

STURGEON REFERENCES

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Summary

New regulations under the Game & Fish Act allow the culture and sale of Lake Sturgeon (*Acipenser fulvescens*) in Ontario. Although a few fish facilities hold limited numbers of Lake Sturgeon, there are currently no commercial sturgeon farms in Ontario. However, there are large commercial sturgeon farms in the United States, particularly in California, but they culture a related species, the white sturgeon. The culture of White Sturgeon is currently not permitted in Ontario. The farming of Lake Sturgeon at any particular location in Ontario is still subject to approval by the local District Office of the Ontario Ministry of Natural Resources. The following is a brief listing of research publications, popular press articles and consultants' reports which should be useful to anyone wishing to learn more about sturgeon. Published research papers can be accessed through most University libraries. Any questions concerning this reference listing can be directed to the Aquaculture Centre, University of Guelph, 519-824-4120 ext. 52689.

General

1. California farms using innovation to develop sturgeon. 1991. Aquaculture Magazine (July/August): 90-92.
2. Conte, F.S., S.I. Doroshov, P.B. Lutes and E.M. Strange. Hatchery manual for the white sturgeon *Acipenser transmontanus* Richardson with application to other North American Acipenseridae. Number 3322 from ANR Publications, Dept. AQ, 6701 San Pablo Avenue, Oakland, CA 94608-1239, USA.
3. Lane, E.D. 1991. Status of the white sturgeon, *Acipenser transmontanus*, in Canada. Canadian Field-Naturalists 105: 161-168.
4. Logan, S.H., W.E. Johnston and S.I. Doroshov. 1995. Economics of joint production of sturgeon (*Acipenser transmontanus* Richardson) and roe for caviar. Aquaculture 130: 299-316.
5. Sturgeon are a realistic prospect. 1990. Fish Farmer (July/August): 55-56.
6. Sturgeon farms moving from development to production stage in pursuit of diverse, premium markets. 1991. Water Farming Journal (September): 9-11.

Husbandry and Production Systems

1. Hedrick, R.P., T.S. McDowell, J.M. Groff, S. Yung and W.H. Wingfield. 1991. Isolation of an epitheliotropic herpesvirus from white sturgeon *Acipenser transmontanus*. *Diseases of Aquatic Organisms* 11: 49-56.
2. Hedrick, R.P., T.S. McDowell, J.M. Groff, S. Yun and W.H. Wingfield. 1992. Isolation and some properties of an iridovirus-like agent from white sturgeon *Acipenser transmontanus*. *Diseases of Aquatic Organisms* 12: 75-82.
3. Hedrick, R.P., J.M. Groff, T. McDowell and W.H. Wingfield. 1990. An iridovirus infection of the integument of the white sturgeon *Acipenser transmontanus*. *Diseases of Aquatic Organisms* 8: 39-44.
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5. LaPatra, S.E., G.R. Jones, K.A. Lauda, T.S. McDowell, R. Schieder and R.P. Hedrick. 1995. White sturgeon as a potential vector of infectious hematopoietic necrosis virus. *Journal of Aquaculture Animal Health* 7: 225-230.
6. Rien, T.A., R.C.P. Beamesderfer and C.A. Foster. 1994. Retention, recognition, and effects on survival of several tags and marks for white sturgeon. *California Fish & Game* 80: 161-170.
7. Smith, T.I.J. 1980. Induced spawning and culture of Atlantic sturgeon. *Progressive Fish-Culturist* 42.
8. Watson, L.R., S.C. Yun, J.M. Groff and R.P. Hedrick. 1995. Characteristics and pathogenicity of a novel herpesvirus isolated from adult and subadult white sturgeon *Acipenser transmontanus*. *Diseases of Aquatic Organisms* 22: 199-210.

Nutrition and Feeding

1. Herold, M.A., S.S.O. Hung and K. Fynnaikins. 1995. Apparent digestibility coefficients of carbohydrates for white sturgeon. *Progressive Fish-Culturist* 57: 137-140.
2. Hung, S.S.O. 1988. Present knowledge of white sturgeon nutrient requirements. *Aquaculture Magazine* (November/December): 50-52.
3. Hung, S.S.O., P.B. Lutes, A.A. Shqueir and F.S. Conte. 1993. Effect of feeding rate and water temperature on growth of juvenile white sturgeon (*Acipenser transmontanus*). *Aquaculture* 115: 297-303.
4. Hung, S.S.O. 1989. Practical feeding of white sturgeon. *Aquaculture Magazine* (January/February): 60-62.
5. Hung, S.S.O. 1989. Choline requirement of hatchery-produced juvenile white sturgeon (*Acipenser transmontanus*). *Aquaculture* 78: 183-194.
6. Hung, S.S.O., P.B. Lutes, F.S. Conte and T. . 1989. Growth and feed efficiency of white sturgeon (*Acipenser transmontanus*) sub-yearlings at different feeding rates. *Aquaculture* 80: 147-153.
7. Hung, S.S.O., J.M. Groff, P.B. Lutes and F.K. Fynn-Aikins. 1990. Hepatic and intestinal histology of juvenile white sturgeon fed different carbohydrates.

- Aquaculture 87: 349-360.
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 10. Stuart, J.S. and S.S.O. Hung. Growth of juvenile white sturgeon (*Acipenser transmontanus*) fed different proteins. *Aquaculture* 76: 303-316.
 11. Xu, R.P., S.S.O. Hung and J.B. German. 1993. White sturgeon tissue fatty acid compositions are affected by dietary lipids. *Journal of Nutrition* 123: 1685-1692.

Physiology

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2. Brennan, J.S. and G.M. Cailliet. 1989. Comparative age-determination techniques for white sturgeon in California. *Transactions of American Fisheries Society* 118: 296-310.
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4. Loew, E.R. and A.J. Sillman. 1993. Age-related changes in the visual pigments of the white sturgeon (*Acipenser transmontanus*). *Canadian Journal of Zoology* 71: 1552-1557.
5. Ng, W.K. and S.S.O. Hung. 1994. Amino acid composition of whole body, egg and selected tissues of white sturgeon (*Acipenser transmontanus*). *Aquaculture* 126: 329-339.
6. Rien, T.A. and R.C. Beamesderfer. 1994. Accuracy and precision of white sturgeon age estimates from pectoral fin rays. *Transactions of American Fisheries Society* 123: 255-265.
7. Sillman, A.J., M.D. Spanfelner and E.R. Loew. 1990. The photoreceptors and visual pigments in the retina of the white sturgeon, *Acipenser transmontanus*. *Canadian Journal of Zoology* 68: 1544-1551.
8. Sillman, A.J., M.E. Sorsky and E.R. Loew. 1996. The visual pigments of wild white sturgeon (*Acipenser transmontanus*). *Canadian Journal of Zoology* 73: 805-809.

Reproduction and Genetics

1. Bidwell, C.A. and D.M. Carlson. 1995. Characterization of vitellogenin from white sturgeon, *Acipenser transmontanus*. *Journal of Molecular Evolution* 41: 104-112.
2. Bolker, J.A. 1993. The mechanism of gastrulation in the white sturgeon. *Journal of Experimental Zoology* 266: 132-145.

3. Bolker, J.A. 1993. Gastrulation and mesoderm morphogenesis in the white sturgeon. *Journal of Experimental Zoology* 266: 116-131.
4. Ciereszko, A., K. Dabrowski, F. Lin and S.I. Doroshov. 1994. Identification of trypsin-like activity in sturgeon spermatozoa. *Journal of Experimental Zoology* 268: 486-491.
5. DiLauro, M.N., W.F. Krise, M.A. Hendrix and S.E. Baker. 1994. Short-term cold storage of Atlantic sturgeon sperm. *The Progressive Fish-Culturist* 56: 143-144.
6. McCabe, G.T. 1990. Use of an artificial substrate to collect white sturgeon eggs. *Calif. Fish Game* 76: 248-250.

Sources of Sturgeon

The Annual Buyers Guide published by Aquaculture Magazine has a listing of fish farms in North America that have sturgeon for sale. Copies of the Annual Buyers Guide are available from Aquaculture Magazine, P.O. Box 2329, Asheville, North Carolina 28802, USA or call (704) 254-7334 or FAX (704) 253-0677.