



## COMMENTARY

### **“Patenting the ‘Climate Genes’ ... and Capturing the Climate Agenda”: A Communiqué by ETC Group**

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## **“Patenting the ‘Climate Genes’ ... and Capturing the Climate Agenda”: A Communiqué by ETC Group**

As concerns about global warming and climate change grow, efforts to adapt to these changes also grow. One important adaptation strategy is to breed traits into crops that increase their tolerance to drought, flooding, salinity and other yield-limiting factors that are directly affected by changes in climate. Some of the science for adapting plants to changing climate is done in the public domain, some by private firms, and some of these relevant genetic material and transformation tools are subject to patent claims. The ETC group released a Communiqué in mid-2008 that characterized these developments as a “patent grab” and viewed these patent claims on “climate proof” genes as “sweeping,” subject to narrow corporate control, and likely to drive up the costs and slowdown the research required to develop more adaptable crop varieties. In this paper, their characterization of the patents is subjected to analysis and their conclusions modified accordingly.

### **1. Summary of Communiqué**

ETC Group contends that the “Gene Giants”, exemplified by BASF, Monsanto, Bayer, Syngenta, and DuPont, claim so-called “climate ready” genes in a total of 55 distinct patent families—containing over 500 patent applications—that have been lodged in patent offices around the world. Many of the patents are said to be related to transcription factors that control stress responses, and to the proteins and genes encoding proteins that affect stress tolerance. In a discussion of several specific patents, ETC alleges that the claims encompass many plant species and, based on this, concludes that the patents are dangerously broad.

Expanding on this perspective, ETC Group also asserts that “... seed and agrochemical corporations are stockpiling hundreds of monopoly patents on genes in plants that the companies will market as crops genetically engineered to withstand environmental stresses such as drought, heat, cold, floods, saline soils, and more” to the ultimate detriment of small farmers. In particular, farmers in poorer countries (the global “South”) may fall victim to what ETC perceives as flash-in-the-pan solutions. ETC therefore calls for a variety of attacks, including the proposal that governments should suspend granting of all patents on climate change-related genes and traits. Furthermore, they urge removing “restrictive seed laws, intellectual property regimes, contracts and trade agreements” that pose barriers to farmers use of seeds.

### **2. Analysis of Patent Data Presented by ETC**

**ETC assertion:** “The Gene Giants are staking sweeping patent claims on genes related to environmental stresses....” in patent offices around the world.

**Reality:** Not every country allows patents to be granted for gene sequences or for transgenic plants. Claims for native gene sequences can be granted in the United States, European Patent Office, Australia,

and China for example, but not in any of the Andean countries or in many other developing countries. As such, the “patent grab” of the Gene Giants is necessarily limited in geographical scope. This is reflected in the countries most listed in Appendix A of the ETC article. Less than half of the patent families have a patent application filed in a developing country. Of these, nearly all of them occur in China, Argentina, and Brazil. That leaves more than 200 countries in which these patent applications will never be pertinent.

**ETC assertion:** Gene sequences are claimed in 532 granted patents and patent applications, although there are only 55 patent families.

**Reality:** The number of patent families is a more accurate indicator of the extent of patent filings.<sup>1</sup> ETC’s count of a total of 532 patent filings related to “climate-tolerant” germplasm and technologies is an overcount of the actual number of patent filings. A number of the patents and applications listed for each family are duplicate entries, such as WO02077403C2 and WO02077403A3, the first being a publication of a corrected page of the second. The WO filing, which is listed for the families, can never mature into a patent, but is “converted” into national filings, which are also listed. As well, publications of U.S. applications and their grants are both listed thus constituting double counting. Furthermore, abandoned patents and applications were also included in Appendix A of the ETC Communiqué.

**ETC assertion:** Many of the “patent claims extend not just to abiotic stress tolerance in a single engineered plant species, but also to a substantially similar genetic sequence in virtually all transformed plants.” Three examples of such broad claiming are then discussed: (1) US 7,253,000 (DuPont), which claims drought / cold tolerance in transgenic monocots and dicots; (2) US 7,161,063 (BASF), which claims “a specified polynucleotide sequence associated with increased tolerance to environmental stress found in any transgenic plant cell from monocot or dicot plants”; and (3) US 2006/0075523A (Syngenta), a patent application seeking to claim sequences that confer abiotic stress tolerance, including substantially similar gene sequences from monocot or dicot plants.

**Reality:** The labeling of claims as “broad” or “narrow” is in the eye of the beholder. Generally, to a patent lawyer, a broad claim is difficult to avoid infringing whereas a narrow claim is one that is relatively easy to avoid infringing. By this criterion, the two issued patents (to DuPont and BASF) have narrow claims.

Claim 1 of the DuPont patent reads:

“A transgenic plant cell transformed with a nucleic acid, wherein the nucleic acid comprises a polynucleotide selected from the group consisting of: a) a polynucleotide having the sequence as set forth in SEQ ID NO:12; and b) a polynucleotide encoding a polypeptide having the sequence as set forth in SEQ ID NO:20.”

In our view, and in contrast to ETC’s opinion, this is a narrow claim. The transgene must either have a specific sequence or encode a protein with a specific sequence, which are set out in the Sequence Listing of the patent. The claim literally excludes coverage of any nucleotide sequence that deviates

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<sup>1</sup> A patent family is a group of patents that share a common priority patent application.

from either SEQ ID NO:12 or encodes a protein sequence that deviates from SEQ ID NO: 20. The other claims of the patent similarly are limited to one of the two sequences. Therefore, although the transformed plant species is unlimited, the transgene sequence is extremely limited, leading to the conclusion that this patent has narrow claims.

Patent filing US 7253000 has a very narrow claim 1 (recites a specific DNA sequence) but a somewhat broader claim 11.

Claim 11 reads:

“A method for increasing plant tolerance to abiotic stress, comprising transforming a plant with a transformation vector comprising an isolated polynucleotide encoding a transcription factor which is involved in modulation of gene expression and is at least 85% identical to SEQ ID NO: 2 or SEQ ID NO: 4, wherein said percent sequence identity is based on the entire SEQ ID NO: 2 or SEQ ID NO: 4 and is determined by BestFit analysis under default parameters.”

Sequences 2 and 4 are *Zea mays* transcription factors CBF1 and CBF2.

This author was puzzled that a claim of this breadth issued in the United States, given the current state of patent law. An investigation of this claim on the U.S. Patent and Trademark Office revealed that claim 11 had been canceled from examination; its inclusion in the printed patent is an error on the part of the patent office. In fact, a follow-on patent contains a claim directed to similar subject matter but limited to a transgene encoding the transcription factor having SEQ ID NO: 4; no related protein sequences are part of the claim. Issued claims of this ilk are typical these days.

Syngenta’s patent application will likely suffer the same fate as DuPont’s and BASF’s—the examination will probably approve only claims to specific sequences. Syngenta is currently pursuing claims directed to SEQ ID NO: 3, fragments, related molecules, etc. The Examiner has rejected the claims as being too broad for the disclosure of the patent application.

### **3. Conclusion**

The report by ETC Group provides an overview of patent applications directed to abiotic stress-related gene sequences. The basic finding and listing of 55 patent families assists interested organizations in crafting their own research and development strategy. It also underscores the paucity of research pertaining to these important public policy and intellectual property practice concerns.

There is no cause for panic, however. Visions of gene grabbing and holding farmers hostage are unwarranted. At most, the patents will be granted in only a handful of countries in the world, allowing the vast majority of countries to use these gene sequences. A positive fallout is that the sequences and experiments are published, giving ready access to the data. Furthermore, delving into three patents cited by ETC Group as especially damaging has shown that the claims are fairly narrow, probably easy to avoid, and one patent even contains a substantial error in the claims.

Overview patent landscapes, like this one by ETC Group, are helpful for setting out the lay of the landscape. However, conclusions about the innovation, commercialization and larger economic and environmental consequences of these particular patents require careful and detailed investigation. In

fact, we have shown that a preliminary but purposeful investigation leads to conclusions very different than those of ETC.

### **References**

ETC Group. *Patenting the "Climate Genes" ... and Capturing the Climate Agenda*. Communiqué No. 99 (May/June 2008). Available on line at [http://www.etcgroup.org/upload/publication/687/03/etcgroupclimategenesfinal05\\_08.pdf](http://www.etcgroup.org/upload/publication/687/03/etcgroupclimategenesfinal05_08.pdf).