

Manejo del fotoperiodo en el salmón coho

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- Berril, I.K., Smart, A., Porter, M.J.R., Bromage, N.R., 2006. A decrease in photoperiod shortly after first feeding influences the development of Atlantic salmon (*Salmo salar*). *Aquacult.* 254, 625-636.
- Björnsson, B.T., Stefansson, S.O. and Hansen, T. 1995. Photoperiod regulation of plasma growth hormone levels during parr-smolt transformation of Atlantic salmon: implications for hypoosmoregulatory ability and growth. *Gen. Comp. Endocrinol.*, 100: 73-82.
- Björnsson, B.T., Stefansson, G.V., Berge, A.I., Hansen, T. and Stefansson, S.O. 1998. Circulating growth hormone levels in Atlantic salmon smolts following seawater transfer: effects of photoperiod regime, salinity, duration of exposure and season. *Aquaculture*, 168: 121-137.
- Brauer, E., 1982. The photoperiod control of coho salmon smoltification. *Aquaculture*, 28 105-111 105.
- Clarke, W.C., Shelbourn, J.E. and Brett, J.R. 1978. Growth and adaptation to sea water in "underyearling" sockeye (*Oncorhynchus nerka*) and coho (*O.kisutch*) salmon subjected to regimes of constant or changing temperature and daylength. *Can. J. Zool.*, 56: 2413 2421.
- Clarke, W.C., Shelbourn, J.E., Ogasawara, T. and Hirano, T. 1989. Effect of initial daylength on growth, seawater adaptability and plasma growth hormone levels in underyearling coho, chinook, and chum salmon. *Aquaculture*, 82: 51-62.
- Ekstrom, P., Meissl, H., 1997. The pineal organ of teleost fishes *Reviews in Fish Biology and Fisheries* 7:199–284.
- Endal, H., Taranger, G.L., Stefansson, S.O., Hansen, T. 2000. Effects of continuous additional light on growth and sexual maturity in Atlantic salmon, *Salmo salar*, reared in sea cages) *Aquaculture*, 191:337–349.
- Estay, F., Neira, R., Diaz, N., Valladares, L., Torres, A. 1998. Gametogenesis and Sex Steroid Profiles in Cultured Coho Salmon (*Oncorhynchus kisutch*, Walbaum). *The Journal of Experimental Zoology*. 280:429-438.
- Gilles, B., Falcón J., 2002. Photoperiod And Growth In Fish. *Vie et Milieu* 51:237-246.
- Johnston, I., S., Manthri, A., Smart, P., Campbell, D., Nickell, R., Alderson. 2003. Plasticity of muscle fibre number in seawater stages of Atlantic salmon in response to photoperiod manipulation. *The Journal of Experimental Biology* 206, 3425-3435.
- Joseph P. Fisher, J.P., William G. Percy. W.G. 2005. Seasonal changes in growth of coho salmon (*Oncorhynchus kisutch*) off Oregon and Washington and concurrent changes in the spacing of scale circuli. *Fish. Bull.* 34–51.
- Lawson, P.W., Logerwell, E.A., Mantua, N.J., Francis, R.C., Agostini V.N. 2004. Environmental factors influencing freshwater survival and smolt production in Pacific Northwest coho salmon (*Oncorhynchus kisutch*). *Canadian Journal of Fisheries and Aquatic Sciences*. 61(3):360-373.
- Le Bail, P.Y. 1988. Growth-reproduction interaction in salmonids. In: "Colloques de l'INRA", *Reproduction in fish. Basic and applied aspects in endocrinology and genetics*, pp 91 108.
- Le Gac F., Blaise O., Fostier A., Le Bail P.-Y., Loir M., Mourou B. and Weil C., 1993. Growth Hormone (GH) and reproduction: a review. *Fish Physiol. Biochem.* 11 (1-6): 219-232.
- Macquarrie, D.W., J.R., Markert, W.E., Vanstone, E. Photoperiod induced off-season spawning of coho salmon (*Oncorhynchus kisutch*). *Annales de biologie animale, biochimie, biophysique*, 1978, 18 (4), pp.1051-1058.
- McBride J.R., D.A. Higgs, U.H.M. Fagerlund, J.T. Buckley. Thyroid and steroid hormones: Potential for control of growth and smoltification of salmonids. 1982. *Aquaculture* 28:201-209.
- Marchiafava, P.L. and Kusmic, C.1993. The electrical responses of the trout pineal photoreceptors to brief and prolonged illumination. *Prog. Brain Res.* 95, 3–13.
- McCormick, S.D., Björnsson, B.T., Sheridan, M., Eilertson, C., Carey, J.B. and O'Dea, M. 1995. Increased daylength stimulates plasma growth hormone and gill Na⁺, K⁺-ATPase in Atlantic salmon (*Salmo salar*). *J. Comp. Physiol. B*, 165: 245-254.
- Migaud, H., Taylor, J.F., Taranger, G.L., Davie, A., Cerda Migaud, H., Taylor, J.F., Taranger, G.L., Davie, A., Cerda-Reverter, J.M. Reverter, J.M., Carrillo, M., Hansen, T., Bromage, N.R., 2006. A Comparative Ex Vivo and in Vivo Study of Day and Night Perception in Teleosts Species Using the Melatonin Rhythm. *J Pineal Res.* 41:42-52
- Morita, Y. 1966. Entladungsmuster pinealer Neurone der Regenbogenforelle (*Salmo irideus*) bei Belichtung des Zwischenhirns. *Pflügers Archiv* 289, 155–167.
- Nordgarden, U., F., Oppedal, G.L. Taranger., G.I., Hemre, T. Hansen. 2003. Seasonally changing metabolism in Atlantic salmon (*Salmo salar* L.) I – Growth and feed conversion ratio. 2003. *Aquacult Nutr.* 9:161 – 168.
- Oppedal F., Taranger G.L., Juell, J., Fosseidengen J.E., Hansen., T. 1997. Light intensity affects growth and sexual maturation of Atlantic salmon (*Salmo salar*) postsmolts in sea cages. *Aquat.Living Resour.*, 10,351-357.
- Oppedal, F., Taranger, G.L., T. Hansen. 2003. Growth performance and sexual maturation in diploid and triploid Atlantic salmon (*Salmo salar* L.) in seawater tanks exposed to continuous light or simulated natural photoperiod. *Aquaculture* 215:145–162.
- Sheridan, M.A., Eilertson, C.D. and Kerstetter, T.H. 1998. Changes in plasma somatostatin associated with seawater adaptation and stunting of coho salmon, *Oncorhynchus kisutch*. *Aquaculture*, 168 (1-4): 195-203
- Sumpter, J.P. 1992. Control of growth of rainbow trout (*Oncorhynchus mykiss*). *Aquaculture*, 100: 299-320.
- Taranger G.L., H. Daae, K.O. Jergensen, T. Hansen 1995. Effects of continuous light on growth and sexual maturation in sea water reared Atlantic salmon. In: *Proc. 5th Int. Symp. Reproductive physiology in fish. University of Texas, Austin, Texas, U.S.A., 200 p.*

Thorarensen, H., Clarke, W.C. 1989. Smoltification induced by a "skeleton" photoperiod in underyearling coho salmon (*Oncorhynchus kisutch*). *Fish Physiol. Biochem.*, 6: 11-18.

Thorarensen, H., Clarke, W.C., Farrell, A.P. 1989. Effect of photoperiod and various intensities of night illumination on growth and seawater adaptability of juvenile coho salmon (*Oncorhynchus kisutch*). *Aquaculture*, 82: 39-49.