



# Sequence Data and Benefit Sharing: DivSeek's Pitfalls Show Need for Appropriate Policy

Edward Hammond

**SEQUENCE DATA AND BENEFIT SHARING:  
DIVSEEK'S PITFALLS SHOW NEED FOR  
APPROPRIATE POLICY**

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Third World Network  
Penang, Malaysia

*Sequence Data and Benefit Sharing: DivSeek's Pitfalls Show  
Need for Appropriate Policy*

is published by  
Third World Network  
131 Jalan Macalister  
10400 Penang, Malaysia.

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Printed by Jutaprint  
2 Solok Sungei Pinang 3, Sg. Pinang  
11600 Penang, Malaysia.

ISBN: 978-967-0747-19-4

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# Chapter 1

## Introduction

IN early 2016, Third World Network began a research project to investigate the access and benefit sharing (ABS) implications of Diversity Seek, or “DivSeek”, an international genomics project designed to pull together agricultural gene sequencing efforts into large and interoperable databases with hundreds of thousands of genomes of crop plants. Some of these plants fall under Annex 1 of the International Treaty on Plant Genetic Resources for Food and Agriculture (the “Seed Treaty”), while others, including many crops and wild relatives, fall under the Convention on Biological Diversity (CBD) and its Nagoya Protocol on ABS.

The project has resulted in four reports, which are presented together here as separate chapters.

The first report, “Digital genebankers plan to ignore UN request on the impact of genomics and synthetic biology on access and benefit sharing” (April 2016), provides background on DivSeek and how it is grappling with – or failing to grapple with – the ABS policy implications of its own plans, after DivSeek was asked to report on its work by the Governing Body of the Seed Treaty.

The second report, “Synthetic biology and agriculture: Access to genetic data is ‘the big issue of our time’”, highlights an unusually frank exchange among United States scientists and

policymakers about the major implications of DivSeek for ABS. The documents, obtained under the US Freedom of Information Act, show that officials know that genetic sequence data coupled with gene editing is poised to transform how genetic resources are used in agriculture. But the US and other wealthy countries are not taking the initiative to address these implications because inaction is favourable to their interests: Encouraging more and more plant genomes to be freely distributed without restrictions on patents and other ABS provisions is in the interest of Northern agroindustry.

The third report, “DivSeek founder offers patent rights on climate change genes to Syngenta and DuPont in exchange for \$400,000”, reveals a DivSeek scientist from the University of British Columbia (UBC) making deals with rights to genes in exchange for research funding and that the same research group at UBC has received a large grant from Genome Canada to try to lobby the CBD and Seed Treaty to create interpretations of ABS policy on genomic data that are favourable for Canadian interests. The report also raises questions about stark differences between statements about DivSeek made by the Global Crop Diversity Trust and the reality laid bare by open records requests.

The fourth and final report is titled “Thousands of pages of DivSeek internal e-mails released, offering detailed insight into the controversial agricultural ‘big data’ project” and is accompanied by the release of scores of DivSeek internal communications obtained under open records laws in the United States and Canada. These communications, summarized in the report and available to view online,<sup>1</sup> further exposed the nature of industry’s interest in DivSeek, and DivSeek’s

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<sup>1</sup> See URL: <http://www.pricklyresearch.com/AutoIndex/index.php?dir=DivSeek/>

willingness to bow to corporate interests. They also reveal divergences between international players affiliated with DivSeek, with tensions running high between the Seed Treaty and the Global Crop Diversity Trust, whose staff colluded with Canadian institutions and other DivSeek and industry partners in an effort to marginalize the Treaty, in significant measure due to its (largely unimplemented) provisions for support for farmers and Farmers' Rights.

Whether or not DivSeek emerges from its present troubles to become a leading digital genebanking entity, these reports explain and illustrate the need to develop policy at the CBD, Nagoya Protocol and Seed Treaty that ensures that synthetic biology techniques do not undermine the nearly 25 years of efforts made to date to implement the ABS provisions of the Convention.



## Chapter 2

# Digital Genebankers Plan to Ignore UN Request on the Impact of Genomics and Synthetic Biology on Access and Benefit Sharing

*4 April 2016*

NEW documents show that key players in Diversity Seek (DivSeek),<sup>2</sup> a large international digital genebanking project, are trying to ignore a request from the United Nations to report on how technologies to deep-sequence, database and electronically distribute the genomes of hundreds of thousands of crop seeds will impact access and benefit sharing (ABS) for genetic resources.

While DivSeek scientists argue that making a report to the UN is too political, at the same time they are actively courting seed giant Syngenta and trying to put together a policy initiative by themselves. DivSeek is privy to Syngenta's private policy papers and is considering a funding scheme to sell access to genetic data that was suggested by the Swiss company. The quiet negotiation of Syngenta's terms for entry into the DivSeek project appears to include DivSeek's acquiescence to the seed company's demands on patenting of plant genes, sequences and traits.

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<sup>2</sup> DivSeek's website is: <http://www.divseek.org>

Documents released under the US Freedom of Information Act reveal these and other DivSeek kicks in the teeth to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), whose government members asked DivSeek to report on sequencing and synthesis technologies in preparation for considering the issue at a 2017 Treaty meeting. The documents point to the need for urgent action by the Convention on Biological Diversity (CBD), a nearly universal treaty governing biodiversity that DivSeek members barely consider relevant to their enterprise, evidenced by the absence of any significant consideration of how the CBD applies to DivSeek in the more than 1,000 pages of documents and e-mails obtained to date.

The CBD is especially important to questions of biological “big data” – industrial-scale genome sequencing and synthesis. The ITPGRFA’s multilateral ABS system is a specialized instrument under the CBD which applies to a short list of crops and which is widely acknowledged not to be working well. As the overarching agreement on all biodiversity under which the ITPGRFA system operates, the CBD will take its approach to access and benefit sharing for gene sequences and associated data. The CBD urgently needs to consider and address the ABS implications of digital genebanking, a process that can start as part of its current consideration of synthetic biology.

DivSeek plans to link and facilitate analysis of databases that will ultimately host the genomes of hundreds of thousands of crop seeds as well as seeds of crop wild relatives, along with characterization information about them. Both the CBD and the ITPGRFA could be undermined if companies avoid ABS agreements when they access such genetic resources electronically, because using synthetic biology technologies such as gene synthesis and editing, digital genetic resources data can be used to select, recreate, manipulate and utilize key genes

without physically transferring materials – and potentially without implementing benefit-sharing obligations.

### **Documents: Digital genbankers dodge fairness and equity discussion**

Governments, civil society organizations and farmers are concerned about DivSeek’s ABS implications, but documents show that DivSeek members want to avoid a discussion ... at least at the United Nations.

In October 2015, concerned governments approved ITPGRFA Resolution 3/2015, which asked DivSeek “to report on the implications for the objectives of the Treaty of the technologies underlying the DivSeek initiative and to compile a synthesis report on this for consideration by the Governing Body at its Seventh Session”. (This is to take place in 2017.)

But shortly thereafter, an internal report showed that key DivSeek leaders were unhappy with the project’s rising policy profile and the Treaty’s request:<sup>3</sup> “The discussions at [the Governing Body] illustrated how much DivSeek has become a topic of the political discourse among ITPGRFA stakeholders ... Was DivSeek meant to embrace the *entire* spectrum of PGRFA stakeholders, including R&D organizations, governments, farmers, NGOs, and consumers? We believe not.” (emphasis in original)

When DivSeek’s steering committee met in December 2015 to discuss the resolution in person, committee member Andreas

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<sup>3</sup> DivSeek (2015). Updates since the last meeting of the Steering Committee. Information note by the Joint Facilitation Unit. Document DS/SC-2/15/2. December. This portion of the Joint Facilitation Unit document was authored by the Global Crop Diversity Trust. USDA FOIA 2016-REE-01121-F.

Graner, head of Germany's IPK Gatersleben seed bank, was recorded as being unequivocally opposed to answering the Treaty. Notes from the meeting say that Graner "strongly recommends that [DivSeek] not accept the invitation" to report to the ITPGRFA.<sup>4</sup>

Graner was not alone. The Global Crop Diversity Trust, which supports the Consultative Group for International Agricultural Research (CGIAR) genebanks and collections of seeds and crop wild relatives, also wants DivSeek to avoid engagement with the Treaty. Meeting notes describe the Crop Trust as "concerned about where [DivSeek] is heading", because it is "being pulled into policy domain, particularly at the Treaty's request". Echoing Graner's comments, the Crop Trust wanted DivSeek to instead be a "science platform"<sup>5</sup> with a "research-driven focus".<sup>6</sup>

### **No to Treaty, but Yes to industry**

But the motives of DivSeek's defenders of scientific "purity" may not be so pure. While the "science platform" envisioned by the Crop Trust purportedly rules out engagement on ABS issues as being too political, documents show that DivSeek does not avoid those issues when it comes to cultivating cosy relations with the seed companies, and that DivSeek is considering a policy initiative of its own.

Steering committee member Emily Marden, a patent attorney affiliated with a United States intellectual property law firm and the University of British Columbia in Canada, leads DivSeek's governance group, which is officially charged with developing

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<sup>4</sup> Marden E (2015). E-mail to Susan McCouch (DivSeek Coordinator). Notes prepared for McCouch by Marden and Peter Phillips (University of Saskatchewan). 9 December. USDA FOIA 2016-REE-01121-F.

<sup>5</sup> Ibid.

<sup>6</sup> DivSeek (2015). Document DS/SC-2/15/2.

proposals for the project's internal governance. Compared with DivSeek's global ambition, Marden's group is rather local. It consists of herself, a University of Saskatchewan professor, two graduate students from Canada and one US government official.<sup>7</sup>

Adding to the strangeness of its membership, the governance group does not only work on governance. It is actively recruiting private sector participation in DivSeek, even though this activity appears to be outside the group's charge. In late 2015, Marden reported to DivSeek steering committee colleagues that her group received a letter from Syngenta (many months earlier) expressing interest in affiliating with DivSeek and including the company's terms for it to do so.<sup>8</sup>

In fact, in September 2015, DivSeek's governance group received a Syngenta policy paper.<sup>9</sup> The paper is titled "Challenges and opportunities in creating consistent governance around plant genetic resources for food and agriculture and related information, knowledge and rights". Among other things, "Challenges and opportunities" puts forward Syngenta's perspective on policies for access to data, and stresses the importance Syngenta places on obtaining patents on plant genes and traits.<sup>10</sup>

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<sup>7</sup> This primarily Canadian contingent confusingly refers to itself by several different names, even within the same document. These include "governance committee", "expert group" and "expert governance committee", and "subcommittee" (of the steering committee), though only two of the five members are on the DivSeek steering committee.

<sup>8</sup> DivSeek (2015). Report of Governance Expert Group [sic]. 8 December. USDA FOIA 2016-REE-01121-F.

<sup>9</sup> DivSeek (2015). Governance Committee [sic] Agenda. 23 September. USDA FOIA 2016-REE-01121-F.

<sup>10</sup> Syngenta (2015). Challenges and opportunities in creating consistent governance around plant genetic resources for food and agriculture and related information, knowledge and rights. White paper. USDA FOIA 2016-REE-01121-F.

The seed giant's paper on "creating consistent governance around plant genetic resources for food and agriculture and related information, knowledge and rights" of course goes to the same policy concerns that ITPGRFA governments had in mind when asking for DivSeek's report.

But whereas key DivSeek members endorse ignoring the ITPGRFA on the grounds that DivSeek should be a purely scientific platform, there is no indication of Graner, the Crop Trust or anyone else objecting to DivSeek's governance committee's engagement with Syngenta.

Perhaps that is because the Canadian-dominated governance group was arguably following the lead of the DivSeek steering committee itself. In May 2015, at its first meeting, the steering committee expressed interest in funding DivSeek by selling subscriptions to its databases.<sup>11</sup> This idea, according to the committee's minutes, is a "model proposed by a white paper submitted by Syngenta to the attention of DivSeek Partner organizations ... and shared with Committee members".<sup>12</sup>

Marden continued her talks with industry at the 6th meeting of the Governing Body of the ITPGRFA in October 2015. While governments debated and ultimately passed Resolution 3/2015 asking for DivSeek's report, Marden was privately offering Syngenta and other, unnamed companies a DivSeek "listening session" in early 2016, during which industry could present terms to affiliate with the project.<sup>13</sup> (It is unclear if this meeting has occurred.)

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<sup>11</sup> Or, perhaps, subscriptions to use its analytical tools to evaluate "open" genomic data. See discussion of GODAN below in this report.

<sup>12</sup> DivSeek (2015). Report of the DivSeek Steering Committee. 28 May. Rome. USDA FOIA 2016-REE-01121-F.

<sup>13</sup> Marden E (2015). E-mail to DivSeek Governance Committee [sic]. 8 October. USDA FOIA 2016-REE-01121-F.

Reporting back to the “governance” group, Marden wrote that companies she consulted about joining DivSeek said that their “main concern would be that information in DivSeek could be subject to the Treaty’s SMTA [Standard Material Transfer Agreement], which to their minds, would be untenable”.<sup>14 15</sup>

Marden added her personal agreement with industry’s concern. Peter Bretting, of the US Department of Agriculture, concurred, replying to Marden and colleagues by saying, “DivSeek is a voluntary association of research institutions, completely independent of the ITPGRFA.”<sup>16 17</sup>

### **Does DivSeek want to make digital genebanking policy on its own?**

Marden’s dalliance with Syngenta and ABS is not the only recent foray by DivSeek’s leaders into the policy arena. In late 2015, the Crop Trust appears to have put DivSeek forward as a mediator of access and sovereignty issues related to soya (soybean), an Asian native not in the ITPGRFA’s Multilateral System (MLS). At a Seattle meeting called by US soya scientists seeking to recruit Asian researchers and genebanks into a DivSeek-affiliated sequencing project, Peter Wenzl, the Crop Trust’s representative to DivSeek, noted that DivSeek could act

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<sup>14</sup> The ITPGRFA’s Standard Material Transfer Agreement implements the ABS obligations of the Treaty’s Multilateral System (MLS). Without application of the SMTA or its equivalent, companies might access and use sequences of MLS seed accessions without incurring benefit-sharing obligations.

<sup>15</sup> Marden E (2015). E-mail. 8 October.

<sup>16</sup> Ibid.

<sup>17</sup> Bretting remarkably ignored that the ITPGRFA Secretariat is part of the DivSeek Joint Facilitation Unit and that other DivSeek facilitators and committee members, like the CGIAR and Crop Trust, have formal Treaty affiliations.

as a “broker for issues surrounding data and germplasm exchange”.<sup>18</sup>

More evidence of disingenuity in DivSeek’s pretence that it is too purely scientific to engage with the United Nations comes in the form of a proposed DivSeek seminar at the Rockefeller Foundation’s Bellagio Center in Italy. A Bellagio conference draft proposal, discussed by the steering committee, would consider “game-changing and potentially disruptive DNA-sequencing technologies, big-data platforms, high performance computing, image-based phenotyping methods, gene-editing techniques, and synthetic biology concepts”.<sup>19</sup>

But the planned consideration of these technologies is not a technical one. Rather, the conference is envisioned to “consider interactions between emerging scientific opportunities and policy challenges related to securing, managing and using plant genetic resources” and to “propose and advocate innovative solutions to global commons policy issues”. (A “policy initiative” is indicated as the outcome of the meeting in the draft proposal.)<sup>20</sup>

This proposal for a DivSeek policy initiative on governance of plant genetic resources in light of synthetic biology technologies does not even mention the Convention on Biological Diversity. Notably, DivSeek has also become an institutional member of Global Open Data for Agriculture and Nutrition (GODAN), an

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<sup>18</sup> DivSeek (2015). DivSeek Steering Committee conference call (Meeting minutes). 27 April. USDA FOIA 2016-REE-01121-F.

<sup>19</sup> DivSeek (2015). Proposal for a Bellagio conference on the science/policy interface in relation to crop germplasm. Information note by the Joint Facilitation Unit. DS/SC-2/15/7. USDA FOIA 2016-REE-01121-F.

<sup>20</sup> Ibid.



initiative of the G-8 funded by the US and European governments.<sup>21</sup> Few would argue against making genomic data available for scientific research, but the terms of availability are certainly relevant. GODAN is focused on open access, i.e., free access to data, but what if making that sequence data freely available – without an appropriate user agreement – allows and encourages companies to avoid benefit sharing?

Clearly, open data on biodiversity of developing countries and international agricultural collections can't mean data that comes without benefit-sharing obligations. Indeed, DivSeek has discussed funding itself by selling access to its databases. Do some DivSeek members envision genomic data as a free resource for anyone to use, with no compensation for providers, while the project's analytic tools will be rented out for payment?

The deeper one scratches, the more dubious DivSeek's assertions of scientific purity become. In fact, key players in DivSeek appear to wish to stall UN policymakers while the project makes de facto policy by itself, offering access to genetic resources for industry and establishing precedents for ABS at digital genebanks, while leaving the CBD, the ITPGRFA and developing countries behind.

### **Call for policy action**

Leaders of the DivSeek project seek to avoid engagement with policymakers but are actively negotiating with industry. This attempt to supplant government policymaking with DivSeek's own deals with Syngenta and self-styled ABS policies for

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<sup>21</sup> GODAN (2015). Public GODAN membership listing (web page). URL: <http://www.godan.info/civicism/profile?pv=1&cid=194&gid=14&force=1&crmPID=2>

hundreds of thousands of crop genomes should be of huge concern to those interested in the health of the international ABS regimes. Governments should immediately move to regulate access and benefit sharing for sequence data and related information, even if digital genebankers are reluctant to cooperate.

DivSeek's double-dealing should be condemned. It avoids engaging with governments, farmers and civil society for reasons of "scientific purity". But that claim is revealed as disingenuous by DivSeek's frequent and deepening engagement with seed companies on the same issues that governments, farmers and civil society raise. Indeed, DivSeek's steering committee is privy to private industry policy papers, is pondering a Syngenta-inspired scheme to sell access to the sequence data of farmers' seeds from international genebanks, appears to be weighing endorsement of industry patent demands, and is considering its own policy initiative.

Whether or not DivSeek ultimately becomes the premier genomic "big data" project in agriculture, the ABS issues that digital genebanking brings to the table will remain. If DivSeek collapsed tomorrow, massive projects such as BEAN-ADAPT (10,000 bean accessions), G2P-SOL (50,000 *Solanaceae* accessions) and others (e.g., on rice and chickpeas) will go ahead. So will smaller, more focused efforts – with ABS implications too – like the Netherlands' Wageningen University project on Andean wild tomato relatives.

The emerging gap in the application of ABS rules between physical and digital access to genetic resources must be closed. Whereas physical access to genetic resources increasingly occurs under signed ABS agreements, electronic access to genetic resources is comparatively unregulated. This problem is felt not only in plant-related projects like DivSeek, but has also arisen in public health policy in relation to pathogens.

If governments fail to quickly close the digital ABS gap, developing countries will lose out. Addressing this policy dimension of synthetic biology requires careful consideration of how to adapt the ABS approaches typically used under the CBD and its Nagoya Protocol on access and benefit sharing to the new reality of “big data” in biology.

The need for action by Parties to the CBD is clear. Genome sequencing and synthetic biology will have increasing impact on access and benefit sharing for genetic resources, and will continue to undermine traditional ABS approaches reliant on physical transfer of genetic resources and material transfer agreements. Without the CBD acting to thoughtfully apply ABS rules to digital genebanks, this undermining process will eventually threaten the core principles of the Convention and the ITPGRFA.

## Chapter 3

# Synthetic Biology and Agriculture: Access to Genetic Data is "the Big Issue of Our Time"

*19 April 2016*

REGULATING access to genetic data is “the big issue of our time” in crop development, says Cornell University’s Edward Buckler. The maize geneticist contends that, at least for industrial agriculture, “Germplasm is becoming the information technology that it always was. So then the question is who has the right to look at the database of whole genome sequences?”

With access to genome sequences of thousands of farmers’ varieties of crops, Buckler says, seed companies should be able to identify key sequences that enable plants to adapt to local conditions and to fit human needs, such as for responding to climate change. These “adaptive SNPs” (single nucleotide polymorphisms) are key genetic variations that may guide altering the genomes of plants with technologies like CRISPR (clustered regularly-interspaced short palindromic repeats). Buckler says “we are getting very close to genome editing the variants we want”.

“If I or a seed company had a database with 100,000 whole genome sequences of maize landraces [i.e., farmers’ varieties], I could take some very educated guesses on the adaptive SNPs,” says Buckler, who concludes, “The cross cultural

implications of this will be extremely contentious.” (By “cross-cultural”, Buckler means international.)

The comments were made last year in an e-mail to United States Department of Agriculture (USDA) international genetic resource policy coordinators, and were released under the US Freedom of Information Act.<sup>22</sup> (The e-mail is appended to this report on p. 20.) Buckler urged the USDA to raise the policy issues on access and use of genetic data with Diversity Seek (DivSeek), an international initiative to coordinate databases of deep-sequenced crops.

Buckler’s comments echo those of NGOs and farmers’ organizations that are concerned about the socio-economic, fairness and safety implications of synthetic biology’s one-two combination of deep sequencing and genome editing. The release of Buckler’s e-mail shows that these concerns are not just civil society worries but are high in the minds of government advisors as well.

Although it is clear that synthetic biology is opening the way for new means to exploit small farmers’ seeds and crop wild relatives, don’t look for the US or Europe to move to quickly address the issues in international policy forums. There’s no evidence that the USDA accepted Buckler’s advice and, in fact, the DivSeek project is trying to forge ahead without engaging the broader community of biodiversity policymakers.

Further, European sources indicate that European Union (EU) governments aim to shy away from the issue at the Subsidiary Body on Scientific, Technical and Technological Advice

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<sup>22</sup> Buckler E (2015). E-mail to Peter Bretting, USDA/ARS Office of National Programs. 26 May. USDA FOIA No. 2016-REE-01477-F.

(SBSTTA) of the Convention on Biological Diversity (CBD), which will consider synthetic biology at its meeting beginning 25 April 2016 in Montreal.

One reason developed countries are reluctant to address this is that their seed industry enjoys “open access” databases in which crop genomic data is posted and can be accessed without restrictions (or obligations) – yet still be patentable. As synthetic biology develops, the more genomic data that is made available without access and benefit-sharing conditions equals more raw materials for corporate patents, entrenching a system that is inherently unfair to small farmers, indigenous peoples and developing countries. So, for Northern countries seeking to advance industrial interests, inaction is advantageous.

While DivSeek is in a position to clearly understand these issues, it too is avoiding them. Recently released records of DivSeek meetings show that members including Germany’s IPK Gatersleben seed bank and the Global Crop Diversity Trust are urging DivSeek to avoid engagement with policymakers, even as the project formalizes relationships with a number of mass sequencing projects, such as G2P-SOL, which plans to deep-sequence 50,000 *Solanaceae* (nightshade) seeds. Those plants primarily originate from developing countries, especially Latin America, such as tomatoes, potatoes, tobacco, peppers and their wild relatives, but include African (e.g., coffee) and Asian (e.g., aubergine) natives.

Key DivSeek members are even inclined to ignore a resolution from the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) asking DivSeek to report on the policy implications of its technologies.

## Fracking for genebanks: Who directs the process and enjoys the results?

Genebank managers also have their own motives to avoid policy discussions about managing the implications of synthetic biology. In nearly 2,000 pages released so far under the US Freedom of Information Act, a repeated theme that surfaces in discussions between participants in DivSeek is a feeling that the work of genebanks is undervalued. For instance, one US genebank manager suffers from a case of freezer envy, expressing frustration that US Senate staff members know about the Svalbard seed vault<sup>23</sup> but were unaware that the US has its own long-term seed storage facility in Colorado.

The managers' gloomy sense of declining relevance was summed up in remarks attributed to Theo van Hintum, of the Dutch Centre for Genetic Resources, who lamented to other genebankers that they are thought "merely to be those nice, dedicated people relegated to working away in the cold basement", who, in the words of USDA counterpart Chris Richards, are "sink[ing] ever further below the radar".<sup>24</sup>

Many genebankers thus see inexpensive, large-scale deep genome sequencing as imparting new relevance and importance to their work. Shifting from sending seed packets off to companies in inglorious transactions, some managers see themselves as potential masters of newly valorized genetic resources, because seeds are becoming exploitable in aggressive new ways thanks to synthetic biology. Think of synthetic biology as fracking technology for genebanks, and of many genebank managers as eager to retain a position of control, in appreciable part in order to enhance their own standing.

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<sup>23</sup> <http://www.regjeringen.no/en/topics/food-fisheries-and-agriculture/landbruk/svalbard-global-seed-vault/>

<sup>24</sup> Richards C (2015). E-mail to Peter Bretting, USDA/ARS Office of National Programs. 22 January. USDA FOIA No. 2016-REE-01477-F.

Synthetic biology is therefore seen as a ticket out of the cold basement and into sunnier scientific circles. And there, in part, lies DivSeek's reluctance to engage with policy forums like the ITPGRFA and the CBD, as doing so cedes territory to others in what is perceived as an impending synthetic biology gold rush.

But genebankers are the curators of collections of genetic resources, not the creators, nor the owners. Much less are genebanks vested with sovereign rights over seeds. The disposition of *ex situ* biodiversity collections, and newly collected materials and their sequences, is not for the collections to negotiate with industry or others; accordingly, avoidance of engaging the policy realm is neither ethically nor legally tenable.

### **No “right to be forgotten” for “public” genomic data**

So while the US, the EU and projects like DivSeek cannot be counted upon to take the initiative to ensure this important aspect of synthetic biology is addressed fairly and equitably, developing-country governments cannot afford to sit idle as projects like BEAN-ADAPT, 3000 Chickpea Genomes and others move to sequence more and more farmers' varieties and wild relatives and to drop those genomes into databases accessible without access and benefit-sharing provisions consistent with the CBD and, for some plants, the ITPGRFA.

The EU may have a “right to be forgotten” for information about its own citizens on the Internet, but it and its allies will forever argue that the valuable genomes of farmers' seeds and other plants from developing countries must remain freely accessible, and exploitable by seed companies, once they are posted online.



Governments can begin to tackle the question of how to apply ABS rules to genetic sequence data – for instance, considering data access and use agreements – when the CBD SBSTTA considers synthetic biology beginning 25 April in Montreal.

**Email released under USDA FOIA No. 2016-REE-01477-F**

**From:** Edward S. Buckler <esb33@cornell.edu>  
**Sent:** Tuesday, May 26, 2015 4:52 PM  
**To:** Bretting, Peter  
**Cc:** Buckler, Ed; Ware, Doreen - External; Ware, Doreen; Richards, Chris  
**Subject:** Re: DivSeek meeting this Thursday

Hi Peter-

I think the big issue of our time is the "dematerialization" of germplasm. For genomes like maize, we are getting very close to genome editing the variants we want. And since every variant already occurs 10,000 times every year by de novo mutation, I really don't see how this will be regulated globally.

Germplasm is becoming the information technology that it always was.

So then the question is who has the right to look at the database of whole genome sequences? If I or a seed company had a database with 100,000 whole genome sequences of maize landraces, I could take some very educated guesses on the adaptive SNPs.

The cross cultural implications of this will be extremely contentious.

Sincerely-  
Ed

On May 24, 2015, at 11:56 AM, Bretting, Peter <Peter.Bretting@ARS.USDA.GOV> wrote:

**Hi Chris, Ed, and Doreen--I'll attend the DivSeek Steering Committee meeting in Rome this week. Are there any particular topics/items/concerns you would like the committee to address (better, begin to address)?**

Thanks, much appreciated!

Peter

Peter Bretting  
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Web site: [http://www.ars.usda.gov/rcsearch/programs/programs.htm?NP\\_CODE=301](http://www.ars.usda.gov/rcsearch/programs/programs.htm?NP_CODE=301)

## Chapter 4

# **DivSeek Founder Offers Patent Rights on Climate Change Genes to Syngenta and DuPont in Exchange for \$400,000**

*25 May 2016*

RECORDS released under Freedom of Information laws reveal that DivSeek founder Loren Rieseberg, a geneticist at the University of British Columbia (Canada), has offered gene giants DuPont and Syngenta access to unpublished research results, gene sequences and patent rights to climate change genes identified by his DivSeek-affiliated project.

In return for privileged access to sequences and patenting opportunities relevant to both sunflower and soya (soybean), Rieseberg wants the seed giants to provide \$400,000 for his research project. The genes being offered confer potentially valuable traits for breeders working to adapt crops to a changing climate, such as drought resistance and heat tolerance.

DivSeek has also received funding to attempt to write the policy rulebook on access to genetic sequence data in agriculture. Rieseberg's project, which is mainly funded by Genome Canada, includes the work of his employee Emily Marden, who is charged with "devis[ing] a governance mechanism for sharing plant genomic resources" and with influencing the Convention on Biological Diversity (CBD) and

the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in ways that support Canada's interest.

Also revealed here is recently released documentation of DuPont's effort to get inside DivSeek with the help of University of Georgia professor Scott Jackson, who also considers himself to be a DivSeek founder.

These revelations further call into question the "pure" science and apolitical pretences of the controversial project, which aims to coordinate projects to deep-sequence hundreds of thousands of crop seed genomes and to place the resulting sequence data into interoperable databases. They also call into question statements made to civil society by DivSeek's representatives, particularly the Global Crop Diversity Trust.

### **Industry offered patents on DivSeek sequences**

An accomplished geneticist, Rieseberg pitched his DivSeek sunflower and soya genomics project to seed giants DuPont and Syngenta in July 2015, offering patent rights and privileged access in return for about \$400,000. He wrote to representatives of both companies stating that "collaborators will have early access to information and germplasm from the project. In addition, there maybe [sic] opportunities to obtain patent protection on resistance alleles that have been modified to enhance efficacy".<sup>25</sup>

To the pitch, Rieseberg attached his funded Genome Canada project proposal, drawing the companies' attention to a passage

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<sup>25</sup> Rieseberg L (2015). Pioneer Syngenta Proposed Collaboration. Document sent via e-mail to officials at DuPont and Syngenta. 17 July. Obtained under the Georgia Open Records Act.

on intellectual property and to how synthetic biology can be used to strengthen proprietary claims. The passage reads in relevant part: “While legal protection of natural allelic variants, such as those identified by the project, is weak, if such variants are modified using gene editing to enhance trait efficacy, then strong patent protection becomes possible. Indeed, Rieseberg’s lab is collaborating with a major seed company to patent modified natural variants underlying a valuable crop protection trait. A similar strategy is likely to be employed here...”<sup>26</sup>

DuPont quickly replied to Rieseberg’s proposal. Instead of funding, the company offered “in kind” research on Rieseberg’s germplasm – introgression lines combining wild and cultivated sunflowers – at its facility in Seville, Spain.<sup>27</sup> Rieseberg told colleagues that he was inclined to accept DuPont’s offer, and for it to effectively replace the University of California’s role in Rieseberg’s project.<sup>28</sup>

This would make DuPont not the first but the fifth company to sign on to the DivSeek founder’s project. With encouragement from Genome Canada, Rieseberg had already garnered support from KWS Seeds, Advanta, Biogemma and Nuseed Americas.<sup>29</sup>

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<sup>26</sup> Rieseberg L and J Burke (2015). Genomics of Abiotic Stress Resistance in Wild and Cultivated Sunflowers. Grant Proposal to Genome Canada. Obtained from the University of Georgia under Georgia Open Records Act requests #16-029 and #16-013.

<sup>27</sup> Streit L (2015). E-mail to Loren Rieseberg. 5 October. Streit is Soy and Oilseeds Platform Director for DuPont Pioneer. Obtained under the Georgia Open Records Act. Syngenta’s reply to Rieseberg’s proposal has not been included in records released to date.

<sup>28</sup> Rieseberg L (2015). E-mail to John Burke (University of Georgia). 6 October. Obtained under the Georgia Open Records Act.

<sup>29</sup> Rieseberg L and J Burke (2015).

DuPont has eagerly sought an opportunity to get inside DivSeek. Gregory May, the company's Senior Research Manager, has sought greater DuPont involvement in DivSeek through Scott Jackson, a University of Georgia geneticist. Jackson, like Rieseberg, describes himself as a founder of DivSeek.<sup>30</sup> In early 2015, May wrote Jackson that companies "would certainly be in a position to contribute as much or more than most of the current [DivSeek] partners", adding, "not to mention the cash that could ... come DivSeek's way".<sup>31</sup>

Jackson told May that he supports bringing companies into DivSeek, but not necessarily as data (i.e., gene sequence) providers, since some DivSeek partners wanted DivSeek to be "much like GenBank – everything available" – and feared corporate data would have access restrictions.

Instead, Jackson suggested DuPont could involve itself in DivSeek in other ways (i.e., as funder and data user). Jackson suggested that May lobby the Global Crop Diversity Trust in order for DuPont to secure a place inside DivSeek.<sup>32</sup>

### **DivSeek's very political genomics governance plans**

Meanwhile, the same Genome Canada grant that supports Rieseberg's applied sunflower and soya project includes money for Rieseberg's employee, Emily Marden, to pursue activities as

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<sup>30</sup> While the origins of DivSeek are unclear, by Jackson's reckoning, it is him, Rieseberg, Susan McCouch (Cornell University) and Hannes Dempewolf (Global Crop Diversity Trust) who began the initiative. Dempewolf is a former student of Rieseberg's. (Jackson S (2014). E-mail to JS Angle, H Scherm and RN Shustad. 23 September. Obtained under the Georgia Open Records Act.)

<sup>31</sup> Jackson S and G May (2015). E-mail exchange on DuPont involvement in DivSeek. 24 February. Obtained under the Georgia Open Records Act.

<sup>32</sup> Ibid.

the Chair of DivSeek's unusual "governance committee", including development of policy proposals for how to govern access and use of genetic sequence data.

DivSeek's "governance committee" uses several different names and is only generously described as a "committee". Records released to date show that it actually operates as an extension of its two full-fledged members, Marden and Peter Phillips, a professor at the University of Saskatchewan. Two others in Canada are members, but both of them are graduate students. Peter Bretting of the United States Department of Agriculture (USDA) is a fifth member, but e-mails released under the US Freedom of Information Act reveal that Bretting is not closely involved. In August 2015 Bretting asked Marden to expand the committee's membership, noting its narrow geographic base, but Marden replied that her attempt to recruit additional members was unsuccessful.<sup>33</sup>

Genome Canada's support to Marden falls under its "GE 3 LS" programme, which addresses "Genomics and its Ethical, Environmental, Economic, Legal, and Social Aspects". In this case, the GE 3 LS grant is not social or environmental science so much as funding for lobbying aimed at implementing DivSeek's preferred alternatives for (non-)governance of access to genomic data, including influencing international treaties in this regard, specifically the ITPGRFA and the CBD.<sup>34</sup>

A key premise of Genome Canada's funding is that "there are multiple layers of ambiguity arising from [the ITPGRFA] and its application that may hamper innovation", and that these

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<sup>33</sup> Marden E and P Bretting (2015). E-mails exchanged on DivSeek's "governance committee". 13 August. Obtained under the Freedom of Information Act.

<sup>34</sup> Rieseberg L and J Burke (2015).

ambiguities can be advantageously interpreted. Among the ambiguities listed is the scope of the ITPGRFA Standard Material Transfer Agreement, the Treaty's obligations regarding gene sequences, whether or not gene edited plants are covered, and how combinations of Treaty and non-Treaty seeds are treated.

Marden's job under the grant is to "identify areas where the legal frameworks are ambiguous and areas where there are opportunities to interpret the frameworks in a beneficial manner [for Canadian interests]". Marden is further tasked "to bring the identified issues into broader policy discussions with the aim of facilitating further innovation in agricultural genomics". That is, by using her position in DivSeek and lobbying the ITPGRFA Secretariat, push forward Canadian agribusiness-friendly interpretations of alleged Treaty ambiguities.

According to the grant, Marden will "devise a governance mechanism for sharing plant genomic resources that respects certain proprietary interests but facilitates innovation". The grant claims that, because she is Chair of the previously described DivSeek governance committee, "This position gives Marden a role at the center of determining how agricultural genomics data will be shared going forward."<sup>35</sup>

Whether or not DivSeek is ultimately at the centre of any policy questions for gene sequence data remains to be seen. The full text of the Genome Canada-funded research project, as well as Rieseberg's written pitch to Syngenta and DuPont, are posted online to accompany this paper. (See "A Note on Sources" at the end of this compilation.)

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<sup>35</sup> This and preceding quotes from Rieseberg L and J Burke (2015).

## **Is the Global Crop Diversity Trust confused? Or worse?**

The Global Crop Diversity Trust is a coordinator of DivSeek, and Crop Trust staff have done a large proportion of the organizing work to get DivSeek started.

According to DivSeek steering committee records, the Crop Trust opposes DivSeek engagement with ITPGRFA policymakers, who have asked DivSeek for a report, because the Crop Trust allegedly considers such engagement to be too political.

Yet the Chair of DivSeek's governance committee is operating under a grant that expressly calls for her to develop governance proposals for genomic data and to use her position to lobby the ITPGRFA and CBD. Also, as has been previously noted, DivSeek is considering a proposal for an invitation-only policy seminar to develop and advocate positions on genetic sequence data policy issues.

The Crop Trust should not continue to pretend that DivSeek does not aim to engage in policymaking and lobbying. Even more disturbing, the Crop Trust does not appear to be on the right side of truth when it comes to characterizing DivSeek's relationships with the private sector either.

In March 2016, the Crop Trust met with some civil society organizations (CSOs) at its headquarters in Bonn, Germany. At the meeting, the Crop Trust claimed that DivSeek has not sought or received any private sector funding – a claim that, at best, might be called obfuscation.

Others involved in DivSeek since the beginning privately note that discussions with Syngenta about funding for DivSeek began before the project was publicly announced. Documents previously released have described the DivSeek steering



committee's interest in a Syngenta-proposed funding scheme, as well as efforts by Marden to recruit deeper corporate involvement in the project.

In this paper, it is revealed that DivSeek's founder is offering patent rights to climate genes to DuPont and Syngenta. It is also revealed that a principal DivSeek scientist is supporting DuPont's bid to get inside the project.

The Crop Trust should explain why the written record on both DivSeek's involvement in policy issues and questions of seed company funding are not consistent with statements made by its staff.

## **Conclusion**

In this third paper reporting the results of open records requests to US and Canadian institutions, it is further confirmed that DivSeek cannot continue to deny that it is working to shape international policy on access to genetic sequence data in its own interests, and can no longer pretend to be a "pure science" enterprise without significant ties to industry.

The Global Crop Diversity Trust in particular needs to explain why its portrayal of DivSeek to biodiversity policymakers and CSOs is so starkly at odds with the written record. Or risk serious damage to its credibility.

The newly released records also serve to further underscore the need for CBD and ITPGRFA Parties and policymakers to act quickly to close the growing gap between physical and digital access to genetic resources. Sequences generated by projects like Rieseberg's can be shared and patented without material (seeds) changing hands, potentially enabling avoidance of access and benefit-sharing obligations.

A key opportunity to begin this work in earnest will come in December 2016, when the Conference of the Parties to the CBD, meeting in Cancun, Mexico, can request that the implications of genome sequencing in combination with gene editing be considered by the CBD's Ad Hoc Technical Expert Group on Synthetic Biology.

## Chapter 5

# **Thousands of Pages of DivSeek Internal E-mails Released, Offering Detailed Insight into the Controversial Agricultural "Big Data" Project**

*March 2017*

AFTER 18 months of Freedom of Information requests on Diversity Seek, or DivSeek ([divseek.org](http://divseek.org)), the controversial international agricultural genomics project, a trove of over 3,000 new pages of internal DivSeek e-mails and other documents has been published online.

The new release primarily consists of records from the University of British Columbia (UBC) in Vancouver, Canada, where DivSeek co-founder Loren Rieseberg is based. They include records of an attorney who works for Rieseberg and heads DivSeek's Governance Committee.

UBC was the most reluctant and evasive of a number of North American institutions that received open records requests on their participation in DivSeek. UBC staff sought to avoid public accountability by using private e-mail servers and other tactics to evade accountability under the law. UBC still has not released all DivSeek-related records that were requested. The Information and Privacy Commissioner of British Columbia has opened an investigation.

In the new release, over 2,000 pages from UBC are supplemented by records from the University of Georgia (UGA) in the United States, where another self-described DivSeek founder and other participants are based. These two releases join previously available e-mails and other documents from DivSeek participants including the Universities of Texas and Minnesota and the US Department of Agriculture.

Together, the extensive DivSeek records offer a frank and unvarnished view into the planning and activities of key players in the project, revealing many things that DivSeek's leaders clearly would have preferred to keep behind closed doors.

Foremost, the records reveal DivSeek as a project working to avoid access and benefit sharing (ABS) laws and principles in relation to use of genetic sequence data of farmers' varieties ("landraces") and other food crop diversity they intend to genetically sequence.

With funding from Genome Canada, UBC set out to cultivate relationships between DivSeek and the seed industry with a shared aim of identifying and exploiting potential weaknesses in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the UN Convention on Biological Diversity (CBD) in relation to genetic sequence data of crops and crop wild relatives.

Indeed, even while DivSeek publicly represented itself as desirous of compliance with ITPGRFA and the CBD, the records reveal DivSeek principals – remarkably but unequivocally including the Global Crop Diversity Trust – worked behind the scenes to sideline the ITPGRFA from DivSeek because its participation appeared to entail due consideration of ABS and the rights of farmers in relation to gene sequences, something that DivSeek and industry both wanted to avoid.

E-mails exchanged between UBC, the Crop Trust and others in the course of their conspiracy to isolate the Treaty rail against the ITPGRFA. The documents repeatedly contain personally disparaging remarks about Treaty staff that the UBC Legal Counsel was obligated to redact (black out) under Canadian law that protects the dignity of persons mentioned in government records.

In contrast, communications from Treaty staff to DivSeek members contain no such remarks and indicate the ITPGRFA Secretariat was acting consistently with the principles of the Treaty and the decisions of its Governing Body.

And while DivSeek presented itself to the world as separate from industry, the records reveal that global seed giants clamoured to build relations with DivSeek, offering money. One company, Syngenta, was involved in DivSeek from the very start of the project.

The records show that in the judgment of DivSeek leaders, industry's agenda included collaborating with DivSeek to advance a goal of releasing genetic sequence data from ABS requirements – in effect positioning genebanks, research professors and industry to enjoy the financial fruits of mining international and other seed banks for valuable sequences, while leaving farmers, indigenous peoples and developing-country governments behind.

Not only were DivSeek leaders more often than not agreeable to industry's intent, but at least in the cases of UBC and UGA, DivSeek members sought to profit by selling to industry giants both early access to sequences and patent rights to DivSeek-affiliated projects. Such offers were made even while DivSeek publicly claimed that its research would be “precompetitive” and hence removed from the proprietary realm.

Turbulence from such revelations and internal discord – for instance, not all DivSeek members enthusiastically embraced the seed industry – have caused DivSeek to enter into a period of reorganization. The ITPGRFA has terminated its association with DivSeek, as recently highlighted by the farmers’ organization La Via Campesina, which is calling on other DivSeek partners to quit the project (see Via Campesina news release of 10 February 2017 at: <http://goo.gl/OJ2o44>).

DivSeek’s internal structures, however, have become more opaque. As documented in the records, DivSeek principals reacted to Freedom of Information requests by moving their discussions to alternative e-mail addresses and other formats, specifically in order to avoid transparency. The US Department of Agriculture’s representative in DivSeek dropped out of a formal role in the project’s governance because of the “problem” that the US Freedom of Information Act posed.

The staff member of the Global Crop Diversity Trust that led the Crop Trust’s efforts to sideline the ITPGRFA and suffocate ABS concerns on gene sequences, who stated to colleagues in published e-mails that the Executive Director of the Crop Trust approved of his activities, has left the Crop Trust for a new job. Now at the International Center for Tropical Agriculture (CIAT) in Cali, Colombia, he is again at the helm of an agricultural “big data” project, this time for the Consultative Group on International Agricultural Research (CGIAR).

With working groups at both the ITPGRFA and CBD poised to consider the implications of genetic sequence data at upcoming meetings, the focus of policy discussion is appropriately moving towards the appropriate multilateral bodies. It remains to be seen, and civil society organizations will remain vigilant, whether projects like DivSeek and others that seek to ‘digitize’ international and other genebanks, respect treaty obligations and the rights of farmers and indigenous peoples.

## **A Note on Sources**

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Records obtained under the open records laws that are referenced in the reports in this compilation may be viewed at: <http://www.pricklyresearch.com/AutoIndex/index.php?dir=DivSeek/>







Diversity Seek (DivSeek) is an ambitious digital genebanking project which aims to coordinate databases documenting hundreds of thousands of genomes of crop plants. This book is a compilation of investigative reports looking into the initiative's potentially far-reaching implications for access to genetic resources and the sharing of benefits resulting from their use.

Drawing on records released under freedom-of-information laws, the reports reveal how leading figures in DivSeek are seeking to bypass international access and benefit-sharing rules, thereby enabling unfettered access by the seed industry to valuable genomic data on plants originating from developing countries.

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ISBN 978-967-0747-19-4



9789670747194