An Agricultural Law Research Article

Waiting for the River: The United State and European Union, Heads Up and High Stakes in the WTO –Genetically Modified Organisms in International Trade

by

Starla L. Borg

Originally published in WASHBURN LAW JOURNAL
43 WASHBURN L. J. 681 (2004)

Waiting for the River: The United States and European Union, Heads Up and High Stakes in the WTO—Genetically Modified Organisms in International Trade

Starla L. Borg*

Poker is the game closest to the western conception of life, where life and thought are recognized as intimately combined, where free will prevails over philosophies of fate or of chance, where men are considered moral agents and where–at least in the short run–the important thing is not what happens but what people think happens.[1]

I. INTRODUCTION

The World Trade Organization (WTO) runs the poker room where the final table has come down to a heads-up battle between the United States (U.S.) and European Union (EU). Each knows the two down cards it has in the hole, the flop and turn have been revealed, and everyone eagerly awaits the river. The game sounds familiar because it is. Just like the American version of no-limit Texas Hold'em played at the highest level during the World Series of Poker,[2] the U.S. and EU are engaging in a tactical battle over the import of genetically engineered crops in the WTO. As with any game of chance, luck and skill combine, allowing one's opponents and spectators to form a perception. The ultimate question is whether the perception is reality or just a good bluff.

This paper addresses the U.S./EU conflict concerning genetically modified (GM) crops under the WTO agreements. I will propose that the EU presumably holds the losing poker hand, a hopeful flush draw against the U.S.'s triple queens with a potential full house, depending on the river. The river, in WTO terms, is the outcome of the dispute settlement panel addressing the U.S. challenge to the EU's import ban on genetically engineered crops.[3] At this stage, it appears that the EU is in violation of the WTO agreements because its import regulations

* B.S. 2001, Kansas State University; J.D. Candidate 2004, Washburn University School of Law. I would like to thank Professor Myrl Duncan and the *Washburn Law Journal* editors for their patience and support. I also wish to thank my parents for teaching me things I could never learn from a textbook.

1. John Luckacs, *Poker and the American Character* (1963), *at* http://www.great-poker.com/poker-quotes-18.html (last visited Apr. 16, 2004).

2. JAMES MCMANUS, POSITIVELY FIFTH STREET: MURDERERS, CHEETAHS, AND BINION'S WORLD SERIES OF POKER 61 (2003).

3. WTO, *European Communities—Measures Affecting the Approval and Marketing of Biotech Products, Request for the Establishment of a Panel by the United States*, WT/DS291/23 (Aug. 8, 2003), *at* http://docsonline.wto.org [hereinafter WTO, *European Measures*].

are trade-discriminatory and unduly restrictive. Because the EU chose to play, if it loses the hand it should have to pay.

However, in Hold'em, a player that folds his or her cards before the flop is not obligated to any further pot commitments. Similarly, a country that itself does not raise genetically modified crops should be able to substantiate an import restriction under the WTO. Because that country is not trying to play the same cards as the EU, thus avoiding the heads-up confrontation overall, it should not have to pay.

To discuss the confrontation adequately, this paper addresses recent concerns confronting genetically modified agricultural products, specifically in the environmental arena. In Hold'em, a player is not always dealt a strong hand, and unsuited cards of low numerical value may be weak, depending on the community cards.[4] Similarly, the WTO agreements furnish little environmental protection; however, the language of the agreements grants such an allowance when justified. Depending on the community cards, akin to international agreements the WTO recognizes, precaution may be a measure available to a country wishing to restrict GM imports under international law.

Overall, I aim to demonstrate that the EU cannot commit to the pot, bluff, and then ask to get its bet back. Another country not raising genetically engineered crops that folds before the flop may have a justifiable environmentally based GM concern that should be recognized and respected in the international trading arena.

II. THE CONFRONTATION: HIGH STAKES AND HEADS UP

Cards are war, in disguise of a sport.[5]

No-limit Hold'em is a version of poker where up to ten players at a table each receive two face-down, or hole, cards.[6] Next, three community cards are dealt facedown. This is known as the flop. The flop is followed by the fourth and fifth community cards, the turn and river.[7] Community cards are available for use by all players in forming their ultimate five-card hand.[8] Players bet on their down cards, and then the flop is revealed followed by another round of betting.[9] This continues for the turn and river if players stay in the game.[10] Although a showdown on the river is somewhat rare, if it occurs the

4. Community cards consist of the flop, turn, and river; these are available for all players to use in formulating a five-card hand. MCMANUS, *supra* note 2, at 59-60.

5. Charles Lamb, *Essays of Elia* (1832), *at* http://www.great-poker.com/poker-quotes-20.html (last visited Apr. 16, 2004).

6. MCMANUS, *supra* note 2, at 60.

7. *Id.*

8. *Id.* at 61.

9. *Id.* at 60.

10. *Id.*

best five-card hand wins.[11] Position at the table can be crucial.[12] The last person to bet gets to witness the preceding wagers and then decide whether his or her down cards are worth the commitment of a bet.[13] Ultimately, a player seeks to reap a financial harvest by overcoming his opponents. In the WTO, the game has reached the decisive showdown on the river.[14] The two players involved, the U.S. and EU, are experienced players who know how to play position and wager on strong hands.

To fully explain the dynamics of no-limit Hold'em within the WTO context, an introduction of the conflict over GM imports will precede the mechanics of the game itself. The U.S./EU conflict is analogous to the stakes of the game—whether the EU will be mandated to import GM products from the U.S. or face economic sanctions under the WTO.

On August 7, 2003, the United States, along with Canada and Argentina, requested a dispute settlement panel under the WTO to challenge the EU's alleged illegal, five-year moratorium banning the approval of any new agricultural biotechnology products.[15] The U.S., supported by Argentina, Canada, and Egypt, initially requested formal WTO consultations on May 13, 2003, three months earlier.[16] Consultations held on June 19, 2003, failed to resolve the dispute.[17]

A. *The U.S./EU Conflict: A Briefing on the EU Moratorium*

In October 1998, the European Communities (EC) declared a moratorium on the approval of agricultural biotech products.[18] This moratorium "suspend[s] consideration of applications for, or granting of, approval of biotech products under the [European Communities'] approval system."[19] In effect, this moratorium excludes U.S. agricultural exports from EU markets.[20] However, this moratorium does not affect previously approved genetically modified products "which are

11. *Id.*
12. *Id.* at 60-61.
13. *Id.*
14. *See id.*; Press Release, U.S. Embassy, Vienna, Austria, United States Requests Dispute Panel in WTO Challenge to EU Biotech Moratorium, *at* http://www.usembassy.at/en/embassy/press_wto.htm (Aug. 11, 2003).
15. U.S. Embassy, Vienna, Austria, *supra* note 14.
16. Press Release, USDA, U.S. and Cooperating Countries File WTO Case Against EU Moratorium and Biotech Foods and Crops, No. 0156.03, *at* http://www.usda.gov/news/releases/2003/05/0156.htm (May 13, 2003). Parties supporting the consultation request indicating intent to join as third parties included: Australia, Chile, Columbia, El Salvador, Honduras, Mexico, New Zealand, Peru, and Uruguay. *Id.*
17. WTO, *European Measures*, *supra* note 3, at 2.
18. *Id.*
19. *Id.* Previously approved products "are still used and are available in member countries." USDA, *supra* note 16. Because the EU froze its approval process, "[n]o biotech product has ever been rejected for approval in the EU." *Id.*
20. WTO, *European Measures*, *supra* note 3, at 1.

still used and are available in EU member countries."[21] Prior to 1999, nine agricultural biotech products were approved by the EU for planting or import.[22] It should be noted that within the EU, six member states have banned genetically modified crops approved and raised by other EU member states.[23] The six include: Austria, France, Germany, Italy, Greece, and Luxemburg.[24]

The WTO challenge initiated by the U.S. includes member state bans and the broader EU moratorium.[25] The U.S. alleges the EU and its member states' actions are in violation of the General Agreement on Tariffs and Trade 1994 (GATT 1994), the Agreement on Sanitary and Phytosanitary Measures (SPS Agreement), the Agreement on Technical Barriers to Trade (TBT Agreement), and the Agreement on Agriculture (AA).[26]

B. *The U.S./EU Conflict: The Problem Within the WTO*

The magnitude of the problem within the WTO is analogous to the World Series of Poker but may require raising the stakes of the game to an unknown level. In poker, the showdown of each player's five-card hand will result in a clear winner, or a rare tie, based upon the hierarchy of hands.[27] In the WTO, seeking dispute resolution over genetically modified foods should also result in a clear winner or a tie. However, dispute resolution may be problematic because specific WTO rules for genetically engineered products do not exist.[28] This situation would be comparable to adding a new card to the once familiar fifty-two card version of the deck. Conversely, it is arguable this showdown is like a hypothetical "Super" World Series of Poker where stakes that have not yet been created may affect the individual player or all players in a way never known before. Nevertheless, both players are waiting for the river—the outcome of the dispute resolution panel. And as in Hold'em, this is an unknown.

To date, "no mandatory labelling scheme has been formally challenged at the WTO, let alone one related to GMOs."[29] Opinions con-

21. Office of the United States Trade Representative, *Press Release: U.S. Request for a WTO Dispute Panel Regarding the EU Biotech Moratorium*, ECON. PERSP., Sept. 2003, at 32, *at* http://usinfo.state.gov/journals/ites/0903/ijee/toc.htm [hereinafter *U.S. Request*].

22. USDA, *supra* note 16. Novartis' Bt corn, genetically modified to exhibit resistance to the corn borer, was one variety approved by the EU. CHARLES E. HANRAHAN, CONG. RESEARCH SERV., U.S. EUROPEAN AGRICULTURAL TRADE: FOOD SAFETY AND BIOTECHNOLOGY ISSUES, No. 98-861, at 4 (2001).

23. *U.S. Request, supra* note 21, at 33.

24. *Id.*

25. *Id.*

26. WTO, *European Measures*, *supra* note 3, at 2.

27. MCMANUS, *supra* note 2, at 59-60.

28. HANRAHAN, *supra* note 22, at 2.

29. HEIKE BAUMÜLLER, TRADE KNOWLEDGE NETWORK, DOMESTIC IMPORT REGULATIONS FOR GENETICALLY MODIFIED ORGANISMS AND THEIR COMPATIBILITY WITH WTO RULES 4, http://www.tradeknowledgenetwork.net/pdf/tkn_domestic_regs_sum.pdf (Jan. 2003).

flict concerning whether "sui generis rules and disciplines for bioengineered products in international trade [are needed] versus other approaches such as interpreting or clarifying existing agreements to take them into account."[30] If interpreted to fit within the WTO scheme, food safety and pest damage concerns leading to biotech product restrictions could be addressed by the SPS Agreement.[31] The basis for these measures should be either international standards or risk assessments.[32] The TBT Agreement, containing technical regulations and standards, could potentially address labeling issues.[33]

III. HOUSE RULES

A poker room can only be as good as the person in charge.[34]

As the game of poker evolved over time, from the Chinese invention of playing cards that spread along trade routes to the modern game of no-limit Hold'em, rules necessarily followed.[35] Although some may not be familiar with the rules of the game, their international significance is undisputed.[36] By contrast, and as with international law, more specifically the WTO, not all countries have voluntarily committed to certain agreements. Nonetheless, for those that are a part of the WTO, the international players must know the rules to play the game.

A. *Background*

The General Agreement on Tariffs and Trade (GATT), established in 1947, administered free trade from a global perspective.[37] In 1994, the Uruguay Round of GATT talks created the WTO.[38] The

30. HANRAHAN, *supra* note 22, at 2 n.2.

31. *Id.*; BAUMÜLLER, *supra* note 29, at 4.

32. BAUMÜLLER, *supra* note 29, at 4. Suits under the SPS Agreement, however, are not new. In fact, in 1996-97 the United States successfully challenged the EU's ban on hormone-treated meat in a WTO dispute settlement under the SPS Agreement. HANRAHAN, *supra* note 22, at 2.

33. BAUMÜLLER, *supra* note 29, at 4; HANRAHAN, *supra* note 22, at 2 n.2.

34. Jan Fisher, *Interview with Jim Albrecht*, *at* http://www.pokerpages.com/articles/interviews/jim-albrecht.htm (last visited Apr. 16, 2004).

35. *See* MCMANUS, *supra* note 2, at 154-62.

36. *Id.* at 161.

37. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, T.I.A.S. 1700, 55 U.N.T.S. 194 [hereinafter GATT 1947]. GATT was then modified, supplemented, and adopted into the WTO charter as Annex 1A. Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, Apr. 15, 1994, 33 I.L.M. 1125 [hereinafter Final Act]. GATT, "a multilateral international trading system," dealt exclusively with goods and was administered as an ad hoc authority, thus lacking an adequate legal foundation to cover emerging trade issues. *The GATT Legacy*, AGJOURNAL (Sept. 11, 2003), *at* http://www.agjournal.com/story.cfm?story_id=236.

38. Final Act, *supra* note 37, at art. 1. The agreement establishing the WTO is a "single institutional framework encompassing the GATT, as modified by the Uruguay Round, all agreements and arrangements concluded under its auspices and the complete results of the Uruguay Round." WTO, *Legal Texts: The WTO Agreements*, *at* http://www.wto.org/english/docs_e/le-

WTO incorporated both the original GATT agreement and its newly expanded scope, thus governing international trade of goods, services, and intellectual property.[39]

In essence, the WTO agreements are contracts governing countries' behavior in international commerce.[40] The WTO guarantees certain trade rights while binding governments to implement trade policies in compliance with established limits for the theoretical benefit to all participants.[41]

The Agreement Establishing the WTO states that goals of free trade efforts include,

> raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development.[42]

The WTO demands "nondiscrimination among products on the basis of their national origin," aiming to "advance global prosperity through the elimination of barriers to international free trade."[43]

B. *The Dispute Settlement Procedure*

The dispute settlement procedure has evolved with the development of GATT and the WTO, and today decisions can be issued without the consent of the parties involved in the dispute.[44] The Uruguay

---

gal_e/ursum_e.htm (Sept. 11, 2003); *see also* Final Act, *supra* note 37, at art. 2. The WTO is led by a Ministerial Conference, which consists of representatives of all members, that meets at least once every two years. *Id.* at art. 4, para. 1. A General Council, also consisting of representatives of all members, "shall meet as appropriate." *Id.* at art. 4, para. 2. This Council acts on a regular basis and oversees general operation as well as Ministerial decisions. WTO, *Legal Texts: The WTO Agreements*, *supra*. The General Council convenes as a Dispute Settlement Body and a Trade Policy Review Body. Final Act, *supra* note 37, at art. 4, paras. 3-4. Subsidiary bodies have also been established to assist with the broad range of WTO trade issues. WTO, *Legal Texts: The WTO Agreements*, *supra*.

39. *The GATT Legacy*, *supra* note 37. Within the WTO, GATT 1947 is legally distinct from GATT 1994. *See* Final Act, *supra* note 37, at art. 2, para. 4.

40. *The GATT Legacy*, *supra* note 37.

41. *Id.* Members are required to import a certain percentage of foreign goods with market globalization as the goal. *See* Lakshman Guruswamy, *The Promise of the United Nations Convention on the Law of the Sea (UNCLOS): Justice in Trade and Environment Disputes*, 25 ECOLOGY L.Q. 189, 195 (1998). Globalization refers to the free flow of goods, ideas, and services, disregarding geographical boundaries. *See* Jost Delbruck, *Globalization of Law, Politics, and Markets—Implications for Domestic Law—A European Perspective*, 1 IND. J. GLOBAL LEGAL STUD. 9, 10-11 (1993). This system is premised on the concept of comparative advantage—some areas are better suited to produce certain goods than others. *See* Guruswamy, *supra*, at 195. Free trade theoretically allows low-cost consumer access to a broad range of goods obtained from either the best producer of each individual good, or the country with the resources to exploit. *Id.*

42. Final Act, *supra* note 37.

43. Guruswamy, *supra* note 41, at 191, 195.

44. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.

Round Understanding on Rules and Procedures Governing the Settlement of Disputes (DSU) establishes an integrated system that permits member claims based on the agreements that establish the WTO.[45] A Dispute Settlement Body (DSB) is vested with authority over the covered agreements[46] and consists of all member governments.[47] In these proceedings, the agreements "shall be interpreted . . . in the light of [the WTO's] object and purpose," and its "context . . . including its preamble."[48] Members must use dispute settlement procedures.[49]

First, a member government must initiate a dispute settlement proceeding.[50] Then, the challenged member enters into mandatory consultations "within 30 days of a request . . . from another [m]ember."[51] If a settlement is not reached within sixty days, a panel may be requested.[52]

A panel usually consists of three members from countries not included in the dispute.[53] Normally, dispute resolution is completed within six months.[54] The DSB adopts reports within sixty days of being issued unless the DSB consensus is against such action or one

---

45. *Id.*

46. *Id.*

47. WTO, *Dispute Settlement*, *at* http://www.wto.org/english/tratop_e/dispu_e/dispu_e.htm (Sept. 11, 2003).

48. Vienna Convention on the Law of Treaties, art. 31, May 23, 1969, 1155 U.N.T.S. 331 (1969) [hereinafter Vienna Convention]. In a 1998 Appellate Body ruling, the WTO preamble and international law aided in a decision addressing a conflict between free trade and environmental goals. Robert Howse, *Democracy, Science, and Free Trade: Risk Regulation on Trial at the World Trade Organization*, 98 MICH. L. REV. 2329, 2339 (2000) (citing WTO Appellate Body Report, United States: Import Prohibition of Certain Shrimp and Shrimp Products, WTO Doc. WT/DS58/AB/R (Oct. 12, 1998) [hereinafter Shrimp Products]). "This kind of interpretation tends to integrate the GATT treaties into a dynamic system of international law as a whole." *Id.*

49. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38. Currently, 301 disputes have arisen since the WTO's creation in 1994. Press Release, WTO, WTO Disputes Overtake 300 Mark (Sept. 11, 2003), *at* http://www.wto.org/english/news_e/pres03_e/pr353_e.htm.comparatively, GATT, the WTO's predecessor with an approximate fifty-year existence, dealt with roughly the same number of disputes. *Id.* WTO Director General Dr. Supachai Panitchpakdi claims this is due to member confidence in the dispute settlement mechanism and the extensiveness of WTO agreements (GATT is only one of the sixteen covered agreements). *Id.* Developing countries have brought the majority of WTO complaints, increasing from forty percent in 1995 to sixty percent since 2000. *Id.* Dr. Panitchpakdi states,

> A few headline-grabbing disputes belie the fact that a large number of cases brought to the WTO are settled without litigation. However, where litigation is necessary, the WTO offers an efficient, impartial, and highly credible system within which [m]embers can present their arguments and receive rulings to help them to resolve their differences.

Id. The dispute settlement system entices countries to follow WTO rules and "look to the WTO for multilateral solutions when problems arise." *Id.*

50. WTO, WTO Disputes Overtake 300 Mark, *supra* note 49.

51. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.

52. *Id.* Alternative methods of dispute resolution, such as mediation and arbitration, are permitted should the parties voluntarily agree. *Id.*

53. *Id.*

54. *Id.* The DSB may consider whether to adopt these reports "20 days after they are issued to [m]embers." *Id.*

party provides notice of intent to appeal.[55] Of the 301 WTO disputes to date, about one-third have advanced to the panel stage.[56]

The DSU now embraces the concept of appellate review.[57] Upon appeal, a seven-member Appellate Body will be formed, with three members serving on a case.[58] Either party may appeal a panel report.[59] Unless consensually decided otherwise, the DSB adopts the appellate report, and it is accepted by disputing parties thirty days after it is issued to members.[60]

Once adopted, the losing party must implement the adopted recommendations.[61] If immediate compliance is impracticable, a reasonable period of time is allowed.[62] The DSB supervises implementation until resolved.[63]

The WTO process differs from the earlier GATT process. GATT's dispute settlement procedure did not contain fixed time frames, losing parties could block the adoption of rulings, no Appellate Body existed, and many cases were inconclusive.[64] By contrast, WTO panel and Appellate Body access is automatic, rulings are adopted unless rejected by a consensus, arbitration is binding, and there is strict oversight of adverse ruling implementations.[65]

C. *The Specific WTO Agreements at Issue*

The U.S. has alleged that EU measures are inconsistent with the Sanitary and Phytosanitary Measures Agreement (SPS Agreement), GATT 1994, the Agreement on Agriculture (AA), and the Technical Barriers to Trade Agreement (TBT Agreement).[66] This paper will specifically address the SPS and TBT Agreements in the context of the current conflict.

---

55. *Id.*

56. WTO, WTO Disputes Overtake 300 Mark, *supra* note 49.

57. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.

58. *Id.* Appellate Body Members have four-year terms and must have "recognized standing in the field of law and international trade" and not be "affiliated with any government." WTO, *Dispute Settlement*, *supra* note 47. Issues of law addressed in the panel report and the panel's legal interpretations limit the issues that may be raised on appeal. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.

59. WTO, WTO Disputes Overtake 300 Mark, *supra* note 49. These proceedings must occur within sixty days of formal notice of appeal. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.

60. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38. The Appellate Body has reviewed "seven of every ten panel reports to date." WTO, WTO Disputes Overtake 300 Mark, *supra* note 49.

61. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.

62. *Id.* This period is decided by the parties with DSB approval or through arbitration. *Id.*

63. *Id.*

64. WTO, WTO Disputes Overtake 300 Mark, *supra* note 49.

65. *Id.*

66. WTO, *European Measures*, *supra* note 3.

1. The SPS Agreement

The SPS Agreement addresses "food safety and animal and plant health regulations."[67] While recognizing that governments may take SPS measures necessary to protect "human, animal or plant life or health," the measures cannot be applied to "arbitrarily or unjustifiably discriminate between [m]embers where identical or similar conditions prevail" or constitute "a disguised restriction on international trade."[68] The Agreement requires SPS measures "based on scientific principles," and measures are "not maintained without sufficient scientific evidence."[69] Conformity with international standards fulfills this obligation under the SPS Agreement, which notes that bilateral agreements or protocols often serve as the basis for SPS measures.[70] Higher standards may be maintained if a scientific justification or risk assessment exists.[71]

Article 5 of the SPS Agreement explains that such scientific justification exists if measures are based on risk assessments that "take into account available scientific evidence" as well as "ecological and environmental conditions."[72] A risk assessment is

> [t]he evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing [m]ember according to the sanitary or phytosanitary measures which might be applied, and of the associated potential biological and economic consequences; or the evaluation of the potential for adverse effects on human or animal health arising from the presence of additives, contaminants, toxins or disease-causing organisms in food, beverages, or feedstuffs.[73]

In a suit under the SPS Agreement in which the U.S. challenged the EU's ban on hormone-treated meat, the Appellate Body interpreted the language of Article 5.1 to imply that a measure could be based on a risk assessment even if scientific opinions differ.[74] The assessment is not required to embody the majority view.[75] Further, a divergent scientific view "may indicate a roughly equal balance of scientific opinion, which may itself be a form of scientific uncertainty."[76] The Appellate Body's analysis stated,

---

67. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.
68. Final Act, *supra* note 37, at Annex 1A, Multilateral Agreements on Trade in Goods: Agreement on the Application of Sanitary and Phytosanitary Measures, art. 2, paras. 1-3 [hereinafter SPS Agreement].
69. *Id.* at art. 2, para. 2.
70. *Id.* at art. 3, paras. 2-3.
71. *Id.*; WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.
72. SPS Agreement, *supra* note 68, at art. 5, para. 2.
73. *Id.* at Annex A, para. 4.
74. WTO Appellate Body Report, EC Measures Concerning Meat and Meat Products, WTO Doc. WT/DS26/AB/R & WT/DS48/AB/R (Jan. 16, 1998) at para. 194 [hereinafter Hormones].
75. *Id.*
76. *Id.*

> In most cases, responsible and representative governments tend to base their legislative and administrative measures on "mainstream" scientific opinion. In other cases, equally responsible and representative governments may act in good faith on the basis of what, at a given time, may be a divergent opinion coming from qualified and respected sources. By itself, this does not necessarily signal the absence of a reasonable relationship between the SPS measure and the risk assessment, especially where the risk involved is life-threatening in character and is perceived to constitute a clear and imminent threat to public health and safety. Determination of the presence or absence of that relationship can only be done on a case-to-case basis, after account is taken of all considerations rationally bearing upon the issue of potential adverse health effects.[77]

The Appellate Body further explained that factors considered in a risk assessment include

> not only risk ascertainable in a science laboratory operating under strictly controlled conditions, but also risk in human societies as they actually exist, in other words, the actual potential for adverse effects on human health in the real world where people live and work and die.[78]

In the Hormone case, however, the EC failed to offer a risk assessment that dealt with hormone use that was "based on scientific evidence nor on an assessment of the risk to health from meat treated with hormones."[79]

In another risk assessment case under the WTO, Canada challenged an Australia import ban on fresh uncooked salmon under the SPS Agreement.[80] Australia identified specific diseases and their likelihood of occurrence in its risk assessment, concluding that no alternative means existed to either prevent the risk of disease entry or reduce it to an acceptable level.[81] Australia claimed potential social and economic consequences justified its ban.[82] The Appellate Body held that this report did not constitute a risk assessment under the SPS Agreement because of its limited evaluation of the likelihood of disease entry and risks compared to alternative measures.[83] Finding that the scientific evidence was inadequate after consulting experts, the ruling

77. *Id.*

78. *Id.* at para. 187.

79. HANRAHAN, *supra* note 22, at 2-3. The EU was given the option to conduct a risk assessment and was directed to comply with SPS rules within fifteen months. *Id.* at 3. On the compliance deadline, the EU stated its ban would continue, offering alleged evidence that one hormone was carcinogenic as its justification. *Id.* The evidence was rejected by U.S. trade and veterinary officials. *Id.* Various scientific studies, "including some by European scientists . . . show 'absolutely no human risks associated with consumption of beef from animals treated with growth-promoting hormones.'" *Id.* The WTO approved retaliatory tariffs on "$116.8 million of EU agricultural imports." *Id.*

80. WTO Appellate Body Report, Australia: Measures Affecting Importation of Salmon, WTO Doc. WT/DS18/AB/R (Oct. 20, 1998) [hereinafter Salmon].

81. *Id.*

82. *Id.*

83. *Id.*

did not provide any explanation of how much weight would be given to such information, nor how to use it in risk assessments.[84]

In 1999, the U.S. challenged a Japanese plant import requirement under the SPS Agreement.[85] Japan required evidence of the effectiveness of quarantine measures before imports were allowed.[86] The Appellate Body ruled that a "causal link" goes to the weight of scientific evidence and such a link demonstrates the existence of a rational basis for the SPS measure.[87] Further, the Appellate Body declared that sufficient scientific evidence is not a de minimus requirement.[88]

This case suggests Japan could have supplied or pursued better evidence.[89] Thus, sufficient scientific evidence refers "to the extent of the obligation of a [m]ember to engage in scientific investigation within the process of rational democratic deliberation" rather than a quantum of scientific proof.[90]

The SPS Agreement, along with risk assessment criteria and procedures, addresses the appropriateness of protection levels.[91] As discussed above, members may implement SPS measures providing greater protection than international standards if a scientific justification or risk assessment exists.[92] When doing so, measures should account for minimizing trade effects, and members "shall avoid arbitrary or unjustifiable distinctions in the levels it considers to be appropriate in different situations, if such distinctions result in discrimination or disguised restriction on international trade."[93] Members individually determine the appropriate level of protection.[94]

In the Hormone case, the EC banned certain injected hormones while foodstuffs containing comparable or significantly higher levels of natural hormones were left unregulated.[95] The Appellate Body ruled that the EC's distinction was not arbitrary or unjustifiable.[96] It stated,

---

84. *Id.* At issue was whether probability assessments were required for each disease or how to quantify probabilities. *Id.*

85. WTO Appellate Body Report, Japan: Measures Affecting Agricultural Products, WTO Doc. WT/DS76/AB/R (Feb. 22, 1999) [hereinafter Japan].

86. *Id.*

87. *Id.* at paras. 83-84.

88. *Id.* at para. 84. Although Japan tried to defend its regulation as a "provisional measure," permitted without sufficient scientific evidence by Article 5.7, it failed. *Id.* at paras. 86-94. Provisional measures require that further efforts are made to obtain information and measures are reviewed within a reasonable time. *Id.* at para. 86.

89. *See* Howse, *supra* note 48, at 2349.

90. *Id.*

91. SPS Agreement, *supra* note 68, at art. 5; WTO, *Legal Texts: The WTO Agreements*, *supra* note 38.

92. SPS Agreement, *supra* note 68, at art. 3, para. 3.

93. *Id.* at art. 5, para. 5.

94. *Id.* at art. 5.

95. Hormones, *supra* note 74.

96. *Id.*

> To the contrary, we consider there is a fundamental distinction between added hormones (natural or synthetic) and naturally-occurring hormones in meat and other foods. In respect of the latter, the European Communities simply takes no regulatory action; to require it to prohibit totally the production and consumption of such foods or to limit the residues of naturally-occurring hormones in food, entails such a comprehensive and massive governmental intervention in nature and in the ordinary lives of people as to reduce the comparison itself to an absurdity.[97]

In the Salmon case, it was found that the basis of Australia's regulation was an arbitrary and unjustified level of protection.[98] The result was a "disguised restriction on trade" or "discrimination."[99] In that case, Australia only conducted risk assessments on certain breeds of fish.[100] When a government fails to conduct assessments of comparable risks, it fails to aid its citizens' understanding of the costs to achieve a certain level of protection.[101] Government selectivity in risk regulation can reinforce societal views regarding the existence and magnitude of risks.[102] Australia claimed that a government may not simultaneously be able to assess all risks due to a lack of resources.[103] However, in that situation, a government may have to explain its choice to study one type of risk when the evidence establishes greater risk from another source.[104]

SPS measures must implement the least trade-restrictive method available to obtain the proper level of protection.[105] Technical and economic feasibility are taken into account.[106] A measure constitutes an undue trade restriction when another reasonably available method results in the appropriate level of protection and is "significantly less restrictive to trade."[107] Thus, members may have to establish that less restrictive or less costly alternatives are unavailable.[108] Accordingly,

---

97. *Id.* at para. 221 (footnote omitted). Human agency is suggested as a basis for greater concern and differential treatment. Howse, *supra* note 48, at 2349-51.

98. Salmon, *supra* note 80.

99. *Id.*

100. *Id.*

101. Howse, *supra* note 48, at 2353.

102. W. Kip Viscusi, *The Dangers of Unbounded Commitments to Regulate Risk*, *in* RISKS, COSTS, AND LIVES SAVED: GETTING BETTER RESULTS FROM REGULATION 135, 139 (Robert W. Hahn ed., 1996); *see also* Jeremy D. Fraiberg & Michael J. Trebilcock, *Risk Regulation: Technocratic and Democratic Tools for Regulatory Reform*, 43 MCGILL L.J. 835, 873-75 (1998).

103. Salmon, *supra* note 80.

104. Howse, *supra* note 48, at 2353.

105. SPS Agreement, *supra* note 68, at art. 5, para. 6.

106. *Id.*

107. *Id.* at art. 5, para. 6 n.3.

108. As an example,

> [I]t would seem that if the United States were to set a policy of zero risk from pesticide Z on apples, it would be entitled to ban the import of apples containing only trace residues of pesticide Z. It is difficult to conceive of a less-restrictive alternative measure that could fully and precisely achieve that objective.
>
> If the U.S. purpose were to eliminate risk from pesticide Z only, a crude ban on all pesticide residues of any kind on apples would seem inconsistent with the least trade-restrictive requirement. For example, if there were a technically feasible, fully reliable,

GATT Article XX(b) allows inconsistent measures if "necessary" to achieve SPS protection.[109]

Under the SPS Agreement, when an international standard is nonexistent or an SPS measure "is not substantially the same as the content of an international standard" and such measure may significantly affect the trade of other members, a notification procedure must take place.[110] A member must take SPS measures "without undue delay and in no less favorable manner for imported products than for like domestic products."[111] Further, "any requirements for control, inspection and approval of individual specimens of a product are limited to what is reasonable and necessary."[112] Thus, the Agreement encourages SPS measures based on international standards and recognition of equivalent standards that achieve the same level of protection.[113]

2. The TBT Agreement

The TBT Agreement encourages the development of international regulatory standards, "including packaging, marking and labelling requirements, and procedures for assessment of conformity with technical regulations and standards" that "do not create unnecessary obstacles to international trade."[114] The TBT Agreement recognizes that a country should be able to take measures to ensure export quality, protect humans, animals, plants, or the environment, and prevent deceptive practices at appropriate levels.[115] These measures cannot be applied as "[an] arbitrary or unjustifiable discrimination between countries where the same conditions prevail or a disguised restriction on international trade."[116] Members are to treat imported products "no less favourable than . . . like products of national origin."[117]

> and inexpensive test to detect only pesticide Z residue on apples, the United States would presumably have to use that test instead of banning all apples with any pesticide residue. Such an outcome, however, would not compromise the environmental protection goal in any way.

John J. Barceló III, *Product Standards to Protect the Local Environment—the GATT and the Uruguay Round Sanitary and Phytosanitary Agreement*, 27 CORNELL INT'L L.J. 755, 763-64 (1994).

109. GATT art. XX, GATT B.I.S.D. (vol. 1) at 48-50 (May 1952) at 1(b).

110. SPS Agreement, *supra* note 68, at Annex B, Transparency of SPS Regulations, *Notification Procedures*, para. 5. Regulations must be promptly published. *See id.* at para. 1. Unless urgent circumstances exist, a reasonable time from publication to application must be allowed so members can "adapt their products and methods of production to the requirements of the importing [m]ember." *Id.* at para. 2.

111. *Id.* at Annex C, Control, Inspection and Approval Procedures, para. 1(a).

112. *Id.* at para. 1(e).

113. HANRAHAN, *supra* note 22, at 1.

114. Final Act, *supra* note 37, at Annex 1A, Multilateral Agreements on Trade in Goods, Agreement on Technical Barriers to Trade [hereinafter TBT Agreement].

115. *Id.*

116. *Id.* "[T]echnical regulations shall not be more trade-restrictive than necessary to fulfill a legitimate objective." *Id.* at art. 2, para. 2.

117. *Id.* at art. 2, para. 1.

Under the TBT Agreement, risks are assessed by considering scientific information, processing technology, and end-uses associated with the overall objective of protecting "human health or safety, animal or plant life or health, or the environment."[118] Members must justify these technical regulations when requested.[119] Product-based technical regulations must be based "in terms of performance rather than design or descriptive characteristics."[120] Additionally, the TBT Agreement requires a reasonable period of time between publication of these regulations and their application.[121]

Procedures cannot be "more strict or be applied more strictly than is necessary to give the importing member adequate confidence" of conformity.[122] Conformity procedures must be completed "as expeditiously as possible and in a no less favourable order."[123] If an international standard does not exist, members must transparently develop conformity procedures.[124] Although members are encouraged to follow international standards, "it does not require them to change their levels of protection as a result of standardization."[125]

3. GATT Article XX

GATT Article XX sets forth exceptions to the general prohibition on trade restrictions. Exceptions are permitted if "necessary to protect human, animal or plant life or health," or if they relate to resource conservation and "such measures are made effective in conjunction with restrictions on domestic production or consumption."[126] Further, the WTO is a form of product-based, rather than process-based, regulation.[127] Several attempts to justify trade restrictions have been defeated on this premise.

GATT Article XX mandates that a party implementing any non-tariff trade barrier, which includes measures to protect the environment, bear the burden of justification.[128] The Article XX exceptions have been interpreted narrowly by dispute resolution panels, permitting "only very limited environmental barriers to full free trade."[129]

---

118. *Id.* at art. 2, para. 2.
119. *Id.* at art. 2, para. 5.
120. *Id.* at art. 2, para. 8.
121. *Id.* at art. 2, para. 12.
122. *Id.* at art. 5, para. 1.2.
123. *Id.* at art. 5, para. 2.1.
124. *Id.* at art. 5, para. 6.
125. WTO, *Legal Texts: The WTO Agreements*, *supra* note 38, at 9.
126. GATT art. XX, *supra* note 109, at 1(b), (g).
127. *See* John S. Applegate, *The Prometheus Principle: Using the Precautionary Principle to Harmonize the Regulation of Genetically Modified Organisms*, 9 IND. J. GLOBAL LEGAL STUD. 207, 237 (2001).
128. GATT art. XX, *supra* note 109.
129. John S. Applegate & Alfred C. Aman, Jr., Symposium, *Sustainable Development, Agriculture, and the Challenge of Genetically Modified Organisms: Introduction: Syncopated Sustainable Development*, 9 IND. J. GLOBAL LEGAL STUD. 1, 4 (2001).

Panel analysis has been limited to the express provisions of GATT and its subsidiary agreements, and panels have refused "to consider the obligations of international environmental treaties and customary law in their rulings."[130]

In one case, the United States imposed an import ban on yellow tuna caught with dolphin-killing nets in order to comply with the United States Marine Mammal Protection Act.[131] The GATT panel ruled that the U.S. violated GATT and its actions did not qualify for Article XX treatment.[132]

Three years later, the European Economic Community challenged a U.S. embargo action that required tuna exporters to provide proof that the exported tuna, as well as any tuna the exporting nation imported, were not caught with dolphin-killing nets.[133] The panel held against the U.S., finding its actions were not "necessary" nor primarily aimed at natural resource conservation under Article XX.[134]

When the U.S. imposed pollution standards on gasoline imports under the Clean Air Act, the Appellate Body yet again ruled against the U.S.[135] The issue was whether the EPA's standard-setting process provided domestic refinement with an unfair advantage.[136] The Appellate Body found no justification for the baselines and pollution standards under Article XX.[137]

In sum, these three cases demonstrate unilateral attempts by the U.S. to engage in environmental protection based upon the process of production. Interpretations of the "necessary" requirement of Article XX(b) indicate members cannot employ trade-restrictive measures if less trade-offensive alternatives exist.[138] Conservation measures with extraterritorial effects must be narrowly tailored.[139] Additionally, Article XX exceptions cannot be directed at process or production methods, only products.[140]

---

130. *Id.*

131. GATT Dispute Settlement Panel Report, United States Restrictions on Imports of Tuna, Aug. 16, 1991, *reprinted in* 30 I.L.M. 1594 (1991) [hereinafter Tuna I].

132. *See* Jeffrey L. Dunoff, *Reconciling International Trade with Preservation of the Global Commons: Can We Prosper and Protect?*, 49 WASH. & LEE L. REV. 1407, 1411, 1415-33 (1992).

133. GATT Dispute Settlement Panel Report, United States Restrictions on Imports of Tuna, GATT Doc. No. DS29/R, at para. 2.12 (June 16, 1994) [hereinafter Tuna II].

134. *Id.* at para. 5.42.

135. WTO Appellate Body Report, United States: Standards for Reformulated and Conventional Gasoline, WTO Doc. WT/DS2/AB/R (Apr. 29, 1996) [hereinafter Venezuela Gasoline Appeal]; WTO Panel Report, United States: Standards for Reformulated and Conventional Gasoline, WTO Doc. WT/DS2/R (Jan. 29, 1996) [hereinafter Venezuela Gasoline Decision].

136. Venezuela Gasoline Decision, *supra* note 135.

137. Venezuela Gasoline Appeal, *supra* note 135.

138. *See* Tuna II, *supra* note 133, at para. 5.35; Venezuela Gasoline Decision, *supra* note 135, at para. 6.31.

139. *See* Tuna II, *supra* note 133, at para. 3.52-.53; Venezuela Gasoline Appeal, *supra* note 135, at pt. 4.

140. *See* Tuna II, *supra* note 133, at para. 5.37.

D. *International Standards*

The WTO agreements expressly recognize international standards as justification for SPS and TBT measures.[141] In essence, these standards may achieve global harmonization "where lack of transparency in the domestic regulatory process makes it impossible to make a principled decision as to whether a given regulation is legitimate or an example of illegitimate cheating on trade liberalization commitments."[142] It has been observed that the process of multilateral trade negotiation would be undermined by disguising regulatory measures to neutralize trade liberalization commitments.[143] However, harmonization may come at a price—governments may be constrained when making rules for legitimate reasons.[144]

In the context of the U.S./EU conflict, for environmental concerns to justify SPS or TBT measures they must be expressed in an international standard recognized by the WTO. Otherwise, the environmental mission may be seen as irrelevant and, in some instances, as an obstruction to free trade.[145] Moreover, in WTO dispute settlement proceedings, environmental treaties may be invalidated as trade barriers, as they are not considered when all GATT parties have not approved of their recognition.[146]

Several international standard-setting bodies are recognized by the WTO.[147] The work of these groups is based on scientific analysis.[148] Regulations adopted in a "logical, objective and science-based manner" promote the maintenance of a free-trading system.[149] The U.S. supports regulations that are "transparent and science-based" in the area of biotechnology.[150]

In the WTO poker room, these are the rules that govern the game. Each player must be aware of the rules and work within their

---

141. *See* Final Act, *supra* note 37, at Annex 2, Understanding on Rules and Procedures Governing the Settlement of Disputes, at art. 3 [hereinafter DSU].

142. Howse, *supra* note 48, at 2335.

143. *Id.* (citing DAVID W. LEEBRON, LYING DOWN WITH PROCRUSTES: AN ANALYSIS OF HARMONIZATION CLAIMS IN FAIR TRADE AND HARMONIZATION: PREREQUISITES FOR FREE TRADE? 41, 65 (Jagdish Bhagwati & Robert E. Hudec eds., 1996)).

144. *Id.* at 2335-36.

145. *See* Guruswamy, *supra* note 41, at 192.

146. *Id.* at 193.

147. Alan Larson, *Trade and Development Dimensions of U.S. International Biotechnology Policy*, ECON. PERSP., *supra* note 21, at 6-7. Specifically recognized bodies include: the Codex Alimentarius Commission, which establishes food safety standards; the International Plant Protection Convention (IPPC), which aims to prevent the spread and introduction of plant pests and products; and the Office of International Epizootics (OIE), which performs a similar function as the IPPC for animal health. *Id.*

148. *Id.*

149. *Id.* Science-based decision making makes it easier for countries to agree under the WTO rules. *Id.* Guidelines approving scientifically based food-safety assessments have been unanimously approved by the Codex Alimentarius Commission, which consists of 169 members, including the U.S. and EU. *Id.*

150. *Id.*

confines in order to succeed. While each player is familiar with the house rules, whether the WTO is equipped to handle genetic engineering concerns remains to be seen.

IV. The First Three Community Cards—The Flop

The commonest mistake in history is underestimating your opponent; happens at the poker table all the time.[151]

In Hold'em, each player receives two face-down cards and decides whether to fold or commit to the pot for a chance to see the first three community cards, otherwise known as the flop.[152] The flop can be crucial to a player's hand.[153] In a mechanical sense, coupled with a player's down cards, it may provide a player with a winning hand or the opportunity to draw into one.[154] However, winning a hand in Hold'em does not always require the best hand; rather, it may require convincing the others at the table they are already beaten.[155]

In the WTO poker room, the U.S. was dealt the queen of hearts and queen of diamonds as its down cards. The EU received the king and jack of spades. Both players know the stakes and choose to stay in the game. Although other players are sitting at the table, they have opted to fold before the flop, knowing their weak position and down cards were not worth wagering over.[156]

The flop consists of the ten of diamonds, two of spades, and queen of spades. At this point each player analyzes the strength of its hand. The U.S. has three of a kind—queens. The EU is one card away from a flush. Both are confident and comfortable at this stage of the game for very different reasons. The three community cards in the flop represent different aspects of the GM issue—the views of its proponents, opponents, and scientific studies to date.

Genetically Modified Organisms (GMOs)

Agricultural production today has implemented the use of a new production technology, genetic engineering.[157] Genetic engineering involves the transfer of genetic information from one plant into another, resulting in the most modernized approach of plant breeding to date.[158] While its larger social acceptance is questionable, a significant

151. General David Shoup, President Kennedy's adviser during the Cuban Missile Crisis, *at* http://www.great-poker.com/poker-quotes-14.html (last visited Apr. 16, 2004).
152. McManus, *supra* note 2, at 60.
153. *See id.* at 236-37.
154. *See id.*
155. *See id.*
156. These players represent those who joined in the U.S. request for consultations and a dispute resolution panel. *But see supra* notes 15-17 and accompanying text.
157. J.B. Penn, *Agricultural Biotechnology and the Developing World*, Econ. Persp., *supra* note 21, at 8.
158. *Id.*

part of the agricultural community has voluntarily decided to welcome the technology since its commercial introduction in 1996.[159] In 2003, biotech crops accounted for 80% of soybean, 38% of maize, and 70% of cotton production in the U.S.[160]

Despite its widespread use, some of the agricultural community does not warmly embrace genetic engineering,[161] and the question remains whether they may be forced to within the context of the WTO. The questions surrounding genetic engineering and its near global adoption necessitate a discussion of its scientific background as compared with "traditional" plant-breeding technology. Further, it is also necessary to account for the general reasoning behind the divergence in views concerning GM products.

1. The Technology

Selective breeding is not a new concept.[162] Used to introduce desirable characteristics into plants, selective breeding has provided several regularly consumed food products.[163] Genetic modification has been a historic means of plant breeding[164] that "occurs when plants within a species simply produce offspring."[165] Examples range from Gregor Mendel unraveling the laws of heredity with garden peas[166] to man-made artificial crosses of sexually compatible plants by pollen transfers that first occurred in the pre-1900s.[167] Other extensions of genetic modification in traditional plant breeding include embryo rescue, first used in the 1930s to cross normally non-compatible plants,[168] and mutation breeding of the 1950s.[169]

Arguably, biotechnology is a "modern, additional tool in the long history of plant cultivation and agriculture."[170] Still, biotechnology is different from traditional plant breeding, as scientists can "incorpo-

159. *Id.* at 9; *see also Plant Biotechnology Timeline*, ECON. PERSP., *supra* note 21, at 34. Some of the first commercialized biotech crops in the U.S. included: genetically engineered soybeans, maize, and cotton. *Id.* In 2002, U.S. biotech crops accounted for 75% of soy, 34% of corn, and 71% of cotton. U.S. Embassy, Vienna, Austria, *supra* note 14. "Worldwide, about 45 percent of soy, 11 percent of corn, 20 percent of cotton and 11 percent of rapeseed are biotech crops." *Id.* The United States, Argentina, Canada, and China produce 99% of this acreage. BAUMÜLLER, *supra* note 29, at 1.

160. Penn, *supra* note 157, at 9.

161. *See* Applegate, *supra* note 127, at 208.

162. A.M. Shelton, *The Role of Plant Biotechnology in the World's Food Systems*, ECON. PERSP., *supra* note 21, at 23.

163. *Id.* In fact, corn (maize), a native Mexican plant, originated from a grass-bearing plant called teosinte. *Id.* Tomatoes originally were the size of grapes, and potatoes debuted as knobby tubers that were toxic to humans. *Id.*

164. *See* Lester M. Crawford, *Understanding Biotechnology in Agriculture*, ECON. PERSP., *supra* note 21, at 11.

165. Penn, *supra* note 157, at 8.

166. Shelton, *supra* note 162, at 23.

167. *Id.*

168. *Id.*

169. *Id.*

170. Penn, *supra* note 157, at 8.

rate genes from other species—something that cannot be done via conventional plant breeding."[171] Modern biotechnology allows selection of a single gene and its incorporation into plant cells, resulting in plants with the selected trait.[172] By inserting isolated genes, the precision of this technology reduces the risk of detrimental trait introduction.[173] This form of biotechnology is referred to as "genetic engineering."[174]

The initial use of biotechnology was in the form of synthetic insulin for diabetics.[175] Soon thereafter, this genetic engineering technology was incorporated into plant breeding. In 1982, a tobacco plant resistant to an antibiotic was produced, and the EPA approved its release in 1986.[176] In 1994, the FDA approved the FlavSavr tomato.[177] Genetically engineered varieties of soybeans, maize, and cotton were the next biotech innovations.[178] Six countries grew these plants on 1.7 million hectares in 1996, the year of their commercial release.[179] By 2002, this number increased to 58.7 million hectares in sixteen countries.[180]

Biotechnology is a front runner of technological advancement. Its wide-ranging potential and rapid adoption in agriculture has not

---

171. *Id.* "Genes are not unique to the organism from which they came." Shelton, *supra* note 162, at 24. "It's the collection of all genes in a tomato or a bacterium that makes it a tomato or bacterium, not a single gene." *Id.*

172. Penn, *supra* note 157, at 8.

173. Crawford, *supra* note 164, at 11.

174. Shelton, *supra* note 162, at 24.

175. *Id.* Synthetic insulin resulted from the 1972 work of Hubert Boyer and Stanley Cohen, who conducted the first isolation and gene transfer from an "organism to a single-celled bacterium where it would express the gene and manufacture a protein." *Id.* Today, virtually all diabetic insulin and many cancer and heart medications are produced through biotechnology and genetic engineering. *Id.* at 23.

176. *Plant Biotechnology Timeline*, *supra* note 159, at 34.

177. *Id.* FlavSavr tomatoes exhibit enhanced flavor and shelf life. *Id.*

178. *Id.* In 2002, herbicide tolerant varieties of soybean, canola, cotton, and maize were produced on 48.6 million hectares. Shelton, *supra* note 162, at 24. The majority of genetically engineered crops are used for weed, pest, and disease management. *Id.* Herbicide-tolerant plant varieties, used for weed management, contain "a modified enzyme (a protein) that allows [the plants] to survive an application of a specific herbicide that normally acts on that enzyme." *Id.* Insect-resistant varieties utilize Bacillus thuringiensis (Bt), a "common soil bacterium . . . commercially used for more than 50 years[ ] as an insecticide spray." *Id.* at 24-25. Bt insecticides were commercialized by France in the late 1930s. *Id.* at 25. "[W]hen a susceptible insect ingests Bt, the Bt protein binds to specific molecular receptors in the gut and creates pores causing the insect to starve to death." *Id.* Present Bt crops, accounting for 14.5 million hectares in 2002, include cotton and maize. *Id.* Virus-resistant plants are developed by the insertion of "a non-infective part of a plant virus into a plant, essentially 'vaccinating' the plant to protect it from the virus." *Id.* The result of this genetic modification is called "pathogen-derived resistance." *Id.* Current crops include squash and papaya, accounting for less than one million hectares in 2002. *Id.*

179. *Plant Biotechnology Timeline*, *supra* note 159, at 34. This is "the most rapidly adopted technology in the history of agriculture." *Id.* By 2000, genetically engineered crops were planted on 44.2 million hectares in thirteen countries, a twenty-five-fold increase from 1996. *Id.*

180. Shelton, *supra* note 162, at 24. These figures demonstrate a "35-fold increase in acreage planted globally with genetically modified (GM) crops . . . and more than a quarter of GM crops are grown in developing countries." Terry D. Etherton, *Improving Animal Agriculture Through Biotechnology*, ECON. PERSP., *supra* note 21, at 26.

been viewed favorably by the entire global population.[181] In the area of international trade, as well as internal regulations, the divergent views of biotechnology proponents and opponents have met head on, creating the U.S./EU conflict.

2. Two Divergent Views

Proponents of genetic engineering speak of the unyielding benefits of biotechnology, while its opponents express fear of the unknown. These two divergent views have resulted in an unresolved conflict in the WTO between the U.S. and EU. Analogous to two of the community cards in the flop, each player believes one of the cards strengthens its hand at this stage of the high-stakes international trade battle.

a. *Proponents—The Ten of Diamonds*

Proponents speak of the environmental and economic benefits of biotechnology.[182] Environmentally, studies have shown a "reduced use of pesticides and increased adoption of environmentally friendly farming practices such as 'no-till' farming, which reduces soil erosion and fertilizer run-off."[183]

Proponents also claim biotechnology can "stimulate agricultural productivity and development in both developed and developing countries."[184] With an expected world population of nine billion by 2050, food production must increase "in an environmentally sustainable way."[185] Increased productivity decreases both the acreage and inputs necessary to produce the same amount of food.[186] With biotechnology, varieties may be developed "that are resistant to environ-

181. *See* Applegate, *supra* note 127, at 208.

182. *See* USDA, *supra* note 16. Agriculture Secretary Ann M. Veneman stated, "'Biotechnology is helping farmers increase yields, lower pesticide use, improve soil conservation and water pollution and help reduce hunger and poverty around the world.'" *Id.*

183. Larson, *supra* note 147, at 6; *see also* Press Release, U.S. Embassy, Vienna, Austria, EU Biotech Ban, *at* http://www.usembassy.at/en/embassy/press_biotech.htm, (May 13, 2003). GM-derived feed components potentially will reduce the amount of animal manure and its odor, as well as phosphorous and nitrogen excretion, resulting in decreased water pollution. Etherton, *supra* note 180, at 26-27.

184. U.S. Embassy, Vienna, Austria, *supra* note 183.

185. Larson, *supra* note 147, at 6. "[T]oday some 800 million people—nearly one in seven—face chronic hunger." Penn, *supra* note 157, at 9. One in three children is undernourished, "and a child dies every five seconds due to hunger." *Id.*

186. Larson, *supra* note 147, at 6. In 2002, the National Center for Food and Agricultural Policy (NCFAP) found that production of genetically engineered soybeans, maize, cotton, papaya, squash, and canola planted on the same acreage in the United States produced "an additional 1.8 million tons of food and fiber . . . improve[d] farm income by $1.5 billion and reduce[d] pesticide use by 210,000 tons." *Plant Biotechnology Timeline*, *supra* note 159, at 35. Improved seed technology increased agricultural productivity by fifty percent in the developing world. Larson, *supra* note 147, at 6. Improved seed can result from biotechnology as well as advancements in traditional methods and conventional hybrids. *Id.*

mental pressures such as drought, temperature extremes and salty soil."[187]

Products directly benefiting consumers through enhanced levels of vitamins, minerals, and disease-fighting chemicals may also result from biotechnology.[188] Enhancing the nutritional content of food can provide undernourished populations with quick access to a better diet.[189] An example is golden rice, rice fortified with beta carotene to stimulate the production of vitamin A, which combats malnutrition and blindness.[190] Future uses of biotechnology include: plant "factories" to produce medical drugs, alternative energy sources, toxic waste site cleaning tools, and biomaterials such as "dyes, inks, detergents, adhesives, lubricants, plastics and the like."[191]

Proponents also maintain that although biotechnology is "'a radically new way to manipulate heredity,'" even traditional plant breeding methods create "'organisms that are not only very different from their wild ancestors, but are in many characteristics the very opposite of the organisms from which they were derived.'"[192] Controversial areas surrounding biotechnology in agriculture include "pesticide resistance, gene flow and intellectual property issues."[193] Proponents argue these risks are present in all types of agriculture, are small, and can be managed with care.[194] Proponents admit environmental and health benefits must be considered prior to resistance development, as well as how to manage resistance "if and where it occurs."[195] Although gene flow, which varies among crops and genes,[196] from genet-

187. Penn, *supra* note 157, at 9. One biotech commentator stresses the need for regulatory systems and training before another food shortage occurs. Bruce Chassy, *The Role of Agricultural Biotechnology in World Food Aid*, ECON. PERSP., *supra* note 21, at 22. Chassy also states that

> [e]ach nation must decide what agricultural goals are in its national interest and what technologies are consistent with consumer acceptance and customs.
>
> . . . .
>
> . . . The global community needs to invest more capital in creating agricultural institutions and infrastructure in countries that face food security challenges. Investment must be made in legal and regulatory systems, agricultural research, transportation and processing systems, and education. The success of the Land Grant University system in improving agriculture and contributing broadly to society in the United States over the last 140 years demonstrates that the development of human capital and educational systems is as important as scientific discovery.

Id.

188. *See* Penn, *supra* note 157, at 9; Shelton, *supra* note 162, at 25. Examples include golden rice and edible vaccines. *Id.*

189. Larson, *supra* note 147, at 6.

190. *Id.* Golden rice was developed in 1999 by German and Swiss scientists. *Plant Biotechnology Timeline*, *supra* note 159, at 34.

191. Shelton, *supra* note 162, at 25.

192. Applegate, *supra* note 127, at 226 (quoting Richard Lewontin, *Genes in the Food!*, N.Y. REV. BOOKS, June 21, 2001, at 81).

193. Shelton, *supra* note 162, at 25.

194. Applegate, *supra* note 127, at 226-27; *see* Shelton, *supra* note 162, at 25.

195. Shelton, *supra* note 162, at 25.

196. *Id.* The risk from soybean crossing is minimal. *Id.* Soybeans self-pollinate and present limited risk of pollen flow. *Id.*

ically engineered to non-genetically engineered crops may be an issue, proponents argue,

> Pest resistance can be handled by creating refuges that will reduce the incentive for new, super strains of insect pests to multiply, by maintaining the selective advantage of existing strains in certain areas. The spread of superweeds can be avoided by buffer zones, which can also act as refuges. Moreover, superweeds are a self-limiting problem, since crop species are highly fragile and occupy an extremely specialized ecological niche (i.e., farms) that must be maintained by extensive human intervention.[197]

Further, the superweed problem has already been posed by exotic species such as kudzu and zebra mussels, yet it has not been a serious threat to human health.[198] Fear of novel toxicant, allergen, and antinutrient introduction into food products can be addressed by prediction and screening.[199]

To the U.S., a proponent of genetic engineering, the ten of diamonds represents its view. Granted, this is not the strongest of the three cards in the flop for the U.S., but this card does not hurt the U.S. position as it sits with triple queens, hoping for a fourth queen or another ten or two for a full house. The U.S. is betting on the proponent view that genetically engineered crops are beneficial and supported by a substantial number of individuals. Although the U.S. suspects the EU may be on a flush draw, using consumer fear to justify its actions, it knows that the EU, by mathematical certainty, must draw another spade to complete its hand. Consumer fear alone cannot justify an exception to the restrictions of the SPS and TBT agreements.[200] Trade restrictions must be based on science and "necessary to protect human, animal or plant life or health"[201] because of dangers from the product, not the process by which it is made.[202]

Moreover, protective trade measures must be made "in conjunction with restrictions on domestic production or consumption."[203] Hence, such measures are prohibited when applied to "arbitrarily or unjustifiably discriminate between [m]embers where identical or similar conditions prevail."[204] The EU's moratorium does not affect previously approved genetically modified products that are currently used and available within its boundaries.[205] From the U.S. position, it appears the EU is discriminating against products from the U.S. in

197. Applegate, *supra* note 127, at 226.
198. *Id.* at 227.
199. *Id.*
200. *Cf.* GATT art. XX, *supra* note 109, at 1(b), (g).
201. *Id.* at 1(b); *see* SPS Agreement, *supra* note 68, at art. 2, para. 2.
202. *See* TBT Agreement, *supra* note 114, at art. 2, para. 8; Applegate, *supra* note 127, at 237.
203. GATT art. XX, *supra* note 109, at 1(g).
204. SPS Agreement, *supra* note 68, at art. 2, para. 3; *see* TBT Agreement, *supra* note 114.
205. *U.S. Request*, *supra* note 21, at 33.

violation of WTO agreements.[206] Similar to the unsuccessful Australian import ban on uncooked salmon, the EU is attempting to justify its actions on potential social and economic consequences.[207] The U.S. sees this as arbitrary. If consumer fear is strong enough within the EU for its government to implement a moratorium, then consumers should fear the products within the EU as well. The EU moratorium on genetically engineered products may be supporting popular beliefs about the seriousness of risks.[208]

Additionally, the proponent view sets forth several alternatives to address consumer fear.[209] To the U.S., these alternatives demonstrate that less trade-restrictive measures exist which adequately address such concerns.[210]

Thus, at this point in the game the U.S. believes the EU's measures are not narrowly tailored and cannot be justified solely by consumer fear. The EU may draw its spade on the turn or the river, but at this stage, knowing the EU's hand is incomplete, the U.S. feels confident with the ten of diamonds and its position at the table.

b. *Opponents—The Two of Spades*

Opposition to genetic engineering comes in varying degrees. Most opponents express fear of unknown health and environmental effects of genetically engineered products.[211] Some have coined the term "Frankenfoods"[212] for genetically engineered products, concerned that scientists "substitute human wisdom for the wisdom of nature."[213] Opponents stress that although genetic engineering is precise as to the gene and trait introduced into an organism, it cannot accurately determine the consequences in the host organism because

---

206. *See* Guruswamy, *supra* note 41, at 195.

207. Salmon, *supra* note 80.

208. Viscusi, *supra* note 102, at 139; *see also* Fraiberg & Trebilcock, *supra* note 102, at 873-75.

209. *See supra* notes 189-95 and accompanying text.

210. SPS Agreement, *supra* note 68, at art. 5, para. 6 n.3; TBT Agreement, *supra* note 114, at art. 2, paras. 1-2.

211. HANRAHAN, *supra* note 22, at 4. Consumer confidence in food safety assurances and the adequacy of food agency regulations, specifically in the context of the BSE (mad cow disease) incident, has taken a blow. *Id.* The argument for cautionary labeling has extended from that fear. *Id.* Environmental groups such as Greenpeace actively oppose GM crops. *Id.* (citing Greenpeace position, *at* http://www.greenpeace.org/~geneng/).

212. Applegate, *supra* note 127, at 210. Applegate states that "[l]ike genetic modifiers, Frankenstein's aspiration was grandiose but well meaning—to create a 'new species [that] would bless me as its creator and source.'" *Id.* at 212 (quoting MARY SHELLEY, FRANKENSTEIN, OR, THE MODERN PROMETHEUS 57 (Airmont Publishing Co. 1963) (1817)).

> But the horror that flows from Frankenstein's ambition provides a straightforward moral: "Learn from me, if not by my precepts, at least by my example, how dangerous is the acquirement of knowledge, and how much happier that man is who believes his native town to be the world, than he who aspires to become greater than his nature will allow."

Id. (quoting SHELLEY, *supra*, at 56).

213. *Against the Grain—Part 2*, RACHEL'S ENVTL. & HEALTH WKLY., (Feb. 18, 1999), *at http://www.rachel.org/bulletin/bulletin.cfm?issue_ID=1253&bulletin_ID=48.*

"[g]enes do not generally act alone; they work in tandem, interacting with each other to create the phenotype."[214] Further, genes control many facets of organisms that may not be immediately apparent.[215] Simply put, opponents emphasize that effects of genetic transfers cannot be predicted with accuracy.[216] Thus, many opponents fear the introduction of novel toxicants, allergens, or anti-nutrients into food products.[217]

Uncertainties as to the consequences of genetic engineering in the host organism itself coincide with concern of the propagation of these organisms in complex ecosystems.[218] Opponents stress that environmental behavior of genetically engineered crops cannot be readily ascertained because "[a]s living entities, they will multiply, adapt, evolve, and interact in ways that traditional inanimate pollutants cannot."[219] "Once released, they cannot be recalled, retrieved, or neutralized."[220] "Pollution" of non-genetically engineered species may occur.[221] New varieties may overtake existing genotypes or limit ecosystem biodiversity.[222]

Hence, opponents stress fear of "superweeds" or "superpests" in the environment.[223] Superweeds are "weedy" species, not created by genetic engineering, that adapt readily, propagate easily, and force out other species.[224] Superpests are organisms not created by genetic engineering that may "evolve into extremely resistant varieties in response to GM plant pesticides."[225] This is a concern even without the presence of genetically engineered crops, and it is now magnified.[226] Because genetically engineered crops "will not respect national boundaries or legal systems,"[227] opponents stress that effective regulatory procedures controlling the release of these crops will be "critical

214. Applegate, *supra* note 127, at 216.
215. *Id.*
216. *Id.* at 216-17.
217. *Id.* at 218-19. For example, a pre-market phase inspection discovered a Brazil nut gene transferred into soybeans was a severe allergen. *Id.* The allergen concern arises from the fact that foods contain proteins, and almost every known human allergen is a protein. Crawford, *supra* note 164, at 11. The introduction of a new protein may possibly result in toxicity. *Id.* at 12. Modification of the nutritional content of food can be caused by the introduction of anti-nutrients into the genetic makeup of a plant; molecules such as phytic acid could reduce dietary minerals like phosphorus. *Id.*
218. Applegate, *supra* note 127, at 217.
219. Stephen Tromans, *Promise, Peril, Precaution: The Environmental Regulation of Genetically Modified Organisms*, 9 IND. J. GLOBAL LEGAL STUD. 187, 188 (2001).
220. *Id.*
221. Applegate, *supra* note 127, at 217. For example, the introduction of cross-pollinating GM crops into a field cannot be entirely confined. *Id.*
222. *Id.*
223. *Id.* at 219.
224. *Id.* at 219-20.
225. *Id.* at 220. This is already occurring with conventional pesticides, referred to as "the pesticide treadmill," and biotech opponents fear genetic engineering will speed up this process. *Id.*
226. *Id.*
227. Tromans, *supra* note 219, at 188.

in ensuring that the worst concerns of commentators do not come to pass."[228]

One concern of opponents that perhaps even biotech proponents could not disagree with is the control of "large multi-national corporations" over biotech seeds.[229] These corporations may "eventually exert external domination and control local seed markets and farmers."[230] Moreover, developing countries may not be able to adequately address intellectual property rights, thereby preventing access to these agricultural technologies.[231]

For the EU, an opponent of genetic engineering, the two of spades represents its view. The EU knows it will take more than consumer fear to justify its moratorium. However, consumer fear may be a crucial factor in obtaining an exception to the SPS and TBT agreements.[232] Thus, although the two is of low numerical value, the EU plays on, one card away from drawing the flush.

The EU will likely maintain that its moratorium is not trade discriminatory. It has no effect on previously approved genetically modified products, which are still grown and marketed within as well as internationally.[233] Because the EU's protective measures apply both internally and externally, its argument for an exception to the general prohibition on trade restrictions is reasonable.[234]

The EU's concern is with new genetically engineered products that it has yet to approve. The EU will argue its moratorium is necessary and similar to the EU ban on hormone-treated meat.[235] The risk from new genetically engineered products is "life-threatening in character and perceived to constitute a clear and imminent threat to public health and safety."[236] Consumer fear demonstrates this risk. The EU's case may be distinguished from the Australian import ban on salmon because the EU is not claiming economic, but rather health, consequences.[237] Thus, the EU is not reinforcing popular prejudices

228. *Id.*

229. Chassy, *supra* note 187, at 22. "[B]iotechnology has 'not yet delivered' on its promises of great benefits for the poor of the world, as opposed to great benefits for the multinationals that provide the bio-engineered products." Applegate, *supra* note 127, at 221 (citing Julian Kinderlerer, *Genetically Modified Organisms: A European Scientist's View*, 8 N.Y.U. ENVTL. L.J. 556, 557 (2000)).

230. Chassy, *supra* note 187, at 22.

231. *Id.* Applegate discusses the profit-luring aspect of genetic engineering, stressing that investments in this technology do not seek to relieve human suffering. *See* Applegate, *supra* note 127, at 261. A few American and European corporations perpetuate their wealth through continued domination of the agricultural intellectual property market. *See id.* at 262-63. "Greed makes new technology dangerous and warrants caution in adopting it." *Id.* at 263.

232. *See* GATT art. XX, *supra* note 109, at 1(b), (g).

233. *U.S. Request*, *supra* note 21, at 33.

234. *See* GATT art. XX, *supra* note 109.

235. *See* Hormones, *supra* note 74.

236. *Id.* at para. 194.

237. *See* Salmon, *supra* note 80.

by its moratorium; rather, it is addressing a perception that may prove to be reality.

The EU will argue that the alternatives set forth by GM proponents do not attain the level of protection it is seeking to establish.[238] Further, it is regulating a product in terms of its perceived performance.[239]

Overall, the EU recognizes that this card does not complete its hand. However, it puts the EU one card closer to a flush. The EU has already substantially committed to this game and believes its position is strong at this stage. With the turn and river still to come, it is willing to risk another wager on its hand.

3. Scientific Studies—The Queen of Spades

Science plays a crucial role in resolution of the U.S./EU conflict over GM imports. In this high-stakes game, science represents the third community card revealed in the flop. As with the other community cards, both players may have differing views of its worth to their hand. The queen of spades also provides each player with the opportunity to bluff or make the other think it should fold early before any further commitment. As previously discussed, theoretically the best hand wins. But this game involves more than theory, and as in the WTO, uncertainty still exists. Each player in this game is strong, with good position, and the high-stakes game progresses. Because the queen of spades is the third community card face up on the table, free for anyone's use to form a winning hand, it must be addressed.

A portion of the scientific debate concerning GM products may arise from its recent introduction in international trade. Throughout history, technological advancements have not always been met with open arms, frequently looked upon with "skepticism, vilification or outright opposition—often dominated by slander, innuendo and misinformation."[240] Looking back with a hindsight bias, one must ask whether such caution has protected or hindered society and the envi-

238. *See supra* notes 189-95 and accompanying text; *see also* SPS Agreement, *supra* note 68, at art. 5, para. 6 n.3; TBT Agreement, *supra* note 114, at art. 2, para. 2.

239. *See* TBT Agreement, *supra* note 114, at art. 2, para. 8.

240. Calestous Juma, *Biotechnology in the Global Communication Ecology*, ECON. PERSP., *supra* note 21, at 29. "Even some of the most ubiquitous products endured centuries of persecution." *Id.* "For example, in the 1500s Catholic bishops tried to have coffee banned from the Christian world for competing with wine and representing new cultural as well as religious values." *Id.* "Similarly . . . in Mecca, in 1511 a viceroy and inspector of markets, Khair Beg, outlawed coffeehouses and the consumption of coffee." *Id.* He relied on doctors and jurists. *Id.* However, his real motive was the erosion coffeehouses had on his authority, "offering alternative sources of information on social affairs in his realm." *Id.* "[C]offee was rumored to cause impotence and other ills and was either outlawed or its use restricted by leaders in Mecca, Cairo, Istanbul, England, Germany and Sweden." *Id.* To defend wine consumption, French doctors declared that when coffee is consumed, "'The body becomes a mere shadow of its former self; it goes into decline, and dwindles away. The heart and guts are so weakened that the drinker suffers delusions, and the body receives such a shock that it is as though it were bewitched.'" *Id.*

ronment from a global perspective. The question in the GM debate is whether science can accurately account for all of the potential adverse effects from GM crops.

To date, numerous scientific studies have determined that biotech foods pose no threat to humans or the environment.[241] Studies have shown biotech foods "to be as safe as conventional varieties,"[242] and genetically engineered feed components to be "equivalent in terms of nutrient composition to non-GM plants."[243] "[M]ore than 223 million hectares of GM crops have been commercially grown over the past 10 years with no documented effects to humans, animals or the environment."[244]

But what about the Monarch butterfly scare?[245] In 1999, Cornell University conducted a study which found that pollen from Bt corn contained a toxin that killed Monarch butterfly larvae.[246] Subsequently, new information "refuted" this study.[247] Another example is the StarLink Corn situation of 2000.[248] The EPA approved StarLink on a limited and conditional basis: StarLink corn was only to be used for animal feed.[249] Nevertheless, the corn found its way into human food consumption channels.[250] Grower contracts and identity preservation practices failed because sellers did not ask all producers to sign the agreements, and some of those asked simply refused.[251] Pre-har-

241. These studies include those conducted by
the French Academy of Medicine and Pharmacy; the French Academy of Sciences; 3,200 scientists from around the world who cosponsored a declaration on biotech foods; and a joint study conducted by seven national academies of science: the National Academies of Science of the United States, Brazil, China, India, and Mexico, plus the Royal Society of London and the Third World Academy of Sciences.
U.S. Embassy, Vienna, Austria, *supra* note 14; *see also* USDA, *supra* note 16.

A joint policy on biotechnology issued by the World Food Program, the World Health Organization (WHO), and the Food and Agriculture Organization (FAO) states, "based on all scientific evidence, genetically modified (GM)/biotech foods now marketed present no known risk to human health." Tony P. Hall, *A Green Famine in Africa?*, ECON. PERSP., *supra* note 21, at 16. This policy was issued in 2002 in response to U.S. shipments of maize to Zambia during a drought and food shortage that were rejected by its government; Zambia citizen riots ensued upon learning of the intended rejection. *Id.* at 15-16.

242. U.S. Embassy Vienna, Austria, *supra* note 183. In 2001, the European Community released a "15 year, $64 million study that involve[d] more than 400 research teams on 81 projects," finding that biotech products "pose no more risk to human health or the environment than conventional crops." *Plant Biotechnology Timeline*, *supra* note 159, at 35.

243. Etherton, *supra* note 180, at 26.

244. *Id.* at 27.

245. Juma, *supra* note 240, at 29.

246. *Id.*; *Toxic Pollen from Widely Planted, Genetically Modified Corn Can Kill Monarch Butterflies, Cornell Study Shows*, CORNELL NEWS (Cornell University, Ithaca, N.Y.), May 19, 1999, *at* http://www.news.cornell.edu/releases/May99/Butterflies.bpf.html.

247. Juma, *supra* note 240, at 29. These refutations did little to change public opinion, and Professor Juma uses this as an example of the misinformation tactics that often surround the introduction of technological advancements that cause social discourse. *Id.*

248. *See* In re StarLink Corn Prods. Liab. Litig., 212 F. Supp. 2d 828 (N.D. Ill. 2002).

249. *Id.* at 834.

250. *Id.* at 835.

251. *Id.*

vest dumping and cross-pollination exacerbated the problem.[252] Elevator managers did not have a reason to believe the 1999 carryover crop was StarLink corn, and others were unaware of its market restrictions.[253] Aventis, the company producing StarLink, announced cancellation of its registration and worked to remedy the situation; however, this near disaster casts serious doubt upon the adequacy of current biotechnology regulations and market structures.[254]

Additional findings indicate the potential shortcomings of genetic engineering. A study conducted by the University of Arkansas furthered opponents' fear of unknown environmental effects, finding that marestail, also known as horseweed, is resistant to the Roundup herbicide at a rate three times that of a normal application.[255] In 1996, bollworms attacked approximately one million acres of Bt cotton, leading to a suit for fraudulent inducement.[256]

Can science account for any potential risks of genetic engineering in a living ecosystem? For example, quoted portions from a European Commission study reiterate that the research did not demonstrate "any new risks to human health or the environment, beyond the usual uncertainties of conventional plant breeding."[257] The European Commission further states that "if there are unforeseen environmental effects—none have appeared as yet—these should be rapidly detected by [EU] monitoring requirements."[258] Perhaps science cannot accurately account for environmental effects of genetic engineering beyond the capabilities of current technology.

From the economic perspective, production of genetically engineered crops may not be as profitable to the farmer as proponents claim.[259] A report published by the Institute for Agriculture and Trade Policy found that U.S. farmers planting genetically engineered corn realized a net loss of $1.31 per acre.[260] Studies in Iowa have

252. *Id.* at 834.

253. *Id.* at 837.

254. *See id.* at 835.

255. Lamar James, *Arkansas Weed Is Resistant to Popular Herbicide*, (Univ. of Ar. Div. of Ag., Cooperative Extension Service, Little Rock, Ark.), May 23, 2003, *at* http://www.uaex.edu/Other_Areas/news/_archives/May2003/0523weed.asp.

256. *See* Monsanto Co. v. Davis, 97 S.W.3d 642 (Tex. Ct. App. 2002).

257. Press Release, European Commission, GMOs: Are There Any Risks? Launch of European Round Table on GMO Safety, http://europa.eu.int/comm/research/press/2001/pr0810en.html (Oct. 8, 2001).

258. *Id.*

259. *See* Charles M. Benbrook, *Troubled Times Amid Commercial Success for Roundup Ready Soybeans: Glyphosate Efficacy Is Slipping and Unstable Transgene Expression Erodes Plant Defenses and Yields*, *at* http://www.biotech-info.net/troubledtimes.html (May 3, 2001); Charles M. Benbrook, *When Does It Pay to Plant* Bt *Corn: Farm-Level Impacts of* Bt *Corn, 1996-2001*, *at* http://www.biotech-info.net/Bt_corn_FF_final.pdf (Nov. 2001).

260. *When Does It Pay to Plant* Bt *Corn: Farm-Level Impacts of* Bt *Corn*, *supra* note 259.

shown a correlation between decreased farrowing rates in sows and the feeding of Bt corn.[261]

In addition, are studies being *objectively* conducted? The majority of the funding comes from the companies producing biotech products.[262] Ethiopia's EPA administrator states that the evolution rather than nature of genetic engineering is the problem.[263] He claims that the private sector seeks to make money and "'will not focus its attention on the needs of the poor, except as a way to sell its products.'"[264] Michael Doane, Monsanto industry affairs manager, stated that Monsanto's business strategy is to use biotech advancements in crop breeding and marketable seed to increase chemical sales, thus dominating both markets as one system.[265]

Hence, the queen of spades represents existing scientific evidence in the high-stakes game between the U.S. and EU. This third community card is important to both players. It provides the U.S. with its third queen and a strong hand at this stage of the game. It provides the EU with a spade, one card away from drawing a flush.

The U.S. believes it is unlikely to lose. Trade-restrictive measures must be "based on scientific principles," and the sufficiency of such evidence is crucial.[266] Scientific justification requires a risk assessment that accounts for available scientific evidence.[267] Although a risk assessment is not required to represent the majority view,[268] the U.S. argues that the evidence establishes only one view—no harmful effects from genetically engineered products have been documented.[269] Further, genetically engineered products have been commercialized for a substantial period of time without causing adverse health effects, thus diminishing the argument that studies have only been conducted in strictly controlled environments.[270] The EU has failed to offer a

261. Tom Block, *Pseudopregnancies Puzzle Swine Producer*, *at* http://www.mindfully.org/GE/GE4/Bt-Corn-Pseudopregnancies-29apr02.htm (Apr. 29, 2002).

262. PETER PRINGLE, FOOD, INC.: MENDEL TO MONSANTO–THE PROMISES AND PERILS OF THE BIOTECH HARVEST 111 (2003).

263. *Id.* at 156-57.

264. *Id.* (quoting Marilyn Berlin Snell, *Against the Grain: Why Poor Nations Would Lose in a Biotech War on Hunger*, SIERRA MAG., July/Aug. 2001).

265. *See* Robert Schubert, *Pushin' Roundup via Roundup Ready Wheat?*, CROPCHOICE NEWS (June 17, 2002), http://www.cropchoice.com/leadstry.asp?recid=751. "[A] report by the General Accounting Office in 2000 found Monsanto sells seed to Missouri farmers for $252 per 50 pounds, whereas in [S]outh America, Monsanto sells the same technology for $9 per 50 pounds." *State Legislators Resist Farmer-Friendly Amendment as Some Arkansas Weeds Resist Glyphosate*, CROPCHOICE NEWS (May 27, 2003), http://www.cropchoice.com/leadstry.asp?recid=1682.

266. SPS Agreement, *supra* note 68, at art. 2, para. 2.

267. *Id.* at art. 5, para. 2.

268. Hormones, *supra* note 74, at para. 194.

269. *See supra* notes 237-40 and accompanying text.

270. *See supra* note 240 and accompanying text; *see also* Hormones, *supra* note 74, at para. 187.

risk assessment based on scientific evidence or on the risk to human health to justify its actions.

Moreover, similar to Australia's failed attempt to justify its salmon import restrictions, the EU has also failed to evaluate alternative measures.[271] The U.S. will argue the EU did not follow the WTO agreements when it placed an outright moratorium on genetically engineered products.

Further, the Appellate Body has ruled that a causal link is required to demonstrate the existence of a rational basis for an SPS measure.[272] In the current conflict, the EU has not demonstrated a causal link between genetically engineered products and the harm it fears if imports are allowed. From the U.S. position, the EU moratorium is irrational and premised upon mere speculation.

Assuming the EU relies upon the small amount of available data that questions genetically engineered products, the WTO has declared that sufficient scientific evidence is not a de minimis requirement.[273] Like Japan, the EU could pursue better evidence, and it has an obligation to do so in order to justify its moratorium under the WTO.[274]

The EU's measure appears to constitute an arbitrary and unjustifiable distinction in the level of protection the EU considers to be appropriate because the distinction "result[s] in discrimination or a disguised restriction on international trade."[275] From the U.S. view, genetic engineering is a process that results in a product similar to traditional crop varieties.

The U.S. will have to distinguish this case from the EU Hormone ban where the Appellate Body found "a fundamental distinction between added hormones . . . and naturally occurring hormones."[276] However, the EU must establish that its product-based regulation is premised "in terms of performance rather than design or descriptive characteristics."[277] The EU moratorium is broad, including all genetically engineered products. The only distinction offered between those previously approved by the EU and any new GM products is that the new products are covered by its moratorium. The U.S. can compare the GM situation to the Australian salmon import ban where risk assessments were only conducted on certain breeds of fish.[278] Because

271. Salmon, *supra* note 80.
272. *See* Japan, *supra* note 85, at paras. 83-84.
273. *See id.* at para. 84.
274. *See* Howse, *supra* note 48, at 2349.
275. SPS Agreement, *supra* note 68, at art. 5, para. 5.
276. Hormones, *supra* note 74, at para. 221.
277. TBT Agreement, *supra* note 114, at art. 2, para. 8.
278. Salmon, *supra* note 80.

the EU has not restricted the previously approved genetically engineered crops, it has failed to account for comparable risks.[279]

The U.S. maintains that genetic engineering leads to a natural product; it is the process of breeding that differentiates these crops from traditional varieties.[280] Throughout the history of crop breeding, much advancement in breeding technology has occurred in laboratories with the assistance of man.[281] Arguably, these efforts produce products that would not naturally occur, yet no objections have been raised to these methods. Therefore, the EU's moratorium covering all genetically engineered products is arbitrary and overreaching.

Previous attempts to justify trade restrictions have been defeated on the product/process premise. In the past, the U.S. has attempted to engage in environmental protection based upon the process of production.[282] These attempts failed because they did not qualify as a GATT Article XX exception to the prohibition on trade-restrictive measures.[283] Therefore, although the Hormone case may be used in a contrary argument, the WTO is not concerned with the method of production as long as the final product is the same.[284]

Overall, sitting with three queens, the U.S. believes it has the best hand. Even if the EU is waiting on a flush draw, there are numerous possible cards that could diminish this likelihood. The U.S. could also draw into a stronger hand on the turn or river. Although the EU might be confident in the two of spades, consumer fear, it may have diminished the value of this card to its hand by reinforcing popular prejudice against genetic engineering.

Across the table from the U.S., the EU is pleased with the flop. With two community cards left, it has a strong chance of drawing into a flush. Suspecting the U.S. might have a queen, the EU also evaluates the strength of its hand at this point in the game.

In essence, the EU needs the two of spades and queen of spades to play together in attempt to draw a flush. In terms of the current conflict, this means its consumer fear must be justified by science. The EU must establish that its moratorium is necessary to protect "human, animal or plant life or health" and does not "arbitrarily or unjustifiably discriminate between [m]embers where identical or similar conditions prevail."[285]

279. *See supra* note 204 and accompanying text.
280. *See supra* notes 170-74 and accompanying text.
281. *See supra* notes 162-69 and accompanying text.
282. *See supra* notes 130-38 and accompanying text.
283. *See supra* notes 130-38 and accompanying text.
284. *See supra* notes 130-38 and accompanying text.
285. SPS Agreement, *supra* note 68, at art. 2, paras. 2-3.

The EU will argue its moratorium is based on sufficient scientific evidence as required by the SPS Agreement.[286] By accounting for available evidence and environmental concerns in its decision to put a standstill on any new approval of GM products, the EU attempts to meet this burden.[287] Scientific opinions regarding genetic engineering differ.[288] The WTO permits a risk assessment to take this into account, and such assessments are not mandated to embody the majority view.[289] The EU will seek to establish that the threat from genetic engineering is "life-threatening in character and is perceived to constitute a clear and imminent threat to public health and safety."[290] In this regard, the EU is permitted to consider risk "in human societies as they actually exist" and "not only risk ascertainable in a science laboratory operating under strictly controlled conditions."[291] Therefore, the EU will argue sufficient scientific evidence exists to justify its moratorium.

To challenge the holding in the Salmon import case, the EU may also need to establish that it is unnecessary to evaluate the risks of less trade-restrictive alternative measures.[292] The EU will argue its position is clear—it is concerned with any genetically engineered products that it has not previously approved. No alternative measures are available because its concern is with the unknown effects of allowing any new genetically engineered products into its country. Thus, this conflict is distinguishable.

Additionally, the EU will seek to diminish the need for a causal link between feared harms and genetically engineered products.[293] Admittedly, the EU is currently unable to establish such a link. In essence, the EU is arguing that it should not have to jeopardize the safety of its people and environment to do so. Its moratorium is in place to prevent the unknown from occurring. Hence, there is no need to establish a causal link. The EU is using its moratorium to provide time to seek out and pursue better evidence.[294] The EU moratorium minimizes trade effects by giving it adequate time and sufficient data to make an informed decision. Because the "appropriate level of protection" is a member determination, the EU should be allowed to exercise its judgment over this matter.[295]

286. *See id.* at art. 2, para. 2.
287. *See supra* notes 245-58 and accompanying text.
288. *See supra* notes 241-58 and accompanying text.
289. Hormones, *supra* note 74, at para. 194.
290. *Id.*
291. *Id.* at para. 187.
292. Salmon, *supra* note 80.
293. *See* Japan, *supra* note 85, at paras. 83-84.
294. *See* Howse, *supra* note 48, at 2349.
295. *See* SPS Agreement, *supra* note 68, at art. 5.

The EU's moratorium is not more trade restrictive than necessary.[296] The EU's concern is with genetic engineering and its unknown effects. Its moratorium bans any further entry of such products until adequate information is obtained. The EU should not have to realize its fears within to establish the inadequacy of proposed alternatives. Thus, it has enacted an outright ban and maintains that no adequate alternatives exist to address its concerns.[297]

WTO precedent provides merit for the EU position. Previously, the EU justified an import ban on injected hormones when the Appellate Body distinguished between hormones that were added and those that occur naturally.[298] In that case, regulation of comparable naturally occurring hormones was unnecessary because it would "entail[ ] such a comprehensive and massive governmental intervention in nature and in the ordinary lives of people as to reduce the comparison itself to an absurdity."[299] The EU's position in the WTO conflict will rely on this man-made/naturally occurring distinction in attempt to justify its ban on genetically engineered products.[300] Genetically engineered products are not naturally occurring.[301] Although the genes are natural, man must assist in the crosses, and the final product could not exist without such input.[302] Granted, the process is an issue, but it is one necessary step in arriving at the product. In this case, the two are indistinguishable. Thus, the EU will argue the genes are added, resulting in a new product.

The EU can distinguish its current moratorium from the Australian salmon import ban, which only dealt with certain breeds of fish, because the EU is prohibiting the approval of all genetically engineered products that were not previously approved.[303] To the EU, the range of comparable risks begins and ends with genetically engineered products.[304] In addition, the EU is not treating new genetically engineered products less favorably than its own like products because the ban applies within the EU as well.[305]

For these reasons, the EU arguably qualifies for GATT Article XX treatment. Overall, the EU moratorium is "necessary to protect human, animal or plant life or health" and "made effective in conjunction with restrictions on domestic production or consumptions."[306]

296. *Id.* at art. 5, paras. 6-7.
297. *See id.*
298. Hormones, *supra* note 74, at para. 221.
299. *Id.*
300. *See* SPS Agreement, *supra* note 68, at art. 5, para. 2.
301. *See supra* note 171 and accompanying text.
302. *See supra* note 171 and accompanying text.
303. *See* Salmon, *supra* note 80; *see also supra* notes 18-22 and accompanying text.
304. *See* Viscusi, *supra* note 102, at 139.
305. *See* SPS Agreement, *supra* note 68, at art. 2, para. 3.
306. *See* GATT art. XX, *supra* note 109, at 1(b), (g).

From the EU's perspective, the extraterritorial effects are as narrowly tailored as possible.[307] It seeks to regulate a product, genetic engineering, for what it believes are legitimate reasons. Its moratorium should constitute a permissible trade restriction under the covered agreements.

The queen of spades symbolizes the importance of science to both players in this heads-up game. Just as the extent of available scientific evidence may be a key issue in resolution of the WTO conflict, the extent to which the queen of spades improves each player's hand is crucial at this stage of the game.

V. THE FOURTH COMMUNITY CARD—THE TURN

Perception is reality.[308]

The turn is the fourth community card in Hold'em.[309] At this point in the game there is one community card left to be seen, the river.[310] A player must again decide whether to fold or stay in the game. A player could already have a winning hand or be waiting to draw into one. Thus, the turn and a player's reaction to it can be important. Even with a weak hand, strategic betting here may convince one's opponent to fold. In Hold'em the best hand will win if played out until the end; however, perception may be and often is the reality of the poker table.

In the WTO poker room, the turn reveals the seven of hearts. The U.S. feels confident that this card does not hurt its hand and diminishes the EU's chance of drawing another spade. The EU remains optimistic. It has already made a substantial commitment to this pot, the stakes are high, and it is willing to wait for the river. The turn in this heads-up and high-stakes game is symbolic of each country's internal regulation regarding genetic engineering. Each country already knows how the other treats genetic engineering within, and in poker terms, this parallels the face up aspect of the turn. Each country also suspects what the turn means to the other's hand and then plays or folds accordingly. Here, both players continue to wager ahead.

Internal Regulation

The two divergent views concerning biotechnology have led to differing governmental regulations. The U.S./EU conflict exemplifies the discord between product-based versus process-based regulations

307. *See* Tuna II, *supra* note 133, at paras. 3.52-.53; Venezuela Gasoline Appeal, *supra* note 135, at pt. 4.

308. Immanuel Kant, *at* http://www.ichibanpoker.com/ichiban_quotes.htm (last visited Apr. 16, 2004).

309. MCMANUS, *supra* note 2, at 60.

310. *See id.*

of genetic engineering. These policies have abruptly clashed in the international trade arena of the WTO.

1. The United States

The U.S. regulates GMOs according to the Coordinated Framework for Biotechnology developed by the White House Office of Science and Technology in 1986.[311] This framework coordinates the activities of the Environmental Protection Agency (EPA), Food and Drug Administration (FDA), and United States Department of Agriculture (USDA).[312] Existing laws are used to regulate genetically engineered crops and food products because the U.S. presumes these products are not different enough to require separate legislation; this presumption is rebuttable.[313] Regulation proceeds on a product-by-product basis.[314]

The FDA presumes GM foods do not differ from non-GM foods.[315] If a GM version is the same as its traditional counterpart, under existing regulations it is "generally recognized as safe" (GRAS) and FDA approval is not required.[316] The FDA's Statement of Policy declares,

> The regulatory status of a food, irrespective of the method by which it is developed, is dependent upon objective characteristics of the food and the intended use of the food (or its components) . . . . [T]he key factors in reviewing safety concerns should be the characteristics of the food product, rather than the fact that the new methods are used.[317]

The FDA can require pre-market testing to assure that foods are unadulterated and that additives do not pose unnecessary dangers.[318]

---

311. Coordinated Framework for Regulation of Biotechnology, 51 Fed. Reg. 23,302 (June 26, 1986).

312. *Id.* The FDA's authority is derived from the Food, Drug and Cosmetics Act (FD&C Act); it is responsible for ensuring food safety for all products except meat, poultry, and certain egg products, which fall under USDA authority. Crawford, *supra* note 164, at 12. The FDA does, however, regulate animal and drug residues in meat and poultry. *Id.* The EPA is in charge of pesticides. *Id.* The USDA has a sub-agency, the Animal and Plant Health Inspection Service (APHIS), which is charged with the oversight of agricultural and environmental safety of biotech planting and field testing. *Id.*

313. Applegate, *supra* note 127, at 232. FDA findings indicate no evidence that either ordinary or inserted DNA poses food safety problems. Crawford, *supra* note 164, at 11. It is unlikely that small amounts of new proteins will drastically alter a plant's safety profile. *Id.* Any safety concerns that arise should fit in one of the following categories: allergens, toxins, or anti-nutrients. *Id.* In addition, biotech developers must ensure food safety compliance with the FD&C Act. *Id.*

314. *Id.*

315. Statement of Policy: Foods Derived from New Plant Varieties, 57 Fed. Reg. 22,984, 22,991 (May 29, 1992).

316. *Id.* at 22,990.

317. *Id.* at 22,984-85.

318. *Id.* at 22,990. Food additives are substances intentionally added to food. Crawford, *supra* note 164, at 12. The FD&C Act requires food additives to have pre-market approval regardless of the method by which it is added to food. *Id.* Otherwise, no pre-market approval requirements for food exist. *Id.* If substances added through the biotech process are similar to other proteins and fats regularly consumed, they are GRAS. *Id.*

This is not done if GRAS status is granted.[319] Labeling is required if modifications materially change a food product's composition.[320] Otherwise, voluntary labeling of GM content is allowed, but not required.[321]

Similarly, the USDA, through the Animal and Plant Health Inspection Service (APHIS), which regulates GMOs as potential plant pests, may review products before release.[322] Overall, the FDA and USDA regulation of GMOs primarily relies on notification and informal consultation.[323]

The EPA studies pesticidal properties of GM plants for the same qualities it examines in other pesticides.[324] EPA regulations balance risks and benefits. For example, Bt cotton and Bt maize were approved but were coupled with size and refuge requirements in order to alleviate the risk of pesticide resistance.[325] Under the Toxic Substances Control Act (TSCA), administered by the EPA, "GM microorganisms are new 'chemical substances,'" and the EPA may gather genetic structure information.[326] Any action taken by the EPA under TSCA must be justified under a "substantial evidence" standard, but the pre-market notification procedure is limited to information existing at a point where it arguably is least available.[327]

Although most regulation occurs at the federal level, some recent state legislation has banned genetically modified seed. In 2002, North Dakota initiated a moratorium on the introduction of genetically modified wheat until August 1, 2003.[328] Idaho, in 2002, considered an amendment to its pure seed law that would initiate a one-year prohibition on the sale of genetically modified alfalfa seed.[329]

Overall, the U.S engages in product-based regulation. The U.S. maintains that genetically modified products are both as similar and as safe as their traditional counterparts.[330] Thus, its existing regulatory framework governs biotech products.

---

319. Statement of Policy: Foods Derived from New Plant Varieties, 57 Fed. Reg. at 22,990.
320. Crawford, *supra* note 164, at 13.
321. HANRAHAN, *supra* note 22, at 5. To assist in voluntary labeling, the FDA has issued draft guidelines. BAUMÜLLER, *supra* note 29, at 2. Oregon and California are attempting to mandate labeling requirements for GM foods. *Id.*
322. Applegate, *supra* note 127, at 234. The Agriculture Risk Protection Act of 2000 aims to combat plant pests through facilitating biological controls; GM products can be introduced after USDA notification. *Id.*
323. *Id.* The FDA consultation process evaluates information "for all of the known hazards and also for potential unintended effects on plant composition and nutritional properties." Crawford, *supra* note 164, at 13.
324. Applegate, *supra* note 127, at 235.
325. *Id.*
326. *Id.* at 235-36; *see also* Reporting Requirements and Review Processes for Microorganisms, 40 C.F.R. § 725.3 (2004).
327. Applegate, *supra* note 127, at 236.
328. H.B. 1338, 57th Leg. Assem., (N.D. 2002).
329. S.B. 1409, 56th Leg. Assem., 2d Reg. Sess. (Idaho 2002).
330. *See supra* notes 315-25 and accompanying text.

In the high-stakes game at the WTO, the U.S. is confident with its position. U.S. regulation parallels the WTO's position on product-based regulation.[331] The U.S. suspects the turn cannot help the EU's hand, and therefore, it cannot hurt its own. The U.S. also perceives this card hurts the EU when combined with the other community cards on the table. Although a flush would beat the U.S.'s three queens, the river must also reveal a spade. In WTO terms, the EU is encountering a great deal of risk by attempting to justify its moratorium when what it does internally is known by others. The U.S. may attempt to increase the betting on this round to see how committed the EU really is.

2. The European Union

The European Commission regulates the introduction and use of GM products in the EU.[332] Food processors must ascertain whether products contain genetically modified materials and labeling of GM products is mandated.[333] The EU regulatory system governing GM products has established directives which create two major legal structures: Directive 2001/18, addressing marketing and release of GMOs into the environment, and Regulation 248/97, addressing novel foods.[334] Currently, a de facto moratorium on any new approval of GM products has been implemented until labeling and traceability rules are finalized.[335]

The EC Directive addressing marketing and environmental release of GMOs, Directive 2001/18, mandates notification to member states where the marketing or release of GM products is intended to occur.[336] These member states may deny or grant consent, and such a decision is binding on other member states.[337] This safeguard procedure, which allows a member state to deny consent to GM products, deviates from the general principle that acceptance is required by all states in common markets.[338] This Directive states, "Living organisms, whether released into the environment in large or small

331. *See* TBT Agreement, *supra* note 114, at art. 2, para. 8.

332. HANRAHAN, *supra* note 22, at 5.

333. Council Regulation 258/97, art. 8, 1997 O.J. (L 043) 1. GM food products that are substantially equivalent to their conventional counterparts are exempt from premarket approval but must be labeled. *Id.*

334. Council Directive 2001/18/EC, 2001 O.J. (L 106) 1; Council Regulation 258/97, *supra* note 333.

335. Applegate, *supra* note 127, at 229-30; *see supra* notes 18-19 and accompanying text. The EU is considering adding another layer of complexity to its regulations. BAUMÜLLER, *supra* note 29, at 1. The European Parliament is debating proposed regulations set forth by the European Commission, which would require labeling of all GM products, regardless of whether GM material is detected. *Id.* Existing rules do not mandate labeling if a product is derived from but contains no traceable level of GM. *Id.*

336. Council Directive 2001/18/EC, *supra* note 334, at art. 6.

337. *Id.* at art. 6, para. 8.

338. Applegate & Aman, *supra* note 129, at 8.

amounts for experimental purposes or as commercial products, may reproduce in the environment and cross national frontiers thereby affecting other [m]ember [s]tates. The effects of such releases on the environment may be irreversible."[339]

The EU mandates a full risk assessment of GMOs intended for environmental release or market placement.[340] Human health and environmental effects are evaluated.[341] Assessments must account for negative effects, whether "direct or indirect, immediate or delayed."[342] Initial information supporting an application for marketing or release is communicated by the Commission to all member states who then may comment or object.[343] The notified state may decide whether to approve the release or marketing when no objections exist; however, if objections exist, are unresolved, or if the notified state fails to reach a conclusion, the Commission is to provide a resolution.[344] A committee composed of individuals from all member states advises the Commission, and voting is by qualified majority.[345] The Council and Parliament then resolve disagreements.[346]

The proposed novel foods regulation vests initial opinion with the European Food Authority, and the Commission with final decision-making authority.[347] Individual member states have the right to appeal to Council.[348]

In effect, EU regulation of GMOs is centralized and politicized.[349] Flexibility is built into the directives, allowing member states to object, not limiting consent by conditions, and permitting withdrawal of consent.[350] A decision by the European Court of Justice has limited some of this flexibility by insisting that new information is required as the basis for withdrawal of consent.[351] Simply put, no release, marketing, or food use of GMOs is allowed in the EU without prior approval.[352]

The EU knows the seven of hearts is not the spade it was hoping to see, but it has one more chance with the river. The U.S. and EU

339. Council Directive 2001/18/EC, *supra* note 334, at pmbl., para. 4.
340. BAUMÜLLER, *supra* note 29, at 1.
341. *Id.*
342. *Id.*
343. Council Directive 2001/18/EC, *supra* note 334, at art. 6. On October 17, 2002, revised Directive 2001/18/EC mandated that "information on notifications, assessments and releases of GMOs, and general rules on mandatory labeling and traceability at all steps leading to placing the product on the market" is provided to the public. BAUMÜLLER, *supra* note 29, at 1.
344. Council Directive 2001/18/EC, *supra* note 334, at art. 15.
345. *Id.* at arts. 13, 18, 30(2) (citing Council Decision 1999/468/EC, at arts. 5, 7).
346. *Id.* (citing Council Decision 1999/468/EC, arts. 5, 7).
347. Applegate, *supra* note 127, at 230-31.
348. *Id.*
349. *Id.* at 230.
350. *Id.* at 231 (citing Council Directive 2001/18/EC, *supra* note 334, at art. 23).
351. *Id.* (citing Case C-6/99, Greenpeace v. Map, 2000 ECJ CELEX LEXIS 6983, at * 35-36).
352. *See id.*; *see also* Council Directive 2001/18/EC, *supra* note 334, at art. 19.

are the only two players left in this round, and the EU does not want to fold. The stakes are high, and it stands to gain a large pot should it ultimately win this hand. The EU wants to put the U.S. to the test and suspects the U.S. may not have the hole cards necessary to win.

Although the U.S. will likely attempt to use the EU's internal regulation against it, the EU is confident this card is not enough to win the game. Further, the EU will likely maintain that its internal regulations are consistent with its actions in the WTO. While some member states currently raise genetically engineered crops, the EU moratorium addresses those that have not previously been approved. It applies to the EU internally as well as to external trade. For this reason, the EU knows the winning hand stands to gain from the growing pot. Thus, the EU decides to wait for the river.

VI. THE FIFTH COMMUNITY CARD—THE RIVER

> *The poker player learns that sometimes both science and common sense are wrong; that the bumblebee can fly; one should never trust an expert; that there are more things in heaven and earth than are dreamt of by those with an academic bent.*[353]

In Hold'em, the fifth community card dealt face up on the table is known as the river.[354] Just like the other community cards, the river can make or break a player's hand. Showdowns rarely reach a confrontation on the river.[355] After the river is turned up, a player may bet or fold. If a player folds, his two down cards remain a secret unless he or she chooses to reveal them. If two or more players bet, their down cards must be revealed to determine the winner of the hand. Thus, strategy and theory play an equal role throughout a game of Hold'em—sometimes the winner is not determined by the player's hand but by the way he or she plays the game.

In the WTO poker room, the river represents the dispute resolution panel. In the U.S./EU conflict, the means by which the panel will address genetic engineering is an unknown, just as players waiting on the river are uncertain of what it will reveal.

Part of the unknown is whether the panel will rule that the existing agreements, or rules of the game, are equipped to address this situation. If so, it would seem to parallel the rules of Hold'em in that the best hand wins if both commit to the pot after the river is revealed. If not, and also similar to Hold'em, a player may win the game without ever showing his actual hand. Further, if the panel decides the existing agreements are inadequate to address concerns regarding ge-

353. David Mament, *Writing Restaurants: Things I Have Learned Playing Poker on the Hill* (1986), *at* http://www.ichibanpoker.com/ichiban_quotes.htm, (last visited Apr. 16, 2004).
354. MCMANUS, *supra* note 2, at 60.
355. *See id.* at 60.

netically engineered products, the question of how the WTO will be modified enters into play. Even if deemed to fit within the agreements, if the panel softens the blow to a disobeying party, this may appear to be a modification of the contractual structure of the WTO.[356] Like the river, this is an unknown.

Assuming the panel decides existing agreements are adequate to resolve the U.S./EU conflict, the EU may have a difficult "draw" ahead of it. Although Article XX contains qualified exceptions to GATT's prohibition on "quantitative restrictions," the SPS Agreement "explicates and tightens" the exceptions.[357] Together, the SPS and TBT Agreements, both seeking to achieve and maintain free trade, require that a country's protective measures are not unnecessarily trade restrictive.[358] The product/process distinction will be a crucial factor in this case, as GATT applies to products rather than the processes by which they are made.[359] All restrictions challenged under the SPS Agreement have been struck down by the WTO.[360]

Normally, trade restrictions must be scientifically based.[361] This aims to ensure predictability to regulation.[362] WTO resolutions indicate science means existing knowledge.[363] For example, the WTO found Australia in violation of the SPS Agreement for justifying its regulations with documented uncertainty rather than science.[364]

When scientific information is insufficient, "a [m]ember may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information . . . . In such circumstances, [m]embers shall seek to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time."[365] In other words, precaution is allowed and may be justified within the context of the WTO.[366] However, precaution is restricted; measures must be

356. *See The GATT Legacy*, *supra* note 37.

357. Applegate, *supra* note 127, at 237.

358. *See* BAUMÜLLER, *supra* note 29, at 5.

359. TBT Agreement, *supra* note 114, at art. 2, para. 8; *see supra* notes 126-40 and accompanying text. For example, the U.S. was not allowed to prohibit shrimp imports that were caught by methods which harmed the endangered sea turtle, as the dispute resolution panel refused to allow process-based restrictions. Shrimp Products, *supra* note 48. As long as the shrimp met U.S. health and safety restrictions, the fishing process used in catching the shrimp was irrelevant and could not constitute the basis of an import ban. *Id.*

360. Applegate, *supra* note 127, at 238.

361. SPS Agreement, *supra* note 68, at art. 2, para. 2; TBT Agreement, *supra* note 114, at art. 2, para. 2.

362. Applegate, *supra* note 127, at 240.

363. SPS Agreement, *supra* note 68, at art. 5, para. 2; TBT Agreement, *supra* note 114, at art. 2, para. 2; Applegate, *supra* note 127, at 239.

364. Salmon, *supra* note 80.

365. SPS Agreement, *supra* note 68, at art. 5, para. 7.

366. *See* Applegate, *supra* note 127, at 239.

provisional and members are obligated to seek additional information to make an objective judgment within a reasonable time.[367]

In the U.S./EU conflict, scientific opinions differ. Following the Hormones case, this divergence may justify scientific uncertainty with regard to genetically engineered crops.[368] However, the EU has failed to come forward with a risk assessment dealing with genetically engineered crops based on scientific evidence or the risk to human health or the environment.[369]

In fact, nine genetically engineered crops are grown within the EU. Coupled with internal farm subsidies, the EU import ban is viewed by some as agricultural protectionism.[370] Arguably, the EU import ban is an arbitrary and unjustifiable distinction, which results in discrimination and a disguised restriction on international trade.[371] The EU's selective regulation may be reinforcing popular prejudice about the magnitude of risk from genetic engineering[372]

Even if the EU can justify its precaution, it must also establish that its measures are not more trade restrictive than necessary to protect human health and the environment.[373] Technical and economic feasibility are considerations.[374] The United States has argued several less trade-restrictive measures exist that would still allow the EU to achieve its objectives and comply with the WTO, such as the implementation of identity preservation systems.[375] The EU/U.S. Biotechnology Consultative Forum suggested establishing mandatory labeling standards for products that contain genetically engineered material.[376] Such measures have been countered by the cost of crop segregation as well as monitoring and testing requirements.[377] However, costs cannot be adequately determined and are "likely to change as the industry adapts to the traceability requirements and as the volume of

367. SPS Agreement, *supra* note 68, at art. 5, para. 7.

368. *See* Hormones, *supra* note 74, at para. 194.

369. USDA, *supra* note 16. The U.S. claims the EU moratorium is without scientific basis. U.S. Embassy, Vienna, Austria, *supra* note 183.

370. *See* Elizabeth Becker, *Western Farmers Fear Third-World Challenge to Subsidies*, N.Y. TIMES, Sept. 9, 2003, *available at* http://www.nytimes.com/2003/09/09/international/europe/09FARM.html. The world's wealthiest nations give more than $300 billion of subsidies to their farmers every year. *Id.* The Organization for Economic Cooperation and Development has found that "[i]n the past decade, the top quarter of farmers in the developed world have steadily gained most of the subsidies—70 percent in Europe and 90 percent in the United States." *Id.* These payments result in large farms producing a surplus of crops domestically and low subsidized prices in overseas sales. *Id.*

371. *See* SPS Agreement, *supra* note 68, at art. 2, para. 3; TBT Agreement, *supra* note 114. The United States Secretary of Agriculture stated, "'This case is about playing by the rules negotiated in good faith.'" USDA, *supra* note 16.

372. *See* Howse, *supra* note 48, at 2352-53.

373. *See* SPS Agreement, *supra* note 68, at art. 5, para. 6.

374. *Id.*

375. *See* BAUMÜLLER, *supra* note 29, at 5.

376. *See* HANRAHAN, *supra* note 22, at 6. This forum is a panel of experts who provide advice on biotechnology to the U.S. and EU. *Id.*

377. BAUMÜLLER, *supra* note 29, at 5.

material involved increases."[378] The adoption of international standards governing labeling and risk management could assist in decreasing future conflict in this area.[379]

Further, SPS measures are to be taken "without undue delay and in no less favourable manner for imported products than for like domestic products."[380] GATT likeness determinations are made on a case-by-case basis and reference four criteria: "physical properties, end-uses, tariff classification, and consumers' tastes and habits."[381] Genetically engineered crops are physically similar to traditional crops, so it appears the EU would need to demonstrate that consumer perception and behavior are affected.[382]

Overall, it does not appear the EU will succeed in justifying its import ban on genetically engineered crops for several reasons. The de facto moratorium has been intact since 1998; nine genetically engineered crops are grown within the EU; the WTO regulates on a product rather than process basis; and, scientifically based risk assessments are nonexistent.

By contrast, for those players who opted to fold early and chose not to raise genetically engineered crops within, a precautionary import ban based on the uncertain effects of genetic engineering may be justifiable.[383] Article 5.7 of the SPS Agreement addresses precaution within the WTO. Precautionary measures under the WTO must be provisional, and the implementing country must demonstrate it is actively seeking "to obtain the additional information necessary for a more objective assessment of risk."[384] Precaution is also a principle of international law and can be used when the measures are not provisional.[385] Because the WTO recognizes certain international agreements, the precautionary principle may play a strong role in the context of international trade and GMO regulation.[386] The question then becomes whether the WTO will permit an environmental action

---

378. *Id.*

379. *Id.*

380. SPS Agreement, *supra* note 68, at Annex C, Control, Inspection and Approval Procedures, para 1(a).

381. BAUMÜLLER, *supra* note 29, at 5.

382. *Id.*

383. Applegate, *supra* note 127, at 208-09. An authoritative statement of this approach is contained in Principle 15 of the 1992 Rio Declaration on Environment and Development: "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 of the United Nations Conference on Environment and Development, June 14, 1992, 31 I.L.M. 874.

384. SPS Agreement, *supra* note 68, at art. 5, para. 7.

385. BAUMÜLLER, *supra* note 29, at 6.

386. *Id.* It is not clear whether this principle is established under international law to the extent that the WTO would account for it in the WTO provisions. *Id.*

authorized by a multilateral treaty that does not include all GATT parties.[387]

In the current high-stakes game, the precautionary principle is not a card available for the EU's use. It is another spade that the EU would like to have face up on the board. Precaution within the WTO agreements mandates that such measures are provisional.[388] Here, the moratorium has been in place and unchanged since 1998.[389] Precaution is exercisable because of uncertainty. The EU raises genetically engineered crops within while seeking to prohibit all new genetically engineered products from entering its borders. If its fear is genetic engineering and its position is that the nine crops previously approved are safe, it arguably should be able to evaluate new varieties as they are introduced or within a reasonable time thereafter.

Therefore, in poker terms, the game has reached the rare yet decisive showdown on the river in the WTO poker room. The EU is hoping for a spade to complete its flush draw. While the U.S. knows the odds of another spade are low, such a draw could still occur. If the river is not a spade, the U.S. will win with three queens and possibly a full house. Thus, the outcome of the dispute resolution panel could make or break the U.S. or EU's hand. However, once the river is revealed each player will re-evaluate its hand to determine whether to stay in the game. Ultimately, time will reveal whether the best hand or best strategy prevails in the WTO poker room. And so we are left, waiting for the river.

387. *See* Guruswamy, *supra* note 41, at 203. International Environmental Law (IEL) institutions, although fragmented and for the most part lacking international jurisdiction in the legal forum, are relevant when embodied in the WTO "Covered Agreements." *See id.*; DSU, *supra* note 141, at arts. 3, 11.

One such multilateral agreement is the Cartagena Protocol on Biosafety, adopted by over 130 countries on January 29, 2000, in Montreal, Canada. U.S. Department of State, *Fact Sheet: The Cartagena Protocol on Biosafety,* ECON. PERSP., *supra* note 21, at 17-19. The protocol became effective on September 11, 2003. *Id.* at 17. The U.S. cannot become a party to the protocol because it is not a party to the Convention on Biological Diversity, which established the protocol. *Id.* However, the U.S. did play an active role in the development of the protocol by negotiating its text and preparations. *Id.* The purpose of the protocol "is to contribute to the safe transfer, handling and use of living modified organisms." *Id.* It regulates the movement of living modified organisms that could adversely affect biological diversity and human health. BAUMÜLLER, *supra* note 29, at 6. However, the protocol also includes a "savings clause" stating that the agreement does not change the rights and obligations of a party under existing international agreements. U.S. Department of State, *supra*, at 17.

388. *See* BAUMÜLLER, *supra* note 29, at 6.

389. WTO, *European Measures*, *supra* note 3, at 1.