Sunday Evening News

Week 12 (2018-03-19 / 03-25)

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

Sehr geehrte Kollegen und Kolleginnen, liebe Freunde und Mitstreiter,

diese Woche hatten wir in den Medien zwei Topthemen:

1. Bier hergestellt mit CRISPR/Cas modifizierter Hefe – Kein Hopfen ist mehr notwendig
2. Die EU-Kommission genehmigt unter Auflagen den Kauf von Monsanto durch Bayer
3. Fleisch von geklonten Tieren ist koscher

Dear all,

this week we had two top topics in the media:

1. Beer made with CRISPR / Cas modified yeast - No hops are needed anymore
2. The EU Commission approves the purchase of Monsanto by Bayer, subject to conditions
3. Meat from cloned animals is kosher

Bier / Beer

Roos D**. Brewing Craft Beer With CRISPR, Not Hops**
By eliminating hops, brewers can make a more sustainable product. But are consumers ready for bioengineered beer?
https://www.seeker.com/biotech/brewing-craft-beer-with-crispr-not-hops

Bardi J. - Inside Science: **GMO IPA? Genetically engineered yeast could provide environmentally friendly alternative to hops**
https://geneticliteracyproject.org/2018/03/22/gmo-ipa-genetically-engineered-yeast-could-provide-environmentally-friendly-alternative-to-hops/

Spiegel: **Wie gut schmeckt Gen-Bier**
Kein Bier ohne Hopfen, sagt das deutsche Reinheitsgebot. Doch Forscher haben den wichtigen Aromastoff gentechnisch ersetzt - und prahlen mit dem extra-herben Geschmack.
http://www.spiegel.de/wissenschaft/natur/wie-gen-bier-ohne-hopfen-schmeckt-a-1199010.html

und die dazu gehörende Publikation – and the corresponding publication

Denby C. M. et al. (2018): **Industrial brewing yeast engineered for the production of primary flavor determinants in hopped beer**. NATURE COMMUNICATIONS 9:965, DOI: 10.1038/s41467-018-03293-x
Flowers of the hop plant provide both bitterness and “hoppy” flavor to beer. Hops are, however, both a water and energy intensive crop and vary considerably in essential oil content, making it challenging to achieve a consistent hoppy taste in beer. Here, we report that brewer’s yeast can be engineered to biosynthesize aromatic monoterpene molecules that impart hoppy flavor to beer by incorporating recombinant DNA derived from yeast, mint, and basil. Whereas metabolic engineering of biosynthetic pathways is commonly enlisted to maximize product titers, tuning expression of pathway enzymes to affect target production levels of multiple commercially important metabolites without major collateral metabolic changes represents a unique challenge. By applying state-of-the-art engineering techniques and a framework to guide iterative improvement, strains are generated with target performance characteristics. Beers produced using these strains are perceived as hoppier than traditionally hopped beers by a sensory panel in a double-blind tasting
https://www.nature.com/articles/s41467-018-03293-x.pdf

Zur Erinnerung: In Deutschland dürfte so ein „Bier“ nicht unter der Bezeichnung „Bier“ verkauft werden. In der EU benötigt ein solches Bier eine Zulassung nach Gentechnik-Recht und hier würde die Frage auftauchen „Bier hergestellt mit gv-Hefe” oder Bier hergestellt von gv-Hefe“

As a reminder: In Germany, such a "beer" is not allowed to be sold under the name "beer". In the EU, such a beer requires an approval under GMO law and here the question would arise "Beer produced with GM yeast" or ”beer produced by GM yeast "

Monsanto - Bayer:

European Commission Clears Bayer's Acquisition of Monsanto (MON), Subject to Conditions

https://www.streetinsider.com/Corporate+News/European+Commission+Clears+Bayers+Acquisition+of+Monsanto+%28MON%29%2C+Subject+to+Conditions/13967999.html

Kessler M.: **Landwirte als Gefangene von "Baysanto"**
Bayer und Monsanto wollen den Marktführer für Welternährung bilden. Doch für die Landwirte, die sich in den Fängen von "Baysanto" befinden, ist es ein schlechtes Geschäft.
http://www.rp-online.de/wirtschaft/wirtschaftskolumnen/der-oekonom/landwirte-als-gefangene-von-baysanto-aid-1.7475463

Kosher-Fleisch – Cloned meat is kosher

Rabbi: Genetically cloned pig meat is kosher, even with milk
"It wouldn't even be meat, so you can consume it with dairy," said the rabbi.
http://www.jpost.com/OMG/Rabbi-Genetically-cloned-pig-meat-could-be-eaten-by-Jews-even-with-milk-546808

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Burrows D. – Food Navigator: **Can organic food capitalise on flagging confidence in the food industry?**
Since the horsemeat scandal of 2013 there has been a steady stream of food scares and scandals, which has played neatly into the hands of organic food. Sales were up more than 11% in Europe at the last count, but is the sector making the most of growing mistrust?
https://www.foodnavigator.com/Article/2018/03/21/Can-organic-food-capitalise-on-flagging-confidence-in-the-food-industry

Folger T.
The Next Green Revolution
https://www.nationalgeographic.com/foodfeatures/green-revolution/?sf185047464=1
and
Folger T. - National Geographic
Viewpoint: Green Revolution II will require GMOs and a paradigm shift toward lower-input farming
https://geneticliteracyproject.org/2018/03/22/viewpoint-green-revolution-ii-will-require-gmos-and-a-paradigm-shift-toward-lower-input-farming/

Chris Sworder C. - Cleantech Group: **How will government regulations impact CRISPR gene editing in agriculture?**
https://geneticliteracyproject.org/2018/03/20/how-will-government-regulations-impact-crispr-gene-editing-in-agriculture/
and
Gene editing in agriculture & food: Accelerating the second green revolution
https://www.cleantech.com/gene-editing-in-agriculture-food-accelerating-the-second-green-revolution/

CAST-Issue Paper 59, March 2018 **Regulatory Barriers to the Development of Innovative Agricultural Biotechnology by Small Businesses and Universities.**
The scientific community is overwhelmingly positive about biotech plant breeding and the benefits for farmers, consumers, and the environment. But the authors of this paper demonstrate that the current process-based U.S. biotechnology regulatory system is a barrier to such agricultural innovation. The regulatory system needs to be adjusted, or "public, academic, and small business entities will continue to be frustrated in using these safe tools to deliver useful products."
This report examines the current U.S. regulatory system for genetically engineered (GE) crops, compares it with those of major trading partners, and considers the effects it has on agricultural biotechnology. In theory, scientifically sound regulations serve the public good by assuring safety while not stifling innovation. But current regulations are sometimes based on spurious, undocumented risks--onerous, expensive regulations discourage innovation, especially in small businesses and universities.
http://www.cast-science.org/file.cfm/media/products/digitalproducts/CAST_IP59_Biotech_Regs_CCE3A1D779985.pdf

Tagliabue G. and Ammann K. (2018): **Some Basis for a Renewed Regulation of Agri-Food Biotechnology in the EU.** J Agric Environ Ethics; https://doi.org/10.1007/s10806-018-9708-9
A radical reform of the agri-food biotech regulation in the EU is considered in many quarters (mostly by academia and industry) as a pressing necessity. Indeed, two important decisions (by the European Court of Justice and by the Commission) on the legal status of the so-called New Breeding Techniques are expected shortly. In order to clarify some basic aspects of the complex scenario, after a brief introduction regarding the

''GMO'' fallacy, we offer our point of view on the following facets: (1) A faulty approach is frequent in the discussion of the agri-food regulation; (2) NBTs, genome editing may lead to the disappearance of the ''GMO'' meme; (3) Beyond health and safety issues: socio-economic considerations; (4) Sustainability: the comprehensive, meaningful starting point of a positive reform; (5) The theoretical and legal basis for the reform are already contained in the EU's general guidelines to legislation
www.ask-force.org/web/Regulation/Tagliabue-Ammann-Some-Basis-Renewed-Regulation-Agri-Food-Biotech-EU-2018.pdf

Zetterberg C. and Bjornberg K. E. (2017): **Time for a New EU Regulatory Framework for GM Crops?** Agric Environ Ethics 30:325–347; DOI 10.1007/s10806-017-9664-9
In recent years, the EU legislation on genetically modified (GM) crops has come under severe criticism. Among the arguments are that the present legislation is inconsistent, disproportionate, obsolete from a scientific point of view, and vague in terms of its scope. In this paper, the EU GM legislation (mainly the ''Release Directive'', 2001/18/EC) is analysed based on five proposed criteria: legal certainty, non-discrimination, proportionality, scientific adaptability, and inclusion of non-safety considerations. It is argued that the European regulatory framework does not at present satisfy the criteria of legal certainty, non-discrimination, and scientific adaptability. Two ways of reforming the present legislation toward greater accommodation of the values expressed through the proposed criteria are briefly introduced and discussed.
https://link.springer.com/content/pdf/10.1007%2Fs10806-017-9664-9.pdf

ISAAA: **Substantial Equivalence of GM**
One of the primary requirements in commercializing a genetically modified (GM) crop is the proof of its substantial equivalence with its non-GM counterpart. In other words, substantial equivalence means that a new product such as a GM crop must be the same as the non-GM crop except for the traits that were enhanced, added, or removed through genetic engineering.
http://www.isaaa.org/resources/publications/pocketk/56/default.asp

Kalaitzandonakes N., Lusk J., Magnier, A. (2018): **The price of non-genetically modified (non-GM) food.** Food Policy: https://doi.org/10.1016/j.foodpol.2018.02.005
Highlights: Added costs for non-GM ingredients and changes in demand for non-GM foods determine non-GM price premiums.
Non-GM price premiums were stable over the 8 year period of analysis.
US Consumers have been paying price premiums of 10–62% for the non-GM products analyzed.
The cost of mandatory labeling of GM foods depends on manufacturer decisions.
If food manufacturers reformulate with non-GM ingredients, costs to consumers could be substantial.
https://www.sciencedirect.com/science/article/pii/S0306919218301131

Butkowski, O. K., Pakseresht, A., Lagerkvist, C. J. and Bröring, S. (2017): **Debunking the myth of general consumer rejection of green genetic engineering: Empirical evidence from Germany.** International Journal of Consumer Studies 41 (6), 723-734
The emergence of a more sustainable economy in Europe was accompanied by a range of bio-based products and technologies. As a prominent example, green genetic engineering opens up multiple options to increase agricultural production, but its public acceptance seems to vary by application area. Risk perception explains consumer acceptance of green genetic engineering, which is a necessary precondition for wider technology adoption. This study investigates risk perceptions for four major sources of risk: health related, environmental, socioeconomic and ethical. Data were collected in a laboratory experiment in Germany, with a total of 439 participants. A between-subject design was employed. The four experimental treatment groups comprised two policy scenarios, namely one only permitting research and development and the other allowing full commercialization of genetically modified products, and two product end-uses, bioenergy and food. The study shows significant end-use differences in both the type of policy scenario and the risk dimension in question. In particular, health risks were generally perceived to be lower for bioenergy than food whenever full commercialization was pursued. Furthermore, full commercialization of genetically modified food prompted higher concerns about personal health, whereas use of crops for bioenergy production was broadly related to higher levels of socioeconomic risk. Finally, although the majority of consumers identified health risks as being most relevant, the consequences for the environment evoked the greatest degree of risk perception. In general, our findings lend support for the notion that the policy regime is the most important determinant for risk perception, followed by the type of risk dimension and level of trust in industry.
https://onlinelibrary.wiley.com/doi/abs/10.1111/ijcs.12385
http://www.ask-force.org/web/Discourse/Butkowski-Debunking-myth-general-consumer-rejection-green-biotech-Germany-2017.pdf

Herter, C.P. et al. (2018**): *Rht24* reduces height in the winter wheat population 'Solitär × Bussard' without adverse effects on Fusarium head blight infection.** Theor Appl Genet (2018). https://doi.org/10.1007/s00122-018-3076-8

The introduction of the *Reduced height* (*Rht*)-*B1* and *Rht-D1* semi-dwarfing genes led to remarkable increases in wheat yields during the Green Revolution. However, their utilization also brings about some unwanted characteristics, including the increased susceptibility to Fusarium head blight. Thus, *Rht* loci that hold the potential to reduce plant height in wheat without concomitantly increasing Fusarium head blight (FHB) susceptibility are urgently required. The biparental population 'Solitär × Bussard' fixed for the *Rht-1* wild-type alleles, but segregating for the recently described gibberellic acid (GA)-sensitive *Rht24* gene, was analyzed to identify quantitative trait loci (QTL) for FHB severity, plant height, and heading date and to evaluate the effect of the *Rht24* locus on these traits. The most prominent QTL was *Rht24* on chromosome 6A explaining 51% of genotypic variation for plant height and exerting an additive effect of − 4.80 cm. For FHB severity three QTL were detected, whereas five and six QTL were found for plant height and heading date, respectively. No FHB resistance QTL was co-localized with QTL for plant height. Unlike the *Rht-1* semi-dwarfing alleles, *Rht24b* did not significantly affect FHB severity. This demonstrates that the choice of semi-dwarfing genes used in plant breeding programs is of utmost consideration where resistance to FHB is an important breeding target.
https://link.springer.com/article/10.1007%2Fs00122-018-3076-8

Fears R., EASAC: **Assessing the Security Implications of Genome Editing Technology Report of an international workshop** Herrenhausen, Germany, 11-13 October 2017
http://www.interacademies.org/43251/Assessing-the-Security-Implications-of-Genome-Editing-Technology-Report-of-an-international-workshop

Li Y., Meijer D., Dicke M. & Gols R. (2018): **Oviposition preference of three lepidopteran species is not affected by previous aphid infestation in wild cabbage.** Entomological Society 1–10, 2018

Several studies have shown that pre-infestation with aphids can improve plant quality for herbivorous defence, signal-transduction pathways induced by aphids and caterpillars, respectively. However, in these studies caterpillars are introduced on the plants by the researcher, whereas in nature, the adult mother often chooses the food plants for her offspring. According to the preference–performance hypothesis adult females should choose oviposition sites that result in optimal performance and survival of their offspring. In this study, we investigated whether three lepidopteran species–Pieris brassicae (L.) (Pieridae), Plutella xylostella L. (Plutellidae) and Mamestra brassicae L. (Noctuidae)– prefer aphid-infested over clean plants. Adult females of the three species was given the choice between wild cabbage (Brassica oleracea L., Brassicaceae) plants infested with aphids, Brevicoryne brassicae (L.) (Hemiptera: Aphididae) for 3, 7, or 14 days vs. non-infested clean plants. Pieris brassicae females was also given the choice between plants dually infested with B. brassicae aphids and P. xylostella caterpillars when the order of infestation was varied. For oviposition, adult females of all three species did not discriminate between aphid-infested and clean plants, irrespective of the duration of aphid infestation. Also, P. brassicae females did not discriminate between sets of dually infested plants, irrespective of the order of infestation. Several mechanisms are discussed that could explain this lack of preference.
https://onlinelibrary.wiley.com/doi/pdf/10.1111/eea.12663

Ujvari B. et al. (2018): **Genetic diversity, inbreeding and cancer**, *Proceedings of the Royal Society B: Biological Sciences* 285: 20172589; http://dx.doi.org/10.1098/rspb.2017.2589

Genetic diversity is essential for adaptive capacities, providing organisms with the potential of successfully responding to intrinsic and extrinsic challenges. Although a clear reciprocal link between genetic diversity and resistance to parasites and pathogens has been established across taxa, the impact of loss of genetic diversity by inbreeding on the emergence and progression of non-communicable diseases, such as cancer, has been over-looked. Here we provide an overview of such associations and show thatlow genetic diversity and inbreeding associate with an increased risk of cancer in both humans and animals. Cancer being a multifaceted disease, loss of genetic diversity can directly (via accumulation of oncogenic homozygous mutations) and indirectly (via increased susceptibility to oncogenic pathogens) impact abnormal cell emergence and escape of immune surveillance. The observed link between reduced genetic diversity and cancer in wildlife may further imperil the long-term survival of numerous endangered species, highlighting the need to consider the impact of cancer in conservation biology. Finally, the somewhat incongruent data originating from human studies suggest that the association between genetic diversity and cancer development is multifactorial and may be tumour specific. Further studies are therefore crucial in order to elucidate the underpinnings of the interactions between genetic diversity, inbreeding and cancer.
http://rspb.royalsocietypublishing.org/content/royprsb/285/1875/20172589.full.pdf
and
Nicholas Payne N. – Deakin University
Inbred organisms are more likely to develop tumours

https://phys.org/news/2018-03-inbred-tumours.html#jCp

Kang, W., Bang-Berthelsen, C. H., Holm, A., Houben, A. J. S., Müller, A. H., Thymann, T., Pociot, F., Estivill, X. and Friedländer, M. R. (2017) **Survey of 800+ data sets from human tissue and body fluid reveals xenomiRs are likely artifacts.** RNA 23 (4), 433-445
http://rnajournal.cshlp.org/content/23/4/433
http://www.ask-force.org/web/Food/Kang-Survey-800-plus-data-sets-human-tissue-body-fluid-reveals-xenomicRs-likely-artifacts-2017.pdf
http://www.ask-force.org/web/Food/Kang-SuppTableLegends-2017.docx
http://www.ask-force.org/web/Food/Kang-Supplemental-Tables-2017.xlsx
http://www.ask-force.org/web/Food/Kang-Supplemental-Figures-2017.pdf

Kafadaroff Gérard (2018): **Transition écologique et glyphosate** AGRICULTURE ET NOUVELLES TECHNOLOGIES
https://www.agriculture-nt.com/transition-ecologique-glyphosate-gerard-kafadaroff/
http://www.ask-force.org/web/HerbizideTol/Kafadaroff-Transition-Ecologique-et-Glyphosate-20180313.pdf

Li Y.-X. et al. (2018): **Resistance to nonribosomal peptide antibiotics mediated by d-stereospecific peptidases.** Nature Chemical Biology 14, 381–387; doi:10.1038/s41589-018-0009-4
Nonribosomal peptide antibiotics, including polymyxin, vancomycin, and teixobactin, most of which contain d-amino acids, are highly effective against multidrug-resistant bacteria. However, overusing antibiotics while ignoring the risk of resistance arising has inexorably led to widespread emergence of resistant bacteria. Therefore, elucidation of the emerging mechanisms of resistance to nonribosomal peptide antibiotics is critical to their implementation. Here we describe a networking-associated genome-mining platform for linking biosynthetic building blocks to resistance components associated with biosynthetic gene clusters. By applying this approach to 5,585 complete bacterial genomes spanning the entire domain of bacteria, with subsequent chemical and enzymatic analyses, we demonstrate a mechanism of resistance toward nonribosomal peptide antibiotics that is based on hydrolytic cleavage by d-stereospecific peptidases. Our finding reveals both the widespread distribution and broad-spectrum resistance potential of d-stereospecific peptidases, providing a potential early indicator of antibiotic resistance to nonribosomal peptide antibiotics.
https://www.nature.com/articles/s41589-018-0009-4
and
Hong Kong University of Science and Technology
Scientists discern new bacterial resistance mechanism against peptide antibiotics
https://phys.org/news/2018-03-scientists-discern-bacterial-resistance-mechanism.html#jCp

Pali-Schöll, I. et al. (2018): **Allergenic and novel food proteins: State of the art and challenges in the allergenicity assessment.** Trends in Food Science & Technology: https://doi.org/10.1016/j.tifs.2018.03.007
In this review, we discuss alternative protein sources for human food consumption such as novel foods derived from other animal sources like insects. Before these novel foods can enter the market place, their safety for consumers should be demonstrated. We herein provide an overview of the legislative framework currently in place across Europe, the key elements required for allergenicity assessment of novel foods, the tools at disposal for allergenicity prediction and the most advanced technologies available for food allergen detection and characterization.
Effective characterization of potential protein-based allergenic hazards in novel food ingredients is essential to support effective risk assessment. Development of a cost-effective, validated tool box to allow improved hazard characterization for allergenicity risk assessment is needed. Although novel methodologies, such as mass spectrometry, have great potential for allergen characterization and allergen detection in different food contributing to reduce the risk for allergic consumers, some work is still required for method validation and the creation of protein sequence databases for proteomic analysis.
https://www.sciencedirect.com/science/article/abs/pii/S0924224417303722

EU-Commission: **The EU Food Fraud Network and the System for Administrative Assistance & Food Fraud** - Annual Report 2017
https://ec.europa.eu/food/sites/food/files/safety/docs/food-fraud_network_activity_report_2017.pdf

EFSA: **Frozen corn likely source of ongoing Listeria monocytogenes outbreak**
Frozen corn is the likely source of an outbreak of *Listeria monocytogenes* which has affected five EU Member States (Austria, Denmark, Finland, Sweden, and the United Kingdom) since 2015. This is the conclusion of a

rapid outbreak assessment published today by EFSA and the European Centre for Disease Prevention and Control (ECDC). As of 8 March 2018, 32 cases including six deaths had been reported.
https://www.efsa.europa.eu/en/press/news/180322?utm_source=EFSA+Newsletters&utm_campaign=2f0c9179a9-EMAIL_CAMPAIGN_2018_03_21&utm_medium=email&utm_term=0_7ea646dd1d-2f0c9179a9-59436449

Tagungen - Conferences

6th Plant Genomics and Gene Editing Congress: Europe
14th May, 2018 to 15th May, 2018, Rotterdam
https://cetaf.org/6th-plant-genomics-and-gene-editing-congress-europe
http://www.global-engage.com/event/plant-genomics/

"Conference – Future of Long-term Experiments in Agricultural Science", Rothamsted Research, Harpenden, Hertfordshire, UK.; 21-23 May 2018:

EPSO conference "Plant Biology Europe 2018 Conference (PBE2018)", Copenhagen, Denmark.18 – 21 June 2018:

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.

This file is saved at https://www.biotech-gm-food.com/sunday-evening-news/ as well as at https://www.wgg-ev.de/infos/wgg-nachrichten/

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