

# Trojan Genes and Trojan Laws: When the Polluter Doesn't Pay

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Aquaculture which uses genetically modified fish is nearly market-ready. As a totally new industry it holds implications for society and the environment, and therefore it should be subject to a legislative regime that is, in terms of precaution, adequate if not rigorous. This paper is a brief look at the state of regulation in the EU for one of the potential hazards of genetically modified fish. It postulates an inability to act on an inability to legislate adequately and begins an analysis of why that is so.

## I. Trojan Genes

As a new industry, the benefits and detriments are hypothesised, rather than known. They are considered in the report “Future Fish? Issues in Science and Regulation of Transgenic Fish” (2003). The report was produced by the Pew Initiative on Food and Biotechnology, an independent organisation which aims to obtain and disseminate factual information on biotechnology in order to facilitate policymaking and debate. Another source of information is the FAO/WHO Expert Consultation on the Safety Assessment of Foods Derived from Genetically Modified Animals, Including Fish (2003). Despite both being several years old, these documents are still the most comprehensive sources available.

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The perceived benefit is that it could relieve the growing global demand for fish as foodstuff, while relieving the pressure on wild fish stocks. Unlike conventional aquaculture, genetic modification can lead to fish that grow twice as quickly, have inbuilt resistance to disease which should reduce local water pollution from use of pesticides and antibiotics and have improved food conversion so that they consume fewer fish as they grow or consume vegetable matter instead (Pew 2003).

Given these advantages, and the fact that many of the development projects are sited in areas that are socio-economically disadvantaged, such as China and Cuba, it seems that GM aquaculture could become a textbook example of the environmental principle of Sustainable Development, with its emphasis on inter-generational equity (it preserves fish stocks for future generations) and intra-generational equity (the benefits are shared with the developing countries).

The process is not without its perceived detriments, however; for example, the idea of modifying a living animal is held by many people to be unethical and repugnant; there may be human health risks in foodstuff composed of genetic material from different species which could not have cross-bred naturally due to lack of genetic similarity (FAO/WHO 2003).

A further detriment for consideration is that aquaculture uses open water sea pens, which leads to the risk of fish escape, and environmental pollution in the potential loss of genetic diversity (Pew 2003). Fish are no respecters of boundaries, and the spread of genetically modified fish would be difficult if not impossible to contain. These risks, particularly the one just mentioned, turn the concept of GM aquaculture as a model sustainable industry, on its head. For this reason, I am using this previously unimaginable environmental risk as a starting point in my research into how traditional laws are evolving in response to developments in biotechnology.

The risks and uncertainty suggest that GM aquaculture could therefore become a textbook example of an industry requiring precautionary legislation. This would be fairly inarguable — although as we will see there are counter factors at work — given the increasing acceptance of the Precautionary Principle (PP) as a legal norm, and its increasing legitimacy. For example, the introduction of the Principle into discussions at the 1992 United Nations Conference on Environment and Development,

led to its inclusion in the subsequent 1992 Rio Declaration on Environment and Development, a set of principles intended to steer future global development.

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities.

The 'precautionary approach' is defined in the following sentence.

Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation (Rio Declaration 1992, Principle 15).

The PP also influences EC legislation on environmental matters, according to the Treaty Establishing the European Community.

Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay. Environmental protection requirements must be integrated into the definition and implementation of other Community policies (Art. 130r(2)).

The PP is subject to interpretation, and although a suggested nineteen versions of it have been identified (Wiener and Rogers 2002), it seems to take three main forms. The first form is the wide interpretation which is essentially an approach: the presence of scientific uncertainty does not allow for inaction, so that traditional methods of postponement of action pending further information are no longer acceptable. The second form encourages action, in that scientific uncertainty and risk of harm lead to the taking of precautionary measures. The third form of PP is an interpretation which allows the reversal of the traditional legal burden of proof. Prior to this, for example, an environmental NGO or other claimant would have to prove that the acts of a State or corporation were harming, or would harm, the environment. With this interpretation of the PP, it may now fall to the State or organisation to prove that their acts are not harming or will not harm the environment.

This new legal thinking may be observed in the case of an appeal to the European Court of Justice in 1996 by the United Kingdom against the European Commission's ban on UK beef exports during the BSE crisis. In *United Kingdom of Great Britain and Northern Ireland v Commission of the European Communities* the UK argued that the burden of proof should lie, as is traditional, on the Commission, as it stated that "there is no scientific basis for the ban on exports" (Transcript of the Court Order, 'Position of the Parties', para. 47). But the case was judged with the PP reversal and the burden placed on the UK to prove the safety of its beef, as had been originally argued by the Commission, as the Court found that "there are still scientific uncertainties" (Transcript of the Court Order, 'Findings of the Court', para. 69) Thus the PP has the potential to modify traditional legal rules in response to environmental risk.

Bearing this in mind, it is interesting to consider the relevant EC Directive for potential GM fish escapes, Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage. The PP should influence the preventative nature of the Directive in accordance with its inclusion in the EC Treaty, but the Directive states:

The prevention and remedying of environmental damage should be implemented through the furtherance of the 'polluter pays' principle, as indicated in the Treaty and in line with the principle of sustainable development. The fundamental principle of this Directive should therefore be that an operator whose activity has caused the environmental damage or the imminent threat of such damage is to be held financially liable, in order to induce operators to adopt measures and develop practices to minimise the risks of environmental damage so that their exposure to financial liabilities is reduced (Preamble (2)).

The Polluter Pays Principle, another principle of sustainable development, aims to internalise the external costs of pollution that may be borne by a third party, society in general, or the environment, by allocating the costs back to the polluter. This is achieved through a system of taxes, charges or liability regimes, and operates on the presumption that there is a monetary cost, that it is quantifiable, and manageable.

Although the PP has at least the potential to reverse the burden of proof, the polluter pays liability regime appears to retain the traditional

burden of proof on the claimant. The Directive combines both strict and fault liability; within it is a list of specific hazardous occupational activities (Annex III) and it is stated in Article 3 ('Scope') that the Directive is applicable to

environmental damage caused by any of the occupational activities listed in Annex III, and to any imminent threat of such damage occurring by reason of any of those activities (Art 3(1)(a)).

This appears to be strict liability, particularly as the second statement of the Directive's application is to

damage to protected species and natural habitats caused by any occupational activities other than those listed in Annex III, and to any imminent threat of such damage occurring by reason of any of those activities, *whenever the operator has been at fault or negligent* [my emphasis] (Art 3(1)(b)).

The explicit statement that damage outside the list cited in Annex III, is subject to fault liability suggests that where fault liability is being considered, a wider, more approach-based interpretation of the PP is being used.

The emphasis within the Directive on liability raises the question of how far the Polluter Pays Principle facilitates new thinking and a move away from traditional liability mechanisms.

The current standard for liability in English tort law is *Caparo Industries plc v Dickman* (1990) and the Directive may be read in the light of this standard. The *Caparo* test is based on three elements; firstly proximity: the relationship of injured to injurer. Proximity is defined in the Directive such that potential claimants are those "affected or likely to be affected by environmental damage or having sufficient interest in environmental decision-making" (Art. 12(1)). The Directive suggests that the latter would mean NGOs as opposed to individuals claiming sufficient interest, in line with the limitations that are set by a proximity test of the *Caparo* kind. The second element is foreseeability: whether it could be reasonably foreseen that harm would occur as a result of a certain act or failure to act. The Directive (Preamble (20)) states that the agent should not bear the costs "in situations where the potential for damage could not have been known when the event or emission took place." The third *Caparo* element is fairness, or the limits to liability. Annex I of the Directive states

The following does not have to be classified as significant damage:

- negative variations that are smaller than natural fluctuations regarded as normal for the species or habitat in question,
- negative variations due to natural causes or resulting from intervention relating to the normal management of sites, as defined in habitat records or target documents or as carried on previously by owners or operators,
- damage to species or habitats for which it is established that they will recover, within a short time and without intervention, either to the baseline condition or to a condition which leads, solely by virtue of the dynamics of the species or habitat, to a condition deemed equivalent or superior to the baseline condition.

So although the Directive employs the Polluter Pays Principle to remedy or prevent environmental harms, the legislation also seems to be substantively similar to the principles of English tort law.

The Precautionary Principle is also liable to an interpretation that is remarkably similar to a particular theory of tort law, namely economic analysis. The Rio Declaration 1992 Principle 15, for example, states that

lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

That the measures are to be cost-effective is of course practical and realistic, but it also is a reflection of the economic theorists' viewpoint. As described by Jules Coleman:

Economic analysts focus primarily on the concept of negligence. Negligence is the failure to take adequate care and adequate care consists in taking cost-justified precautions. Precautions are cost-justified whenever their cost is less than the costs of the harm risked (by not taking precautions) discounted by the probability of the harm's occurrence (Coleman 2003).

According to this theory, he adds, “[a]n agent will be at fault only if the costs of precautions are less than the costs of the harm discounted by the probability of occurrence”.

That emerging legal principles show signs of assimilation into existing legal principles is perhaps unsurprising given the role played by the continuity and predictability of law as a legitimating factor, and the need for legitimacy of the laws themselves, such, for example, as is bestowed by democratically elected law-makers in a Parliament. But the question remains as to the adequacy of their application, considering the magnitude of the new risks for which policy makers should be creating legislative instruments. There is something rather sadly optimistic about the phrase “environmental liability directive” suggesting an ordered world where transgressions are minor, measurable and punishable.

To return to Directive 2004/35/EC, and its relevance for the potential pollution issues with GM aquaculture: the “Net Fitness Methodology” created by Muir & Howard (Pew 2003), uses computer simulation to hypothesise that modified fish that escape into the wild will behave in one of three ways. They may breed successfully and alter the genome of the wild population; they may fail to breed and die out leaving the wild population unaffected; or they may trigger local population extinction. This last scenario is due to possession of a “Trojan Gene”; the destroyer lurking within. Trojan Gene fish would appear to be viable, attractive with good reproductive success, but contain within some latent unviability, causing them to die out quickly. In this way, each generation of Trojan Gene fish would attract mates at the expense of their less glamorous but healthier natural competitors, reproduce, then die out in vast quantities. Within a few generations, or a few years, the population would be extinct.

That this is ecosystem damage is evident, but equally evident is the fact that a disappearance of fish is neither concrete nor quantifiable. The fish may simply be elsewhere. Therefore it is very likely that in litigation following such a scenario, a causal link would not be found, and liability could not be established.

## II. Trojan Laws

Extinction of species, as a fundamental threat to ecosystems, with a potential accumulative negative effect on the viability of the planet, is a cost that cannot be externalised. Therefore it may be considered one of the most pressing of environmental risks that requires precautionary policy decisions.

Action to prevent the possibility of the spread of Trojan Gene fish might still be available under 2004/35. As with remedies for environmental damage, prevention of damage is implemented according to the Polluter Pays Principle. Preventative measures may be taken by the potential polluter, or by the affected Member State with subsequent recovery of the costs incurred. Such measures could include injunction to suspend or cease certain potentially polluting activities. As with remedies for damage already caused, the potential liability for threat of damage is split in two, with strict liability for the activities listed under Annex III, and fault liability for other activities. Such action would only be available if the test for proximity were satisfied, though who is not proximate in the case of species extinction?

The Directive however acknowledges the impossibility of liability in cases where pollution of such a nature has already occurred; it is

not a suitable instrument for dealing with pollution of a wide-spread, diffuse character, where it is impossible to link the negative environmental effects with acts or failure to act of certain individual actors (Preamble (13)).

It is my contention that the unsuitability of liability mechanisms as a substantive feature of environmental law is clear. Negligence is an outmoded concept that is effective in traditional cases of measurable damage, but has a limited utility that courts have long recognised. In the *Caparo* case, Lord Oliver alluded to the need for the tort of negligence to be redefined to allow a more sophisticated consideration of the limits of responsibility and liability. The tort originated with *Donoghue v Stevenson* (1932), a case where physical damage, via a contaminated ginger beer bottle, occurred to the claimant due to the negligent act of the defendant. The application of the tort developed through cases of increasing subtlety, and in *Caparo* it was being considered for a case of pure economic loss, due to the publication of incorrect company accounts. Although Lord Oliver is speaking about cases of economic loss, the fact that environmental legislation is looking to the principles of negligence, renders his speech pertinent:

The opportunities for the infliction of pecuniary loss from the imperfect performance of everyday tasks upon the proper performance of which people rely for regulating their affairs are illimitable and the effects are far reaching. A defective bottle of



ginger beer may injure a single consumer but the damage stops there (632).

Acknowledging the futility of trying to manage species extinction on ginger beer bottle legislation is one thing, but the danger is that the lack of a clear principle to guide legislation for unmeasurable environmental risks will be rendered normal through an acceptance of the state of affairs. With legislation such as 2004/35, it could be argued that Trojan Laws are being created; ones that implicitly or explicitly acknowledge that they do not legislate for the most serious of risks, so that with time, the lack of legislation, the deadly gap in the Act, becomes a social and legal norm and no-one need feel that it requires remedying.

It appears that policy makers are suffering from an inability to act upon the inability to legislate adequately, which may be due to several factors. Firstly there is the variation in the value judgements that we hold about nature, society and the interplay between them. A member of an environmental NGO for example, would probably feel that nature was fragile and that society was robust, and could therefore bear the cost of increased precaution. Policy makers on the other hand, may be more inclined to think the exact opposite.

Secondly there is variation in our perceptions of what constitutes acceptable risk. There may be natural and wholly rational scepticism of scientific estimates of risk (along with totally irrational scepticism) as the estimate may conceal other interpretations, vested interest or incomplete analysis. Also as Scott Veitch has pointed out, citing the observations of Ulrich Beck, risks are open to social definition which may influence perceptions. Veitch cites Jonathan Schell's observation that the discussions about the use of nuclear weapons were conducted with "insane calmness" as if anxiety or fear were *infra dig* (Veitch 2007 at 124). It would appear that the greater the risk, the greater the calmness and the lesser the legislation. An individual will be prosecuted if their dog fouls the pavement, but corporations, or legal individuals, can destroy whole ecosystems without being called to account.

Thirdly, there is also a possibility that tolerance of risk varies according to exposure to previous like risk. The EC was strongly precautionary towards the import of US hormone-added beef in the WTO *Beef Hormones* case and banned its import as there was scientific uncertainty about risks to human health. The continuation of the ban, in the face of

an appeal to the WTO by the USA and Canada, was no doubt due to the material facts of the case, but possibly also because the EC had very recently encountered a similar risk with BSE in British beef.<sup>1</sup> No significant aquaculture disaster has happened yet. We don't know if the seas are boiling with healthy fish or completely depleted, because we can't *see*. This 'out of sight out of mind' mentality is perhaps the reason that both conventional aquaculture and fisheries legislation have been so patchy and reactive. For policy makers who do not live in fishing communities, fishing may conjure up sentimental sepia-tinted images of oilskin-clad men on Fleetwood trawlers, and not, as the writer Mark Kurlansky observed, the reality of the modern factory processing ships "pulling trawls with openings large enough to swallow jumbo jets" (Kurlansky 1997 at 140).

Finally, another possible reason for the eerie calm of the Trojan Law is that it must be someone else's responsibility. Veitch postulates that legal institutions are capable of not only failing to legislate against irresponsible behaviours but actually to promote and organise them. In certain cases, human suffering and environmental disaster can become legitimated by the acceptance of them as norms. He cites Stanley Milgram's descriptions of the "fragmentation of the total human act" allowing harm to happen in a systematic discrete manner where no one person is responsible (Veitch 2007 at 45).

We can all find examples of this from history. Perhaps this fragmentation can be found to explain in part the creation of laws like 2004/35 which toss the hot potato of risk responsibility on to the next legislation. As long as it can keep being someone else's responsibility, then we don't have to worry about it.

## Conclusion

The initial aim of my PhD research was to investigate the legislation for GM aquaculture from the perspective of precaution and responsibility, but at present the direction seems to be widening to consider the state of the field of Biotechnological Law in general; it does not appear to be a field that is burdened with regulation, which seems to reinforce the postulation that lawmakers are failing to legislate adequately for the new risks.

<sup>1</sup> See the discussion of *United Kingdom of Great Britain and Northern Ireland v Commission of the European Communities* above at p.72.

It is of particular interest to consider in what way legal thinking needs to evolve in response. This will probably involve an in-depth investigation of the application of the Precautionary Principle in case law to date, and investigation of legal commentary on the relationship between law and risk. This paper looks at the exemplar of EC Directive 2004/35, but there is perhaps also a need to consider the relationships between various pre-existing national legislation of EC Member States and 2004/35, and between the EC and other countries, for example the US, the biotechnological legislation of which consists of pre-existing legislation, interpreted in the light of new risks.

## Legislation

Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:143:0056:0075:EN:PDF>

Rio Declaration on Environment and Development 1992

<http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>

Treaty Establishing the European Community

<http://europa.eu/abc/treaties/archives/en/entoc053.htm>

## Cases

'Beef Hormones case': WTO Case DS26: *European Communities-Measures Concerning Meat And Meat Products(Hormones)*

[http://www.wto.org/english/tratop\\_E/dispu\\_e/cases\\_e/ds26\\_e.htm](http://www.wto.org/english/tratop_E/dispu_e/cases_e/ds26_e.htm)

*Caparo Industries plc v Dickman* [1990] 2 AC 605

*Donoghue v Stevenson* [1932] AC 562

*United Kingdom of Great Britain and Northern Ireland v Commission of the European Communities* Case C-180/96

[http://eur-lex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!CELEXnumdoc&numdoc=6199600180&lg=en](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!CELEXnumdoc&numdoc=6199600180&lg=en)

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