



# Black Sea Journal of Agriculture

Volume 7 | Issue 5



ISSN: 2618 - 6578





**BLACK SEA JOURNAL OF AGRICULTURE**  
**(BSJ AGRI)**

  
**BS Journals**

Black Sea Journal of Agriculture (BSJ Agri) is a double-blind peer-reviewed, open-access international journal published electronically 6 times (January, March, May, July, September, and November) in a year since January 2018. It publishes, in English, full-length original research articles, innovative papers, conference papers, reviews, mini-reviews, rapid communications or technical note on various aspects of agricultural science like agricultural economics, agricultural engineering, animal science, agronomy, including plant science, theoretical production ecology, horticulture, plant breeding, plant fertilization, plant protect and soil science, aquaculture, biological engineering, including genetic engineering and microbiology, environmental impacts of agriculture and forestry, food science, husbandry, irrigation and water management, land use, waste management etc.

ISSN: 2618 - 6578

Phone: +90 362 408 25 15

Fax: +90 362 408 25 15

Email: [bsjagri@blackseapublishers.com](mailto:bsjagri@blackseapublishers.com)

Web site: <http://dergipark.gov.tr/bsagriculture>

Sort of publication: Periodically 6 times (January, March, May, July, September, and November) in a year

Publication date and place: September 15, 2024- Samsun, TÜRKİYE

Publishing kind: Electronically

**OWNER**

Prof. Dr. Hasan ÖNDER

**DIRECTOR IN CHARGE**

Assoc. Prof. Uğur ŞEN

## **EDITOR BOARDS**

### **EDITOR IN CHIEF**

Prof. Dr. Hasan ÖNDER, Ondokuz Mayıs University, TÜRKİYE

Assoc. Prof. Uğur ŞEN, Ondokuz Mayıs University, TÜRKİYE

### **SECTION EDITORS\***

Prof. Dr. Berna KILIÇ, Section Editor of Aquaculture, Ege University, TÜRKİYE

Prof. Dr. Kürşat KORKMAZ, Section Editor of Soil Science and Plant Nutrition, Ordu University, TÜRKİYE

Prof. Dr. Mahmut KESKİN, Section Editor of Animal and Veterinary Sciences, Hatay Mustafa Kemal University, TÜRKİYE

Prof. Dr. Mehmet KURAN, Section Editor of Agricultural Biotechnology, Ondokuz Mayıs University, TÜRKİYE

Prof. Dr. Muharrem ÖZCAN, Section Editor of Horticulture, Ondokuz Mayıs University, TÜRKİYE Prof. Dr. Şerife Evrim ARICI, Section Editor of Plant Protection, Applied Sciences University of Isparta, TÜRKİYE

Assoc. Prof. Dr. Hasan Gökhan DOĞAN, Section Editor of Agricultural Economics, Kirsehir Ahi Evran University, TÜRKİYE

Prof. Dr. Kadir Ersin TEMİZEL, Section Editor of Agricultural Structures and Irrigation, Ondokuz Mayıs University, TÜRKİYE

Assoc. Prof. Dr. Kadyrbay CHEKİROV, Section Editor of Biological Researches, Kyrgyz Turkish Manas University, KYRGYZSTAN

Assoc. Prof. Dr. Kemal Çağatay SELVİ, Section Editor of Agricultural Machinery and Technologies Engineering, Ondokuz Mayıs University, TÜRKİYE

Assoc. Prof. Dr. Ömer SÖZEN, Section Editor of Field Crops, Kirsehir Ahi Evran University, TÜRKİYE

Assoc. Prof. Dr. Şerife Evrim ARICI, Section Editor of Süleyman Demirel University, TÜRKİYE

Assoc. Prof. Dr. Ümran ÇİÇEK, Section Editor of Nutrition and Food Sciences, Tokat Gaziosmanpaşa University, TÜRKİYE

---

\*The ranking is arranged alphabetically within the academic title

### **EDITORIAL - ADVISORY BOARD\***

Prof. Dr. Ahmet BALKAYA, Ondokuz Mayıs University, TÜRKİYE

Prof. Dr. Alireza TERINEJAD, Azarbaijan Shahid Madani University, IRAN

Prof. Dr. Zeynel CEBECİ, Çukurova University, TÜRKİYE

Prof. Dr. Gheorghe VOICU, Politehnica University of Bucharest, ROMANIA

Prof. Dr. Savaş ATASEVER, Ondokuz Mayıs University, TÜRKİYE

Prof. Dr. Sherein Saeid ABDELGAYED, Cairo University, EGYPT

Prof. Dr. Habil Sorin STEFAN BIRIS, Politehnica University of Bucharest, ROMANIA

Prof. Dr. Mustafa BOĞA, Nigde Ömer Halisdemir University, TÜRKİYE

Dr. Jiban SHRESTHA, Nepal Agricultural Research Council, NEPAL

Dr. Mikó JÓZSEFNÉ JÓNÁS, University of Szeged, HUNGARY

Dr. Valentin VLADUT, National Research and Development Institute, ROMANIA

---

\*The ranking is arranged alphabetically within the academic title

### **STATISTIC EDITOR**

Prof. Dr. Taner TUNÇ, Ondokuz Mayıs University, TÜRKİYE

### **ENGLISH EDITOR**

Asst. Prof. Dr. Betül ÖZCAN DOST, Ondokuz Mayıs University, TÜRKİYE

## **REVIEWERS OF THE ISSUE\***

Prof. Dr. Ali Beyhan UCAK, Siirt University, Department of Biosystem Engineering, Agricultural Irrigation, TÜRKİYE

Prof. Dr. Belgin ÇAKMAK, Ankara University, Department of Agricultural Structures and Irrigation, Agricultural Structures, TÜRKİYE

Prof. Dr. Erdihan TUNÇ, Gaziantep University, Department of Biology, Soil Sciences and Plant Nutrition, TÜRKİYE

Prof. Dr. Erdoğan ÖZTÜRK, Atatürk University, Department of Field Crops, Industrial Crops, TÜRKİYE

Prof. Dr. Erhan AKÇA, Adıyaman University, Technical Sciences Vocational School, Soil Survey and Mapping, TÜRKİYE

Prof. Dr. Göksel ÖZER, Bolu Abant İzzet Baysal University, Department of Plant Protection, Phytopathology, TÜRKİYE

Prof. Dr. Halim ORTA, Tekirdağ Namık Kemal University, Department of Biosystem Engineering, Agricultural Structures, TÜRKİYE

Prof. Dr. Harun BAYRAKTAR, Ankara University, Department of Plant Protection, Phytopathology, TÜRKİYE

Prof. Dr. Mbarek Ben NACEUR, Carthage University, Department of Field Crops, Cereals and Legumes, TUNUSIA

Prof. Dr. Mehmet YILDIRIM, Dicle University, Department of Field Crops, Cereals and Legumes, TÜRKİYE

Prof. Dr. Kağan KÖKTEN, Sivan Science and Technology University, Department of Field Crops, Pasture-Meadow Forage Plants, TÜRKİYE

Prof. Dr. Oktay ERDOĞAN, Pamukkale University, Department of Organic Agriculture, Phytopathology, TÜRKİYE

Prof. Dr. Sibel DERVİŞ, Mardin Artuklu University, Department of Plant and Animal Protection, Phytopathology, TÜRKİYE

Prof. Dr. Şeyda ZORER ÇELEBİ, Van Yüzüncü Yıl University, Department of Field Crops, Pasture-Meadow Forage Plants, TÜRKİYE

Assoc. Prof. Dr. Aydın ALTOP, Ondokuz Mayıs University, Department of Animal Science, Animal Feeding, TÜRKİYE

Assoc. Prof. Dr. Bekir Bülent ARPACI, Çukurova University, Department of Horticulture, Vegetable Growing and Treatment, TÜRKİYE

Assoc. Prof. Dr. Deniz EROĞUL, Ege University, Department of Horticulture, Pomology and Treatment, TÜRKİYE

Assoc. Prof. Dr. Ekrem MUTLU, Kastamonu University, Department of Geography, Hydrobiology, TÜRKİYE

Assoc. Prof. Dr. Erdem GÜLÜMSER, Bilecik Şeyh Edebali University, Department of Field Crops, Field Crops and Pasture Production, TÜRKİYE

Assoc. Prof. Dr. Ertuğrul KUL, Kirşehir Ahi Evran University, Department of Animal Science, Large Animals, TÜRKİYE

Assoc. Prof. Dr. Gökhan ÖZTÜRK, Atatürk University, Department of Electrical and Electronics Engineering, Remote Sensing, TÜRKİYE

Assoc. Prof. Dr. İsa COŞKUN, Kirşehir Ahi Evran University, Department of Animal Science, Animal Feeding, TÜRKİYE

Assoc. Prof. Dr. Mehmet Emin BİLGİLİ, Eastern Mediterranean Agricultural Research Institute, Agricultural Energy Systems, TÜRKİYE

Assoc. Prof. Dr. Mehtap GÜRİSOY, Aksaray University, Department of Field Crops, Industrial Crops, TÜRKİYE

Assoc. Prof. Dr. Ömer Faruk COŞKUN, Mustafa Kemal University, Department of Horticulture, Plant Breeding, TÜRKİYE

Assoc. Prof. Dr. Pınar OĞUZHAN, Atatürk University, Department of Aquaculture, Aquaculture and Fisheries, TÜRKİYE

Assoc. Prof. Dr. Zeynep DEMİR, Soil, Fertilizer and Water Resources Central Research Institute, Plant Nutrition and Soil Fertility, TÜRKİYE

Asist. Prof. Dr. Akife DALDA ŞEKERCİ, Erciyes University, Department of Horticulture, Vegetable Growing and Treatment, TÜRKİYE

Asist. Prof. Dr. Aybüke KAYA, Mustafa Kemal University, Department of Agricultural Economy, Agricultural Economy, TÜRKİYE

Asist. Prof. Dr. Esra BALIKÇI, Yozgat Bozok University, Department of Gastronomy, Food Packaging, Preservation and Processing, TÜRKİYE

Asist. Prof. Dr. Hasan Ali İRIK, Erciyes University, Department of Biosystem Engineering, Farm Structures and Irrigation, TÜRKİYE

Asist. Prof. Dr. İsmail NANELİ, Sakarya Applied Sciences University, Department of Agricultural Economy, Agricultural Economy, TÜRKİYE

Asist. Prof. Dr. Mehmet Zahit YEKEN, Bolu Abant İzzet Baysal University, Department of Field Crops, Cereals and Legumes, TÜRKİYE

Asist. Prof. Dr. Metin KOÇAK, Van Yüzüncü Yıl University, Department of Agricultural Biotechnology, Plant Biotechnology in Agriculture, TÜRKİYE

Asist. Prof. Dr. Rahime CENGİZ, Sakarya Applied Sciences University, Department of Field Crops, Crop and Pasture Breeding, TÜRKİYE

Asist. Prof. Dr. Sultan DERE, Siirt University, Department of Horticulture, Horticultural Production, TÜRKİYE

Dr. Derya İlkay YILMAZ, Namık Kemal University, Department of Agricultural Economy, Agricultural Economy, TÜRKİYE

Dr. Güney AKINOĞLU, Ondokuz Mayıs University, Department of Soil Sciences and Plant Nutrition, Plant Nutrition and Soil Fertility, TÜRKİYE

Dr. Merve BAYHAN, Dicle University, Department of Field Crops, Field Crops and Pasture Production, TÜRKİYE

Dr. Muhammed Said YOLCU, Sakarya Applied Sciences University, Department of Field Crops, Medicinal and Aromatic Plants, TÜRKİYE

Dr. Nesrin UZUNOĞULLARI, Atatürk Horticultural Central Research Institute, Phytopathology, TÜRKİYE

Dr. Oluwaseun KOMOLAFE, Nnamdi Azikiwe University, Department of Agricultural Economy, Agricultural Economy, NIGERIA

Dr. Onur OKUMUŞ, Erciyes University, Department of Field Crops, Field Crops and Pasture Production, TÜRKİYE

Dr. Şuheda Basire AKÇA YILMAZ, Zonguldak Bülent Ecevit University, Department of Horticulture, Plant Breeding, TÜRKİYE

---

\* The ranking is arranged alphabetically within the academic title

Table of Contents

Research Articles

1. **GENETIC DIVERSITY OF WHITE CABBAGE (*Brassica oleracea* var. *capitata* subvar. *alba*) INBREED LINES USING SRAP MARKERS**  
*Ercan EKBİÇ, Cemregül TIRINK*.....429-436
2. **VERMICOMPOST EFFECTS ON SOIL CHEMISTRY AND BIOLOGY: CORRELATIONS WITH BASIL'S (*Ocimum basilicum* L.) TOTAL PHENOLIC CONTENT AND PHENOLOGICAL TRAITS**  
*Fevziye Şüheda HEPŞEN TÜRKAY*.....437-450
3. **DEVELOPMENT OF CLUSTER TOMATO VARIETIES RESISTANT/TOLERANT TO TOMATO YELLOW LEAF CURL VIRUS (TYLCV) AND *Fusarium oxysporum* f.sp. *Radicis-lycopersici* (Forl) THROUGH MOLECULAR MARKER-BASED PLANT BREEDING**  
*Hüseyin BASIM, Osman KANDİL*.....452-459
4. **DETERMINATION OF CHANGES IN PHYSICAL AND TECHNOLOGICAL CHARACTERISTICS OF SOME POTATO (*Solanum tuberosum* L.) VARIETIES GROWN IN KONYA UNDER LONG STORAGE CONDITIONS**  
*Nursel ÇÖL KESKİN*.....460-466
5. **DETERMINATION OF FISH CONSUMPTION HABITS IN DİYARBAKIR PROVINCE**  
*Filiz ÖZCAN, Muhammed Kasım AYDIN*.....467-471
6. **DETERMINATION OF THE RELATIONSHIP OF HARMONIZATION RATIO AND SOME YIELD CHARACTERISTICS WITH GRAIN YIELD IN BARLEY**  
*Abdulkadir TANRIKULU*.....472-477
7. **ASSESSMENT OF GERMINATION AND SEEDLING DEVELOPMENT FACTORS OF SOYBEAN CULTIVARS IN DIFFERENT SALINITY LEVELS**  
*Rüstem ÜSTÜN, Muhammad AMJID*.....478-486
8. **EFFECTS OF DIFFERENT SOWING FREQUENCIES AND NITROGEN DOSES ON THE YIELD COMPONENTS OF SILAGE SORGHUM X SUDAN GRASS HYBRID (*Sorghum bicolor* X *Sorghum sudanense* Mtapf.) IN THE İĞDIR BASIN**  
*Hakkı AKDENİZ, Bilal KESKİN, Barış EREN*.....487-497
9. **CONSUMPTION ESTIMATES OF FOOD CALORIES IN PORT HARCOURT HOUSEHOLDS, SOUTH-SOUTH NIGERIA: LA/AIDS APPROACH**  
*Micheal Ige Ediabai EDABA, Adeyinka Richard AROYEHUN, Grant Chukwuemeka ONYENMA, Favour Chinomnso EDABA*.....498-504
10. **INFLUENCE OF DIFFERENT ORGANIC FERTILIZERS ON GROWTH, YIELD, QUALITY, AND ELEMENT CONTENT IN LETTUCE (*Lactuca Sativa* var. *Longifolia*)**  
*Yahya NAS*.....505-514
11. **WATER FOOTPRINT ASSESSMENT OF AGRICULTURAL PRODUCTION IN BILECIK PROVINCE**  
*Hüseyin Tevfik GÜLTAŞ*.....515-523

**12. EVALUATION OF PROXIMATE, PHYTOCHEMICALS, ANTIOXIDANT CAPACITY, ENZYMATIC INHIBITION, AND ANTI-INFLAMMATORY PROPERTIES OF AVOCADO SEED MEAL AS POTENTIAL FEED ADDITIVE**

*Oluwaseyi Israel ATIBA, Andrew Bamidele FALOWO, Olugbenga David OLORUNTOLA, Olumuyiwa Joseph OLAROTIMI, Micheal AYANKOSO.....524-533*

**13. EVALUATION OF LIVESTOCK ENTERPRISES IN TERMS OF FARMER SATISFACTION AND CURRENT SITUATION**

*Faruk ÇETİN, Emine OLHAN.....534-541*

**14. EFFECTS OF OZONE TREATMENTS ON IN VITRO SEED GERMINATION OF *Ruscus aculeatus*, *Ruscus hypoglossum* AND *Danae racemosa***

*Mehmet TÜTÜNCÜ, Merve ANDIÇ, Fatih KEBELİ, Fisun Gürsel ÇELİKEL, Özhan ŞİMŞEK.....542-547*

**15. DETERMINATION OF BIOMASS YIELD, FORAGE QUALITY AND MINERAL CONTENT OF PEARL MILLET VARIETIES (*Pennisetum glaucum* (L.) R. BR.) UNDER SEMI-ARID CONDITIONS**

*Muhammed Niyazi SAYĞIDAR, Celal YÜCEL, Timuçin TAŞ.....548-556*

**16. EFFECT OF DIFFERENT CHEMICAL INDUCERS ON MYCELIAL GROWTH OF *Neoscytalidium dimidiatum***

*Gülsüm PALACIOĞLU.....557-562*

**17. THE SINGLE AND INTERACTIVE EFFECT OF SALINITY AND TEMPERATURE ON GERMINATION CHARACTERISTICS OF ITALIAN RYEGRASS (*Lolium multiflorum* LAM.) SEEDS**

*Onur OKUMUŞ, Akife DALDA ŞEKERCİ, Satı UZUN.....563-569*

**Reviews**

**18. ON VARIOUS SOIL MOISTURE MEASUREMENT TECHNIQUES AVAILABLE IN THE LITERATURE**

*Hafize HASAR.....570-579*

**19. A REVIEW OF THE EFFECT OF CLEANER ENERGY TRANSITION ON FOOD PRICES AND CLIMATE CHANGE MITIGATION IN SUB-SAHARAN AFRICA: NIGERIA AS A CASE STUDY**

*Edamisan IKUEMONISAN.....580-595*

**20. POTENTIAL BIOENERGY CROPS: SWEET SORGHUM AND GLOBE ARTICHOKE**

*Birgül GÜDEN, Tuğçe ÖZSAN KILIÇ.....596-602*