The future of plant breeding is under threat in Europe

Current interpretation of patent law is insufficient to stop patents on conventional breeding

Report by *No Patents on Seeds!*
Presented by Dagmar Urban, *ARCHE NOAH*

No patents on seeds! is an international alliance of farmers', environmental, seed diversity, international development and other organisations, which are concerned about patents on seeds.

ARCHE NOAH is a Central European seed savers' organisation, which works on the conservation and sustainable use (e.g. in participatory breeding projects) of crop diversity, as well as on policies related to seed diversity.

https://www.no-patents-on-seeds.org/en/report2023

Overview

Patents on seeds?

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Patents on seeds?

Patents on seeds?

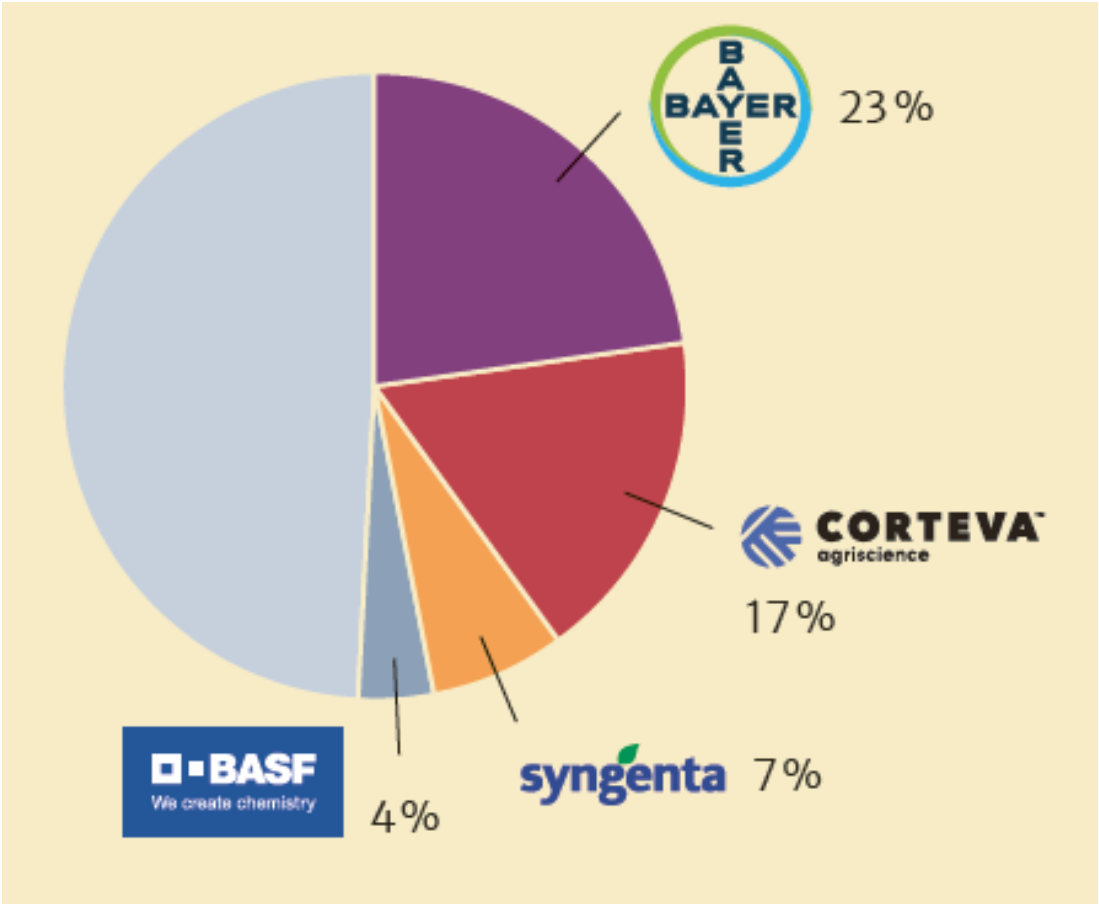
Patents on plant breeding and plant varieties are not allowed in Europe

According to Article 53 (b) of the European Patent Convention (EPC) plant and animal varieties as well as conventional breeding are excluded from patentability.

In 1998, the EU adopted the Directive 98/44 on the legal protection of biotechnological inventions (EU patent directive). This directive allows patents on technical inventions / genetic engineering.

However, in the last years, the European Patent Office (EPO) has been granting more and more patents on conventionally bred plants.

Global seed market



Source: ETC Group 2020

Over 3.500 patents on plants granted in Europe

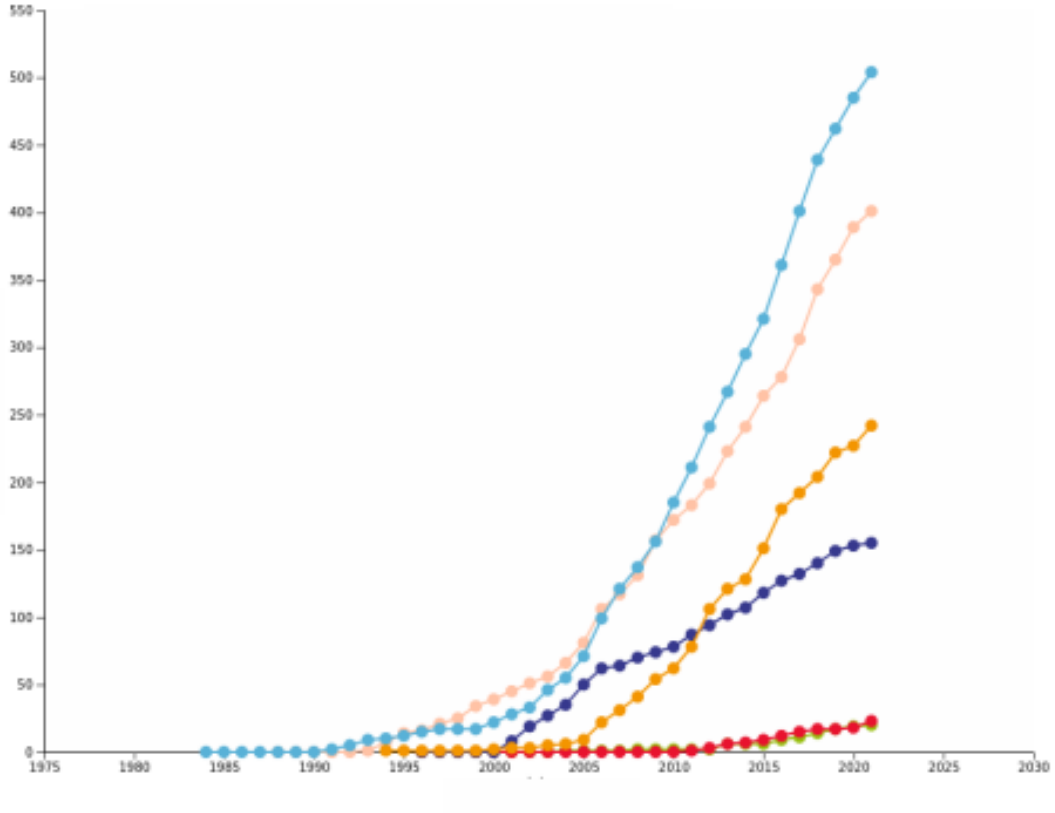


Figure 3: All EPO patents granted on plants, categorized by individual companies and accumulated since 1990. Research according to official classifications (IPC A01H or C12N15/82).
Source: www.kein-patent-auf-leben.de/patentdatenbank/

Patents on conventional plants

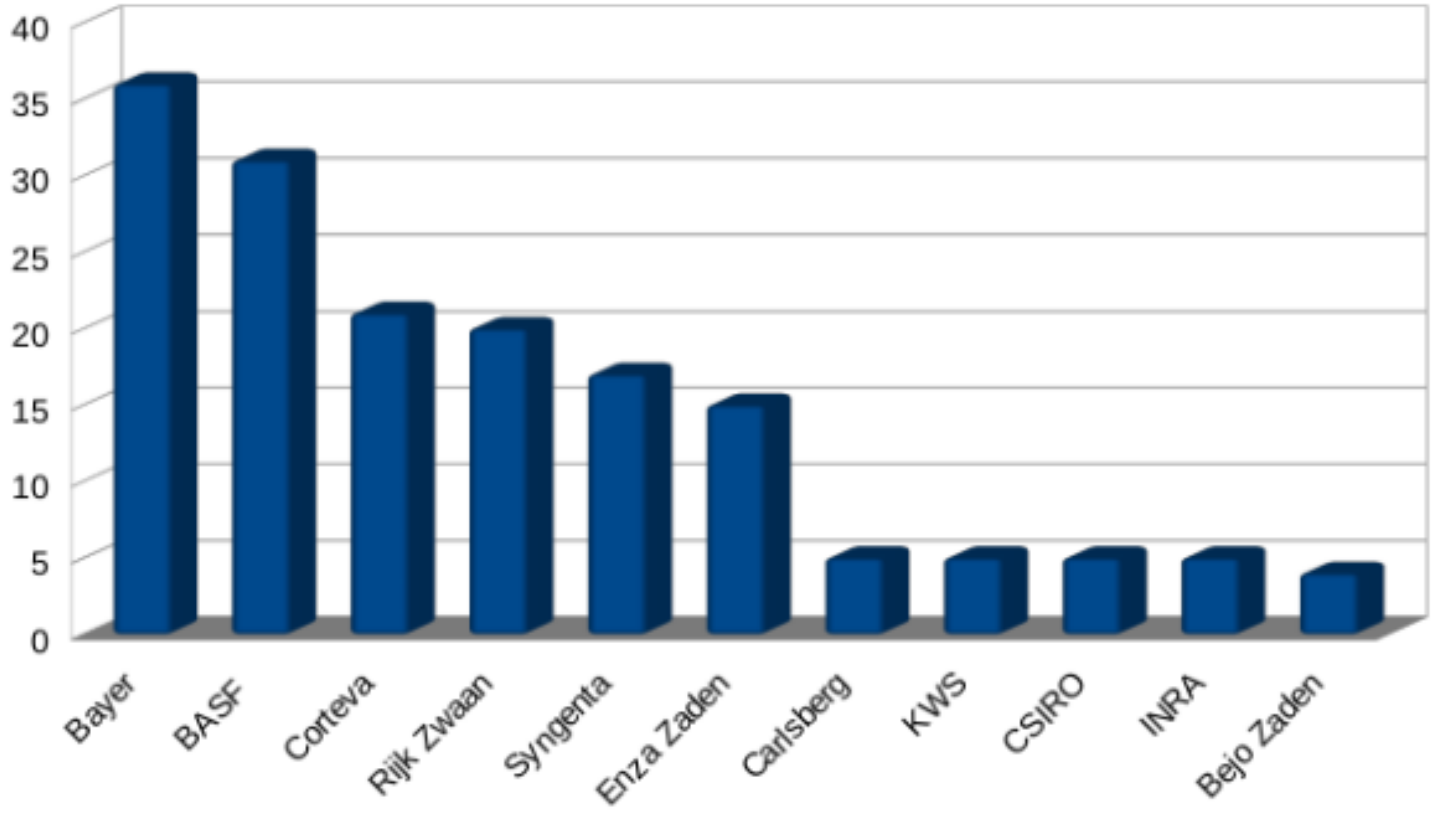


Figure 6: EPO patents granted for conventional plant breeding (international classifications IPC A01H or C12N15/82), between 2012 and 2022, categorized by companies. Source: database of *No Patents on Seeds!*

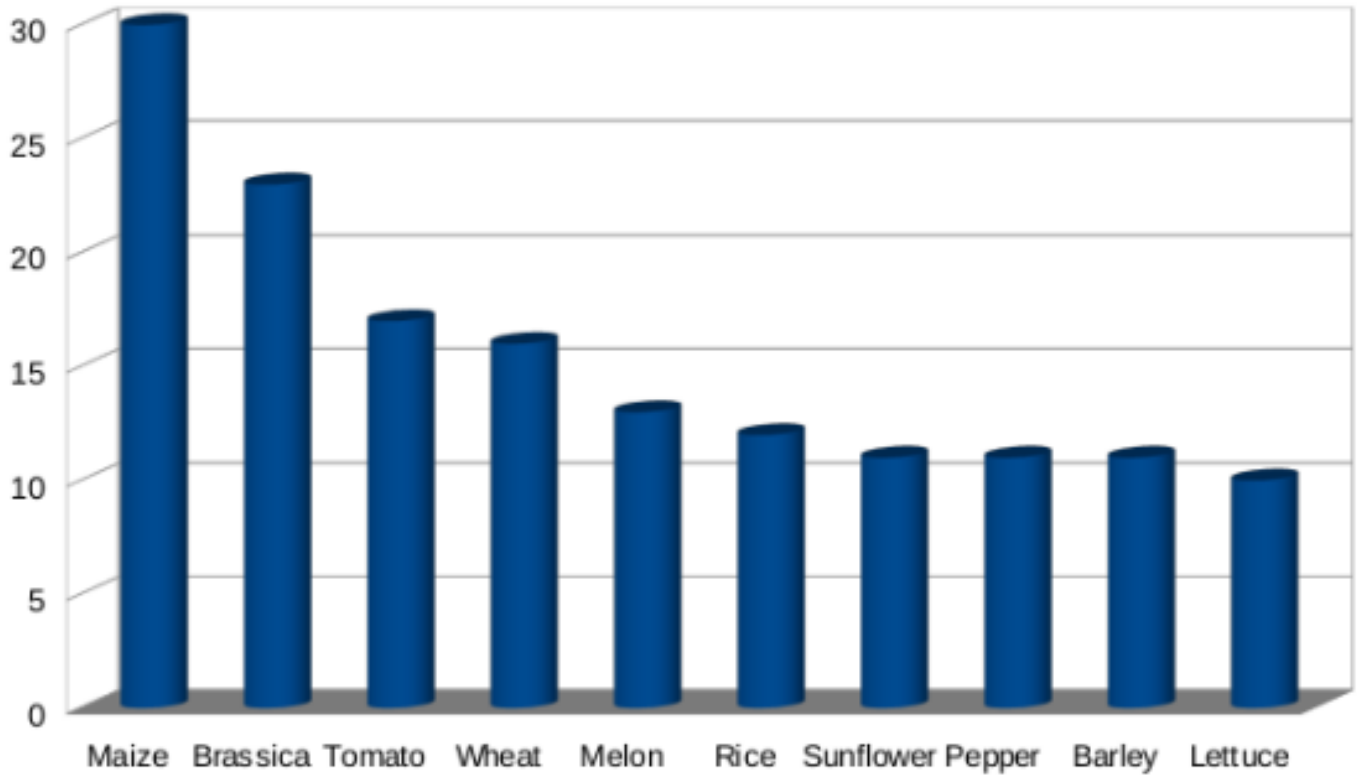


Figure 7: EPO patents granted on conventional plant breeding (international classifications IPC A01H or C12N15/82) between 2012 and 2022, categorized by species. Source: database of *No Patents on Seeds!*

What are the problems with patents on seeds?

Plants are not technical inventions!

Patents create monopolies: the patent holder can exclude other breeders from using them to bring new varieties to the market - or make breeders dependent on license contracts.

Breeding needs access to biological diversity.

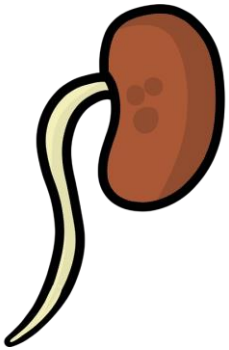
The current legal situation creates major legal uncertainty for breeders and food producers.

The plant variety protection law gives freedom to operate for all breeders to use all conventionally bred varieties on the market to breed even better varieties and market them independently. Patents do not grant this freedom to operate – licenses platforms only create new dependencies

In many cases, the patents also cover the use of the harvested plants in food production and food products. Patents thus represent one of the biggest threats to global food security.

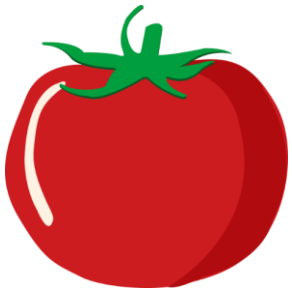
Recent patent applications on conventional breeding of plants

Recent patent applications in Europe



No patents on seeds! Report: 100 patent application on conventional breeding in 2022

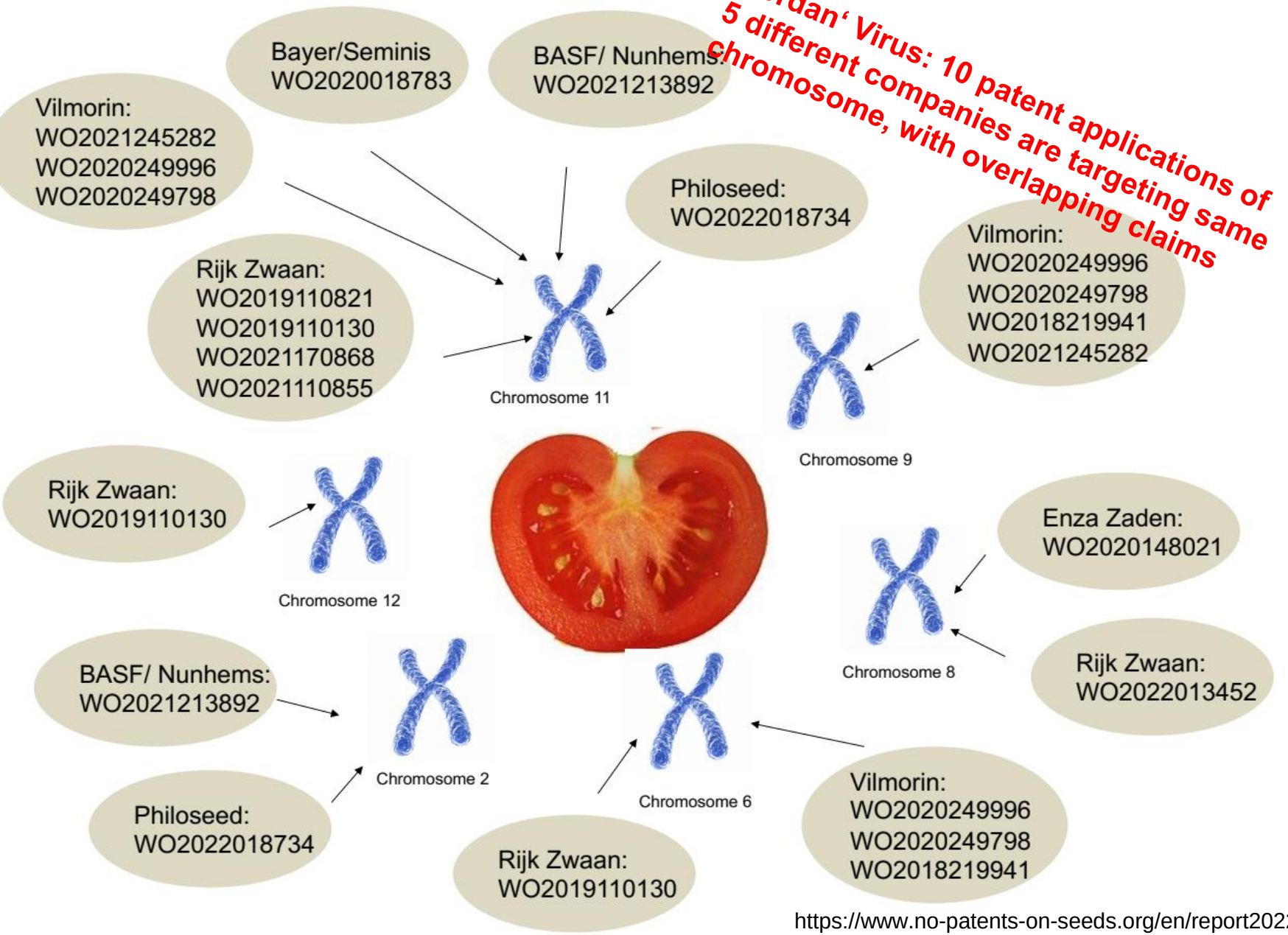
Syngenta / ChemChina patent application for soy plants with resistance to Asian soybean rust, WO2022173659
Gene variants were detected in populations of wild relatives of soybeans (glycine tomentella), crossing and selection is sufficient to generate new varieties with improved resistance. Part of claims: all plants inhering any of the listed genetic markers – around 45.000!



Rijk Zwaan patent application for tomatoes with resistance to Tomato Brown Rugose Fruit Virus (TOBRFV), WO2022013452
The patent description explains how the gene variants were detected in populations of wild relatives of domesticated tomatoes (Solanum pimpinellifolium), i. e. by screening for natural resistance. It is shown that crossing and selection are sufficient to generate new varieties with improved resistance to TOBRFV.
More than a dozens patent applications from different companies on TOBRFV resistance!

International patent applications on resistance against TBRF-Virus in tomato

‚Jordan' Virus: 10 patent applications of 5 different companies are targeting same chromosome, with overlapping claims



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

Recently granted patents on conventional breeding of plants

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 560 330 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
15.06.2022 Bulletin 2022/24

(21) Application number: **18169122.1**

(22) Date of filing: **24.04.2018**

(51) International Patent Classification (IPC):
A01H 1/04 *(2006.01)* ***C12Q 1/68*** *(2018.01)*
C12N 9/14 *(2006.01)* ***C12N 15/82*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
C12N 15/8255; A01H 1/04; C12N 9/0071; C12N 15/8216; C12Q 1/6895; C12Y 114/13088; C12Q 2600/156

(54) **PLANTS WITH IMPROVED DIGESTIBILITY AND MARKER HAPLOTYPES**

PFLANZEN MIT VERBESSERTER VERDAULICHKEIT UND MARKERHAPLOTYPEN

PLANTES À DIGESTIBILITÉ AMÉLIORÉE ET HAPLOTYPES MARQUEURS

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
30.10.2019 Bulletin 2019/44

(73) Proprietor: **KWS SAAT SE & Co. KGaA**
37574 Einbeck (DE)

- **MAURICE BOSCH ET AL: "Identification of genes involved in cell wall biogenesis in grasses by differential gene expression profiling of elongating and non-elongating maize internodes", JOURNAL OF EXPERIMENTAL BOTANY, vol. 62, no. 10, 14 March 2011 (2011-03-14), pages 3545-3561, XP055498299, GB ISSN: 0022-0957, DOI: 10.1093/jxb/err045**
- **RIBOULET C ET AL: "QTL mapping and candidate gene research from lignin content and cell wall digestibility in a top-cross of a flint maize**

Impacts on breeding: One patent – many problems

One patent can affect dozens of varieties:

Research in the (voluntary) PINTO database shows that the 100 patents listed affect almost 1200 varieties, the maximum number of varieties affected by one patent is 175.

Small and medium sized breeders do not have capacity to understand the complexity and negotiate access. And they should not have to!

Impacts on plant breeding & the food system



Patents impact the whole food chain: They lead to monopolisation of breeding, less diversity, less choice for farmers, and patents on food.

E.g. the independent private beer brewers in Austria stated that the patents on barley & beer by Carlsberg and Heineken threatened their economic foundation

Legal situation

Legal background: Patents & technical inventions concerning plants

- EU patent directive 98/44 allowed patents on technical inventions concerning plants and animals (Art. 4.2) for the first time in Europe.
- This is in form of an exemption from Article 53 (b) of the European Patent Convention (EPC), which prohibits patents on plant varieties as well as on plant breeding based on essentially biological processes.
- The wording of EU directive (1999) and the historical background (EPC 1973) make it clear that the exemption from the prohibition is only applicable to plants derived from genetic engineering (including genome editing).
- Therefore, e.g. random mutations, naturally occurring genetic variations or crossing and selection should not be patentable
- If patents on technological inventions are granted, the scope of the patents has to be restricted to the specific technical processes and any products thereof, so that conventional breeding is not affected.

Past clarifications of the interpretation of the patent law

- Explicit intention of the EU legislator has been clear since 1999 (patent directive 98/44): There should be patents on genetically engineered plants and animals, but not conventional seeds, they are „essentially biological“.
- However the EPO has granted patents on conventional seeds
- After several statements from European institutions (EP resolutions 2012, 2015, Commission notice C/2016/6997, Council Conclusions 2017), some progress was made – but it was not enough:
  A new Rule (28(2)) was established at the EPO to clarify „essentially biological processes cannot be patented“
- But large industry players strategically exploit loopholes in the decision, and patents on random mutagenesis, and gene variants are still granted by the EPO!

How to free the seeds

Patents on processes including crossing and selection, or the use of naturally occurring or randomly generated genetic variations, have to be prohibited, as well as the extension of patents on genetically engineered processes to plants and animals and plant and animal varieties obtained from conventional breeding.

The EU Directive did not want to change these prohibitions! There should be no patents on conventional seeds.

A first model law was established in Austria in 2023

Article 2, para 2.3. reads (own translation):

"*A process for breeding of plants or animals is essentially biological, if it is exclusively based on natural phenomena such as crossing, selection, non-targeted mutagenesis or random genetic variations that occur in nature.*"

Article 22 para 1b reads:

The rights conferred by a patent which concerns plants or animals do not extend to plants or animals with the same specified trait, which were produced independently from the patented biological material and with essentially biological processes, as well as not to biological material derived from that independent biological material through propagation or multiplication. (…)"

Source:
https://ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10002181

How to free the seeds

The correct interpretation of the EPC should be implemented as soon as possible by a simple majority vote in the Administrative Council of the EPO.

In parallel, national legislation of the contracting states of the EPO should be adopted with the inclusion of the correct interpretation of patent laws.

The EU should take a lead to ensure the correct interpretation of the EU directive: A strong signal from the European Parliament & a new Commission notice would be crucial to achieve correct interpretation!

Thank you!