

Invitation to lunch seminar

Lecture by prof. Marc Verdegem

Visiting Professor at CENAKVA

„Ecological intensification of Aquaculture“

Friday, April 21, 2023, 11:00 – 12:30

Na Sádkách 1780, 370 05 České Budějovice
Campus of the University of South Bohemia,
The lecture room R1

Please confirm your participation [here](#), by April 20.

Lunch sandwich for all registered participants.

Free admission. Capacity max. 50 persons.

Abstract

Until ± 1953 global aquaculture production was less than 1 million metric tonne using production methods stimulating natural food availability for culture organisms. Ponds – one of these early production systems – produce 62% of the global aquaculture animal production, making it the most important global aquaculture production system in use today. Important factors contributing to the success of pond culture are its in-situ self-purifying capacity and its primary productivity, the latter providing the energy needed to sustain self-purification. However, in semi-intensive or intensive ponds, externally produced commercial feed when fed outstrip to capacity of the pond for self-purification. Extra carbon needs to be added to enhance the biological self-cleaning capacity of the pond. In nearly all aquaculture ecosystems, not the primary producers (algae) but the culture species are the largest biomass present in the pond ecosystem.

One challenge of adding extra carbohydrate to the pond is that CO₂ emissions increase, adding to existing global warming and other climate change impacts. Farmers add easily digestible carbohydrates like molasses or corn starch which can be quickly digested in the pond, resulting in added CO₂ production. To avoid this, fibre can be included in the diet as this cannot be digested by fish or shrimp. A large fraction of the fibre will then enter the pond with the faeces, providing extra energy for pond microorganisms. In turn, the bacteria decompose more waste, causing more nutrients to be assimilated in the food web, leading to the Production of more natural food. Because the 'C' content of carbohydrates and protein is in the same range, replacing protein partially with fibre in the diet has the same effect as adding extra easily digestible carbohydrates without increasing CO₂ emissions.

To maintain a clean, productive and healthy pond environment, nations should improve and enforce environmental regulations and educate farmers on pond ecology and ecological intensification of aquaculture.



Dr. Marc C.J. Verdegem



Associate professor at the Aquaculture and Fisheries Group,
Wageningen University & Research

Research

My research focuses on pond aquaculture, looking at the interaction between nutrition, water quality, production. recent research focuses on “ecological intensification of Aquaculture”.

Employment

- 1979-1983 Technical director, Fish Culture Development program, Haiti. Set up a fish farm in Fort Liberté (Northeast of Haiti) and coordinated a regional extension program.
- 1984-1987 Hatchery and experimental station manager of the University of Puerto Rico, in charge of a state-wide extension program promoting duo-culture of tilapia and freshwater prawn (1 day/week) – mainly during summer recess. PhD scholarship: (4 day/week)
- 1988-1990 Project manager at the Fish Culture and Fisheries Group, Department of Animal Sciences (duty stations in Costa Rica and Nigeria).
- 1990-2000 Project Coordinator at the Aquaculture and Fisheries Group and at the Office for International relations of Wageningen University.
- 2001-2015 Assistant professor at the Aquaculture and Fisheries Group (UD-1)
- 2009-2016 Study coordinator MSc Aquaculture and Marine Resource Management (0.2 fte)
- 2015-today Associate professor at the Aquaculture and Fisheries Group (UHD-1)
- 2019-today Senior Expert assigned to WorldFish-CGIAR institute (0.4 fte)

5 key publications

Hermesen, D., Van de Waal, D. B., Declerck, S. A. J., Verreth, J. A. J., & Verdegem, M. C. J. (2020). In situ fatty acid production supports shrimp yields in diets lacking fish oil and fishmeal. *Aquaculture Nutrition*. doi:10.1111/anu.13202 (0 citations)

Kabir, K. A., Schrama, J. W., Verreth, J. A. J., Phillips, M. J., & Verdegem, M. C. J. (2019). Effect of dietary protein to energy ratio on performance of Nile tilapia and food web enhancement in semi-intensive pond aquaculture. *Aquaculture*, 499, 235-242. (13 citations)

Giatsis, C., Sipkema, D., Smidt, H., Heilig, H., Benvenuti, G., Verreth, J., & Verdegem, M. (2015). The impact of rearing environment on the development of gut microbiota in tilapia larvae. *Scientific Reports*, 5, 18206 (90 citations)

Verdegem, M.C.J. ; Bosma, R.H. ; Verreth, J.A.J. (2006). Reducing water use for animal production through aquaculture. *International Journal of Water Resources Development* 22 (1). - p. 101 - 113. (104 citations)

Dam, A.A. van; Beveridge, M.C.M. ; Azim, M.E. ; Verdegem, M.C.J. (2002). The potential of fish production based on periphyton. *Reviews in Fish Biology and Fisheries* 12 (1). - p. 1 - 31. (127 citations)

