

Syngenta – The Genome Giant?

No more “Mr. Nice Guy,” Syngenta makes a bid for multi-genome monopolies – not just control of rice gene sequences but those of 40 plant species – as it plays private games with public science and leads nanotech down on the farm.

ISSUE: Swiss gene giant Syngenta, the world’s largest agrochemical corporation and third largest seed company (see tables) has applied for patents that could effectively allow the company to monopolize key gene sequences that are vital for rice breeding as well as dozens of other plant species. Syngenta’s enthusiasm for the rice genome stems from rice’s major genetic similarities (i.e., DNA or protein sequences) to other species ranging from maize and wheat to bananas. (The genetic similarities are called “homologies.”) While the Genome Giant “donates” rice germplasm and information to public researchers with one hand, it is attempting to monopolize rice resources with the other. Governments, public sector researchers and the United Nations must re-evaluate and reform their cozy connections to companies like Syngenta.

IMPACT: At the close of 2004 – anointed the “International Year of Rice” by the United Nations – researchers were just weeks away from completing a polished sequence of the rice genome, the DNA blueprint of the crop that feeds half the world’s people – including information related to the control of rice’s biological functions. Syngenta’s controversial and convoluted relationship with rice, poor farmers and patents, including its sticky involvement with genetically modified Golden Rice and the Syngenta Foundation’s embarrassing membership in the Consultative Group on International Agricultural Research (CGIAR), could further hamper the United Nations’ Millennium Goal of halving the number of hungry people by 2015 – especially the half that survives on rice.

POLICIES AND FORA: Syngenta should immediately withdraw its EPO patent claims and publicly clarify its policy on genome sequence patenting and public access to genome data. In the meantime, Syngenta should be removed from membership in CGIAR and excluded from UN fora. As a preemptive action, ETC Group has written to the World Intellectual Property Organization (WIPO), the US Patent and Trademark Office (USPTO) and the European Patent Office (EPO) urging them to reject Syngenta’s sweeping patent applications related to the rice genome. When the Conference of the Parties to FAO’s Genetic Resources Treaty meets in 2005, governments must ensure that genome sequence information is deposited in public databases that guarantee free access but with strict prohibitions against intellectual property on the use of information, germplasm and its parts and components. When the scientific committee (SBSTTA) of the Convention on Biological Diversity (CBD) meets in Bangkok, February 7-11, governments should examine the implications of “digital” genome patent claims on food security and biodiversity, and take steps to prevent privatization. CGIAR, FAO and – most importantly, the UN in its 2005 review of the Millennium Development Goals – needs to re-establish the integrity of public institutions, including governments, and the quality of governance vis-à-vis global corporations. Finally, FAO and the UN must monitor and evaluate the impact of new technologies, including nano-scale technologies, not only in food and agriculture but in every aspect of society and the economy.

Introduction: DuPont has always been brighter and Monsanto has always been “badder,” but in 2004 Syngenta has shown that it can get down and dirty with the worst of them. At the end of November 2004 at the Asia-Pacific Convention on Food Sovereignty in Dhaka, Bangladesh, ETC Group was asked point-blank, “Who is the enemy?” by the farmers’ organizations present. Expecting the almost ritual response, “Monsanto,” the 600 delegates were treated instead to a litany of Syngenta’s latest exploits. “If your concern is food security,” the audience was told, “Syngenta has crop genome patents pending that make Monsanto’s outrageous soybean species patent seem modest.¹ If the issue is control of public science, Syngenta is becoming omnipresent in CGIAR and FAO. If your fear is technology monopoly, Syngenta holds more patents on Terminator seed technology than any other company.² And Syngenta is leading the pack in bringing nanotechnology to crop chemicals.” Here’s what Syngenta has been up to while we were all watching Monsanto shoot itself in the foot with biotech’s silver bullet...

Syngenta: Who’s Your Daddy?

Syngenta traces its roots to a long line of multinational mergers and acquisitions:
1970 – Swiss chemical companies Ciba and Geigy merge to form **Ciba-Geigy**.
1996 – Sandoz (Swiss) merges with Ciba-Geigy (Swiss) to form **Novartis**.
1993 – ICI (British) spins off agrochemical, seed and pharma interests to form **Zeneca** (British).
1999 – Astra (Swedish pharmaceutical company) merges with Zeneca to form **AstraZeneca** (Swedish/British life sciences company)
2000 – Novartis’ agrochemicals and seed divisions and **AstraZeneca’s** agrochemical business merge to form **Syngenta**.

Source
<http://www.corporatewatch.org.uk/genetics/syngenta.htm>

Mr. Nice Guy...or just the Rice Guy? Tangled Tales of the Rice Genome: Since 1997, both public and private sector research groups worldwide have been alternately competing and ETC Group *Communiqué*, Issue # 86
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collaborating to sequence the rice genome. The front-runner consortium is the International Rice Genome Sequencing Project (IRGSP), a network of publicly funded laboratories in ten countries. While the IGRSP focuses on the rice sub-species *japonica*, the Beijing Genomics Institute (BGI) is sequencing rice’s *indica* sub-species. Meanwhile, in the private sector, Monsanto and Syngenta have been avidly charting their own rice genome maps. In early 2005, the international public sector rice sequencers are inching to the finish line. Although rice is only one of 1,182 registered genome projects underway (as of mid-2004), it is unquestionably the most relevant genome for sustainable food security.³

Rice may not be a major commodity in world trade, but it is cultivated in 113 countries and on all continents except Antarctica.⁴ Developing countries produce ninety-five percent of the world’s rice production and rice feeds more of the world’s people than any other crop. So it’s not surprising that the rice genome is a focus for public researchers – especially in Asia. But why are multinational Gene Giants like Monsanto and Syngenta competing and occasionally collaborating in the rice race? Are the companies taking the long view and looking for bucks at the “bottom of the pyramid?” One reason is certain: “rice is particularly attractive from a genomics perspective,” explains Syngenta rice researcher Stephen Goff, because “it has the smallest genome of the important crop cereals [and is] a model for the much larger genomes of maize and wheat.”⁵ In other words, by sequencing the rice genome and analyzing its genes and their functions, researchers can uncover agronomic traits that should pop up in many other – commercially (or collectively) more important – species such as maize, wheat and banana. The digital print-out of a rice DNA sequence that codes for early-maturity, for example, is very likely to turn up in other crops. If a corporation can patent uses of the sequence in rice, it can also lay claim to the same sequence (homologous DNA) in dozens of other species – or at least that’s what Syngenta hopes patent examiners will believe! In the Gene Giant’s food chain, rice is not an end but a means to multi-genome monopoly.

World's Top 10 Agrochemical Firms

Company	2003 Agchem Sales US millions
1. Syngenta (Switzerland)	\$5,507
2. Bayer (Germany)	\$5,394
3. BASF (Germany)	\$3,569
4. Monsanto (US)	\$3,031
5. Dow (US)	\$3,008
6. DuPont (US)	\$2,024
7. Sumitomo Chemical (Japan)	\$1,141
8. MAI (Israel)	\$1,035
9. Nufarm (Australia)	\$801
10. Arysta (Japan)	\$711

Source: *Agrow World Crop Protection News*, 25 August 2004, PJB Publications Ltd.

Below, ETC Group examines the leading public and private players and power struggles in the rice race:

The International Rice Genome Sequencing Project (IRGSP), a consortium of publicly funded laboratories, led by rice genome researchers in Tsukuba, Japan, was established in 1997 with the goal of producing a high quality, map-based sequence of the rice genome using the cultivar Nipponbare of the sub-species *japonica* – the short-grain rice popular in Japan. Today, there are 13 members of IRGSP in 10 countries.⁶ (Japan, USA, China, Taiwan, Korea, India, Thailand, France, Brazil, and the UK.) The Project adheres to a policy of immediate release of its sequence data to the “public domain” (see box below). IRGSP uses a slow and expensive sequencing method known as “clone-by-clone,” which provides the most precise and complete sequence, with a goal of 99.99% accuracy across the entire genome.

The Beijing Genomics Institute (BGI) is the other major public sector effort to sequence the rice genome. BGI's focus is the rice sub-species *indica*, which is grown in China and accounts for most of the world's rice. The Beijing researchers are using the “whole genome shotgun” strategy, a faster, but less accurate method than the “clone-by-clone” technique.⁷

In April 2000 **Monsanto**, the world's leading purveyor of genetically modified seeds and traits, made available its draft sequence of part of the rice genome (using the “clone-by-clone” method) to IRGSP. Monsanto, which had also sequenced the Nipponbare strain, allowed members of IRGSP to use the sequenced clones, on condition that they not commercially exploit them.⁸

Less than one year later, in January 2001, **Syngenta** and its partner **Myriad Genetics** (USA) announced the completion of the draft sequence of the *japonica* rice genome using the shotgun method, but the company opted not to publish its data. Noting that his company had finished sequencing six months ahead of schedule, Adrian Dubock, Syngenta's Head of Ventures & Licensing, told *The Scientist*, “we need a bit of time to assess our own commercial interest...at the moment we've a time advantage created with commercial money and we're looking for a reward.”⁹ It was then that Syngenta's lawyers began actively seeking a reward – by filing monopoly patent applications related to the rice genome. (See below.) Adrian Dubock now serves on the Golden Rice Humanitarian Board.

Later the same year, Syngenta announced a new Technology Transfer Policy to facilitate the South's access to the company's patented technologies.¹⁰

In April 2002 the BGI (sequencing *indica*) and Syngenta (sequencing *japonica*) simultaneously published descriptions of their results in *Science*. But while BGI placed its data in GenBank, the standard repository for public genomic data, Syngenta opted to restrict public access by placing its data on the web site of its then-subsiary Torrey Mesa Research Institute (the California-based lab that coordinated the sequencing). Prominent academic researchers (including two Nobel prize winners) protested the move. Echoing the rationale of a year earlier, a Syngenta spokesman told *Science* in 2002 that the company believed it had “a significant commercial advantage” and wasn't ready to permit unrestricted use of its data by its competitors.¹¹

The following month, responding to an outcry from public scientists, and pressured by Monsanto's more media-savvy example, Syngenta finally surrendered its rice data to the IRSGP under an access agreement for participating organizations.¹²

Top 10 Rice Producers 2003
(paddy production in metric tonnes)

1. China	166,000,000
2. India	133,513,000
3. Indonesia	51,849,200
4. Bangladesh	38,060,000
5. Viet Nam	34,605,400
6. Thailand	27,000,000
7. Myanmar	21,900,000
8. Philippines	13,171,087
9. Brazil	10,219,300
10. Japan	9,863,000

Source: FAO, 2004

Meanwhile, as scientists and Syngenta sparred over the company's undisclosed sequence information, the company's lawyers were filing patents based on its findings.

The Humungous Homologue Heist: Recent Syngenta Patent Applications In June 2002, Syngenta applied for three patents based on its rice genome research:

- **WO03000904A2/3** relates to the manipulation of "development and timing of flower formation in plants and which can be used to modulate flower development, architecture and flowering time."
- **WO03000905A2/3** discloses "a set of genes the expression products of which are up-regulated during the grain filling process in rice and active in different metabolic pathways involved in nutrient partitioning. The invention also discloses the use of said genes to modify the compositional and nutritional characteristics of the plant grain."
- **WO030007699A2/A3** provides "polynucleotides encoding transcription factors of cereals and in particular

rice...Also provided are recombinant vectors, expression cassettes, host cells and plants containing the polynucleotides. Methods for using the polynucleotides to alter resistance or tolerance of plants to stress, alter biological pathways, and alter gene expression are also provided."

Dr. Paul Oldham of the ESRC Centre for Economic and Social Aspects of Genomics at Lancaster University (UK) has written a detailed analysis of international patent application WO03000904A2/3, which claims monopoly control of DNA that regulates flowering development, flower formation, whole plant architecture and flower timing in rice – in up to 115 countries.¹³ According to Oldham, the scope of the patent application is virtually limitless – extending to flowering plants in general, including those not yet classified by taxonomists! The 323-page patent application extends to at least 23 major food crops under the International Treaty on Plant Genetic Resources for Food and Agriculture – the legally binding treaty governing the conservation and exchange of vital crop germplasm.¹⁴ Crop species protected by the Treaty cannot be placed under intellectual property. If Syngenta's patents are approved, the fundamental integrity of the Treaty is compromised.

Oldham warns that recent patent claims on DNA sequences found across organisms may have significant negative "anticommons" effects on the future of agricultural research and innovation: "The problem that emerges here is that if the patent application is successful anyone using the sequences, or 'substantially similar' or 'homologous' sequences for trait selection, identifying varieties, and plant breeding may run the risk of patent infringement. This extends to the use of the sequences within a primer and computer readable [digital] medium."¹⁵ "Does this imply," asks Oldham, "that public and private research initiatives may be required to enter into agreements with patent holders [Syngenta] for the use of the DNA sequences, or 'homologous' or 'substantially-similar' sequences, or risk potential litigation?"¹⁶

Syngenta's pending patents may be accepted, rejected or amended by the European Patent Office any day now. It is customary for corporate patent lawyers to reach for the moon when they craft their claims, of course, but Syngenta's claims are a true reflection of its willingness to monopolize the genome of one of the world's most critical food crops – and much more. Patent offices increasingly view the Gene Giants as their “customers” rather than seeing themselves as defenders of the public good.

If Syngenta has no intention to monopolize rice or other crop genomes, the company should immediately withdraw its EPO patent claims and publicly clarify its policy on genome sequence patenting and public access to genome data. Regardless of its patent posture, Syngenta should be removed from membership in CGIAR. Until Syngenta abandons its claims and corrects its public domain policies, it should be denied its observer status in UN fora.

A Firm's Foundation? CGIAR as Syngenta's Southern Exposure: In late October 2002, four short months after Syngenta filed its rice DNA sequence patents, the Consultative Group on International Agricultural Research (CGIAR) – a network of 15 research centres whose goal is to generate “global public goods that are available to all” – welcomed four new members: Israel, Malaysia, Morocco and the Syngenta Foundation. While CGIAR membership is open to private foundations that support the CGIAR's mission as well as to governments, the Syngenta Foundation has a character distinguishing it from the three other foundation members of CGIAR (Ford, Kellogg and Rockefeller). Most obviously, none of the other foundations are linked to transnational enterprises in the seed and agrochemical business.

According to the Syngenta Foundation web site, “the CGIAR welcomed the Foundation's membership as marking ‘an important new direction in addressing hunger and poverty around the globe.’”¹⁷ New direction indeed. Five men serve on the Syngenta Foundation's Board. Of the five, two also serve on the Board of Syngenta:

Heinz Imhof is President of the Syngenta Foundation as well as Chairman of the Board of Syngenta. Pierre Landolt is also on both Boards (and on the Board of Novartis, the Basel-based pharmaceutical giant and former parent of Syngenta). (Andrew Bennett, the Foundation's Executive Director, is a long-time CGIAR insider as former chair of the Group's Oversight Committee and as former director of rural livelihoods and environment and chief natural resources adviser at the UK government's Department for International Development. Christian Bonte-Friedman, another Foundation board member, is even more of an insider, having been Director General of a CGIAR centre [ISNAR, now defunct] and an Assistant Director General of FAO.)¹⁸

According to the Syngenta Company's articles of incorporation, “the Board of Directors shall consist of a maximum of twelve members who shall be shareholders.”¹⁹ In addition, the Chairman of the Board “shares responsibility for the strategic direction of Syngenta with the Chief Executive Officer (CEO)... [and] represents, jointly with the CEO, the interests of the Company as a whole...”²⁰ This means that at least two board members of the Syngenta Foundation are shareholders of the Syngenta Company and that the Foundation's President also happens to be responsible for the “strategic direction” of the Company. And it means that the Company can heavily influence the activities of the Foundation.

The Foundation's goals and the Corporation's goals are not the greatest concern. The real concern is that the goals and work of CGIAR, as a public sector network, are being influenced by Syngenta's private sector agenda. For example, when CGIAR finally decided to examine the issue of GM contamination in September 2004, Syngenta – the Company – was invited to attend and give its views. Farmers' organizations were not invited.²¹ Why has CGIAR allowed Syngenta to play a role in public sector international agricultural governance?

Necrofieldiacs, or FAO's Pests? Syngenta is only the most prominent among many multinational seed, biotech and agrochemical companies becoming common fixtures in the UN Food and Agriculture Organization's corridors in Rome. Some attribute their increasingly pervasive presence to the UN Secretary-General's Global Compact – the UN's new strategy of partnering with multinational corporations as part of the Millennium Development Goals. While Syngenta isn't a card-carrying member of the Global Compact (although its former parent, Novartis is), the genome giant is a member of CropLife International, the Brussels-based global pesticide trade association better known to its environmental critics as the "Necrofieldiac" of organic farming. The growing influence of CropLife International, and of Syngenta in particular, has resurrected concerns that FAO's past close collusion with multinational agribusiness is returning. Syngenta's CEO is currently the president of CropLife.

In the late 1960s, A.H. Boerma, a former Dutch Minister of Agriculture and consultant to Shell Oil (then heavily invested in agrochemicals) became Director-General of FAO and quickly threw his support behind the Industry Cooperative Programme (ICP). The ICP was an undisguised lobby group for agribusiness whose staff were ensconced directly within FAO headquarters. During Boerma's reign, the ICP dominated FAO's policies and publications related to the use of crop chemicals and also worked closely with the international centres that eventually formed the CGIAR. ICP officials led and directed national advisory teams, wrote chemical user handbooks, and generally promoted the concepts of industrial agriculture throughout the South under the FAO banner.²² However, when Edouard Saoma, an FAO insider, unseated Boerma in 1976, he joined forces with Sweden and other sympathetic governments to oust the ICP on the grounds that it was compromising good governance. Ah, the good old days!

Within a year, however, the ICP was transformed into the ICD (Industry Council for Development) under the protection of the UN Development Program and headquartered at UN Plaza in New York.

Multinational encroachment in agriculture surfaced again in the preparations for the World Food Summit of 1996. At that time, the fledgling new Director-General of FAO, Jacques Diouf, desperate to finance the expensive Summit, penned a letter to major food and agricultural corporations inviting their CEOs to participate in the Summit as his personal guests. In return for a \$1 million contribution, the Director-General offered to give the corporations access to all aspects of the Food Summit and to grant them priority access to directly influence any follow-up policies and programmes in their fields of interest. When CSOs got wind of the proposal, the Director-General withdrew his offer.

Thus, when FAO released its 2004 State of the World's Food and Agriculture (Sofa) report favorable to agricultural biotechnology, civil society organizations were understandably alarmed. Since then, the growing presence of Syngenta and CropLife International in the FAO headquarters and meetings has caused CSO concerns to escalate.

The Golden Rice Guy: Tarnished Transgenes and Tainted Trust: For those who have followed the fractious biotech debate, Syngenta and Golden Rice are nearly synonymous. Golden Rice refers to the genetically modified, beta carotene-enriched rice that industry heralds as the biotech solution to Vitamin A deficiency plaguing millions of poor people in the South. It's the biotech industry's favourite 'proof of concept' that GM crops could benefit poor people – in other words, it's powerful PR. Steve Linscombe, senior rice breeder at

Louisiana State University (LSU, USA) where Golden Rice was grown in field trials this summer, explains it this way: "We look at [Golden Rice] as a good mechanism for informing the public that genetic engineering does have a lot of positive benefits."²³ ETC Group and other critics note that is not yet known whether Golden Rice is a safe, effective or appropriate technology; there are safer, cheaper and less controversial methods for addressing Vitamin A deficiencies.

On the eve of World Food Day 2004, Syngenta generated headlines by announcing it would donate new Golden Rice seed and lines to poor farmers in the developing world via the Golden Rice Humanitarian Board and stated that “the company has no commercial interest in the Golden Rice project.”²⁴ When asked for clarification on this point, a spokesperson for Syngenta explained to ETC Group that the company will retain rights but, “in the long view” has “no plans” to commercialise Golden Rice.²⁵

But Syngenta’s self-presentation as magnanimous steward of Golden Rice is misleading. In May 2000, millions of dollars and 10 years worth of publicly funded research on Golden Rice was surrendered to multinational Gene Giant AstraZeneca (now Syngenta) because the public sector researchers developing it were paralyzed in the face of an estimated 70-105 patents which they believed blocked commercial release of Golden Rice technology. In reality, the patents were not insurmountable obstacles for poor countries.²⁶ Assuming the position of owner, the company promptly announced that it would donate “license free” rights for poor farmers in the South – a move that generated substantial publicity and considerable controversy.²⁷

To date, Golden Rice has not been commercialized anywhere in the world, but it was field-tested for the first time in 2004 in Louisiana on a test plot approximately 40m x 10m. September’s harvest is currently being tested for Vitamin A content and the results are expected to be published within a year.²⁸ According to Syngenta, more field trials will be conducted in Asia in 2005.²⁹

Meanwhile, a Golden Rice Humanitarian Board has been established to steward the project, and to foster the use of GM rice for humanitarian purposes in poor countries. The Board’s responsibilities include overseeing biosafety and socio-economic assessments, supporting deregulation and mediating information.³⁰ In addition to the two “inventors” of Golden Rice, Ingo Potrykus and Peter Beyer, the Board includes representatives from CGIAR Centres (IRRI,

IFPRI), national government agencies (USDA), private foundations (Rockefeller), universities (Cornell and Swiss Federal Institute of Technology) and one private corporation (Syngenta). Syngenta’s representative on the Board is Adrian Dubock, Head of Ventures & Licensing.

One of the groups represented on the Humanitarian Board is IRRI, the International Rice Research Institute, one of the CGIAR centres. IRRI has established a “Golden Rice Network” to facilitate its development and distribution. Dr. Gerard Barry, former Director of Research Product and Technology Cooperation, Monsanto (among other positions held at Monsanto), became coordinator of the Golden Rice Network at IRRI in late 2003. His title is Deputy Director General for Partnerships.

Syngenta’s 2004 Seed Company Acquisitions

- Advanta BV (including Garst maize and soybean)
- Garwood Seed
- Golden Seed Co., LLC
- Golden Seed Co. Inc.
- J.C. Robinson Seeds, Inc.
- Sommer Bros. Seed Co.
- Thorp Seed Co.,
- Golden Harvest Seeds, Inc.
- maize breeding material from CHS Research

With these acquisitions Syngenta increases its North American market share to approximately 15% in maize and 13% in soybeans.³¹

Public domain...or dominating the public?

In a world of run-away privatization, the concept of “public domain” is being perverted. Unfortunately, depositing genomic information in public databases does not guarantee that it won’t be privatized.

In theory, public domain germplasm and information cannot be subject to IP claims *per se*, because they are already “public”— existing as prior art, and therefore not “new.” Gene Giants like Syngenta state that “unaltered genetic material in its natural environment is not patentable.”³² But there are giant loopholes that render these principles meaningless. Once isolated, modified, purified, altered or recombined, the “raw” material becomes fair game for monopoly patent claims. The following examples illustrate how so-called “public domain” resources can be turned into patentable, private commodities:

J. Craig Venter, the controversial and flamboyant genomics mogul, is leading a US-government funded ocean expedition to collect microbial diversity from marine and terrestrial environments worldwide.³³ Microbial samples collected by the expedition are shipped to Venter’s laboratory in Maryland (USA) where they are de-coded by a fleet of sequencing machines that operate around the clock. Venter’s non-profit Institute for Biological Energy Alternatives pledges not to patent the raw microbes it collects, a pledge that aims to silence critics and defenders of national sovereignty – while leaving the back-door open to monopoly patent claims. Modified microbes or new life forms engineered from collected microbes, as well as products or derivatives based on genomic information, can be patented and privatized. Furthermore, only a handful of institutions have the capacity to handle the genomic information and the high-tech, costly tools required for its interpretation. And many of these tools are themselves proprietary technologies.

The legally-binding International Treaty on Plant Genetic Resources seeks to insure international cooperation and open exchange of “any genetic material of plant origin of actual or potential value for food and agriculture,” most of which was developed, improved and exchanged by farmers over 10,000 years. The Treaty applies to over 64 major crops and forages. Although the spirit of the Treaty is to safeguard Farmers’ Rights and to prohibit intellectual property claims on plant genetic resources covered under its Multilateral System, ambiguous clauses on intellectual property threaten to betray farmers and the public interest: “Recipients (of material taken from the covered crops) shall not claim any intellectual property or other rights that limit the facilitated access to the plant genetic resources for food and agriculture, or their genetic parts or components, *in the form received from the Multilateral System.*” The clause, “in the form received,” means that you can’t slap a patent on exchanged seed or even its genes or fragments – but the door is ajar to intellectual property claims once breeders change the original material – effectively making the Multilateral System a “feedstock” for genetic material that breeders can modify to gain exclusive monopoly. But how much breeding work is required before something is considered novel and therefore patentable? A recent CGIAR publication provides a “handbook” on how and under what conditions intellectual property can be claimed on derivative material included under the Multilateral System.³⁴

Does putting information (genes, seeds, human DNA, etc.) in the public domain facilitate piracy? In the context of today’s intellectual property regimes, the answer is yes. There are few mechanisms to prevent individuals and enterprises from seeking to privatize collective public resources, and many rewards for doing so. Does this imply that it would be better to keep information out of the public domain? No. First and foremost, patents on nature should be illegal. Second, governments and public sector bodies must re-evaluate and strengthen public domain resources and the collective rights of innovators.

Biotech's Gene Giants

Gene Giant	Agrochemical Sales 2003	Seed Sales 2003
Syngenta	\$5,507	\$1,071
Monsanto	\$3,031	\$1,879
Dupont	\$2,024	\$2,240

Source: ETC Group

How Small is Syngenta? Nanotech Down on the Farm:

While Syngenta's seed sales were over a billion dollars in 2003, the bulk of its revenue came from sales of its agrochemicals, which exceeded seed sales five-fold (\$5.5 billion). Syngenta, like other Gene Giants, are now researching and, in some cases, selling agrochemicals containing nano-scale active ingredients, that is, particles on the scale of atoms and molecules. Nano-scale materials are just beginning to get attention from scientists and regulators because they appear to exhibit different toxicity from the same materials on larger scales. Currently, no government regulatory system in the world is prepared to address the potential health and environmental impacts of manufactured nanoparticles. (See ETC Group report, "Down on the Farm," available at www.etcgroup.org.)

Syngenta already sells pesticide products formulated as emulsions containing nano-scale droplets. The company says that the particle sizes are about 250 times smaller than typical pesticide particles. According to Syngenta, the active ingredients are absorbed into the plant's system and cannot be washed off by rain or irrigation.³⁵ Nano-scale pesticides can also be encapsulated – packaged within a kind of tiny "envelope" or "shell" – and Syngenta is researching nano-encapsulated pesticides, in order to control the conditions under which the chemicals are released.³⁶ Will nano-encapsulated pesticides pose greater threats to human health and safety, and the environment? Will nano-scale pesticides be smuggled into the food chain more readily? At this point, nobody knows the answers to these questions.

Recommendations: All of today's Gene Giants challenged the infamous soybean species patent granted by the European Patent Office to Agracetus in 1994. Then Monsanto had an epiphany and decided that monopoly control of a

major food crop was a great idea and perfectly ethical. Monsanto bought Agracetus acquiring control of the patent and defending it in court.³⁷ Twelve years later, ETC Group and Syngenta are still challenging the species patent. Why should we be surprised that one of the Gene Giants is now going after multi-genome monopolies? The rise of genomics allows claims across species, genera and classes.³⁸

If Syngenta has no intention to monopolize rice or other crop genomes, the company should immediately withdraw its EPO/WIPO patent claims and publicly clarify its policy on genome sequence patenting and public access to genome data. Regardless of its patent posture, Syngenta should be removed from membership in CGIAR. Until Syngenta abandons its claims and corrects its public domain policies, it should be denied its observer status in UN fora.

ETC Group has preemptively written to WIPO, EPO and USPTO urging them to immediately reject Syngenta's sweeping multi-genome patent applications. Because of the implications for the FAO Treaty on Plant Genetic Resources for Food and Agriculture, public research, and food sovereignty, ETC Group has also written to FAO and CGIAR urging both organizations to demand the rejection of the Syngenta claims.

When the Conference of the Parties to FAO's Genetic Resources Treaty meets in 2005, governments must ensure that genome sequence information is deposited in public databases without restrictions but with strict prohibitions against intellectual property on the use of information, germplasm and its parts and components. Civil society and UN agencies should also examine public domain issues including public databases and repositories to ensure that the public's interests are truly being served and that intellectual property or other monopolistic claims are not allowed.

When the scientific committee (SBSTTA) of the Convention on Biological Diversity (CBD) meets in Bangkok, February 7-11, governments should examine the implications of “digital” genome patent claims for food security and biodiversity.

CGIAR, FAO and – most importantly, the UN in its 2005 review of the Millennium Development

Goals – needs to re-establish the integrity of governments and the quality of governance vis-à-vis global corporations.

Finally, FAO and the UN must monitor and evaluate the impact of new nano-scale technologies not only in food and agriculture but in every aspect of society and the economy.

Rice: The Events of Sequencing

1997	The International Rice Genome Sequencing Project (IRGSP), a consortium of publicly funded laboratories, led by the Rice Genome Research Program in Tsukuba, Japan, is established.
April 2000	Monsanto makes available to IRGSP a draft sequence of part of the rice genome using the “clone-by-clone” method.
May 2000	Beijing Genomics Institute (BGI) sets out to sequence the genome of the rice sub-species <i>indica</i> .
May 2000	The Swiss and German researchers who developed Golden Rice announce they cannot navigate the tangle of patent licenses needed to get Vitamin A rice to farmers and opt to surrender their research (the product of \$9 million in public funding) to AstraZeneca.
July 2000	European Commission clears the merger of the agrochemicals/seed divisions of Novartis and AstraZeneca to create Syngenta
Jan. 2001	Syngenta announces that it has completed the sequencing of the <i>japonica</i> rice genome, but does not publish the data.
April 2002	BGI (sequencing <i>indica</i>) and Syngenta (sequencing <i>japonica</i>) publish descriptions of their sequencing results in <i>Science</i> . BGI deposits data in GenBank; Syngenta does not.
June 2002	Syngenta files for three patents based on its rice genome research.
July 2002	Syngenta announces that it will share its draft sequence with two member laboratories of IRGSP and agrees “to allow its data to be inserted into GenBank as part of any finished sequence submitted by [IRGSP],” though public access to its genome data remains restricted through the TMRI web site. ³⁹
Oct. 2002	Syngenta Foundation for Sustainable Agriculture becomes a member of the CGIAR.
Dec. 2002	The UN declares that 2004 will be the “International Year of Rice.”
Dec. 2002	IRGSP announces the completion of a high quality draft sequence of the rice genome.
Sept. 2004	The first Golden Rice field trials are harvested in the USA at Louisiana State University’s AgCenter’s Rice Research Station.
Oct. 2004	Syngenta announces its “donation” of Golden Rice seeds and lines to the Golden Rice Humanitarian Board.
Dec. 2004	IRGSP notes that the formal announcement of the completion of the rice genome is imminent.

World's Top 10 Seed Corporations

Company	2003 Seed Sales US millions	2002 Seed Sales US millions
1. Dupont (Pioneer) US	\$2,240 ⁴⁰	\$2,000
2. Monsanto (US)	\$1,879	\$1,600
3. Syngenta (Switzerland)	\$1,071	\$937
4. KWS AG (Germany)	\$529 ⁴¹	\$391
5. Seminis (US)	\$477	\$453
- Advanta (Netherlands)	Sold to Syngenta	\$435
6. Groupe Limagrain (Vilmorin Clause) France	\$497	\$433
7. Sakata (Japan)	\$395	\$376
8. Delta & Pine Land (US)	\$315	\$258
9. Bayer Crop Science (Germany)	\$311 ⁴²	\$250
10. Dow (US)	\$204 ⁴³	\$200

¹See ETC Group's news release, "Patently Wrong!" May 7, 2003, available on the Internet at <http://www.etcgroup.org/article.asp?newsid=398>

²For a list of Syngenta's Terminator patents, see: <http://www.etcgroup.org/article.asp?newsid=389>
Syngenta's official position on genetic seed sterilization states: "Syngenta and its predecessor companies have a long-standing policy not to use the so-called 'terminator' technology to prevent seed germination." The Syngenta position statement is available on the company web site: http://www.syngenta.com/en/social_responsibility/position.aspx

³Paul Oldham, "Global Status and Trends in Intellectual Property Claims: Genomics, Proteomics and Biotechnology," submission to the Executive Secretary of the Convention on Biological Diversity, ESRC Centre for Economic and Social Aspects of Genomics (UK), October 2004, p. 4. On the Internet: <http://www.cesagen.lancs.ac.uk/docs/genomics-final.doc>

⁴Ben Rosenberg, "2004 is the International Year of Rice," *GeneFlow*, IPGRI, p. 37.

⁵Bruce Lieberman, "S.D. team maps rice strain's gene code," n. d., SignOnSanDiego.com

⁶IRGSP website: <http://rgp.dna.affrc.go.jp/IRGSP>

⁷BGI web site and Eliot Marshall, "A Deal for the Rice Genome," *Science*, Vol. 296, Issue 5565, 34, April 5, 2002.

⁸Proceedings of the 20th Session of the International Rice Commission, Bangkok, Thailand, 23-26 July 2002.

⁹Robert Walgate, "Syngenta claims ownership of rice – but will give data away," *The Scientist*, February 1, 2001.

The Syngenta Foundation lists three current projects on its web site. www.syngentafoundation.org : millet and sorghum improvement in Mali, land and resource management in Eritrea and insect resistant maize seeds in Kenya. The development / distribution of Golden Rice is not a project of the Syngenta Foundation.

¹⁰Oldham, p. 38.

¹¹Eliot Marshall, "A Deal for the Rice Genome," *Science*, Vol. 296, Issue 5565, 34, April 5, 2002.

¹²Oldham, p. 38-39. For further details, see: "IRGSP-Syngenta Rice Genome Announcement Release," 23 May 2002. On the Internet: <http://www.nias.affrc.go.jp/pressrelease/2002/20020523/announcement.html>

¹³Oldham, p. 47.

¹⁴According to Oldham, Syngenta's (WO03000904) international patent application claims "...any plant species" can be transformed, followed by a list of 40 individual species, (i.e. maize, banana, sorghum, millet etc), all genera and species of duckweed (*Lemna*) including those as yet unknown, 6 genera of vegetables, 10 ornamentals, 11 conifers (i.e. pines), 3 cedars, 11 leguminous plants (beans, peas), +8 legumes, 6 forage/turf grasses, 55 other plants, including 20 members of the Brassica complex (i.e. broccoli, cabbage), and 28 specific ornamental plants. Oldham, p. 39.

¹⁵Ibid., p. 46.

¹⁶Ibid., p. 47.

¹⁷<http://www.syngentafoundation.com/partnerships.htm>

¹⁸The other Syngenta Foundation Board member is Klaus M. Leisinger, who is also Executive Director and President of the Novartis Foundation for Sustainable Development.

¹⁹See <http://www.syngenta.com/en/downloads/syngenta-statuten-e.pdf>

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- ²⁰ Ibid.
- ²¹ See ETC Group, News Release, “Taking Care of Business: The CGIAR and GM Contamination,” August 27, 2004.
- ²² Food First, *Circle of poison - Pesticides and People in a Hungry World*, 1981, chapter 7, available on the Internet at <http://payson.tulane.edu:8085/cgi-bin/gw?e=t1c11misc-env1-1-T.1.B.73.1-500-50-00e&q=&d=T.1.B.73.10&a=t>
- ²³ “Golden staple could help solve problem of malnutrition,” *The Lafayette Daily Advertiser*, October 21, 2004, on the Internet: <http://www.theadvertiser.com/news/html/24894A55-326C-4A17-89CD-DA9DBDA336C0.shtml> (Bruce Shultz of the LSU AgCenter contributed to this story.)
- ²⁴ See Syngenta news release at http://www.syngenta.com/en/media/article.aspx?article_id=449
- ²⁵ Phone conversation with Anne Burt of Syngenta, December 15, 2004.
- ²⁶ See RAFI (ETC Group) *Communiqué*, “Golden Rice and Trojan Trade Reps,” October 2000. On the Internet: www.etcgroup.org
- ²⁷ Ibid.
- ²⁸ Email communication with Dr. Steve Linscombe, December 16, 2004.
- ²⁹ See <http://www.syngenta.com/en/popups/viewB.html>
- ³⁰ See http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/006/Y4751E/y4751e06.htm
- ³¹ Syngenta News Release, “EU approves acquisition of Advanta by Syngenta,” Basel, August 17, 2004.
- ³² See, for example, Syngenta’s official position on intellectual property, available on the company’s web site: http://www.syngenta.com/en/social_responsibility/position.aspx
- ³³ For background, please see ETC Group, “Playing God in the Galapagos,” *Communiqué*, March/April 2004. Venter’s Institute for Genomic Research is one of the publicly-funded institutions participating in the IRGSP.
- ³⁴ Fowler, Cary, “The Status of Public and Proprietary Germplasm and Information: an Assessment of Recent Developments at FAO.” In *IP Today*, No.7-2003, Ithaca, NY, USA. See also: “Fowler, Cary; Engels, Jan and Frison, Emile, “The Question of Derivatives: Promoting use and ensuring availability of non-proprietary plant genetic resources” in *Issues in Genetic Resources* No. 12 -September 2004, IPGRI, Rome, Italy”
- ³⁵ See Syngenta’s Banner MAXX brochure on the Internet: http://www.engageagro.com/media/pdf/brochure/bannermaxx_brochure_english.pdf
- ³⁶ Syngenta’s patent, WO0194001A2, relates to nano and micron size capsules for agrochemicals.
- ³⁷ See ETC Group’s news release, “Patently Wrong!” May 7, 2003, available on the Internet at <http://www.etcgroup.org/article.asp?newsid=398>
- ³⁸ Oldham, p. 47.
- ³⁹ Nicole Johnston, “Rice Genome Rising,” *The Scientist*, March 1, 2004.
- ⁴⁰ DuPont: 2003 Data Book, www.dupont.com
- ⁴¹ http://www.kws.de/global/show_document.asp?id=aaaaaaaaaacikrn (converted from €443.7 million)
- ⁴² This figure also includes seed treatments. Phone Conversation with Norbert Lemken, Bayer Cropscience, Germany, December 21, 2004. (275 million Euros = 311 US dollars).
- ⁴³ Estimate provided by Dow AgroSciences.