



Liberating seeds with open source licenses

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June 2015

AGRECOL
Association for
AgriCulture and Ecology
Göttingen, Germany



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Layout: Karin Eizenhöfer

Citation: Kotschi, J. und L. Minkmar (2015): Liberating seeds with open source licenses. Working Paper. AGRECOL Göttingen.

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Commons or Commons-based plant breeding has become a topic of significant societal relevance and AGRECOL has been committed to this subject for a number of years. A working group consisting of plant breeders, agronomists, lawyers and commons experts is looking for ways to translate open source ideas to the field of plant genetic resources with a view to support the development and production of new plant varieties. In addition to dialogues within the group, an expert report by Claudia Schreider helped further clarify legal issues¹. The combined results are summarised in the present paper.

1 Aims and terms

We live in an era of privatisation. Wherever possible and notwithstanding whether it concerns material goods - such as soil, water, and even living organisms - or intangible things - such as scientific knowledge, musical works, or computer programs - exclusive property rights regulate the world around us by legally sanctioning the ownership of pretty much anything these days. It is irrelevant whether these goods are scarce, precious and exhaustible, or unlimited and could be used by all people.

When it comes to agricultural and horticultural crops there is little difference. While plants have been bred, propagated and exchanged over millennia - often shared as a common pool of resources - increasingly plants and *plant genetic material* are owned exclusively by private companies, who research, develop and create new varieties that are sold as commodities. Seeds are business as usual.

But why not privatise seeds? Do not private companies best ensure the supply of quality seeds? After all, in the last century, commodity based plant breeding has achieved great successes reflected in the intensification of agriculture. Yields, food quality and plant health have improved significantly, even though this development has had a detrimental impact on biodiversity, resource use and environment.

We are now at a turning point, however. Decades of corporate consolidation, towards the formation of monopolies, has led to an imbalance in the production of seeds expressed in a reduction of genetic diversity, vendor lock-ins for farmers and, at the end of the day, drastically less choice for consumers. Privatisation has arguably gone too far.

The lopsided development results from the "economies of scale", a main principle in business economics: only crops widely grown and grown in large areas are the focus of breeding efforts, while economically insignificant crops are almost never bred, even though the latter sometimes have enormous breeding potential that could be realised with relatively little effort, but which cannot be price tagged easily and, therefore, investments cannot be recuperated by breeders under current market oriented conditions. Private plant breeding with such limited scope is simply not enough. Generally speaking, plant breeding could and, we think, ought to provide wider societal benefits than that.

In view of the great challenges posed by climate change and environmental degradation, the current plant breeding paradigm is generally too limited and the development of varieties too narrow. Firstly, greater crop diversity is needed for the agricultural adaptation to climate change and to meet nutritional needs. Secondly, to produce high-quality food, while reducing the environmental impact, varieties are needed that make extensive use of site-specific ecological potential and require little chemical input, even if they cannot cover large areas. Last, but not least, the shaping of our cultural landscapes requires an ecological agriculture, in

order that their valuable properties, such as drinking water or recreational space are preserved. These are all aspects neglected or ignored in corporate plant breeding, because they have no direct market value.

Therefore, in parallel to market based plant breeding, a public interest plant-breeding sector is necessary, which can ensure that these socio-environmental needs are met. Indeed, inspiring counter models focusing on the creation of common goods have been emerging in recent decades. Numerous associations, cooperatives and foundations, and also for-profit, public interest seed companies, have been formed over the last 30 years in Europe, especially in Germany and in Switzerland². They perform breeding and produce seeds for organic farming with the aim to create varieties that are and remain accessible to everyone.

The question remains as to how these varieties can be legally protected so that they do remain accessible. For should it not be prevented that open-pollinated organic varieties, developed in the public domain, can be used for the development of a new variety that fall under plant variety or patent protection?

By analogy with the successful open source software project called Linux - which has been developed as a common good - the idea of open source seeds presents itself: how can the open source concept developed in computer science be translated to the field of plant genetic resources and be used to protect seeds and the development of new and accessible varieties? Legally, this is the question: how can the copyleft principle (see below) be applied in plant breeding and to plant genetic material?

In this paper we examine legal aspects relevant for applying the idea of open source to seeds and consider some of their implications. In our analysis we refer to German Law. We are aware that our findings are not fully applicable to other EU countries, but assume that our final conclusions are generally useful in all member states of the European Union.

2 What do we want to protect?

It is appropriate to ask what should actually be protected. In the context of access and use rights, it is usually seeds or - if asexually reproduced - seedlings for which protection are sought. Seeds are the physical-biological carrier of a genotype, they permit reproduction, guarantee the preservation of the plant and ensure the potential for its further development. Nevertheless, seeds are only one part of what is to be protected. It is the plant in itself that requires protection. A plant consists of its character traits and genetic composition - specifically of the changes that have resulted from breeding. Therefore, even though the changes resulting from breeding of course are inherent in the seed, the term "seed" alone does not fully indicate the extent of that for which protection is sought. In a sense, it is rather the creation of a commons through actual labour and cognitive input of breeders, as well as material investments that needs protection. That is a commons including registered varieties and informal populations.

Most agricultural crops are covered under seed laws and are thus state regulated³. Any crop variety, including *conservation* and *amateur varieties*, must in order to be tradable be approved and thus registered by relevant authorities⁴. Crop varieties - except for *conservation* and *amateur varieties* - can furthermore be protected according to the Plant Variety Protection Act (PVPA)⁵. For all other genetic material - land races, populations and germplasm from

gene-banks - registration does not apply. Their sale is in fact illegal. They can at best be exchanged informally without breaching existing seed laws.

3 Open Source, Copyleft and Copyfarleft

The term open source is derived from computer science. It refers to free and open access to computer source code facilitated by a clever hack of intellectual property rights. Open Source is not the same as open access, which is completely free and unlimited access. Essentially, open source ensures access to a common good by protecting it against privatisation and as such it is a regulated and “protected commons” (Kloppenborg)⁶. It constitutes, in principle, a framework that could be adapted to protect seeds.

The open source concept is a further development of the Free Software⁷ principles first articulated in the GNU General Public License (1989) by Richard Stallman, but already declared in the GNU Manifesto (1983). His aim was that developers and users of computers should always be allowed to investigate how software works and be able to modify and share their work freely with others. Stallman defined four conditions (“*freedoms*”) required for software to be considered free⁸:

- (1) The freedom to run the program as you wish, for any purpose.
- (2) The freedom to study how the program works, and change it so it does your computing as you wish. Access to the source code is a precondition for this.
- (3) The freedom to redistribute copies so you can help your neighbour.
- (4) The freedom to distribute copies of your modified versions to others. By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

In order for software not just to be free, but also remain free in a way that is legally enforceable, the four freedoms of software were articulated in the GNU General Public License (GPL), which is a legal document that rests on and extends the rights defined in copyright law. In short, the GPL ensures that any further and future developments of software code (based on the four freedoms) remain free and open source. The general method of doing so - using copyright to build commons - Stallman cleverly called “copyleft”.

The copyleft principle obliges developers to pass on the same rights as those they themselves enjoyed in the first place⁹. As we shall see below, this turns on the GPL as a contractual agreement between parties in extension of - as a subclause to - existing copyright. If the rights are not passed on, the freedoms fall away and basic copyright comes into play, leaving the user with no rights of use and no access at all (apart from, of course, the rather minimal rights provided in variants of the so-called fair use clauses, depending on national legal definitions). Thus, the code and the freedoms become inseparable and that principle, much to the dismay of Stallman, has been called the “viral clause”, because the freedoms “spread” with the code like a virus.

In other words, copyleft (“all rights reversed”) transforms the original purpose of copyright (“all rights reserved”) to ensure software freedom in perpetuity. While copyright normally requires nothing of the author and allows the user very little, copyleft changes this. Paradoxically, perhaps, the concept of copyleft, as briefly mentioned above, rests on copyright¹⁰. Using the rights of the author enshrined in copyright, a legally binding contract (the GPL) is entered into between authors and users, where the authors relinquish their

exclusive right to their creation (software code) under certain conditions (the software freedoms, as articulated in the GPL) that require the user to release their modified code under the same conditions. That is what is known as the viral clause. If the user breaches that contract (or if the contract under any given legal regime is deemed invalid), the code in question is automatically covered and hence protected by copyright. In other words, to repeat, copyleft does not replace copyright, but transforms it to ensure continued freedom, i.e. access to the code in the future by anyone. Copyleft, then, is simply an additional (viral) clause to copyright, which is based on the exclusive rights of an author to do what s/he sees fit with a given creation, such as sharing it with the world and contribute to commons.

In order to translate the freedoms of software - that is, the principles of open source and copyleft as enshrined in the GPL - to the domain of seeds, we propose the following conditions:

- (1) Plant genetic material covered by an open source license may be used for any purpose and by anyone.
- (2) Seeds and derived plants must be documented so that users can understand a given variety's characteristics and developmental history.
- (3) The user may reproduce the variety and pass it on to others.
- (4) The user may use the variety for further breeding and make it accessible to the general public.
- (5) All future plant breeders attach to their newly bred varieties the same rights as those they themselves enjoyed.

A common argument against applying the copyleft or open source principle to seeds and plants is that plant breeding is a form of labour that requires remuneration so that the breeder can exist and continue to perform breeding activities.

Here the “copyfarleft” concept, developed by Dmytri Kleiner, is relevant¹¹. Copyfarleft - transferred to plant breeding - would allow those who are contributing to a seeds commons to charge a fee for their developed varieties. This would apply to non-governmental entities that are not-for-profit, i.e. cooperatives, foundations and associations. By contrast, the copyleft principle would apply for everyone else. A license corresponding with copyfarleft would allow the breeder to levy fees in order to continue to create as well as preserve commons. The consequences are discussed in Section 6 below.

However, it can be argued, that copyleft on its own is sufficient, clearer and therefore more appropriate. Royalties for plant breeding can generally be challenged. Opponents view it as a compulsory levy, which often does not stand in any direct proportion to the cost of development. In addition, breeding should be based on the challenges faced and not return on investment¹². However, this does of course demand a new funding strategy for plant breeding.

Open source licenses are widely used to protect many kinds of art, literature and science, which are all creations that fall under copyright law and as such are recognised and protected as intellectual property. A developer or inventor is automatically entitled to copyright simply by virtue of being the original author (or developer or inventor) of a given work, and no further action is required.

When it comes to seeds, and more precisely to breeding of agricultural crops, the situation is different. Although the development of a variety is a creative and intellectual process, seeds are not covered by copyright, but by seed laws. In Germany (as well as in other EU countries), a Seed Act governs which specific seeds may be traded in the market place; in

other words, varieties are approved by the relevant authorities. The Seed Acts permits breeders to register approved varieties in their name. Additionally, a breeder can apply for variety protection, preventing others from propagating it. The processes of variety approval and variety protection is an expensive legal process that takes several years.

In the following discussion we address questions of whether and how the principles of open source can be applied to protect approved varieties.

4 Compatibility of open source licenses and variety protection

From a legal point of view, it is primarily of interest whether an imagined open source license is compatible with current regulation concerning variety protection. It is in particular pertinent to examine whether proposed license conditions are in conflict with the so-called breeders' privilege.

4.1 Scope of plant variety protection

Plant Variety Protection protects intellectual property rights in plant varieties. Breeders (and discoverers) of a new plant variety can apply for variety protection, which in Germany is handled by the Federal Plant Variety Office (the *Bundessortenamt*, which is an independent authority under the supervision of the German Ministry of Food and Agriculture). Plant variety protection is formally recognised as an intellectual property right. The owner has an exclusive right of use, hence excluding third-party use of any kind, although with some important exemptions, the most important one of which we will look at in detail in section 4.2 below.

According to the German Plant Variety Protection Act, protection includes propagating material, i.e. the plant itself as a whole and any part of the protected plant variety. Plant variety protection rights cover production, marketing and storage of propagating material. Rights holders are entitled to royalties from any third-party use of the plant and its propagating materials.

There are, however, exceptions to plant variety protection¹³. Private, non-commercial use of a protected variety is allowed, including use for experimental purposes by anyone. Commercial use is also allowed in special circumstances where the focus is on technical aspects concerning the suitability for further development of a new variety. Not excluded from plant variety protection, however, is marketing aptitude testing.

4.2 Breeders' privilege

The most important exception to plant variety protection is the so-called breeder's exemption, or breeders' privilege, articulated in the German Plant Variety Protection Act (Chapter 10a, Section 1. 3), which stipulates that breeders may use otherwise protected plant material without the permission of the rights holder for the purposes of the development of a new variety. This exemption is crucial for breeders, since breeding is a long-term process and because new varieties are always based on and thus necessitate existing varieties.

As the development of a new variety involves the selection of propagating materials and the specific manner and methods of their transformation, breeding is, also, a cognitive and intellectual process. However, breeders cannot fully control the natural processes that flow

into the breeding process. As such, evolution is always a “breeding partner”, which is an aspect that should be considered when assessing the value of a breeder’s performance and contribution and, which, also justifies that subsequent breeders enjoy the same privilege¹⁴.

The intent and purpose of the legal provision of the breeder's privilege is therefore to promote breeding research and development by making available, in its entirety, existing biological (propagating) material, and thus facilitate the creation of new varieties¹⁵.

In political discourse and also among breeders, the breeder's privilege is referred to as an "open source" regulation, but that does not correspond with the open source understanding we define and promote in this paper. Newly bred varieties, if they are sufficiently distinct from the initial variety or varieties on which they are based (and fulfil a series of other conditions), can be approved as a new variety and as such also enjoy plant variety protection (PVP). In such a new variety, the previous breeder, whose propagating material underpins it, has no rights. The rights of the new variety remain exclusively with subsequent breeders. In other words, breeders of sufficiently distinct new varieties hold the rights required to register the variety in their name, trade it commercially and to charge a licensing fee for use, even though the propagating material (germplasm) was freely accessible in the first place.

4.3 Compatibility of Open Source and breeders' privilege

Unlike PVP, an open source seed license would, in our conception, ensure that plant genetic material remains free by stipulating that derivatives must be re-released under the same conditions (of freedom of access and use) that made access and use possible in the first place. Essentially, the plant genetic material (propagating material) and the freedoms become inseparable. Or, as it were, the (open source) conditions of (plant) freedom go viral.

The question therefore arises, whether such an open source inspired seed license that restricts users’ ability to protect a derived variety would come into conflict with the existing breeders’ privilege, as stipulated in the Plant Variety Protection Act and outlined above.

In order to address this question it is necessary to determine whether a given variety (or given seed), for which open source licensing is sought, falls within the scope of the breeder's privilege. In other words: does the plant breeders’ privilege apply to open source licensed varieties and other seeds that are not protected by PVP?

Below we present the pros and cons of the envisaged style of open source licensing entering into conflict with the breeders’ privilege:

- The argumentation against: the breeders’ privilege is a special provision (crucial for the breeding industry) that obtains only in cases of registered *and* protected varieties. That is to say that the letter of the law specifies the breeders’ privilege in the context of protected varieties. Thus one could argue that the breeders’ Privilege obtains only in the case of such varieties that are not only registered, but also protected by law. It can be argued that for any other category of seeds the PVP-Act and the breeders’ privilege do not apply. This concerns registered but not PVP protected varieties, land races, and other propagating material. In other words, unless a variety is protected, there is no conflict between an open source inspired license and the breeders’ privilege.
- The argumentation in favour: On the other hand, the intents and purposes - i.e. the spirit of the breeders’ privilege is that *all* plant genetic material should be available for breeding purposes, as its very aim is to make breeding possible by keeping germplasm

accessible. Every breeder should be able to do breeding with available varieties and seeds in order to develop new and potentially improved varieties and to market them. As this applies to PVP protected varieties (§ 10 Abs. 1 Nr. 3 SortenSchG) one could argue that the privilege should apply “even more so” to unprotected seeds. Additionally, the breeders’ privilege could also be understood as a norm, which exists notwithstanding its codification for plant breeding, as a kind of customary right. As such an open source license would be restricting breeders’ freedom to use plant material in the manner they have customarily done, and see fit to do.

According to the first argument, an open source licensing mechanism and specifically its associated viral mechanism *would not* be in conflict with the breeders’ privilege. Accordingly an open source licence is valid; while according to the second argument an open source licensing mechanism, in the way we define it, *would* be in conflict with the Breeders’ Privilege and, hence, be legally dubious if not impossible.

At any rate, an open source licensing scheme would establish a common domain, a *seed commons*, that would prevent the kind of access and exclusive use rights that commercial actors currently enjoy. Such restriction is understood to be controversial.

- Opponents of open source seed licensing argue that it would restrict the breeders’ privilege, because commercial breeders using copyleft varieties in the development process of a new variety would not be able to protect the new variety in an exclusive manner. That is not an attractive proposition for commercial breeders whose main revenue source is royalties based on exclusive ownership of a given variety. Additionally, it is argued, research and development would suffer, because the majority of breeders would thus be unable to use the plant genetic material covered by such an open source license.
- Proponents of open source inspired licenses for seeds respond to this argument that in the open source licensing scheme there is a long-term, future potential which would guarantee a protection of non-private breeding. It would and increase the amount of plant genetic material in the domain of commons and be freely available for breeding and other purposes.

5 The GNU General Public Licence (GPL)

Open source licenses already ensure that many kinds of intellectual creations are free of exclusive intellectual property rights. Particularly widespread is the GNU General Public Licence (GPL), of which more than 70 derived licenses are registered by the Open Source Initiative (OSI)¹⁶. For works of art, literature and, in part, also science, Creative Commons (CC) licenses are often used. As well the GPL as CC licenses are legally enforceable in Germany^{17,18}. Here we will consider the applicability of the GPL.

5.1 The scope of the GPL

The General Public License (GPL) was developed in the United States and is used mainly for globally available open source software. A GPL for seeds was first proposed by Michaels in 1999¹⁹. In practice the GPL is a contract between two parties, which enshrines their agreed upon rights, duties and privileges. In principle, such a system of contractual agreement should also be possible for internationally available seeds. In the following, for argument’s sake, we

assume that both contracting parties are resident in Germany and that therefore German law applies.

5.2 The GPL as a type of contract

As noted above, the GPL can be understood as a contract, or, as it were, a license agreement. Under German civil law it is not a type of contract that falls under specific regulation. It is classified as a *sui generis* contract and exhibits various elements of different types of contract (rent, lease, purchase, etc.). Licensing agreements are contractual, binding agreements between companies, between individuals or between companies and individuals.

The basic properties of the GPL license, as outlined above, ensure specific freedoms of use and access - free of charge - and stipulate that if anyone makes use of these freedoms, then they have by virtue of doing so also entered into a contractual agreement that binds them. Developers who use Free Software are contractually obliged to pass on - attached to and including their own changes and any further developments - the same specified set of freedoms and conditions, i.e. the GPL. This unfolding and unbroken chain of contractual agreements ensures the possibilities for access and use by anyone else who, in turn, may wish to enter into the same contractual agreement. This viral nature of open source creates (software) freedom in perpetuity and a commons is thereby established and continually sustained. It all turns on the GPL as a contractual agreement, which permits copying, changing and commercially using software source code for any purpose.

For seeds, that is for plant genetic material, it would mean that a right of access and use is provided that permits a user to reproduce and change such propagating material by way of breeding, insofar as they pass on their future creations under the same conditions.

5.3 The GPL as general business terms and conditions

In Germany, legal cases have seen the GPL be classified as a contractual agreement that falls under general business terms and conditions (Allgemeine Geschäftsbedingungen, AGB)²⁰. That is because it satisfies the conditions of relevant regulation (§ 305 I BGB) of German civil law: it is literally a contract, which is pre-written for general, multiple and unilateral use by one single party, and not individually negotiated.

In devising a GPL for seeds - an open source license for plant genetic material - ensuring compliance with relevant regulation concerning general business terms and conditions is a central challenge. On a practical level, to satisfy the basic demand that the licensee is fully aware of the licensor's general terms and conditions, in the context of seeds, it means the licensing conditions should be fully and prominently visible and legible on the packaging.

5.4 Shrink wrap contracts

For some software products a so-called "shrink wrap" contract (or license) is used. The terms and conditions of such a license can only be reviewed upon tearing open the packaging. That is, the specific agreements of the purchase remain unknown until you have effectively, by opening it, bought it. Shrink-wrap licenses are, for obvious reasons, legally disputed and arguably violate German laws concerning general business terms and conditions (AGB).

Shrink-wrap licenses are therefore not applicable to seeds. Instead, license conditions ought to be visible and possible to review in their entirety on the outside of the bag or be provided

separately in such a manner that they can be read and reviewed. It would probably not be enough to specify and display on the bag a web address (link). The licence holder would have to have Internet access and follow the link before he can take note of the contract.

6 Conclusions and open questions

The results of our study can be summarised in 8 points:

(1) The purpose of open source licenses is to create and sustain commons by resisting privatisation. That is successfully achieved on the basis of existing copyright law. We have examined to what extent agricultural or horticultural crop varieties could also be protected from privatisation by means of an analogue form of open source licensing.

(2) We have identified that the central elements of open source licenses that prevent privatisation and promote commons, and which are relevant for the protection of seeds, are copyleft and copyfarleft.

- The copyleft concept would guarantee the free use of seeds and it would condition breeders to provide future breeders the same rights as those they enjoyed themselves. Hence copyleft is also called “viral” because all derivatives are subject to the same terms and conditions. Thus, a commons is created and grows in the long-term.
- The copyfarleft concept would allow specific breeders (with a community interest) to charge a fee in order to support their breeding operations. This would apply to cooperatives, foundations, associations and charities, i.e. entities which are not-for-profit and do not encourage private ownership. For all other parties copyleft would apply. A corresponding license would therefore allow breeders to create and sustain commons, while simultaneously demanding royalties.

(3) Open source licenses are commonly used for works of art, literature and science. Such works are protected by means of intellectual property rights, on the basis of copyright. Plant breeding is a creative process requiring cognitive input. Seeds, however, are not covered by copyright law, but are subject to seed laws. Relevant seed laws regulate, which seeds can be traded, by approving and registering them, and also afford breeders the so-called plant variety protection that gives them exclusive rights over a newly developed variety. An open source license would, as an alternative to existing plant variety protection, in principle be possible.

(4) However, there are exceptions to plant breeders' exclusive rights. The most important exception is the so-called breeder's privilege. This exemption allows breeders access to and use of existing plant genetic material without permission of the relevant rights holder, insofar as such access and use is for the purposes of further breeding and the creation of a new variety. Whether the breeders' privilege would be restricted by an open source license is legally unclear, as there is no precedence. At any rate, a seed commons would be established that would prevent exclusive, commercial use as is provided by current regulation. Such a restriction is deemed controversial.

(5) The General Public Licence (GPL) has proven to be a valid license in a number of cases and can in principle also be used for seeds. In a German court of law, the GPL is treated as an instance of general business terms and condition (AGB) - i.e. as a non-negotiable, standard contract covered by relevant law. In practice, this means that breeders who use a GPL-inspired, open source license must ensure that the license conditions are visible, legible and

obviously attached to the packaging of the plant genetic material in question. A so-called “shrink-wrap” license, which is sometimes used for software, is not relevant for the purposes of seed licensing, because it is doubtful whether shrink-wrap licenses provide legally binding terms and conditions.

(6) The licensor has documentation responsibilities: when issuing a license, the origin and properties of the given material must be documented and publicly registered so that it can be reviewed.

(7) In conclusion: open source licensing of seed - that is of plant genetic material and new varieties - is novel legal and jurisprudential territory. Compatibility and potentially conflict with the legally provided breeders’ privilege remain unclear. Some clarification could be sought by experimentally releasing seeds with a GPL, open source inspired license and let a court of law decide on the validity of the license.

Citations and annotations

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Acknowledgements: This working paper is part of the “Seeds as Commons” (Saatgut als Gemeingut) project, funded by Software AG Stiftung Deutschland and Stiftung Mercator Schweiz. We are grateful for their valued support.