BIODIVERSITY, GMOS, & GENE DRIVES OF THE MILITARISED MIND

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A 2016 report from the National Academy of Science of The United States, titled "Gene Drives on the Horizon : Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values"[2] warns: "One possible goal of release of a gene-drive modified organism is to cause the extinction of the target species or a drastic reduction in its abundance."

Gene Drives have been called "mutagenic chain reactions" and are to the biological world what chain reactions are to the nuclear world. The Guardian describes Gene Drives as the "gene bomb"[3].

Kevin Esvelt of MIT exclaims "a release anywhere is likely to be a release everywhere", and asks "Do you really have the right to run an experiment where if you screw up, it affects the whole world?"[4]
The NAS report cites the case of wiping out amaranth as an example of "potential benefit".

The Problem

"Palmer amaranth infests agricultural fields throughout the American South. It has evolved resistance to the herbicide glyphosate, the world's most-used herbicide (Powles, 2008), and this resistance has become geographically widespread."[5]

Industrial agriculture – promoted by the United States Foreign Policy – treats amaranth greens as "weeds", and first tried to exterminate them with herbicides. Then came Monsanto, with Roundup Ready crops, genetically engineered to resist the spraying of Roundup so that the GMO crop would survive the otherwise lethal chemical, while everything else that was green perished. But not Palmer Amaranth, the superweed.

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[1] Shiva, Vandana. "Biodiversity , GMOs, & Gene Drives of the Militarised Mind." Seed Freedom. Last modified July 7, 2016. https://seedfreedom.info/biodiversity-gmos-gene-drives-of-the-militarised-mind/

[2] National Academies of Sciences, Engineering. *Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values*, 2016. https://www.nap.edu/catalog/23405/gene-drives-on-the-horizon-advancing-science-navigating-uncertainty-and

[3] Thomas, Jim. "The National Academies' Gene Drive Study Has Ignored Important and Obvious Issues." *The Guardian*, June 9, 2016, sec. Science. https://www.theguardian.com/science/political-science/2016/jun/09/the-national-academies-gene-drive-study-has-ignored-important-and-obvious-issues

[4] "Meet the Moralist Policing Gene Drives, a Technology That Messes with Evolution." *MIT Technology Review*. Last modified June 7, 2016. https://www.technologyreview.com/2016/06/07/8151/meet-the-moralist-policing-gene-drives-a-technology-that-messes-with-evolution/

[5] Committee on Gene Drive Research in Non-Human Organisms: Recommendations for Responsible Conduct; Board on Life Sciences; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine. Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values. Washington (DC): National Academies Press (US); 2016 Jul 28. 3, Case Studies to Examine Questions About Gene-Drive Modified Organisms. Available from: https://www.ncbi.nlm.nih.gov/books/NBK379273/

A quick fix involving potential irreparable damage

Instead of seeing the emergence of Palmer Amaranth as a superweed, as a result of the failure of the misguided approach of herbicide resistant GMOs, Monsanto & Co – which includes investors, scientists, corporations, DARPA, and Gates – are now rushing to drive the Amaranth species to extinction through the deployment of an untested tool. The tool of gene editing and gene drives.

A "DARPA-Mind" report casually states potential harm:
"*Gene drives developed for agricultural purposes could also have adverse effects on human well-being. Transfer of a suppression drive to a non-target wild species could have both adverse environmental outcomes and harmful effects on vegetable crops, for example. Palmer amaranth in Case Study 6 is a damaging weed in the United States, but related Amaranthus species are cultivated for food in Mexico, South America, India, and China.*" [6]

A scientific assessment would tell us that plants evolve resistance to herbicides which are supposed to kill them because they have intelligence, they evolve, and simply by the law of natural selection, they develop resistance. Denial of the intelligence in life, and denial of evolution is unscientific.

Amaranth is a web of life in itself

Amaranth's root, the word amara – meaning 'eternal' and 'deathless' in both Greek and Sanskrit – connects two formidable Houses of the ancient world. From the high slopes of the Himalayas, through the plains of north, central and south India, to the coastlines of the east, west and the south, Amaranth is a web of life in itself. Numerous varieties are found throughout the country. In fact, the Himalayan region is one of the 'centres of diversity' for the Amaranth.

Amaranth, amaranto, love-lies-bleeding, tassel flower, Joseph's coat, or ramdana (gods own grain) is the grain of well-being. It is rich in names, nutrition, history and meaning. There are records of Amaranth cultivation in South and Meso America as far back as 5,000 B.C. The sacred Amaranth criss-crosses the Ancient World, nourishing cultures from the Andes to the Himalayas. Amaranth is a sacred grain for the Indian Civilisation as much as it is for the Aztec Civilisation, civilisations in the shadow of time, yet very much alive.

[6] Committee on Gene Drive Research in Non-Human Organisms: Recommendations for Responsible Conduct; Board on Life Sciences; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine. Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values. Washington (DC): National Academies Press (US); 2016 Jul 28. 4, Charting Human Values. Available from: https://www.ncbi.nlm.nih.gov/books/NBK379278/

The leaves of the amaranth contain more iron than spinach, and have a much more delicate taste. Besides rice bran, the grain of the amaranth has the highest content of iron amongst cereals. 1 kilogram of Amaranth flour, added to 1 kilogram of refined wheat flour, increases its iron content from 25 milligrams to 245 milligrams. Adding amaranth flour to wheat/rice flour is a cheaper and healthier way to prevent nutritional anaemia; rather than buying expensive tablets, tonics, health drinks, branded or bio fortified flour.

The Amaranth is extremely rich in complex carbohydrates and in proteins.[7] It has 12–18% more protein than other cereals, particularly lysine – a critical amino acid.[8] It also differs from other cereals in that 65% is found in the germ and 35% in the endosperm, as compared to an average of 15% in the germ and 85% in the endosperm for other cereals. When Amaranth flour is mixed 30:70 with either rice flour or wheat flour, protein quality rises, from 72 to 90, and 32 to 52, respectively. The Amaranth grain is about the richest source of calcium, other than milk. It has 390 grams of calcium compared to 10 grams in rice, and 23 grams in refined flour.[9]

The diversity of Amaranth greens is incredible, edibles that grow uncultivated in our fields. They are a major source of nutrition. Per 100 grams, Amaranth greens can give us 5.9 grams of protein, 530 milligrams of calcium, 83 milligrams of phosphorus, 38.5 milligrams of iron,14,190 micrograms of carotene, 68 micrograms of Vitamin-C,122 milligrams of magnesium. [10, 11, 12, 13]

Amaranth is a superior alternative as a carotene source to GMO Golden Rice – which is being promoted as a future miracle for addressing Vitamin A deficiency. The poorest, landless woman and her children have access to nutrition through the generous gift of the Amaranth plant.

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[7] Maurya, Neelesh & Arya, Dr Pratibha. (2018). Amaranthus grain nutritional benefits: A review. 2258-2262. https://www.researchgate.net/publication/331832812_Amaranthus_grain_nutritional_benefits_A_review

[8] Ibid.

[9] Ibid.

[10] Janssen, Frederik, Anneleen Pauly, Ine Rombouts, Koen J. A. Jansens, Lomme J. Deleu, and Jan A. Delcour. "Proteins of Amaranth (Amaranthus Spp.), Buckwheat (Fagopyrum Spp.), and Quinoa (Chenopodium Spp.): A Food Science and Technology Perspective." *Comprehensive Reviews in Food Science and Food Safety* 16, no. 1 (2017): 39–58. https://onlinelibrary.wiley.com/doi/full/10.1111/1541-4337.12240

[11] Muchuweti, M & Kasiamhuru, A & Benhura, Mudadi & Chipurura, Batsirai & Amuna, Paul & Zotor, Francis & Parawira, Wilson. (2009). Assessment of the Nutritional Value of Wild Leafy Vegetables Consumed in the Buhera District of Zimbabwe: a Preliminary Study. Acta horticulturae. 10.17660/ActaHortic.2009.806.40. https://www.researchgate.net/publication/233741670_Assessment_of_the_Nutritional_Value_of_Wild_Leafy_Vegetables_Consumed_in_the_Buhera_District_of_Zimbabwe_a_Preliminary_Study

[12] Sarker, Umakanta, and Shinya Oba. "Nutrients, Minerals, Pigments, Phytochemicals, and Radical Scavenging Activity in Amaranthus Blitum Leafy Vegetables." *Scientific Reports* 10, no. 1 (March 2, 2020): 1–9. https://www.nature.com/articles/s41598-020-59848-w

[13] "HORT 281 :: Lecture 31 :: ORIGIN, AREA, PRODUCTION, VARIETIES, PACKAGE OF PRACTICES FOR AMARANTHUS, PALAK AND GOGU." *Development of E-Courses for B.Sc (Agriculture)*. http://eagri.org/eagri50/HORT281/lec31.html

Conclusions

The paradigm of genetic engineering is based on genetic determinism and genetic reductionism. It is based on a denial of the self-organised, evolutionary potential of living organisms. It treats living organisms as a play lego set. But it is not, life is complex, self-organised, dynamic evolution – autopoietic.

The right to food and nutrition of the people outside the US, and the right of amaranth to continue to grow and evolve and nourish people, can be extinguished by powerful men in the US because they messed up their agriculture with Roundup Ready crops. And now want to mess up the planet, its biodiversity, and food and agriculture systems of the world with the tool of gene drives to push species to extinction.

As in the case of GMOs, the rush for Gene Drives, and CRISPR-based gene editing are linked to patents. And Bill Gates is financing the research that is leading to these patents. He with other billionaires has invested $120 million in a company EDITAS to promote these technologies[14]. Bayer, the new face of Monsanto & Co, has invested $35 million in the new GMO technologies, and committed over $300 million over the next 5 years[15].

"Biofortification" has been given the world food prize of 2016, yet biofortification is inferior to the nutrition provided by biodiversity and indigenous knowledge. The same forces promoting biofortification are also promoting the extermination of nutritious crops like amaranth, as well as rich indigenous cultures of food.

The project of deliberately exterminating species is a crime against nature and humanity. We are members of an Earth Family. Every species, every race is a member of one Earth Community. We cannot allow some members of our Earth Family to allocate to themselves the power and hubris to decide who will live, and who will be exterminated. The DARPA-Mind is obsolete.

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[14]Loria, Kevin. "Bill Gates and Others Just Invested $120 Million in a Revolutionary Medical Startup." *Business Insider*. Last modified August 10, 2015. https://www.businessinsider.com/bill-gates-and-others-invest-in-editas-for-crispr-gene-editing-2015-8

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