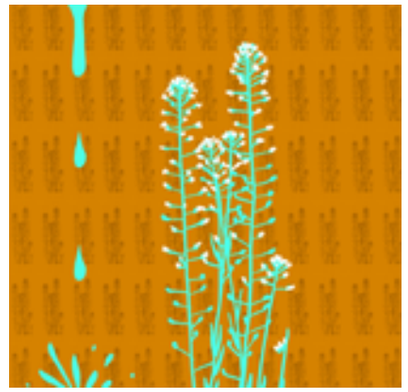
Patents and New GE (NGT) applications in agriculture and plant breeding







www.testbiotech.org/en/limits-to-biotech

Christoph Then, Testbiotech, July 2023

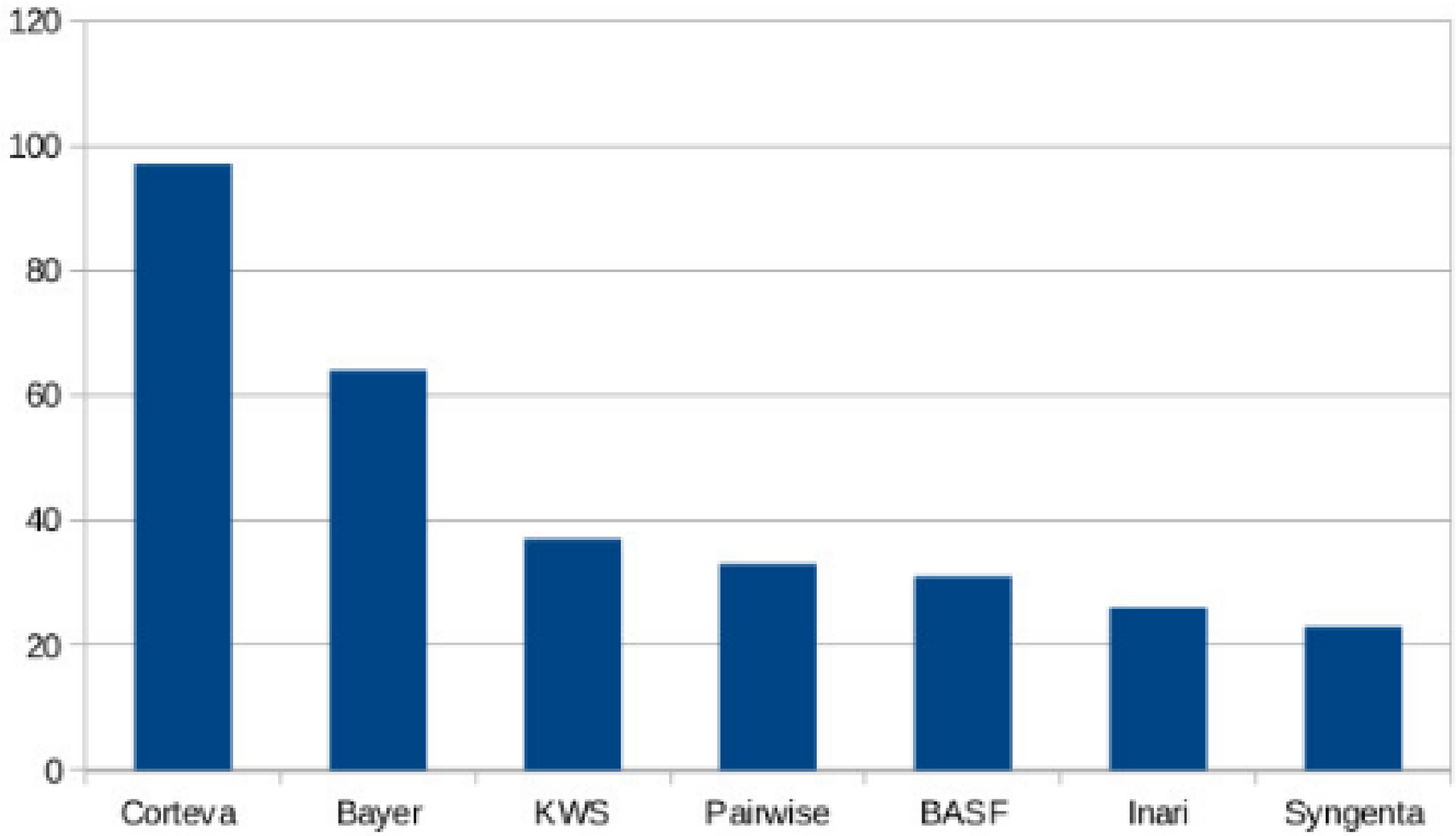


Figure 2: Overall number of filed international patent applications (WIPO/WO) covering the usage of nucleases (CRISPR/Cas, TALENs, zinc finger or meganucleases) in the food plant sector, up until the end of 2022.

Source

Corteva in a predominant position

In 2018, Corteva announced it had negotiated several licences with the ‘inventors’ of the CRISPR/Cas technology, including the University of California, the Broad Institute/MIT and the Vilnius University.

Aready at that time, they established a patent pool comprising around 50 ‚most important‘ patents needed for plant breeding.

Meanwhile, around 30 European patents were granted for Corteva on NGT applications on plants

Breeders interested in accessing the patent pool not only have to pay licence fees, but also have to sign contracts on stewardship and confidentiality. In Europe, Bejo and Vilmorin already signed such contracts.

Source

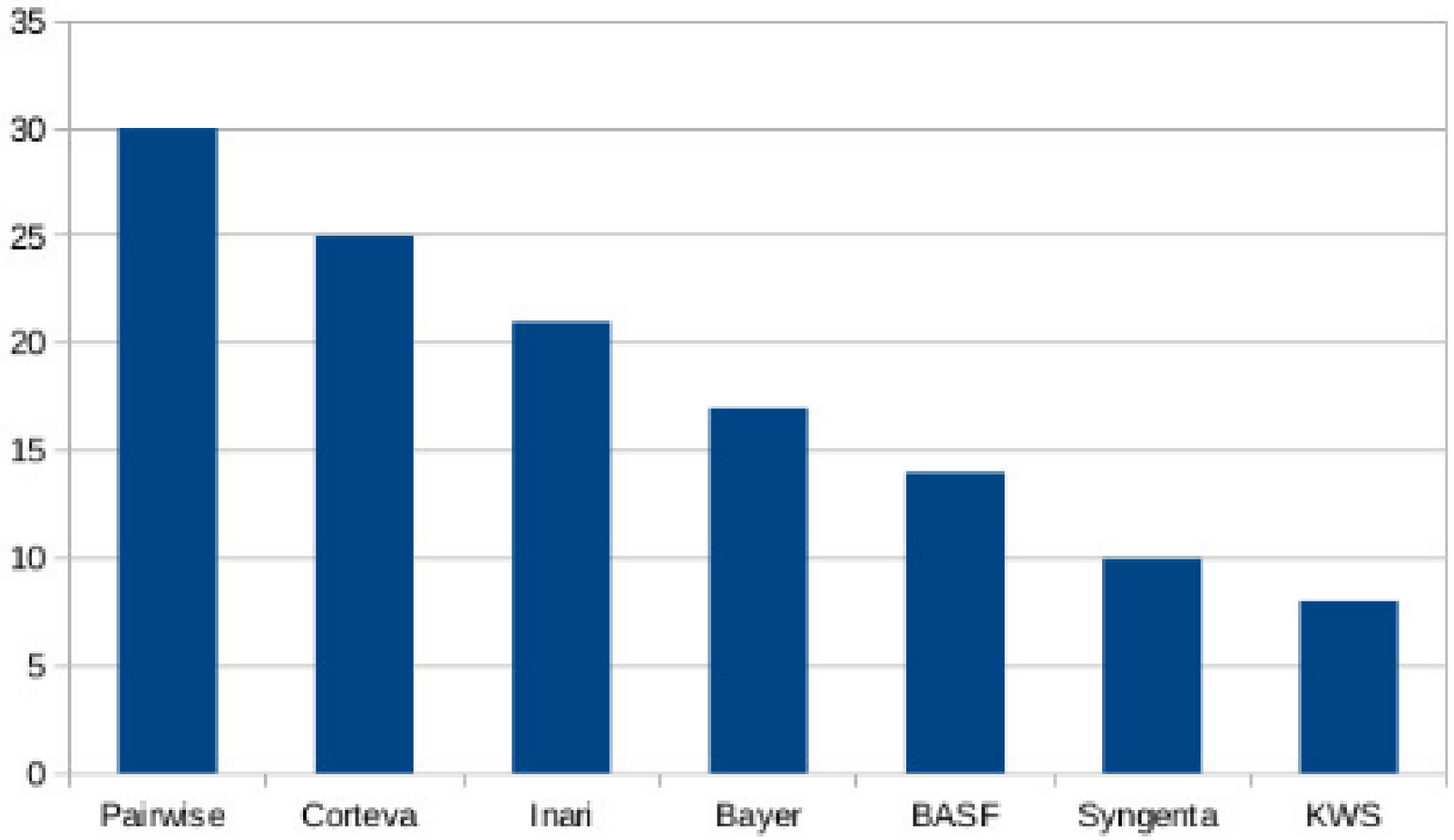


Figure 1: Number of filed international patent applications (WIPO/WO) covering usage of nucleases (especially CRISPR/Cas) in the food plant sector, published in 2021 and 2022.

Source

INARI: TEAM

NAME	POSITION	FORMER/OTHER AFFILIATIONS (INARI website)
Ponsi Trivisvavet	CEO & Director	President of Syngenta Seeds North America
Pierre-Etienne Boin	Chief Legal Officer	Syngenta, General Counsel for Seeds and Biotechnology globally
Dr. Catherine Feuillet	Chief Scientific Officer	Bayer CropScience, head of trait research
Claudia Nari	Chief Product Officer	Bayer Crop Science, Head of Regulatory Science Strategy and Operations
Dr. Michael Kock	SVP, Innovation Catalyst	Syngenta, head of intellectual property

INARI: BOARD

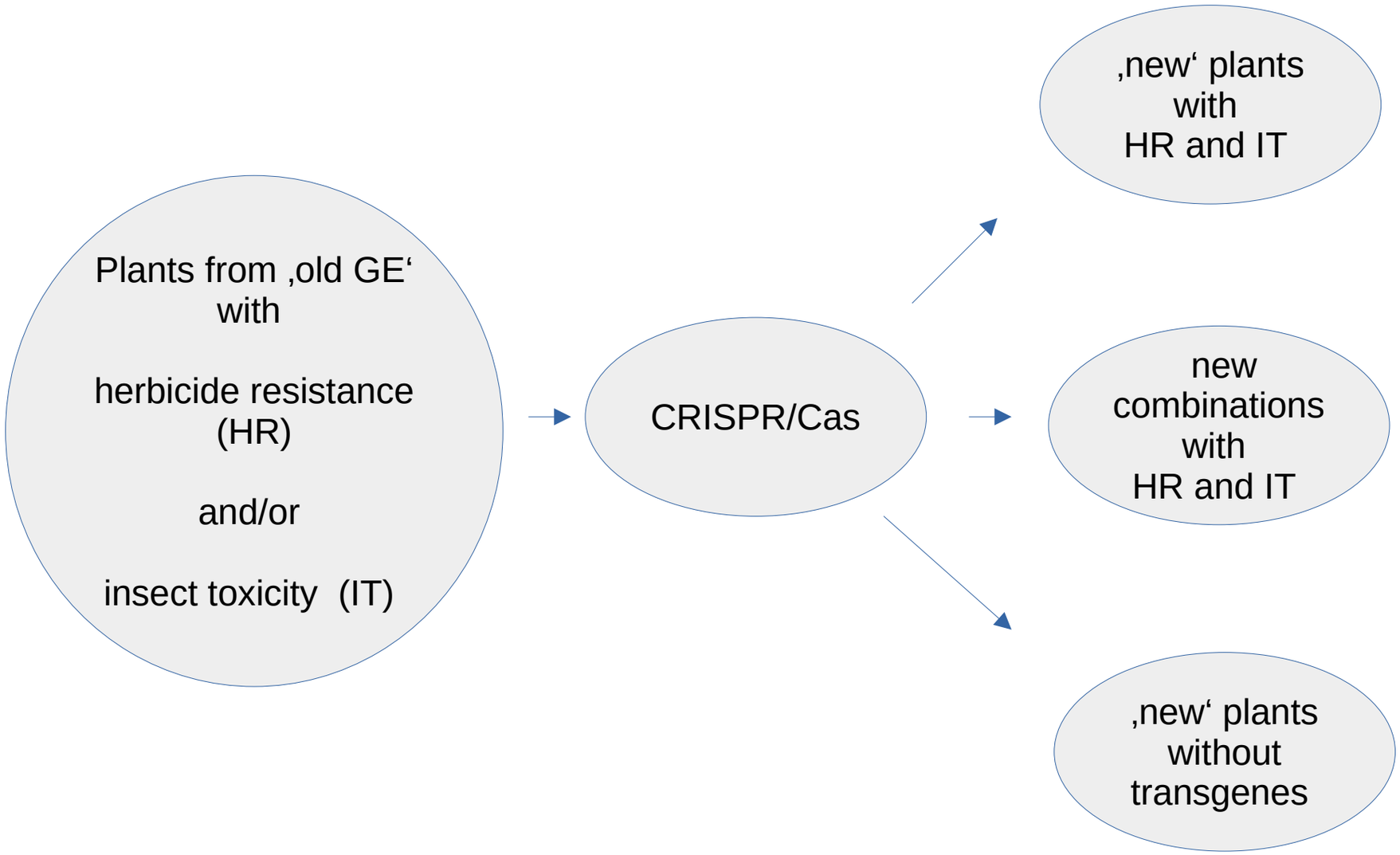
NAME	POSITION	FORMER/OTHER AFFILIATIONS (INARI website)
Mike Mack	Executive chair	Syngenta, CEO, executive director of the board from 2008 to 2015
Robert Berendes	Director	Flagship Pioneering Syngenta, global head of business development, member executive committee
Howard W. Buffett	Director	Executive director of the Howard G. Buffett Foundation
Ignacio Martinez	Co-Founder and director	Flagship Pioneering Managing director of Syngenta Ventures

INARI: SCIENTIFIC STRATEGY BOARD (SSB)

NAME	POSITION	FORMER/OTHER AFFILIATIONS (INARI website)
George Church	Scientific Co-Founder	Harvard University
Jennifer Doudna	Nobel Prize Winner 2020	University of Calfornia
Dirk Inze	Plant molecular genetics	Flemish Institute of Biotechnology (VIB)

Source: www.inari.com / Testbiotech

Patents on existing plant material



Source: Patent applications from Inari / Testbiotech

Patent applications on biological ressources

Table 1: SNP Positions within SEQ ID NO: 1 that are associated with increased resistance to ASR

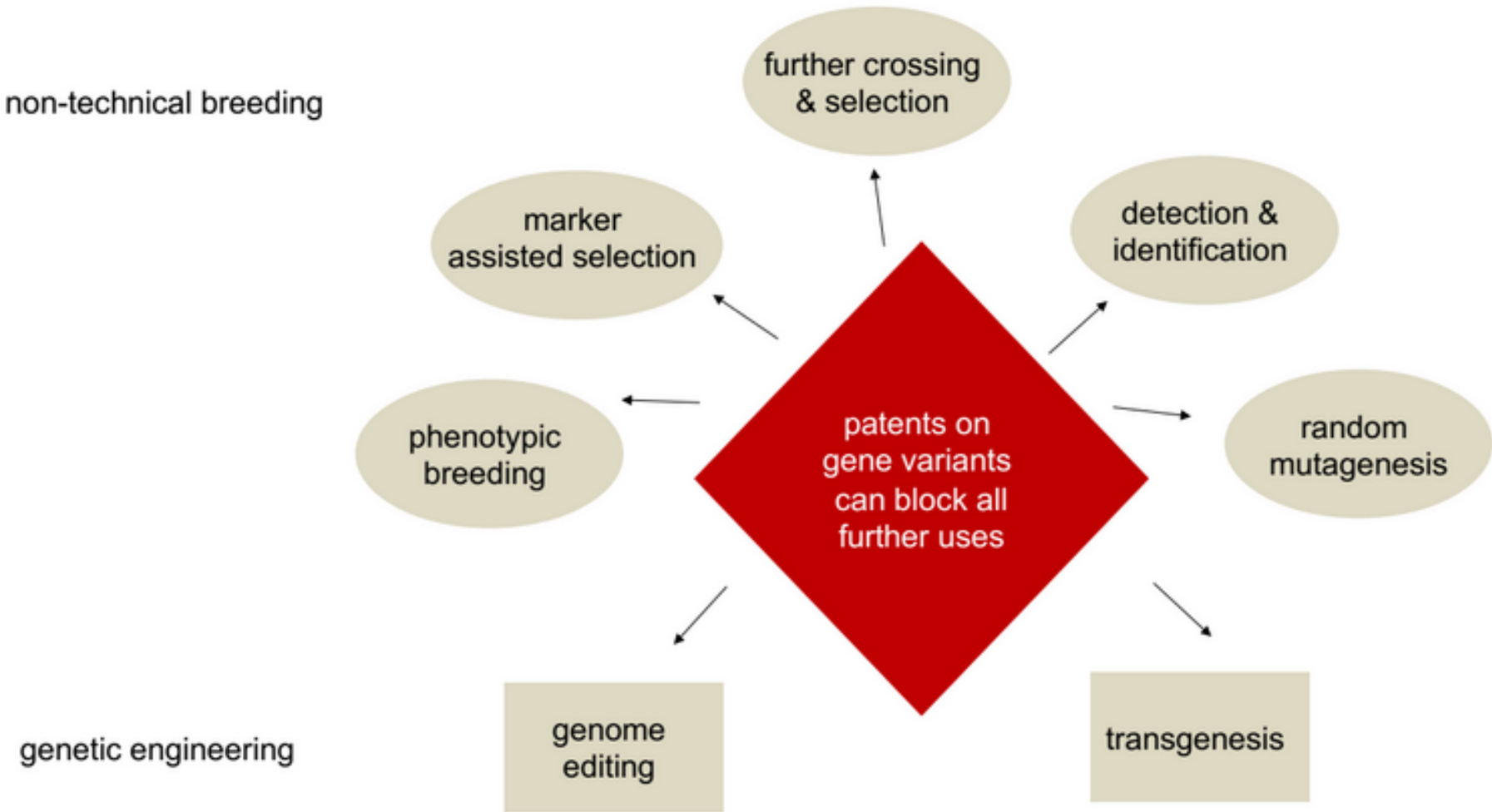
Table 1 is organized as follows: (Position in Scaffold 22052, favorable allele, unfavorable allele)

(24,A,G)(2425,G,A)(3023,T,C)(3024,C,T)(3094,A,C)(3158,A,G)(3666,G,A)(4104,C,A)(4133,T,TTGCTGCTATAATCGATTAAGC)(4155,G,C)(4156,C,A)(4157,T,C)(4159,C,G)(4160,T,G)(4239,C,A)(4289,A,G)(4321,C,T)(4355,C,T)(4474,G,T)(4528,C,T)(4659,A,C)(4820,T,C)(4906,T,G)(5028,T,G)(5077,T,C)(5202,A,C)(5228,G,A)(5254,G,A)(5291,T,C)(5316,G,A)(5613,G,A)(5649,T,C)(5744,C,T)(5755,T,TGGGTCATGGC)(5758,GACAACA,G)(6029,A,C)(6133,C,T)(6183,T,A)(6210,A,ACT)(6599,T,C)(6695,G,A)(6931,T,TG)(6937,C,T)(7007,T,C)(7030,A,G)(7094,A,G)(7117,T,TA)(7322,T,C)(7467,A,G)(7530,G,C)(7558,G,A)(8071,A,G)(8367,A,G)(8524,T,C)(8691,T,G)(8729,A,C)(8877,G,A)(8913,G,T)(9001,A,ATG)(9005,A,G)(9007,G,A)(9008,G,C)(9010,A,T)(9199,T,A)(9311,C,T)(9447,T,C)(9568,A,G)(9595,T,C)(9648,T,A)(9871,A,AC)(9896,T,A)(9911,C,T)(10105,C,T)(10319,C,T)(10443,A,G)(10487,A,C)(10497,A,G)(10567,T,C)(10738,A,C)(10914,G,T)(10945,T,A)(11114,A,C)(11134,C,A)(11155,G,T)(11219,A,G)(11272,C,T)(11869,A,G)(11975,AT,A)(12370,C,T)(12403,C,T)(12474,C,T)(12567,G,C)(12734,G,A)(12997,C,A)(13052,A,G)(13071,G,A)(13101,C,T)(13103,A,G)(13174,C,A)(13210,C,G)(13257,C,G)(13430,A,G)(13474,T,C)(13589,G,C)(13823,A,C)(13943,TA,T)(14093,A,G)(14246,C,T)(14277,G,A)(14303,A,C)(14337,G,A)(14877,T,G)(14907,T,C)(14926,A,G)(15061,C,T)(15405,A,G)(15525,A,C)(15722,T,C)(15783,C,A)(15809,A,T)(15907,ATGCATAGT,A)(15991,G,A)(16377,A,T)(16418,A,G)(16437,A,G)(16590,G,A)(16695,T,C)(16725,A,C)(16729,A,T)(16951,C,T)(17006,T,C)(17302,G,A)(17588,G,A)(17679,G,A)(18002,A,G)(18620,G,T)(18631,A,G)(18673,C,T)(19024,G,T)(19060,G,A)(19260,G,A)(19349,G,A)(19535,C,A)(19559,T,C)(19693,T,C)(19773,A,C)(19830,A,G)(20155,A,G)(20235,T,G)(20382,C,T)(2046

Syngenta, WO2021154632 claims around 5.000 single nucleotide polymorphism (SNPs) detected in wild relatives of soybeans.

https://www.no-patents-on-seeds.org/en/report2022

Patents on gene variants impact all breeders



Source

Experts with patent applications in the field of genetic engineering and / or affiliations to companies such as Bayer and BASF

Members of the working group

Prof. Dr. Regina Birner	Hans-Ruthenberg Institute, University of Hohenheim, Bioeconomy Council
Prof. Dr. Ralph Bock	Max Planck Institute of Molecular Plant Physiology, Potsdam-Golm, DFG Senate Commission on Genetic Research
Prof. Dr. Hans-Georg Dederer	Faculty of Law, University of Passau, DFG Senate Commission on Genetic Research
Prof. Dr. Bärbel Friedrich	German National Academy of Sciences Leopoldina
Dr. Johannes Fritsch	German National Academy of Sciences Leopoldina
Prof. Dr. Bernd Müller-Röber	Department of Molecular Biology, University of Potsdam
Prof. Dr. Holger Puchta	Botanical Institute, Karlsruhe Institute of Technology, Karlsruhe
Prof. Dr. Matin Qaim	Department of Agricultural Economics and Rural Development, Georg-August-University Göttingen
Prof. Dr. Chris-Carolin Schön	School of Life Sciences, Technical University of Munich
Prof. Dr. Klaus Tanner	Faculty of Theology, University of Heidelberg
Prof. Dr. Jochen Taupitz	Department of Law, University of Mannheim
Prof. Dr. Jörg Vogel	Institute for Molecular Infection Biology, University of Würzburg
Prof. Dr. Detlef Weigel	Max Planck Institute for Developmental Biology, Tübingen
Dr. Ralf Wilhelm	Institute for Biosafety in Plant Biotechnology, Julius Kühn Institut, Quedlinburg
Prof. Dr. Ernst-Ludwig Winnacker	Gene Center of the LMU Munich

Figure 6: The list of experts named in the Leopoldina (2019) report, highlighting those who are involved in filing patent applications on GE plants.

Recommendations

- reinforce the prohibitions of Article 53 (b), EPC (plant varieties);

- establish a clear distinction between genetic engineering and other breeding methods to exclude patents on native traits, randomly occurring gene variants and conventionally bred plants;

- restrict the scope of the patents to the specific technical processes;

- introduce full transparency in regard to patents on New GE seeds by labelling seed packages with all relevant patent numbers and the name of patent holders.