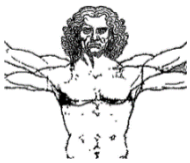
ECOCYCLES
ISSN 2416-2140

Open access scientific journal
of the European Ecocycles Society



Ecocycles, Vol. 5, No. 1, pp. 42-43 (2019)
DOI: 10.19040/ecocycles.v5i1.143

BOOK REVIEW

A review of the book 'Aquaponics Food Production Systems' (editors S. Goddek, A. Joyce, B. Kotzen, G. M. Burnell)

by Laszlo Stündl

University of Debrecen, Faculty of Agriculture, Food and Environmental Management

E-mail address: stundl@agr.unideb.hu

Abstract – This paper summarizes the views of the author on the new book 'Aquaponics Food Production Systems' (editors S. Goddek, A. Joyce, B. Kotzen, G. M. Burnell).

Keywords – aquaponics, production of fish and vegetables, circular economy, ecological cycles

Received: August 16, 2019 Accepted: August 21, 2019

Aquaponics Food Production Systems *- Combined Aquaculture and Hydroponic Production Technologies for the Future***.** S. Goddek, A. Joyce, B. Kotzen, G. M. Burnell (Editors). 155 x 235 mm 619p. Springer-Verlag GmbH, 2019. 51.99 € ISBN 978-3-030-15943-6 (hardback & OpenAccess e-book) (Goddek et al., 2019).

Aquaponics, a buzzword now among the experts and enthusiasts of sustainable food production, as well as the best example for integrated multitrophic aquaculture (IMTA), is also a hot topic in the scientific and technical literature. The technology itself is not new, its predecessor was practiced in the Inca Empire, but the detailed knowledge on the key elements of this complex system (e.g. biology, nutrient management, mass flow, system design and operation, pest control, energetics, economics, etc.) has just recently reached the level required to really understand its complete operation.

During the last 10 years, several books were published in this topic of which the '*Aquaponic Gardening - A Step-by-Step Guide to Raising Vegetables and Fish Together*' by Bernstein (2011) is considered to be the fundamental literature. Others, such as '*Hydroponics / Aquaponics: The Ultimate 2 in 1 Guide to Mastering Aquaponics and Hydroponics for Beginners!*' by Cardone (2015) or '*Aquaponics: From Beginner to Expert: Hydroponics & Aquaponics Double Book Bundle: Exact Blueprint to Aquaponic & Hydroponic Organic Gardening from Home*' by Walsworth (2016) are mostly for beginners describing the basic technologies, biological processes, and management issues. There is one 'commercial' book: '*The Aquaponic Farmer: A Complete Guide to Building and Operating a Commercial Aquaponic System'* by Southern and King (2017), however, it is only for family-farm scale operations. A further important publication which is freely available to download, as is this one, is the FAO's 2014 publication '*Small scale aquaponic food production: Integrated fish and plant farming*' (Somerville et al., 2015).

The book ***Aquaponics Food Production Systems*** *- Combined Aquaculture and Hydroponic Production Technologies for the Future* is really a gap-filler. It has been written and edited by the experts of the EU Aquaponics Hub, an international team which came to life as COST Action FA1305 funded by the EU and participating countries. Each chapter was written by teams of authors, all are experts in the relevant field adding together the knowledge and translating it into easy-to-follow sentences and paragraphs that are similarly clear for "newbies" as well as practitioners and (semi)professionals. The authors are obviously aiming for completeness of the subject, covering all aspects of aquaponics starting from its history, going through the existing technologies (with lots of examples) to economics, marketing, and even to educational aspects and future tendencies.

Another massive advantage is the sharing of information in the form of data, calculations, examples, formulas, etc., which is clearly and directly a great help to the designers or

operators to improve the performance of the already existing systems, or ones planned for the future. These features are the reasons why the extent of the book is large and much greater than anything yet written: 619 pages of fresh & digestible information.

The book has 23 chapters and is split into five parts, starting from the reasons/need for such an integrated and sustainable system ('*Part I: Framework Conditions in a Resource Limited World*') that can help to face global food challenges and limited resources and describing the two main parts (recirculating aquaculture and hydroponic technologies), altogether in 110 pages.

The next part ('*Part II: Specific Aquaponics Technology'*) provides detailed information on aquaponics technology from the basic processes, such as nutrient cycles, mineralization, modeling, and the pros and cons concerning the fundamental question on coupled or decoupled system that need to be considered. The subsequent part, '*Part III Perspective for Sustainable Development*' is the logical continuation of the previous section describing the nutrition and pest control issues, but one step forward is taken: i.e. the integration of the urban farming concept and policy issues. These core topics are discussed over a massive 321 pages, more than half of the book.

The following part (125 pages) '*Part IV Management and Marketing*' brings the publication to a fitting conclusion, making it complete with its discussions on the business side, including a good impact assessment. It looks at the financial and trade issues with risk and health assessment and management, commercialization, and extensive information for investment and business planning with lots of figures and examples. The section on the legal framework is also an important one since this special mixture on fish and plant production is typically in the intermediate zone of horticultural and aquacultural legislation sometimes with contradictory regulations especially for licensing of the operation or project funding. All these issues with the appropriate references on the relevant regulations and policies are discussed here.

The last chapter ('*Part V Aquaponics and Education*') contains the chapters on the outreach of aquaponics towards the public, targeting mainly the younger generations (elementary and secondary schools) but also giving a good overview of those involved in the vocational training and higher education across 56 pages. All these are backed with case studies and best practice approaches from various European countries.

According to the hype around aquaponics nowadays, this book is a really good and important source of information for professionals, decision-makers, and even those who are just interested in this novel, or, being more precise, re-invented method of sustainable food production. The up-to-date knowledge flowing from the text, with numerous explanatory of figures and tables, even the specific ones such as recirculation aquaculture systems (RAS) or hydroponic gardening can directly be used by various stakeholders, technologists, designers or decision-makers, as well as those involved in research or education in this field.

Last, but not least: it is unparalleled, that such a comprehensive and wide range of information can be accessed freely – if one is satisfied with the e-version. It is very important that the state of the art knowledge in aquaponics is freely available, across the globe, as many people in developing countries cannot afford hard copy. Free access has been afforded through the generosity of the COST (European Cooperation in Science and Technology) organization who provided most of the funding for open access and to the EU Aquaponics Hub who organized for this to happen.

References

Bernstein, S., 2011. Aquaponic Gardening: A Step-by-Step Guide to Raising Vegetables and Fish Together. New Society Publishers, Gabriola Island, Canada. ISBN: 10: 086571701X

Cardone, J., 2015. Hydroponics: Aquaponics: The Ultimate 2 in 1 Guide to Mastering Aquaponics and Hydroponics for Beginners! CreateSpace Independent Publishing Platform. ISBN: 978-1-5122-9308-1

Goddek, S., Joyce, A., Kotzen, B., Burnell, G. (Eds.), 2019. Aquaponics Food Production Systems: Combined Aquaculture and Hydroponic Production Technologies for the Future. Springer International Publishing. ISBN: 978-3-030-15942-9. DOI: 10.1007/978-3-030-15943-6

Somerville, C., Cohen, M., Pantanella, E., Stankus, A., Lovatelli, A., 2015. Small-scale Aquaponic Food Production: Integrated Fish and Plant Farming. Food and Agriculture Organization of the United Nations. ISBN: 978-92-5-108532-5

Southern, A., King, W., 2017. The Aquaponic Farmer: A Complete Guide to Building and Operating a Commercial Aquaponic System. New Society Publishers. ISBN: 978-0-86571-858-6

Walsworth, W., 2016. Aquaponics: From Beginner to Expert: Hydroponics & Aquaponics Double Book Bundle: Exact Blueprint to Aquaponic & Hydroponic Organic Gardening from Home. CreateSpace Independent Publishing Platform. ISBN: 978-1-5352-1228-1