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General Biology Phylogeny and Morphology

Fontana, F., 2002. A cytogenetic approach to the study of taxonomy and evolution in sturgeons. J. Appl. Ichthyol. 18 (4-6): 226-233.

North, J.A., Farr, R.A., Vescei, P. 2002. A comparison of meristic and morphometric characters of green sturgeon *Acipenser medirostris*. J. Appl. Ichthyol. 18 (4-6): 234-239.

Snyder, D.E. 2002. Pallid and shovelnose sturgeon larvae - morphological description and identification. J. Appl. Ichthyol. 18 (4-6): 240-265.

Developmental biology

Dettlaff, T., Gonsharov, B.F. 2002. Contribution of developmental biology to artificial propagation of sturgeon in Russia. J. Appl. Ichthyol. 18 (4-6): 266-270.

Gisbert, E., Williot, P. 2002. Duration of synchronous egg cleavage cycles at different temperatures in Siberian sturgeon (*Acipenser baerii*). J. Appl. Ichthyol. 18 (4-6): 271-274.

Vázquez, M., Rodríguez, F., Domezain, A., Salas, C. 2002. Development of the brain of the sturgeon *Acipenser naccarii*. J. Appl. Ichthyol. 18 (4-6): 275-279.

Rodríguez, A., Gisbert, E. 2002. Eye development and the role of vision during Siberian sturgeon early ontogeny. J. Appl. Ichthyol. 18 (4-6): 280-285.

Genetic Diversity

Congui, L., Fontana, F., Patarnello, T., Rossi, R. Zane, L. 2002. The use of AFLP in sturgeon identification. J. Appl. Ichthyol. 18 (4-6): 286-289.

Krieger, J. Fuerst, P.A. 2002. Evidence of multiple alleles of the nuclear 18S ribosomal RNA gene in sturgeon (Family: Acipenseridae). J. Appl. Ichthyol. 18 (4-6): 290-297.

Chicca, M., Suci, R., Ene, C., Lanfredi, M., Congiu, L., Leis, M., Tagliavini, J., Rossi, R., Fontana, F. 2002. Karyotype characterization of the stellate sturgeon, *Acipenser stellatus*, by chromosome banding and fluorescent in situ hybridization. *J. Appl. Ichthyol.* 18 (4-6): 298-300.

Zhu, B., Zhou, F., Cao, H., Shao, Z., Zhao, N., May, B., Chang, J. 2002. Analysis of genetic variation in the Chinese sturgeon, *Acipenser sinensis*: estimating the contribution of artificially produced larvae in a wild population. *J. Appl. Ichthyol.* 18 (4-6): 301-306.

Smith, C.T., Nelson, R.J., Pollard, S., Rubidge, E., MacKay S.J., Rodzen, J., May, B., Koop, B. 2002. Population genetic analysis of white sturgeon (*Acipenser transmontanus*) in the Fraser River. *J. Appl. Ichthyol.* 18 (4-6): 307-312.

Wirgin, I., Waldman, J., Stable, J., Lubinski, B., King, T. 2002. Comparison of mitochondrial DNA control region sequence and microsatellite DNA analyses in estimating population structure and gene flow rates in Atlantic sturgeon *Acipenser oxyrinchus*. *J. Appl. Ichthyol.* 18 (4-6): 313-319.

Physiology

Cech, J.J., Crocker, C.E. 2002. Physiology of sturgeon: effects of hypoxia and hypercapnia. *J. Appl. Ichthyol.* 18 (4-6): 320-324.

Moghini, M., Vajhi, A.R., Veshkini, A., Masoudfard, M. 2002. Determination of sex and maturity in *Acipenser stellatus* by using ultrasonography. *J. Appl. Ichthyol.* 18 (4-6): 325-328.

Cataldi, E., Albano, C., Boglione, C., Dini, L., Mohaco, G., Bronzi, P., Cataudella, S. 2002. *Acipenser naccarii* fine structure of the alimentary canal with references to its ontogenesis. *J. Appl. Ichthyol.* 18 (4-6): 329-337.

Crocker, C.E., Cech, Jr. J.J., 2002. The effects of dissolved gases on oxygen consumption rate and ventilation frequency in white sturgeon, *Acipenser transmontanus*. *J. Appl. Ichthyol.* 18 (4-6): 338-340.

Domeneghini, C., Radaelli, G., Bosi, G., Arrighi, S., Di Giancamillo, A., Pazzaglia, M., Mascarello, F. 2002. Morphological and histochemical differences in the structure of the alimentary canal in feeding and runt (feed deprived) white sturgeon (*Acipenser transmontanus*). *J. Appl. Ichthyol.* 18 (4-6): 341-346.

Gisbert, E., Williot, P., Castelló-Orvay, F. 2002. Fully vitellogenic oocyte amino acid profile of Siberian sturgeon (*Acipenser baerii*, Brandt). *J. Appl. Ichthyol.* 18 (4-6): 347-350.

Khabarov, M.V., Luk'yanenko, V.V., Luk'yanenko, V.I. 2002. Heterogeneity and polymorphism of hemoglobin and albumin of the Russian sturgeon in the seas and the river life periods. J. Appl. Ichthyol. 18 (4-6): 351-358.

Vázquez, M., Rodríguez, F., Domezain, A., Salas, C. 2002. Cytochrome oxidase histochemistry in the brain of the sturgeon *Acipenser naccarii*. J. Appl. Ichthyol. 18 (4-6): 359-364.

Arai, T., Miyazaki, N. 2002. Microstructural growth in otoliths of the Russian sturgeon, *Acipenser gueldenstaedtii*. J. Appl. Ichthyol. 18 (4-6): 265-367.
Reproductive Physiology

Goncharov, B.F. 2002. In vitro approaches to studying the mechanisms of oocyte maturation in sturgeons: a review of fundamental and applied aspects. J. Appl. Ichthyol. 18 (4-6): 368-374.

Semenkova, T., Barannikova, I., Kime, D.E., McAllister, B.G., Bayanova, L., Dyubin, V., Kolmakov, N. 2002. Sex steroid profiles in female and male stellate sturgeon (*Acipenser stellatus* Pallas) during final maturation induced by hormonal treatment. J. Appl. Ichthyol. 18 (4-6): 375-381.

Linares-Casenave, J., Van Eenennaam, J.P., Doroshov, S.I. 2002. Ultrastructural and histological observations on temperature-induced follicular ovarian atresia in the white sturgeon. J. Appl. Ichthyol. 18 (4-6): 382-390.

Ceapa, C., Williot, P., LeMenn, F., Davail-Cuisset, B. 2002. Plasma sex steroids and vitellogenin levels in stellate sturgeon (*Acipenser stellatus* Pallas) during spawning migration in the Danube River. J. Appl. Ichthyol. 18 (4-6): 391-396.

Bayunova, L., Barrannikova, I., Semenkova, T. 2002. Sturgeon stress reactions in aquaculture. J. Appl. Ichthyol. 18 (4-6): 397-404.
Diseases, Pathology and Parasites

Raikova, E.V., 2002. Polypodium hydriforme infection in the eggs of acipenseriform fishes. J. Appl. Ichthyol. 18 (4-6): 405-415.

Jeney, G., Jeney, Z. 2002. Application of immunostimulants for modulation of the non-specific defense mechanisms in sturgeon hybrid: *Acipenser ruthenus* x *A. baerii*. J. Appl. Ichthyol. 18 (4-6): 416-419.

Bauer, O.N., Pugachev, O.N., Voronon, V.N. 2002. Study of parasites and diseases of sturgeons in Russia: a review. J. Appl. Ichthyol. 18 (4-6): 420-429.
Toxicology

Kruse, G.O., Scarfnechia, D.L. 2002. Assessment of bioaccumulated metal and organochlorine compounds in relation to physiological biomarkers in Kootenai River white sturgeon. *J. Appl. Ichthyol.* 18 (4-6): 430-438.

Population Dynamics, Management Stock Assessment and Status

Jackson, J.R., VanDeValkm A.J., Brooking, T.E., vanKeken, O.A., Rudstam, L.G. 2002. Growth and feeding dynamics of lake sturgeon, *Acipenser fulvescens*, in Oneida Lake, New York: results from the first five years of a restoration program. *J. Appl. Ichthyol.* 18 (4-6): 439-443.

Arndt, G.-M., Gessner, J., Raymakers, C. 2002. Trends in farming, trade and occurrence of native and exotic sturgeons in natural habitats in Central and Western Europe. *J. Appl. Ichthyol.* 18 (4-6): 444-448.

Haxton, T. 2002. An assessment of lake sturgeon (*Acipenser fulvescens*) in various reaches of the Ottawa River. *J. Appl. Ichthyol.* 18 (4-6): 449-454.

Exploitation and Management

Trencia, G., Verreault, G., Georges, S., Pettigrew, P. 2002. Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) fishery management in Québec, Canada, between 1994 and 2000. *J. Appl. Ichthyol.* 18 (4-6): 455-462.

Conservation, Enhancement and Restoration

Chebanov, M.S., Karnaukhov, G.I., Galich, E.V., Chmir, Y.N. 2002. Hatchery stock enhancement and conservation of sturgeon, with an emphasis on the Azov Sea populations. *J. Appl. Ichthyol.* 18 (4-6): 463-469.

Smith, T.I.J., McCord, J.W., Collins, M.R., Post, W.C. 2002. Occurrence of stocked shortnose sturgeon *Acipenser brevirostrum* in non-target rivers. *J. Appl. Ichthyol.* 18 (4-6): 470-474.

Armstrong, J.L., Hightower, J.E., 2002. Potential for restoration of the Roanoke River population of Atlantic sturgeon. *J. Appl. Ichthyol.* 18 (4-6): 475-480.

Runstrom, A., Bruchn R.M., Reiter, D., Cox, D. 2002. Lake sturgeon (*Acipenser fulvescens*) on the Menominee Indian Reservation: an effort toward co-management and population restoration. *J. Appl. Ichthyol.* 18 (4-6): 481-485.

Manny, B.A., Kennedy, G.W. 2002. Known lake sturgeon (*Acipenser fulvescens*) spawning habitat in the channel between lakes Huron and Erie in the Laurentian Great Lakes. *J. Appl. Ichthyol.* 18 (4-6): 486-490.

Assessment Techniques

Collins, M.R., Cooke, D.W., Smith, T.I.J., Post, W.C., Russ, D.C., Walling, D.C. 2002. Evaluation of four methods of transmitter attachment on shortnose sturgeon, *Acipenser brevirostrum*. *J. Appl. Ichthyol.* 18 (4-6): 491-494.

Thomas, M., Haas, R.C. 2002. Abundance, age structure, and spatial distribution of lake sturgeon, *Acipenser fulvescens*, in the St. Clair System. *J. Appl. Ichthyol.* 18 (4-6): 495-501.

Heney, E., Kynard, B., Zhuang, P. 2002. Use of electro-narcosis to immobilize juvenile lake and shortnose sturgeons for handling and the effects on their behavior. *J. Appl. Ichthyol.* 18 (4-6): 502-504.

Kynard, B., Kieffer, M. 2002. Use of a borescope to determine the sex and egg maturity stage of sturgeons and the effect of borescope use on reproductive structures. *J. Appl. Ichthyol.* 18 (4-6): 505-508.

Population Dynamics

Waldman, J.R., Grunwald, C., Stabile, J., Wirgin, I. 2002. Impacts of life history and biogeography on the genetic stock structure of Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus*, Gulf sturgeon *A. oxyrinchus desotoi*, and shortnose sturgeon *A. brevirostrum*. *J. Appl. Ichthyol.* 18 (4-6): 509-518.

Sulak, K.J., Randall, M. 2002. Understanding sturgeon life history: enigmas, myths, and insights from scientific studies. *J. Appl. Ichthyol.* 18 (4-6): 519-528.

Kynard, B., Suci, R., Horgan, M. 2002. Migration and habitats of diadromous Dunabe River sturgeons in Romania: 1998-2000. *J. Appl. Ichthyol.* 18 (4-6): 529-535.

Taverny, C., Lepage, M., Piefort, S., Dumont, P., Rochard, E. 2002. Habitat selection by juvenile European sturgeon *Acipenser sturio* in the Gironde estuary (France). *J. Appl. Ichthyol.* 18 (4-6): 536-541.

Paragamian, V.L., Wakkinen, V.D. 2002. Temporal distribution of Kootenai River white sturgeon spawning events and the effect of flow and temperature. *J. Appl. Ichthyol.* 18 (4-6): 542-549.

Bevelhimer, M.S. 2002. A bioenergetics model for white sturgeon *Acipenser transmontanus*: assessing differences in growth and reproduction among Snake River reaches. *J. Appl. Ichthyol.* 18 (4-6): 550-556.

Auer, N.A., Baker, E.A. 2002 Duration and drift of larval lake sturgeon in the Sturgeon River, Michigan. *J. Appl. Ichthyol.* 18 (4-6): 557-564.

Ecology and Habitat

Erickson, D.L., North, J.A., Hightower, J.E., Weber, J., Lauck, L. 2002. Movement and habitat use of green sturgeon *Acipenser medirostris* in the Rogue River, Oregon, USA. *J. Appl. Ichthyol.* 18 (4-6): 565-569.

Bruch, R.M., Binkowski, F.P. 2002. Spawning behavior of lake sturgeon (*Acipenser fulvescens*). *J. Appl. Ichthyol.* 18 (4-6): 570-579.

Caron, F., Hatin, D., Fortin, R. 2002. Biological characteristics of adult Atlantic sturgeon (*Acipenser oxyrinchus*) in the St. Lawrence River estuary and the effectiveness of management rules. *J. Appl. Ichthyol.* 18 (4-6): 580-585.

Hatin, D., Fortin, R., Caron, F. 2002. Movements and aggregation areas of adult Atlantic sturgeon (*Acipenser oxyrinchus*) in the St Lawrence River estuary, Québec, Canada. *J. Appl. Ichthyol.* 18 (4-6): 586-594.

Hightower, J.E., Zeifuss, K.P., Fox, D.A., Parauka, F.M., 2002. Summer habitat use by Gulf sturgeon in the Choctawhatchee River, Florida. *J. Appl. Ichthyol.* 18 (4-6): 595-600.

Kozfkay, J.R., Scarnecchia, D.L. 2002. Year-class strength and feeding ecology of age-0 and age-1 paddlefish (*Polyodon spathula*) in Fort Peck Lake, Montana, USA. *J. Appl. Ichthyol.* 18 (4-6): 601-607.

Paragamian, V.L., Wakkinen, V.D., Kruse, G. 2002. Spawning locations and movement of Kootenai River white sturgeon. *J. Appl. Ichthyol.* 18 (4-6):608-616.

Sulak, K.J., Edwards, R.E., Hill, G.W., Randall, M.T. 2002. Why do sturgeons jump? Insights from acoustic investigations of the Gulf sturgeon in the Suwanee River, Florida, USA. *J. Appl. Ichthyol.* 18 (4-6): 617-620.

Law Enforcement and CITES

Straughan, D.J., Burnham-Curtis, M.E., Fain, S.R. 2002. Experimental search for forensically useful markers in the genus *Scaphirhynchus*. *J. Appl. Ichthyol.* 18 (4-6): 621-628.

Raymakers, C., Hoover, C. 2002. *Acipenseriformes*: CITES implementation from Range States to consumer countries. *J. Appl. Ichthyol.* 18 (4-6): 629-638.

Aquaculture Hatchery Programmes

Yesaki, T.Y., Ek.R., Siple, J., Van Eenennaam, J.P., Doroshov, S.I. 2002. The effects of iodophor disinfection and transportation on the survival to hatch of fertilized white sturgeon (*Acipenser transmontanus*) eggs. *J. Appl. Ichthyol.* 18 (4-6): 639-641.

Ireland, S.C., Beamesderfer, R.C.P., Paragamian, V.L., Wakkinen, V.D., Siple, J.T. 2002. Success of hatchery-reared juvenile white sturgeon (*Acipenser transmontanus*) following release in the Kootenai River, Idaho, USA. *J. Appl. Ichthyol.* 18 (4-6): 642-650.

Nathanalides, C., Tsoumani, M., Papazogloy, A., Paschos, I. 2002. Hatching time and post-hatch growth in Russian sturgeon *Acipenser gueldenstaedtii*. *J. Appl. Ichthyol.* 18 (4-6): 651-654.

Breeding for Restoration and Conservation

Burtsev, I.A., Nikolaev, A.I., Maltsev, S.A., Igumnova, L.V. 2002. Formation of domesticated brood-stocks as a guarantee of sustainable hatchery production of sturgeon for sea ranching. *J. Appl. Ichthyol.* 18 (4-6): 655-658.

Zhuang, P., Kynard, B., Zhang, L., Zhang, T., Zhang, Z., Li, D. 2002. Overview of biology and aquaculture of Amur sturgeon (*Acipenser schrenckii*) in China. *J. Appl. Ichthyol.* 18 (4-6):659-664.

Domestication and Commercial Culture

Gessner, J., Wirth, M., Kirschbaum, F., Krüger, A., Patriche, N. 2002. Caviar composition in wild and cultured sturgeons - impact of food sources on fatty acid composition and contaminant load. *J. Appl. Ichthyol.* 18 (4-6): 665-672.

Nutrition and Feeding

Gawlicka, A., Herold, M.A., Barrows, F.T., De La Moue, J., Hung, S.S.O. 2002. Effects of dietary lipids on growth, fatty acid composition, intestinal absorption and hepatic storage in white sturgeon (*Acipenser transmontanus* R.) larvae. *J. Appl. Ichthyol.* 18 (4-6): 673-681.

Rónyai, A., Csengeri, I., Váradi, L. 2002. Partial substitution of animal protein with full-fat soybean meal and amino acid supplementation in the diet of Siberian sturgeon (*Acipenser baerii*). *J. Appl. Ichthyol.* 18 (4-6): 682-684.

Kasumyan, A.O., 2002. Sturgeon food searching behaviour evoked by chemical stimuli: a reliable sensory mechanism. *J. Appl. Ichthyol.* 18 (4-6): 685-690.

Soriguer, M.C., Domezain, A., Aragonés, J., Domezain, J., Hernando, J.A. 2002. Feeding preference in juveniles of *Acipenser naccarii* Bonaparte 1836. *J. Appl. Ichthyol.* 18 (4-6): 691-694.

Qian, X., Cui, Y., Xie, S., Lei, W., Zhu, X., Xiong, B., Yang, Y. 2002. Individual variations in growth, food intake and activity in juvenile Chinese sturgeon

Acipenser sinensis Gray. J. Appl. Ichthyol. 18 (4-6): 695-698.