

Acipenser sturio L., 1758 conservation resources on the World Wide Web

B. Elvira¹, A. Almodóvar² and G.G. Nicola²

¹ Department of Animal Biology I, Faculty of Biology, Complutense University of Madrid, E-28040 Madrid, Spain.

E-mail: belvira@eucmax.sim.ucm.es

² IMIA, Madrid Regional Government, El Encín, PO Box 127, E-28800 Alcalá de Henares, Madrid, Spain

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ABSTRACT

This paper presents a comprehensive review of the information currently available on the World Wide Web regarding *Acipenser sturio* L., 1758, featuring 113 selected sites concerning its conservation, biology, and related subjects. Web sites with additional information on other sturgeon species' conservation are also included. A Web page of links to the main sources of news on *A. sturio* and the conservation of other sturgeons can be accessed at <http://www.ucm.es/info/zoo/Vertebrados/elvira.htm>.

Key words: Atlantic sturgeon, information sources, protection, www.

RESUMEN

Recursos sobre conservación de Acipenser sturio L., 1758 en la World Wide Web

Este trabajo comprende un análisis detenido de la información disponible sobre conservación y otros temas relacionados de *Acipenser sturio* L., 1758 localizada en la World Wide Web. Se seleccionaron 113 páginas con información relevante sobre la biología y conservación del esturión atlántico. Asimismo, se incluyen las direcciones Web con información complementaria sobre conservación de esturiones. Una página Web que contacta con las principales fuentes de noticias sobre conservación de *A. sturio* y otros esturiones se encuentra disponible en <http://www.ucm.es/info/zoo/Vertebrados/elvira.htm>.

Palabras clave: Esturión atlántico, fuentes de información, protección, www.

INTRODUCTION

The Atlantic sturgeon *Acipenser sturio* L., 1758 is a highly threatened species (Lepage and Rochard, 1995; Birstein, Bemis and Waldman, 1997), currently on the verge of extinction and catalogued worldwide as "Critically Endangered – CR A2d" (Anon., 2000). For this reason, several recent efforts have been aimed at recovering this formerly

common species (Elvira and Gessner, 1996; Williot *et al.*, 1997). A consequence of this interest was the recent organization of the first scientific symposium devoted exclusively to the conservation of *A. sturio* (Elvira (ed.), 1999, 2000).

The phenomenal growth of the Internet has occurred because of the creation of the World Wide Web (WWW). The Web stores a huge amount of all sorts of biological information. It poses unlimited

opportunities for people to access information. Furthermore, the Web has grown from being a resource centre for a select group of scientists to a large database of information which is available to both professionals and the public. The Web is considered to be a viable tool for scientific research, and several investigators have already made use of it in their studies. Ubiquity, global reach, interactivity, a decentralized, hyperlinked structure, and multimedia format characterise the WWW. The present paper is aimed at facilitating the access of people concerned with sturgeon conservation to this wealth of online information.

MATERIALS AND METHODS

Searches were undertaken from March 1999 to September 1999 (the last, updated search was conducted in October 2000 during proofs correction) using nearly 40 search engines. More than 200 Web documents were visited and evaluated, providing a final selection of 113 addresses.

The top 25 search engines (alphabetical order) providing the highest number of positive results for *Acipenser sturio* are as follows:

- Alta Vista: <http://www.altavista.com/>
- America On Line: <http://search.aol.com/>
- CNET Search: <http://www.search.com/>
- C4: <http://www.c4.com/>
- EuroSeek: <http://www.euroseek.com/>
- Excite: <http://www.excite.com/>
- Fast Search: <http://www.ussc.alltheweb.com/>
- Go: <http://www.go.com/>
- Google: <http://www.google.com/>
- Goto: <http://www.goto.com/>
- Hotbot: <http://www.hotbot.com/>
- Infospace: <http://www.infospace.com/>
- LookSmart: <http://www.looksmart.com/>
- Lycospro: <http://lycospro.lycos.com/>
- Magellan: <http://magellan.excite.com/>
- MetaCrawler: <http://www.metacrawler.com/>
- MSN: <http://search.msn.com/>
- NBCI: <http://home.nbc.com/>
- Netscape Search: <http://search.netscape.com/>
- Northern Light: <http://www.northernlight.com/>
- Raging Search: <http://ragingsearch.altavista.com/>
- Scrub The Web: <http://www.scrubtheweb.com/>
- Search Hound: <http://www.searchhound.com/>
- WebTop: <http://www.webtop.com/>
- Yahoo: <http://www.yahoo.com/>

RESULTS

One hundred and thirteen Web URLs on *A. sturio* were selected, and are presented below. Likewise, four Web pages with valuable information on sturgeon conservation are also listed below. All of our results are listed on the Web page <http://www.ucm.es/info/zoo/Vertebrados/elvira.htm>, where links with the main sources of information on *A. sturio* and the conservation of other sturgeons are available. This page provides the opportunity of visiting administrative departments and bureaus, museums, universities, and private locations with primary information on the subject. All of these files are available 24 h/day, 7 days/week with no online charges.

The URL addresses are listed in alphabetical order, each followed, in brackets, by the page name, the species involved (only *A. sturio* or several Acipenseridae), the country where the page was produced, the language, and the main content subject.

Acipenser sturio biology and conservation

- <http://alun.uio.no/zoomus/fisk/fiskeliste.html> (Zoologisk museum - Fiskeavdelingen / *A. sturio* / Norway / Norwegian / faunal lists)
- <http://base.dux.ru/eco/kniga/bfish.htm#r1> (Kniga / *A. sturio* / Russia / Russian / general)
- <http://fish-news.teia.org/osetr.htm> (Gigantic fish of Russia. Sturgeon. / *A. sturio* / Russia / Russian / general)
- <http://free.imd.it/Colapesce/Pescitalia/PaginePesci/Acipenseriformi/storione.htm> (Storione / *A. sturio* / Italy / Italian / general)
- <http://freeweb.aspide.it/freeweb/FishingTaverne/storione.htm> (Storione / *A. sturio* / Italy / Italian / general)
- <http://home.online.no/~ka-ei/eurfish/sp002.htm> (Acipenser sturio / *A. sturio* / Norway / English / general)
- <http://home.wxs.nl/~hwdenie/extinct.htm> (Extinct fish species - uitgestorven vissoorten / *A. sturio* / Netherlands / Dutch / general)
- <http://ibs.uel.ac.uk/fish-bin/fishgen.pl?speccode=2066> (FishBase WWW:Taxonomy / *A. sturio* / UK / English / general)
- <http://ibss.iuf.net/blacksea/species/freelife/pisces.html> (IBSS NASU. Black Sea. Pisces)

- (Fish) / Acipenseridae / Ukraine / English / faunal lists)
- <http://ligam.cg24.fr/SITEWEB/PAGES/EnCeMom/Sturio/Sturio.htm> (Esturgeon accueil / *A. sturio* / France / French / general)
 - <http://linnaeus.nrm.se/zool/fish/P00094.html.en> (NRM Ichthyology Collection: NRM 94 / *A. sturio* / Sweden / English / general)
 - <http://members.es.tripod.de/solopeces/fichas/esturionc.htm> (Esturión común / *A. sturio* / Spain / Spanish / general)
 - <http://members.magnet.at/aquaculture/sturgeon.htm> (Gesellschaft zur Rettung des Störs / *A. sturio* / Austria / English / general)
 - http://members.xoom.it/piasal/pescare/storione_comune.htm (Storione Comune / *A. sturio* / Italy / Italian / general)
 - <http://mitglied.tripod.de/MiksHomepage/fischpage/Fische/Stoer.html> (Stör Störs / *A. sturio* / Germany / German / general)
 - <http://ourworld.compuserve.com/homepages/BMLSS/sturgeon.htm> (Sturgeon Acipenser sturio / *A. sturio* / UK / English / general)
 - <http://ourworld.compuserve.com/homepages/bmlss/sussex.html#Sturgeon> (Rare Fishes of Sussex (Marine) / *A. sturio* / UK / English / general)
 - <http://perso.libertysurf.fr/pechepassion/page/poisson/esturgeon.htm> (esturgeon / *A. sturio* / France / French / general)
 - http://rdb.eaurmc.fr/c_peche/html/poi_mi4.html (L'Esturgeon / *A. sturio* / France / French / general)
 - <http://salix.fme.vutbr.cz/ENCYKLOP/CERVKNIK/2CKOHO.HTM> (Ěervená kniha 2 podle ohrožení / *A. sturio* / Czech Republic / Czech / faunal lists)
 - <http://server.parliament.ge/GOVERNANCE/GOV/enviro/manual/Tevzi.html#5> (Tevzi / *A. sturio* / Georgia / English / images)
 - http://space.tin.it/scienza/cjbur/sch_stor_comune.htm (Storione comune - scheda / *A. sturio* / Italy / Italian / general)
 - <http://space.tin.it/scienza/psoria/specie.html> (Le specie ittiche presenti in provincia di Pavia / *A. sturio* / Italy / Italian / faunal lists)
 - <http://sunsite.ee/animals/Kalad/kalalist2.htm> (Systematic list of Estonian fishes / *A. sturio* / Estonia / English / faunal lists)
 - <http://sunsite.ee/loomad/Kalad/ACISTU.htm> (Tuur - täiendav info / *A. sturio* / Estonia / Estonian / general)
 - <http://sunsite.ee/loomad/Kalad/ACISTU2.htm> (Tuur - liigikirjeldus / *A. sturio* / Estonia / Estonian / general)
 - <http://utenti.tripod.it/husohuso/storioni.htm> (Storioni / Acipenseridae / Italy / Italian / general)
 - <http://vissen.huisdier.net/0053.htm> (Acipenser sturio / *A. sturio* / Netherlands / Dutch / general)
 - <http://www.ac-bordeaux.fr/Etablissement/ADaquitaine/estuaire/poissons.htm> (Les poissons de l'estuaire' / *A. sturio* / France / French / general)
 - <http://www.ac-nancy-metz.fr/ia57/lindrebasse/Site%20phil/texte%20html/esturgeon.htm> (esturgeon / *A. sturio* / France / French / general)
 - <http://www.anglersdirectory.net/Sturgeon.htm> (Sturgeon / *A. sturio* / UK / English / general)
 - <http://www.aquaclub.de/rotliste.htm> (Aqua Quality Club - Artenschutzliste / *A. sturio* / Germany / German / faunal lists)
 - <http://www.arconet.es/users/marta/Esturionc.htm> (Esturion / *A. sturio* / Spain / Spanish / images)
 - http://www.arkive.org.uk/public/search1/?species_uid=1 ("Untitled" / *A. sturio* / UK / English / general)
 - <http://www.BerlinOnline.de/wissen/wissenschafts-archiv/980429/.html/berlin1.html> (BerlinOnline: Wissenschaft / *A. sturio* / Germany / German / news)
 - <http://www.bianchi.ch/warenkunde/suesswasser/34.htm> (Bianchi: Warenkundelexicon / *A. sturio* / Switzerland / German / general)
 - <http://www.biokotor.org/projects/check/ribe.htm> (Check liste ribe - Zavod za biologiju mora, Kotor / *A. sturio* / Yugoslavia / Serbian / faunal lists)
 - <http://www.birkhauser.com/cgi-win/ISBN/3-7643-5321-X> (Birkhauser - Conservation of Endangered Freshwater Fish / *A. sturio* / Switzerland / English / references)
 - <http://www.bordeaux.cemagref.fr/doc/Esturgeon.pdf> (Cemagref Bordeaux: Publications récentes / Acipenseridae / France / French / references)
 - <http://www.bordeaux.cemagref.fr/doc/rabx97.html> (Cemagref Bordeaux: Unité RAC, publica-

- tions 1997 / Acipenseridae / France / French / references)
- <http://www.bretagne-online.com/telegram/htdocs/archive/1998/19980315/article/3426666.htm> (Un esturgeon dans l'estuaire de l'Odet / A. sturio / France / French / news)
 - http://www.bretagne-online.com/telegram/htdocs/archive/1999/19991126/MORBIHAN/article/art_010A0B0000_389755.htm (Un plan de sauvegarde pour l'esturgeon européen / A. sturio / France / French / news)
 - http://www.bretagne-online.com/telegram/htdocs/archive/2000/20000207/29_LOCALES_SUD/article/art_0105080601_686253.htm#INTER1 (Esturgeons dans la baie: et de deux! / A. sturio / France / French / news)
 - http://www.bretagne-online.com/telegram/htdocs/archive/2000/20000205/29_LOCALES_SUD/article/art_0105080601_679266.htm#INTER1 (Un esturgeon pêché par un plaisancier dans la baie / A. sturio / France / French / news)
 - <http://www.britannica.com/bcom/eb/article/9/0,5716,71869+1,00.html> (sturgeon - Britannica.com / Acipenseridae / UK / English / encyclopaedia)
 - <http://www.cabuzel.com/oleron/frames/esturgeon.html> (Esturgeon / A. sturio / France / French / general)
 - <http://www.cco.asso.fr/ieo/ieo24/creac.html> (LO CREAC D'AQUITÀNIA/L'esturgeon d'Aquitaine. / A. sturio / France / French / general)
 - <http://www.ccplclub.demon.co.uk/mas/quarry/sturgeon.htm> (MAS - The Maldon Angling Society / A. sturio / UK / English / general)
 - <http://www.cemagref.fr/infos/com/ext/im19/sturio.html> (Pour la première fois sur un salon professionnel dédié à l'aquaculture... / A. sturio / France / French / general)
 - http://www.comptons.com/encyclopedia/ARTICLES/0175/01753600_A.html#PIA1 (Sturgeon / Acipenseridae / USA / English / encyclopaedia)
 - http://www.cplus.fr/html/ete97/poitou/st_seurin.htm (Saint Seurin d'Uzet / A. sturio / France / French / news)
 - <http://www.cucina.italynet.com/pesci/dati/88.htm> (Il pesci... / A. sturio / Italy / Italian / general)
 - <http://www.daba.lv/ldf/CORINE/Fish.html> (Appendix 1. Red Data Book: Fishes / A. sturio / Latvia / English / faunal lists)
 - http://www.dgf.min-agricultura.pt/leipesca/leipesca2_Anexo.html (Lista actualizada dos peixes de água doce: anexo decreto 44623, 10 de outubro de 1962 / A. sturio / Portugal / Portuguese / faunal lists)
 - <http://www.dierentuin.net/vissen/steur.html> (Dierentuin.Net Dieren Database Steur / A. sturio / Netherlands / Dutch / general)
 - <http://www.ee/baltic21/publicat/R4.htm> (BALTIC 21: INTERNATIONAL BALTIC SEA FISHERY COMMISSION SECTOR REPORT ON FISHERIES / A. sturio / Estonia / English / faunal lists)
 - <http://www.esvjahn.purespace.de/stoerbe.htm> (Stoer Beschreibung / A. sturio / Germany / German / general)
 - <http://www.fetonte.polesineinnovazione.it/schede/storione.htm> ("Untitled" / A. sturio / Italy / Italian / general)
 - <http://www.fishbase.org/Summary/SpeciesSummary.cfm?ID=2066&genusname=Acipenser&speciesname=sturio> (Species Summary / A. sturio / Philippines / English / general)
 - <http://www.fishing.kiev.ua/riby/sab/ost01.htm> (Osetr / A. sturio / Ukraine / Ukrainian / general)
 - http://www.fribourg-peche.ch/peche/poissons/description/esturgeon_welcome.htm (La pêche au pays de Fribourg - Description des espèces de poissons - L'esturge / A. sturio / Switzerland / French / general)
 - <http://www.gamta.lt/Raimis/aamta/PADALIN/KBVD/BIS/sarasai.htm> (Istatymo blankas / A. sturio / Lithuania / Lithuanian / faunal lists)
 - <http://www.genecat.es/darp/espesca/cespes19.htm> (Peixos: fitxa Esturió / A. sturio / Spain / Catalan / general)
 - <http://www.geocities.com/CapeCanaveral/Hall/1345/sturgbibl.html> (Bibliography of Sturgeons / Acipenseridae / USA / English / references)
 - <http://www.geocities.com/RainForest/3414/storione.htm> (Storione / A. sturio / Italy / Italian / general)
 - <http://www.geocities.com/RainForest/8769/lista-roja/1069.htm> (Esturion, Acipenser sturio / A. sturio / Spain / Spanish / general)

- <http://www.gla.ac.uk/Acad/IBLS/DEEB/biomed/pictures/acipe.htm> (Image Gallery - c / *A. sturio* / UK / English / images)
- <http://www.guldennet.nl/flevoland/wrk/visserij/vissen/vis032.html> (Steur/Acipenser sturio / *A. sturio* / Netherlands / Dutch / general)
- <http://www.helcom.fi/news/news297.html#1> (HELCOM News 2/97 / *A. sturio* / Finland / English / news)
- <http://www.icn.pt/sipnat/especies/tcontpei.html> (Espécies - Peixes do Continente / *A. sturio* / Portugal / Portuguese / faunal lists)
- <http://www.iii.to.cnr.it/pesci/storione.htm> (STORIONE / *A. sturio* / Italy / Italian / general)
- <http://www.iks.r.org/icpr/l2000/species-diversity-research.htm> (Salmon 2000 - The Rhine a salmon river again: Species diversity research / *A. sturio* / Germany / English / general)
- <http://www.italiaset.com/Ittiofauna/GallFish/Osteichtys/Acipenser%20sturio.htm> (Acipenser sturio / *A. sturio* / Italy / Italian / general)
- <http://www.izmiran.troitsk.ru/Boroda-t/Sabaneev/0s43-txt.htm> (Osetr nemetskiĭ / *A. sturio* / Russia / Russian / general)
- http://www.lib.washington.edu/fish/image_bank/i42a.html (i42a / *A. sturio* / USA / English / images)
- <http://www.livingplanet.org/resources/publications/species/underthreat/page26.htm> (Common Sturgeon / *A. sturio* / Switzerland / English / general)
- <http://www.lusolink.net/especies/sturgeon.htm> (The Sturgeon / *A. sturio* / Portugal / English / general)
- <http://www.markuskappeler.ch/tex/texs/stoere.html> (Störe / Acipenseridae / Switzerland / German / general)
- <http://www.mir.gdynia.pl/akw/dydakt25.htm> (EDUCATIONAL HALL2 / *A. sturio* / Poland / English / images)
- http://www.mma.es/docs/conservnat/naturalia/naturalia_hispanica/Peces/obrashidraulicas/CAP01.htm (2 / *A. sturio* / Spain / Spanish / general)
- http://www.mma.es/docs/conservnat/naturalia/naturalia_hispanica/Peces/pecescontinentales/cap3pecescontinentales/cap3_1_2.htm (3 / *A. sturio* / Spain / Spanish / general)
- http://www.mma.es/docs/conservnat/naturalia/naturalia_hispanica/vertebrados/LibroRojoVertebrados/ESTURION_SOLLO.htm (Acipenser sturio Linnaeus, 1758 / *A. sturio* / Spain / Spanish / general)
- <http://www.multimania.com/estuairegironde/CEG-407.html> (Estuaire de la Gironde: milieu naturel / *A. sturio* / France / French / general)
- <http://www.museocivico.rovereto.tn.it/MuseoAperto/zoologia/zoologiaIttiologiaStorione.htm> (MCR - Zoologia - Ittiologia / *A. sturio* / Italy / Italian / images)
- <http://www.nic.funet.fi/pub/sci/bio/life/pisces/actinopterygii/acipenseriformes/acipenseridae/acipenserinae/acipenser/index.html> (Acipenser / Acipenseridae / Finland / English / faunal lists)
- <http://www.nrm.se/ve/pisces/swedfish.shtml.en> (Swedish Fishes / *A. sturio* / Sweden / English / faunal lists)
- <http://www.omne-vivum.com/v/12583.htm> (Foto-album: Acipenseridae / Acipenseridae / Netherlands / English / images)
- http://www.peche.org/esturgeon/esturgeon_europeen.htm (sauver l'esturgeon européen / *A. sturio* / France / French / general)
- http://www.peche.org/poissons_eau_douce/esturgeon.htm (esturgeon / *A. sturio* / France / French / general)
- <http://www.pescados-basilio.es/productos/esturi.htm> (La mar de recetas... / *A. sturio* / Spain / Spanish / general)
- <http://www.pfri.hr/fish/f063.html> (Ribe jadranskog mora / *A. sturio* / Croatia / Croatian / images)
- <http://www.proszynski.pl/Zwierzaki/1998/maj/czerwonaksiega/czerwonaksiega.htm> (Zwierzaki 4/98 - Polska czerwona ksiega czesc V / *A. sturio* / Poland / Polish / general)
- <http://www.provincia.milano.it/ambiente/pesca/fauna/storione.htm> (Storione / *A. sturio* / Italy / Italian / general)
- <http://www.provincia.venezia.it/cacciapesca/manifest/pescimare/storione.htm> (STORIONE COMUNE / *A. sturio* / Italy / Italian / general)
- <http://www.sns.dk/netpub/rodliste/715.htm> (8 kontor - rødliste 1997 / *A. sturio* / Denmark / Danish / faunal lists)
- <http://www.stabi.hs-bremerhaven.de/pesta2/privat/zoo/stoer.htm> (Stör / *A. sturio* / Germany / German / general)
- <http://www.terroir.sud.fr/site/produit/mer/esturgeon.htm> (Untitled Document / *A. sturio* / France / French / general)

- <http://www.uhc.lublin.pl/mazury/ryby/jesiotr.htm> (Ryby / *A. sturio* / Poland / Polish / general)
- <http://www.unife.it/geneweb/sturio.htm> (Acipenser sturio / *A. sturio* / Italy / English / general)
- <http://www.uni-rostock.de/fakult/manafak/biologie/abt/zoologie/stoer/arefev2.htm> (Perspectives of... / *A. sturio* / Germany / English / general)
- <http://www.uni-rostock.de/fakult/manafak/biologie/abt/zoologie/stoer/stoersw.JPG> (JPEG image 640×350 pixels / *A. sturio* / Germany / English / general)
- <http://www.urnerbarry.com/lithographs/acipense.htm> (Acipenser Sturio Sturgeon / *A. sturio* / USA / English / images)
- <http://www.waterland.net/ovb/kenniscentrum/visportret/steur.html> (De Steur/ *A. sturio* / Netherlands / Dutch / general)
- <http://www.waterland.net/visschenwinkel/sturgeon.htm#sturgeon> (Acipenseriformes / *A. sturio* / Netherlands / English / general)
- http://www.wcmc.org.uk/species/data/species_sheets/sturgeon.htm (World Conservation Monitoring Centre - WCMC/WWF Species Under Threat / *A. sturio* / UK / English / general)
- <http://www.welt.de/daten/1997/07/05/0705ws91106.htm> (DIE WELT online vom 05.07.1997 - Wissenschaft / *A. sturio* / Germany / German / news)
- <http://www.wildernis.nl/helgoland/helgoland.htm> (Foto's uit de Europese Wildernis / *A. sturio* / Netherlands / Dutch / images)
- <http://www.wkap.nl/issuetoc.htm/0378-1909+48+1/4+1997> (Environmental Biology of Fishes Table of Contents / Acipenseridae / Netherlands / English / references)
- <http://www.wms.com.pl/jesiotr0.htm> (jesiotr_03 / *A. sturio* / Poland / Polish / general)
- <http://www.worldstar.com/~dlarson/stofworld.htm> (Sturgeon of the World / Acipenseridae / USA / English / faunal lists)
- <http://www.y.lst.se/miljosidor/analys/Hotade%20arter/Appendix/ryggrads.html> (HOTADE ARTER / *A. sturio* / Sweden / Swedish / faunal lists)
- <http://www.zone.sk/animals/jesetery.html> (ANIMAL PLANET - VERTEBRATES / Acipenseridae / Slovakia / Slovak / general)

- http://www-cal.univ-lille1.fr/~cv/ecologie/by_thema/biodiversite/frl96_compacte.htm (World Conservation Monitoring Centre: French Animal Redlist / *A. sturio* / France / French / faunal lists)

Sturgeons conservation

- <http://www.euro-sturio.de/> (EURO-STURIO - Internationale Gesellschaft zur Rettung der Donau-Störe e.V. / Acipenseridae / Germany / German / general)
- <http://www.scientificamerican.com/explorations/1998/061598sturgeon/index.html> (Scientific American: Explorations: The Last Sturgeon: June 15, 1998 / Acipenseridae / USA / English / news)
- <http://www.traffic.org/cop11/briefingroom/sturgeon.html> (TRAFFIC: COP11 / Acipenseridae / Switzerland / English / news)
- <http://www.worldstar.com/~dlarson/html/welcome.html> (Sturgeon Page / Sturgeons / USA / English / general)

Additional information found on the WWW regarding *A. sturio* conservation is included in Appendix I (*Acipenser sturio* on international Red Lists and Conventions), together with relevant locations on related subjects (Conservation, Fishes, and European Union Legislation). The WWW also features information on national and regional regulations regarding *A. sturio* conservation, but these Web sites are not included in our lists.

Web pages selected for *A. sturio* conservation were created in 24 European countries, the USA and the Philippines. In fact, those European countries already involved in recovery programmes on Atlantic sturgeon conservation, led by France, have produced the highest number of locations (figure 1). Of the 20 different languages used in these pages, English is the most important, followed by French and Italian (figure 2).

DISCUSSION

Databases and the WWW have overwhelmed the information market. Organisations increasingly present their activities on the Web, which allows them to disseminate updated information about

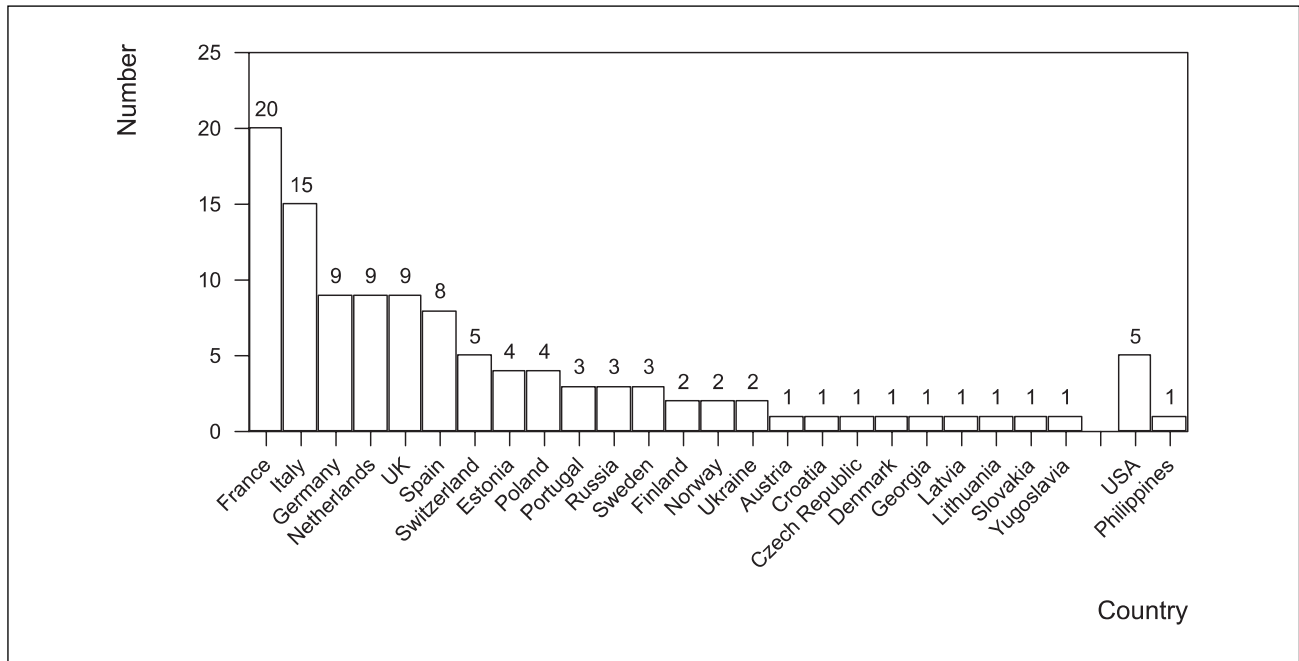


Figure 1. Number of Web sites with relevant information on *Acipenser sturio*, by countries

their experts, publications and on-going research projects, in a much more efficient way than was possible previously. Web technology has a major advantage over printed products since it allows end-users to search, browse, and print the information in different formats, according to their own specific needs. For this reason, the possibility of ex-

changing data via the Web has the potential to increase our knowledge concerning sturgeon conservation worldwide.

In summary, the Internet is a powerful tool for accessing information about nature conservation. We hope to contribute, with this paper, to the use of this wealth of valuable information.

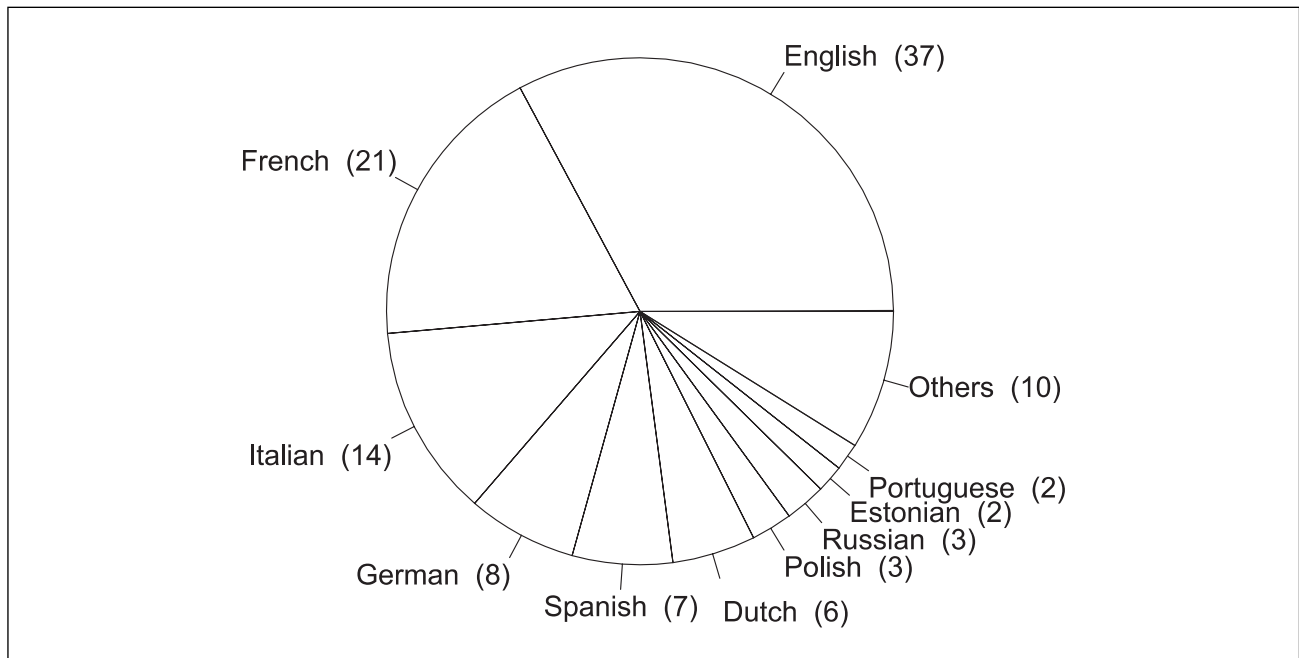


Figure 2. Number of Web sites with relevant information on *Acipenser sturio*, by languages

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Several persons helped us to search for Web pages and provided us with URL addresses. Thanks also go to two anonymous referees for improving the manuscript. Finally, the WWW is a living creature, in continuous motion, and we would appreciate the submission of any further information on this subject, in order to include it on our Web page.

REFERENCES

Anon. 2000. *IUCN Red List of Threatened Species*. IUCN. Gland.
 Birstein, V. J., W. E. Bemis and J. R. Waldman. 1997. The threatened status of acipenseriform species: a summary. *Environmental Biology of Fishes* 48: 427-435.

APPENDIX I

Acipenser sturio on international Red Lists and Conventions

- *Acipenser sturio* in Annex I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES - Washington Convention): http://www.wcmc.org.uk:80/CITES/common/append/fauna12_correct.shtml
- *Acipenser sturio* in Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention): http://www.wcmc.org.uk/cms/cms_app2_inter.htm
- *Acipenser sturio* in Appendix II of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention): [http://www.coe.fr/fr/txtjur/a_ii\(104\).htm](http://www.coe.fr/fr/txtjur/a_ii(104).htm)
- *Acipenser sturio* in 2000 IUCN Red List of Threatened Species: <http://redlist.cymbiont.ca/species.asp?id=230>

Conservation

- Barcelona Convention, Mediterranean Action Plan (MAP): <http://www.unepmap.org/>
- Convention on Biological Diversity (CBD): <http://www.biodiv.org/>

Elvira, B. (ed.). 1999. *Symposium on Conservation of the Atlantic Sturgeon Acipenser sturio in Europe. Abstracts Book*. Publicaciones de la Estación de Ecología Acuática. Seville: 110 pp.
 Elvira, B. (ed.). 2000. *Symposium on Conservation of the Atlantic Sturgeon Acipenser sturio L., 1758 in Europe*. *Boletín. Instituto Español de Oceanografía* 16 (1-4): 254 pp.
 Elvira, B. and J. Gessner. 1996. The Society to Save the Sturgeon *Acipenser sturio*. *The Sturgeon Quarterly* 4 (1-2): p. 7.
 Lepage, M. and E. Rochard. 1995. Threatened fishes of the world: *Acipenser sturio* Linnaeus, 1758 (Acipenseridae). *Environmental Biology of Fishes* 43: 28.
 Williot, P., E. Rochard, G. Castelnaud, T. Rouault, R. Brun, M. Lepage and P. Elie. 1997. Biological characteristics of European Atlantic sturgeon, *Acipenser sturio*, as the basis for a restoration program in France. *Environmental Biology of Fishes* 48: 359-372.

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): <http://www.wcmc.org.uk:80/CITES/>
- Convention on Migratory Species (Bonn Convention): <http://www.wcmc.org.uk/cms/>
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention): <http://www.nature.coe.int/english/cadres/berne.htm>
- European Environment Agency (EEA): <http://eea.eu.int/>
- European Topic Centre on Nature Conservation (EEA-ETC/NC): <http://www.mnhn.fr/ctn/>
- United Nations Environmental Programme (UNEP): <http://www.unep.ch/>
- Wildlife Trade Monitoring Programme of WWF and IUCN (TRAFFIC): <http://www.traffic.org/>
- World Conservation Monitoring Centre: <http://www.wcmc.org.uk/>
- World Conservation Union (IUCN): <http://iucn.org/>

Fishes

- Catalogue of Fishes: <http://www.calacademy.org/research/ichthyology/catalog/index.html>
- FishBase: <http://www.fishbase.org/>
- Ichthyology Web Resources: <http://www.biology.ualberta.ca/jackson.hp/iwr/iwr.html>

- Internet Resource Guide for Zoology - Fish: <http://www.york.biosis.org/zrdocs/zoolinfo/#f>
- World Wide Web Virtual Library - Fish: <http://actwin.com/WWWVL-Fish.html>

European Union Legislation

Bonn Convention

- Convention on the conservation of migratory species of wild animals: http://europa.eu.int/eur-lex/en/lif/dat/1979/en_279A0623_01.html
- 82/461/EEC: Council Decision of 24 June 1982 on the conclusion of the Convention on the conservation of migratory species of wild animals: http://europa.eu.int/eur-lex/en/lif/dat/1982/en_382D0461.html
- 98/145/EC: Council Decision of 12 February 1998 on the approval, on behalf of the European Community, of the amendments to Appendices I and II to the Bonn Convention on the conservation of migratory species of wild animals as decided by the fifth meeting of the Conference of the parties to the Convention: http://europa.eu.int/eur-lex/en/lif/dat/1998/en_398D0145.html

Directive on the quality of fresh waters needing protection or improvement in order to support fish life

- Council Directive 78/659/EEC of 18 July 1978 on the quality of fresh waters needing protection or improvement in order to support fish life: http://europa.eu.int/eur-lex/en/lif/dat/1978/en_378L0659.html

Habitats Directive

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora: http://europa.eu.int/eur-lex/en/lif/dat/1992/en_392L0043.html
- 97/266/EC: Commission Decision of 18 December 1996 concerning a site information format for proposed Natura 2000 sites: http://europa.eu.int/eur-lex/en/lif/dat/1997/en_397D0266.html

- Council Directive 97/62/EC of 27 October 1997 adapting to technical and scientific progress Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora: http://europa.eu.int/eur-lex/en/lif/dat/1997/en_397L0062.html

Washington Convention (CITES)

- Council Regulation (EC) no. 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1997/en_397R0338.html
- Commission Regulation (EC) no. 939/97 of 26 May 1997 laying down detailed rules concerning the implementation of Council Regulation (EC) no. 338/97 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1997/en_397R0939.html
- Commission Regulation (EC) no. 2307/97 of 18 November 1997 amending Council Regulation (EC) no. 338/97 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1997/en_397R2307.html
- Commission Regulation (EC) no. 2214/98 of 15 October 1998 amending Council Regulation (EC) no. 338/97 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1998/en_398R2214.html
- Commission Regulation (EC) no. 1476/1999 of 6 July 1999 amending Council Regulation (EC) no. 338/97 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1999/en_399R1476.html
- Commission Regulation (EC) no. 939/97 of 26 May 1997 laying down detailed rules concerning the implementation of Council Regulation (EC) no. 338/97 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1997/en_397R0939.html
- Commission Regulation (EC) no. 767/98 of 7 April 1998 amending Regulation (EC) no. 939/97 laying down detailed rules concerning

the implementation of Council Regulation (EC) no. 338/97 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1998/en_398R0767.html

- Commission Regulation (EC) no. 1006/98 of 14 May 1998 amending Regulation (EC) No 939/97 laying down detailed rules concerning the implementation of Council Regulation (EC) no. 338/97 on the protection of species of wild fauna and flora by regulating trade therein: http://europa.eu.int/eur-lex/en/lif/dat/1998/en_398R1006.html

Water protection

- Cooperation Agreement for the protection of the coasts and waters of the North-East Atlantic against pollution: http://europa.eu.int/eur-lex/en/lif/dat/1993/en_293A1028_01.html
- Convention for the protection of the marine environment of the North-East Atlantic: http://europa.eu.int/eur-lex/en/lif/dat/1998/en_298A0403_01.html
- Protocol concerning specially protected areas and biological diversity in the Mediterranean: http://europa.eu.int/eur-lex/en/lif/dat/1999/en_299A1214_01.html
- 99/800/EC: Council Decision of 22 October 1999 on concluding the Protocol concerning specially protected areas and biological diversity in the Mediterranean, and on accepting the annexes to that Protocol (Barcelona Convention): http://europa.eu.int/eur-lex/en/lif/dat/1999/en_399D0800.html
- 1999/802/EC: Council Decision of 22 October 1999 on the acceptance of amendments to the Convention for the Protection of the Mediterranean Sea against Pollution and to the Protocol for the Prevention of Pollution by Dumping from Ships and Aircraft (Barcelona Convention): http://europa.eu.int/eur-lex/en/lif/dat/1999/en_399D0802.html
- Annex V to the Convention for the Protection of the Marine Environment of the North-East Atlantic on the protection and conservation of the ecosystems and biological diversity of the maritime area: http://europa.eu.int/eur-lex/en/lif/dat/2000/en_200A0519_01.html