altered levels of proteases, lipases, and free amino acids. Beetle-tended carcasses develop a biofilm-like matrix housing the yeast, which, when experimentally removed, leads to reduced larval growth. Thus, tended carcasses hosted a mutualistic microbial community that promotes optimal larval development, likely through symbiont-mediated extraintestinal digestion and detoxification of carrion nutrients. The adaptive preservation of carrion coordinated by the beetles and their symbionts demonstrates a specialized resource-management strategy through which insects modify their habitats to enhance fitness.
http://www.pnas.org/content/early/2018/10/09/1812808115

Max Planck Society
How beetle larvae thrive on carrion
https://phys.org/news/2018-10-beetle-larvae-carrion.html#jCp

Atkinson F.S., Hancock D., Petocz P., Brand-Miller J.C. (2018): **The physiologic and phenotypic significance of variation in human amylase gene copy number.** *The American Journal of Clinical Nutrition*, 108 (4), 737–748, https://doi.org/10.1093/ajcn/nqy164
Background: Salivary α-amylase gene (*AMY1*) copy number (CN) correlates with the amount of salivary α-amylase, but beyond this, the physiologic significance is uncertain.
Objective: We hypothesized that individuals with higher *AMY1* CN would digest starchy foods faster and show higher postprandial responses and lower breath hydrogen excretion compared with those with low CN.
Design: Four linked studies were conducted. In Study 1, we genotyped 201 healthy subjects with the use of real-time quantitative polymerase chain reaction and determined glucose tolerance, insulin sensitivity, salivary α-amylase activity, body mass index (BMI), and macronutrient intake. In Study 2, a pool of 114 subjects tested 6 starchy foods, 3 sugary foods, 1 mixed meal, and 2 reference glucose solutions, containing either 50 or 25 g of available carbohydrate. In Study 3, we compared glycemic and insulin responses to starchy foods with responses to glucose in 40 individuals at extremes of high and low CN. In Study 4, we compared breath hydrogen and methane responses over 8 h in 30 individuals at extremes of CN.
Results: *AMY1* CN correlated positively with salivary α-amylase activity ($r = 0.62$, $P < 0.0001$, $n = 201$) but not with BMI, glucose tolerance, or insulin sensitivity. However, CN was strongly correlated with normalized glycemic responses to all starchy foods (explaining 26–61% of interindividual variation), but not to sucrose or fruit. Individuals in the highest compared with the lowest decile of CN produced modestly higher glycemia (+15%, $P = 0.018$), but not insulinemia, after consuming 2 starchy foods. Low-CN individuals displayed >6-fold higher breath methane levels in the fasting state and after starch ingestion than high-CN individuals ($P = 0.001$), whereas hydrogen excretion was similar.
Conclusions: Starchy foods are digested faster and produce higher postprandial glycemia in individuals with high *AMY1* CN. In contrast, having low CN is associated with colonic methane production. This trial was registered at www.anzctr.org.au as ACTRN12617000670370.
https://academic.oup.com/ajcn/article-abstract/108/4/737/5100310?redirectedFrom=fulltext

University of Sydney
Did eating starchy foods give humans an evolutionary advantage?
https://phys.org/news/2018-10-starchy-foods-humans-evolutionary-advantage.html#jCp

Whitworth K.M. et al. (2018): **Resistance to coronavirus infection in amino peptidase N-deficient pigs**. *Transgenic Research*, 2018; DOI: 10.1007/s11248-018-0100-3

The alphacoronaviruses, transmissible gastroenteritis virus (TGEV) and Porcine epidemic diarrhea virus (PEDV) are sources of high morbidity and mortality in neonatal pigs, a consequence of dehydration caused by the infection and necrosis of enterocytes. The biological relevance of amino peptidase N (ANPEP) as a putative receptor for TGEV and PEDV in pigs was evaluated by using CRISPR/Cas9 to edit exon 2 of ANPEP resulting in a premature stop codon. Knockout pigs possessing the null ANPEP phenotype and age matched wild type pigs were challenged with either PEDV or TGEV. Fecal swabs were collected daily from each animal beginning 1 day prior to challenge with PEDV until the termination of the study. The presence of virus nucleic acid was determined by PCR. ANPEP null pigs did not support infection with TGEV, but retained susceptibility to infection with PEDV. Immunohistochemistry confirmed the presence of PEDV reactivity and absence of TGEV reactivity in the enterocytes lining the ileum in ANPEP null pigs. The different receptor requirements for TGEV and PEDV have important implications in the development of new genetic tools for the control of enteric disease in pigs.
https://link.springer.com/content/pdf/10.1007%2Fs11248-018-0100-3.pdf

Austin Fitzgerald, University of Missouri-Columbia
Researchers produce virus-resistant pigs, could vastly improve global animal health
https://phys.org/news/2018-10-virus-resistant-pigs-vastly-global-animal.html#jCp

Meetings

EUSynBios Symosium
Toulouse, October 22-23
https://biosynsys2018.sciencesconf.org/data/pages/Program.pdf
Program with abstracts

Save the date
Genome Editing with Crispr/Cas
04.09. – 06.09.2019 Berlin

Wie immer wird für Hinweise und der Zusendung von Publikationen und sonstigen Informationen gedankt. pdf-Dateien können meist direkt aus den links heruntergeladen werden.

Bitte besuchen sie auch die Webseite des Wissenschaftlerkreis Grüne Gentechnik e.V. (WGG): www.wgg-ev.de . Hier finden Sie weitere interessante Informationen.

*As always, I thank you all for hints and for publications. M*ost of the pdf files can be downloaded directly from the links.

Klaus-Dieter Jany
Nelkenstrasse 36
D-76351 Linkenheim-Hochstetten
jany@biotech-gm-food.com

1. Vorsitzender des WGG e.V.
Postfach 120721
D-60114 Frankfurt/Main
kd.jany@wgg-ev.de