ISSN: 2392-4535 (Print), 2392-4543 (Online)

Journal of Nepal Agricultural Research Council

Volume 7, April 2021





© Nepal Agricultural Research Council 2021

Frequency of Publication: Annual

Official Language: English

ISSN: 2392-4535 (Print), 2392-4543 (Online)

NPSN: 868-882/2020/21

DOI Prefix: 10.3126/jnarc

Subject of Interest: Agro-biodiversity, agronomy, plant breeding, horticulture (vegetables, fruits,

spices, beverages, flowers), entomology, plant pathology, soil science, animal science (pasture and forage, breeding, nutrition, health), fisheries and aquaculture (warm, cool, cold water fisheries and aquaculture), agro-forestry, agricultural engineering, agricultural environment, agricultural botany, agricultural economics, agricultural ecology, post-harvest technology, food science, weed science, seed science. Agriculture policy, market, socio-economics, outreach and

agri-extension and agri-education

Submission Email: cpdd@narc.gov.np; narcjournal@gmail.com

Cover Photo Traditional system of de-husking proso millet (left), Chino Kutak (right)

Published by: Nepal Agricultural Research Council

National Agricultural Technology Information Centre

Khumaltar, Lalitpur

PO Box: 3605, Kathmandu, Nepal

Phone: 977 1 5523 041 Fax: 977 1 5521 197 Email: cpdd@narc.gov.np

URL: http://narc.gov.np/narc-journal/

Correspondence: Editor-in-Chief, Journal of Nepal Agricultural Research Council

Nepal Agricultural Research Council was established in 1991 as an autonomous organization under "Nepal Agricultural Research Council Act 1991" (URL: http://narc.gov.np/)

The submission of the articles in the journal declares that all terms and conditions of the journal has been read and accepted by the authors. All articles are licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0); they represent the view of authors to whom they are credited and are not necessarily those of members of Editorial Board and publisher.

Call for Reviewers

The journal is always seeking conscientious reviewers and extends an invitation to agricultural researchers to join the Review Team of the Journal of NARC. We believe the best reviewers are persons who have published themselves. Ideally, we prefer persons who have published at least 6 manuscripts and hold a doctoral degree.

Reviewer needs to review papers electronically (eg track change mode in word file) and should have knowledge of online submission system and author's guidelines. To be a reviewer, please register NepJol website (https://www.nepjol.info/index.php/JNARC/about/submissions#onlineSubmissions). It is expected that manuscripts will be reviewed and returned within four weeks. A reviewer if repeatedly submit late reviews or fail to return reviews, he/she will be removed from the Review Team. If you are unable to review four weeks, kindly decline the review.

This journal is a peer reviewed open access journal, abstracted and indexed in more than 27 databases. Paper is published free of cost and journal is distributed widely both color e-copy and color print copy. Please visit http://narc.gov.np/narc-journal/ for journal details and reviewer's guidelines. We recognize your contribution by different means. If you agree to the aforementioned conditions, please submit an application with full name, subject/field, detail address including email and phone number at narcjournal@gmail.com.

Journal of Nepal Agricultural **Research Council**

Volume 7: iv+167, April 2021

Patron

Deepak Bhandari, PhD **Executive Director**

Nepal Agricultural Research Council, Kathmandu, Nepal

Email: b.deepak359@gmail.com

The Editorial Board

Editor-In-Chief

Bal Krishna Joshi, PhD Senior Scientist

National Genebank, NARC Khumaltar, Lalitpur, Nepal

Email: joshibalak@yahoo.com

ORCID: https://orcid.org/0000-0002-7848-5824

Managing Editor

Yubrai Bhusal Senior Scientist

National Agricultural Technology Information Centre, NARC, Khumaltar, Lalitpur, Nepal

Email: rbconus@gmail.com

Associate-Editor-In-Chief

Jiban Shrestha Scientist

National Plant Breeding and Genetic Research Centre, NARC, Khumaltar, Lalitpur, Nepal

Email: jibshrestha@gmail.com

ORCID: https://orcid.org/0000-0002-3755-8812

Editors

Neena Amatya Gorkhali, PhD

Senior Scientist

National Animal Breeding and Genetic Research

Centre, NARC, Khumaltar, Lalitpur, Nepal

Email: neenagorkhali@hotmail.com

ORCID: https://orcid.org/0000-0003-3592-4652

Subash Subedi, PhD Senior Scientist

National Maize Research Program

Rampur, Chitwan, Nepal

Email: subedi.subash1@gmail.com

ORCID: https://orcid.org/0000-0003-3739-1773

Editors

Umesh Acharya, PhD Senior Scientist

National Citrus Research Program

Dhankuta, Nepal

Email: umeshach@gmail.com

Krishna P. Timsina, PhD

Senior Scientist

National Agriculture Policy Research Centre

Khumaltar, Lalitpur, Nepal

Email: krishnatimsina2000@gmail.com

ORCID: https://orcid.org/0000-0003-4005-7039

Dinesh Panday, PhD

Post-Doctoral Research Associate The University of Tennessee, Knoxville 2506 E J. Chapman Dr, Knoxville, TN

37996 United States

E-mail: agriculturenepal@gmail.com

ORCID: https://orcid.org/0000-0001-8452-3797

Kazuhiro Nemoto, PhD Associate Professor

Faculty of Agriculture, Shinshu University 8304 Minami, Nagano 399-4598, Japan

Email: knemoto@shinshu-u.ac.jp

Editor Assistant

Rishi Ram Adhikari Computer Officer

National Agri. Technology Information Centre

NARC, Khumaltar, Lalitpur, Nepal Email: adhikari_rishi@yahoo.com

Contents

A Dwarfing Gene sd1-d (Dee-geo-woo-gen dwarf) on Lodging Resistance and Related Traits in Rice	1
Mukunda Bhattarai, Misa Kamimukai, Birendra Bahadur Ran, Hiroki Oue, Shinji Matsumura and Masayuki Murai	
Morphological and Yield Traits of Pole-Type French Bean Genotypes Binod Prasad Luitel, Santosh Kalauni and Bishnu Bahadur Bhandari	10
Characterization of Gladiolus Genotypes under Khumaltar Condition of Nepal Mira Dhakal, Tul Bahadur Poon, Pratistha Adhikari, Suprabha Pandeyland Shandesh Bhattarai	22
Rapeseed Yield in a Maize – Rapeseed Cropping Pattern over a Long-Term Nutrient Management Experiment Gautam Shrestha, Bandhu Raj Baral and Ram Das Chaudhary	30
The Major Chemical Constituents of Teosinte Grown as Mono and Mixed Cropping with Legumes in different Sowing Date Birendra Khanal, Naba Raj Devkota, Megh Raj Tiwari and Neena Amatya Gorkhali	44
Biocontrol of Soil Borne Pathogen of Potato Tuber Caused by Rhizoctonia solani through Biosurfactant based Bacillus strain	54
Touseef Hussain, Abrar Ahmad Khan and M.A. Khan	
Advancement, Simplification and Piloting of Electrical Proso Millet De-Husker (Chino Kutak) Ganga Ram Bhandari, Devendra Gauchan, Bharat Bhandari, Bal Krishna Joshi and Saroj Panta	67
Determinants of Small-Scale Mechanization for Potato Farming: A Case from Bangladesh Moniruzzaman, Md. Sadique Rahman and Md. Hayder Khan Sujan	75
Genetic and Non-Genetic Factors on Productive and Reproductive Performance of Indigenous Buffalo	83
Uddhav Paneru, Keshav Prasad Dhungana, Surendra Kanu and Parbati Sharma	
Intermixing of Commercial Pure Breed Chickens with Indigenous (Sakini) Breed of Nepal Neena Amatya Gorkhali, Chhiring Sherpa, Mana Raj Kolachhapati, Bhoj Raj Pokharel, Nirajan Bhattarai and Saroj Sapkota	92
Temporal Dynamics of Rice Production and Import in Nepal Samaya Gairhe, Devendra Gauchan and Krishna Prasad Timsina	97
Economics of Organic vs Inorganic Rice Production: A Case of Chitwan District of Nepal Bidya Kiran Sapkota, Ananta Prakash Subedi, Kalyani Mishra Tripathi and Shiva Chandra Dhakal	109
Conservation Agriculture Mitigates the Effects of Climate Change Tika Bahadur Karki and Pankaj Gyawaly	122
Sustainable Intensification in Agriculture: An Approach for Making Agriculture Greener and Productive Jiban Shrestha, Subash Subedi, Krishna Prasad Timsina, Sudeep Subedi1, Meena Pandey, Aakriti Shrestha, Sajina Shrestha and Mohammad Anwar Hossain	133
Evaluation of Broad Leaf Mustard Genotypes in Central Mid-hill of Nepal Surendra Lal Shrestha, Suprabha Pandey, Yadav Kumar Shrestha and Iswori Prasad Gautam	151
Instruction to Authors	161