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**Effect of Palm Pollen Grains on Reproductive
Performance of African Catfish (*Clarias gariepinus*)
Under A Different Environmental Condition**

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Baliga MS, Baliga BRV, Kandathil SM, Bhat HP and Vayalil PK(2011):A review of the chemistry and pharmacology of the date fruits (Phoenix dactylifera L.)J Food Res Int .44:1812-1822.

Barbeau, A. (1969): L-DOPA Therapy in Parkinson's Disease: A Critical Review of Nine Years' Experience. *Canadian Medical Association Journal*, 101, 791-800.

Barrero, M., Small, B.C., D'Abramo, L.R., Waldbieser, G.C.,Hanson, L.A., Kelly, A.M.,(2008): Effect of carp pituitary extract and luteinizing hormone releasing analog hormone on reproductive indices and spawning of 3-year-old channel catfish. North Am. J.Aquacult. 70 (2), 138–146.

Beveridge, M.C.M.; Phillips, M.J.; Dugan, P. and Brummet, R. (2010): Barriers to aquaculture development as a pathway to poverty alleviation and food security. Advancing the aquaculture agenda: Workshop Proceed., World Fish Center: 345-359.

Bhatnagar, A. and Devi, P (2013):Water quality guidelines for the management of pond fish culture. Inter. J. Enviro. Scie., 3(6), 1980-1997.

- Billard, R., Bry, C. & Gillet, C. (1981):** Stress, environment, and reproduction in teleost fish. In *Stress and Fish* (Pickering, A. D., ed.), pp. 185–208. London: Academic Press.
- Borkovic, S.S.; Pavlovic, S.Z.; Kovacevic, T.B.; Stajin, A.S.; Petrovic, V.M. and Saicic, Z.S. (2008):** Antioxidant defence enzyme activities in hepatopancreas, gills and muscle of spiny cheek crayfish (*Orconectes limosus*) from the River Danube. *Comp. Biochem. Physiol. Part C Toxicol. Pharmacol.* , 147: 122–128.
- Boyd, C. E. (1989):** Water quality management and aeration in shrimp farming. Fisheries and Allied Aquacultures departmental series 2, Alabama Agricultural Experiment Station, Auburn University.
- Boyd, C.E. (1990):** Water Quality in ponds for Aquaculture. Alabama Agricultural Exper. Station, Auburn Univ., Auburn, Alabama, p 482.
- Boyd, C.E. and Tucker, C.S. (1992):** Water quality and pond soil analysis for aquaculture. Alabama agricultural experimental station (USA) , Auburn Univ., Auburn, Alabama, p183.
- Brian, O. (2005):** Nitrogen-ammonia in water. Wilkes University center for environmental quality, geo environmental sciences and engineering department. <http://www.water-research.net/Watershed>.

- Broadhurt, C.L.(1999):** Bee products: medicine from the live. Nutr. Sci. News, 4:366-368.
- Bruzuska, E.; Raczkevi, R. J.; Adamek, J. and Radics, F. (1999):** Preliminary investigation on the ovulation, embryonic survival and larval morphology in African catfish (*Clarias gariepinus* Burchell, 1822) (in Hungarian with English Summary) Halaszat, 2: 88-92.
- Busch, R.L. (1985):** Channel Catfish culture in ponds. in Tucker, C.S. Editor, Channel Catfish Culture. Elsevier Science Publishers B.V., Amsterdam, The Netherlands, Pages 13-78.
- Cabrita E, Robles V and Herraes P (2009):** Sperm quality assessment. Methods in reproductive aquaculture. Marine and freshwater species. Cabrita E., Robles V., Herraes P. eds. CRC Press Taylor & Francis Group, Boca Raton, USA, ISBN 978-0- 8493-80532.
- Calabrese, A. (1969):** Effects of acids and alkalies on survival of bluegills and largemouth bass. U.S.Fish.Wildi. Ser., Tech-paper 42. 10pp.
- Campbell, P. M., Pottinger, T. G. & Sumpter, J. P. (1994):** Preliminary evidence that channel catfish in heated earthen ponds. Journal of the World Aquaculture 120, 151–169.

References

- Carreon., J.A., Ventura, R. F. and Almazan, G. J. (1973).**
Notes on the induced breeding of *Clarias microcephalus*. *Gunther. J. Aquacult.*, 2: 5- 16.
- Chapman, D. and Chapman, D.E. (1996):** Water Quality Assessments. A guide to the use of biota, sediments and water in environmental monitoring. 2nd Edition, Chapman & Hall, London.
- Chen,A.;Bookstein, J.J. and Meldrum, D.R.(1991):**Diagnosis of a testosterone-secreting adrenal adenoma by selective venous catheterization.*Fertil.Steril.*55,1202-1203.
- Colt, J. E. and Armstrong, D. A. (1981):** Nitrogen toxicity to crustaceans, fish and molluscs. Fish-Culture Section of the Ame.Fisheries Soc., FCS Publication 1, pp. 34-47.
- Cosson J, Groison AL, Suquet M, Fauvel C, Dreanno C, Billard R(2008a):** Marine fish spermatozoa: racing ephemeral swimmers. *Reproduction* 136(3):277-294.
- Cosson J, Groison AL, Suquet M, Fauvel C, Dreanno C, Billard R(2008b):** Studying sperm motility in marine fish: an overview on the state of the art. *J. Appl. Ichthyol.* 24(4):460-486.
- Curry, R. A. ;Noakes, D. L. G. and Morgan,G. E. (1995):**
*Canadian Journal of Fisheries and Aquatic Science.*52(8):1741-1794.

- De Graaf, G and Janssen, H. (1996):** Artificial reproduction and pond rearing of the African catfish (*Clarias gariepinus*) in Sub-Saharan Africa. FAO Fisheries Technical Paper 362, 73.
- De Graaf, G.J., Galemoni F.,and Banzoussi, B. (1995):** The artificial reproduction and fingerling production of the African catfish *Clarias gariepinus* (Burchell 1822) in protected and unprotected ponds. Aquaculture Research 26: 233-242.
- Dhara, K. and Saha, N.C., (2013):** Controlled breeding of Asian catfish *Clarias batrachus* using pituitary gland extracts and ovaprim at different temperatures, latency periods and their early development. J. Aquacult. Res. Dev. 4 (4), 9.
- Dügenci, S.K.; Arda, N. and Candan, A. (2003):** Some medicinal plants as immune stimulant for fish. Journal Ethnopharmacology, 88(1): 99-106.
- Dytham, C. (1999):** Choosing and Using Statistics: A Biologist's Guide. Blackwell Science Ltd., London, UK. pp 147.
- Eckert, S.M.; Yada, T.; Shepherd, B.S.; Stetson, M.H.; Hirano, T. and Grau, E.G. (2001):** Hormonal control of osmoregulation in the channel catfish *Ictalurus punctatus*. Gen. Comp. Endocrinol. 122, 270-286.

- El-Ebiary, E.H. (2002).** Modern technology for intensification of fish culture and its environmental impact. Report of a workshop held in Ismailia, Suez Canal Univ., 1-2 July, 2002.
- El-Emary, N.A.(1993):**Egyptian Medicinal plants:An overview I, Assiut J. Env. Studies,Overview series,(2):18-19.
- El-Neweshy MS, El-Maddawy ZK, El-Sayed YS(2013):** Therapeutic effects of date palm (*Phoenix dactylifera* L.) pollen extract on cadmium-induced testicular toxicity. *Andrologia* volume 45,Issue 6:369-378.
- El-Ridi, M.S., Strait L.A. and Aboul-Wafa, M.H. (1952):** Isolation of rutin from the pollen grain of the date palm (*Dactylifera palma* L.). *Archives of Biochemistry and Biophysics*, 39(2): 317-321.
- Eman Mahmoud (2007):** Physiological studies on reproductive performance of carp fishes. M. Sc., faculty of science, Zagazig university, p. 7.
- Faleh B.H. and Sawad A.A. (2006):**Effect of palm pollen grains extracts(*Phoenix dactylifera* L) on spermatogenic activity of male rabbits. *Basrah Journal of Agricultural Sciences*. 5(1-2):1-10.
- FAO-FISHSTAT (2012):** Fisheries Department, Fishery Information, Data and Statistics Unit. *Fishstat J. A Tool for Fishery Statistical Analysis*, Release 2.0.0. Global Capture Fisheries Production 1950–2010,

Global Aquaculture Production 1950–2010, Global Commodities Production and Trade 1978–2009. Rome: FAO.

Farag,S.; Rashed M.M.; Abdel-wahab Safaa A.E., Ahmed A.S.and Thabet Hala A. (2008):Biochemical studies on pollen grains of some medicinal and classical plants. *Advances in food sciences*.30 (3):192-198.

Faulton, (1902): Rate of growth of sea fishes. *Sci. Invest. Fish Dev. Scot. Rept.* 20.

Fazeleh Moshfegh, Javad Baharara, Farideh Namvar, Saeedeh Zafar-Balanezhad, Elaheh Amini and Lobat Jafarzadeh (2016): Effects of date palm pollen on fertility and development of reproductive system in female Balb/C mice. *Journal of HerbMed Pharmacology*;5(1):23-28.

Fostier, A., Jalabert, B., Billard, R., Breton, B. and Zohar, Y. (1983): The gonadal steroids. In: WS Hoar, DJ, Randall, Donaldson EM (Eds). *Fish Physiology*. (9A). Academic Press, New York.

Fouad Mehraban, M.Sc., Mehrzad Jafan,Ph.D., Mehdi Akbartabar Toori,Ph.D., Hossein Sadeghi, Ph.D., Mostafa Mostafazade, M.Sc., and Heibatollah Sadeghi, Ph.D.(2014):Effects of date palm pollen (*Phoenix Dactylifera L.*) and *Astragalus Ovinus* on

sperm parameters and sex hormones in adult male rats. Iran J Reprod Med 12(10): 705-712.

Geriesh, M.H.; Balke, K. and El-Bayes, A. (2008): Problems of drinking water treatment along Ismailia Canal Province, Egypt. J. Zhejiang Univ. Sci. B., 9 (3): 232–242.

Gibert, J., Culver D. C., Danielopol D. L., Griebler C., Gunatilaka A., Notenboom J. and Sket, B. (2008): Groundwater ecosystems: human impacts and future management. – In: Polunin, N. V. C. (ed.), Aquatic ecosystems, trends and global prospect. Cambridge University Press, Cambridge, pp. 30–34.

Gore-langton, R.E and Armstrong, D.T. (1988): Follicular Steroidogenesis and its control. In: Knobil, E., and Neil, J. et al., ed. The physiology of reproduction. Raven press, New York, pp. 331-385.

Green, B.W., El Nagdy, Z.; Hebicha, H.; Shaker, I.; Kenawy, D.A.R. and El Gamal, A.R. (1995). Evaluation of Nile tilapia production systems in Egypt. CRSP Research report 95-91. Pond Dynamics/Aquaculture CRSP, Oregon State University, Corvallis, Oregon: 12 p.

Grizzle, J. (1985): Reproductive Biology in C.S. Tucker, Editor. Channel Catfish Culture. Elsevier, Amsterdam, The Netherlands Pages 229-282.

- Gu, L., M.A. Kelm, J.F. Hammerstone, G. Boecher, J. Holden, D. Haytowitz and R.L. Prior, (2003):** Screening of foods containing proanthocyanidins and their structural characterization using LCMS/MS and thiolytic degradation. *J. Agric. Food Chem.*,51: 7531-7521.
- Gupta, P.K. (2000):** Methods in environmental analysis water,soil and air. *Agrobios*, (5): pp. 1-400.
- Hanafy, M.M(1995):**The use of Anise(*Pimpinella anisum*), Fennel (*Foeniculum vulgare*) and Ginger(*Zingiber officinale Roscoe*)as a feed additives in the nutrition of broilers.M.Sc.thesis, Faculty Agric., Univ.Alex. ARE.
- Haniffa,M.A.K. and Sridhar,S. (2002):** Induced spawning of spotted murrel (*Channa punctatus*) and catfish (*Heteropneustes fossilis*) using human chorionic gonadotropin and synthetic hormone (ovaprim). *Vet.Arhib* 72(1), 51-56.
- Harraz,F.M.; Abdel-Sattar; Khedr,A.;Al-Marzouki Z.M.H. and Abul-Rahim M.(2008):**Determination of esterone in the date pits of the major cultivars of date palm(*Phoenix dactylifera*) grown in Saudi Arabia and possible use as a natural hormonal source.Khedr et al. *EJAFChE*,7(7):3115-3125.

- Hassan ,A. and Abou-Elwafa,M.A.(1947):**An estrogenic substance in pollen grains of date palm tree *Phoenix dactylifera L., palmae*. *Nature*.159-409.
- Hassan, H.M.M., (2008):** Biochemical characterization of palm pollen extracts as a biostimulator in different systems. Ph.D. Thesis, Cairo University, Giza, Egypt.
- Hassan, W.A., El-Kaslan A.M. and Ehssan N.A., (2012):** Egyptian date palm pollen ameliorates testicular dysfunction induced by cadmium chloride in adult male rats. *J. Am. Sci.*, 8(4): 659-669.
- Hayashi, M. and Rosenberry. D.O. (2002):** Effects of Ground Water Exchange on the Hydrology and Ecology of Surface Water. Review Paper. *Ground Water* 40: 309-316.
- Hecht,T.,(1996):** The culture of *Clarias gariepinus* in southern Africa, with comments on the Relative Futility of Subsistence Aquaculture in Africa. in T.G. Heggberget, Ed. *The Role of Aquaculture in world Congress. Theme 6*. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, pp:121-135.
- Henrotte E,Mandiki R.S.N.M,Prudencio A.T,Vandecan M.,Melard C.,Kestemont p(2010):**Egg and larval quality ,and egg fatty acid composition of Eurasian perch breeders (*Perca fluviatilis*) fed different dietary DHA/EPA/AA ratios.*Aquacult Res* 41:53-61.

- Henry, R.J. (1974):** Clinical chemistry: principles and techniques. 2nd edition, Harper and Row, New York, USA.
- Hossain, M.B., Rahman, M.M., Sarwer, M.G., Ali, M.Y., Ahamed,F., Rahman, S., Fulanda, B., Rahman, M.M., Subba, B.R.,Hossain, M.Y., (2013):** Comparative study of carp pituitary gland (PG) extract and synthetic hormone ovaprim used in the induced breeding of stinging catfish, *Heteropneustes fossilis* (Siluriformes:Heteropneustidae). *Our Nat.* 10 (1), 89–95.
- Hossain, M.Y., Ahmed, Z.F., Leunda, P.M., Jasmine, S., Oscoz, J.,Miranda, R., Ohtomi, J., (2006):** Condition, length–weight and length–length relationships of the Asian striped catfish *Mystus vittatus* (Bloch, 1794) (Siluriformes: Bagridae) in the Mathabhanga river, southwestern Bangladesh. *J. Appl. Ichthyol.* 22 (4), 304–307.
- Hosseinifard, S.J. and Aminiyan, M.M. (2015):** Hydrochemical characterization of groundwater quality for drinking and agricultural purpose: A case study in Rafsanjan plain, Iran. *Water Qual. Expo. Health*, 7: 531-544.
- Huisman, E. A. and Richter, C.J.J. (1987):** Reproduction, growth, health control and aquaculturalpotential of the

African catfish, *Clarias gariepinus* (Burchell 1822).
Aquaculture, 63: 1-14.

Ibrahim, N, A. (1997): Effects of different chemical fertilizers applied at a hyper dose on fish production, B. Sc. Thesis. Animal production Dept. Fac. of Agric. Cairo Univ. Interpretation of water analysis reports for fish culture. Southern Regional Aquaculture Center (SARC). No.4606.

Inter African Bureau for animal resources (2015): African catfish (*Clarias gariepinus*), African union.

Jaroenporn S, Malaivijitnond S, Wattanasirmkit K, Trisomboon H, Watanabe G, Taya K, et al(2006): Effects of *Pueraria mirifica*, an herb containing phytoestrogens on reproductive organs and fertility of adult male mice. *J Endcor.* 30:93-101.

Jauncey, K. and Rose, B. (1982). A Guide to tilapia feeds and feeding, institute of aquaculture. University of Sterling, Scotland.

Javed, M. and Usmani, N. (2015). Stress response of biomolecules (carbohydrate, protein and lipid profiles) in fish *Channa punctatus* inhabiting river polluted by thermal power plant effluent. *Saudi. J. Bio. Sci.*, 22(2): 237–242.

Jeney, G.; Nemcosk, J.; Jeney, Z. and Olah, J. (1992): Acute effect of sublethal ammonia concentrations on

common carp (*Cyprinus carpio*) II Effect of ammonia on blood plasma transaminases (GOT,GPT). *Aquaculture*, 104: 149-156.

Juario, J. V.; Duray, M. N.; Duray, V. M.; Nacario, J. F. and Almendras, J. M. E. (1984): Induced breeding and larval rearing experiments with milkfish *Chanos chanos* (Forsskal) in the philippines. *Aquaculture*, 36: 61– 70.

Karima, M.; Hanadi A.; Falwa A.; Fatima N.; Rokaya M.; Shamma S. and Amin A. (2004): Protictive effects of Phoenix dactylifera (data palm) pollen grains against chemotherapeutic induced infertility in mammals. 6th Annual U.A.E Univ. Res. Conf.

Kassen A.; Berges R. and Senge T. (2000): Effect of beta-sitosterol on transforming growth factor-beta-1 expression and translocation protein kinase C alpha in human prostate stromal cells in vitro. *Eur Urol*, 37:735-741.

Kobayashi, M., Aida, K. and Hanyu, U. (1987): Hormone changes during ovulation and effects of steroid hormones on plasma gonadotropin levels and ovulation in goldfish. *General and Comparative Endocrinology*, 67: 24-32.

Konradt, A. G. (1968). Methods of breeding the grass carp *Ctenopharyngodon idellus* and the silver carp

References

Hypophthalmichthys molitrix. FAO Fish Rep., 44: 101-130.

Krejszeff S, Targonska K, Zarski D and Kucharczyk D.(2009): Domestication affects spawning of the ide (*Leuciscus idus*)-Preliminary study. *Aquaculture* 295:145-147.

Krejszeff S, Targonska K, Zarski D, and Kucharczyk D.(2010): Artificial reproduction of two different spawn-forms of the chub. *Reprod Biol* 10:67-74.0

Kumar D, Kumar A and Prakash O.(2012): Potential antifertility agents from plants: A comprehensive review. *J Ethnopharmacol* 140:1-32.

Kumar, M. and Puri, A. (2012): A review of permissible limits of drinking water. *Indian J. Occupational and Environ. Med.*, 16(1): 40-44.

LaDon Swann (2000): A fish farmer's guide to understanding water quality: *Aquaculture Extension*, Illinois, Indiana, Sea Grant Program, Purdue University IL-IN-SG-97-2: 1-7.

Lamba, V., Goswami, S.V. and Sundararaj, B.I. (1983): Circannual and circadian variations in plasma levels of steroids (Cortisol, estradiol-17b, estrone, and testosterone) correlated with the annual gonadal cycle in the catfish, *Heteropneustes fossilis* (Bloch).

General and Comparative Endocrinology, 50: 205-225.

László, Gizella Tamas and Chris Seagrave. (2002):Carp and pond fish **Horvath** culture. Fishing News Books. Second Edition. ISBN 238- 282.

Lee, J. S. (1981): Spawning and producing fry, fingerlings, and stockers. Pages 209-233 in Commercial Catfish Farming. Interstate Publishers, Danville, Illinois,USA.

Liu, F. G.; Lin, T. S.; Huang, D. U.; Perng, M. L. and Liao, I. C. (2000):An automated system for egg collection, hatching, and transfer of larvae in a fresh water finfish hatchery. Aquaculture, 182: 137- 148.

MacKay, K.T. (1995): Rice-Fish Culture in China. Ottawa, International Development Research Centre (IDRC) p276.

Mahran, G.H., Abdel-Wahab S.M. and Attia A.M(1976): A phytochemical study of date palm pollen.Planta Medica, 29(2): 171-175.

Malcolm, J. (1995): Text Book of Environmental Biology of Fishes. First edition. Printed in Great Britain by T. J. Press (Padstow) LTD, Padstow, Cornwall.

Mansouri, A., Embarek G., Kokkalou E. and Kefalas P. (2005): Phenolic profile and antioxidant activity of the Algerian ripe date palm (*Phoenix dactylifera*). Food Chem., 89: 411-420.

- Mapfumo, E.; Willms, W. and Chanasyk, D. (2002):** Water Quality of Surface Runoff from Grazed Fescue Grassland Watershed in Alberta. *Water Quality Research Journal of Canada*, 37(3): 543-562.
- Mãrgãoan, R., Mărghitas L.A., Dezmirean D., Mihai C.M. and Bobis O.(2010):** Bee collected pollen -general aspects and chemical composition. *Bulletin UASVM Animal Science and Biotechnologies*,67(1-2): 254-259.
- Mckee, J. E. and Wolf, H. W. (1963):** Water quality criteria. Publication 3-A, Resources Agency of California, State Water Quality Control Board.
- Mikolajczyk, T.; Chyb, J.; Mikolajczyk, M. S.; Enringht, W. J.; Epler, P.; Filipiak, M and Breton, B. (2003):**Attempts to induce an (LH) Surge and ovulation in common carp (Cyprinus carpio L.) by differential application of a potent GnRH analogue, azagiy- nafarelin, under laboratory, commercial hatchery, and natural conditions *Aquaculture*, 223: 141- 157.
- Miura,T.; Ohata,T.; Miura,C.L. and Yamauchi,K. (2003):** Complementry deoxyribonucleic acid cloning of spermatogonial stem cells renewal factor. *Endocrinol.*,144:5504-5510.

- Mohamad, S. and Abasali, H. (2010):** Effect of plant extracts supplemented diets on immunity and resistance to *Aeromonas hydrophila* in common carp (*Cyprinus carpio*). Annual Review of Biochemistry, 5: 119-127.
- Mohamed Al-Ahmady Al-Zahaby(2017):** Hazard effect of drainage water on the reproductive performance and physiological status of cultivated tilapia. Ph.D. Animal Production Department , Faculty of Agriculture, Zagazig University.P.180-181.
- Morsy,M.M.A.(1995):**The use of Fenugreek(*Trigonella foenum Graecum*) Clove (*Syzygium aromaticum*) and Cinnamon (*Cinnamomum zeylanicum*) in broilers nutrition as a feed additives.M.Sc.,Fac. Agric., Alex., Univ. Alex., ARE.
- Moshtaghi A, Johari H, Shariati M, Amiri J. (2010):**Effects of phoenix *dactylifera* on serum concentration of estrogen, progesterone and gonadotropins in adult female rats. Journal of Rafsanjan University of Medical Sciences. 9(2):117-124.
- Munkittrich, K.R. and Dixon, D.O. (1988):** Growth, fecundity and energy stores of white sucker (*Catostomus commersoni*) from lakes containing elevated levels of copper and zinc. Can. J. Fish. Aquatic. Sci., 45: 1355-1365.

- Musa, O.K.; Shaibu, M.M. and Kudamnya, E.A. (2013):** Heavy metal concentration in groundwater around Obajana and its environs, Kogi State, North Central Nigeria. *Am. Int. J. Contemp. Res.*, 3(8): 170-177.
- Nayernia,K.,;Li,M.; Jaroszynski,L.et al.(2004):**Stem cell based therapeutically approach of male infertility by tetatocarcinoma derived germ cells. *Hum. Mol.Genet.*,13:1451-60.
- Nikolsky, G. V. (1963):**The ecology of fishes Academic press, London and New York, P. 352.
- Nitha A, Ansil PN,Prabha SP, Wills PJ and Latha ms.(2011):**Preventive and curative effect of woodfordia fruticosa Kurz flowers on thioacetamide induced oxidative stress in rats. *Asian Pac J Biomed* 1(5):395-400.
- Oguntuase Bukola Gbemisola and Adebayo O. T.(2014):** Sperm Quality and reproductive performance of male Clarias Gariepinus induced with synthetic hormones (Ovatide and Ovaprim). *International Journal of Fisheries and Aquaculture*, Vol. 6(1), pp. 9-15.
- Olivier, J.D.A., de Jong, T.R. and Dederen, P.J. (2007):** Effects of Acute and Chronic Apomorphine on Sex Behavior and Copulation-Induced Neural Activation in the Male Rat. *European Journal of Physiology*, **576**, 61-76.

- Osibona A. O., Kusemiju K. And Akande G. R. (2006):** Proximate composition and fatty acids profile of the African Catfish *Clarias gariepinus*. Journal Acta SATECH. 3, 85-89.
- Osman, A.G.M.; Al-Awadhi, R.M.; Harabawy, A.S.A. and Mahmoud, U.M. (2010):** Evaluation of the use of protein electrophoresis of the African catfish, *Clarias gariepinus* (Burchell, 1822) for biomonitoring aquatic pollution. Environ. Res. J., 4: 235–243.
- Peterson, N.P. and Quinn T.P. (1996):** Spatial and temporal variation in dissolved oxygen in natural egg pockets of chum salmon *Oncorhynchus keta* (Walbaum), in Kennedy Creek, Washington. Journal of Fish Biology 48:131-143.
- Phelps, R.P.; Hastey, R.; Pendetar, A.; Linley, L.; Papanikos, N.; Dunham, R.A. (2007):** Effects of temperature on the induced spawning of channel catfish and the production of channel x blue catfish hybrid fry. Aquaculture 273(1), 1-10.
- Pottinger, T. G., Campbell, P. M. & Sumpter, J. P. (1991):** Stress-induced disruption of the salmon liver-gonad axis. In Reproductive Physiology of Fish 1991 (Scott, A. P., Press, p 114-116.

Quinn, T.P. (2005): The behavior and ecology of Pacific salmon and trout. University of Washington Press, American Fisheries Society, p 388.

Radoslaw Krol, Katarzyna Targonska, Joanna Nowosad, Roman Kujawa, Krzysztof Kupren, Andrzej Mamcarz, Joanna Luczynska, Rafal Kaszubowski, Tomasz K.Czarkowski, Grazyna Furgala-Selezniow, Dariusz Kucharczyk (2014): Effect of environmental conditions and feeding on the effectiveness of the *Leuciscus idus* (L.) reproduction. Vol 21, No, 2.

Robert R. and Krueger R. (2007): The date palm (*Phoenix dactylifera* L.) overview of biology, uses, and cultivation. Hort Science. 24(5):1077-1082.

Rodriguez-Manzo, G. (1999) :Yohimbine Interacts with the Dopaminergic System to Reverse Sexual Satiation: Further Evidence for a Role of Sexual Motivation in Sexual Exhaustion. *European Journal of Pharmacology*, 372, 1-8.

Rottmann, R. W.; Shirman, J. V. and Chapman, F. A. (1992):Hormonal control of reproduction in fish for induced spawning. Alabama cooperative Extension Services, Auburn University, Southern Regional Aquaculture Center (SRAC) publication No. 424, 1 - 4.

- Russo, R. C and Thurston, R. V, (1991):** Toxicity of ammonia, nitrite and nitrate to fishes. World Aquaculture Soc., Baton Rouge, pp.58-89.
- Sallam, G.R.A. (2010):** Studies on production and spawning of *Oreochromis* sp. PhD Thesis 6in Agriculture Scie. Fac. Agriculture, Saba Bacha, Alex. Univ.
- Salman I, Munazza A, Hina MA, Tahir S, Yasir A, Gul EN(2014):** Evaluation of spermatogenesis in prepubertal albino rats with date palm pollen supplement. Afr J Pharm Pharmacol. 2014;8(2):59-65.
- Scaletta, L.L. and Hull, E.M. (1990):** Systemic or Intracranial Apomorphine Increases Copulation in Long-Term Castrated Male Rats. *Pharmacology, Biochemistry, and Behavior*, **37**, 471-475.
[http://dx.doi.org/10.1016/0091-3057\(90\)90015-A](http://dx.doi.org/10.1016/0091-3057(90)90015-A).
- Schlotfeldt, H. J. and Alderman, B. J. (1995):** What should I do? A practical guide for the freshwater fish farmer. European Association of Fish Pathologists/Warwick Press, Weymouth.
- Shahin, M. (1991):** Assessment of groundwater resources in Egypt. IHE Report Series № 23, Delft: p 71.
- Shaker, I. M. (1998):** Effects of some environmental conditions on the properties of the soils and waters of fish

cultures and their productivity. Ph. D. Thesis. Soil and water Dept. Fac. of Agric. Al-Azhar Univ.

Shalaby, A.M.; Khattab, Y.A. and Abdel-Rahman, A. (2006): Effects of garlic, *Allium sativum*, and Chloramphenicol on growth performance, physiological parameters and survival of Nile tilapia, *Oreochromis niloticus*. J. Venom Anim. Toxins and Trop. Dis., 12(2): 172-201.

Sharaf, S. M. (1992): Utilization of pituitary gland in the induced spawning of *Clarias lazera*. M.Sc. Thesis, Fac. Agri. Suez Canal University.

Shearer, T.R.; Wagstaff, S.J.; Calow, R.; Stewart, J.A.; Muir, J.F.; Haylor, G.S. and Brooks, A.C. (1997). The potential for aquaculture using saline groundwater. British Geological Survey, DFID Technical Report WC/97/58 Overseas Geology Series: 116-154.

Shokr, E. A. M. (1999): Influence of prostaglandin F₂ alpha and human chorionic gonadotropin on reproduction, growth and some biochemical aspects of The Nile tilapia; *Oreochromis niloticus*. Ph.D. Thesis, Faculty of Science. Cairo.

Small B. C.(2004): Effect of dietary cortisol administration on growth and reproductive success of channel catfish. Journal of Fish Biology 64, 589–596.

- Soghra Fallahi, Minoo Rajaei, Kianoosh Malekzadeh and Seyed Mehdi Kalantar (2015):** Would Phoenix Dactylifera Pollen (Palm seed) be considered as a treatment agent against males infertility? A systematic review. *Electronic Physician*,7(8): 1590-1596.
- Stahl, R. and Ramadan, A.B. (2008):** Environmental studies on water quality of the Ismailia Canal / Egypt; Karlsruhe, Germany. Institut für Technische Chemie, Forschungszentrum Karlsruhe GmbH, Karlsruhe, Germany: 1-23.
- Stanley, R.G. and Linskens H.F. (1974):**. Pollen: Biology, Chemistry and Management , Springer-Verlag, New York.
- Suloma, A. and Ogata, H. Y. (2006):** Future of Rice- Fish Culture, Desert Aquaculture and Feed Development in Africa: That case of Egypt as the leading Country in Africa. *JARQ* 40 (4),351-360.
- Sumpter, J.P. (1990):** General concepts of seasonal reproduction. Pages 13-32 in Munro, A.D., A.P. Scott, T.J. Lam. Editors. *Reproductive Seasonality in Teleosts: Environmental Influences*. CRC press Inc. Boca Raton, Florida, United States.
- Sutton, S.G.; Bult, T.P. and Haedrich, R.L. (2000).** Relationships among fat weight, body weight, water

weight and condition factors in wild Atlantic salmon parr. T. Am. Fish. Soc., 129: 527–538.

Suvarna Kim S, Christopher Layton and Bancroft John D. (2013): Bancroft's Theory and Practice of Histological Techniques, 7th Edition.

Svobodova, Z.; Lloyd, R.; Machova, J. and Vykusova, B.(1993): Water quality and fish health. EIFAC technical paper 54, FAO,Rome.

Swingle, H. S. (1961): Relationships of pH of pond waters to their suitability for fish culture. Proc. Pacific Sci. Congress 9 (1957), Vol. 10, fisheries,72-75.

Szabo, T.; Modgyasszay, C. S. and Horvath, L. (2002): Ovulation induction in nase (*Chondrostoma nasus*). Using pituitary extract or GnRH analogue combined with domperidone. Aquaculture 203: 389-395.

Taepongsorat, L.; P. Tangpraprutgul; N. Kitana and S. Malaivijitnond (2008): Stimulating effects of quercetin on sperm quality and reproductive organs in adult male rats. Asian J. Androl., 10:249-258.

Tagliamonte, A., Fratta, W., Del Fiacco, M. and Gessa, G.L. (1974): Possible Stimulatory Role of Brain Dopamine in the Copulatory Behavior of Male Rats. *Pharmacology, Biochemistry, and Behavior*, **2**, 257-260. [http://dx.doi.org/10.1016/0091-3057\(74\)90061-6](http://dx.doi.org/10.1016/0091-3057(74)90061-6).

- Targonska K, Kucharczyk D, Kujawa R, Mamcarz A, Zarski D(2010):**controlled reproduction of asp, *Aspius aspius*(L.) using luteinizing releasing hormone(LHRH) analogues with dopamine inhibitors. *Aquaculture* 306:407-410.
- Targonska K, Kucharczyk D. Zarski D, Cejko B, Krejszef S, Kupren K, Krol R, Dryl K, Kowalski R, Glogowski J (2011a):**Artificial reproduction of wild and cultured barbel (*Barbus barbus*, Cyprinidae) under controlled conditions. *Acta Veter Hung* 59:363-372.
- Targonska K. and Kucharczyk D. (2011b):** The Application of hCG, CPH and ovopel in Successful Artificial Reproduction of goldfish (*Carassius auratus auratus*) under controlled conditions, *Reporod Domest Anim* 46:651-655.
- Teugels G. (1986):** A systematic revision of the African species of the genus *Clarias* (Pisces: Clariidae). *Annales Musee Royal de l'Afrique Centrale*, 247:1-99.
- Thanae M.A.A.S. (1994):** Biocemical Study on Heavy Metals Residues in Some Fishes. (Ph. D.) Biochemistry and Clinical Biochemistry Department. Faculty of Veterinary Medicine, Alexandria University.
- Truscott, B., Idler, D.R., So, Y.P. and Walsh, J.M. (1986):** Maturational steroids and gonadotropin in upstream

migratory sockeye salmon. *General and Comparative Endocrinology*, 62: 99–110.

Volckaert, P.A.; Hellemans B.A.; Galbusera P.; Ollevier F.; Sekkali B. and Belayew A. (1994): Replication, expression and fate of foreign DNA during embryonic and larval development of the African catfish. *Molecular Marine Biology and Biotechnology*, 3 (2): 57-69.

Wafaa A. Hassan; Akram M. El-kashlan and Noha A. Ehssan (2012): Egyptian Date palm pollen ameliorates testicular dysfunction induced by cadmium chloride in adult male rats. *Journal of American Science*, 8(4).

Waleed El-Hawarry N., Soliman Abd El-Rahman H. and Ramy Shourbela M. (2016): Breeding response and larval quality of African catfish (*Clarias gariepinus*, Burchell 1822) using different hormones/hormonal analogues with dopamine antagonist. *Egyptian Journal of Aquatic Research*, 42, 231-239.

Watson, L. C. (1987): Spawning and hatching Atlantic tomcod. *Prog. Fish. Cult.*, 49: 69 - 71.

Whitehead, C., Bromage, N.R. and Breton, B. (1983): Changes in plasma levels of gonadotropins, oestradiol 17 β and vitellogenin during the first and subsequent

References

reproductive cycles of female rainbow trout. *Aquaculture*, 34: 317-326.

Yakubu MT, Akanji MA and Oladiji AT(2008):Effects of oral administration of aqueous extract of *Fadogia agrestis* (Schweinf.Ex Hiern) stem on some testicular function indices of male rats. *J Ethnopharmacol.*115:288-292.

Zaki,A.K., Schmidt J., Hammouda F.M. and Adam G.,(1993): Steroidal constituents from pollen grains of *Phoenix dactylifera*. *Planta Medica*, 59(7): 613-614.

Zaki,M.M.; Eissa,A.E. and Saeid,S.(2011):Assessment of the immune status in Nile tilapia(*O.niloticus*) experimentally challenged with toxogenic and septicemic bacteria during treatment trial with Florfenicol and Enrofloxacin.*World Journal of Fish and Marine Sciences*,3(1):21-36.

Zamble, A., Sahpaz, S., Brunet, C. and Bailleul, F. (2008): Effects of *Microdesmis keayana* Roots on Sexual Behavior of Male Rats. *Phytomedicine*,15, 625-629. <http://dx.doi.org/10.1016/j.phymed.2007.10.002>

Zarski D, Kucharczyk D, Targonska K, Jamroz M, Krejszeff S, Mamcarz A(2009):Application of Ovopel and Ovaprim and their combination in

References

controlled reproduction of two reophilic cyprinid fish species. *Pol J Nat Sci* 24:235-244.

Zarski D, Kucharczyk D, Sasinowski W, Targonska K, Mamcarz A (2010): Influence of temperature on successful reproduction of burbot, *Lota lota* (L.) under hatchery conditions. *Pol J Nat Sci* 25:93-105.

Zeig, R. D.; Morton, J. D.; Stewart, M. M. (1999): Source Water Quality for Aquaculture: A Guide for Assessment. The World Bank. Washington D. C. *Zoology*. 59:717–727.

vita

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Arabic Summary

الملخص العربي

مع الزيادة السكانية السريعة وزيادة الحاجة للغذاء وخاصة مصادر البروتين، تعتبر الأسماك من أهم وأفضل المصادر للحصول علي البروتين الحيواني الذي يجمع بين القيمة الغذائية العالية وقلة الثمن حيث يمثل احتياطي بروتيني هام نستطيع من خلاله توفير الاحتياج البروتيني الذي يتناسب مع الزيادة السكانية.

نظرا لاهمية النباتات الطبيعية لما تحتويه من المركبات الفينولية بالإضافة أنها ليس لها أثار جانبية مقارنة بالاضافات الكيميائية لذا ركزت هذه الدراسة على استخدام حبوب لقاح النخيل وهو من النباتات الطبيعية المعروفة منذ القدم بتأثيرها الطبي على الانسان خاصة في تحسين الكفاءة التناسلية.

ومن ثم أجريت هذه التجربة بهدف الدراسة إلي تحسين الكفاءة التناسلية لذكور واناث القرموط الأفريقي باستخدام نباتات طبيعية كحبوب لقاح النخيل وذلك تحت ظروف بيئية مختلفة باستخدام المياه العذبة والمياه الجوفية.

لقد أجريت هذه الدراسة بالمعمل المركزي لبحوث الثروة السمكية و بمفرخ العباسة السمكي التابع للهيئة العامة لتنمية مصادر الأسماك بالعباسة- أبوحماد- شرقية على ذكور واناث القرموط الأفريقي في المياه العذبة والمياه الجوفية بمتوسط أوزان (500-600جم).

تم تكوين أربعة علائق متماثلة في البروتين (34%) احتوت على (صفر- 0,1- 0,2- 0,3%) من حبوب لقاح النخيل بمعدل تغذية (3%) من الوزن الحي .

لقد تم اجراء تجربتين في هذه الدراسة امتدت لمدة شهرين من الفترة 15 ابريل – 15 يونيو موسم 2016:

1- التجربة الأولى قد أجريت لدراسة تأثيرحبوب لقاح النخيل على الكفاءة التناسلية لذكور القرموط الأفريقي فى المياه العذبة والمياه الجوفية بعدد 240 سمكة قرموط أفريقي ويشمل هذا العدد 168 ذكر و 72 أنثى حيث هذا العدد من الاناث استخدم أثناء التفريخ (أي لن تتغذى على حبوب لقاح النخيل).

التجربة الثانية قد

أجريت لدراسة تأثير حبوب لقاح النخيل على الكفاءة التناسلية لاناث القرموط الأفريقي في المياه العذبة والمياه الجوفية بعدد 240 سمكة قرموط أفريقي ويشمل هذا العدد 168 أنثى و 72 ذكر حيث هذا العدد من الذكور استخدم أثناء التفريخ (أي لن تتغذى على حبوب لقاح النخيل).

في كلا التجربتين قسمت الأسماك الى ثمانية معاملات (أربعة معاملات في المياه العذبة وأربعة معاملات في المياه الجوفية) لكل معاملة ثلاث هابات حجم الهابة $2 \times 1 \times 1$ م موضوعة في ربع فدان حوض ترابي بعمق 1م وكل هابة تحتوي على سبعة أسماك.

تمت عملية تغذية الأسماك علي حبوب لقاح النخيل لمدة شهرين بمعدل تغذية 3% من الوزن الحي وفي بداية هذه الفترة تم أخذ سمكتين من كل هابة لقياس الوزن والطول لحساب معامل الحالة الابتدائي وأيضا تم وزن الكبد والخصية والمبيض لحساب المؤشر الكبدي الابتدائي (Initial hepatosomatic index) وحساب مؤشر الأعضاء التناسلية الابتدائي (Initial gonadosomatic index). وفي نهاية هذه الفترة تم أخذ سمكتين من كل هابة لقياس الوزن والطول لحساب معامل الحالة النهائي وأيضا تم وزن الكبد والخصية والمبيض لحساب المؤشر الكبدي النهائي (Final hepatosomatic index) وحساب مؤشر الأعضاء التناسلية النهائي (Final gonadosomatic index) وتم أخذ هذه العينات للتحليل الهستولوجي, كما تم أخذ عينات دم لقياس البروتين الكلي وبعض الهرمونات مثل الكورتيزول والتستوستيرون والاستراديول وأيضا تم أخذ عينات سائل منوي للذكور لقياس حجم السائل المنوي ونسبة حركة الحيوانات المنوية وحساب فترة حركة الحيوانات المنوية.

خلال فترة التجربة (شهرين) تم قياس خصائص المياه أسبوعيا ومن هذه القياسات (درجة الحرارة - درجة الحموضة - الأكسجين الذائب - درجة الملوحة - تركيز الأمونيا - تركيز النترات و النيتريت - تركيز الحديد).

بعد نهاية فترة التغذية تم وضع كل ذكر وأنثى في حوض فايبر مساحته 1×1 م بعمق 1 م للتفريخ وقد تم استخدام مستخلص الغدة نخامية للمبروك العادي لتحفيز عملية التفريخ وقد تم حقن 3 ملجم غدة نخامية لكل سمكة في الحقنة الأولى و 3 ملجم غدة نخامية لكل 1 كجم من وزن السمكة في الحقنة الثانية بفارق زمني 8 ساعات بين الحقنتين وتم حقن الذكور 6 ملجم لكل ذكر في الحقنة الثانية.

بعد التفريخ تم أخذ القياسات الآتية :

- وقت الاستجابة (Latency time) – معدل التبويض (Ovulation rate) – وزن البيض – عدد البيض لكل 1 جم بيض – قطر البيضة – معدل الإخصاب – معدل الفقس - معدل الاعاشة للذريعة.
- ولقد أظهرت التجربة النتائج الآتية :

1- حالة السمكة قبل التفريخ:

- عدم وجود فروق معنوية في معامل الحالة الابتدائي والنهائي والمؤشر الكبدي الابتدائي والنهائي ومؤشر الأعضاء التناسلية الابتدائي.
 - وجود فروق معنوية في معدل النمو وفي مؤشر الأعضاء التناسلية النهائي وكان أفضل تركيز (0,2%) حبوب لقاح النخيل في المياه العذبة أفضل منها في المياه الجوفية عند نفس التركيز مقارنة بالتركيزات الأخرى.
- 2- قياسات الأداء التناسلي:

- حدوث تحسن واضح في الكفاءة التناسلية للقرموط الأفريقي في أسماك المياه العذبة أفضل منها في المياه الجوفية عند تركيز (0,2%) حبوب لقاح النخيل وذلك تمثل فيما يلي:
- زيادة في حجم السائل المنوي, زيادة في نسبة حركة الحيوانات المنوية وزيادة في فترة حركة الحيوانات المنوية.
- الإسراع في وقت الاستجابة (Latency time) – زيادة في معدل التبويض – زيادة في وزن البيض – زيادة في قطر البويضة – زيادة في معدل الإخصاب ومعدل الفقس – زيادة في معدل اعاشة الذريعة.

3- قياسات الدم :

- لقد أوضحت تحليلات الدم مايلي: نقص في هرمون الكورتيزول في أسماك المياه العذبة أقل منها في المياه الجوفية عند تركيز (0,2%) حبوب لقاح النخيل مقارنة بالتركيزات الأخرى , وزيادة في نسبة هرمون التيستوستيرون وهرمون الاستراديول وأيضا زيادة في نسبة البروتين الكلي في أسماك المياه العذبة أفضل منها في المياه الجوفية عند نفس التركيز مقارنة بالتركيزات الأخرى.

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- 4- الفحوصات الهستولوجية:
- لقد أوضحت القطاعات الهستولوجية أن الكبد طبيعي في أسماك المياه العذبة والمياه الجوفية عند جميع التركيزات.
 - بالنسبة للخصية فقد أوضحت القطاعات الهستولوجية تحسن واضح في عملية تكوين الحيوانات المنوية (Spermatogenesis) في أسماك المياه العذبة أفضل منها في المياه الجوفية عند تركيز (0,2%) حبوب لقاح النخيل.
 - بالنسبة للمبيض فقد أوضحت القطاعات الهستولوجية تحسن واضح في عملية التبويض (Oogenesis) وكان المبيض أكثر نشاطا في أسماك المياه العذبة أفضل منها في المياه الجوفية عند تركيز (0,2%) حبوب لقاح النخيل مقارنة بالتركيزات الأخرى.
- نستنتج من هذه الدراسة أن استخدام المياه العذبة والنباتات الطبيعية مثل حبوب لقاح النخيل في علائق أسماك القرموط الأفريقي يحسن من أداء النمو والكفاءة التناسلية وكان أفضل تركيز هو (0,2%) حبوب لقاح النخيل مقارنة بالتركيزات الأخرى.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

'وَعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا'

صدق الله العظيم

سورة النساء الآية (113)



جامعة الزقازيق
كلية الطب البيطري
قسم أمراض ورعاية الأسماك

تأثير حبوب لقاح النخيل على الكفاءة التناسلية
للقرموط الأفريقي تحت ظروف بيئية مختلفة
رسالة مقدمة من

ايناس نصر محمد خليل

بكالوريوس في العلوم الطبية البيطرية - جامعة الزقازيق (2012)

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أستاذ ورئيس قسم التفريخ و فيسيولوجيا تكاثر
الأسماك المعمل المركزي لبحوث الثروة
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رسالة مقدمة الى

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(أمراض الأسماك ورعايتها)

قسم أمراض ورعاية الأسماك

(2018)