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*Having or Doing Intellectual Property Rights?
Transgenic Seed on the Edge
between Refeudalisation and Napsterisation*

Abstract

In contrast to neoliberal rhetoric, the commercialisation of knowledge has proved to be an intricate endeavour that implies unexpected effects. Taking Monsanto's transgenic canola and its propertisation regime as an example, we will shed some light on the counterintuitive phenomenon that strong intellectual property rights are in heavy contrast to the liberal utopia of full commodification, *i.e.* universal competition and ideal type market relationships. We will find that Monsanto, in order to avoid Napsterisation, has established and still maintains a rather repressive commercialisation regime that maximises property control by strongly reducing the exchangeability of seed and crops. It can therefore be interpreted as a new form of landlord dominion which contradicts the modernist idea of concordance between market liberalisation and individual emancipation.

Keywords: Intellectual property rights; Knowledge capitalism; Genetic engineering; Commercialisation; Modernisation theory.

LOOKING AT THE development of the seed industry during the last 150 years, an increasing propertisation and exchangeability of seed seems to be an unchallenged fact – at least at first glance. At a second glance, however, it can be argued that the advent of genetic engineering and the strong propertisation efforts with respect to transgenic seed via Intellectual Property Rights (IPRs) during the 1990s conflict with its full commodification and exchangeability. What will be argued here is that the commodification and exchangeability of seed reached its highest level during the Fordist era and the Green Revolution, and began to decline with the introduction of strong IPRs during the post-fordist/neoliberal era.

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Admittedly, this thesis is somewhat counterintuitive. All the more so, since the neoliberal narrative suggests that increasing degrees of propertisation and exchangeability with regard to all goods in general go hand in hand. As will be shown later, this can be true of conventional goods like bread or beer. In the case of knowledge goods, however, exchangeability and propertisation contradict each other, leading to a situation in which neoliberal ideology and day to day practice diverge to a large extent.

In this context, the conceptualisation of transgenic seed as a knowledge good presents an innovative and crucial building block of our argument. Similarly to compact discs and software, the single grain serves as a carrier substance, in this case as a carrier substance for the technology of herbicide resistance. Analogously to software, farmers become users of Monsanto's technology. As argued *e.g.* by Richard Nelson (1959, 2003), the properties of knowledge itself produce strong resistance to appropriation, privatisation and hence to commercialisation, first and foremost because there is no natural scarcity of knowledge. What is more, the technology of herbicide resistance (the knowledge good) is incorporated into a living organism – the canola grain – that can reproduce or “pirate copy” itself for free. Traditionally, farmers make use of this natural mechanism of reproduction by saving some of the seed to replant the following year. In the case of software, replication and pirate copying is also quite easy but it does not work in the absence of a social actor acting with intent.

We will argue that Monsanto's present success in overcoming these obstacles (at least in North America) not only derives from the sheer existence of patents and the mechanisms of the technological treadmill, as argued by Mascarenhas and Busch (2006). Instead, and in contrast to the neoclassic spot-market, which presupposes full propertisation and exchangeability, Monsanto is establishing a rather feudalistic property regime in which the horizontal exchange of seed as practised during the Green Revolution has given way to a feudalistic propertisation regime that first and foremost consists of hierarchic mechanisms of control and sanction and long-term relationships that aim at enforcing and activating IPRs attached to transgenic seed on a day-to-day basis.

Before going into detail, the intricate properties of knowledge goods like transgenic seed will be discussed and put into the theoretical context of IPRs. Our empirical material stems from a four month stay in Saskatchewan, Canada, in 2007. Our main focus was on Monsanto's commercialisation regime of herbicide resistant canola but, as far as we know, the empirical findings can generally be applied to all genetically modified Monsanto crops and to all sites in North America (Schubert 2007).

*The properties of transgenic seed
and the importance of intellectual property rights*

The exchange of goods and property titles presents one of the main pillars of capitalism. A high degree of exchangeability of goods eases market transactions, and is one of the preconditions for an ideal type textbook market with full information and full competition: Anonymous buyers and sellers come together on a spot-market, evaluate and exchange goods right away, with no hope or fear of ever meeting again (Callon 1998). Accordingly, we define exchangeability in terms of high degrees of divisibility, confinability and measurability with regard to quantity, quality, price and unwanted side-effects. However, we will argue that these terms and conditions cannot be taken for granted. Rather they are very hard to achieve, especially with knowledge goods. In contrast to neoclassic economics or jurisprudence approaches which tend to take property for granted and to treat it like a black box, our sociological interpretation of property emphasises its dynamic and intricate character: “Property in the most general sense concerns the way in which the relations between society’s members with respect to valuables are given form and significance” (von Benda-Beckmann *et al.*, 2006, p. 14). From that point of view, property can be interpreted as an institution that is produced, reproduced and transformed by social actors like farmers, dealers, firms and courts on a day-to-day basis (Hann 2007). Following this line of argument, property relationships are the outcome of negotiation and bargaining processes between two or more parties that seek to hold rights on a specific property object.

Without going into detail here, it can be shown that there are property objects whose exchange requires more negotiation and bargaining efforts than others. In other words, the costs associated with safeguarding property rights attached to a specific property object differ to a great extent. These costs are also referred to as transaction costs (North 1990, Williamson 2000). To simplify slightly, we will distinguish between two types of goods and their corresponding regimes of marketisation: private goods and public goods.

Private goods like apples naturally feature specific characteristics which enable and facilitate their propertisation and exchangeability with rather low transaction costs. This is so because private goods differ from public goods like knowledge by natural excludability and rivalry with regard to consumption. They are coined by natural

scarcity. Given these characteristics, private goods are typically exchanged on a spot-market which is the standard model in neoclassic textbooks. They are characterised by full information and transparency, full competition, anonymity and short-term relationships. This market type commands the highest degree of propertisation and exchangeability.

In the case of public goods like explicit knowledge, there is no natural scarcity since it is neither rival nor excludable. What is more, in the case of herbicide resistance the respective knowledge is incorporated into a living organism that can reproduce itself for free. Looking at other knowledge goods like software or digitalised music, it becomes obvious that the problems encountered in commercialising genetically manipulated seed do not present an exotic exception (apart of course from its automatic mode of replication), but lie at the heart of what is called knowledge capitalism (*e.g.* Burton-Jones 1999). As the example of the file-sharing site Napster and the music industry shows, knowledge goods present a real challenge to hitherto existing forms of commercialisation – once a specific formula, *e.g.* for herbicide resistance has been found (with high investments in research and development), it is out there and easy to copy at close to zero costs (Dolata 2008). Consequently and following the neoclassic argumentation, there are no incentives to invest in the development or provision of public goods like knowledge in general, because there are strong incentives to use public goods without sharing the costs associated with their provision (Olson 1965). Therefore many public goods, *e.g.* national defence or education, are provided by the state.

To motivate private firms like Monsanto to invest in new technologies, intellectual property rights come into play and create artificial scarcity. In other words, what Monsanto, Microsoft and Sony try to do is to transform knowledge into a private good. Against the background of these theoretical considerations, the historical development of both the seed industry and IPRS will be discussed. By taking Monsanto as an example, it will be shown how the company tries to circumvent the looming fate of Napsterisation. As the example of Argentina shows, the sheer existence of IPRS is a necessary yet insufficient precondition to escaping the obstacles mentioned above. In Argentina, farmers replant Monsanto's transgenic crops without paying royalties since law enforcement in this respect does not work – legal offences are neither found out nor taken to court (Gill 2009). The example shows that some sort of formal or informal institutions that allow for the efficient control and enforcement of property rights have to exist. As will be shown, Monsanto's efforts to establish full propertisation have

resulted in the establishment of a hierarchic and feudalistic commercialisation regime that substantially differs from the neoclassic ideal of the spot-market – with the effect that full propertisation conflicts with full exchangeability and vice versa.

*The historic development of intellectual property
and commodity forms in the seed industry*

The seed industry is a somewhat particular, but very interesting example for the study of the development and commercialisation of knowledge. In its beginnings it is the « knowledge » of nature itself which by evolutionary trial and error – variation and selection – adapts the plants to diverse and changing environments. During the history of agriculture mankind has learnt from nature to copy and enhance the natural methods of plant breeding, initially by a more implicit and finally by more explicit understanding. But in contrast to mechanical disciplines, biological knowledge is still a mixture of nature and technology since it is impossible to “create” life analogously to machines or chemical substances. In addition, plants are able to replicate and spread naturally which presents another stumbling block for propertisation: Thus, nature subverts confinability and scarcity – “excludability” and “rivalry” in economists’ terminology – as substantial preconditions for commercialisation. Hence, the commercialisation of knowledge is actually more intricate than that of other branches of production (Kloppenburger 2004).

Semi-commercial plant breeding in the Fordist era

Up to the 1980s, plant breeding was dominated and guided by academic institutes and public research. As indicated above, for commercial plant breeding research to develop, three problems had to be resolved. First, in order to recuperate the costs of research and development via markets, there is the need for some form of exclusion and propertisation. Since seed replicates naturally and due to the farmers’ habit of saving seed, it is far from easy to prevent infringement of IPRS, e.g. by farmers who may multiply the seed and sell it on the market. Second, to convince farmers to pay money for the seed which they could just as well save from last year’s harvest, there is

a need for superior quality and for quality certification. Third, as to the basis for intellectual property rights as well as for quality certification, the definition and guarantee of the identity of the seed must be secured since these factors cannot be proved on the spot.

In the US, public institutes developed seed for major crop plants, certified them and gave them to small private plant breeders for free. Due to competition, private breeders could not recuperate major profits out of the knowledge that public institutes had incorporated into the seed (Kloppenburg 2004). In other words, private breeders could only charge the costs associated with the reproduction of seed – *i.e.* the cost of copying the technology – to the farmers' account. The farmers preferred the certified seed over seed of private origin since they could rely on its quality. The private breeders complained about this intrusion by public research institutes, and in the same line of ideological market liberalism, their lobby also agitated against administrative quality assurance; but at the same time, the private firms and their trade associations were not able to establish private institutions for quality assurance. Thus, the domination of the public institutes remained untouched.

With the advent of hybrid corn in the 1950s, the situation changed significantly and private plant breeders could strengthen their position: Due to the fact that hybrids cannot be replanted the next year without major loss of yield, saving seed becomes a pointless endeavour. Now, as some kind of exclusive mechanism had been installed, the propertisation of seed appeared to be more and more feasible. More concentration and hence more money was in the seed industry and the lobby agitating for the privatisation of specific varieties gained momentum. From then on, that is with the emergence of an oligopolistic market structure, quality was also assured by trademarks – as a functional equivalent to public quality assurance.

In contrast to the US, German private plant breeders cooperated early on with each other, with academic institutes, and with the public administration to develop market regulations for identity and quality assurance (Flitner 1995, Winter 1999, IöW *et al.* 2004, Wieland 2006). When high yielding varieties from cross-breeding came to market maturity in the 1930s, the German state enacted identity control in the form of tests for distinctiveness, unity and stability (DUS-tests). Regional administrations were authorised to grant market approval only if the new variety showed a decisive improvement in at least one trait over the already established varieties for the respective region. Farmers were urged from now on to buy the high yielding seeds

instead of replanting the old land varieties, on the one hand by political propaganda to implement “modern methods” to improve the provision of food, on the other hand by market competition. At the same time, the plant breeders were granted IPRS in the form of temporarily constrained monopolies to sell their variety or demand royalties. However, there were two exemptions, namely that other breeders were allowed to use the seed for further breeding, and that farmers could save the seed for replanting it as long as they wanted – the so-called breeders’ and farmers’ privileges. The introduction of quality assurance and plant breeders’ rights in those days were accompanied by Nazi rhetoric about higher and lower races in Germany. But after World War II, the regulation as such became the conceptual paradigm for most industrialised countries and also for the international UPOV-Convention with which intellectual property in seeds became legally binding in transnational trade.

Summing up, the general situation between the end of the First World War and the 1980s, roughly speaking during the Fordist era, can be characterised as a compromise between public and private governance, with basic research and quality assurance tests funded and made available by public organisations on the one hand and some applied research, seed multiplication, and market distribution organised by private plant breeders on the other. Yields were boosted strongly during this time, both with regard to the productivity of labour and the productivity of land – the main focus was on a higher degree of technologisation of seed, *e.g.* to fight world hunger (and not so much on proprietisation). Although there are substantial differences, *e.g.* between North America and Europe, the general result was and still is a heavy concentration of farming, with ever more smallholders giving up their rural lifestyles and transferring their land to a few remaining agro-industrial firms. Since the 1960s, the so-called Green Revolution was also extended to Third World Countries, with technology transfer being actively supported by Western and Eastern industrialised countries in their competitive effort to find allies in the Cold War.

How do these facts and developments relate to our research question? Interestingly and perhaps surprisingly, the strongest exchangeability and commodification of seed occurred at the time of the Green Revolution. Farmers could take the seed and do whatever they wanted – as with all other commodities. Breeders had no legal possibilities to intrude into the farmers’ business because farmers were allowed to save seed due to their exemption from the IPRS.

Consequently, and in the absence of environmental and health concerns, farm products could be sold on ever widening spot-markets where the tracing of provenance and supplier-distributor-relationships did not play a major role. However, with the advent of biotechnology in the post-fordist/neoliberal era, both points have begun to play a significant role.

Genetic modification and extended IPRs in the neoliberal era

The discovery and experimental isolation of DNA as the material basis of the biological inheritance process and its subsequent manipulation opened up a new phase in plant breeding. Since the 1970s, traits can be taken from other species, even from non-plant organisms such as bacteria, viruses and animals, and be introduced even more pointedly. This disembedding of traits from their origin evoked strong fears, not only in the growing environmental movement, but among scientists themselves. In contrast to non-living substances that are degraded over a long time, biological organisms are able to multiply, propagate and transform themselves once they have been introduced into the environment. Just think of the introduction of small pox to America or the introduction of syphilis to Europe, or less spectacularly, the invasion of new parasites and weeds (Crosby 1986). As a result of this controversy, market regulation now covers not only identity and quality assurance, but also testing and monitoring rules to avoid health hazards and ecological side-effects. In this respect, market approval for plant varieties has become comparable to pharmaceutical drugs (Gill *et al.* 1998). In addition, the EU and Japan require the labelling of genetically modified crops to allow consumers the freedom not to buy them (« free choice »). Accordingly, the global supply chains of modified and non-modified crops have to be segregated, requiring a great amount of control procedures (Gill 2009).

With the switch from the Fordist to the neoliberal era, IPRs were strongly intensified, particularly in the US, widening the scope especially for patenting (Rhoten/Powell 1997, Meier 2005). In contrast to plant breeders' rights, patents do not allow exemptions for breeders and farmers on a local or global scale. Consequently, the patent holder is given the legal right to influence and control all the downstream economic activity. A strong concentration process took place, on the horizontal level among agrochemical producers, and on

a vertical level by the integration of what were often smaller and more localized plant breeders into the agrochemical business.

Without going into detail here, the major discourse behind the new IPR-policy is “global competition” (Slaughter/Rhoades 1996). Modernisation rhetoric was given the spin that, with the phase of industrialisation now over and the “knowledge economy” as the next step, the US (and the EU) could only defend their economic advantages through stronger IPRS. The US saw itself globally as the source of most basic research with most of the technological outcome spilling over to its rivals abroad, *e.g.* to China and India. This view is also reflected in international political economics literature: Without IPRS, it is claimed, the bulk of social welfare generated by technological inventions goes to consumers worldwide; with IPRS it can be retained within the country, at least to a certain degree (Scotchmer 2003). However, with regard to the findings of this paper, it could be argued that the productivity gain generated by green biotechnology is – at least partly – devoured by the high transaction costs associated with its private appropriation.

Contested legitimacy of DNA patents

We will now come to the particular role of IPRS in the context of genetic engineering. Stretches of DNA – on which biological traits are inherited – can be seen as chemical substances, and chemical substances, as *e.g.* pharmaceutical drugs or pesticides, can be patented. However, the DNA stretch, even if created in the laboratory, is henceforth not produced in a factory, but reproduced in a living organism, *e.g.* in bacteria, plants, animals and humans. Nature itself – its discovery and its so called laws – has not been patentable up to this point. Should the introduction of an artificial stretch of DNA render the whole organism patentable? Or, to put it the other way round: Should patents on genetic modifications be denied since these are reproducible in nature only? From a sociological perspective, this controversy allows deep insight into the dynamic and unstable character of property, property relationships and the efforts that are necessary to transfer knowledge into a private good. Although there are IPRS in place, it can be observed that they do not automatically translate into respective social action (as shown above for the case of transgenic soybeans in Argentina or the Napsterisation of music). One possibility to highlight the high amount of insecurity that is attached

to the question of how to deal with contradicting property claims with regard to genetically modified organisms is to have a closer look at the Canadian Supreme Court's zigzag decisions in this controversy.

After the Supreme Court's decision in the "Harvard College v. Canada (Commissioner of Patents)" case in 2002 (Supreme Court of Canada 2002), the decision of the "Monsanto Canada Inc. v. Schmeiser" case in 2004 (Supreme Court of Canada 2004) came as a surprise. In the "Harvard College v. Canada" case, Harvard College tried to patent a transgenic animal with a genetically induced susceptibility for cancer, the so called Onco-Mouse. In this case, the question was whether or not higher life forms are a patentable "composition of matter" within the context of the Canadian Patent Act. In a very close 5 to 4 decision, the Supreme Court judges ruled that it was simply not possible to patent a plant or animal. Two years later, in the Schmeiser case, the Harvard mouse decision was held up and flipped around simultaneously in a narrow 5 to 4 judgement. The majority of the court ruled that a gene that codes for glyphosate-resistance is not a higher life form, and for that reason (in contrast to the Harvard mouse), it could be patented. The minority argued that it did not make sense to distinguish between the gene on the one hand and a higher life form (e.g. a plant) on the other because each single cell of that plant has in it the particular gene. In other words, patenting the gene is an indirect patent on the whole plant which cannot be patented according to the Harvard mouse case. Against this background, it can be argued that the legal basis for commercialising transgenic plants and organisms is built on shaky ground.

"Doing property" – Private IPRS as private law enforcement

However, written law does not automatically translate into everyday practises and routines, particularly when these laws challenge long standing habits like saving and replanting seed. Therefore, we will now have a closer look at diverse mechanisms of control installed by Monsanto to prevent farmers from illegally saving seed and pirate copying the technology of herbicide resistance.

From a juridical point of view, the heart of the property relationship between Monsanto and the farmers is constituted by the "Technology Use Agreement" (TUA) which has to be signed by any farmer who wants to buy seed containing Monsanto's technology. But before being allowed to sign such an agreement, the farmer has to

attend a special seminar, a so-called grower-meeting, to learn what the agreement means and what the farmer's rights and obligations are concerning the seed. Once the farmer has accepted these conditions, she will obtain a so-called "grower number" or "tech-number". The grower-number is something like a customer number. It authorizes the farmer to purchase seed containing Monsanto's technology from the local seed dealer.

The TUA has five functions: First, to prevent patent infringement, *i.e.* to prevent farmers from saving seed and replanting it in the years to come or even from multiplying and distributing it to other farmers. The farmer agrees that Monsanto may inspect her fields and her accounts. Second, the TUA insures the farmer against the risk of a failing seed in case a disaster is due to deficiencies of the seed. In addition, it insures farmers against risks like hail or flooding up to a given date. Third, the TUA compels the farmer to buy the complementary herbicide, *e.g.* "Roundup WeatherMAX[®]", from Monsanto rather than a generic equivalent (the "Roundup" patent has expired). Otherwise, the farmer will lose her insurance protection. Fourth, the TUA pledges the farmer to follow the specific ecological and segregational requirements of the crop she has purchased, *e.g.* to avoid the development of glyphosate-resistant weeds. Fifth, the TUA implicitly allows for price discrimination since it prevents farmers from reselling their seed to other farmers (Fulton/Giannakas 2001).

In sum, the TUA is a legal tool aimed at handling the intricacies mentioned above by legally sterilising the seed and creating the legal basis for control mechanisms (and by criminalising farmers that do not obey). Here, the paradox phenomenon of declining exchangeability due to the attempt at propertisation with regard to the technology of herbicide resistance becomes very obvious. Due to the endeavours to transfer knowledge into a private good it becomes increasingly deprived of its exchangeability. Instead of becoming a disembedded and tradeable commodity, it is transformed into a good whose everyday handling is highly restricted and controlled.

Farmers are used to buying commodities once and using them deliberately from that point on. They now have to learn that Monsanto's seeds are not a conventional commodity but a technology for which they have to pay a fee as long as they want to use it. What they actually purchase are temporary rights of use. To legitimize the ongoing payment, Monsanto tries to portray its business as a continuous service of local accommodation to the needs of the farmers. The supply of the technology is embedded in a tight network made up of

consultation services providing recommendations on what seed, chemicals, and cultivation measurements should best be applied according to the current weather, pest infestation and sales conditions. Monsanto refers to these services as stewardship work. Insurance against failing seed or weather extremes is a normal procedure of risk relief intended to encourage farmers to buy the costly technology (\$15 per acre for the technology fee and \$3-6 per acre for seed and spray). Since the supplier has the larger pocket, it is “economically efficient” to provide such a guarantee from a mathematical insurance perspective. To make an insurance claim in case of a calamity, it is necessary for Monsanto inspectors to visit the fields concerned. Consequently, the farmer does not just buy seed and temporary rights of use but becomes embedded in a dense network of service relations. In the words of Monsanto’s critics and in an analogy with George Orwell’s famous dystopia “Nineteen Eighty-Four”: “Monsanto is watching you” (albeit in a helpful and friendly manner at least at first).

Asked whether they see the technology fee as justified, farmers working with the technology answered in a slightly disgruntled manner, but not more so than about paying taxes to the state. That they do not always pay voluntarily becomes clear by the fact that Monsanto has sued several farmers for contract or patent infringement, in about 100 to 200 cases in North America (Glenn 2004, Kershen 2004). Local seed dealers and consultants have an eye on the situation, all the more so in a rural and rather sparsely populated area like Saskatchewan. Monsanto has installed and advertised a telephone number where observations can be reported – anonymously or confidentially. Critics call it the “snitch line”. Monsanto refers to it as the official hotline farmers can use for all purposes, *e.g.* to obtain information about how to deal with specific pests or weeds. Inspectors regularly check the crops and accounts of suspects. Some farmers have even claimed that Monsanto drops “spray bombs” of Roundup herbicide to detect fields with unexpected herbicide resistance (*i.e.* fields not under contract). Whether true or not, this story illustrates an atmosphere of subjectively-felt suspicion and intimidation.

In this context, and in addition to the TUA and other means of control (or intimidation?) mentioned above, the exchangeability of both conventional and genetically modified varieties is also constrained by the non-availability of specific chemicals. In the case of both conventional and transgenic canola, the grain has to be treated with a special chemical before seeding in order to protect the seedling against flea beetle disease or other diseases like seed- or root-rot. Due

to the processes of market concentration, the necessary chemical called “Helix[®]”. is no longer freely available in the market. Syngenta, another provider of transgenic crops, puts it quite bluntly: “Helix[®] should only be used in commercial seed treatment facilities with closed transfer systems, and should be applied using standard slurry seed treatment equipment which provides uniform seed coverage” (Syngenta 2010). Consequently, there is no longer the practical possibility of saving seed (or putting aside some seed), either legally or illegally, since it is worthless without the relevant treatment. In the case of transgenic canola, this can be interpreted as another attempt to achieve full proprietisation and to prevent farmers from saving seed. Thus, as a side-effect, even farmers who have decided to grow conventional varieties are involuntarily affected by the proprietisation efforts within the seed business.

Coming back to the Schmeiser-case, and with regard to Monsanto’s mechanisms of control, this instance plays a crucial role. Farmers like Schmeiser who save their own seed have to take it to a commercial seed processor to have it treated. By doing so, farmers very much expose themselves because the seed treater takes a sample of the seed before and after the treatment for his own protection. In the Schmeiser-case, Monsanto asked the seed treater to hand over part of the sample he had taken before treating Schmeiser’s seed. As can be seen in the Supreme Court judgement, Schmeiser’s canola appeared to be 95 to 98 percent Roundup resistant (Supreme Court of Canada 2004, p. 36). One of our interviewees put it this way: “They really nailed him on that one. There is no way that the seed blew onto his land. And there was no way that it was contaminated by pollen. He planted it. And he actually admitted on the stand that he harvested the seed that his neighbour grew the year before. I don’t think there is a farmer in Western Canada that believed Schmeiser in the first place. It’s very hard to get these volunteers to grow in nice straight rows like he had” (Adams 2007, p. 10).

What has become evident in the above chapter is this: The sheer existence of IPRS does not automatically translate into successful commercialisation of knowledge goods. Monsanto employs a broad variety of control mechanisms that fall into the categories of either “carrot” or “stick”. Some of these mechanisms are aimed at creating an atmosphere of fairness, commitment and legitimacy; others are directly aimed at exercising control. Both kinds of mechanisms aim at stabilizing and enforcing Monsanto’s commercialisation regime in everyday practices, and preventing the freedom of exchange both for transgenic and conventional seed.

Conclusion

Looking back at the above thoughts on the commercialisation of knowledge goods like glyphosate-resistance, it has become obvious how Monsanto deals with the stumbling blocks of non-rivalry and non-excludability, the farmers' habit of saving seed and with seed itself as a living copying device. In order to avoid Napsterisation in North America, Monsanto has set up a propertisation regime that first and foremost consists of strong control and sanctioning mechanisms, long-term relationships and the hierarchic integration of farmers into the Monsanto cooperation. Altogether, these findings strongly encourage us to conclude that strong IPRs contradict full exchangeability and commodification which are essential for liberal market exchange. As elaborated above, even conventional varieties are affected and de-commodified by the commercialisation and propertisation efforts of the seed business. With the advent of biotechnology, the intellectual property owner is far from being an anonymous competitor in a spot-market as implied in the neoclassic market model. Instead, the owner is a monopolist, therefore highly visible in all debates about the pros and cons of the technology.

Despite all the ideological talk about market efficiency and the new era of "knowledge capitalism", it is quite surprising to see the extent to which neoclassic market ideals and every day practices diverge in the case of transgenic seed. What has become clear from our research is the interesting phenomenon that success or failure in commercialising knowledge goods like transgenic seed is not only a question of whether or not the relevant IPRs exist; it also depends on how a company is able to enforce and activate its ownership and authority on a day-to-day basis. The IPRs in transgenic seed or digitalised music are rights which may be backed up by the courts. But compliance is not guaranteed by general respect and the police, as is the case with most other property. Instead, it has to be monitored by the owner herself. For this reason Monsanto has set up a dense network of social control that can be interpreted as a new form of virtual landlord dominion and refeudalisation. Against these findings, the neoliberal argument of rising efficiency and increasing gains in social welfare due to privatisation has to be strongly challenged. In the case of knowledge goods, there seems to be a tendency whereby the gain in social welfare may be cancelled out by the high costs of control that go hand in hand with its commercialisation.

An even more severe effect could be looming at the back door of “knowledge capitalism”: A creeping cutback on modern liberties. Up to now markets were usually conceived of as emancipatory tools: They destroy traditions, they disembed humans and things, and in doing so they enable individualisation and self-determination within the framework of more abstract and therefore more liberal institutions. With modernisation, ever more widening markets and ever more rationalised rules of law supersede personal obligations and dependencies (e.g. Simmel 1907). The former peasant has turned into an industrial farmer, but with the private IPR revolution now tightening, the latter is thrown back into tight and quasi feudalistic personal entanglements of help, surveillance and policing. Where the integration into this network of social control works, as is the case in North America, royalties are collected to a rather large extent. Where such a network is not set up, as in Argentina and other parts of the world, seed may still be used as textbook commodity. However, to the disappointment of the apologists of « knowledge capitalism », no revenue is paid.

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BIBLIOGRAPHY

- ADAMS 2007. Interview conducted in Saskatoon, Canada, 2007, anonymised name.
- BURTON-JONES Alan, 1999. *Knowledge Capitalism: Business, Work, and Learning in the New Economy* (Oxford, Oxford University Press).
- CALLON Michel, 1998. “Introduction. The embeddedness of economic markets in economics”, in Michel CALLON, ed., *The Laws of the Markets* (Oxford, Blackwell).
- CROSBY Alfred W., 1986. *Ecological Imperialism. The Biological Expansion of Europe 900-1900* (Cambridge, Cambridge University Press).
- DOLATA Ulrich, 2008. “Das Internet und die Transformation der Musikindustrie. Rekonstruktion und Erklärung eines unkontrollierten Wandels”, *Berliner Journal für Soziologie*, 18 (3), pp. 344-369.
- FULTON Murray and Konstantinos GIANNAKAS, 2001. “Agricultural Biotechnology and Industry Structure”, *AgBioForum*, 4 (2), pp. 137-151.
- GILL Bernhard, 2009. “Property Claims in GM and Non-GM Crops: Intellectual Property Rights versus Brand Property Rights in Postindustrial Knowledge Societies”, *International Journal of Agricultural Resources, Governance and Ecology (IJARGE)*, special Issue on “Rural Change: Re-Valorisation of Property Objects and the Institutionalisation of (New) Property Rights”, 8 (1), pp. 14-36.
- GILL Bernhard, Johann BIZER and Gerhard ROLLER, 1998. *Riskante Forschung. Zum Umgang mit Ungewißheit am Beispiel der Genforschung in Deutschland. Eine sozial- und rechtswissenschaftliche Untersuchung*, (Berlin, Edition Sigma).
- GLENN Jane M., 2004. “Footloose: Civil Responsibility for GMO Gene Wandering in

- Canada", *Washburn Law Journal*, 43 (3), pp. 573-547.
- FLITNER Michael, 1995, *Sammler, Räuber und Gelehrte. Die politischen Interessen an pflanzengenetischen Ressourcen 1895-1995*, (Frankfurt/M., Campus).
- HANN Christoph, 2007. "A new double movement? Anthropological perspectives on property in the age of neoliberalism", *Socio-Economic Review*, 5, pp. 287-318
- IÖW et al. 2004. Institut für ökologische Wirtschaftsforschung, Öko-Institut e.V., Schweisfurth-Stiftung, Freie Universität Berlin, Landesanstalt für Großschutzgebiete (Hrsg.): *Agrobiodiversität entwickeln! Handlungsstrategien für eine nachhaltige Tier- und Pflanzenzucht*. Endbericht. Berlin 2004, www.agrobiodiversitaet.net (Jan., 21. 2011).
- KERSHEN Drew L., 2004. "Of Straying Crops and Patent Rights", *Washburn Law Journal*, 43 (3), pp. 575-610.
- KLOPPENBURG Jack R., 2004. *First the Seed. The Political Economy of Plant Biotechnology, 1492-2000* (Madison, Wisconsin, University of Wisconsin Press).
- MASCARENAS Michael and Lawrence BUSCH, 2006. "Seeds of Change: Intellectual Property Rights, Genetically Modified Soybeans and Seed Saving in the United States", *Sociologia Ruralis*, 46 (2), pp. 122-138.
- MEIER Henk E., 2005. "Wissen als geistiges Privateigentum? Die Einfriedung der Public Domain", *Leviathan*, 33 (4), pp. 492-521.
- MONSANTO, 2006a. "2006 Monsanto Technology/Stewardship Agreement", <http://www.farmsource.com/images/pdf/2006%20EMTA%20Rev3.pdf>, (Mai, 21. 2006).
- , 2006b. "The Sum of our Commitments", 2006 Pledge Report, http://www.monsanto.com/pdf/pubs/2006/plledge_report.pdf, (Sep., 17. 2007).
- NELSON Richard R., 1959. "The Simple Economics of Basic Scientific Research", *The Journal of Political Economy*, 67 (3), pp. 297-306.
- , 2003. "The Advance of Technology and the Scientific Commons", *Philosophical Transactions – Mathematical, Physical and Engineering Sciences*, 361 (1809), pp. 1691-1708.
- NORTH Douglas C., 1990. *Institutions, Institutional Change and Economic Performance* (Cambridge, Cambridge University Press).
- OLSON Mancur, 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups* (Cambridge, Harvard University Press).
- RHOTEN Diana and Walter W. POWELL, 2007. "The Frontiers of Intellectual Property: Expanded Protection versus New Models of Open Science", *Annual Review of Law and Social Science*, 3, pp. 345-73.
- SCHUBERT Johannes, 2007. *Appropriating and commercialising immaterial goods in knowledge economies – Monsanto's property Regime and the case of transgenic seed*, thesis submitted for the Diploma in Sociology, www.ls2.sozioologie.uni-muenchen.de/personen/wiss_ma/schubert_johannes/veroeffentlichungen/da_schubert_final.pdf.
- SCOTCHMER Suzanne, 2003. *The Political Economy of Intellectual Property Treaties*, (Cambridge, National Bureau of Economic Research), Working Paper 9114.
- SIMMEL Georg, 1907, *Philosophie des Geldes* (Leipzig, Druckner und Humbolt).
- SLAUGHTER Sheila and Gary RHOADES, 1996. "The Emergence of a Competitiveness Research and Development Policy Coalition and the Commercialization of Academic Science and Technology", *Science, Technology & Human Values*, 21 (3), pp. 303-339.
- SUPREME COURT OF CANADA, 2002. *Harvard College v. Canada (Commissioner of Patents)*, www.canlii.org/ca/cas/scc/2002/2002scc76.html, (Mai, 22. 2006).
- , 2004. *Monsanto Canada Inc. v. Schmeiser*, www.canlii.org/ca/cas/scc/2004/2004scc34.html, (Apr., 27. 2006).
- SYNGENTA 2010. <http://www.syngentacrop.protection.com/prodrender/index.aspx?nav=APPLICATION&ProdID=723&ProdNM=Helix%20XTra> (Aug., 6. 2010)
- VON BENDA-BECKMANN Franz, Keebet von BENDA-BECKMANN and Melanie WIBER, 2006. *Changing Properties of Property*, (New York, Berghahn Books).
- WIELAND Thomas, 2006. "Scientific Theory and Agricultural Practice: Plant Breeding in Germany from the Late 19th to the Early 20th Century", *Journal of the History of Biology*, 39 (2), pp. 309-343.

WILLIAMSON Oliver E., 2000. "The New Institutional Economics: Taking Stock, Looking Ahead", *Journal of Economic Literature*, XXXVIII, pp. 595-613.

WINTER Joachim, 1999. "Gesetzliche Rahmenbedingungen für die Pflanzenzucht – Saatgut, Sortenwesen und Biotechnologie", *Biologie in unserer Zeit*, 29 (3), pp. 167-176.

Résumé

En contradiction avec la théorie néolibérale, la marchandisation de la connaissance se révèle être une affaire complexe avec des effets inattendus. En prenant l'exemple de Monsanto gérant la propriété de la canola transgénique, on entend porter au clair un phénomène contre-intuitif, à savoir que des droits de propriété intellectuelle bien gardés sont loin de l'utopie libérale d'une concurrence libre et non faussée. Il est montré que Monsanto a établi et maintient, pour éviter la napsterisation, un mode de commercialisation qui maximise son contrôle et limite très fortement l'échange de semences et de plants. On peut y voir une forme nouvelle de domination seigneuriale qui invalide l'idée moderniste d'une harmonie entre marché libre et émancipation de l'individu.

Mots clés: Droit de propriété intellectuelle ; Capitalisme de la connaissance ; Semence transgénique ; Marchandisation ; Théorie de la modernité.

Zusammenfassung

Die Wissensvermarktung gestaltet sich schließlich komplizierter als gedacht, mit unerwartenden Auswirkungen und dem Neoliberalismus widersprechend. Als Beispiel sei hier Monsanto zitiert, Verwalter transgenerischer Rapssamen (canola plant), anhand dessen ein kontraintuitives Phänomen verdeutlicht werden kann: Lizenzen vertragen sich kaum mit der liberalen Utopie einer freien und unverfälschten Konkurrenz. Um die Napsterisierung zu verhindern, hat Monsanto bekannterweise eine Vermarktungstechnik aufgebaut und bis heute praktiziert, die die Kontrolle verstärkt und den Austausch von Samengut und Pflanzen begrenzt. Es handelt sich hier um eine neue Form herrschaftlicher Vormachtstellung, die die moderne Idee einer Harmonie zwischen freier Marktwirtschaft und individueller Emanzipation widerlegt.

Schlagwörter: Patentwesen; Wissenskapitalismus; Transgenetisches Saatgut; Vermarktung; Modernitätstheorie.