CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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Fourteenth meeting of the Conference of the Parties
The Hague (Netherlands), 3-15 June 2007

ADDITIONAL INFORMATION CONCERNING PROPOSAL COP14 PROP. 18 ON THE EUROPEAN EEL *(ANGUILLA ANGUILLA)*

The attached information document has been submitted by Germany.

Additional information concerning Proposal 18 *Anguilla anguilla* European eel

1) Life cycle of *Anguilla anguilla*
2) Range states/distribution area
3) Trade in short
4) Identification
5) References to Identification

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1) Life cycle of *Anguilla anguilla*

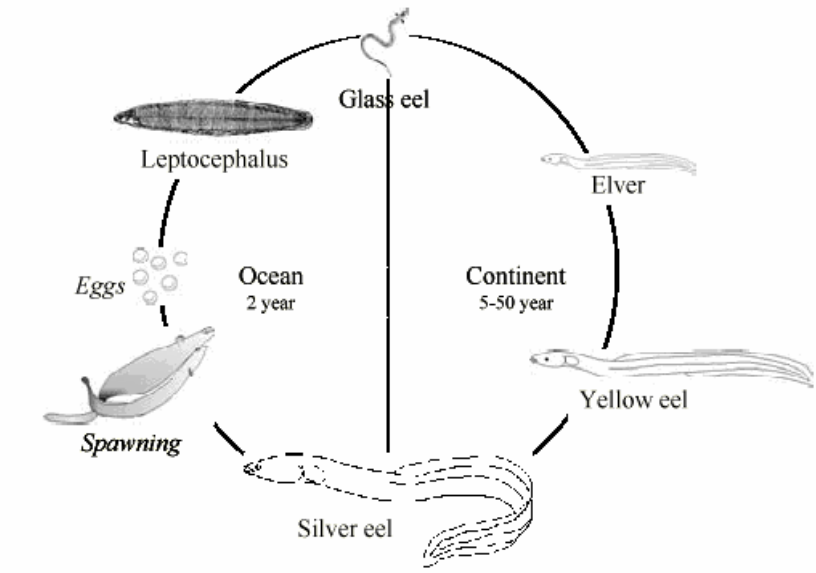


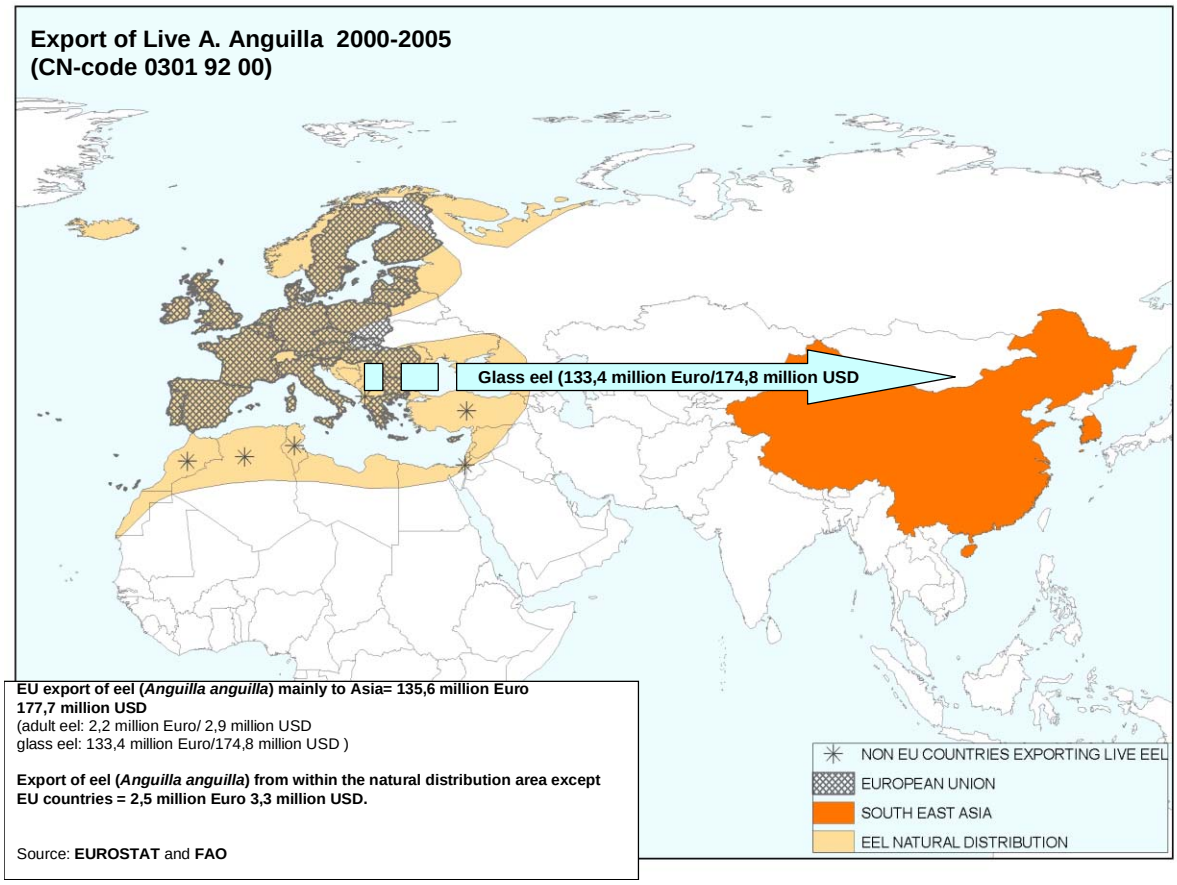
Figure 3 The life cycle of the European eel. The names of the major life stages are indicated; spawning and eggs have never been observed in the wild and are therefore only tentatively included.

(From Dekker 2000a)

2) Range states/distribution area for *Anguilla anguilla*

Albania	Germany	Norway
Algeria	Gibraltar	Poland
Austria	Greece	Portugal
Azores	Iceland	Rumania
Belarus	Ireland	Russian Federation
Belgium	Isle of Man	Serbia
Bosnia and Herzegovina	Israel	Slovakia
Bulgaria	Italy	Slovenia
Canary Islands	Latvia	Spain
Channel Islands	Lebanon	Sweden
Croatia	Libya	Switzerland
Cyprus	Lithuania	Syria
Czech Republic	Luxembourg	The Åland Islands
Denmark	Malta	Tunisia
Egypt	Madeira	Turkey
Estonia	Mauretania	Ukraine
Faroe Islands	Moldavia	United Kingdom
Finland	Monaco	Western Sahara
France	Montenegro	
Georgia	Netherlands	

3) Trade in short *Anguilla anguilla*

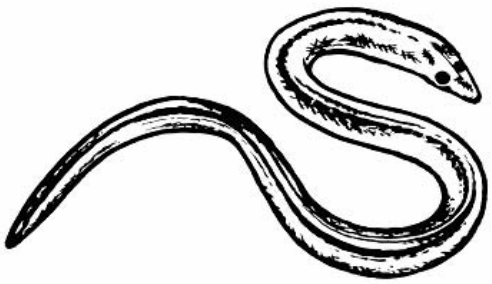


EU export of eel (*Anguilla anguilla*) mainly to Asia= 135,6 million Euro 177,7 million USD
(adult eel: 2,2 million Euro/ 2,9 million USD
glass eel: 133,4 million Euro/174,8 million USD)

Export of eel (*Anguilla anguilla*) from within the natural distribution area except EU countries = 2,5 million Euro 3,3 million USD.

Source: **EUROSTAT** and **FAO**

4) Identification



There are taxonomic differences between Anguilla anguilla, A. japonica, A. rostrata and A. marmorata. Most taxonomic differences are however overlapping and therefore genetic testing is required to distinguish these species.

The 15 to 18 species and subspecies of the *Anguilla* share a simple overall morphology and colour pattern, making them difficult to distinguish without closer examination (Ege 1939, Watanabe 2003). In the pigmented phase, a species may either be uniformly colored or marked with darker blotches. Among uniformly coloured species, the dorsal fin may either be proportionally long or proportionally short. The relative dorsal fin length may also be employed for identification of glass eels of certain species. A most important systematic character is the shape of the tooth band in the upper jaw. Vertebral counts have often been found diagnostic. Most species, however, have definite geographical distributions, and requirements for determination tools are in practice limited to needs for distinguishing two or three sympatric species, and generally only concern the major commercial species *A. anguilla*, *A. rostrata*, *A. japonica* and *A. marmorata*. The majority of eel exports from range states, e.g. glass eels, are readily recognizable in a CITES sense by their origin.

Genetic markers, using short sequences of mitochondrial or nuclear DNA, DNA fingerprinting or microsatellites, may be more useful when the origin of the material is unknown, for processed material, and for the pre-adult ontogenetic stages. There are several studies of various genetic markers (see 5). It may be expected that the global collaboration within the Consortium for the Barcode of Life (CBOL, www.barcoding.si.edu/) will provide a standard genetic marker based on the mitochondrial cytochrome oxidase subunit I (CO-I). The European FishTrace project (www.fishtrace.org), an online genetic catalog of European marine fishes, provides standardised mitochondrial cytochrome *b*, and nuclear rhodopsin sequences for *Anguilla anguilla*, supporting European Union standards and policy for identification of marine food products. FishTrace and CBOL have standardised protocols for the preservation of tissue for genetic analysis.

5) References relevant to species determination

General

Ege, V. 1939. A revision of the genus *Anguilla* , Shaw: Systematic, phylogenetic and geographical study. Dana Report, 16(3): 8-256.

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Molecular methods

Aoyama, J., Watanabe, S., Nishida, M. and Tsukamoto, K. 2000. Discrimination of catadromous eel species, genus *Anguilla*, using PCR-RFLP analysis of the mitochondrial 16SrRNA domain. Trans. Amer. Fisher. Soc., 129: 873-878.

Aoyama, J., Ishikawa, S., Otake, T., Mochioka, N., Suzuki, Y., Watanabe, S., Shinoda, A., Inoue, J., Lokman, P. M., Inagaki, T., Oya, M., Hasumoto, H., Kubokawa, K., Lee, T. W., Fricke, H. and Tsukamoto, K. 2001. Molecular approach to species identification of eggs with respect to determination of the spawning site of the Japanese eel *Anguilla japonica*. Fisheries Science, 67: 761-763.

Hwang D. F., Jen H.C., Hsieh Y.W. and Shiau C.Y. 2004. Applying DNA techniques to the identification of the species of dressed toasted eel products. J. Agric. Food Chem., 52: 5972-5977.

Itoi, S., Nakaya, M., Kaneko, G., Kondo, H., Sezaki, K. and Watabe, S. 2005. Rapid identification of eels *Anguilla japonica* and *Anguilla anguilla* by polymerase chain reaction with single nucleotide polymorphism-based specific probes. Fisheries Science, 71: 1356-1364. *(Fast method that also works on processed material).*

Lin, Y.-S., Poh, Y.-P., Lin, S.-M., and Tzeng, C.-S. 2002. Molecular techniques to identify freshwater eels: RFLP analyses of PCR-amplified DNA fragments and allele-specific PCR from mitochondrial DNA. Zoological studies 41: 421-430. *(Four species (A. japonica, A. marmorata, A. anguilla and A.rostrata) were successfully identified with these two methods.)*

Lin, Y.-S., Tzeng, C.-S. and Hwang, J.-K. 2005. Reassessment of morphological characteristics in freshwater eel (genus *Anguilla*, Anguillidae) shows congruence with molecular estimates. Zoologica Scripta, 34: 225-234.

Maes G.E., Pujolar J.M., Raeymaekers J.A.M., Dannewitz J. and Volckaert F.A.M. 2006. Microsatellite conservation and Bayesian individual assignment in four *Anguilla* species. Marine Ecology-Progress Series, 319: 251-261.

Rehbein, H., 1998. Differenzierung roher und geräucherter Aale durch Protein- und DNA-Analyse. Inf. Fischwirtsch., 45: 23–26.

Rehbein, H., Sotelo, C., Perez-Martin, R. I., Chapela-Garrida, M. J., Hold, G. L., Russell, V. J., Pryde, S. E., Santos, A. T., Rosa, C., Quinteiro, J. and Rey-Mendez, M. 2002. Differentiation of raw or processed eel by PCR-based techniques: restriction fragment length polymorphism analysis (RFLP) and single strand conformation analysis (SSCP). Eur. Food Res. Technol., 214: 171-177. *(A. anguilla, A. rostrata, A. japonica and A. australis, all were distinguishable but in mixtures A. anguilla sometimes masked A. japonica and A. australis).*

Sezaki, K., Itoi, S. and Watabe, S. 2005. A simple method to distinguish two commercially valuable eel species in Japan *Anguilla japonica* and *A. anguilla* using polymerase chain reaction strategy with a species-specific primer. Fisheries Science, 71: 414-421. *(Same accuracy as PCR-RFLP but easier and quicker, works with A. japonica and A. anguilla in this case).*

Trautner, J. 2006. Rapid identification of European (*Anguilla anguilla*) and North American eel (*Anguilla rostrata*) by polymerase chain reaction. Inf. Fischereiforsch., 53: 49–51.

Watanabe, S., Minegishi, Y., Yoshinaga, T., Aoyama, J. and Tsukamoto, K. 2004. A quick method for species identification of Japanese eel (*Anguilla japonica*) using real-time PCR: An onboard application for use during sampling surveys. Mar. Biotechnol., 6: 566-574. *(Did discriminate A. japonica from two other Anguilla species and six other Anguilliform species, rapid method.)*