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Overview of existing international/regional mechanisms to ban or restrict trade in potentially invasive alien species

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SUMMARY

ABBREVIATIONS

AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds (1995)
CBD	United Nations Convention on Biological Diversity (Rio de Janeiro, 1992)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979)
ECJ	European Court of Justice
EIA	Environmental impact assessment
EPPO	European and Mediterranean Plant Protection Organisation
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade (1947)
GISP	Global Invasive Species Programme
IAS	Invasive alien species
ICAO	International Civil Aviation Organization
ICES	International Council for the Exploration of the Seas
IMO	International Maritime Organization
IPPC	International Plant Protection Convention (1951, revised in 1997)
ISPM	International Standard for Phytosanitary Measures
IUCN	The World Conservation Union
LMO	Living modified organism (under the CBD Cartagena Protocol on Biosafety)
MEA	Multilateral environmental agreement
OIE	World Organisation for Animal Health (Organisation mondiale pour la santé animale, formerly Office international des épizooties)
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SPS Agreement	WTO Agreement on the Application of Sanitary and Phytosanitary Measures (1994)
UNCLOS	United Nations Convention on the Law of the Sea
WHO	World Health Organization
WTO	World Trade Organization

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EXECUTIVE SUMMARY

Globalisation provides vastly expanded opportunities for species to be transported to new locations through a wide range of pathways. Those alien species that become established and spread can have serious implications not just for the environment and communities but also for national trade and development. Invasive alien species (IAS) can affect not only domestic interests but also a country's trade partnerships and export markets. Investment in structured prevention efforts carries a cost but non-investment may be far costlier in the long run in terms of direct damage, market restrictions and higher management costs. Prevention measures should be applied to pathways for introduction and be internationally or regionally coordinated.

The World Trade Organization (WTO) establishes the overarching context for international trade and, through its constituent agreements, determines how countries can regulate IAS without creating unfair barriers to trade. The agreement most relevant to IAS prevention and management is the WTO Agreement on the Application of Sanitary and Phytosanitary Measures which protects human, animal or plant health/life from risks arising from the entry, establishment or spread of pests, diseases, or disease-causing organisms where these may directly or indirectly affect international trade. This Agreement recognizes standards developed by the International Plant Protection Convention, which potentially covers pests of wild plants and natural systems, and the World Organization for Animal Health, whose focus is limited to animal diseases.

Multilateral environmental agreements mainly focus on non-trade aspects of IAS prevention. Exceptions include the Convention on International Trade in Endangered Species of Wild Fauna and Flora, decisions adopted by Parties to the Convention on Biological Diversity (CBD) and the CBD Cartagena Protocol on Biosafety which covers trade in living modified organisms. Gap analysis initiated by the CBD indicates that a high number of trade pathways still fall outside the international regulatory framework. In Europe, regional mechanisms for IAS prevention in the context of trade are developing in interesting ways. Two cases involving trade in IAS have been judged by the European Court of Justice.

The design and implementation of IAS prevention measures needs to take account of WTO rules and disciplines to withstand possible challenges from trading partners under the WTO dispute settlement framework. The most recent WTO ruling is summarised and areas of possible difficulty are highlighted, particularly the application of the precautionary approach, use of risk assessment and the interface between WTO and environmental rules. Indicators are provided for application of other WTO rules and the use of species listing techniques.

Recommendations focused at the regional level cover information exchange, early warning systems, cooperation on high-risk pathways and risk assessment, regional standards and species listing and mainstreaming of IAS issues in national and regional policies and actions.

I. TRADE: A PRIORITY ISSUE FOR IAS PREVENTION AND MANAGEMENT POLICIES

A. Introduction of potentially invasive alien species through trade

It is now well known that globalisation and growth in trade and tourism, coupled with expanded arrangements for free trade, provide more opportunities than ever before for species to be transported to new locations, whether intentionally or unintentionally.

Pathways include transportation (e.g. boat, plane, train), sectoral activities (e.g. horticulture, forestry, game-breeding) and commodities (e.g. timber, grapes, seed consignments). Unintentional introductions can occur in association with most of the pathways listed under intentional introductions (see Table 1).

Table 1 – Examples of Pathways of Invasive Alien Species Introductions[1]

Intentional Introductions		**Unintentional Introductions**
Direct Introductions into the Environment	**Introductions into Captivity/Containment**	
▪ Agriculture ▪ Forestry ▪ Soil improvement ▪ Horticulture (*ornamentals, nursery stock, bulbs, house plant*) ▪ Conservation ▪ Fishery releases ▪ Hunting and fishing ▪ Release of mammals on islands as food sources ▪ Biological control ▪ International development assistance ▪ Smuggling	▪ Escapes from botanical and private gardens ▪ Zoos ▪ Animal husbandry, livestock ▪ Beekeeping ▪ Aquaculture ▪ Pet trade ▪ Aquarium and horticultural pond trade ▪ Research facilities	▪ Vessels, vehicles (*land, water, air*) ▪ Ballast water ▪ Hull fouling ▪ Sea cargo ▪ Sea containers ▪ Personal baggage/equipment ▪ Agricultural produce ▪ Seed contaminants ▪ Soil, gravel, sand, etc. ▪ Timber ▪ Packaging material ▪ Dirty equipment, machinery, vehicles (*military, construction*) ▪ International mail ▪ Solid waste ▪ Aquaculture (*hitchhiker parasites, diseases*) ▪ Cut flowers ▪ Nursery trade

Increased trade affects the dynamics of IAS movements in several ways:

- increasing volumes of goods leads to more chances for introduction;
- more introductions lead to a greater probability that an IAS will become established;
- an increasing variety of goods and means of transport increases the potential array of species that may be moved and their pathways for transfer;

[1] Table based on the Global Invasive Species Programme: *Invasive alien species: a toolkit of best prevention and management measures* (R. Wittenberg & M.J.W. Cock eds. 2001).

- more frequent delivery of goods from and to a wider range of countries and habitats increases the rate and variety of potential introductions;
- faster modes of transport may improve an organism's chances of survival while in transit (Burgiel et al, 2006).

B. Implications of invasive alien species for trade and development

Whilst many introduced species underpin national production systems (agriculture, fisheries, aquaculture, forestry, horticulture..), the economic, social and environmental impacts of those alien species that become invasive are increasingly recognised, at least at the international policy level[2].

There is considerable uncertainty about the total economic costs of invasions but even partial estimates of the economic impacts on particular sectors indicate the seriousness of the problem. The introduced comb-jellyfish caused losses to the anchovy fisheries in the Black Sea estimated at $17 million annually[3]. IAS-related economic damage in Germany's inland water systems from erosion of river banks and embankments is estimated at 32 million € per year for *Fallopia* species and 12 million € per year for *Heracleum mantegazzianum* and for the muskrat *Ondatra zibethicus*[4].

Cumulative IAS impacts affect both market and non-market values. Invasions can affect not only domestic interests but also a country's trade partnerships and export markets (i.e. where its goods are excluded because of the presence of pests or disease or non-compliance with required import standards). Inadequate IAS prevention can thus have a knock-on effect on sustainable development objectives at the level of a country or region. Non-market values affected by IAS include disruption of ecosystem services essential for local economies and sectoral productivity (e.g. altered hydrological cycle, flood control, water regimes; recycling of nutrients; soil conservation and regeneration; pollination of crops; seed dispersal).

Prevention measures are therefore essential to protect the environment, public health and economies against possible IAS impacts. Although investment in prevention carries a cost (border control and quarantine services, risk assessment, monitoring etc.), non-investment may be far costlier in the long run in terms of direct damage, lost trade opportunities (market restrictions) and higher management costs.

Structured prevention frameworks are the best way to minimise risks of unwanted introductions whilst benefiting from trade expansion and diversification.

C. Overview of prevention measures in the context of trade

Existing IAS instruments, whether binding or non-binding, endorse prevention as the preferred approach, given the technical and financial constraints on successful eradication and control[5]. In addition, States have a general obligation under customary international law to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or to areas beyond the limits of national jurisdiction. This prevention norm extends to export of potentially invasive species[6].

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[2] For studies of economic and other impacts, see http://www.gisp.org/ecology/IAS.asp and Perrings et al (2005) *The Economics of Biological Invasion.*

[3] D. Knowler and E. Barbier (2000). *The Economics of an Invading Species: A Theoretical Model and Case Study Application*. The Economics of Invading Species. Edited by C. Perrings, M. Williamson and S. Dalmazzone. Edward Elgar, U.K.

[4] Case study cited in SBSTTA 2005. *The ecological and socio-economic impacts of invasive alien species on inland water ecosystems* (UNEP/CBD/SBSTTA/10/1).

[5] See e.g. Shine et al (2005), Burgiel et al (2006).

[6] Trail Smelter (U.S. v. Canada), 3 R.I.A.A. 1905 (1941); Corfu Channel (U.K. v. Albania), 1949 I.C.J. 4 (Judgment of Apr. 9).

Prevention efforts need to reflect the international or regional character of IAS pathways and recognise that fragmented unilateral action is likely to be ineffective. Species-specific measures can too be used when screening intentional introductions, but pathway-based mechanisms provide the only realistic way to tackle unintentional introductions.

Existing controllable pathways for IAS are managed mainly to control unwanted disease, pathogens and parasites for quarantine purposes, often for crops or livestock which are themselves alien. Procedures in place rarely involve consideration of the potential impacts of the primary organisms being moved and have tended to focus on economic impacts, not impacts upon native biodiversity (SBSTTA, 2005). However, border control and quarantine frameworks represent a substantial network of expertise and capacity into which broader-based biodiversity considerations can be integrated.

Regional/national import requirements may be applied at different stages

Table 2 – Examples of Prevention Measures During Different Stages of Transport (Burgiel, 2006)

Pre-Border Measures	At-Border Measures	Post-Entry Measures
• Pest control in production fields • Quality control measures in packing facilities • Inspection during production, packing and prior to shipment • Pest-proof packaging • Treatment (*fumigation, temperature treatments, ultra-violet sterilization*) • Timing of shipment (*e.g. use of seasonal differences to inhibit pest survival*) • Pre-shipment quarantine for live plants/animals, etc. • Certification • Mid-ocean ballast water exchange	• Certification • Treatment • Visual inspection • Remote inspection (*X-ray, sniffer dogs, cameras*) • Defined ports of entry • Quarantine in border facilities	• Domestic inspection, treatment • Environmental assessment of infrastructure development • Monitoring around ports of entry or of key at-risk areas • Tracking movement of certain products

Pre-border measures reduce the risk of potential IAS reaching new countries or ecoregions and lessen the burden on regulatory officials at border control points. Examples include: requiring ships to discharge ballast water offshore prior to port entry; fumigation, quarantine or other processing requirements carried out in the exporting country; consultation of national lists of species that can or cannot be imported.

Border measures are designed to intercept IAS at a political boundary and should preferably complement pre-border measures. The best-known include customs rules, inspections and quarantine procedures which regulate import of potential IAS or potential pathways. Additional stricter measures now recommended include environmental impact assessment (EIA)/risk assessment for first-time intentional introductions.

Post-entry measures are important to prevent the further spread of an alien species that (a) is already invasive in one part of the country or (b) is benign in one area, but potentially invasive if transported to a different part of that country with different ecological conditions. Stringent in-country prevention is particularly important in states with islands to prevent the spread of IAS between islands or between islands and the mainland, but should also be used to protect vulnerable ecosystems and protected areas.

II. OUTLINE OF THE INTERNATIONAL TRADE REGIME

A World Trade Organization (WTO): basic rules

The WTO establishes the overarching context for international trade and, through its constituent agreements, determines how countries can regulate IAS without creating unfair barriers to trade.

International trade in products and services between WTO Members is disciplined by the 1994 Uruguay Round of Agreements which incorporate the General Agreement on Tariffs and Trade. The GATT sets out binding rules, enforced by a compulsory dispute settlement mechanism, to ensure that governments extend non-discriminatory market access[7] to each other's products and services, on the basis of transparency.

WTO Agreements are not directly concerned with the environmental policies and measures, except to the extent that these may have a significant impact on international trade[8]. However, Article XX of the GATT provides a legal basis for exceptions for measures "necessary to protect human, animal or plant life or health" or "relating to the conservation of exhaustible natural resources" if such measures are made effective in conjunction with restrictions on domestic production or consumption. Such measures must not be designed or applied in a way that would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade.

This provision is broad enough to support IAS import restrictions that can be shown to be consistent with WTO rules, although each case needs to be considered on its specific circumstances[9].

B WTO agreements relevant to invasive alien species

1. WTO Agreement on the Application of Sanitary and Phytosanitary Measures

The SPS Agreement (1995) provides the international framework for national measures to protect human, animal or plant health/life from risks arising from the entry, establishment or spread of pests, diseases, or disease-causing organisms where these may directly or indirectly affect international trade.

It is the most relevant WTO Agreement to IAS issues and also has more stringent risk assessment and science requirements than other WTO agreements. To reduce protectionist decisions, it requires that any SPS measure is applied only to the extent necessary to protect human, animal or plant life or health, is based on scientific principles and is not maintained without sufficient scientific evidence (Art 2.2).

The Agreement encourages use of international standards, guidelines and recommendations when developing SPS measures and recognises three organisations for international standard-setting: the International Plant Protection Convention, the World Organisation for Animal Health and, for food safety standards, the Codex Alimentarius Commission. The SPS Committee may recognise other organisations for matters not covered by those three organisations but this has not happened to date.

Art.3 of the Agreement envisages three types of measures:

- *those that "conform to" international standards (Art.3.1)*

  This is where a national measure embodies an international standard completely. There are several benefits[10]: such measures are presumed to be consistent with the SPS Agreement and GATT

[7] (1) Products should be treated no less favorably under national laws of the importing country than like domestic products; (2) products from one country should be treated no less favorably than products from any other country.

[8] Downes, D. 1999. *Integrating Implementation Of The Convention On Biological Diversity And The Rules Of The World Trade Organization*. IUCN Gland, Switzerland and Cambridge, UK.

[9] For a detailed review of how IAS measures may comply with relevant international trade rules, see Burgiel et al (2006).

[10] CBD 2005b, *Report of the Ad Hoc Technical Expert Group on Gaps and Inconsistencies in the International Regulatory Framework in relation to Invasive Alien Species* §31.

(rebuttable presumption), are cheaper to develop and implement, and contribute greater harmonisation at the international and national level, reducing compliance costs.

However, experience to date shows that collective negotiation of standards generally reflects a lower common denominator of protectiveness with trade facilitation as the main objective. Developing countries may lack the resources, expertise or scientific information to participate effectively in standard development and ensure their concerns are taken into account.

- *those that provide for higher levels of protection than international standards (Art.3.3).*

  A Member establishing an SPS has the right to determine the appropriate level of protection to protect human, animal or plant life of health within its territory. National measures are subject to requirements concerning scientific justification, risk assessment, non-discrimination, consistency and least trade-restrictiveness (see further Part IV).

- *those that are "based on" international standards. This enables countries to tailor the relevant standard to their national circumstances. They do not benefit from an automatic presumption of consistency but may avoid the more rigorous procedures for developing measures not based on international standards.*

Where relevant scientific information is insufficient, a Member may provisionally adopt an SPS measure on the basis of available pertinent information and seek to obtain the additional information necessary for a more objective assessment of risk and review the measure within a reasonable period of time (Art.5.7 and see Part IV for a discussion of precaution in this context).

2. Other agreements

The WTO Agreement on Technical Barriers to Trade (TBT Agreement) aims to prevent national regulations, standards, testing and certification procedures from being used to create unfair barriers to trade. It again promotes use of international standards to facilitate trade and harmonise national regulations. National regulations may be adopted to protect human, animal and plant life and health or the environment, but should not be more trade-restrictive than necessary and should take into account the risks of non-action. The TBT Agreement does not apply to measures covered by the SPS Agreement but is relevant to broader IAS issues e.g. identification, documentation, labeling and traceability systems[11].

The General Agreement on Trade in Services (GATS) provides a framework for increased trade in services as diverse as transport, tourism and communications, several of which provide major IAS pathways. Members may make exceptions for measures necessary to protect human, animal or plant life or health, provided they comply with the general WTO rules described above.

III. SCOPE OF EXISTING MECHANISMS REGULATING TRADE IN POTENTIALLY INVASIVEALIEN SPECIES

A. Standard-setting bodies recognised under the SPS Agreement

1. International Plant Protection Convention (IPPC)

The IPPC[12] aims to prevent the spread of pests of plants and plant products between countries and promote appropriate measures for their domestic control. 'Pest' is defined as 'any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products'.

[11] e.g. In June 2006, the European Commission notified the WTO Committee on Technical Barriers to Trade of its proposed Regulation on the use of alien and locally absent species in aquaculture, discussed III.D below (G/TBT/N/EEC/110).

[12] Adopted 1951; revised version adopted 1997, in force since 2 October 2005.

Parties must establish national plant protection organisations and implement import regulations and systems for compliance, surveillance, reporting, control and export certification. International Standards for Phytosanitary Measures (ISPMs) adopted by the IPPC's Commission on Phytosanitary Measures provide the basis for national measures. Implementation is supported by nine regional plant protection organisations which may develop regional standards (for the pan-European region, see III.D.1 below).

Although IPPC's main focus is on preventing damage to plants of economic importance, it also covers invasive species that meet the definition of 'pest' and cause direct or indirect damage to wild plants and the natural environment[13]. Two ISPMs adopted in 2003 explicitly address pest impacts on unmanaged ecosystems as well as agricultural systems:

- The Supplement on *Analysis of environmental risks*[14] focuses on plants that are potential weeds and explicitly covers risks to biodiversity. It provides that a species that is allowed entry based on available information, which subsequently moves to an unintended environment and becomes problematic, may be treated as if it had just arrived and is a new pest. This means that IPPC provisions regulating the entry of a pest may be applied to domestic movements of an organism, even years after its introduction. The Supplement also supports control of pests that can cause indirect impacts on biodiversity and ecosystem function as well as direct impacts to plants.
- The Supplement on *Guidelines on the understanding of potential economic importance and related terms including reference to environmental considerations*[15] clarifies that pest risk analysis can account for environmental concerns in economic terms by using monetary or non-monetary values: market impacts are not the sole indicator of pest consequences. This means that Parties may adopt phytosanitary measures for pests even where the damage they cause to plants, plant products or ecosystems within an area cannot be easily quantified in economic terms.

Despite this progress, existing standards focus mainly on issues of process (i.e., providing guidance to authorities on how to conduct a risk assessment or develop quarantine, certification and/or surveillance systems) rather than to the regulation of particular species or pathways. Only one ISPM directly addresses a major IAS pathway, wood packaging[16].

ISPMs under development[17] include:

- *Pest risk management for plants for planting in international trade* (Specification No.34).

The rationale for the proposed standard is that international trade in plants for planting has a high potential for the introduction of regulated pests, but current phytosanitary measures that rely mainly on treatments and inspections upon entry are sometimes inadequate to mitigate the risks. Harmonised procedures for phytosanitary security of traded plants for planting are necessary to allow increased trade while minimizing the number of regulated pests on plants for planting to an acceptable level and reducing delay.

- Definition of *appropriate level of protection* (Specification No.36)

This term in the SPS Agreement underpins selection of phytosanitary measures in policy making but difficulties result from its vague or ambiguous use which potentially affect trade and market access. The

[13] Third Meeting of the Interim Commission on Phytosanitary Measures, 2001, building on the recommendations of a 1999 Working group on GMOs, biosecurity and invasive species; see also Hedley (2004).
[14] Supplement to ISPM No. 11 *(Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms).*
[15] Supplement to ISPM No.5 (*Glossary of Phytosanitary Terms*).
[16] ISPM No.15 (2002) on *Guidelines for regulating wood packaging material in international trade.*
[17] In June 2006, the IPPC Secretariat called for nominations for Expert Working Groups and Technical Panels *inter alia* through the CBD website (see http://www.biodiv.org/doc/programmes/cro-cut/alien/allien-2006-05-17-nomination-en.doc).

new standard will provide clear and practical definitions for *appropriate level of protection* and *acceptable level of risk* in relation to pest risks and describe how the term can be clearly used.

IPPC cooperates with the CBD Secretariat through a joint work plan and regular meetings. In 2003, its Secretariat held an expert workshop to build awareness amongst phytosanitary experts, environmental managers and regulators of the scope to use IPPC tools in IAS prevention and management[18].

2. World Organisation for Animal Health (OIE)

OIE's mandate is to safeguard world trade by publishing health standards for international trade in animals and animal products. It develops Terrestrial and Aquatic Animal Health Codes setting out standards and guidance to prevent the introduction of infectious agents and diseases pathogenic to animals and humans in the course of trade. Implementation is carried out by national veterinary services.

Guidelines on import risk analysis cover the obligations of both importing and exporting countries and certification procedures, to provide importing countries with an objective and defensible method of assessing disease risks associated with importation of animals, animal products, animal genetic material, feedstuffs, biological products and pathological material. The principles and methods are the same whether the commodities are derived from aquatic and/or terrestrial animal sources (CBD 2005a).

Existing OIE standards do not provide a basis to ban imports of animal species that may be invasive in their own right nor do they address risks of invasiveness related to potential 'carriers' of animal diseases. They do not directly address animal diseases that could threaten native animals but not food-producing animals (e.g. avian malaria) or have impacts on natural systems (Miller et al, 2006).

Recent developments have been driven by disease outbreaks during the period 2000-2005, like foot and mouth disease in 2001 and avian influenza in 2005[19]. A Global Early Warning System for Animal Diseases including Zoonoses (GLEWS) was set up in 2003 by FAO, OIE and WHO to share information on animal disease outbreaks and epidemiological analysis, promote transparency among countries and better coordinate international response to animal disease emergencies.

B Multilateral environmental agreements relevant to trade in potentially invasive alien species

Multilateral environmental agreements (MEAs) traditionally tackle non-trade IAS aspects (regulation of releases to the wild, management of incursions). Although some treaty institutions have begun to consider trade aspects, most recommendations relevant to trade are both general and voluntary, taking the form of decisions of the Conference of the Parties or non-binding action plans[20].

1. Convention on International Trade in Endangered Species of Wild Fauna and Flora

CITES is the only MEA to address international trade in certain categories of animals and plants. In 1997, Parties recognised its potential relevance to IAS in terms of trade in CITES-listed species that are potentially invasive in some parts of the world[21]. In 2001, the CITES Animals Committee agreed to

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[18] *Invasive Alien Species and the International Plant Protection Convention: An expert consultation of phytosanitary services and environmental protection agencies* (Braunschweig, Germany, 22-26 September 2003 (proceedings available http://www.fao.org).

[19] Note that three biodiversity-related organisations address the implications of avian influenza for wild birds: the Ramsar Convention on Wetlands (Resolution IX.23); the African-Eurasian Waterbird Agreement (Resolution 3.18); and the Convention on the Conservation of Migratory Species of Wild Animals (Resolution 8.27).

[20] e.g. The Ramsar Convention on Wetlands COP urges Parties to address the environmental, economic and social impact of the movement or trade of alien species within their jurisdictions (Resolution VII/14).

[21] Decisions 10.54, 10.76 and 10.86 (COP10, Harare, 1997).

prepare a concise list of potentially invasive CITES species in collaboration with the CITES Plants Committee and IUCN[22].

Resolution 13.10 on *Trade in Alien Invasive Species* (2004) considers that alien species can pose significant threats to biodiversity and that species of fauna and flora in commercial trade are likely to be introduced to new habitat as a result of international trade. It recommends that CITES Parties should:

- consider the problems of invasive species when developing national legislation and regulations that deal with trade in live animals or plants[23];
- consult with the Management Authority of a proposed country of import, when possible and when applicable, when considering exports of potentially invasive species, to determine whether there are domestic measures regulating such imports.

Initial follow-up to this Resolution focused on species listing of potential IAS[24] and contact was established with the CBD Secretariat and the IUCN/SSC Invasive Species Specialist Group. However, the 2006 joint session of the Plants and Animals Committees decided that possible cross-referencing of IAS with CITES-listed species were not a priority for the Committees and advised the Secretariat not to pursue its efforts in this regard. Concerns included possible duplication of IAS-related activities, given resource constraints[25].

For the time being, there is no formalised work programme on IAS in trade within the CITES remit. However, the Committees support continued consultations under the CITES-CBD Memorandum of Understanding[26] and will have an opportunity to contribute to the CBD's internal review of implementation of IAS-related decisions prior to CBD COP9 in 2008, where IAS will be a priority theme.

2. Convention on Biological Diversity (CBD)

Although the CBD's comprehensive provision on IAS[27] does not mention trade, all IAS decisions adopted since 2002 address trade-related prevention in a general (non-species-specific) way. Four of the Guiding Principles[28], on which the European Strategy on Invasive Alien Species is based, are particularly relevant:

- recognition by States of the risk that activities within their jurisdiction or control may pose to other States as a potential source of IAS (e.g. intentional transfer of an IAS to another State, even where harmless in the State of origin; intentional introduction of an alien species into their own State if there is a risk of that species subsequently spreading into another State and becoming invasive) (GP4);

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[22] Implementation of Decision 11.100 regarding trade in alien species. Seventeenth meeting of the Animal Committee, Hanoi (Viet Nam), 30 July-3 August 2001.

[23] The CBD Secretariat indicates that some consideration of invasiveness in the granting of CITES permits has resulted from Resolution 13.10 (CBD 2005a).

[24] The Animals Committee suggested keeping a watch list of potentially invasive species *that may have an impact on CITES species* (emphasis added) and noted that IAS could be accidentally spread with specimens of CITES-listed species, an issue linked to transport. The Plants Committee suggested that the CBD could assist CITES in determining which CITES-listed plant species should be considered as potential IAS (AC21, PC15, Geneva, May 2005).

[25] 7-8 July 2006 (Lima, Peru: see documents AC22 Doc. 14 and PC16 Doc. 14).

[26] One Committee member suggested that CITES could provide information on trade routes that facilitate IAS proliferation.

[27] Art 8(h) requires Parties, as far as possible and as appropriate, to "prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species".

[28] *Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species*, annexed to Decision VI/23 (2002).

- implementation of border controls and quarantine measures for alien species that are or could become invasive (GP7);
- prior authorisation of first-time intentional introductions or subsequent introductions of an alien species already invasive or potentially invasive within a country: decision-making should be based on the precautionary approach within a risk analysis framework (GP10);
- measures to minimise unintentional introductions through pathways associated with sectoral activities such as fisheries, agriculture, forestry, horticulture, shipping, ground and air transportation, construction projects, landscaping, aquaculture including ornamental aquaculture, tourism, the pet industry and game-farming (GP11).

The most recent CBD Decision on IAS[29] urges States to communicate to potential importing countries relevant information about particular species that are subject to export and known to be potentially invasive, using web-based databases, alert lists or other information-sharing mechanisms at global and regional levels and including data relevant for risk analysis and proactive prevention measures.

The Decision supports further consultations with the IPPC, OIE, FAO and WTO on whether and how to address the lack of international standards covering IAS, in particular animals that are not pests of plants under the IPPC (see III.C below).

3. CBD Cartagena Protocol on Biosafety

The movement of a native species which has been subject to selective breeding or other processes that have altered its genetic characteristics should be addressed as an IAS issue under the CBD[30].

The Protocol, in force since 2003, aims to ensure an adequate level of protection in the field of safe transfer, handling and use of living modified organisms (LMOs[31]) that may have adverse effects on biodiversity conservation and sustainable use. It introduces an advance informed agreement procedure for the first intentional transboundary movement of LMOs for intentional introduction into the environment, requires Parties to undertake risk assessments in the course of LMO-related decision-making and covers standards for LMO handling, transport, packaging and identification. In 2006, the Parties agreed detailed documentation requirements for LMOs for food, feed or processing[32].

A 2004 memorandum of cooperation between IPPC, CBD and the Cartagena Protocol formalised cooperation between the three conventions and initiated a joint work plan. Regular tripartite meetings address IAS issues as they affect plant health in the broadest sense.

C Gaps in trade pathway coverage at the international level

The most recent gap analysis was carried out in 2005 by a technical expert group set up under the CBD[33], whose conclusions are reflected in CBD Decision VIII/27. The Expert Group found that inadequate implementation of existing international provisions at national level, largely due to insufficient national capacity, underpinned many problems with IAS prevention and management.

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[29] Decision VIII/27 (COP8, 20-31 March 2006, Curitiba (Brazil)).

[30] CBD 2005b §29, which notes that CBD COP decisions do not always refer to both alien species and alien genotypes, which might incorrectly imply that the latter are not always covered.

[31] Defined as a "living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology" (in everyday usage LMOs are usually considered to be the same as GMOs (Genetically Modified Organisms).

[32] The 'Curitiba Rules' approved under Decision BS-III/10 (MOPIII, 13-17 March 2006, Curitiba (Brazil)).

[33] CBD 2005b. *Report of the Ad Hoc Technical Expert Group on Gaps and Inconsistencies in the International Regulatory Framework in relation to Invasive Alien Species* (Auckland, New Zealand, 16-20 May 2005; UNEP/CBD/SBSTTA/11/INF/4).

The most significant gap in existing international standards concerns animals that are (potential) IAS but not marine, aquatic or terrestrial pests of plants under the IPPC. For animals in this category (e.g. snails, snakes, rats, birds, ants, other potential hitchikers on traded commodities), there is no standard-setting body with a mandate to develop SPS-recognised standards to address such risks. In addition, although the IPPC covers protection of all plants, its implementation in many countries does not cover marine plants.

The Expert Group identified specific pathway gaps in the international regulatory framework, including:

- **conveyances as pathways for potential IAS**[34]
- **aquaculture/mariculture**

There are no mandatory standards for assessment of risks related to release of alien organisms into transboundary water systems or their use in marine/inland water systems for commercial and recreational fisheries. The existing non-binding framework consists of OIE codes, which do not address invasiveness of introduced stock *per se*, and technical codes of practice (e.g. FAO Code of Conduct for Responsible Fisheries 1995[35]; ICES Code of Practice on the Introductions and Transfers of Marine Organisms 2004[36]).

- **pets, aquarium species, live bait, live food and plant seeds**

Invasion risks associated with trade in such organisms are not covered unless these qualify as pests of plants under IPPC, even though such trade is increasing particularly through internet-based transactions. Some industry sectors (e.g. the Ornamental Aquatic Trade Organization) have developed voluntary codes and some governments prohibit releases at national level. The Organisation for Economic Cooperation and Development (OECD) operates voluntary schemes for the varietal certification of seed to minimise the presence of undesirable organisms such as noxious weeds in international movements of seeds.

- ***ex situ* animal breeding programmes**

This pathway gap covers breeding and movement of alien animal species to provide game species for hunting, fish for sports fisheries (including movements of fish between water bodies and drainage basins), exchanges between safari parks etc.

- **scientific research and botanic gardens**

Research provides pathways through the movement of organisms or biological specimens, species reintroductions as part of biodiversity management programmes and the spread of pests and diseases on contaminated equipment (e.g. wading apparel used in aquatic research). Researchers with access to sites of high conservation value may carry equipment or organisms into sites closed to the general public.

Botanic gardens are a major source of alien species introductions, even promoting the deliberate spread of new horticultural species. Decision VIII/27 encourages relevant bodies, including the Future Harvest (CGIAR) Centres, Botanic Gardens Conservation International and the International Union of Forestry Research Organizations, and professional societies to develop codes of practice and carry out risk assessments on proposed species introductions associated with scientific research activities.

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[34] E.g. floating timber, equipment and machinery, household goods, packaging and containers, waste materials, air transport vessels, tourist vessels.

[35] Which recommends that States develop international agreements for trade in live specimens where there is a risk of environmental damage *inter alia* in importing States (section 11.2.10).

[36] http://www.ices.dk/reports/general/2004/ICESCOP2004.pdf: the revised Code includes Appendices on risk assessment, quarantine and monitoring.

- **alien species as biocontrol agents for control or eradication of IAS**

The IPPC has adopted broad *Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms*[37] which cover some key aspects (e.g. pollinators) but do not include LMOs or microbial agents intended for vertebrate pest control. Use of marine organisms in biocontrol is covered by the voluntary ICES Code of Practice on the Introductions and Transfers of Marine Organisms. There are no binding international measures on using alien animals for biological control of other animals.

Decision VIII/27 supports the evaluation and taking of appropriate measures (e.g. development of guidance or codes of practice regarding the trade and use of biocontrol agents) at national, regional and global levels to address the potential risks of biocontrol agents as IAS, taking into account the work of relevant international bodies and agreements such as the IPPC and national experience.

- **incentives for use of IAS in environmental management projects**

Potential IAS may be intentionally imported for forestation/afforestation, erosion control, salinity management, production of biomass/biofuel crops for fuel generation, in some cases under incentive schemes like the carbon credits scheme developed under the Kyoto Protocol[38].

- **tourism**

Decision VIII/27 urges States and regional bodies to address tourism as an IAS pathway, taking into account the CBD Guidelines on Biodiversity and Tourism Development[39], with particular emphasis on tourism in sites of high conservation value. It encourages the World Tourism Organisation, International Air Transport Association and other bodies to promote public awareness and develop codes of practice.

- **other pathways for unintentional introductions**

Although prevention measures for some shipping pathways (ballast water) are now in place[40], IAS risks related to marine biofouling (hull-fouling, fouling of offshore oil and gas platforms) and non-shipping pathways (dredging, recreational boating) are not yet adequately addressed.

The International Civil Aviation Organization (ICAO) now recognises aviation as a significant IAS pathway[41]. Decision VIII/27 urges States to promote collaboration among relevant agencies (e.g., civil aviation, transport, customs, trade, plant protection, environment) to ensure that all relevant issues are raised through national participation in the ICAO. The CBD Expert Group noted that many of the alien species moved by aviation are within the mandate of the IPPC, OIE or WHO. Existing and future standards they develop are directly relevant to control of this pathway.

Other identified gaps (unintentional introductions in the course of international development assistance, military activities, emergency relief, aid and response, inter-basin water transfer and canals) are not discussed further here for reasons of space.

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[37] Revised International Standard for Phytosanitary Measures #3, adopted April 2005.

[38] Note that UNFCCC Parties are now requested to evaluate, in accordance with their national laws, risks associated with the use of potentially invasive alien species in afforestation/reforestation projects (Preamble to Decision 19/CP.9, United Nations Framework Convention on Climate Change (December 2003).

[39] http://www.biodiv.org/programmes/socio-eco/tourism/guidelines.asp.

[40] The International Convention for the Control and Management of Ships' Ballast Water and Sediments was adopted in February 2004 under the auspices of the International Maritime Organization (not yet in force) (see http://globallast.imo.org).

[41] Resolution A35-19, ICAO Assembly.

D Europe: regional mechanisms for IAS prevention in the context of trade

1. IAS listing by the European and Mediterranean Plant Protection Organisation (EPPO)

EPPO – which regroups 48 member countries covering almost all countries of the European and Mediterranean region - is developing a cooperative European strategy for protection against IAS in the framework of the IPPC and of the European Strategy on Invasive Alien Species.

In 2002, it established an Ad Hoc Panel on Invasive Alien Species which:

- screens and maintains a list of plants considered to pose an important threat to plant health, environment and biodiversity in the EPPO region;
- collects data on IAS and official control measures;
- in appropriate cases, performs Pest Risk Analysis in accordance with the EPPO *Decision support scheme for Pest Risk Analysis for quarantine pests* to evaluate whether national or international action would be suitable, including through use of climatic prediction (CLIMEX); and
- identifies measures to prevent introduction and spread or to eradicate, suppress and contain invasive plants already introduced.

Plants included in the EPPO Priority List of Invasive Alien Plants to be managed in member countries[42] should meet the following criteria:

- be considered invasive or potentially invasive by several EPPO countries;
- be absent or still containable by appropriate measures in several EPPO countries;
- have the potential for further spread and damage into significant areas where it is absent;
- be reported to be actively spreading or becoming more damaging in its current distribution area.

EPPO recommends that countries endangered by these species take measures to prevent their further introduction/spread or manage unwanted populations (publicity, restriction on sale and planting, control).

EPPO Priority List of Invasive Alien Plants (September 2006)

Terrestrial plants	**Terrestrial plants (cont)**	**Aquatic plants**
Acacia dealbata	*Helianthus tuberosus*	*Azolla filiculoides*
Acroptilon repens	*Heracleum mantegazzianum*	*Cabomba caroliniana*
Ailanthus altissima	*Heracleum sosnowskyi*	*Crassula helmsii*
Ambrosia artemisiifolia	*Impatiens glandulifera*	*Egeria densa*
Amelanchier spicata	*Lupinus polyphyllus*	*Elodea nuttallii*
Amorpha fruticosa	*Lysichiton americanus*	*Hydrocotyle ranunculoides*
Baccharis halimifolia	*Oxalis pes-caprae*	*Lagarosiphon major*
Bidens frondosa	*Paspalum distichum*	*Ludwigia peploides*
Buddleja davidii	*Prunus serotina*	*Ludwigia uruguayensis*
Carpobrotus acinaciformis	*Pueraria montana* var. *lobata*	*Myriophyllum aquaticum*
Carpobrotus edulis	*Rhododendron ponticum*	
Cenchrus incertus	*Senecio inaequidens*	
Cortaderia selloana	*Sicyos angulatus*	
Cyperus esculentus	*Solanum elaeagnifolium*	
Fallopia japonica	*Solidago canadensis*	
Fallopia sachalinensis	*Solidago gigantea*	
Fallopia x bohemica	*Solidago nemoralis*	

[42] Available at http://www.eppo.org/QUARANTINE/ias_plants.htm. See also Brunel (ed.) 2005.

The Panel is developing a transparent screening process and criteria for invasive alien plants to select plants which should be submitted to Pest Risk Analysis and for which international measures may be recommended[43]. Five such plants have now been subject to PRA and are recommended for regulation: *Crassula helmsii, Hydrocotyle ranunculoides, Lysichiton americanus, Pueraria lobata* and *Solanum elaeagnifolium.*

An EPPO Standard on *Guidelines for the management of invasive alien plants or potentially invasive alien plants which are intended for import or have been intentionally imported* was adopted in September 2006 and gives guidance on internal management measures such as publicity, surveillance, restrictions and/or codes of conducts on import, sale, holding, transport, etc.

2. European Community legislation

European legislation most relevant to IAS prevention in the trade context concerns:

- the import and export of potential IAS into and out of the Community (trade with third Countries);
- intra-Community holding and movement of potential IAS.

Trade and the operation of the Single Market are matters of Community competence. The removal of national border controls, which can serve to control movements of invasive alien species, means that Member States' powers to regulate trade and movement of potential IAS are technically limited to domestic activities (but see IV.A. below).

General rules on the release of potential IAS to the wild[44] are not discussed further here, except to note that Member States have total discretion for their implementation and are not required to conduct risk assessment prior to such introductions. It is not clear how far unintentional introductions and introductions into non-wild environments are covered by this legislation.

The Community has well-established legislation and operational systems to restrict import, prevent spread, and ensure control of **animal diseases**[45] (including aquatic species) and **pests of plants**[46] within the Community. It also regulates the holding, release, classification, assessment and transboundary movements of **genetically modified organisms**[47].

Plant protection and animal health policy in the EU is coordinated by the Directorate-General for Health and Consumer Protection (DG-SANCO), based on the SPS Agreement and standards developed by IPPC or OIE where applicable.

The Community implements CITES through the Wildlife Trade Regulations[48]. These enable the Commission to adopt EU-wide import restrictions on live specimens of species for which "it has been established that their introduction into the natural environment of the Community presents an **ecological threat to wild species of fauna and flora indigenous to the Community**"[49]. Four invasive animal species (Red-eared slider *Trachemys scripta elegans,* American bullfrog *Rana catesbeiana,* Painted turtle *Chrysemys picta*, American ruddy duck *Oxyura jamaicensis*) are currently listed, all with already

[43] Riga, Latvia (3-5 October 2006).
[44] Art.22, Habitats Directive (Directive 92/43/EC) requires deliberate introduction of alien species to the wild to be regulated to avoid prejudice to native flora and fauna and, if necessary, prohibited shall not prejudice the local flora and fauna.
[45] Through species-specific and general directive: see http://ec.europa.eu/comm/dgs/health_consumer/index_en.htm.
[46] 'Harmful organisms' listed under the Plant Health Directive (2000/29/EC as amended).
[47] Directives on contained use of genetically modified microorganisms and release of GMOs (90/219/EC and 2001/18/EC); Regulation on transboundary movements of genetically modified organisms (1946/2003/EC). The EU's 2006 Biodiversity Communication aims to significantly reduce the impact of alien genotypes on biodiversity in the EU by 2010 and again by 2013.
[48] Regulations 338/97/EC, 1808/2001/EC and 865/2006/EC.
[49] Art.4(6)d, Regulation 338/97/EC.

established populations within Community territory. No invasive plants are listed under this provision. The Commission may also establish restrictions on the intra-Community holding or movement of live specimens of species for which import is restricted under Article 4(6)[50], but has not done so to date.

A proposed Regulation on the **use of alien and locally absent species in aquaculture** is due to come into force end 2006[51]. It aims to decouple economic growth of the aquaculture industry (involving use of new species to satisfy market needs) from potential IAS impacts on ecosystems by anticipating and preventing negative biological interaction with indigenous populations, including genetic change, and by restricting the spread of non-target species and other detrimental impacts.

Under the proposed Regulation, all proposed introductions of an alien species, or a native species locally absent from an area, would be submitted for approval to a national advisory committee with appropriate scientific expertise. This would screen the proposal to determine whether the proposed introduction was 'routine' (from a known source of aquatic organisms classified as low risk) or 'non-routine', in which case an environmental risk assessment is required. Permits (up to five years) should only be granted for movements assessed as low risk or reduced to low risk by application of mitigation procedures or technologies. Specific provisions cover quarantine procedures for non-routine introductions, pilot release, contingency plans, monitoring (at least two years) and the keeping of national registers.

The proposed Regulation would apply to translocations:

- between ecoregions;
- to, from or between non-European territories of a Member State; or
- where there are grounds for foreseeing environmental threats due to the translocation;

Movements liable to affect another Member State are subject to a consultation procedure with the Commission and other Member States.

Unregulated categories of potential IAS (i.e. that fall outside existing Community legislation) include:

- non-genetically modified plants;
- animals or invertebrates that are not 'harmful organisms' as defined in the Plant Health Directive;
- plants and animals not designated as ecological threat species under the Wildlife Trade Regulations.

The proposed Aquaculture Regulation will not cover keeping of alien aquatic organisms as ornamental species in pet shops, garden centres and commercial and private aquaria, even though there is significant Community trade in such organisms, as this falls outside the scope of the Common Fisheries Policy.

3. European Court of Justice judgments relevant to IAS prevention

Trade restrictions for IAS prevention have also been tested, to a very limited extent, within the EU. The EC Treaty (Articles 28 and 29) prohibits quantitative restrictions on imports and exports but permits certain exceptions where justified on grounds such as public security and protection of human, animal or plant health (Article 30).

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[50] Article 9(6), Regulation 338/97/EC. A 2002 review of the application of these Regulations to IAS (Adrados & Griggs 2002) concluded they were not adequate to deal with IAS problems, were not preventing ecological impacts from the two species listed under Article 4(6) at the time of the analysis and proposed development of a specific EC Regulation and authority for IAS.

[51] COM(2006)154 final, 4 April 2006. This was developed under the Commission Strategy for the sustainable development of aquaculture (2002) and builds on the voluntary ICES and EIFAC/FAO codes of practice. An impact assessment of the proposed measures is available (SEC(2006) 421, 4 April 2006).

The European Court of Justice (ECJ) has considered two cases relevant to IAS restrictions:

- Germany's ban on imports of live freshwater crayfish to prevent spread of crayfish plague (*Aphanomyces astaci*) was challenged by the European Commission (case C-131/93). The German law provided that such imports were subject to permit and could only be authorised for research and teaching purposes. This ban affected around ten German firms engaged in crayfish import and distribution. A conditional exemption was provided to allow crayfish imports for a limited time, subject to specification of precise quantity, country of origin and species name. The ECJ upheld the Commission's claim that such restrictions breached the EC Treaty because they established import bans against Member States, ruling that the reduction in risks from the crayfish plague could have been achieved through measures less restrictive for intra-Community trade. Alternatives to a ban could have included requirements for health certification for the crayfish, or by regulating the marketing and management of crayfish within Germany.
- The 'Danish bees' case (case C-67/97) concerned Denmark's prohibition on keeping any non-indigenous species of nectar-gathering bee on the island of Læsø (the only species permitted being the brown bee indigenous to that island). When the government brought a prosecution, the defendant claimed that the Danish law constituted a quantitative restriction on imports in violation of Article 28 of the EC Treaty. The ECJ agreed that the Danish law was a restriction, but held that this was justified under Article 30 for the protection of animal health and life (i.e. Denmark's native species).

Because there is so little caselaw on the application of Article 30 to IAS prevention and each case is considered on its own merits, there is uncertainty at Member State level concerning the scope of restrictions that may be adopted to protect native biodiversity. Most countries have (widely varying) provisions in place regulating different aspects of import/export, possession and commercial activities[52] but it is not clear how far such provisions comply with EC trade rules governing the operation of the Single Market.

IV. DESIGNING PREVENTION MEASURES COMPATIBLE WITH INTERNATIONAL TRADE RULES

A. Recent rulings within the WTO dispute settlement system

As of February 2006, only four cases on interpretation of the SPS Agreement had been considered by the WTO Appellate Body: in each case, the defending Member was found to violate certain SPS disciplines. These different rulings, not always easy to reconcile, are important for the design and implementation of IAS prevention measures that can withstand challenges pursuant to WTO agreements[53].

The most recent ruling is the 'EC-Biotech' case (interim ruling 7 February 2006)[54] which concerned a challenge by the United States, Canada, and Argentina to various categories of EC and Member State measures[55] but not an examination of whether biotech products are safe or not. Key points of the interim report are provided with comment below:

[52] A detailed description of Member State measures is provided in Miller et al, 2006 (Annexes).

[53] For fuller discussion, see the detailed analysis in Bernasconi-Osterwalder et al, 2006; Burgiel et al, 2006; also Shine et al, 2000.

[54] European Communities – Measures affecting the Approval and Marketing of Biotech Products. . The Panel's final report was made public on 29 September 2006, "largely reiterating its February interim ruling" (BRIDGES Trade BioRes, of 6 October 2006, see at http://www.ictsd.org/biores/06-10-06/story1.htm). The final conclusions and recommendations are available: http://www.wto.org/english/tratop_e/dispu_e/291r_conc_e.pdf.

[55] Alleged EC moratorium on approvals of biotech products, product-specific EC measures related to the approval of biotech products measures, related to the import and/or marketing of specific biotech products.

- GMOs are covered – as pests - by the SPS Agreement [56];.
- the breaches of SPS rules concerned the manner in which the EC approval procedures were applied. The case does not limit countries' rights to adopt import prohibitions or moratoria on GMO use and marketing.
- safeguard measures taken by some EC Member States for products already approved at Community level were found to be inconsistent with SPS risk assessment obligations laid down in Annex A(4)[57]. The Panel took a closer textual interpretation than earlier rulings which recognized the need for flexibility in establishing an adequately broad scope for risk assessments.
- for provisional measures, the Panel recognised Article 5.7 (adoption of provisional measures in the case of insufficient scientific evidence) as a stand-alone right[58] but seemed to interpret this provision narrowly to exclude cases where a risk assessment has been conducted. This would rule out use of provisional measures in situations where, although the quantity of scientific research allows for risk assessment, the quality of scientific evidence is not sufficiently reliable to permit an adequate assessment of risks, and is a departure from earlier WTO jurisprudence, This raises serious concerns for the right of WTO Members to adopt and maintain their chosen level of SPS protection.
- the Panel held that evolving science, scientific complexity and limited available scientific data are not, in and of themselves, grounds for delaying substantive approval decisions. Application of a prudent and precautionary approach to identifying, assessing and managing risks to human health and the environment must be subject to reasonable limits, to avoid endless deferrals swallowing the discipline imposed by the SPS Agreement[59]. The obligation on Members is to come to a decision on an application: the Panel suggested that they could grant time-limited approvals or approvals subject to other appropriate conditions, or they could reject an application subject to the possibility of a review of that decision in case of changes in circumstances, such as the state of scientific knowledge[60].
- regarding the interface of WTO-MEA rules, the Panel rejected the EC's argument that the CBD and the Cartagena Protocol on Biosafety should be taken into account when interpreting relevant WTO rules. It found that according to the Vienna Convention on the Law of Treaties, it was not obliged to take these treaties into account since not all parties to the WTO dispute were parties to the CBD and the Biosafety Protocol. This has generated concern that the ruling may work against building channels of dialogue in an increasingly fragmented international legal system and addressing environmental concerns multilaterally (Bernasconi et al, 2006).
- although Art.10 requires Members to take account when preparing SPS measures of the special needs of developing country Members, especially the least-developed country Members, the Panel held that such needs do necessarily take priority over other legitimate interests such as those of the importing Member's own consumers and its environment.

The following sections outline considerations to be taken into account when designing national

[56] The Panel considered evidence that GM plants grow where they are undesired, *e.g.*, as a result of seed spillage or persistence or invasiveness, and situations of unintentional gene flow or transfer from a GM plant ("outcrossing"), leading to cross-breeds between GM plants and wild or cultivated plants.

[57] The documents were not found to strictly match all elements of this risk assessment definition as they did not provide in themselves an evaluation of the potential for adverse effects on human or animal health arising from the products in question; analysed only the possibility and not the probability of likelihood of such adverse effects; and called for further assessment instead of providing actual analysis.

[58] This could have a positive impact on environmental and health regulation by recognising the importance of precaution in advancing SPS objectives and adequately allocating the burden of proof (Bernasconi-Osterwalder et al, 2006).

[59] Annex C(1)(a) first clause.

[60] Paragraph 7.1516 and 1520, Interim Report.

measures that are stricter than international standards or that apply to areas where there are no standards. This list is not exhaustive.

B. Use of the precautionary approach

Precaution is embedded in many international mechanisms dealing with IAS, notably the CBD and the Guiding Principles annexed to Decision VI/23 (2002). It is central to the design of prevention measures as there are currently no known broad scientific principles or reliable procedures for identifying the invasive potential of plants, plant pests, or biological control agents in new geographic ranges[61]. Species thought to be restricted to transformed ecosystems and previously poorly competitive species may turn up, sometimes after a long lag time, as invasive in natural/semi-natural ecosystems, facilitated by climate change, disturbance, fire or other factors.

However, precaution is only implicitly referenced in international trade rules[62] and as noted above, can give rise to potential conflict between the WTO and the multilateral environmental regime. Two WTO rulings have refrained from expressing a view whether the precautionary principle has been widely accepted by Members as a principle of general or customary international law[63].

The CBD Expert Group (see III.C above) found that:

- there is no common understanding on use of the precautionary approach in decision-making[64];
- interpretations of precaution vary widely across the extensive literature on the subject;
- variations in national capacity affect the ability to resolve uncertainties and apply precaution in specific countries;
- because legal decisions are reached on a case-by-case basis, judgments on whether national measures are compatible with WTO rules and disciplines may be contradictory (CBD 2005b).

Whatever the difficulties of interpretation with existing case law, certain indicators can be provided.

Precaution should come into play during the risk analysis process as well as during decision-making. It does not override specific requirements under the SPS Agreement or customary international law.

Precaution does not dispense with science, but in fact requires some scientific evidence to be operational. The competent authority reviews the risk assessment prepared in support of the import application to determine whether potential risks associated with an import/pathway are acceptable with regard to national policies and priorities for protection of environmental, agricultural and public health. This determination provides the rationale for a national SPS measure prohibiting entry or imposing other restrictions, which must be technically justified and consistent with WTO rules of non-discrimination,

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[61] National Research Council,. 2002. *Predicting Invasions Of Non-Indigenous Plants And Plant Pests* 9, cited in Burgiel, 2006.

[62] Preamble to the SPS Agreement; sections 3.3 and 5.7.

[63] EC-Biotech; EC-Hormones Panel on Measures Concerning Meat and Meat Products (§124, WT/DS26/AB/R, WT/DS48/AB/R, 13 February 1998) which held, when considering whether "sufficient scientific evidence" existed to warrant the maintenance of a provisional measure, that "responsible, representative governments commonly act from perspectives of prudence and precaution where risks of irreversible, i.e., life-terminating, damage to human health are concerned.".

[64] e.g. Principle 15 of the Rio Declaration on Environment and Development provides that "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." This is restated in the Preamble to the CBD and in the Cartagena Protocol on Biosafety but without the reference to cost-effectiveness. This has been the source of some concern when compared with WTO and SPS obligations to minimize impacts on trade when designing domestic measures (Burgiel et al 2006).

transparency etc. Where appropriate, a provisional measure may be adopted whilst additional steps are taken to reduce scientific uncertainty (in line with Art.5.7).

A robust approach to IAS prevention is thus potentially compatible with international trade rules. New Zealand's adoption of comprehensive Import Health Standards and a multiple species listing approach show that countries do have scope to develop rigorous national frameworks (Miller et al, 2006).

C. Risk assessment and provisional measures[65]

SPS measures must be based on an assessment, as appropriate to the circumstances, of the risks to human, animal or plant life or health, taking into account risk assessment techniques developed by the relevant international organisations. Risk assessment must satisfy three cumulative requirements:

- identify the risks or threats to be prevented and the potential consequences;
- evaluate the likelihood of entry, establishment and spread of an IAS and the potential consequences (baseline risk);
- evaluate the likelihood of entry, establishment and spread of the IAS in the event that a chosen SPS measure is applied.

States should also consider: available scientific evidence; relevant process and production methods; inspection, sampling and testing methods; prevalence of specific diseases or pests; relevant ecological conditions; and quarantine and other treatments (Art.5, SPS Agreement).

There is no threshold or magnitude of risk to be demonstrated to maintain consistency with the SPS Agreement, but WTO rulings interpret these provisions quite strictly[66]. The evaluation may include qualitative as well as quantitative considerations and should be sufficiently specific to the product or pathway risk under consideration. General theoretical uncertainty or risk is not seen as a credible basis for determining SPS measures (Burgiel et al, 2006).

Importing countries may base national measures on risk assessment carried out by a relevant international organisation or regional body (e.g. EPPO). Regional risk assessments have been raised in the SPS Committee as one way to reduce length and duplication of RA procedures. These could be useful for IAS that are already problematic in several countries within a region and/or for species that are not yet present there but predicted to be problematic if they arrive and that have a high potential of introduction.

D Application of other WTO rules

- **Consistency**

Once a country determines what level of risk it is willing to tolerate in the flow of goods across its borders (its SPS protection level), it should apply this consistently across a comparable range of threats. In particular, it should ensure broadly consistent treatment of different pathways by which the same pest could be introduced to avoid the risk of measures being found arbitrary[67].

Countries should also ensure consistency in regulating similar risks in domestic and international commerce. Where an IAS has already been introduced and established to some extent within a country,

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[65] For practical guidance, see presentation by Griffin, R. *The Fundamentals of Risk Analysis and its practical application*, SPS Risk Analysis Workshop (Geneva, 19-20 June 2000; http://www.wto.org/english/tratop_e/sps_e/risk00_e/risk00_e.htm).

[66] Australia -Measures Affecting the Importation of Salmon (WT/DS18/AB/R, adopted 6 November 1998), §123-4; EC-Biotech.

[67] e.g. In Australia - Salmon, the WTO dispute settlement body found that restrictions to prevent disease in imports of frozen salmon were arbitrary because they were significantly tighter than measures governing imports of live ornamental fish and frozen herring for bait, which present a similar level of risk.

the consistency principle calls for adoption of a domestic regulatory regime for eradication, containment, and/or control. Without this, import controls might be challenged as discriminatory.

Ideally, individual measures for species/pathways should be developed within the framework of broader IAS policy to maximise consistent approaches. This emphasis on integration underpins the European Strategy on Invasive Alien Species.

- **Necessity/Least Trade-Restrictiveness**

As noted, SPS measures that might affect trade may be "applied only to the extent necessary to protect human, animal or plant life or health" (Art. 2.2) and must not be "more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, taking into account technical and economic feasibility" (Art.5.6).

To comply with these rules, countries need to select methods based on scientific principles and not maintained without sufficient scientific evidence. The use of scientific evidence is critical to provide a reasoned explanation for how potential threats link to prevention measures. Earlier WTO jurisprudence has found that decision-making could reflect divergent views as long as there was an sufficient basis to support the necessary rational relationship between the SPS measure and the risk assessment[68]: the EC-Biotech ruling specifies that divergent views must appear in the same risk assessment.

- **Burden of proof**

WTO members, as sovereign entities, are presumed to act in accordance with their WTO obligations. A party claiming that a member acted inconsistently with WTO rules bears the burden of proving that claim. This means that an importing country that adopts a prevention measure is presumed to have met its SPS obligations. An exporting country that initiates a trade dispute must present a *prima facie* case of inconsistency: if it succeeds, the importing country must then submit sufficient evidence that it met the relevant requirements of the SPS Agreement. If successful, the burden shifts back to the exporting party to persuade the adjudicative body that it has the stronger case.

The burden of proof is also on an exporting country if it seeks to demonstrate that its SPS export regulations provide an equivalent level of protection to the importing country's level of SPS protection.

- **Transparency**

Member states must notify other countries of proposals to adopt new or changed measures, respond to requests for more information and provide the text of adopted measures (Art.7 and Annex B). This need not interfere with adoption of effective prevention measures, except in the sense of adding to cost and process burdens, and helps minimise the possibilities for disguised trade barriers.

E. Use of species listing techniques

Species lists provide a useful tool for screening intentional introductions, though they can also be referenced in border control and quarantine procedures. Competent agencies can determine whether a particular organism may be imported, whilst exporters can consult lists to check whether a species may be imported, needs a permit or is prohibited by the country in question.

- **Black lists**

Black lists contain species banned from import because of the damage they may cause to human, animal or plant health, including the natural environment. They are the most common listing mechanism used at national level[69], but their content varies widely. Regionally coordinated black lists are almost

[68] EC – Hormones, §193

[69] Including many EU Member States (see IEEP 2006 (Annex 3)), South Africa, United States, Australia and New Zealand.

exclusively limited to plant pests/animal diseases but, as noted above, the EU operates a very limited black list for four invasive animals.

Developers of black lists should consider the scope of listing (e.g., designation of an entire genus vs. identification of particular species within a genus) as well as species identification (e.g., if species look alike but have different potentials for invasiveness).

Drawbacks include the fact that black lists are usually reactive (a species is most often listed after it has become invasive within the country or region) and tend not to be regularly updated, particularly where there is resistance from trade interests[70].

Consistent with the SPS Agreement, inclusion of a species on a black list should:

- be based on risk assessment to determine the potential invasiveness and impacts of the species;
- be periodically reviewed to re-assess whether trade restrictions are still justifiable (procedures should cover delisting of a species, particularly in the case of temporary bans).

- **White Lists**

White lists identify organisms that are considered low risk and approved for introduction. Listing is either based on prior risk assessment, which has determined the species to be safe, or relates to already established species that can no longer be controlled. White lists are most commonly associated with agricultural and animal crops. They can be used independently or in conjunction with black lists to increase transparency and legal certainty for potential importers and to streamline import control procedures.

- **Grey Lists**

Where black or white listing is not appropriate because risk cannot be adequately determined, grey lists provides for a temporary ban on proposed imports pending further assessment to determine whether a species is safe or potentially invasive. They function as provisional black lists to the extent that they prevent import until the competent agency can make a scientifically-based determination.

Whilst grey lists are clearly precautionary, they may be consistent with the SPS Agreement's provisions on provisional measures provided that the necessary further information is sought and a decision eventually taken. The import regulatory authority can request the exporter to provide scientific evidence and analysis to facilitate this assessment and/or charge an administrative fee to cover costs of evaluation. This is likely to be in the exporter's commercial interest to speed up determination of its import application. If there is still insufficient evidence to make an adequate assessment of risk, the species can be left on the grey list pending the collection of additional information and a subsequent re-assessment.

- **Combined use of species lists**

The most precautionary approach – which if properly operated, may also fit best with international trade rules - is to combine these three types of list within an integrated framework.

Consultation of white and black lists enables a government or exporter to determine whether a species is already allowed for or banned from import into a particular country. Species proposed for import that are not already listed can be placed on a grey list pending risk assessment and then moved to the white list (if safe) or the black list (if potentially harmful). Flexibility is important, particularly with regard to processing new submissions and proposals for movement from one list to another. Lists that are not well

[70] E.g. the U.S. Government's list of 'noxious weeds' banned from import contained about 93 taxa in 1993: ten years later, there were only about 96 (two removed and five added), despite a number of new IAS introductions and a backlog of data on other potentially harmful noxious weeds that were candidates for listing (Burgiel et al, 2006).

or frequently maintained are more likely to run afoul of trade rules than those which have prompt, transparent timelines and procedures (Burgiel et al 2006).

The proposed EU Regulation on the use of alien and locally absent species in aquaculture (see III.D above) provides for nationally-driven combined listing. Member States will be required to distinguish between 'routine' (considered safe) and 'non-routine' proposed introductions, which trigger the need for environmental risk assessment.

V. REGIONAL RECOMMENDATIONS

The following recommendations are tailored to the pan-European region to assist Parties to implement relevant obligations under the Bern Convention in line with the European Strategy on Invasive Alien Species. They should be read in conjunction with recommendations under CBD Decision VIII/27 (2006) which address specific pathway needs and cooperation between relevant international bodies.

A. Regional information exchange

Improved information systems for IAS are a high priority. They provide data to identify potential IAS and major pathways, track invasiveness in other regions and implement rapid response and mitigation, all of which make it easier to assess risk and design justifiable SPS measures.

Regional mechanisms (web-based databases, alert lists, clearing house mechanisms) should include:

- national IAS lists/inventories (baseline data, updated through monitoring);
- data on IAS interceptions, incursions, detected pathways and management techniques;
- data on impacts and other information relevant for risk analysis;
- policy-relevant information (national standards, regulatory frameworks, species lists for consultation by potential importers, data on potentially invasive species that are subject to export).

The most developed European mechanism (outside plant and animal health frameworks) is the subregional NOBANIS portal through which thirteen environment ministries cooperate[71]. NOBANIS provides administrative tools to support national action and regional cooperation on IAS prevention in marine, freshwater and terrestrial environments. Tools include:

- an open-access searchable database on about 5000 alien species recorded within the region, with data on their introduction, distribution, invasiveness, and control;
- detailed fact sheets on around 60 of the worst IAS;
- a catalogue of regulations relevant to IAS in participating countries;
- a catalogue of IAS literature from within the region;
- links to regional and global IAS networks and projects.

A complementary mechanism within the EU is the DAISIE project[72] which is developing European inventories of IAS and a database of experts in different fields related to biological invasions.

These mechanisms need to be extended geographically or interlinked to new mechanisms for other sub-regions in Europe. Individual countries should proactively contribute data to such mechanisms to

[71] North European and Baltic Network on Invasive Alien Species, funded by the Nordic Council of Ministers (see www.nobanis.org). Participating countries are Denmark, Estonia, Finland, the Faroe Islands, Germany, Greenland, Iceland, Latvia, Lithuania, Norway, Poland, the Russian Federation and Sweden. Ukraine was formally invited to join in October 2006.

[72] Delivering Alien Invasive Species Inventories for Europe (http://www.daisie.se), funded through the EU Sixth Framework Programme (2005-2008).

maximise their coverage and effectiveness. Mechanisms should be linked to but avoid duplication with existing ones (eg hosted by EPPO).

B. Early warning systems

Europe needs a robust rapid alert system for IAS that threaten biodiversity. Currently, existing systems are limited to plant/animal health (at EPPO or EU level) and there are no reporting obligations linked to incursions of IAS that are not plant pests or animal diseases[73].

An early warning system could be operated through the regional information mechanism(s) (see above). National, subregional or regional alert lists could be prepared, based on reports of domestic occurrences of alien species that may be invasive elsewhere and prompt notification by neighbouring countries of detected spread. Early warning systems support a proactive approach to coordinated prevention, rapid response and management, particularly between neighbouring countries.

C. Regional cooperation on high-risk pathways and risk assessment

Building on the recommendations under CBD Decision VIII/27 and regional information exchange, pathways of highest risk to the region or subregions should be prioritised. States concerned should cooperate, through regional bodies where appropriate, on risk assessments for species and pathways of entry that are of concern to two or more countries.

Pathway measures should be developed in an inclusive way with stakeholder groups and promote best practice through appropriate codes or guidance (eg for horticulture, pet trade, recreational fisheries and restocking). Regional bodies should develop standards or codes for particular conveyances as pathways for IAS introduction and spread.

National IAS policies, legislation and practice should be as regionally consistent as practicable. Prevention measures are needed to minimise movement of potential IAS between islands and to different ecoregions where they are not yet established.

In addition, a stronger focus is needed on export-related measures to minimise unintentional introductions that may damage the environment of receiving States: this is particularly important where the importing country faces capacity constraints. Pre-border controls, which support dealing with risks at source, are mainly limited to plant and animal health frameworks but could be extended.

Regional bodies could initiate consideration of innovative approaches like pathway user fees to generate sustainable funding for prevention and management: such mechanisms, based on the polluter pays principle, aim to allocate the costs of prevention measures equitably and in a manner that provides incentives to reduce invasive alien species risks to the actors most responsible for those risks.

Another possibility (Burgiel et al, 2006) is to select one or more indicator species associated with an introduction pathway for detailed risk assessment. This could provide the basis for an IAS measure addressing the introduction pathway not only for the species concerned but also, more generally, for other species suspected of being invasive and introduced through the same pathway. By employing a particular indicator species in this fashion, limited risk assessment resources might be leveraged to maximum effect.

D. Regional standards and species listing

Regional standards recognised under the SPS Agreement could be expanded to cover a broader range of pests within the remit of IPPC (e.g. pests of marine and freshwater plants, invasive forestry species).

In addition, regional standards or equivalents are needed for IAS, in particular animals, that are not

[73] The IPPC requires States to report outbreaks of pests of plants (Article 8.1(a)). The Ballast Water Management Convention has a similar obligation to report outbreaks of harmful aquatic organisms and pathogens. The EU Biodiversity Communication (2006) supports development of an IAS early warning system by 2008, coordinated at Community level (A5.1.4).

pests of plants under the IPPC. This expansion of standards could be encouraged through all appropriate regional fora, including the European Community.

States have a common interest in promoting a robust level of protection for plant and animal health and life in Europe through support for rigorous regional SPS standards that give fuller consideration to impacts on natural systems. National measures consistent with WTO rules could be based, as far as practicable, on regional risk assessment that includes analysis of risk of cross-border spread.

Particularly at the subregional level, States could consider harmonising and possibly expanding their species lists to increase the effectiveness of national prevention efforts. Listing should be based on risk assessment which can be jointly performed, as indicated above.

E. Mainstreaming of IAS issues

Improved coordination at national and regional levels is a priority and should not be postponed pending developments at the international level (e.g. between the CBD and WTO or OIE).

Closer coordination between environment, plant and animal health, transport and other sectors is needed to make best use of existing regulatory frameworks and mainstream consideration of IAS impacts on natural systems in decision-making. This is supported by the European Strategy on IAS and should be underpinned by a national IAS strategy and/or coordination mechanism.

National and local decision-making (strategic planning, EIA, risk assessment) on forestry, transport corridors, inter-basin water transfers and other pathways should integrate IAS considerations with specific reference to possible cross-border impacts, including in transboundary water systems and the marine environment. Best use should be made of expertise and resources already in place for animal and plant health.

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