Licensing Agreements in Agricultural Biotechnology

RICHARD S. CAHOON, *Executive Director, Cornell Center for Technology, Enterprise & Commercialization and Senior Vice President, Cornell Research Foundation, U.S.A.*

ABSTRACT

Though similar in many ways to other kinds of license agreements, agri-biotech licenses have some unique elements that require special attention. Considering first the similarities, this chapter looks closely at the typical boilerplate language that all license agreements share and outlines the basic structures and concerns of all such agreements. The chapter then turns to the singularities of agri-biotech licenses, focusing on such issues as multiple property types that often cover a single technology and/or product, freedom to operate issues that drive anti-royalty-stacking provisions, philanthropic- and humanitarian use clauses, and stewardship obligations.

1. INTRODUCTION

"Agricultural biotechnology" is a relatively broad term that can include cell culture, fermentations, bioprocessing, breeding and animal husbandry, diagnostic methods and apparatus, and biocontrol of plant disease and pests. An important, challenging area of IP management and licensing in agricultural biotechnology relates to the *genetic engineering* of plants and animals through applied nucleic acid chemistry and related technologies. These technologies include methods and materials for isolating functional pieces of DNA (for example, genes and promoters), creating *genetic constructs* (that is, functional packages of DNA sequences), and stably inserting genes into plants and animals. This chapter focuses on these issues (the terms *agricultural biotechnology* and *agri-biotech* will be used synonymously to describe this area of genetic engineering). Since the largest amount of genetic engineering activity in agriculture to date has involved plants, the discussion focuses on plant-related technology. But many of the principles of intellectual and biological property-based management and licensing in plant-based agri-biotech apply equally to animals and microbes.

This chapter's topic is license agreements. It explores the basic nature and purpose of a license agreement: the definition and transfer of certain property rights between two or more parties under a specified sharing of rights and obligations between those parties. A license is distinguished from a "sale" in that ownership of the property does not transfer but remains with the original owner. In a license, the owner, called the *licensor*, transfers certain rights of possession and use (but not ownership) to the recipient of those rights (the *licensee*).

As in any area, the process of creating a license agreement in agri-biotech involves the precise definition of the property of interest, an articulation of the exact rights of the licensor and licensee in the property after the agreement is signed, and the ongoing rights and obligations of each party. The elements of this process are defined below, and the attendant issues in agri-biotech licensing are described. Preferred licensing methods are also suggested.

Cahoon RS. 2007. Licensing Agreements in Agricultural Biotechnology. In *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices* (eds. A Krattiger, RT Mahoney, L Nelsen, et al.). MIHR: Oxford, U.K., and PIPRA: Davis, U.S.A. Available online at www.ipHandbook.org.

2. BACKGROUND ISSUES IN AGRI-BIOTECH LICENSING

A decision about whether to license an agri-biotech invention is typically based on a few important background issues:

- the significant cost to create, develop, and commercialize agri-biotech products
- the critical role of government regulations in testing and commercializing products
- the importance of public perception and acceptance of agri-biotech products
- the necessity of using numerous, different (and often proprietary) technologies to create agri-biotech products

This last issue leads to the following related problems:

- the "tragedy of the anticommons" problem, which creates different technology owners with respect to a single product
- the challenge of obtaining freedom to operate (FTO) for agri-biotech technologies and products
- the royalty-stacking problem, in which each owner of a proprietary technology expects a significant royalty on sales
- the existence of multiple forms of property that can exist simultaneously in any one technology or product, namely:
  - utility patents
  - plant patents
  - plant breeder's rights (for example, plant variety protection based on the UPOV Convention)
  - trade secret
  - trademark
  - tangible biological property
- the unique attributes of the agricultural industry, that is:
  - low profit margins
  - commodity economics
  - national food security issues
  - humanitarian concerns over hunger and malnutrition

3. OVERVIEW OF AGRI-BIOTECH LICENSES

The factors described above combine to configure and constrain agri-biotech license terms and conditions. For example, the multifaceted aspects of possible property instruments in agri-biotech require the type and scope of property rights contained in the license to be carefully described. Does the license include a patent and a plant variety protection certificate on a new plant variety? Does the license include limited rights of possession of tangible materials such as seeds, vegetative cuttings, or tissue cultures?

Similarly, the precise nature of the rights granted to the licensee must be clearly stated. Is the grant limited to a nonexclusive, freedom to operate for testing only or an exclusive right to make, use, and sell? Does the grant include rights in improvements to the technology or product and to related future inventions (for example, does the right to make, use, and sell a transgenic plant include rights to all crosses made with that plant using traditional breeding techniques)? And does the grant of rights permit ownership of further developments by the licensee? For example, does the grant of rights to a transgenic plant include the right to use individual components of the genetic construct (individually or in combination) in other constructs and "transgenic plant events" made by the licensee? Agri-biotech licenses should also define the precise rights of sublicensing granted to the licensee. For example, is sublicensing limited to specific transgenic events or to genetic components? Finally, what is the geographical scope of these rights? Are certain rights granted in one country but not in another? Breeding rights, for example, could be limited to one country and sales to another.

The low profit margins typical of commodity agriculture naturally depress the royalty rates that a technology owner can expect. For similar reasons, the large up-front license fees more typical of pharmaceuticals are unlikely.

The flipside of rights is obligations, and several sections of the license will define the obligations of the licensee. The most obvious are the financial obligations. Licensee payments will be defined, which may include license fees, royalty on product sales, milestone payments, and IP expenses. Such obligations can be defined in many different structures, schedules, and unique terms. In agri-biotech licenses, milestones may include the achievement of successful field tests, regulatory approval, and first product sale. Other obligations of the licensee are likely to include adherence to applicable laws, assumption of business risk, and product quality assurance. The license may also include licensee obligations for mandatory sublicensing, diligence in commercial development, labeling requirements, trademark use, confidentiality, and requirements for certain philanthropic and humanitarian uses, especially in developing countries.

The license is also likely to contain obligations for the licensor. For example, the licensor may be obligated to provide a specified amount of biological material over a certain time period. Similarly, the licensor may be required to provide know-how, and/or access to proprietary data, documents, and related information. On occasion, licensors will be obligated to perform certain tests or laboratory work or to provide access to future inventions and improvements. Almost certainly, the licensor will be obligated to guarantee its ownership rights and perhaps also product performance, noninfringement of licensed IP, and so on.

Of course, the parties to the license will be obligated to adhere to a set of legal requirements that are standards of contracts, such as formal notifications, protocols for contract amendment, dispute resolution, use of names, and the delineation of legal remedies and venues. Although each part of a contract has importance, one of these sections of legal boilerplate, warrants and representations, is especially critical. This language exactly defines the commitments being made by the parties and must always be scrutinized carefully.

The important sections of an agri-biotech license are described in more detail below, and some of the implications unique to licensing in this area of technology are discussed.

4. IMPORTANT SECTIONS OF AGRI-BIOTECH LICENSES

4.1 *The preface*

The preface sections, which precisely define the parties and provide background and context for the agreement, are not unique to agri-biotech licenses. Like any license, the WHEREAS clauses of an agri-biotech license provide a good background to the terms and conditions of the agreement—when they are written well.

4.2 *Definition of property rights*

It is particularly important in agri-biotech licensing to precisely define the property rights contained in and transferred by the agreement. Biological materials should be described precisely. For example, complete lists of named plant-breeding lines, cell type sand lines, plasmids, and the like should be attached to the agreement. All patents, patent applications, and plant protection certificates should be listed in an attachment that includes serial numbers and their applicable countries. It should also be clear what derivates of patents and applications are to be included in the grant of rights, including continuations, continuations-in-part, divisionals, and reexaminations.

4.3 *Grant of rights*

This section of the license agreement precisely defines the rights conveyed by the owner-licensor to the licensee. In agri-biotech, there will likely be a mix of such rights granted. For example, the licensee may receive an exclusive right to sell a specific line of transgenic plant but not to make variants of the line. The grant of commercial exclusivity to a transgenic plant line will very likely not include the right to make, use, or sell any of the components of the genetic construct alone or in combination, but only as an inextricably linked part of the specific transgenic plant.

The grant of rights should also define any territorial limitations. As with any IP, agri-biotech patents are country-specific. But in agri-biotech this might include limits on export from countries where the right to make and sell has been granted. In addition, licensors in agri-biotech will frequently provide incentives for licensees to sublicense, especially when the sublicense will cover markets in which the licensee may not be strong or even have a presence. The grant of sublicensing rights and its scope, therefore, is often an important issue.

It is particularly important in agri-biotech to define whether the licensee may use the technology to create new variants. For example, will the licensee have the right to make crosses of the exclusively licensed plant line with its own proprietary germplasm? If so, will this affect other license terms, such as the royalty rate owed?

The grant of rights will define the nature of rights exclusivity and whether there are any time limits to the exclusivity. For example, some exclusive licenses provide only an exclusive lead-time of five years or so, after which the license reverts. Nonexclusive licenses are common in agri-biotech licensing, but sole, exclusive, and co-exclusive licenses are also often granted.

Finally, agri-biotech licenses are relatively unique with regard to the scope of rights concept field-of-use. In agri-biotech licenses, field-of-use typically refers to a crop type that may be broadly or narrowly defined. For example, the grant of rights may broadly include the right to make, use, and sell all monocots and dicots created using the technology. Or, the field-of-use might grant only monocots, or only corn. The field-of-use grant is particularly prevalent in the licensing of agri-biotech genetic construct components, such as genes, selectable markers, translation enhancers, or promoters. This is due to the technologies' frequently broad applicability.

4.4 *Consideration*

The consideration section of the agreement is one of the most familiar. It is common to all licenses, including agri-biotech. What did the license cost? How valuable is the license? These are standard issues dealt with in the consideration. This section is designed to deal with the *opportunity cost* to the licensor and to account for the potential value, cost to develop, and market potential of the licensed rights. Agri-biotech licenses may provide for exchanges of germplasm and access to other technology owned by the licensor. For example, the licensee may provide the licensor of a genetic construct access to the licensee's valuable germplasm for future transformations. As mentioned above, agri-biotech licenses have typically lower license fees and are often characterized by milestone payments at critical commercial development stages.

4.5 *Royalty payments*

Like most licenses, agri-biotech agreements contain provisions for a royalty payment linked to sales volume. Frequently, this link is a percentage of net sales. Due to low profit margins in agriculture, this percentage is almost always much less than 10%. In fact, royalties of between 1% and 5% are common.

A relatively unique aspect of agri-biotech royalty rate setting is the important problem of *royalty stacking*. This problem arises when several different owners of intellectual or tangible property components in an agri-biotech product all expect a reasonable royalty on each sale. All of the owners will then "stack" their royalty expectation on the sale of each product. While this may be relatively manageable for two or three separate stacked royalties, it is wholly unmanageable when there are several and/or when any one of the component owners expects a royalty that is too large. For example, it is common for each of four or five different owners of different proprietary technical components to request half of the profit margin. Obviously, that kind of royalty stacking makes commercializing an agri-biotech product economically unfeasible. The royalty stacking provisions of agri-biotech licenses are designed to mitigate this problem. Although such provisions can be difficult to negotiate, when implemented they can provide a pro rata sharing protocol that self-adjusts as the technology-property-ownership mosaic changes over time.

Other popular royalty mechanisms include fixed-fee payments based on some type of added-value calculation. For example, in the United States, royalty on the sale of transgenic corn with lepidopteran and/or herbicide resistance (that is, Bt corn or Roundup Ready® Corn) has been based on a fixed *tech fee* on each bag of seed. Rebates, trademark use, incentives, and other mechanisms act to modify the fixed-fee amount.

4.6 *Minimum royalty payment*

Minimum royalty payment obligations are not unique to agri-biotech licensing. They are common in all exclusive licenses. In agri-biotech licenses, such payments are often linked to the scope of rights granted, particularly territory and field-of-use rights. For example, the licensor may use increased or decreased minimum payments as an incentive (or disincentive) for the licensee to pursue commercialization in certain crop types or countries.

4.7 *Philanthropic and humanitarian use*

There is often pressure to establish philanthropic- or humanitarian-use provisions in agri-biotech licenses, particularly if the crops are important food staples (for example, rice or wheat) in developing countries. Such provisions are designed to establish clear boundaries between the commercial sphere and uses that directly impact a country's poor population. Although there are a variety of ways to define these boundaries, they are often based on the scale of production and the scope of commercial activity. Such definitions depend on the crop, the country, and the particular socio-economic situation. For example, growing three avocado trees would very likely be defined as philanthropic use in Bangladesh. Growing twenty-five trees there may or may not be philanthropic; a plantation of 500 hectares would most certainly be considered commercial. However, if the production of these 500 hectares was used by a nonprofit organization to feed the poor, it would likely be considered philanthropic use. Carefully designing and implementing philanthropic-use boundaries is essential, as is ongoing monitoring for compliance. Philanthropic use should always be considered when staple crops in developing countries are involved. However, such provisions should not be used to disguise commercial-scale use.

Philanthropic- or humanitarian-use provisions of a commercial agri-biotech license will often identify a third party responsible for implementing the noncommercial provisions. The license may also define certain protocols for the interaction of the commercial licensee and the philanthropic-use licensee. A separate philanthropic-use license will be in place between the technology owner and the noncommercial partner. Such licenses usually would contain royalty or other payment obligations. However, stringent obligations for controlling and monitoring the technology and products may be imposed on the licensee to ensure the achievement of philanthropic and commercial goals. Despite the licensor's waiver of royalty payments for philanthropic use, nominal fees may be required by the philanthropic licensees to support dissemination of the technology. Both commercial and philanthropic-use licenses must be designed to enhance—and not hinder—the respective purposes of each agreement.

4.8 *Stewardship of technology*

The issue of stewardship arises frequently in agri-biotech licensing. Although precise definitions vary, *stewardship* generally refers to the ongoing oversight and guidance of the commercial development and dissemination of the new technology. It typically refers to the importance of maintaining a licensor's overall interests in sustaining the long-term use of transgenic crops. Stewardship clauses in agri-biotech licenses have been particularly concerned with smooth regulatory approvals, good government relations, effective management of public relations, and mitigation of the loss of product efficacy caused by inappropriate or less-than-optimal implementation. For example, stewardship clauses in an agri-biotech license will most certainly obligate the licensee to actions that will not harm regulatory approvals or relations between relevant government officials, the licensee, and/or the licensor. These clauses may also prescribe rights and obligations of the licensor and licensee that are designed to allow the licensor to maintain effective control over public relations efforts. Finally, on the technical side, stewardship clauses have been used to avoid the development of pest resistance in transgenic crops by mandating certain crop management techniques, such as rotations, buffers, and pest reservoirs.

4.9 *Enforcement and litigation*

Successful agri-biotech products have a history of significant patent-infringement litigation. For example, large agri-biotech companies such as Monsanto, Syngenta, Bayer, and Pioneer Hi-Bred International Inc. (now a division of DuPont) have engaged in numerous, complex patent infringement actions against each other and their sublicensees. Although litigation can be viewed as generally undesirable, it may be unavoidable. Therefore, agri-biotech licenses should contain enforcement and litigation provisions that are designed with this eventuality in mind.

5. PRACTICAL EXAMPLES

Cornell University's long history of licensing its agricultural intellectual property (IP) began with veterinary vaccines. Cornell patented and licensed these animal vaccines in the early 1930s after establishing its patent and licensing subsidiary, Cornell Research Foundation (CRF). Years before this, Cornell had an informal technology transfer process through which it delivered new crop varieties to New York farmers. Using this informal process, Cornell transferred new seed varieties to the commercial sector (farmers) through the New York Seed Improvement Program (NYSIP), a function of the New York Agricultural Experiment Station within Cornell's College of Agricultural and Life Sciences. Although not a licensing process per se, NYSIP provided farmers with Cornell-developed seed under a long-held tradition in which farmers paid a nominal fee to NYSIP in exchange for the seed. And, following a practice that characterizes Cornell's IP technology transfer today, NYSIP transferred these seeds from the University to the private sector nonexclusively.

Nonexclusive licensing reflects Cornell's public mission and its fundamental desire to see Cornell technology widely disseminated.

Given the long history of the NYSIP seed-distribution program, it's not surprising that after vet vaccines, the next significant effort of Cornell's patenting and licensing in agriculture was a program to transfer new varieties of tree, vine, and other fruits through nonexclusive licenses. In the early 1980s, Cornell began a program to patent and license new raspberry and strawberry varieties. This activity was driven, in part, by the arrival of a new generation of plant breeders who saw patents and licensing as an important part of the mission for plant breeding at a land-grant university. More-traditional breeders at Cornell, responsible for Cornell's apples and other tree fruits, were resistant to the notion of such using intellectual property to control dissemination of new varieties. They preferred the traditional route of placing new-fruit varieties in the public domain, involving no intellectual property, no controls over distribution, and no financial return to Cornell or its breeding program.

This traditional view of public domain releases began to change with the release of Cornell's "Jonagold" apple variety. Although this variety was a modest success in the United States (often labeled as other, more common apples), Jonagold was hugely popular throughout Europe. For many years, it was the most popular European apple. But, because Cornell had not sought protection for the variety, there was no intellectual property in place, and this marketplace popularity did not translate into financial benefit for Cornell. This fact, coupled with a decline in state and federal support for apple breeding, changed the traditional "public domain" mind-set among certain groups at Cornell once and for all.

Since the mid-to-late 1980s, Cornell has had a comprehensive program of patenting and domestic licensing of apples, cherries, plums, grapes, apple rootstocks, raspberries, and strawberries. These licenses are nonexclusive, simple, two-page contracts that provide for a royalty to be paid to CRF on sales of plants. These licenses have no up-front fees or minimums. While these licenses have accomplished the goal of widespread use of Cornell varieties, they have also been a disappointment because nonexclusive licensees provide little or no incentive to invest in developing the market for the licensed variety. So, sales volume per licensee stays small.

In one rare instance, Cornell decided to license a raspberry variety, "Watson," exclusively, with significant license fees, minimum royalty payments, and higher royalty amounts per sale. The license proved to be a financial success for Cornell and its fruit-breeding program and one that catalyzed significant market development for Watson. But this exclusive license was a political failure. Various political constituencies at Cornell, including farmers, nursery owners, state legislators, and others, protested this license. Thus, until recently, all domestic licenses for Cornell fruit varieties have been nonexclusive. And, although the royalties gained from these nonexclusive licenses have provided significant support for Cornell's fruit breeders, one wonders if Cornell fruit varieties might have been even more successful in the market if exclusive licenses had been allowed to incentivize market development.

Despite this adherence to nonexclusive licensing in the crop sector, Cornell continued to license veterinary technology on an exclusive basis. This was in consideration of the large investment necessary by the licensee to bring the product to market, but also the lack of political resistance to exclusive licenses in the animal-health area. These conditions likewise existed in the food-process and agricultural-device fields. Throughout the seventies, eighties, and nineties, Cornell patented and exclusively licensed several food-manufacturing processes including: egg pasteurization and vegetable blanching, as well as the supercritical CO2 fluid extruder. The latter was unique in that the licensed device required a royalty payment on sales of food product made using the patented machine.

During this same period, a number of biological control technologies were patented and licensed, all exclusively. Two of these are notable because the technologies were commercialized through start-up companies. In both cases, CRF took an equity stake in the companies. One company, Bioworks, sells a patented fungal species for control of plant disease. Bioworks is privately held, and Cornell retains strong ties to this New York company. A second company, Eden Bioscience trades on NASDAQ and was responsible for one of the largest equity-liquidation events realized by Cornell for its patented inventions.

The policy decision to allow CRF to take equity in start-ups as part of a patent license was a watershed event. That decision, made in the late 1980s, was driven by one of the first and most important inventions in plant biotechnology—the "gene gun." The gene gun, which is based on a biolistics process, was invented by Cornell professors, John Sanford and Edward Wolf. CRF patented the invention but was unsuccessful in licensing it to existing agriculture-related companies. Sanford and Wolf founded a company, Biolistics, which was ultimately purchased by DuPont, that actively commercialized the device. CRF had founder's equity in Biolistics and realized significant benefits on the sale of the company to DuPont.

Although the Biolistics story was a technology transfer success in many respects, the early participants were not fully aware of certain implications of some of the intellectual property aspects of the license arrangements. In particular, Cornell failed to retain its own right to use the invention for research and technology transfer purposes and also failed to carve out certain philanthropic or humanitarian uses from the commercial license. This has presented problems for some who wish to use the technology without having to abide by constraints imposed by DuPont and its sublicensees. Cornell has been criticized for this lack of foresight and, perhaps, rightly so. However, at the time, few people understood the full implications of licensing agri-biotechnologies that were largely unproven.

There was one, very positive outcome of the gene-gun experience. After the gene gun, every invention licensed by CRF was also made available for philanthropic and humanitarian purposes. Furthermore, all licensing by CRF contained explicit conditions that would ensure diligent use of Cornell technologies for any and all crops and in any geographical region.

After the gene-gun experience, Cornell and CRF actively pursued a two-pronged approach in agri-biotech licensing: nonexclusive and exclusive. Nonexclusive licensing is more common, and when exclusive licenses are granted, they contain quite stringent requirements for diligent development in all applications, as well as carve-outs for philanthropy and orphan crops. For example, the "harpin" technology was licensed to Eden Bioscience under two different sets of terms: one for topical applications of the harpin proteins (for plant-disease control and yield enhancement), and the other for transgenic expression of the harpin genes. This provided for two sets of diligence requirements and financial terms.

A good example of Cornell's nonexclusive licensing strategy in agri-biotechnology has been the licensing of the rice actin promoter. This promoter, discovered in rice, has widespread utility in monocot crops. It has particular utility in transgenic corn and has been used in corn lines with stacked traits of herbicide and insect resistance. Use of the rice actin promoter in corn has stimulated widespread interest in licensing. Cornell's strategy of nonexclusive licensing has successfully disseminated the invention while providing reasonable compensation to Cornell. However, the licensing effort has been complicated by the varied business models of the various nonexclusive licensees. Although Cornell attempted to maintain a standard set of license terms, each successive licensee asked for variations that were tailored to their particular business models. In order to maintain fairness to all licensees, this tailoring of license terms required Cornell to adjust the balance of rights and obligations. For example, significant adjustments have been required in the sublicense provisions. Of course, no sublicensing of the promoter, per se, was allowed. However, the extent to which sublicensees could develop new crosses has been a frequent area of license negotiations.

An aspect of the nonexclusive rice actin licensing strategy has been the development of a hybrid of paid-up and royalty-bearing licenses. The agri-biotechnology industry has demanded paid-up licenses. The industry's complaint was that royalty on each sale was too much of an accounting burden. But, such terms make it difficult for the licensor to realize a significant return; unless the paid-up amount is very, very large. So, Cornell developed a hybrid for which the licensee would not pay an ongoing royalty on each sale; rather, lump-sum payments (of a predetermined amount) are owed upon reaching certain defined milestones. For example, payments are owed on signing, first successful field trial, first regulatory approval, first sale, third anniversary of first sale, and so on.

Today, Cornell uses a variety of licensing strategies to accomplish the privacy goal of assuring delivery of Cornell technology to the marketplace. This practice relies heavily on nonexclusive licenses, but exclusives are more readily accepted. Cornell continues to try new and innovative licensing strategies to satisfy its multifaceted mission.

6. CONCLUSION

Agri-biotech license agreements share many similarities with other types of intellectual-property-based technology licenses. Much of the standard, legal boilerplate will be similar to that of any other license technology agreement. However, there are unique aspects of agri-biotech that set its licenses apart. Those differences include:

- multiple property types often covering a single technology and/or product
- freedom-to-operate issues that drive anti-royalty-stacking provisions
- philanthropic- and humanitarian-use clauses
- stewardship obligations.

Common themes, structures, and contract conventions are part of this technology domain, but the complex nature of agri-biotech and its industry requires each license agreement to be unique, with special, built-in mechanisms that foster the mutual agreement of licensor and licensee. Hopefully, this overview will take us a step closer to a greater understanding of both the common and the unique aspects of agri-biotech licensing. ■

RICHARD S. CAHOON, *Executive Director, Cornell Center for Technology, Enterprise & Commercialization and Senior Vice President, Cornell Research Foundation, Cornell University, 20 Thornwood Drive, Suite 105, Ithaca, NY, 14850, U.S.A.* rsc5@cornell.edu