Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Special Section:
Fostering Socially and Ecologically Resilient Food and Farm Systems Through Research Networks

SPECIAL SECTION SPONSORED BY:

Intellectual property exhaustion, breeder frustration, and hindered innovation: Reviewing U.S. organic corn seed development

A. Bryan Endres,[a] Jessica Guarino,[b] * and Nabilah Nathani [c]
University of Illinois

Submitted March 10, 2023 / Revised May 20 and June 27, 2023 / Accepted June 30, 2023 / Published online August 22, 2023

Citation: Endres, A. B., Guarino, J., & Nathani, N. (2023). Intellectual property exhaustion, breeder frustration, and hindered innovation: Reviewing U.S. organic corn seed development. *Journal of Agriculture, Food Systems, and Community Development*, *12*(4), 55–65. https://doi.org/10.5304/jafscd.2023.124.012

Abstract

Private-sector dominance of plant breeding constitutes the present norm of organic seed genetics research, which has generated concerns in the organic farming community in this era of robust intellectual property protections. Intellectual property restrictions primarily in the form of certificates, patents, and contractual arrangements are blamed for stifling the innovation of organic seed varieties. To better understand the challenges small-scale and university-based breeders and researchers face in organic corn seed genetic development, this article provides an overview of intellectual property structures surrounding seed innovation and sharing. After describing the legal landscape in which organic corn seed research and

[a] A. Bryan Endres, Professor of Food & Agricultural Law and Director, Bock Agricultural Law & Policy Program, Department of Agricultural and Consumer Economics, University of Illinois.

[b] * *Corresponding author:* Jessica Guarino, J.D., LL.M., Postdoctoral Legal Research Associate, Bock Agricultural Law and Policy Program, University of Illinois; jguarino@illinois.edu

[c] Nabilah Nathani, J.D., University of Illinois.
Nathani was Research Assistant, Bock Agricultural Law & Policy Program, University of Illinois.

Funding Disclosure

This work was supported by USDA grant numbers ILLU-470-394 and 2017-51300-27115 and the C. Allen and Darren A. Bock Agricultural Law and Policy Program in the Department of Agricultural and Consumer Economics, University of Illinois.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Development of the JAFSCD special section in which this article appears, "Fostering Socially and Ecologically Resilient Food and Farm Systems Through Research Networks," was sponsored by INFAS and eOrganic and supported in part by the U.S. Department of Agriculture, National Institute of Food and Agriculture, through the Organic Agriculture Research and Education Initiative, Grant # 2017-51300-27115.

development occurs, the article details research efforts exploring the veracity of claims that contractual arrangements (in the form of seed-sharing agreements between breeders and universities) stifle the innovation of organic varieties. In doing so, the article describes the search methodology utilized and highlights a critical barrier to research: the closely guarded nature of private contracts that parties are reluctant to reveal. While we were able to identify several data points that highlighted the importance of seed-sharing agreements as a part of the intellectual property regime controlling organics research and breeding, we were unable to obtain contracts or identify disputes over contractual language to further analyze. Such contractual language only becomes available upon consent and release by individual parties to the contract or by litigation that exposes the contractual language, both of which we attempted to explore and utilize. The article concludes with a discussion of why contractual arrangements in the context of organic corn seed development are an informative piece of the intellectual property puzzle worth exploring, as well as future points of research necessary to yield data substantiating the concerns of stakeholders in the organic seed industry.

Keywords
Seed Sharing, Organic Corn, Transdisciplinary Research Networks, Intellectual Property, Legal, Breeding Networks, Contracts, Land-Grant University, Open-Source Seed

Introduction

With private-sector dominance of plant breeding constituting the norm of organic seed genetics research, growing concerns voiced by the organic farming community warrant a closer examination of the intellectual property structures governing seed research and plant breeding. Seed saving is an integral and time-honored agricultural practice (Oczek, 2000; Stein, 2005). Kloppenberg (2004), a scholar of seed research regimes, describes U.S. seed policy as,

> the continuous growth and elaboration of publicly performed research and development in a virtual vacuum of private investment. Global plant germplasm collection was initiated by the U.S. Patent Office in 1839. Thus was established a powerful tradition of state commitment to agriculture in general and plant sciences in particular. (p. 12; see also Blair, 1999; Kloppenberg, 2004; Stein, 2005)

This commitment to germplasm collection, however, was not initially a government initiative, but rather can be traced to the seed exchanges made between Indigenous Peoples and colonists. Although Indigenous knowledge gave European settlers their start, settlers took not only Indigenous seeds but Indigenous land as well to further agricultural research (Kloppenberg, 2004; Lyon et al., 2021). Land-grant universities, created and supported by the passage of the Morrill Act in 1862 and the Hatch Act of 1887, resulted from this dispossession. Additionally, the U.S. passed the Smith-Lever Act in 1914 to ensure access and distribution of information to farmers via Cooperative Extension Services (Kloppenberg, 2004). Much criticism remains, however—and rightly so—of the past and continued appropriation of Indigenous knowledge, seed genetics, and land, with strong arguments that the very survival of historical data and environmental biodiversity rest upon the recognition and protection of the Indigenous peoples' integral role in the seed rights regime (McCune, 2018; Posey, 1990).

While free and open exchange of seeds remained the norm for some time—with the U.S. Department of Agriculture (USDA) allocating nearly a third of its budget in 1878 to seed collection and distribution—it was not long before commodification became prevalent (Stein, 2005). The first seed lobbying group, the American Seed Trade Organization, was founded in 1883. As hybridization science developed, companies exerted even more control over seed availability and planting because of the poor performance of second-generation crops grown from hybrid seed (Stein, 2005).

Modern plant-breeding research, a task granted primarily to the land-grant university system, has dramatically shifted over the past century "from being viewed as a freely exchanged public good, toward increasingly considered a product of human

invention that is owned and protected" (Luby et al., 2018, "Introduction," para. 1). While numerous plant breeders used to work at land-grant institutions, plant breeding programs and positions have experienced decline (Luby et al., 2018; Shelton & Tracy, 2017). Despite this decline, the Bayh-Dole Act of 1980 mandated that plant cultivars developed using federal funding be released through the university's technology transfer office (Luby et al., 2018). This means that land-grant systems still actively enforce or restrict access to intellectual property rights to garner royalty revenue, which is not used for supporting plant breeding research at many universities (Luby et al., 2018). More robust research-and-development departments now exist in the private sector among seed companies with internal plant breeding programs, the seeds of which are almost always proprietary (Luby et al., 2018).

In response to the increasing privatization of research, intellectual property barriers have imposed significant "impacts on the exchange of plant germplasm amongst plant breeders and what farmers can and cannot do with seeds and harvest" (Luby et al., 2018, para. 1). Seed legislation, in addition to private contractual arrangements, deters organic seed genetics research: "To be approved for commercial exchange, a new seed variety must meet the so-called DUS criteria, meaning that it must be distinct, uniform and stable in its characteristics" (Fredriksson, 2021, p. 4)—criteria not easily met by local and organic varieties.

Particularly within the organic corn seed market, researchers and farmers participating in seed breeding activities encounter barriers to access to top-quality genetics, which hinders the advancement of breeding activities. Although private seed-breeding research lends itself well to the development of commodity corn varieties, issues arise for organic farms, on which plants typically experience more diverse and higher-stress environments. Studies suggest that nearly 95% of maize varieties utilized by organic farmers "originate in conventional breeding backgrounds selected in regions with benign climates, optimal or high levels of fertility, and unconstrained use of seed and herbicide treatments to reduce insect, disease and weed pressure" (Endres et al., 2022, p. 3). Conversely, organic corn seed varieties require genetics "that are nutrient-use efficient, disease-resistant, and able to compete well with pathogens and weeds" (Endres et al., 2022, p. 3). The development of organic seed genetics is stalled especially since part of the overall corn seed market is dominated by four major biotech firms (Hubbard, 2021).

Corn breeding for the organic sector is a complex social-ecological system, similar to fisheries, forests, and water resources, that needs a framework for sharing research findings (Ostrom, 2009). Scientific knowledge is a critical component of the continuous improvement and resilience needed to sustain socio-ecological systems (Folke, 2006), especially in the face of escalating threats from a changing climate. But as described above, the social, economic, and governance settings within which organic corn breeders and researchers operate frustrate key information sharing. Knowledge, in the form of improved genetics and in the existing system, is viewed as economic power to be captured and exploited (Clark et al., 2016). This approach undermines essential elements of the resilience and adaptive systems needed for breeding in the organic sector. Levin (1998) highlighted the importance of the individuality of components and an autonomous process that selects from those components based on the results of local interactions. Unfortunately, most of these factors that would advance the sustainability and resilience of organic corn breeding are currently absent or restricted by other forces.

To combat the stronghold private firms have on the corn seed market and to advance organic corn seed genetics, several university research teams have engaged in transdisciplinary research efforts across technical disciplines. Under the USDA's Organic Research and Extension Initiative, several grants were issued to fund the study of organic corn seed breeding and systems at the University of Wisconsin, the University of Illinois, and Iowa State University, among others (National Sustainable Agriculture Coalition [NSAC], 2021). Research disciplines include expertise in seed genetic development, the social science elements of seed distribution and development, and the legal ramifications of seed sharing. While designing breeding projects, researchers have

emphasized the importance of connecting with others throughout the duration of a trial, including check-ins, reaching out to participants by phone and email, and asking participants to visit the site (Dawson et al., 2023). Robust transdisciplinary and collaborate research networks have the potential to better navigate the intellectual property thickets that might otherwise hinder organic corn seed research and breeding development. Promoting seed-sharing networks can also enhance sustainability and resiliency across the food system, as organic production is intended to "integrate cultural, biological and mechanical practices that foster cycling of resources, promote ecological balance and conserve biodiversity" (USDA, 2023, para. 1).

In addition to university research teams, nonprofit organizations like the Organic Seed Alliance (OSA) also have arisen to combat dominance by private firms. OSA, for example, specifically named market consolidation as a threat to organic innovation and has established multiple regional seed networks that "emphasize diversity, ecology, and shared benefits" (OSA, 2023, "Confronting," para. 2) in their research. In its *2022 State of Organic Seed* report, OSA identified restrictive seed-sharing agreements as both a potential barrier to organic seed research and a potential concern of plant breeders, but also highlighted their potential to be fair and reasonable tools. In particular, the OSA report suggested that provisions restricting or permitting research differ depending on whether universities or industry were utilizing the contracts (OSA, 2022).

Central to the question of what preventative elements obstruct genetic research for organic corn seed markets are these seed-sharing contracts, which fill the gap that other IP tools like utility patents do not. Scholarship identifies restrictive contracts and licensing as one of the broad issues plaguing plant-breeding and seed-genetics research and presenting a particular challenge for organics (Jenney, 2022). Under existing contracts, what restrictions are placed upon the distribution of seeds? In what ways does contractual language stifle research, especially in the university context? How does the Open Source Seed Initiative (OSSI) affect the existing research structure, and what tools or concepts might be useful to implement in contractual arrangements? This article explores these questions through the lens of the organic corn seed market in two parts. The first part briefly describes the history of U.S. seed genetics research and the intellectual property schemes that arose to guide research and development, including the establishment of the Open Source Seed Initiative. The second part describes efforts to obtain sample seed-sharing agreements and the barriers to research discovered in the context of organic corn. We conclude with a discussion of why contractual arrangements governing seed research, development, and sharing warrants further exploration in tandem with other forms of intellectual property protections.

Part I. Intellectual Property and Patent-Like Protection of Organic Seeds

Barriers to seed-saving and -sharing to control the distribution of seeds erupted throughout the 20th century, initially to help maintain quality control of seeds (Endres, 2005). Stricter regulations enforced through intellectual property rights and patent-like protection of seeds, however, also created ample opportunity for the commercialization and consolidation of seed distribution and, consequently, seed genetics. Domestically, the American Plant Patent Act of 1930 was the first to allow for the patenting of plant varieties. On an international level, patent-like protections granted by plant-variety protection legislation similarly privatized seed breeding (Fredriksson, 2021).

The intellectual property protection of seeds may take a variety of forms, all protecting slightly different aspects of seed research and dissemination. Types of protection include trade secrets, open-source pledges, Plant Variety Protect Act (PVPA) certificates, utility patents, and private contractual agreements (Luby et al., 2018). Beginning with the Plant Patent Act of 1930 (PPA), Congress allowed for the patenting of asexually reproduced plants (Brickey, 2020). In 1970, Congress permitted an additional layer of protection by enacting the Plant Variety Protection Act (PVPA), which allows for patent-like protections for plants reproducing via seeds. In its initial form, the PVPA authorized farmers to save (and resell) harvested seeds, along with granting infringement protections for research

activities (Brickey, 2020). However, subsequent amendments to the PVPA in the 1990s significantly narrowed the economic incentives for farmer-saved seed by eliminating third-party sales of saved seed (also known as "brown bag" seed) and limiting saved seed only for personal use (Chen, 2014; Endres, 2005).

The landmark case of *Diamond v. Chakrabarty* in 1980 held that living organisms could be protected under a utility patent so long as they were human-made and not naturally occurring (Endres, 2005). This propelled the seed industry into a new realm of intellectual property protections as seed developers preferred the stronger intellectual property protections afforded by utility patents relative to PVPA certificates and the accompanying saved-seed exceptions (Chen, 2014). While the development of genetically engineered crops was increasing, so too were the opportunities for private companies to patent the materials (Center for Food Safety [CFS], 2023). The passage of the Bayh-Dole Act in 1980 "allowed public institutions to obtain patents on publicly funded research and spurred the initiation of public-private partnerships, where industry funds public research to advance their own goals and often appropriates the resulting technology" (CFS, 2023, para. 5).

This philosophy and temporary reality of publicly funded research, however, was eclipsed by the rather sudden consolidation of the seed market that followed (Sumpter, 2021). The 1990s and 2000s witnessed significant merger and acquisition activity among the larger seed companies. By 2009, six firms dominated seed sales: Monsanto, Bayer, Syngenta, Dow, DuPont, and BASF (Torshizi & Clapp, 2021). Less than a decade later, further consolidation left only four: DowDuPont, ChemChina, Bayer, and BASF (Sumpter, 2021; Torshizi & Clapp, 2021). Congressional concern has recently been expressed over this exact issue: "In the United States, the [four] largest corn seed sellers accounted for 85% of the market in 2015, up from 60% in 2000" (Sumpter, 2021, p. 634).

Utility patents offer the most stringent levels of protection due to their 20-year duration and ability to prevent experimental use of the patented product (Chen, 2005; Endres, 2005). Alternatively, trade secrets protect developer methodology, an important research component in the development of hybrid plant varieties (Endres, 2005). For corn seeds in particular, farmers must purchase new corn seed for each growing season because hybrid seeds lack resiliency and repeatable viability over generations. (Fitzgerald, 1993). In combination with this single-use nature of hybrid corn, trade secrets protecting parent seed genetics inherently involve measures to ensure profitability, which only amplifies the capitalist nature of intellectual property regimes controlling seed breeding and sharing (Endres, 2005; Jenney, 2022). Numerous lawsuits consequently arose involving seed companies fighting over the ownership of parent lines of hybrid corn (Endres, 2005).

The complexities of overlapping intellectual property rights can present significant obstacles to routine business transactions such as seed sales. To streamline the process, farmers, seed breeders, and the owners of the intellectual property resort to licensing and other contractual arrangements (Endres, 2005; Smulders et al., 2021). These agreements, however, often contain language that protects the rights of the intellectual property owner at the expense of further research and development of seed genetics for organic and other diverse varieties (Endres, 2005). Because relatively few large corporations own the intellectual property rights to most conventional corn seed, seed legislation and contractual arrangements regularly favor research targeted at aspects of resiliency like germination availability and resistance to disease over biodiversity that might optimize the development of improved organic varieties (Fredriksson, 2021). As a result, although studies have revealed that an increasing number of organic farmers are using organically produced seeds (Luby et al., 2018), the research and development for those seeds often is not tailored to use in organic production systems. Recent funding efforts by USDA's National Institute of Food and Agriculture (NIFA) are attempting to address the research gap (NSAC, 2021). Meanwhile, the use of non-organic seed in organic production is an intentional loophole initially intended to address concerns about the inadequate supply of certified organic seed, but through its implementation has proven to also obstruct genetic development (Endres, 2022).

From the perspective of land-grant universities seeking to further plant breeding research, in particular, research on organic corn seed genetics, liability issues remain prominent for the experimental use of seed. The introduction of utility patents to the seed realm and the shift away from PVP certificates significantly restricted research flexibility. The broad intellectual property protections embedded in utility patents prohibit research derived from patented seed that may have commercial implications. This would include equivalents or even new varieties derived from seed subject to a utility patent (Endres, 2005). In 2002, the Federal Circuit in *Madey v. Duke* "held the research exception does not shield universities from liability when 'the act is in furtherance of the alleged infringer's legitimate business and is not solely for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry'" (p. 1362). Although blanket research exceptions garner well deserved criticism for running contrary to the theoretical underpinnings of intellectual property's role in advancing scientific discovery (Chen, 2005), inflexible intellectual property rights may work against the public interest in some parts of the agricultural context; as noted by Brickey (2020), "Agricultural innovators are not competing to develop 'a better mouse-trap' or build the next iPhone. Instead, the results of their innovations may increase access to a basic human necessity" (p. 300).

In response to increasingly consolidated and exclusive intellectual property rights in the seed market, the Open Source Seed Initiative (OSSI) was founded in 2012 (OSSI, 2023a). OSSI's goal "is to continuously enlarge the pool of crop varieties that are 'OSSI-Pledged,' and so are freely available for use and improvement by farmers, gardeners and breeders without encumbrances" (OSSI, 2023a, para. 5). As of 2021, OSSI lists over 350 seed varieties that are available from 51 OSSI Seed Company Partners (OSSI, 2023a).

Particularly relevant to seed breeding research at land-grant universities is the lack of a research exemption for patented seed varieties. Utility patents restrict the ability to develop new varieties derived from patented seeds. PVP certificates provide patent-like protection for sexually reproduced plants but also afford research exemptions "to breed new varieties of seed and for any 'bona fide' experimental purpose," which includes use "'in a breeding program to develop new commercial varieties,' at least as long as such new varieties are different enough not to be 'essentially derived' from the original protected variety" (Winston, 2008, pp. 324–325; see also Chen, 2005). PVPA notably does not provide as stringent protection as utility patents, however, and thus PVPA protections are generally not preferred by agricultural innovators (Winston, 2008).

The relative strength of utility patents compared to PVPA as a protection of intellectual property is a key point of contention in the seed-sharing debate. As stated on the OSSI website, "Patented and protected seeds cannot be saved, replanted, or shared by farmers and gardeners. And because there is no research exemption for patented material, plant breeders at universities and small seed companies cannot use patented seed to create the new crop varieties that should be the foundation of a just and sustainable agriculture" (OSSI, 2023b, para. 2). Although an open-source approach has proved inviable with respect to patented seeds, strong public relations efforts have bolstered OSSI's prominence.

OSSI employs "copyleft" commitments to maintain free and open development of seed varieties, offering an alternative to the constrictive contractual and legislative impediments facing organic seed genetics research (OSSI, 2023a). The copyleft principle, originally coined in the field of software development, attempts to provide both "moral and legal force" to seed breeding (OSSI, 2023a, para. 3). Copyleft concepts applied to seed breeding would mean:

- "Varieties may be used by anyone,
- "The user is allowed to change / develop the varieties,
- "The user may multiply varieties and pass them on to others, and
- "Any new variety developed from the variety under *copyleft* would be subject to the same rules (the 'viral' clause)." (Kotschi & Wirz, 2015, p. 13)

Studies are still assessing the impact, if any, of

the open-source seed movement on the organic seed market. At the time of this article, there is only one study that examines how various open-source strategies affect the freedom of breeding and sharing seeds (Beck, 2011). Although OSSI's pledge and copyleft principles still require much research, scholars of the open-source seed movement suggest particular avenues ripe for exploration, such as the viability of enforcing open-source seed licensing and genetics (World Intellectual Property Organization [WIPO], 2023). For example, German civil law allows for a material transfer agreement that employs copyleft principles (WIPO, 2023). One scholar of seed-sharing regimes, Martin Fredriksson (2021), has suggested additional research to explore the political significance of open-source seed initiatives and whether there is an associated impact on national or international laws regarding seeds. As a contribution to this line of research, this article will examine efforts to identify and analyze U.S. seed-sharing agreements and the impact of their arrangements on the organic seed industry.

Part II. The Search for Seed-Sharing Agreements

There is vibrant discussion within the organic seed research and development community over contractually arranged rights and restrictions placed upon organic seed research and distribution (Luby et al., 2018), but data supporting these struggles is difficult to obtain because of the closely guarded and private nature of contracts. Contracts for seed research are individualized and negotiated between the plant breeder and the institution supporting the research conducted, utilizing sensitive financial and personal data that participants are hesitant to share, let alone make publicly available online. Due to their private nature, contractual language generally becomes available to the public only upon instigation of litigation and the attendant discussion by the court regarding the contractual rights and obligations that are otherwise shrouded by confidentiality clauses (Lee et al., 2021). Current studies assessing seed-sharing contracts thus far indirectly asked questions about contractual arrangements via a survey and have drafted contract designs to utilize rather than relying on collection and review of existing contracts in use (Veettil et al., 2021). To assess what contractual and intellectual property restrictions may stifle organic seed development, we utilized the following methodology.

We first looked to case law to assess the current landscape of seed-sharing intellectual property rights and agreements in the context of land-grant university research. We found little on the issue. We utilized databases such as Westlaw and LexisNexis, two primary legal research repositories, to search all U.S. jurisdictions for federal and state litigation concerning organic seed research agreements with land-grant universitates dictating intellectual property rights among other contractual rights and obligations. We also conducted a general search for litigation discussing intellectual property rights, seed-sharing agreements, and land-grant universities. The search did not yield cases relevant to the university research and seed-sharing context. The scant results of case law research indicate that organic seed research occurring in breeding networks involving land-grant universities is not a topic of litigation garnering judicial attention, which indicates that to the extent there are disputes, they are resolved through private negotiations or court settlement prior to a trial verdict.

Next, we searched the academic literature on seed-sharing agreements and intellectual property rights. We utilized HeinOnline, Google Scholar, JSTOR, and other relevant scholarly databases to search for literature discussing seed-sharing agreements, IP, land-grant universities, and organic plant and corn breeding research. The search incorporated a detailed search for discussion surrounding organic corn breeding and seed-sharing agreements governing its development, but did not find sources. This search was done using key words like "seed sharing," "seed agreements," "plant breeding," "organic," "research," "symposium," "contract," and "intellectual property protection" and was aimed at searching for domestic results rather than discussion of international efforts.

The literature discussing organic corn seed focuses on the varieties developed and the methodology for the research and production or the benefits of performance in organic versus conventional systems (Lorenzana & Bernado, 2008; Shelton & Tracy, 2015; Zystro et al., 2020). Additionally,

while there is much scholarly discussion surrounding general seed intellectual property rights (Borowiak, 2004; Mascarenhas & Busch, 2006; Smulders et al., 2021; Stein, 2005), direct discussion of seed-sharing agreements in the university context and for organic corn in particular is not available. This indicates the need to further explore methods and opportunities to unlock private contracts that might provide greater understanding of the legal and economic landscape.

Finally, we searched other general online search databases including Google to identify any extension work, symposiums, or materials not captured in searching legal databases and journal repositories. Information from symposiums and other academic materials appear to follow the same line as legal scholarship and cases in terms of availability but have the potential to provide additional data. Symposium information in legal and scientific fields, while not peer-reviewed, is generally proffered by experts in their respective fields, lending reliability to the data presented. This search was done utilizing key words like "seed sharing," "seed agreements," "plant breeding," "organic," "research," "symposium," "contract," and "intellectual property protection" and was aimed at searching for domestic results rather than discussion of international efforts. Again, the presence of the contracts was confirmed but details were unavailable or omitted. This search yielded one guideline for cultivar release (University of Florida) but did not detail the rights and obligations as a seed-sharing agreement would.

Webinars discussing seed-sharing agreements and organic plant breeding were few but present. For example, eOrganic at Oregon State University was the primary search result and was one of the only results dedicated to plant breeding, intellectual property rights, and contract arrangement. eOrganic hosted several webinars discussing seed intellectual property rights yet did not comprehensively discuss the vital nature of seed-sharing agreements. In describing the 2022 National Organic Research Agenda, Dr. Thelma Velez advocated for a revision of the PVPA to protect sexually reproductive plants (Velez, 2022). She also argued that patent law should be reformed to exclude living organisms, including seeds, plants, plant parts, and genetic traits. However, none of this content covered seed-sharing agreements in the university context. Work by the Organic Farming Research Foundation (OFRF) in connection with USDA represented the other search results. An OFRF webinar discussing organic plant genetics and intellectual property rights emphasized the important role that seed-sharing agreements play in the agricultural intellectual property rights sphere and specifically identified agreements between universities and plant breeders as a point of improvement (in overall fairness of terms) (Schonbeck, 2023). Another webinar, hosted by the National Center for Appropriate Technology (NCAT), also highlighted contractual agreements governing seed sharing as worthy of research exploration, particularly examining terms and conditions that limit breeding and research (NCAT, 2020). Overall, contractual arrangements dictating rights and obligations in organic seed research are regularly identified as a crucial component of intellectual property structures that control seed genetics, but the concept is rarely explored further than that. This lack of further detail is likely due to difficulty in obtaining or reluctance in sharing explicit contract language, terms, and agreements.

Part III. Concluding Thoughts

Organic seed research and breeding is premised upon sustainability, a concept that may be at odds with the existing intellectual property regimes described above that focus on profit and confidentiality. Sustainability requires resilience and continuous improvement. Diversity, modularity, knowledge sharing, feedback mechanisms, leadership, and trust are some of the conditions enabling such resilience (Folke et al., 2016). For those involved in organic research, production, distribution, and consumption, these are familiar principles and aspirations. Moreover, Article 1, Section 8, Clause 8 of the U.S. Constitution provided Congress the power to develop intellectual property regimes to "promote the Progress of Science and useful arts." Again, this echoes the goals of the organic seed-breeding community to advance development of genetics appropriate for the heterogeneous nature of organic agriculture. Yet in its current manifestation, intellectual property rights,

coupled with restrictive seed-sharing agreements, appear to serve a contrary purpose as genetics with potential benefit to the organic sector are relegated to the locked storerooms of private firms focused on the larger-scale conventional or genetically engineered corn seed markets. As a result, many in the organic community feel trapped in a system that demands innovation, diversity, trust, and knowledge sharing, but has external structures limiting their ability to access needed resources.

This article is an attempt to identify some of the legal-structural factors that may hinder advancements in organic corn breeding through an examination of the contractual language governing organic seed research and breeding, which the organics community has identified as a relevant and crucial component of the intellectual property protections that can stifle development. But, as noted, the lack of reported case law and scholarship in the area indicates a need to further investigate the structure of private seed-sharing contracts for multiple organic products through more robust investigative measures and to explore the development of alternative pathways to promote resilient and sustainable organic seed-breeding networks. Whether action comes through the efforts of grassroots organizations, like those of the National Sustainable Agriculture Coalition, or formal federal action via legislation like the farm bill, it is clear that the organics community requires the promotion of a community-based and community-forward approach to seed sharing, research, and breeding.

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