

DECEMBER
2018



YEAR : 2018
VOLUME : 2
ISSUE : 4

INTERNATIONAL JOURNAL OF AGRICULTURE, ENVIRONMENT AND FOOD SCIENCES

www.jaefts.com 

dergipark.gov.tr/jaefts 

editor@jaefts.com 



e-ISSN : 2618-5946

JAEFTS



JAEFS

International Journal of Agriculture, Environment and Food Sciences

Int J Agric Environ Food Sci

e-ISSN : 2618-5946
DOI: 10.31015/jaefs



www.jaefs.com

December

Volume : 2

Issue : 4

Year : 2018

Editor-in-Chief

Assoc.Prof.Dr. Gultekin OZDEMIR
Agricultural Sciences, Horticulture, Viticulture
Dicle University, Faculty of Agriculture, Department of Horticulture,
Diyarbakir, Turkey
gozdemir@dicle.edu.tr - editor@jaefs.com

Co-Editor-in-Chief

Prof.Dr. Zeynel CEBECI
Agricultural Sciences, Biometry & Genetics
Çukurova University, Faculty of Agriculture, Div. of Biometry & Genetics,
Adana, Turkey
zcebeci@cu.edu.tr

Language Editor

Jiban SHRESTHA
Agricultural Sciences, Field Crops
Nepal Agricultural Research Council, National Commercial Agriculture Research Program,
Pakhribas, Dhankuta, Nepal
jibshrestha@nmp.gov.np

Editorial Board

Prof.Dr. Hakan AKTAS
Agricultural Sciences, Horticulture
Suleyman Demirel University, Faculty of Agriculture Department of Horticulture, Isparta, Turkey
aktashakan@sdu.edu.tr

Prof.Dr. Yilmaz BAYHAN
Agricultural Sciences, Agricultural Machinery
Namık Kemal University, Faculty of Agriculture Department of Biosystem Engineering, Tekirdağ,
Turkey
ybayhan@nku.edu.tr

Prof.Dr. Oner CETIN
Agricultural Sciences, Agricultural Structures and Irrigation
Dicle University, Faculty of Agriculture Department of Agricultural Structures and Irrigation,
Diyarbakir, Turkey
oner_cetin@yahoo.com

Prof.Dr. H. Yildiz DASGAN
Agricultural Sciences, Horticulture
Çukurova University, Faculty of Agriculture Department of Horticulture, Adana, Turkey
dasgan@cu.edu.tr

Prof.Dr. Tetyana KALNA-DUBINYUK
Agricultural Sciences, Agricultural Economics
National University of Life and Environmental Sciences, Department of Extension and Tourism of
Ukraine Kyiv, Ukraine
tatiankd@yahoo.com

Prof.Dr. Sezai ERCISLI
Agricultural Sciences, Horticulture
Ataturk University, Faculty of Agriculture Department of Horticulture, Erzurum, Turkey
sercisli@atauni.edu.tr

Prof.Dr. Ismail KARACA
Agricultural Sciences, Plant Protection
Applied Sciences University, Faculty of Agriculture, Department of Plant Protection, Isparta,
Turkey
ismailkaraca@sdu.edu.tr

Prof.Dr. Ayzn B. KUDEN
Agricultural Sciences, Horticulture
Çukurova University, Faculty of Agriculture Department of Horticulture, Adana, Turkey
abkuden@cu.edu.tr

Prof.Dr. Mark MATTHEWS
Agricultural Sciences, Viticulture and Enology
California University, Department of Viticulture and Enology, Davis, U.S.A.
mamathews@ucdavis.edu

Editorial Board

Prof.Dr. N. Yesim Yalcin MENDI

Agricultural Sciences, Horticulture
Çukurova University, Faculty of Agriculture Department of Horticulture, Adana, Turkey
yesimcan@cu.edu.tr

Prof.Dr. Semih NEMLIOGLU

Environmental Sciences, Water Pollution and Control
Istanbul University, Faculty of Engineering, Department of Environmental Engineering, Istanbul, Turkey
snemli@istanbul.edu.tr

Prof.Dr. Ibrahim ORTAS

Agricultural Sciences, Soil Science, Plant Nutrition
Çukurova University, Faculty of Agriculture, Department of Soil Science and Plant Nutrition, Adana, Turkey
iortas@cu.edu.tr

Prof.Dr. Orhan OZCATALBAS

Agricultural Sciences, Agricultural Economics
Akdeniz University, Faculty of Agriculture, Department of Agricultural Economics, Antalya, Turkey
ozcatalbas@akdeniz.edu.tr

Prof.Dr. Nebahat SARI

Agricultural Sciences, Horticulture
Çukurova University, Faculty of Agriculture Department of Horticulture, Adana, Turkey
nesari@cu.edu.tr

Prof.Dr. Nazım SEKEROGLU

Food Sciences, Medicinal and Aromatic Plants
Kilis 7 Aralik University, Faculty of Engineering and Architecture, Department of Food Engineering, Kilis, Turkey
nsekeroglu@gmail.com

Prof.Dr. Abdullah SESSIZ

Agricultural Sciences, Agricultural Machinery
Dicle University, Faculty of Agriculture, Department of Agricultural Machinery and Technologies Engineering, Diyarbakir, Turkey
asessiz@dicle.edu.tr

Prof.Dr. Semih TANGOLAR

Agricultural Sciences, Horticulture
Çukurova University, Faculty of Agriculture Department of Horticulture, Adana, Turkey
tangolar@cu.edu.tr

Prof.Dr. Serpil TANGOLAR

Agricultural Sciences, Horticulture
Çukurova University, Faculty of Agriculture Department of Horticulture, Adana, Turkey
stangolar@cu.edu.tr

Assoc.Prof.Dr. Erol ATAY

Agricultural Sciences, Plant Protection
Mustafa Kemal University, Faculty of Agriculture, Department of Plant Protection, Antakya, Turkey
eatay@mku.edu.tr

Assoc.Prof.Dr. Khuda BAKHSH

Agricultural Sciences, Environmental Economics
COMSATS Institute of Information Technology, Department of Management Sciences, Vehari, Pakistan
kbakhsh@ciitvehari.edu.pk

Assoc.Prof.Dr. Sema Kale CELIK

Agricultural Sciences, Agricultural Structures and Irrigation
Applied Sciences University, Faculty of Agriculture Department of Agricultural Structures and Irrigation, Isparta, Turkey
semakale@sdu.edu.tr

Assoc.Prof.Dr. Yuriy KRAVCHENKO

Agricultural Sciences, Soil Science
National University of Life and Environmental Sciences of Ukraine, Soil Science and Soil Conservation Department Ukraine
kravch@i.ua

Assoc.Prof.Dr. Róbert SZILAGYI

Agricultural Sciences, Mobile Internet in Agriculture
Debrecen University, Debrecen, Hungary
szilagyi.robert@econ.unideb.hu

Editorial Board

Assoc.Prof.Dr. Selma TOZANLI

Agricultural Sciences, Agricultural Economics
Institut Agronomique Méditerranéen de Montpellier, France
tozanli@iamm.fr

Assist.Prof.Dr. Simone CASTELLARIN

Agricultural Sciences, Viticulture & Plant Genomics
British Columbia University, Department Viticulture & Plant Genomics, Canada
simone.castellarin@ubc.ca

Dr. Javier LOPEZ

Agricultural Sciences, Plant Biotechnology
Tecnologico del Valle de Oaxaca, Mexico
javier_lopezb@hotmail.com

Dr. Xing-Jun WANG

Agricultural Sciences, Plant Biotechnology
Shandong Academy of Agricultural Sciences, Biotechnology Research Center, Jinan, China
xingjunw@hotmail.com

Advisory Board

Prof.Dr. Irfan Ahmad BAIG

Agricultural Sciences, Agricultural Economics
Muhammad Nawaz Shareef University of Agriculture, Multan, Pakistan
irfan.baig@mnsuam.edu.pk

Prof.Dr. Ahmet BAYRAM

Agricultural Sciences, Plant Protection
Dicle University, Diyarbakir, Turkey
abayram@dicle.edu.tr

Prof.Dr. Mohamed BOUAZIZ

Food Sciences, Food Technology
University of Sfax, Tunisia
mohamed.bouaziz@isbs.usf.tn

Prof.Dr. Salih ÇELİK

Agricultural Sciences, Viticulture
Namik Kemal University, Tekirdag, Turkey
salihcelik@nku.edu.tr

Prof.Dr. Giuliano FINETTO

Agricultural Sciences, Horticulture
University of Verona, Verona, Italy
giulianofinetto@gmail.com

Prof.Dr. Bülent GÜLÇUBUK

Agricultural Sciences, Agricultural Economics
Ankara University, Ankara, Turkey
gulcubuk@agri.ankara.edu.tr

Prof.Dr. Rafiq ISLAM

Environment Sciences, Soil, Water and Bioenergy Resources
The Ohio State University, Piketon, USA
islam.27@osu.edu

Prof.Dr. George JAPOSHVILI

Agricultural Sciences, Entomology
Agraricultural University of Georgia, Tbilisi
g.japoshvili@agrni.edu.ge

Prof.Dr. Hüseyin ÇELİK

Agricultural Sciences, Viticulture
Ondokuz Mayıs University, Samsun, Turkey
huscelik@omu.edu.tr

Prof.Dr. Haşim KELEBEK

Food Sciences, Food Technology
Adana Science and Technology University, Adana, Turkey
hkelebek@adanabtu.edu.tr

Prof.Dr. Kürşat KORKMAZ

Agricultural Sciences, Soil Science and Plant Nutrition
Ordu University, Ordu, Turkey
korkmaz60@hotmail.com

Advisory Board

Prof.Dr. Birhan KUNTER

Agricultural Sciences, Viticulture
Ankara University, Ankara, Turkey
marasali@agri.ankara.edu.tr

Prof.Dr. Veaceslav MAZĂRE

Environmental Sciences, Soil Science
Banat University of Agricultural Sciences and Veterinary Medicine, Romania
valentin.mazare@gmail.com

Prof.Dr. Pahlaj MOOLIO

Agricultural Sciences, Agricultural Economics
Paññāsāstra University of Cambodia (PUC), Phnom Penh, Cambodia
pahlaj@puc.edu.kh

Prof.Dr. Peter ONDRIŠÍK

Agricultural Sciences, Agrobiology and Food Resources
Slovak University of Agriculture, Nitra, Slovak Republic
peter.ondrisik@uniag.sk

Prof.Dr. Hakan ÖZKAN

Agricultural Sciences, Field Crops
Cukurova University, Adana, Turkey
hozkan@cu.edu.tr

Prof.Dr. Ali SABIR

Agricultural Sciences, Viticulture
Selcuk University, Konya, Turkey
asabir@selcuk.edu.tr

Prof.Dr. Sekan SELLI

Food Sciences, Food Technology
Cukurova University, Adana, Turkey
sselli@cu.edu.tr

Prof.Dr. Vinayak S. SHEDEKAR

Agricultural Sciences, Food, Agricultural and Biological Engineering
The Ohio State University, Piketon, USA
shedekar.1@osu.edu

Prof.Dr. Velibor SPALEVIC

Environmental Sciences, Ecological Engineering
University of Montenegro, Podgorica, Montenegro
velibor.spalevic@gmail.com

Prof.Dr. George J. STATHAS

Agricultural Sciences, Entomology & Zoology
Technological Educational Institute of Peloponnese, Kalamata, Greece
gstathas@teikal.gr

Prof.Dr. Metin TURAN

Agricultural and Environmental Sciences, Soil Science and Plant Nutrition
Yeditepe University, Istanbul, Turkey
metin.turan@yeditepe.edu.tr

Prof.Dr. Halil İbrahim UZUN

Agricultural Sciences, Viticulture
Akdeniz University, Antalya, Turkey
uzun@akdeniz.edu.tr

Prof.Dr. Hüsnü ÜNÜ

Agricultural Sciences, Horticulture
Suleyman Demirel University, Isparta, Turkey
husnuunlu@sdu.edu.tr

Prof.Dr. Halit YETİŞİR

Agricultural Sciences, Horticulture
Erciyes University, Kayseri, Turkey
yetisir1@yahoo.com

Assoc.Prof.Dr. Halil ERDEM

Agricultural Sciences, Soil Science and Plant Nutrition
Gaziosmanpaşa University, Tokat, Turkey
erdemh@hotmail.com

Assoc.Prof.Dr. Önder KAMILOĞLU

Agricultural Sciences, Viticulture
Mustafa Kemal University, Hatay, Turkey
okamiloglu@mku.edu.tr

Advisory Board

Asoc.Prof.Dr. Milena MOTEVA

Agricultural Sciences, Agricultural Economics
University of Architecture, Civil Engineering and Geodesy (UACEG), Sofia 1046, Bulgaria
milena.moteva@yahoo.com

Assoc.Prof.Dr. Mecit Halil ÖZTOP

Food Sciences, Food Packaging
Middle East Technical University, Ankara, Turkey
mecit@metu.edu.tr

Assoc.Prof.Dr. Nataliia SILONOVA

Environmental Sciences, Machine Learning
National University of Life and Environmental Sciences of Ukraine, Kyiv
silonova@ukr.net

Assoc. Prof. Vjekoslav TANASKOVIKJ

Environmental Sciences, Water Quality
Ss. Cyril and Methodius University, Skopje, Macedonia
vjekoslavtanaskovic@yahoo.com

Assoc.Prof.Dr. Zeljka ZGORELEC

Agricultural Sciences, Agronomy
University of Zagreb Faculty of Agriculture, Croatia
zzgorelec@agr.hr

Asst.Prof.Dr. Abdurrahman KARA

Agricultural Sciences, Agricultural Economics
Dicle University, Diyarbakir, Turkey
abdurrahman.kara@dicle.edu.tr

Asst.Prof.Dr. Nurgül KITIR

Agricultural and Food Sciences, Plant Biotechnology
Konya Food and Agriculture University, Konya, Turkey
nurgul_kitir@hotmail.com

Dr. Bulent Koc

Agricultural Sciences, Agricultural Mechanization
Clemson University, Clemson, USA
bulent@clemson.edu

Dr. Huma Naz

Agricultural Sciences, Plant Protection
Department of Agriculture and Cooperation, Ministry of Agriculture and Farmers Welfare, Krishi
Bhawan, New Delhi, India
humanaz83@gmail.com

Dr. Wilson HUANCA-MAMANI

Agricultural Sciences, Plant Biotechnology
Universidad de Tarapacá, Arica, Chile
whuanca@uta.cl

Dr. Edmundo Mercado SILVA

Agricultural Sciences, Plant Physiology
Universidad Autónoma de Querétaro, Querétaro, Mexico
mercado501120@gmail.com

Reviewer Board

Prof.Dr. Mehmet BASBAG

Dicle University, Faculty of Agriculture, Department of Field Crops, Diyarbakir, Turkey
(mbasbag@dicle.edu.tr)

Prof.Dr. Omer Faruk EMEKSIZ

Cukurova University, Faculty of Agriculture, Department of Agricultural Economics, Adana, Turkey (femeksiz@cu.edu.tr)

Prof.Dr. Ismail KARACA

Applied Sciences University, Faculty of Agriculture, Department of Plant Protection, Isparta, Turkey (ismaikaraca@sdu.edu.tr)

Prof.Dr. Saliha KIRICI

Cukurova University, Faculty of Agriculture, Department of Field Crops, Adana, Turkey (kirirci@cu.edu.tr)

Prof.Dr. Semih NEMLIOGLU

Istanbul University, Faculty of Engineering, Department of Environmental Engineering, Istanbul, Turkey (snemli@istanbul.edu.tr)

Prof.Dr. Orhan OZCATALBAS

Akdeniz University, Faculty of Agriculture, Department of Agricultural Economics, Antalya, Turkey (oozatalbas@gmail.com)

Prof.Dr. Nazim SEKEROGLU

Kilis 7 Aralik University, Faculty of Engineering and Architecture, Department of Food Engineering, Kilis, Turkey (nsekeroglu@gmail.com)

Assoc.Prof.Dr. Kemal DOGAN

Mustafa Kemal University, Faculty of Agriculture, Department of Soil Science and Plant Nutrition, Hatay, Turkey (kdogan@mku.edu.tr)

Assoc.Prof.Dr. Md. Alamgir KABIR

Patuakhali Science and Technology University, Faculty of Agriculture, Department of Agroforestry, Patuakhali, Banladesh (alamgirmk@yahoo.com)

Assoc.Prof.Dr. Inanc OZGEN

Firat University, Faculty of Engineering, Department of Bioengineering, Elazig, Turkey (inancozgen@gmail.com)

Assoc.Prof.Dr. Gultekin OZDEMIR

Dicle University, Faculty of Agriculture, Department of Horticulture, Diyarbakir, Turkey (gozdemir@dicle.edu.tr)

Assoc.Prof.Dr. Abdullahi Muhammad SADDIQ

Modibbo Adama University of Technology, Department of Soil Science, Yola, Adamawa State, Nigeria (amuhammadsaddiq@mautech.edu.ng)

Dr. Turgut ALAS

European University of Lefke, Department of Horticultural Production and Marketing, Lefke, Cyprus (turgutalas01@gmail.com)

Dr. Ibrahim BULDUK

Usak University, Faculty of Engineering, Department of Chemical Engineering, Usak, Turkey (ibrahim.bulduk@usak.edu.tr)

Dr. Ibrahim KAHRAMANOGLU

European University of Lefke, Department of Horticultural Production and Marketing, Lefke, Cyprus (ibrahimcy84@yahoo.com)

Dr. Ferhat KIZILGECI

Sirnak University, Faculty of Agriculture, Department of Field Crops, Sirnak, Turkey (ferhat_kizilgeci@hotmail.com)

Dr. Remziye OZEL

Harran University, Faculty of Agriculture, Department of Agricultural Economics, Sanliurfa, Turkey (rozel@harran.edu.tr)

Dr. Arzu SECER

Cukurova University, Faculty of Agriculture, Department of Agricultural Economics, Adana, Turkey (asecer@cu.edu.tr)



Production Information

Journal Name	International Journal of Agriculture, Environment and Food Sciences
Abbreviation	Int J Agric Environ Food Sci
Subjects	Agriculture, Environment and Food Sciences
e-ISSN	2618-5946
Publisher	Gultekin Ozdemir
Owner	Gultekin Ozdemir
Language	English
Frequency	Quarterly (March, June, September, December)
Type of Publication	International, Scientific, Open Access Double-blinded peer review Widely distributed periodical
Manuscript Submission and Tracking System	JAEFS uses the submission system of TUBITAK-ULAKBIM JournalPark Open Journal Systems - http://dergipark.gov.tr/jaefs
License	Journal is licensed under a Creative Commons Attribution 4.0 International License
Legal Responsibility	Authors are responsible for content of articles that were published in Journal.
Indexed and Abstracted in	Crosref, Directory of Open Access Journal (DOAJ), Google Scholar, Scilit, ROAD (Directory of Open Access Scholarly Resources), Neliti, International Citation Index, ROOT Indexing, ResearchBib, Index Copernicus International, ESJI, JournalTOCs, TEELS, ResearchGate, Microsoft Academic
Address	International Journal of Agriculture, Environment and Food Sciences Gultekin Ozdemir Dicle University Faculty of Agriculture Department of Horticulture, 21280 Diyarbakir / TURKEY
Contact	Phone: +90 532 545 07 20 E-mail: editor@jaefs.com jaefseditor@gmail.com Web : www.jaefs.com dergipark.gov.tr/jaefs

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 double-blinded peer-review 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.

Journal of JAEFS welcomes article submissions and does not charge any article submission or processing charges.

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-ND.

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

