

Transitions in Agbiotech: Economics of Strategy and Policy

EDITED BY
William H. Lesser

*Proceedings of NE-165 Conference
June 24-25, 1999
Washington, D.C.*

Including papers presented at the:

*International Consortium on Agricultural Biotechnology
Research Conference
June 17-19, 1999
Rome Tor Vergata, Italy*

PART THREE:
Intellectual Property Rights

**15. The TRIPS Agreement and WTO
Enforcement of Intellectual Property
Rights in Agricultural Biotechnology**

William A. Kerr, Revadee Yampoin and Jill E. Hobbs

© 2000
Food Marketing Policy Center
Department of Agricultural and Resource Economics
University of Connecticut
and
Department of Resource Economics
University of Massachusetts, Amherst

**The TRIPS Agreement and WTO Enforcement
of Intellectual Property Rights
in Agricultural Biotechnology**

William A. Kerr

Revadee Yampoin

Jill E. Hobbs

Department of Agricultural Economics
University of Saskatchewan
Saskatoon, Canada

Copyright © 2000 by Food Marketing Policy Center, University of Connecticut. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

**The TRIPS Agreement and WTO Enforcement of Intellectual Property Rights
in Agricultural Biotechnology**

William A. Kerr, Revadee Yampoin and Jill E. Hobbs¹

Introduction – The Nature of the Problem

While intellectual property piracy in developing countries is perceived as being endemic by those in developed countries who produce intellectual property (and by their governments), developing countries also perceive that their intellectual property is under threat from more technologically advanced countries. According to Panutampon and Lianchamroon (1998:51):

Biopiracy, or the stealing of genetic material and knowledge from communities in the gene-rich developing countries is an exploding issue in Asia. Industrialized countries want exploitation and ownership rights over the biodiversity of the South.

To illustrate the complexity which surrounds intellectual property in agricultural products, consider the following scenario. Over a long period of time traditional farmers in a developing country breed a crop variety which is adapted to local climatic conditions and which has characteristics which appeal to local consumer tastes. Over the last few decades, local scientific plant breeders improve on the varieties through selective breeding and release strains using a name which has widespread local acceptance. These local varieties also appeal to niche market consumers in other countries and a considerable export trade develops. Intellectual property protection in the country, however, is poor and, in any case, the government is opposed to the granting of monopoly rights in agricultural crops.

Seeing the international market potential of the local crop variety, an agricultural biotechnology company in a developed country acquires samples of the crop. As these varieties are not produced using biotechnology, the firm convinces its government to make use of the exemption for plants and animals allowed in the Agreement on Trade Related Aspects of Intellectual Property (TRIPs) by claiming these are natural varieties where no inventor can be identified. This is strictly correct because the developing country did not provide intellectual property protection for the varieties. The use of the exemption voids any rights on the part of the developing country to the “natural varieties”. The agricultural biotechnology company then genetically engineers a close substitute for the “natural variety” which maintains its desirable consumer characteristics. This genetically modified variety can be patented along with its name, which makes it eligible for intellectual property protection under the TRIPs. This means that the

biotechnology firm can license the production of the crop in any climatically friendly country, export the product in competition with the natural varieties and prevent the natural varieties from being sold in importers' markets using their traditional names. In the extreme, the biotechnology firm could ask for protection of its intellectual property in the original developing country to prevent both seeds and the outputs of the natural varieties from being sold under the traditional name. The claim for protection would be backed by the TRIPs. Far fetched?

A close variant of this scenario is being played out for Jasmine rice from Thailand and Basmati rice from India. In both cases, variants of the two rice varieties have been patented and trade-marked by US firms. There has been an adverse reaction to this perceived "biopiracy" in both India and Thailand. For example, in an open letter to the US ambassador to Thailand dated July 22, 1998, Thai Farmers (1998: back cover) called on the US government to:

... revoke the patent on basmati rice and to reject any IPR application from Rice Tec Inc. and other companies in the US related to jasmine rice... Thai farmers and Indian farmers have developed rice varieties over thousands of years. Jasmine and basmati are two such rices widely known and appreciated across the planet today.

... rewarding minor genetic modifications of these materials through patent and other monopoly rights in the United States is nothing less than stealing the natural resources for the sole and totally illegitimate benefit of the rich in industrialized countries.

We call on the US government to cancel and prohibit the use of any form of the name Jasmine on any rice grown in the United State. The trademark "Jasmati" is a blatant defamation of both jasmine and basmati and gives deliberately false information to consumers. People are being led to believe they are buying a product related to Thai jasmine rice.

Thailand's Deputy Agriculture minister Newin Chidchop announced his government's resolve to fight "US effort to imitate or undermine" jasmine rice by lodging a formal protest at the World Trade Organization (WTO) (Hongthon 1998).

The complexity of the issues relating to the international protection of agricultural biotechnology suggests three things: (1) that a wide range of disputable issues exist; (2) that it may not only be developed countries which will seek resolution of disputes at the WTO and; (3) countries may not wish to voluntarily enforce some forms of intellectual property protection - particularly in the area of agricultural biotechnology. As a result, the likely efficacy of the TRIPs/WTO enforcement mechanisms is important to both the developers of agricultural biotechnology and their governments. This paper attempts to answer the question of whether the enforcement mechanisms in the TRIPs/WTO can, in fact, provide sufficient inducement for countries to live up to their TRIPs commitments to effectively enforce intellectual property rights in agricultural biotechnology.

Institutional Developments

Agricultural biotechnology creates a situation in which the intellectual property value of agricultural products is more easily captured by the inventors of that intellectual property than was the case in the past. Previously, the natural ability of crops and animals to reproduce meant that it was not possible to capture the intellectual property value of agricultural products. Therefore, to prevent under-investment in new agricultural technology, most genetic improvements were subsidized by the state or developed directly by state-funded research establishments. This has changed with the advent of modern biotechnology. The proportion of the value of an agricultural good represented by intellectual property has risen accordingly. Partly a result of the computer revolution, the share of intellectual property in the value of goods generally has also been increasing. Intellectual property piracy became an increasing international concern and, as a result, the protection of intellectual property was a major topic of negotiation at the Uruguay Round of the General Agreement on Tariffs and Trade (GATT).

The outcome of the negotiations was a radically altered institutional structure for the conduct of international commercial relationships. The new World Trade Organization was instituted to administer three agreements, the GATT, the TRIPs and the General Agreement on Trade in Services (GATS). One of the major reasons for tying the three agreements together in the WTO was to allow retaliation across agreements. In short, the WTO structure allows retaliation against the import of goods through the GATT for violations of intellectual property rights protection in the TRIPs. The absence of an effective enforcement mechanism was the root of developed countries' frustration with the existing World Intellectual Property Organization (WIPO) (Guterman 1993).

The new TRIPs/WTO mechanisms will not be tested until the 21st century because a period of grace was provided to allow countries to put legal/regulatory/enforcement regimes in place to comply with their TRIPs' commitments. As yet, no agreement has been reached on the penalties which can be imposed on the party judged to be in violation of its TRIPs' commitments. In the absence of either a formal WTO agreement regarding the penalties which can be imposed, or precedents from disputes panels, the question arises as to what might be the retaliatory principle applied. If no agreement can be reached on compensation, the common practice when a country ignores the trade rules established by the GATT is for the injured country to be allowed to retaliate against the offending country up to the value of the trade foregone. This retaliation takes the form of a tariff or other border measures (Kerr and Perdakis 1995). The products to which retaliatory tariffs apply are selected by the injured party. Allowing retaliation of this form for TRIPs violations would be consistent with GATT precedents and, for the moment, we will assume this is the retaliation rule agreed at the WTO.

The debates over protection of intellectual property rights are largely polarized between developed countries, which produce most of the world's intellectual property and are advocates of strong international protection, and developing countries which perceive that the payment of monopoly rents for the use of intellectual property is

detrimental to their development process (Mansfield 1993, Taylor 1993, Gaisford and Richardson 1996, Government of India 1989). The payment of monopoly rents has been particularly contentious for agricultural inputs such as seed as well as pharmaceuticals - the former because of its effect on poor farmers and the latter because of the effect on the poor's ability to afford health care. As suggested above, biotechnology has added a new dimension to the debate because there is perception among some in developing countries that the granting of monopoly rights to genetic material is biopiracy being practiced against developing countries (Khamphiraphap 1998).

While arguments are sometimes made that those in developing countries who hold the rights to intellectual property in agriculture deserve no return (Steidlmeir 1993), most advocates of the developing countries' position would concede that those who invest in the creation of intellectual property should receive a competitive rate of return on their investment. Hence, the major contentious issue is the method used to reward the producers of intellectual property - i.e. the granting of monopoly rights through patents. The granting of monopoly rights means that the rewards available from producing intellectual property are not directly related to the costs of producing intellectual property. In this paper we only consider the case where a monopoly is acquired by the developer of agricultural biotechnology, Yampoin and Kerr (1998) examine the incentives for enforcement when only normal rates of return are available to the holder of intellectual property rights.

The monopoly returns to intellectual property which is traded internationally are appropriated in three ways: (1) directly through the prices of exports; (2) fees for use and; (3) profits of subsidiaries (Maskus 1990). If failure to enforce intellectual property rights is instrumental in preventing the establishment of a foreign subsidiary, the use of WTO-sanctioned cross retaliation via trade measures would not be possible. As no trade in goods has taken place, retaliation based on the value of lost trade has no effect. No loss of goods exports can be claimed by the country owning the intellectual property even though there is a loss from the failure to protect intellectual property.

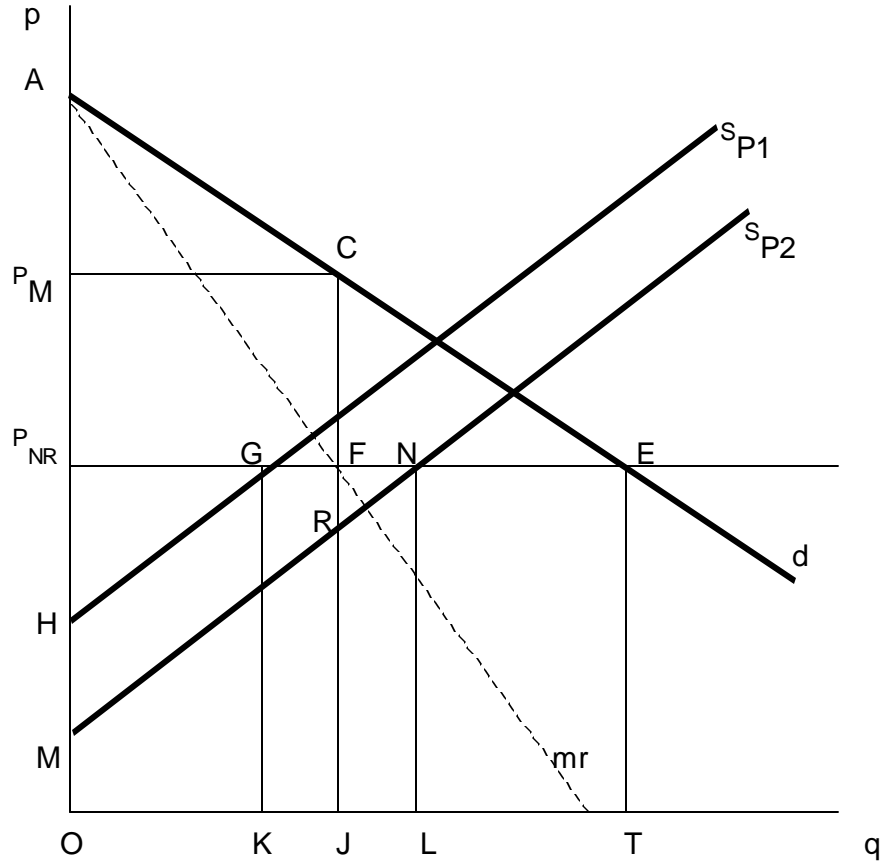
The Model

The case where the foreign owner of agricultural biotechnology has the monopoly rights to its intellectual property enforced in the importing country can be illustrated in Figure 1. This is the *worst case* for those in developing countries who object to intellectual property protection for foreign owners. For simplicity, we assume that this is the small country case where imports of the product will be supplied at a constant price whether at the monopoly price or at a price which reflects costs - the competitive export supply curve is perfectly elastic due to constant marginal cost.

Assume that a market situation exists where the developing country faces no threat of cross-retaliation as a result of non-enforcement. This is where it has exercised an unchallenged exemption or would have been the situation prior to the TRIPs. A pirate industry exists in the developing country and has supply curve SP_1 . When faced with

non-enforcement of its intellectual property rights and competition from pirate firms, the firm which produces the agricultural biotechnology will attempt to compete with pirate firms and supply exports at a price that reflects a normal rate of return on the investment in creating intellectual property, P_{NR} . Domestic pirate firms in the developing country will supply OK and imports will equal KT .

FIGURE 1 Foreign Monopolization of the Industry if Intellectual Property Rights are Enforced



Now assume that the country is a member of the WTO and either lives up to its TRIPs commitment or suffers the imposition of trade sanctions. The importing country now has a choice. It can live up to its TRIPs commitments and enforce intellectual property rights by shutting down the pirate industry or it can ignore its TRIPs commitments and suffer the cost imposed by cross-retaliation.

The Non-Enforcement Outcome

If the importing country chooses not to enforce, then it can expect its exports of other products to be subject to trade measures imposed by the government of the firm

which holds the intellectual property rights and exports the agricultural biotechnology. Assume the lost value of exports is used to establish the size of the penalty. In Figure 1, the value of the trade loss is $P_M CJO$. It should be made explicitly clear that the export loss is not $P_{NR} GKO$, the value of the pirates' production, but rather the value of exports once a monopoly position in the market has been obtained. Of course, the value of the trade loss will be applied strategically against export products of the offending country where the damage done to firms in the offending country is expected to have the best effect in terms of encouraging the government to enforce intellectual property rights. Alternatively, the restrictions on imports might be used to satisfied influential domestic vested interests seeking protecting.

The Enforcement Outcome

If the importing country chooses to enforce, the exporter of agricultural biotechnology will be able to set its exports so as to monopolize the market, at P_M . Quantity OJ will be imported. As price increases from R_{NR} to P_M , there will be a loss in consumers' surplus equal to $P_M CEP_{NR}$. There will also be a loss in producers' surplus equal to $R_{NR} GH$ from shutting down the domestic pirate industry. To this must be added the cost of enforcement. The total cost to the importing country equals $P_M CEP_{NR} + P_{NR} GH +$ the cost of enforcement.

Little is known about the costs of intellectual property rights enforcement. There are two aspects to enforcement costs. First, there are costs associated with identifying pirate firms and monitoring their production premises. Clearly, these costs will vary from product to product and will depend on the degree to which the capital equipment required for pirate production is fixed or mobile, the absolute size of the premises required for production, the degree of concentration in the pirate industry, etc. Secondly, there are factors which affect the efficacy of the enforcement effort. These include the effectiveness of the legal system in obtaining convictions, the degree of corruption in the police service and justice system and the ability of the pirate industry to influence the political will to actively pursue enforcement. One suspects that in many developing countries the cost of ensuring a degree of enforcement sufficient to satisfy developed countries will be non-trivial. Given these costs are not transparent, they will be ignored in this analysis, hence it is assumed that fully effective enforcement can be costlessly obtained. Our analysis represents the *best case* for enforcement from the perspective of the firm who owns the rights to intellectual property.

Incentives to Enforce

To see if the importing country will have the incentive to enforce intellectual property rights in agricultural biotechnology in the absence of enforcement costs, one must compare the loss associated with enforcement, $P_M CEP_{NR} + P_{NR} GH$ with the loss associated with non-enforcement, $R_M CJO$. As areas $R_M CFP_{NR}$ and $P_{NR} GH$ are common, i.e., they arise whether or not enforcement takes place, the net loss from enforcement is

CEF while the net loss from non-enforcement is HGFJO. As drawn in Figure 1, HGFJO is greater than CEF and the importing country will have an incentive to enforce intellectual property rights in agricultural biotechnology as long as the cost of enforcement is less than HGFJO minus CEF.

Compare this result with that where the pirate industry is larger, pirate supply curve SP_2 . In the absence of enforcement, imports will be LT. If the importing country chooses to enforce intellectual property rights, the loss in consumer surplus remains the same as in the previous case, $P_M CEP_{NR}$ but the loss in producer surplus increases to P_{NRNM} . The retaliatory trade loss remains unchanged at PMCJO. The net loss from enforcement increases to CENR (from CEF) while the net loss from non-enforcement declines to MRJO (from HGFJO). Hence, the likelihood that the importing country will have an incentive to enforce intellectual property rights in agricultural biotechnology will decline as the size of the pirate industry increases. The likelihood that enforcement will take place is further reduced because one would expect the cost of enforcement to rise as the size of the pirate industry increases.

This result is not the one desired by the owners of intellectual property in agricultural biotechnology. Presumably, they would wish for stronger incentives to enforce intellectual property rights as the size of the pirate industry increases.

Discussion

It would appear that if the members of the WTO decide to follow the customary GATT practice of allowing penalties equal to the value of lost trade when they establish the cross-retaliatory penalties for TRIPs violations, then the penalties which can be imposed will not provide sufficient incentives for countries to fulfill their TRIPs commitments in all situations when violations of intellectual property rights occur. If the monopoly rents are large, the size of the potential trade penalty will not be sufficient to justify enforcing intellectual property rights. Of course, the transfer of monopoly rents to foreigners is the basis for the objections to the enforcement of intellectual property rights by developing countries.

Further, our analysis puts forward the *best case* for enforcement because the costs of enforcement are assumed to be zero. As the size of the pirate industry increases, the likelihood that the importing country will enforce intellectual property rights to agricultural biotechnology declines. Thus, when large pirate industries exist, and firms that own intellectual property rights to agricultural biotechnology are suffering large losses, the probability of enforcement is smallest.

It might be possible for the owners of intellectual property in agricultural biotechnology to convince their governments to threaten retaliation when the pirate industry in a foreign country is small. This is when the threat of trade sanctions is likely to be most effective and could deter the successful establishment of a pirate industry. Finding sufficient political support, however, for mounting a costly WTO challenge when

only a small pirate industry exists may be very difficult given that WTO challenges tend to sour international relations on a number of fronts.

The use of a retaliation rule based on the value of exports lost might also have considerable practical difficulties associated with its implementation. This is because the trade loss is a counterfactual value - in other words it is not observable when a country fails to enforce intellectual property rights. Quantity OJ in Figure 1 cannot be determined until pirate firms are removed from the market. While it would be possible to estimate point C in Figure 1, it depends crucially on the slope of the demand curve. Disputes over the size of the threatened penalty would likely become endemic at the WTO.

The threatened country will also have difficulty assessing the actual harm it will suffer when the equivalent value is translated into trade restrictions on its exports. Such a lack of transparency may well reduce the effectiveness of the threat, therefore reducing the incentive to enforce intellectual property rights to agricultural biotechnology.

Alternative Penalty Structures

If penalties based on the value of lost exports will not consistently lead to compliance with TRIPs commitments, what should members of the WTO consider as an alternative? The use of the value of the trade foregone to establish penalties is only a crude proxy for the loss suffered by the owners of intellectual property in agricultural biotechnology when their rights are not enforced in the importing country. The true loss is the monopoly profits foregone.

Would using the direct measure of the loss suffered by the owners of intellectual property provide the appropriate incentives for consistent enforcement of TRIPs commitments? In Figure 1, the monopoly rents lost when enforcement does not take place equal R_MCFP_{NR} . As this value is less than the value of trade foregone, $PMCJO$, it will provide even less incentive for importing countries to enforce intellectual property rights. In any case, the loss of monopoly rents will always be less than the loss of consumers' surplus associated with enforcement, P_MCEP_{NR} . This suggests that an importing country would never have an incentive to enforce intellectual property rights in agricultural biotechnology.

It should be clear that to induce consistent compliance with TRIPs commitments, the members of the WTO would have to agree to penalties which are greater than either the actual losses suffered by agricultural biotechnology companies or the (larger) value of the trade loss arising from the failure to enforce intellectual property rights. Setting aside the practical difficulties of establishing the actual size of the penalty required to induce a country to enforce intellectual property rights - having to estimate consumer and producer surplus plus enforcement costs - it seems unlikely that countries would agree to trade penalties in excess of the loss suffered by the exporting country, however defined. It is not a precedent that WTO members would desire for other aspects of trade disputes. Thus it seems that the TRIPs/WTO cannot be relied upon to provide the level of

protection desired by the owners of agricultural biotechnology. As a result, there is likely to be under-investment in agricultural biotechnology.

These results suggest that the entire idea of using cross retaliation in the WTO to induce enforcement of intellectual property rights needs to be re-examined. Cluttering trade agreements with non-trade issues is a poor precedent in any case. The problem of protection of intellectual property needs to be tackled directly through multinational negotiations. In the past, the problem was that developing countries had little to gain from protecting intellectual property. Now there are signs that they may see some benefit to owning property rights in the genetics of their natural flora, fauna and traditional crop varieties. Hence, with both parties having something to win from international protection of intellectual property rights, there may be the basis for an agreement. Given the agricultural biotechnology potential that lies within tropical floral and fauna, it might be interesting to see if developed countries would be willing to trade the granting of rights to products such as Jasmine rice in exchange for better protection of intellectual property rights to agricultural biotechnology. As Thailand's Deputy Agriculture Minister Newin Chidchob speculated when discussing the Jasmine rice controversy:

The US has long campaigned against imitation products. I would like to know how it will treat this case because the violator is a US company (as cited in Panutampon and Lianchanroon 1998:51).

Endnote

¹William A. Kerr is Van Vliet Professor, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, Canada; Revadee Yampoin is lecturer, Department of Agricultural Economics, Kasertart University, Bangkok, Thailand and Jill E. Hobbs is Assistant Professor, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, Canada.

References

- Gaisford, J. D. and R. S. Richardson. 1996. North-South Disputes Over Protection of Intellectual Property. *Canadian Journal of Economics* 29 (special issue):5376-5381.
- Government of India. 1989. *Paper presented by India in Uruguay Round Multilateral Talks*. Washington D.C. Embassy of India.
- Gutterman, A. S. 1993. The North-South Debate Regarding the Protection of Intellectual Property Rights. *Wake Forest Law Review* 28:89-139.
- Hongthong, P. 1998. Rice Copycat Faces Wrath of Thailand. *The Nation*. May 1. As cited in Panutampon, P. and W. Lianchamroon. 1998. Biopiracy, TRIPS and the Patenting of Asia's Rice Bowl. *Thai Development Newsletter* 34(January-June):51-57.

- Kerr, W. A. and N. Perdakis. 1995. *The Economics of International Business*. London: Chapman and Hall.
- Khamphiraphap, C. 1998. Biopolicy in Thailand. *Thai Development Newsletter* 34:31-36.
- Mansfield, E. 1993. The Case for and Against a Uniform Worldwide Intellectual Property Rights System. In *Global Dimensions of Intellectual Property Rights in Science and Technology*, ed. M. B. Wallerstem, M. E. Moguee and R. A. Schoen, 18-39. Washington, DC, National Academy Press.
- Maskus, K. E. 1990. Normative Concerns in the International Protection of Intellectual Property Rights. *The World Economy* 13:18-39.
- Panutampon, P. and W. Lianchamroon. 1998. Biopiracy, TRIPS and the Patenting of Asia's Rice Bowl. *Thai Development Newsletter* 34(January-June):51-57.
- Steidlmeier, P. 1993. The Moral Legitimacy of Intellectual Property Claims: American Business and Developing Countries' Perspectives. *Journal of Business Ethics* 12:157-164.
- Taylor, M. S. 1993. TRIPs, Trade and Technology Transfer. *Canadian Journal of Economics* 26:625-37.
- Thai Farmers. 1998. An Open Letter to the United States Government Regarding American Intellectual Property Claims to Jasmine Rice. Reprinted in *Thai Development Newsletter* 34(January-June):back and front cover.
- Yampoin, R. and W. A. Kerr. 1998. Can Trade Measures Induce Compliance with TRIPS? *Journal of Asia Pacific Economy* 3(2):165-182.