OWNING SEEDS THROUGH PATENTS AND NEW GENE EDITING GMO TECHNOLOGIES

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We are witnessing today an acceleration of technological revolutions in all fields and concentration of economic power in the hands of a small number of super wealthy individuals and organizations and competing forces throwing all caution to the winds in their haste for unfettered profits and power.

Such is the case with gene editing.

Bill Gates is a big player in both promoting the old failed GMOs, including the GMO banana, Golden Rice and Bt Eggplant, as well as new GMOs based on gene editing and gene drives[1]

Life is self-organised creative complexity.

Living organisms are complex self-organizing evolving systems. When genes are added, edited, or removed through genetic engineering, the self-organizing capacity of living systems is disrupted. But the self-organizing organism will nonetheless continue to evolve. How it will evolve is unpredictable and unknown.

To impose a mechanical, reductionist paradigm on evolving, living systems creates new hazards and unpredictable consequences as evidenced in the widespread failure of the first generation of GMOs.

Gates mechanistic view of life likens it to a Microsoft programme, and cutting and pasting living organisms is simply the next step in patenting and owning the next commodity.

As is typical in our times of post truth, Gates and the biotechnology industry are pushing a new technological tool, gene editing and gene drives as a precision and time efficient technology, though unpredictable and unreliable, as a magic bullet for every problem in agriculture and health. In their haste, they side-step any regulation[2] and don't give a minute's thought to the attendant ethical, moral and safety concerns. For them, each magic bullet will become a patent which will bring immeasurable profit[3].

CRISPR, the new diamond in genetic engineering, has been described as "a relatively easy way to alter any organism's DNA, just as a computer user can edit a word in a document"[4].

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[1] Shiva, V., & Shiva, K. (2020). Oneness Vs. The 1 Percent: Shattering Illusions, Seeding Freedom. CHELSEA GREEN PUB. https://books.google.it/books?id=4TmTzQEACAAJ

[2] Husted, Kristofor. "Dupont Develops Corn Using New CRISPR Technology," April 27, 2016. https://www.kmuw.org/post/dupont-develops-corn-using-new-crispr-technology

[3] Stoye, Emma. "Crispr-Edited Mushroom Dodges Regulation." *Chemistry World*, April 26, 2016. https://www.chemistryworld.com/news/crispr-edited-mushroom-dodges-regulation/1010298.article

[4] Pollack, Andrew. "Jennifer Doudna, a Pioneer Who Helped Simplify Genome Editing." *The New York Times*, May 11, 2015, sec. Science. https://www.nytimes.com/2015/05/12/science/jennifer-doudna-crispr-cas9-genetic-engineering.html

Gates has been quick to invest and promote CRiSPR technology, funding the two leading biochemists developing the technology, Jennifer Doudna, University of Berkley, California, and Feng Zhang, MIT McGovern Institute and the Broad Institute[5].

It is a simple yet powerful tool for editing genomes in seemingly any organism on Earth, including humans, allowing researchers to easily alter DNA sequences and modify gene function[6]. It should come as no surprise that the technology is eliciting major concerns and ethical and moral questions[7].

The paradigm of genetic engineering is based on genetic determinism and genetic reductionism. It is based on a non-acceptance of the self-organised, evolutionary potential of living organisms and treats living organisms as a Lego play set. But it is not child's play. Life is complex, self-organised, dynamic evolution – autopoietic.

As Jonathan Latham cautions, ordinary CRISPR "can induce mutations at sites that differ by as many as five nucleotides from the intended target", i.e. CRISPR may act at unknown sites in the genome where it is not wanted (Fu et al., 2014)[8]. This shows how unreliable and misinformed are the assumptions and projections that genome editing techniques like CRISPR are precise, predictable, and therefore safe and so need for Biosafety regulation.

Bill Gates and 13 other investors have poured $120 million into a "revolutionary gene-editing startup" 'Editas Medecine' a new leading genome editing company focusing on CRISPR genome editing systems - co-founded by Feng Zhang[9]. The piracy of common genomic data of millions of plants bred by peasants is termed "big data". But big data is not long-held farmers intellectual knowledge. It is biopirated and privateered data. As Editas has stated "Investing in intellectual property is one component how we are building the company to be a leader in genomic medicine,"[10]. Its lead investor is a newly created firm

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[5] Sanders, Robert. "Gates Foundation Awards $100,000 Grants for Novel Global Health Research." *Berkeley News*, May 10, 2010. https://news.berkeley.edu/2010/05/10/gates-foundation/

[6] "What Is CRISPR-Cas9?" *Yourgenome*, n.d. https://www.yourgenome.org/facts/what-is-crispr-cas9

[7] Otieno MO (2015) CRISPR-Cas9 Human Genome Editing: Challenges, Ethical Concerns and Implications. J Clin Res Bioeth 6: 253.doi: 10.4172/2155-9627.10002. https://www.longdom.org/open-access/crisprcas9-human-genome-editing-challenges-ethical-concerns-and-implications-2155-9627-1000253.pdf

[8] Latham, Jonathan. "God's Red Pencil? CRISPR and Myths of Precise Genome Editing." *Independent Science News | Food, Health and Agriculture Bioscience News*, April 25, 2016. https://www.independentsciencenews.org/science-media/gods-red-pencil-crispr-and-the-three-myths-of-precise-genome-editing/

Fu Y, Sander JD, Reyon D, Cascio VM, Joung JK. Improving CRISPR-Cas nuclease specificity using truncated guide RNAs. Nat Biotechnol. 2014 Mar;32(3):279-284. doi: 10.1038/nbt.2808. Epub 2014 Jan 26. PMID: 24463574; PMCID: PMC3988262.

[9] Herper, Matthew. "Bill Gates And 13 Other Investors Pour $120 Million Into Revolutionary Gene-Editing Startup." *Forbes*, August 10, 2016. https://www.forbes.com/sites/matthewherper/2015/08/10/bill-gates-and-13-other-investors-pour-120-million-into-revolutionary-gene-editing-startup/

[10] Begley, Sharon . "CRISPR Patent Fight: The Legal Bills Are Soaring." *STAT*, August 16, 2016. https://www.statnews.com/2016/08/16/crispr-patent-fight-legal-bills-soaring/

called BioNano Genomics (bng0), a select group of family offices led by Boris Nikolic, who was previously a science advisor to Bill Gates. Both Editas and Gates' office confirm that the Microsoft billionaire, who is the world's second richest man, is a major investor in the genomic firm bng0[11].

Thus biotechnology, information technology, and financial technology are being integrated into one mega machine, transforming life into a money making casino.

It is of note that Doudna and Editas (Zheng), both heavily funded by Gates, are engaged in a patent battle on CRISPR technologies. No matter who loses, Gates wins[12].

The attempt to deregulate new gene edited GMOs and rushing them commercially on the market is to falsely assert they are "natural". However, new research has established that Gene editing is not "natural", that it can in fact be tested, and therefore should be regulated for Biosafety as a GMO[13].

The European Court of Justice in July 2018 had ruled that CRISPR is a gene modification technology and needs to be regulated like all GMOs. "In today's judgment, the Court of Justice takes the view, first of all, that organisms obtained by mutagenesis are GMOs within the meaning of the GMO Directive, in so far as the techniques and methods of mutagenesis alter the genetic material of an organism in a way that does not occur naturally. It follows that those organisms come, in principle, within the scope of the GMO Directive and are subject to the obligations laid down by that directive"[14].

This ruling was put to the test in the UK when the House of Lords voted against a Trojan amendment' 275 in the Agriculture Bill which was pushing to introduce gene editing as "natural"[15].

It can be assumed that the industry hopes that the introduction of the new gene edited GMOs will cover up the failure of old GMOs – the failure of Bt cotton to control pests and the failure of Roundup Ready crops to control weeds.

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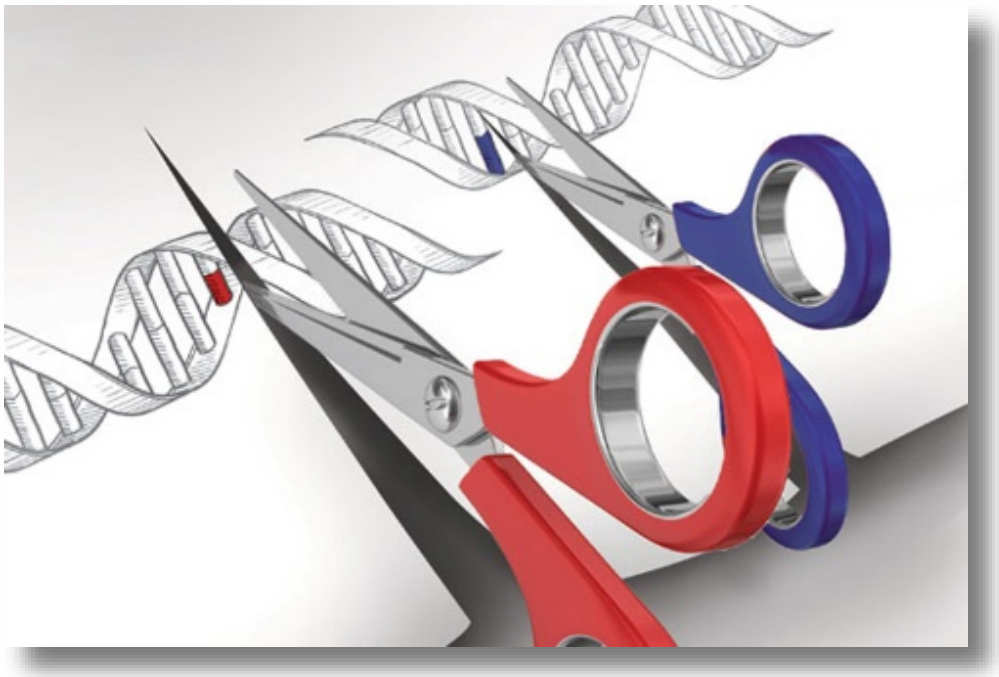
[11] "Bng0 - Company Profile." *BCIQ*. https://bciq.biocentury.com/companies/bng0

[12] Sanders, Robert. "Twelfth CRISPR Patent Awarded to UC Team." *Berkeley News*, September 3, 2019. https://news.berkeley.edu/2019/09/03/twelfth-crispr-patent-awarded-to-uc-team/
"Crispr-Cas Component Systems, Methods and Compositions for Sequence Manipulation," n.d. https://patents.google.com/patent/EP2840140A1/en.

[13] Shiva, Vandana. "Gene Edited Foods Are GMOs: New Research." *Seed Freedom*, September 7, 2020. https://seedfreedom.info/gene-edited-foods-are-gmos-new-research-establishes-that-gene-editing-is-not-natural-that-it-can-be-tested-and-should-be-regulated-for-biosafety-as-a-gmo/

[14] Court of Justice of the European Union, PRESS RELEASE No 111/18, Luxembourg, 25 July 2018, Judgment in Case C-528/16, Confédération paysanne and Others v Premier ministre and Ministre de l'Agriculture, de l'Agroalimentaire et de la Forêt, *Organisms obtained by mutagenesis are GMOs and are, in principle, subject to the obligations laid down by the GMO Directive*. https://curia.europa.eu/jcms/upload/docs/application/pdf/2018-07/cp180111en.pdf

[15] Citizen Action: https://www.gmfreeze.org/current-actions/ask-ministers-to-reject-plans-toderegulate-genome-editing/
Action briefing: https://www.gmfreeze.org/publications/action-briefing-on-agriculture-billamendment-to-de-regulate-genome-editing/
Political briefing: https://beyond-gm.org/wp-content/uploads/2020/07/Genome-Editing-_Ag-Bill_Political-Briefing_030720-FINAL_updated.pdf



Nonetheless, industrial agriculture is s till faced with managing the unmanageable problem of superpests and superweeds.

CRISPR technology poses serious health risks. Two studies published earlier this summer found that editing cells with CRISPR/Cas9 could increase the chance that the cells being altered to treat disease could become cancerous or trigger the development of cancer in other cells[16].

Some high-placed scientists like the former director of the US National Institute of Health, have called for a self-imposed ethical moratorium on CRISPR until more is known, particularly on these germline mutations that could potentially be passed on through generations[17]. The risk of unintended permanent mutation in CRiSPR technology calls for the precautionary principle and a moratorium until we have full understanding of the risks involved and the potential harm and mutation to the human body and other species.

CRISPR could potentially permanently alter an entire population. Once out, there is no going back. A failure to properly anticipate *all* the effects and consequences could be apocalyptic[18].

[16] Hruska , Joel . "CRISPR Gene Editing May Have Unanticipated Side Effects." *ExtremeTech*, July 24, 2018. https://www.extremetech.com/extreme/274110-study-suggests-crispr-gene-editing-could-have-unanticipated-side-effects

[17] Licholai , Greg . "Is CRISPR Worth the Risk?" *Yale Insights*, August 21, 2018. https://insights.som.yale.edu/insights/is-crispr-worth-the-risk

[18] Creighton, Jolene . "Gene Drives: Assessing the Benefits & Risks." *Future of Life Institute*, n.d. https://futureoflife.org/gene-drives-assessing-the-benefits-risks/