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Images on the front cover: Scientific activities on soybean breeding at the Kazakh Scientific Research Institute have been carried out for more than 50 years. More than 20 varieties of 6 ripeness groups have been developed and approved for use. Production of high quality seeds of the most demanded varieties is an urgent task. Within the framework of the State Program (BR10764991) "Creation of high-yielding varieties and hybrids of oilseeds and cereals on the basis of achievements of biotechnology, genetics, physiology, biochemistry of plants for their sustainable production in different soil-climatic zones of Kazakhstan" the varietal peculiarity of seeds for harvesting and finishing was studied. Various technologies have been suggested to reduce seed injury during harvesting. Detailed information on the results of the work can be found in the article by Tusupbaev et al. (2023) titled "Tusupbaev KB, Didorenko SV, Kassenov RZh, Dalibayeva AM, Aldekov AN, Tleubaeva TN (2023). Soybean varieties assessment based on degree of injury and seed quality for biological traits in primary and elite seed production. *SABRAO J. Breed. Genet.* 55(4): 1065-1078. <http://doi.org/10.54910/sabrao2023.55.4.5>". © SABRAO

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- Aswidinnoor H, Listiyanto R, Suwarno WB (2023). Genetic architecture of new plant type rice (*Oryza sativa* L.) lines based on a 12-years multi-experiment. *SABRAO J. Breed. Genet.* 55(4): 1025-1037. <http://doi.org/10.54910/sabrao2023.55.4.2>.
- Kashif M, Usman M, Ahmad N, Owais M, Javed A, Ahmad J, Ahmad A (2023). Selection of stable wheat genotypes under different agro-ecological zones of Punjab, Pakistan. *SABRAO J. Breed. Genet.* 55(4): 1038-1050. <http://doi.org/10.54910/sabrao2023.55.4.3>.
- Laily AN, Daryono BS, Purwantoro A, Purnomo (2023). Plant segregation and pollen characteristics of highland papaya (*Vasconcellea pubescens* A.DC.) based on sex types. *SABRAO J. Breed. Genet.* 55(4): 1051-1064. <http://doi.org/10.54910/sabrao2023.55.4.4>.
- Tusupbaev KB, Didorenko SV, Kassenov RZh, Dalibayeva AM, Aldekov AN, Tleubaeva TN (2023). Soybean varieties assessment based on degree of injury and seed quality for biological traits in primary and elite seed production. *SABRAO J. Breed. Genet.* 55(4): 1065-1078. <http://doi.org/10.54910/sabrao2023.55.4.5>.

- Asif M, Khan AA, Cheema HMN, Khan SH, Iqbal Z (2023). Cotton germplasm characterization for drought tolerance based on morpho-physiological and fiber quality parameters. *SABRAO J. Breed. Genet.* 55(4): 1079-1093. <http://doi.org/10.54910/sabrao2023.55.4.6>.
- Matniyazova H, Nabiev S, Kholikova M, Mavlonova G (2023). Physiological and biochemical parameters of soybean genotypes under diverse water regimes. *SABRAO J. Breed. Genet.* 55(4): 1094-1108. <http://doi.org/10.54910/sabrao2023.55.4.7>.
- Akhtar MA, Aslam M, Schafleitner R, Atif RM, Murtaza G (2023). Genetics of cercospora leaf spot resistance in mung bean. *SABRAO J. Breed. Genet.* 55(4): 1109-1122. <http://doi.org/10.54910/sabrao2023.55.4.8>.
- Mustafa SE, Razzaq H, Khan FA, Khan SH (2023). Estimation of combining ability effects for yield and fatty acid-related traits in *Brassica rapa* using line by tester analysis *SABRAO J. Breed. Genet.* 55(4): 1123-1131. <http://doi.org/10.54910/sabrao2023.55.4.9>.
- Ainebekova BA, Yerzhanova ST, Dossybayev K, Seitbattalova AI, Tilek K, Kambarbekov EA, Meldebekova NA, Meirman GT (2023). Genetic analysis and molecular characterization of the wheatgrass (*Agropyron cristatum* L. Gaertn.) in South-East Kazakhstan. *SABRAO J. Breed. Genet.* 55(4): 1132-1141. <http://doi.org/10.54910/sabrao2023.55.4.10>.
- Al-Shakarchi MA (2023). Genetic diversity and phylogeny of rhizobia isolated from nodules using RFLP-PCR technique in Nineveh Province, Iraq. *SABRAO J. Breed. Genet.* 55(4): 1142-1153. <http://doi.org/10.54910/sabrao2023.55.4.11>.
- Laghari SR, Abro TF, Baloch AW, Soomro ZA, Gandahi N, Soomro AA, Chattah SH, Soomro TA, Nargis M, Soomro MM, Memon MD (2023). Comparative assessment of genetic diversity between *Brassica napus* and *Brassica juncea* based on phenotypic traits. *SABRAO J. Breed. Genet.* 55(4): 1155-1169. <http://doi.org/10.54910/sabrao2023.55.4.12>.
- Laily AN, Daryono BS, Purwantoro A, Purnomo (2023). Sex effect on the telomer length, elemental composition, and phytochemical content of highland papaya (*Vasconcellea pubescens* A.DC.) leaves. *SABRAO J. Breed. Genet.* 55(4): 1170-1182. <http://doi.org/10.54910/sabrao2023.55.4.13>.
- Chozin M, Sumardi S, Sudjtmiko S, Gusmiatun G (2023). Grain yield stability of swamp rice lines across swampland agroecosystems in Bengkulu Province of Indonesia. *SABRAO J. Breed. Genet.* 55(4): 1183-1192. <http://doi.org/10.54910/sabrao2023.55.4.14>.
- Juraev D, Amanov O, Dilmurodov Sh, Boysunov N, Turaeva S, Mamadjanova N, Raimova D (2023). Winter wheat assessment for growth, grain yield, and quality parameters under diverse soil and climatic conditions. *SABRAO J. Breed. Genet.* 55(4): 1193-1204. <http://doi.org/10.54910/sabrao2023.55.4.15>.

- Zahid MI, Shakeel A, Saeed A, Ahmed N (2023). Multivariate analysis for evaluating diversity in *Avena sativa* germplasm. *SABRAO J. Breed. Genet.* 55(4): 1205-1221. <http://doi.org/10.54910/sabrao2023.55.4.16>.
- Abbas T, Ahmad I, Khan ZI, Ahmad K (2023). Micromorphological and anatomical responses of native dicots to industrial effluents released from contaminated region of the Chenab River in Pakistan. *SABRAO J. Breed. Genet.* 55(4): 1222-1244. <http://doi.org/10.54910/sabrao2023.55.4.17>.
- Shayakhmetova A, Savenkova I, Nasiyev B, Akhmetov M, Useinov A, Taskulova A, Temirbulatova A (2023). Agrotechnology for feed cultivation and creation of hayfields and pastures in the forest and steppe zone of Northern Kazakhstan. *SABRAO J. Breed. Genet.* 55(4): 1245-1258. <http://doi.org/10.54910/sabrao2023.55.4.18>.
- Blaw HH, Jassim SJ, Makki AA (2023). Economic analysis and effect of triple bacterial and mineral fertilizers on the growth and yield traits of wheat. *SABRAO J. Breed. Genet.* 55(4): 1259-1270. <http://doi.org/10.54910/sabrao2023.55.4.19>.
- Al-Asadi HH, Goga N, Mandana M (2023). Greenhouse cost index methodology based on the diverse Regions of Iraq. *SABRAO J. Breed. Genet.* 55(4): 1271-1283. <http://doi.org/10.54910/sabrao2023.55.4.20>.
- Aloush RH (2023). Morphological and anatomical characterization of the species *Trifolium incarnatum* L. cultivated in Iraq. *SABRAO J. Breed. Genet.* 55(4): 1284-1293. <http://doi.org/10.54910/sabrao2023.55.4.21>.
- Al-Someidae TA, Abdullah RM, El-Sheekh MM (2023). Alginate beads utilization for long-term storage of microalgal isolates. *SABRAO J. Breed. Genet.* 55(4): 1294-1301. <http://doi.org/10.54910/sabrao2023.55.4.22>.
- Shehab MOM (2023). Molecular classification of the Genus *rosa* L. (*Rosaceae*) grown in Northern Iraq by using RAPD markers. *SABRAO J. Breed. Genet.* 55(4): 1302-1310. <http://doi.org/10.54910/sabrao2023.55.4.23>.
- Alaarage S, Alamery AA (2023). Role of bio-azotobacter and nitrogen fertilizers on growth and yield traits of sorghum (*Sorghum bicolor* L.). *SABRAO J. Breed. Genet.* 55(4): 1311-1320. <http://doi.org/10.54910/sabrao2023.55.4.24>.
- Hussain MM, Saeed A, Shakeel M, Rauf A, Jan F, Gul S, Mohibullah M, Munir M, Khan I, Yasin M (2023). Dynamics of lead tolerance in Tobacco (*Nicotiana tabacum* L.) genotypes. *SABRAO J. Breed. Genet.* 55(4): 1321-1331. <http://doi.org/10.54910/sabrao2023.55.4.25>.
- Al-Katib MA, Al-Rashedy HSMA, Alsinjari WE (2023). Heavy metals treated soil effects on the concentration of chlorophyll A, B, and mineral elements in algae. *SABRAO J. Breed. Genet.* 55(4): 1332-1341. <http://doi.org/10.54910/sabrao2023.55.4.26>.

- Abed AS, Majeed DM, Ismail EN, Al-Jibouri AM, Bader SM (2023). Alkaloid accumulation in *Catharanthus roseus* L. in vitro culture enhanced via Ag and TiO₂ nanoparticles. *SABRAO J. Breed. Genet.* 55(4): 1342-1350. <http://doi.org/10.54910/sabrao2023.55.4.27>.
- Al-Fatlawi ZH, Jabbar MKH (2023). Drought-tolerant *OsCIPK* genes in local aromatic rice cultivars. *SABRAO J. Breed. Genet.* 55(4): 1351-1358. <http://doi.org/10.54910/sabrao2023.55.4.28>.
- Kausar M, Akhtar N, Arshad M, Gul S, Saleem U, Khan M, Yousaf MI (2023). Iron-zinc based genetic diversity assessment in maize (*Zea mays* L.) genotypes. *SABRAO J. Breed. Genet.* 55(4): 1359-1368. <http://doi.org/10.54910/sabrao2023.55.4.29>.
- Majeed RE, Ibrahim IA, Shuku OS (2023). Maize seed inoculation with bioagent and its effects on the growth and yield traits. *SABRAO J. Breed. Genet.* 55(4): 1369-1376. <http://doi.org/10.54910/sabrao2023.55.4.30>.
- Hassn NT, Al-Maathide AM, Al-Saffar RS (2023). Phenolic compounds play a crucial role as chemotaxonomic markers in the *Cucurbitaceae* species cultivated in Iraq. *SABRAO J. Breed. Genet.* 55(4): 1377-1391. <http://doi.org/10.54910/sabrao2023.55.4.31>.
- Alaarage SS, Alamery AA (2023). Nitrogen and biofertilization effects on biochemical, qualitative, and physiological traits of sorghum (*Sorghum bicolor* L.). *SABRAO J. Breed. Genet.* 55(4): 1392-1400. <http://doi.org/10.54910/sabrao2023.55.4.32>.
- Hassan AY (2023). Effect of plants space and foliar application of humic acid in seed yield and biochemical composition of goat pea (*Securigera securidaca* L.). *SABRAO J. Breed. Genet.* 55(4): 1401-1410. <http://doi.org/10.54910/sabrao2023.55.4.33>.
- Nazeer S, Sarwar G, Tahir MA, Siddiqui AR, Gul S, Sherani J, Ahmad J (2023). Extenuating the detrimental effects of sodic water on agronomic, ionic, and quality attributes of fodders. *SABRAO J. Breed. Genet.* 55(4): 1411-1422. <http://doi.org/10.54910/sabrao2023.55.4.34>.
- Rashid E, Hussain Z, Nawaz MA, Rashid S (2023). Evaluation of pea genotypes for salt stress tolerance *SABRAO J. Breed. Genet.* 55(4): 1423-1434. <http://doi.org/10.54910/sabrao2023.55.4.35>.
- Hamad AH, Abdulmajeed AH, Abdulrazzaq ZM (2023). Effect of organic and mineral fertilization and humic acid application on increasing the flavonoid content in *Moringa oleifera* leaves. *SABRAO J. Breed. Genet.* 55(4): 1435-1442. <http://doi.org/10.54910/sabrao2023.55.4.36>.
- Aubied IA, Al-Janabi AMI, AlKhafaji ZAH (2023). Effect of npk fertilization and leaf/bunch ratio on fruit yield and quality of Khastawi date palm. *SABRAO J. Breed. Genet.* 55(4): 1443-1450. <http://doi.org/10.54910/sabrao2023.55.4.37>.

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Priority is given to articles that are of direct relevance to plant breeders with an emphasis on the Asian region. Research articles, short communications, methods, reviews, commentaries, and opinion articles will be accepted or invited for publication. Scientific contributions will be refereed and edited to international standards.

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ICRISAT Campus, Patancheru, Hyderabad, ndhra Pradesh, India
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Plant Genetics and Breeding Division
Department of Agronomy and Horticulture
Bogor Agricultural University, Bogor, Indonesia
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Department of Plant Breeding and Genetics
University of Agriculture, Peshawar, Pakistan
Email: nukmarwat@yahoo.com, nukmarwat@aup.edu.pk

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Rural Development Foundation, Roosevelt Road, Taipei, Taiwan
Email: rdf@ms4.hinet.net

THAILAND

Dr. Suchila Techawongstien
Department of Plant Science and Agricultural Resources
Khon Kaen University, KhonKaen, Thailand
Email: suctec.kku@gmail.com

TURKEY

Dr. Kamile Ulukapi
Department of Plant and Animal Production
Vocational School of Technical Sciences
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Research Center for Food Crops, Research Organization for Agriculture
and Food National Research and Innovation Agency (BRIN), Bogor, INDONESIA
Email: aris.hairmansis@brin.go.id, a.hairmansis@gmail.com
Area of Expertise: Plant Breeding, Genetics, Molecular Breeding

Dr. Gwen Iris Descalsota-Empleo

Plant Breeding and Genetics Division
University of Southern Mindanao, Kabacan, North Cotabato, PHILIPPINES
Email: gidescalsota@gmail.com; gidempleo@usm.edu.ph
Area of expertise: Rice and Cacao Breeding and Genetics, QTL Mapping

Dr. Maxim V. Trushin

Department of Genetics
Institute of Fundamental Medicine and Biology
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E-mail: mtrushin@mail.ru
Area of expertise: Genetics, History of Biology, Ecotoxicology, Physiology

Dr. Kamile Ulukapi

Department of Plant and Animal Production
Vocational School of Technical Sciences
Akdeniz University, Konyaalti-Antalya, TURKEY
Email: kamileonal@akdeniz.edu.tr
Area of expertise: Vegetable Production and Breeding, Common Bean

Dr. B.P. Mallikarjuna Swamy

International Rice Research Institute (IRRI),
Los Baños, Laguna, PHILIPPINES
Email: m.swamy@irri.org
Area of expertise: Rice Molecular Breeding, Genetics, and Genomics

Prof. Dr. P.I. Prasanthi Perera

Department of Horticulture and Landscape Gardening
Wayamba University of Sri Lanka, Makandura, Gonawila, SRI LANKA
Email: panawalageindra@gmail.com, prasanthi@wyb.ac.lk
Area of expertise: Plant Breeding, Plant Tissue Culture, Reproductive Biology

Prof. Dr. Clara R. Azzam

Department of Cell Research
Field Crops Research Institute, Agricultural Research Center, Giza, EGYPT
Email: clara.azzam@arc.sci.eg
Area of expertise: Plant Breeding, Mutation and Molecular Breeding,
Plant Tissue Culture

Dr. Tonette P. Laude

University of the Philippines Los Banos, Laguna, PHILIPPINES
Email: tplaude@up.edu.ph
Area of expertise: Applied Plant Breeding and Genetics, Maize

Dr. Quaid Hussain

Zhejiang A & F University
666 Wusu St, Hangzhou, CHINA
Email: quaid_hussain@yahoo.com
Area of expertise: Crop Genetics and Breeding, Genome-wide association and Identification
analysis, Transcriptomic analysis, Abiotic stresses, Wheat, Rapeseed, Chickpea,
Liriodendron chinense, *Torreya grandis*

Dr. Osama Osman Atallah

Assistant Professor
Department of Plant Pathology, Zagazig University, Zagazig, EGYPT
E-mail address: osamaoatall1h@ufl.edu
Area of expertise: Plant Pathology, Mycology, Virology, Molecular Plant-Microbe
Interactions, Bioinformatics, Molecular technology

Dr. A.N. Farhood

Department of Field Crops
University of Kerbala, Kerbala, IRAQ
E-mail: ali.nazem@uokerbala.edu.iq, ali.nazem1987@gmail.com
Area of expertise: Plant production, Genetics, Breeding, Biotechnology

Prof. Dr. Zahoor Ahmad Soomro

Department of Plant Breeding and Genetics
Sindh Agricultural University, Tandojam Sindh, PAKISTAN
E-mail: zasoomro@sau.edu.pk, zasoomro_cap@hotmail.com
Area of expertise: Crops Breeding, Quantitative Genetics, Stress Physiology

Dr. Khundej Suriharn

Department of Agronomy
Khon Kaen University, Khon Kaen, THAILAND
E-mail: sphala@kku.ac.th, bsuriharn@gmail.com
Area of expertise: Corn Breeding

Prof. Dr. Ijaz Rasool Noorka

Department of Plant Breeding and Genetics
College of Agriculture, University of Sargodha, Sargodha, Punjab, PAKISTAN
E-mail: editorsabrao@gmail.com, ijazphd@yahoo.com
Area of expertise: Plant Breeding & Genetics, Botany, Toxicology, Biotic and Abiotic
stresses, Biodiversity and Germplasm Conservation

Dr. Sajjad Hussain Qureshi

Ph.D (PBG), Ph.D (IT), MBA (HRM)
Department of Management Information System
MEPCO-WAPDA, Sahiwal, Punjab, PAKISTAN
E-mail: sajjads2002@yahoo.com

Area of expertise: Plant Breeding & Genetics, Precision Agriculture, Resistant Breeding in Maize, Biotic stresses, Biodiversity, Botany, Machine Learning , Image Processing, GIS Systems, Artificial Intelligence and Human Resource Management

Lanie C. Reyes

Advisory Editor
Head, Applied Knowledge Resources Unit
SEARCA, College, Laguna, PHILIPPINES
E-mail: lcr@searca.org

Area of expertise: Science Communication and Publication Management

SABRAO PUBLISHING TEAM

Ms. Maria Rowena M. Baltazar

SABRAO Editor
Laguna, PHILIPPINES
Email: rbaltazar929@gmail.com

Mr. Joseph "Otep" Vicente

SABRAO Editor
Laguna, PHILIPPINES
Email: sabraojournal.editingteam2@gmail.com

Mr. Nelson A. Tresballes

Web Manager
SEARCA, College, Laguna, PHILIPPINES
Email: nat@searca.org

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