



**JAEFS**

**International Journal of  
Agriculture, Environment and Food Sciences**

---

Int J Agric Environ Food Sci

e-ISSN: 2618-5946



**September**

---

**Volume: 6    Issue: 3    Year: 2022**

---



**Editor-in-Chief**

**Gültekin Özdemir, Ph.D**

Dicle University, Faculty of Agriculture, Department of Horticulture, Diyarbakır, Türkiye

**Co-Editor-in-Chief**

**Zeynel Cebeci, Ph.D**

Çukurova University, Faculty of Agriculture, Div. of Biometry & Genetics, Adana, Türkiye

**Managing Editor**

**Javier Lopez, Ph.D**

Agricultural Sciences, Plant Biotechnology Tecnologico del Valle de Oaxaca, Mexico

**Associate Editors**

**Agriculture**

**İsmail Karaca, Ph.D**

Applied Sciences University, Faculty of Agriculture, Department of Plant Protection, Isparta, Türkiye

**Mark Matthews, Ph.D**

California University, Department of Viticulture and Enology, Davis, U.S.A.

**Vinayak S. Shedekar, Ph.D**

The Ohio State University, Piketon, USA

**Environment**

**Semih Nemlioğlu, Ph.D**

Istanbul University Cerrahpasa, Faculty of Engineering, Department of Environmental Engineering, Istanbul, Türkiye

**Yuriy Kravchenko, Ph.D**

National University of Life and Environmental Sciences of Ukraine, Soil Science and Soil Conservation Department, Kiev, Ukraine

**Food Science**

**Haşim Kelebek, Ph.D**

Adana Science and Technology University, Adana, Türkiye

**Mecit Halil Öztop, Ph.D**

Middle East Technical University, Ankara, Türkiye

**Mohamed Bouaziz, Ph.D**

University of Sfax, Tunisia

**Statistical Editor**

**Şenol Çelik, Ph.D**

Bingöl University, Department of Zootechnics Div. of Biometry and Genetics Bingöl, Türkiye

**Language Editor**

**Jiban Shrestha, MSc**

Nepal Agricultural Research Council, National Commercial Agriculture Research Program, Pakhribas, Dhankuta, Nepal



**Editorial Board**

**Ahmad Ali, Ph.D**

University Department of Life Sciences, University of Mumbai, Vidyanagari, Santacruz (East), India

**Ahmet Bayram, Ph.D**

Dicle University, Faculty of Agriculture, Department of Plant Protection, Diyarbakır, Türkiye

**Akbar Hossain, Ph.D**

Bangladesh Wheat and Maize Research Institute, Nashipur, Dinajpur 5200, Bangladesh

**Albena Stoyanova, Ph.D**

University of Food Technologies Plovdiv Bulgaria

**Ales Vokurka, Ph.D**

University of Zagreb, Faculty of Agriculture, Dept, of Plant Breeding, Genetics & Biometrics  
Svetošimunska 25, Zagreb, Croatia

**Alban Ibrahimi, Ph.D**

Department of Department of Agronomic Sciences Faculty of Agriculture and Environment Agricultural University of  
Tirana - Albania

**Ali Sabır, Ph.D**

Selcuk University, Faculty of Agriculture, Konya, Türkiye

**Bülent Koç, Ph.D**

Clemson University, Clemson, USA

**Chunpeng Wan, Ph.D**

Jiangxi Agricultural University, Jiangxi, China

**Edmundo Mercado Silva, Ph.D**

Universidad Autónoma de Querétaro, Querétaro, Mexico

**Emine Elmaslar OZBAS, Ph.D**

Istanbul University-Cerrahpasa, Faculty of Engineering, Department of Environmental Engineering, Istanbul, Türkiye

**Florin Stanica, Ph.D**

University of Agronomic Sciences, Faculty of Horticulture, Bucuresti, Romania

**George J. Stathas, Ph.D**

Technological Educational Institute of Peloponnese, Kalamata, Greece

**George Japoshvili, Ph.D**

Agricultural University of Georgia, Tbilisi

**Geza Bujdoso, Ph.D**

Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungarian

**Giuliano Finetto, Ph.D**

University of Verona, Verona, Italy

**Hakan Aktas, Ph.D**

Suleyman Demirel University, Faculty of Agriculture Department of Horticulture, Isparta, Türkiye

**Hakan Özkan, Ph.D**

Cukurova University, Adana, Türkiye

**Halit Yetişir, Ph.D**

Erciyes University, Kayseri, Türkiye

**Hanifeh Hajizadeh, Ph.D**

Department of horticulture, faculty of agriculture, university of Maragheh, Iran

**Huma Naz, Ph.D**

Department of Agriculture and Cooperation, Ministry of Agriculture and Farmers Welfare, Krishi Bhawan, New Delhi,  
India

**Ilian Badjakov, Ph.D**

Agro Bio Institute, Sofia, Bulgaria

**Irfan Ahmad Baig, Ph.D**

Muhammad Nawaz Shareef University of Agriculture, Multan, Pakistan

**Ivan Salamon, Ph.D**

Department of Ecology, Faculty of Humanities and Natural Sciences, University of Presov, Presov, Slovak Republic



**Khuda Bakhsh, Ph.D**

COMSATS Institute of Information Technology, Department of Management Sciences, Vehari, Pakistan

**Metin Turan, Ph.D**

Yeditepe University, Istanbul, Türkiye

**Milena Moteva, Ph.D**

University of Architecture, Civil Engineering and Geodesy (UACEG), Sofia 1046, Bulgaria

Mumbai, Maharashtra, India

**N. Yeşim Yalçın Mendi, Ph.D**

Çukurova University, Faculty of Agriculture Department of Horticulture, Adana, Türkiye

**Nataliia Silonova, Ph.D**

National University of Life and Environmental Sciences of Ukraine, Kyiv

**Nazım Şekeroğlu, Ph.D**

Kilis 7 Aralık University, Faculty of Engineering and Architecture, Department of Food Engineering, Kilis, Türkiye

**Öner Çetin, Ph.D**

Dicle University, Faculty of Agriculture Department of Agricultural Structures and Irrigation, Diyarbakir, Türkiye

**Orhan Özçatalbaş, Ph.D**

Akdeniz University, Faculty of Agriculture, Department of Agricultural Economics, Antalya, Türkiye

**Ufuk Tansel Şireli, Ph.D**

Ankara University, Faculty of Veterinary Medicine Department of Food Hygiene and Technology, Ankara

**Pahlaj Moolio, Ph.D**

Paññāsāstra University of Cambodia (PUC), Phnom Penh, Cambodia

**Peter Ondrišík, Ph.D**

Slovak University of Agriculture, Nitra, Slovak Republic

**Rafiq Islam, Ph.D**

The Ohio State University, Piketon, USA

**Róbert Szilagyi, Ph.D**

Debrecen University, Debrecen, Hungary

**Sekan Selli, Ph.D**

Cukurova University, Adana, Türkiye

**Selma Tozanlı, Ph.D**

Institut Agronomique Méditerranéen de Montpellier, France

**Sezai Ercişli, Ph.D**

Ataturk University, Faculty of Agriculture Department of Horticulture, Erzurum, Türkiye

**Simone Castellarin, Ph.D**

British Columbia University, Department Viticulture & Plant Genomics, Canada

**Tetyana Kalnadubinyuk, Ph.D**

National University of Life and Environmental Sciences, Department of Extension and Tourism of Ukraine Kyiv, Ukraine

**Veaceslav Mazăre, Ph.D**

Banat University of Agricultural Sciences and Veterinary Medicine, Romania

**Velibor Spalevic, Ph.D**

University of Montenegro, Podgorica, Montenegro

**Vjekoslav Tanaskovikj, Ph.D**

Ss. Cyril and Methodius University, Skopje, Macedonia

**Wilson Huanca-Mamani, Ph.D**

Universidad de Tarapacá, Arica, Chile

**Xing-Jun Wang, Ph.D**

Shandong Academy of Agricultural Sciences, Biotechnology Research Center, Jinan, China

**Zeljka Zgorelec, Ph.D**

University of Zagreb Faculty of Agriculture, Croatia

**Zeynep Eren, Ph.D**

Ataturk University, Department of Environment Technologies, Erzurum, Türkiye



#### Reviewer Board

Abdullah TAŞKIN, Ph.D  
Ahmet BAŞARAN, Ph.D  
Ali KAYAHAN, Ph.D  
Ali ÖZKAN, Ph.D  
Başak SAVUN-HEKİMOĞLU, Ph.D  
Bülent KÖSE, Ph.D  
Burcu KENANOĞLU, Ph.D  
Burhan ÖZALP, Ph.D  
Canan ÖZTOKAT, Ph.D  
Emine Deniz TEKİN, Ph.D  
Emre İLHAN, Ph.D  
Fatih DAĞLI, Ph.D  
Fatih HATIPOĞLU, Ph.D  
Fatma ÇOŞKUN, Ph.D  
Hakan BOZDOĞAN, Ph.D  
Hüseyin ÇANCI, Ph.D  
Huynh DO BAO TAM, Ph.D  
İbrahim CENGİZ, Ph.D  
İbrahim DEMİR, Ph.D  
İlknur KORKUTAL, Ph.D  
Kadri KURT, Ph.D  
Kazım MAVİ, Ph.D  
Khalid Mahmood KHAWAR, Ph.D  
Luka ANTHONY, Ph.D  
Mahmut Murat ASLAN, Ph.D  
Mahmut YILDIZTEKİN, Ph.D  
Mehmet DEMİROK, Ph.D  
Mehmet EKİCİ, Ph.D  
Mehmet Emin ÇALIŞKAN, Ph.D  
Naida MAGAYA, Ph.D  
Nguyen Huu HUONG DUYEN, Ph.D  
Nilgün BUDAK, Ph.D  
Nilgün ÖZDEMİR, Ph.D  
Olusegun OSUNDİYA, Ph.D  
Özge UÇAR, Ph.D  
Russell CHİMHARE, Ph.D  
Sadika HAQUE, Ph.D  
Sadreddin TUSUN, Ph.D  
Seydi YIKMIŞ, Ph.D  
Süleyman TOY, Ph.D  
Tufan Can ULU, Ph.D  
Tuğba İDUĞ, Ph.D  
Tugba KÖK TAŞ, Ph.D



### Journal Information

<b>Journal Name</b>	International Journal of Agriculture, Environment and Food Sciences
<b>Abbreviation</b>	Int. J. Agric. Environ. Food. Sci.
<b>Subjects</b>	Agriculture, Environment and Food Sciences
<b>e-ISSN</b>	2618-5946
<b>Publisher</b>	Edit Publishing; Edit Teknoloji ARGE San. Tic.Ltd. Şti. Diyarbakır, Türkiye
<b>Owner</b>	Gultekin Ozdemir
<b>Language</b>	English
<b>Frequency</b>	Quarterly (March, June, September, December)
<b>Type of Publication</b>	International, Scientific, Open Access, Double blinded peer review, Widely distributed periodical
<b>Manuscript Submission and Tracking System</b>	JAIEFS uses the submission system of TUBITAK ULAKBİM JournalPark Open Journal Systems - <a href="http://dergipark.gov.tr/jaiefs">http://dergipark.gov.tr/jaiefs</a>
<b>Licence</b>	Journal is licensed under a Creative Commons Attribution 4.0 International License
<b>Legal Responsibility</b>	Authors are responsible for content of articles that were published in Journal.
<b>Indexed and Abstracted in</b>	TÜBİTAK ULAKBİM TR Dizin, Crossref, Directory of Open Access Journal (DOAJ), AGORA (Access to Global Online Research in Agriculture), AGRIS (Agricultural Science and Technology Information), WorldCat, Google Scholar, SOBIAD, Scilit, ROAD (Directory of Open Access Scholarly Resources), Neliti, International Citation Index, ROOT Indexing, ResearchBib, Index Copernicus International, ESJI, JournalTOCs, TEELS, ResearchGate, Microsoft Academic
<b>Address</b>	International Journal of Agriculture, Environment and Food Sciences Edit Teknoloji Arge Sanayi ve Ticaret Limited Şirketi Dicle Teknokent Dicle Üniversitesi Kampüsü Yiğit Çavuş Mah. Silvan Yolu Üzeri Kat:2 No:26, Diyarbakır, Türkiye
<b>Contact</b>	Prof. Dr. Gultekin Ozdemir Phone: +90 532 545 07 20 E-Mail: <a href="mailto:editor@jaiefs.com">editor@jaiefs.com</a> - <a href="mailto:bilgi@editteknoloji.com">bilgi@editteknoloji.com</a> Web: <a href="http://www.jaiefs.com">www.jaiefs.com</a> - <a href="http://dergipark.gov.tr/jaiefs">dergipark.gov.tr/jaiefs</a>



## Aim and Scope

“International Journal of Agriculture, Environment and Food Sciences” (JAEFS) is an international journal, which publishes original research and review articles dealing with Agriculture, Environment and Food Sciences. JAEFS Journal is an international, scientific, open access periodical published in accordance with independent, unbiased, and doubleblinded peerreview principles.

Journal publishes Quarterly (March, June, September, December).

The publication language of the journal is English and continues publication since December 2017.

A Digital Object Identifier (DOI) number has been assigned for each article accepted to be published in JAEFS, starting from December 2017.

International Journal of Agriculture, Environment and Food Sciences areas of interest include, but are not limited to: Agricultural Engineering and Technology, Environmental Engineering and Technology, Food Engineering and Technology, Agriculture, Environment, Food, Agriculture History, Agricultural Economics, Agronomy, Animal Sciences, Aquaculture, Biochemistry, Biotechnology, Bioinformatics and Data Science, Crop Science, Dairy Science, Extension Science and Education, Entomology, Environmental Science, Fish and Fisheries, Food Processing, Food Chemistry, Food Culture, Food Health and Nutrition, Food History, Food Industry Development, Food Marketing, Food Policy and Practices, Food Safety, Forestry, Horticulture, Information Technologies and Systems, Irrigation, Molecular Biology, Organic Agriculture, Plant Physiology, Plant Breeding, Plant Protection, Plant Sciences, Precision Agriculture, Rural Development and Policy, Sustainable Agriculture, Soil Science, Plant Nutrition, Energy Crops, Veterinary, Water Resources.

## Open Access Statement

International Journal of Agriculture, Environment and Food Sciences (JAEFS) publishes fully open access journal, which means that all articles are available on the internet to all users immediately upon publication.

All the original articles and review papers published in JAEFS journal are free to access immediately from the date of publication.

International Journal of Agriculture, Environment and Food Sciences (JAEFS) don't charge any fees for any reader to download articles and reviews for their own scholarly use.

Users are allowed to read, download, copy, distribute, print, search, or link to the full texts of the articles, or use them for any other lawful purpose, without asking prior permission from the publisher or the author. This is in accordance with the BOAI definition of open access.

Copyright of the layout and design of International Journal of Agriculture, Environment and Food Sciences articles remains with the journal and cannot be used in other publications.

International Journal of Agriculture, Environment and Food Sciences also operates under the Creative Commons Licence CC-BY-NC.

All authors publishing with the JAEFS accept these as the terms of publication.

Benefits of open access for Authors include:

Free access for all users worldwide

Authors retain copyright to their work

Increased visibility and readership

Rapid publication

No spatial constraints

## Copyright Policy

Authors who publish with International Journal of Agriculture, Environment and Food Sciences (JAEFS) agree to the following terms:

Authors transfer the copyright to International Journal of Agriculture, Environment and Food Sciences (JAEFS). Authors, however, upon the publication of their work, can republish it in another journal or book provided that they obtain the permission of the Journal. Moreover, they are to include the note indicating that their work has first been published in International Journal of Agriculture, Environment and Food Sciences (JAEFS) and the link to their work in the journal.

Authors, upon the publication of their work, can publish it in online environments and/or social networks (personal webpages, course content websites, Facebook, etc.). However, they also provide the link to the work as published in the journal.

“International Journal of Agriculture, Environment and Food Sciences” journal is licensed under a Creative Commons Attribution 4.0 International License



#### **Instructions to Authors**

Please read all of the following manuscript preparation instructions carefully and in their entirety. The manuscript must be in good scientific English; this is the author's responsibility.

All authors must have read and approved the most recent version of the manuscript.

Manuscripts submitted via any other medium will not be processed.

Manuscripts submitted to the International Journal of Agriculture, Environment and Food Sciences will first go through a technical evaluation process where the editorial office staff will ensure that the manuscript has been prepared and submitted in accordance with the journal's guidelines.

Submissions that do not conform to the journal's guidelines will be returned to the submitting author with technical correction requests.

The journal management requires that all authors register to ORCID at <http://orcid.org/register> and get a free ORCID ID.

All submissions are screened by a similarity detection software.

We are using iThenticate plagiarism solution and our maximum allowed score, for the document in which the Materials and Methods and References sections truncated, is 20%. Higher scores are not allowed and the author will be given the plagiarism report and the manuscript will be returned to the authors.

#### **Manuscript Structure**

##### **Font**

Manuscripts must be prepared as a Microsoft Word file.

Word document, Times New Roman, 10 point, single line space.

Page margins are 2.5 for all sides.

##### **Length**

Maximum length for articles is 20 pages.

Articles over 20 pages in length can only be considered on an exceptional basis.

##### **Title**

A concise title of the paper.

Use bold 14-point Times Roman font.

Use title lowercase.

Make title in centered.

##### **Name(s) and surname(s) of author(s)**

Use centered, bold 11-point Times Roman font.

##### **Affiliation(s) of author(s)**

Use 9-point Times Roman font.

E-mail address of the corresponding author

Use 8-point Times Roman font.

##### **ORCID(s) of author(s)**

Use 9-point Times Roman font.

The journal management requires that all authors register to ORCID at

<https://orcid.org/register>

and get a free ORCID ID.

##### **Abstract**

Each article is to be preceded by a succinct abstract, of up to 300 words, that highlights the objectives, methods, results, and conclusions of the paper. The abstract should state briefly the purpose of the research, the principal results and major conclusions.

The abstract body is typed in Times New Roman, 10 pt.

##### **Keywords**

About four Keyword or phrases in order of importance, separated by commas and typed in Times New Roman, 10 pt.

##### **Headings**

Use bold, lowercase, 10 Times New Roman font for headings.

##### **Introduction**

This should define the problem and, if possible, the frame of existing knowledge.





Please ensure that people not working in that particular field will be able to understand the intention.  
The word length of the introduction should be 150 to 300 words.

#### **Materials and Methods**

Materials and methods should be clearly presented to allow the reproduction of the experiments.

#### **Results and Discussion**

Results should be clear and concise and give the significance of the results of the work. Data must not be repeated in figures and tables. Discussion should interpret the results in reference to the problem outlined in the introduction and of related observations by the author/s or others.

Implications for further studies or application may be discussed.

#### **Conclusion**

A conclusion should be added if results and discussion are combined.

#### **Tables and Figures**

Tables should have a short descriptive title.

The unit of measurement used in a table should be stated.

Tables should be numbered consecutively.

Figures should be prepared in GIF, TIFF, JPEG or PowerPoint.

Tables and Figures should be appropriately cited in the manuscript.

#### **Acknowledgments**

Acknowledgments of financial support, advice, or other kinds of assistance should be given at the end of the text under the heading "Acknowledgements". The names of funding organizations should be written in full.

#### **References**

They should be grouped at the end of the paper in surname order of appearance.  
Use lowercase, 10 Times New Roman font for References.

The references must be written in alphabetical order by authors' names,  
with the following elements:

##### **Original Papers**

Surname, N.N., Surname, N.N. (Year). The full title of the article. Journal Name, volume, and issue, first and last page. DOI number.

##### **Book or Proceeding**

Surname, N.N., Surname, N.N. (Year). Title of the contribution. In: Title of the book or proceeding. Volume (Publisher, City, first and last page)

##### **Thesis**

Surname, N.N. (Year). Title of the thesis, University and Faculty, City. pages.