Philippine Journal of Science

Volume 150 No. 5, October 2021

Philippine Journal of Science (Philipp J Sci) is a scientific journal published by the Department of Science and Technology (DOST) and managed by the Science and Technology Information Institute (STII).

Editorial Board

Editor-in-Chief Caesar A. Saloma, Ph.D.

National Institute of Physics, College of Science University of the Philippines Diliman, Quezon City, Philippines

Dolores A. Ramirez, Ph.D.

Institute of Plant Breeding, College of Agriculture University of the Philippines Los Baños College, Laguna, Philippines

Fabian M. Dayrit, Ph.D.

School of Science and Engineering Ateneo de Manila University Loyola Heights, Quezon City, Philippines

Queena N. Lee-Chua, Ph.D.

Department of Mathematics Ateneo de Manila University Loyola Heights, Quezon City, Philippines

Rafe M. Brown, Ph.D.

Department of Ecology and Evolutionary Biology 1345 Jayhawk Blvd., Dyche Hall University of Kansas Lawrence, KS 66045 USA

William G. Padolina, Ph.D.

National Academy of Science and Technology DOST Complex, Bicutan, Taguig City

Rosalia C.M. Simmen, Ph.D.

Department of Physiology and Biophysics, and The Winthrop P. Rockefeller Cancer Institute University of Arkansas for Medical Sciences Biomed Bldg. 1, Rm. 212D, 4301 W. Markham St. Little Rock, AR 72205 USA

Ronaldo P. Ferraris, Ph.D.

Department of Pharmacology and Physiology New Jersey Medical School 185 S. Orange Avenue Newark, NJ 07103-2714 USA

Josefino C. Comiso, Ph.D.

Laboratory for Hydrospheric Processes, Code 971 National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt, MD 20771 USA

Sohichi Hirose, Ph.D.

Department of Civil and Environmental Eng'g. School of Environment and Society Tokyo Institute of Technology Ookayama, Meguro-ku, Tokyo, Japan

Victor B. Amoroso, Ph.D.

Center for Biodiversity Research and Extension in Mindanao, and Biology Department College of Arts and Sciences Central Mindanao University Musuan, Bukidnon, Philippines