

READINGS -- FES/TOX 435/535 -- Spring Term 2023

NOTES

If you are working at home, you may need to use the Oregon State University VPN to access some of these articles – download [here](#)

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Date	Topic	➤ Reading
<p>Week 1</p> <p>Apr 3</p>	<p>Class organization, rationale, goals. Short review of biotech science and basic methods</p>	<ul style="list-style-type: none"> ➤ Genetic engineering techniques overview: Wikipedia (read up to “gene targeting” section) ➤ 11 things to know about GMOs 2016 ➤ Class “spirit”: Stop arguing over GMOs 2020 (argue over the specifics about them instead) ➤ GMO myths 2021 ➤ Health risks GMO crops? NAS 2022
<p>Apr 5</p>	<p>Crop domestication and green revolution</p>	<ul style="list-style-type: none"> ➤ Green Revolution - Curse or Blessing? - IFPRI 2002 ➤ Popped secret: The mysterious origin of corn – HHMI BioInteractive 2016 ➤ Borlaug and green revolution – BBC 2019 ➤ Are all crops we eat modified? NAS 2022 ➤ What fruits and vegetables looked like before we domesticated them (video) ➤ \$ impact of green revolution 2021
<p>Apr 7</p>	<p>Of wizards vs. prophets / Navigating the wild! tech infosystem</p>	<ul style="list-style-type: none"> ➤ How will we survive when the population hits 10 billion – Mann - TED 2018? ➤ GE salmon update - 2021 ➤ GMO salmon genetic engineering overviews ➤ Frankenfish Phobia – Egan NYT 2011 And response: ➤ Frankenfish Fatuity - Miller 2011 ➤ Online disinformation on GMO 2020 (SciPod podcast, 10 min) and source article (read abstract only)
<p>Week 2</p>	<p>Plant genetic engineering: methods and status</p>	<ul style="list-style-type: none"> ➤ Agrobacterium gene insertion – You Tube 2008 (short video)

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Apr 10		<ul style="list-style-type: none"> ➤ Insecticidal Plants: Tech and Safety – Harvard 2015 ➤ Pest resistance to GE crops 2020 ➤ Summary of genetically engineered crops: experiences and prospects – The National Academies of Sciences 2016 (executive summary only, pdf pages 24-26)
Apr 12	New biotech methods: RNAi/HIGS	<ul style="list-style-type: none"> ➤ Robert Krulwich RNAi video (view up to 9:40 only) ➤ Innate potato (web site and infographics), and view three FAQs of choice
Apr 14	CRISPR / Diversity of genetic modification methods	<ul style="list-style-type: none"> ➤ CRISPR/Cas9 video ➤ Gene edited soy oil 2019 ➤ Gene edited crop overview 2023 – read only Exec summary, Figs 1 & 2, Box 1, Table 1 ➤ History of agricultural biotechnology: how crop development has evolved - Nature Education 2012 ➤ Key events in history of biotechnology 2017 (peruse) ➤ Rapid crop breeding – Nature Biotech 2019 (study all figures, and the first two and the last two paragraphs)
Week 3 Apr 17	Biofortification	<ul style="list-style-type: none"> ➤ Sweet potato overview - 2020 ➤ Cassava multiple biofortification - 2021 ➤ Biofortified yum – pink pineapples 2021 ➤ Allow Golden Rice to Save Lives – PNAS 2021
Apr 19	Gene flow and herbicide tolerant crops	<ul style="list-style-type: none"> ➤ Bunharo et al. 2022 (abstract, future + conclusions sections, figures/tables, only) ➤ No till and herbicide tolerant crops – GLP 2020 ➤ New superweeds seen in Georgia – NPR 2019 ➤ Carbon cost of avoiding GMOs - 2021 ➤ Spread of GM-Rice – ScienceMag 2006

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		<ul style="list-style-type: none"> ➤ The impact of asynchronous approvals for biotech crops on agricultural sustainability, trade and innovation – CAST 2016 (read pages 2-3 “The Issue” and page 8 “Conclusion”)
Apr 21	Creeping bentgrass and other glyphosate-resistant lawngresses – a GMO disaster?	<ul style="list-style-type: none"> ➤ GMO grass is creeping across Oregon – High Country News 2018 ➤ Scotts progress in bentgrass control – Capitol Press 2017 ➤ Commercial glyphosate tolerant grass: <ul style="list-style-type: none"> ○ Biology from Scotts 2021 ○ Product sheet: Provista GMO low-mow and herbicide resistant grasses (peruse only)
Week 4 Apr 24	Toxicology introduction / Risk assessment of pesticides	<ul style="list-style-type: none"> ➤ NIH Toxicology Tutor: Introduction to Toxicology ➤ Pesticide Risk Assessment overview 2017 ➤ Interpreting Pesticide Residues in Food CAST 2019 ➤ Risk Assessment for Pesticides Purdue University (peruse all, read pages 1-11)
Apr 26	The glyphosate/Roundup controversy	<ul style="list-style-type: none"> ➤ Glyphosate controversy 2022 ➤ EPA glyphosate web site - 2020 ➤ IARC and risk communication – Atlantic 2016 ➤ Glyphosate Use and Cancer Incidence in the Agricultural Health Study - May 2018 (read abstract) ➤ Bayer wins two Roundup lawsuits 2021
Apr 28	Risk perception	<ul style="list-style-type: none"> ➤ Intuitive Toxicology (NIH) ➤ Risk Perception: It’s personal – Environmental Health Perspectives 2014 ➤ The widening world of hand-picked truths 2015 ➤ People with extreme anti-science views know the least, but think they know the most – National Post 2019

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		<ul style="list-style-type: none"> ➤ Beware of online filters (Eli Pariser, TED talk, 2011)
Week 5 May 1	Pollinator health: Pesticides, parasites, GMOs and beyond	<ul style="list-style-type: none"> ➤ Bee Literacy – Oregon Stater 2015 ➤ Beepocalypse myth handbook 2023 ➤ Playbook for earth poisoning 2020
May 3	Patents and intellectual property in breeding and biotech	<ul style="list-style-type: none"> ➤ Arrested Development – Terra 2014 ➤ Purple GM tomato authorized 2022 ➤ Patents often impede innovation 2021 ➤ Farmer’s Fight with Monsanto – NPR Salt 2013 ➤ 5 myths of GMOs – NPR 2012 ➤ I’m a farmer and I signed a contract with Monsanto 2016 ➤ Saving America’s Patent System – NYT 2022
May 5	Precautionary Principle and global legal challenges	<ul style="list-style-type: none"> ➤ Precautionary principle 2003
Week 6 May 8	Regulating GMOs	<ul style="list-style-type: none"> ➤ GE crops – From idea to product – 2014 (Read only abstract, Figures 1-3, concluding remarks and summary points) ➤ Product vs. process regulation 2015 (Read only abstract, introduction, path forward, conclusions sections) ➤ SECURE Rule USDA 2021 (read intro, background, conclusion) ➤ New USA label law takes effect – NPR 2022 ➤ Provisions of new labeling law in USA – Food Navigator 2018 ➤ CRISPR plants now subject to tough GM laws in European Union – Nature 2018

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May 10	How to change minds: Facts vs. values plus	➤ When facts are not enough 2020
May 12	Food Evolution movie – <i>view ahead of class</i>	➤ View through OSU Kanopy site
Week 7 May 15	Advancing Sustainable Agriculture: The intersection of IPM and GMOs	<ul style="list-style-type: none"> ➤ IPM historical perspective 2023 ➤ Read abstract, figures, tables, box only: Surge in insect resistance 2017 ➤ GE crop diversification 2019
May 17	Organic agriculture	<ul style="list-style-type: none"> ➤ Organic foods safer? Mayo Clinic 2022 ➤ Pew update on public views GMO vs. organic 2016 (read up to section on “Personal food philosophies...”) ➤ Is organic really better for the environment than conventional agriculture? GLP, 2017 ➤ Organic crash not fail - 2021 ➤ GE crop “Halo Effect” helps Organic – Alliance for Science 2018 ➤ Pesticide residue assessment - GLP 2022 ➤ EWG and organic industry 2023 ➤ What is ‘natural’ food? A riddle wrapped in notions of good and evil – The Salt 2016
May 19	MIDTERM IN CLASS	<i>No smartphones or computers allowed. Bring pen and/or pencil, and single sheet of paper with notes on front and/or back, only.</i>
Week 8 May 22	Integrated breeding to rescue the wild chestnut tree	<ul style="list-style-type: none"> ➤ GMO Chestnut history and tech 2022 ➤ High tech chestnuts – AP 2019 ➤ Paralysis of good intentions – Science 2015

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May 24	Public attitudes to biotech and the GMO chestnut	<ul style="list-style-type: none"> ➤ Biotech and Forest Health – Report Highlights – Natl Acad Sci USA 2016 ➤ GE trees in the wild a tough road – GLP 2019
May 26	Public vs. scientist credibility / Reliability of science	<ul style="list-style-type: none"> ➤ Major gaps between public and scientists Pew 2015 ➤ Pew GMO attitude update 2020 ➤ Anti-gmo-themes-losing-traction 2022? ➤ Twenty tips for interpreting scientific claims – Nature 2013 ➤ Separating science from policy – Lackey 2016 ➤ 10 tips to spot misinformation 2020
Week 9 May 29	MEMORIAL DAY HOLIDAY	<ul style="list-style-type: none"> ➤ No class or readings
May 31	Hot news 1 – student summaries of what is new and interesting in ag/forest/food biotech or tox	<ul style="list-style-type: none"> ➤ TED talk ingredients 2006 - video ➤ Telling a good science story – Nature 2020
June 2	Hot news 2 – student summaries of what is new and interesting in ag/forest/food biotech or tox	No assigned readings
Week 10 June 5	YouTube videos 1 – Student choices and explanations in class	No assigned readings
June 7	YouTube videos 2 – Student choices and explanations in class	No assigned readings
Jun 9	Alliance for Science / Misinformation /colonialism?	<ul style="list-style-type: none"> ➤ Alliance for Science intro: Who we are, team, news (peruse), research (peruse) ➤ One-fifth of media stories on GMOs published in Africa contain misinformation, study finds 2022 ➤ Agroecology and western colonialism? 2021

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		➤ Complicated truths about cotton in India 2018
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