UPM
UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

IKP NEWSLETTER

IN THIS ISSUE

IKP RESEARCHER SHARED THE ROLE OF MALAYSIAN AGRICULTURAL ENGINEERS IN THE INTERNATIONAL EVENT

ABOUT US

INSTITUTE OF PLANTATION STUDIES (IKP)

The establishment of the Institute of Plantation Studies (IKP) was approved by the Department of Higher Education, Malaysia in 2004 to become a Centre of Excellence for the advancement of plantation and agricultural agrotechnology and problem solving to commodity crops issues. Currently, IKP has three research laboratories; Laboratory of Sustainable Agronomy and Crop Protection (SACP), Laboratory of Plantation System Technology and Mechanization (PSTM) and Laboratory of Processing and Product Development (PPD) to cover the upstream, midstream and downstream activities of plantation crops.

To date, IKP is actively involved in research and consultancy projects covering plantation crops such as palm oil, rubber, cocoa, tea, pepper, coconut, pineapple, and durian. IKP activities mainly support the National Agricommodity Policy 2021-2030 (DAKN2030) to tackle issues and challenges faced by the plantation industry such as to meet global export demand, stagnant productivity (soil infertility, pest and diseases, and overdependence on foreign labour), and lack of value-creation (limited -value added products and limited development of downstream product/ technology). With various backgrounds of researchers in IKP and strong collaborations with government agencies, plantation companies and technology providers, IKP would dedicate its experience and expertise to agricultural and plantation research areas.

For more information on IKP, please visit us at:

ikp.upm.edu.my

Institut Kajian Perladangan, Universiti Putra Malaysia

KajianUpm

FOREWORD FROM THE DIRECTOR

PROF. DR. SHAUFIQUE FAHMI AHMAD SIDIQUE

I am pleased to introduce the 2023 edition of the IKP Newsletter, which is our mouthpiece of sharing the exciting transformation of the institute with our colleagues, students, and the farming community. The primary objective behind the establishment of IKP is to specialize in the development of farming technology, encompassing all aspects of upstream and downstream activities related to plantation crops. IKP serves as an institute that brings together researchers from various specialties at UPM to assist the Malaysian plantation industry and collaborate with related government agencies.

Our institute features three specialized laboratories: the Sustainable Agronomy and Crop Protection Laboratory (SACP) primarily focuses on upstream activities such as crop agronomy, pest and disease management, systems biology, and genomics. The Plantation System Technology and Mechanization Laboratory (PSTM) covers mechanization, automation, smart agricultural technology, and IoT in the plantation industry. Meanwhile, the Product Processing and Development Laboratory (PPD) focuses on downstream activities, including the production of green products for both food and industrial purposes, the development of environmentally friendly processing technologies, and the utilization of biomass.

UPM is renowned as a leading agricultural university in Malaysia and the region, particularly in research and education in agriculture and related fields. IKP's mission is to achieve excellence in the agricultural industry by fostering knowledge creation, advancing new technologies, and promoting postgraduate studies in plantation crops. We hope you find the following pages informative and insightful as you learn more about IKP.

MAIN HIGHLIGHT | RESEARCH ASSOCIATES IN THE LABORATORY OF PLANTATION SYSTEM TECHNOLOGY AND MECHANIZATION (PSTM)

GET TO KNOW ABOUT PSTM

PSTM is established to carry out research and development in mechanization and automation, digital technology and smart farming technology for plantation industry in Malaysia. Research in this field is very important to support the implementation of National Agrofood Policy and National Commodity Policy. Research and development program in the field of mechanization and plantation technology can reduce the nation's dependency on foreign labor and improve farm productivity as well as competitiveness of our plantation sector. The application of simple and affordable digital technologies would be able to attract the younger generation to be involved in the plantation sector.

HEAD OF LABORATORY

Assoc. Prof. Dr. Nazmi Mat Nawi is a lecturer of Agricultural Mechanization and Crop Sensing Technology. He received his BEng. in Biological and Agricultural from Universiti Putra Malaysia and PhD in Agricultural Engineering from University of Southern Queensland, Australia. His research areas include farm machinery design, non-invasive assessment of fruit quality, post-harvest engineering and emergency response and planning.

RESEARCH ASSOCIATES

Prof. Gs. Dr. Abdul Rashid Mohamed Shariff is a retired professor of Spatial Information Science and Engineering. He received his B. Surv. in Land from Universiti Teknologi Malaysia and PhD in Spatial Information Science and Engineering from University of Maine, USA. His research areas include GIS and precision agriculture. Currently, he is serving UPM as "Perkhidmatan Amal Putra".

Prof. Dr. Norhisam Misron is a professor of Electrical Machine and Power Electronic Drive. He received his B.Eng and PhD from Shinshu University, Japan. His research areas include applied magnetic, magnetic sensor, electrical motor design, electrical generator design and power electronic.

Prof. Ts. Dr. Wan Zuha Wan Hasan is a professor of Bio Medical Engineering, Robotic and Automation and Sensor and Solar Technology. He received his B.Eng. in Electronic and Computer from Universiti Putra Malaysia and PhD in Memory Testing from Universiti Kebangsaan Malaysia. His research areas include microelectronics, mobile robot, and automated machine.

Prof. Ts. Dr. Rosnah Shamsudin is a professor of Food process machinery design for small scale industry. She received her B.Eng. in Agricultural Engineering from Universiti Putra Malaysia and PhD in Chemical and Process from Universiti Kebangsaan Malaysia. Her research areas include process machinery design, food properties and postharvest engineering.

Assoc. Prof. Ts. Dr. Siti Khairunniza Bejo is a lecturer of Imaging Technology and Precision Agriculture. She received her B.Eng. in Computer System and Communications from Universiti Putra Malaysia and PhD in Image Processing from University of Surrey, United Kingdom.

Dr. Muhammad Razif Mahadi is a lecturer of Machinery Design, Control and Automation. He received his B.Eng. in Mechanical from California State University Sacramento, USA and PhD in Mechatronics from University of Southern Queensland, Australia.

Dr. Muhamad Saufi Mohd Kassim is a lecturer of Imaging Technology and Agricultural Automation. He received his B.Eng. and PhD in Agricultural Engineering from Universiti Putra Malaysia.

Gs. Dr. Nik Norasma Che'Ya is a lecturer of Precision Agriculture and GIS. She received her BSc. in Geoinformatics from Universiti Teknologi Malaysia and PhD in Precision Agriculture from The University of Queensland, Gatton, Australia.

Ts. Dr. Ahmad Suhaizi Mat Su is a lecturer in Agricultural Mechanization. He received his B.Eng. in Agricultural and Biological from Universiti Putra Malaysia and PhD in Agricultural Mechanization from McGill University, Montreal, Quebec, Canada.

Assoc. Prof. Ts. Dr. Aimrun Wayayok is a lecturer in Precision Farming Engineering. He received his BSc. in Soil Science from KMITL, Bangkok and PhD in Smart Farming Technology from Universiti Putra Malaysia.

Gs. Dr. Ya'akob Mansor is a senior lecturer in Physics. He received his B.Eng. in Electrical from Universiti Teknologi Malaysia and PhD in Remote Sensing from Universiti Putra Malaysia.

Ts. Dr. Anas Mohd Mustafah is a lecturer in Control and Automation, Agricultural Machinery Design and Control, Automation, Green Technology and Energy. He received his PhD in Mechanical Engineering from University of Sheffield, United Kingdom.

RESEARCH OFFICERS

Dr. Zailani Khuzaimah is a research officer of remote sensing, Geographic Information System, disaster management and forestry. He received his BSc. in Forestry Science (Management) and PhD in Spatial Information Engineering from Universiti Putra Malaysia.

Mrs. Siti Nooradzah Adam is a research officer of spatial information engineering, non-destructive testing and plantation technology. She received her B.Eng. in Computer System and Communications and MSc. in Spatial Information Engineering from Universiti Putra Malaysia.

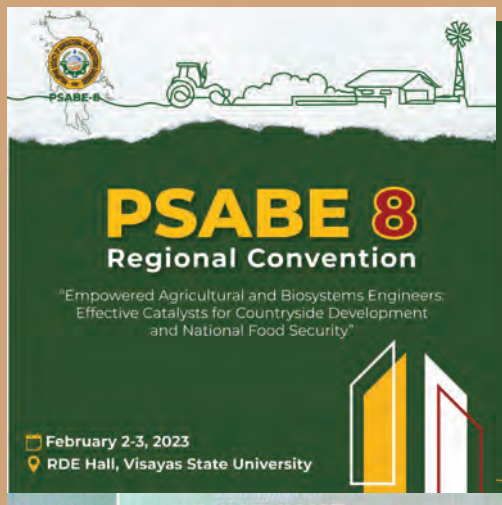
Mr. Ahmad Faiz Mokhtar is a research officer of plantation and forest management. He received his BSc. in Forestry Science (Management) from Universiti Putra Malaysia.

HIGHLIGHTS

IKP RESEARCHER SHARED THE ROLE OF MALAYSIAN AGRICULTURAL ENGINEERS IN THE INTERNATIONAL EVENT

2nd - 3rd February – Head, Laboratory of Plantation System Technology and Mechanization (PSTM), IKP, Assoc. Prof. Dr. Nazmi Mat Nawi was invited by Visayas State University, Philippines to be one of the keynote speakers in the regional convention of the Philippines Society of Agricultural and Biosystems Engineers (PSABE) which was held in RDE Hall, Visayas State University. This two-day convention was attended by 250 agricultural engineers mainly from region-8, Philippines. The theme of the convention was “Empowered agricultural and Biosystems Engineers: Effective Catalysts for Countryside Development and National Food Security.” In this convention, Dr. Nazmi presented the talk entitled “Adoption of IR4.0 in the Agricultural Sector in Malaysia: The Role of Agricultural Engineers.

In his talk, Dr. Nazmi shared the role of agricultural engineers in Malaysia to modernize the agricultural sector using digital technology in the era of industrial revolution IR4.0. He also shared the level of adoption and challenges face by the agricultural industry in using the technology. In addition, Dr. Nazmi also explained the role of researchers from IKP in promoting the technology to the agricultural sector in Malaysia through research and development program. From this convention, several research collaboration projects between IKP and Visayas State University were identified and would be implemented in the near future.



RECOGNITIONS

VISIT OF THE CHAIRMAN, UNIVERSITY BOARD OF DIRECTORS TO IKP

24th February – YBhg. Prof. Emeritus Dr. Ibrahim Komoo, Chairman, University Board of Directors, UPM, has paid official visit to IKP. YBhg. Prof. Emeritus Dr. Ibrahim Komoo was welcomed by the Director of IKP, YBhg. Prof. Dr. Shaufique Fahmi Ahmad Sidique, top management members, and IKP staff. The session was started with an explanation of the background of IKP by the director, followed by a visit to the laboratories and the transgenic greenhouse.

Through this official visit session, YBhg. Prof. Emeritus Dr. Ibrahim Komoo shared his views on the importance of collaboration between the institute and industry as well as other government agencies. He emphasized that beneficial collaboration can be achieved by building trust and developing partnerships while exploring collaboration opportunities that complement research needs of each other.

DISCUSSION ON FOOD SECURITY ISSUES WITH DATO' SRI MUSTAPA MOHAMED

7th March – A discussion on food security issues was conducted between researchers from UPM and Dato' Sri Mustapa Mohamed (former Minister in the Prime Minister's Department for Economic Affairs) at Astana Putra. Among the researchers who joined the discussion were Prof. Dr. Shafique Fahmi Ahmad Sidique, Prof. Dr. Kamarul Ariffin Ahmad (Director, Putra Science Park), Prof. Dr. Amin Ismail (Director, Centre for Quality Assurance), Dr. Kamil Yusoff (Chief Executive Officer, UPM Education and Training Sdn. Bhd.), Assoc. Prof. Dr. Mohd Rafein Zakaria (Head, PPD), Dr. Zailani Khuzaimah, Dr. Fariz Adzmi, and Mr. Rizal Husin. The discussion focused on food security issues and the roles of UPM in addressing them.

In the discussion, Dato' Sri Mustapa Mohamed has shared his experience as a minister in various portfolios for more than 20 years. He also contributed his ideas and insights in helping UPM play a more effective role and come up with mitigation strategies to overcome food security issues. From the discussion, Dato' Sri Mustapa Mohamed has requested the researchers from UPM to prepare a conceptual paper related to food security issues to be extended to relevant ministries.

IRRDB INTERNATIONAL RUBBER CONFERENCE 2023

20th -22nd February – The Deputy Director of IKP, UPM, Prof. Dr. Wong Mui Yun, was invited as an invited speaker at the IRRDB International Rubber that was held at InterContinental Hotel Kuala Lumpur.

FELLOW OF ACADEMY OF SCIENCES MALAYSIA (ASM) 2023

29th April – The Deputy Director of IKP, UPM, Prof. Dr. Wong Mui Yun, was elected as a fellow for the Academy of Sciences Malaysia (ASM) in 2023 in biological, agricultural, and environmental sciences disciplines at the 28th ASM Annual General Meeting. The top management and staff of IKP have expressed their warmest congratulations to Prof. Wong on this appointment. It is hoped that the appointment will give Prof. Wong more opportunities to contribute her expertise to the development of a sustainable plantation industry in Malaysia.

RECOGNITIONS

OUTBOUND STUDENT MOBILITY PROGRAM TO ANDALAS UNIVERSITY, INDONESIA - WORLD CLASS UNIVERSITY PROGRAM 2023

Five (5) graduate students from the Institute of Plantation Studies have been selected as participants in the World Class University Programme 2023, organized by Andalas University, Indonesia. The programme was held for two weeks from 7 - 28 May 2023.

The selected students were Mohd Naim Muhammad Ali, Dayana Chong Muhammad Amirul Solihin Chong, Zee Kar Mun, Nurfadzilah Madian, and Siti Saripa Rabiah Mat Lazim.

Throughout this two weeks programme, students have been involved in various activities scheduled by Andalas University. Among them are meet and greet sessions with the Dean and department heads, tours around the campus and visits to local tourism centres, cultural activities with local students, community service programmes with local farmers, site visits to rice fields, and a series of discussions with farmers and local students about technology, the latest issues, and challenges in agriculture both in Malaysia and Indonesia.

In general, the involvement of IKP students in this mobility program aimed to achieve the following objectives; (a) expanding the educational experience for IKP student international experiences in Andalas University; (b) allow students to improve their understanding of issues and global perspectives related to the field of knowledge they are engaged in; and (c) gaining knowledge to become excellent graduates, respected and relevant to the country and the global community.

Students have also been given the opportunity to present in a hybrid seminar session regarding their respective fields of study.

It is hoped that this programme will have an impact on bilateral cooperation between UPM and Andalas University. In addition, it will improve the educational experience of IKP students inside and outside the campus environment.

QUALITY & MANAGEMENT

MEGA RAYA AIDILFITRI 2023 PROGRAMME

10th May - UPM had successfully organized the Mega Raya Aidilfitri 2023 programme which were celebrated in the whole campus. The programme was attended by all centres of responsibility (PTJ), which were divided into 13 clusters. IKP participated in the event under cluster G, which took place at the Banquet Hall, UPM. During the event, IKP set up a booth named Warung IKP, which catered char kuey tiaw and ubi rebus for visitors. More interestingly, the Vice Chancellor of UPM, Dato' Prof. Dr. Mohd Roslan Sulaiman, also visited the booth and spent some time with IKP staff and visitors.

BIOAGROTECH AND BIOPHARMACEUTICAL EMPLOYABILITY AND ENTREPRENEURSHIP SPECIAL TRAINING (BEST 2.0)

29th March - NQC Technology Sdn. Bhd., in collaboration with IKP, organised the Bioagrotech and Biopharmaceutical Employability and Entrepreneurship Special Training (Best 2.0) programme on 27–29 March 2023, at IKP and the Faculty of Agriculture. This programme was sponsored by the Malaysian Bioeconomy Corporation. The aim of the programme was to support and develop young and talented graduates specifically in biotechnology, agrotechnology, and biopharmaceutical fields who are enthusiastic and keen to develop their passion for becoming young bio-agropreneurs.

This apprenticeship programme provides tailored theoretical knowledge combined with industrial work experience at executive level with essential skills and knowledge for positions within biotechnology, bio-based, biopharmaceutical, agriculture, or agrifood companies.

There were six participants from different agricultural companies enrolled in this program. This programme offered three modules, including i) the basics of plant tissue culture and breeding; ii) precision and smart farming through wireless sensor network systems with IoT; and iii) post-harvest technology and produce preservation. The content of each module was delivered by an experienced UPM lecturer in that particular field. This programme served as a platform for IKP to engage with the industry and community that are related to the plantation sector.

VISITATION FROM BRIN

7th - 8th February – IKP received a visit from the Director, Research Center for Applied Microbiology, Badan Riset dan Inovasi Nasional (BRIN), Indonesia, Dr. Ahmad Fathoni. The visit was also attended by Dr. Nur Laili and Dr. Fina Amreta Laksmi.

TECHNICAL VISIT TO AAR

18th May – The top management members of IKP paid a technical visit to Applied Agricultural Resources Sdn. Bhd. (AAR) in Subang Jaya, Selangor. The delegation was well received by the director of research at AAR, Mr. Tey Seng Heng, together with research staff. This visit was one of the IKP roadshow programmes to promote IKP and build collaboration with relevant private companies and key players in the plantation industry. During the visit, Prof. Dr. Wong shared the mission and vision of the institute and highlighted the niche research areas and expertise in IKP. The IKP delegate was also briefed about the research project in AAR. From this visit, several collaboration research projects between IKP and AAR were identified and set to commence soon.

VISITATION FROM CHINA

6th June – Universiti Putra Malaysia received a visit from representatives of Liaoning Agricultural Vocational and Technical College, China, and MyEdu Group Sdn. Bhd.

RESEARCH OFFICER FROM IKP RECEIVED SEARCA SPONSORSHIP FOR PRESENTING RESEARCH PAPER IN CHIANG MAI

18th May – Maejo University (MJU) successfully hosted the 8th UC Graduate Forum at the Furama Hotel in Chiang Mai, Thailand. The Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) served as the secretariat while the Southeast Asian University Consortium for Graduate Education in Agriculture and Natural Resources (UC) organized the forum jointly. The theme for the forum was "Future of Agriculture Sustainability: Organic Intelligent Agriculture." A total of 54 research papers were presented during the plenary and parallel sessions on four subthemes.

One of the research officers from the Institute of Plantation Studies (IKP), Mrs. Siti Nooradzah Adam, was sponsored by SEARCA to attend the forum and present her research entitled "Development of an Early Detection Method of Bacterial Heart Rot Disease in Pineapple using Spectroscopic Technology" in the Digital Agro-Economy: BCG Model, Digital Economics, and Farm Management parallel session.

Having convened at least 70 researchers, experts, practitioners, policymakers, and students from Indonesia, Japan, Malaysia, the Philippines, Thailand, and Taiwan, the graduate forum successfully facilitated the exchange of ideas, cutting-edge advancement discussions, and strategies to overcome the challenges facing food and agriculture systems.

INDUSTRIAL AND COMMUNITY ENGAGEMENT

RESEARCH VISIT TO COCOA RESEARCH AND DEVELOPMENT CENTRE (JENGKA), MALAYSIAN COCOA BOARD, JENGKA, PAHANG

12th January – A group of researchers from PSTM, IKP, had visited Cocoa Research and Development Centre (Jengka), Malaysian Cocoa Board Jengka, Pahang. This visit was led by the head of laboratory, Assoc. Prof. Dr. Nazmi Mat Nawi, and joined by two research officers, Mr. Ahmad Faiz Mokhtar and Mrs. Siti Nooradzah Adam. The visit was also joined by Dr. Soyoyye Babatunde Oluwamayokum (a post-doctoral researcher at IKP) and four post-graduate students. The delegate was welcomed by Mrs. Nurfadzilah Madian, research officer of Malaysian Cocoa Board, Jengka, Pahang.

The main objective of the visit was to establish a research collaboration between IKP and LKM to study the potential application of spectroscopic technology for the detection of cocoa pod maturity levels in a field. In this study, a total of 100 fresh cocoa pods from the PBC 140 clone were freshly harvested from LKM cocoa farm. The fresh cocoa pods that have been sampled were taken directly to the LKM laboratory for the measurement of spectral data, colour, weight, and size. While the measurements of moisture content, skin firmness, and sucrose content for each sample were carried out in the Laboratory of Post-Harvest, Faculty of Agriculture, UPM.

IKP RESEARCH SEMINAR SERIES 1/2023

26th January- This seminar highlighted the design and fabrication of a single-row motor-assisted maize planter to be used by farmers in Nigeria to increase their maize production. The electrically powered maize planter can detect a free-falling object with an equivalent or greater than 0.7 mm distance in the planter delivery tube and has the ability to monitor a seed drop on the planter accurately. Dr. Soyoye emphasized that this seed planting machine could help in sowing seed in a desired position, thereby assisting the farmers in saving time and manpower. More than 45 participants from UPM and other agencies benefited from this seminar.

IKP RESEARCH SEMINAR SERIES 2/2023

30th March - In this seminar, Dr. Yasmeen highlighted the impact of BSR in the oil palm industry and summarized the current management practices to manage the disease. She emphasized that inability to control this devastating disease is due to a lack of fundamental understanding of how the pathogen establishes itself on the host and what role it plays in wood component degradation. From her research work, she concluded that phenolic acids could be used as one of the potential strategies to control BSR disease by inhibiting the stages and events of oil palm wood biodegradation due to G.boninense establishment.

The degradation of infected palm logs can be treated with formulated white rot fungus (WRF), which may reduce the G.boninense infection rate. This technique could be used by oil palm plantations for the management of waste and the reduction of Ganoderma pressure. More than 85 participants from UPM, UPMKB, and other agencies, including the Malaysian Palm Oil Board (MPOB), Sime Darby, and Sarawak Tropical Peat Research Institute, successfully attended and benefited from this seminar.

IKP RESEARCH SEMINAR SERIES 3/2023

LIST OF PUBLICATIONS FROM IKP IN CIJ FOR JANUARY - JUNE 2023

No	Publication
1.	**Okoli J., Nahazanan H., Nahas F., Kalantar B., Shafri H.Z.M., Khuzaimah Z**. High-Resolution Lidar-Derived DEM for Landslide Susceptibility Assessment Using AHP and Fuzzy Logic in Serdang, Malaysia. Geosciences. 2023; 13(2):34. doi:10.3390/geosciences13020034
2.	**Anggraini E., Vadamalai G., Kong L.L., Mat M., Lau W.H.** Complete Genome Sequences of *Oryctes rhinoceros nudivirus* Strains Detected in Haplotype-G Oryctes rhinoceros from Johor, Malaysia. Microbiol Resour Announc. 2023;12(3): e0001923. doi:10.1128/mra.00019-23
3.	**Yousefi K., Abdullah S.N.A., Hatta M.A.M., Ling K.L**. Genomics and Transcriptomics Reveal Genetic Contribution to Population Diversity and Specific Traits in Coconut. Plants (Basel).;12(9):1913. 2023. doi:10.3390/plants12091913
4.	**Hafid, H.S., Omar, F.N., Bahrin, E.K.** Extraction and surface modification of cellulose fibers and its reinforcement in starch-based film for packaging composites. Bioresour. Bioprocess. 10 (7), 2023. doi:10.1186/s40643-023-00631-w
5.	**Jiangyu Z., Xiaomiao T., Halimatun S. H., Minato W.** A novel strategy to promote microalgal growth and lipid productivity by supplementation of lignin related phenolic elicitors, Fuel, V.334 (2), 2023, 126775, ISSN 0016-2361. doi:10.1016/j.fuel.2022.126775
6.	**Chu, C. J., Hafid, H. S., Omar, F. N., Hairuddin, A. A., Mokhtar, M. N., Samsu Baharuddin, A., and Wakisaka, M**. Improvement of residual oil recovery from oil palm biomass using high pressure water steam system for biodiesel production. BioResources 18(1), 1664-1683 , 2023.
7.	**Sani I, Jamian S, Saad N**. Inoculation and colonization of the entomopathogenic fungi, *Isaria javanica* and *Purpureocillium lilacinum*, in tomato plants, and their effect on seedling growth, mortality and adult emergence of *Bemisia tabaci* (Gennadius). PLoS One. 2023;18(5):e0285666. doi:10.1371/journal.pone.0285666
8.	**Sani, I., Jamian, S., Saad, N**. Identification and virulence of entomopathogenic fungi, *Isaria javanica* and *Purpureocillium lilacinum* isolated from the whitefly, *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae) in Malaysia. Egypt J Biol Pest Control 33 (14), 2023. doi:10.1186/s41938-023-00657-4
9.	**Ibrahim S., Syari J., Siti I. I., Norsazilawati S., Sumaiyah A., Erneeza M. H. and Johari J.** Effect of temperature on germination, radial growth, and sporulation of the new isolates of *Metarhizium anisopliae* and their virulence to Whitefly, *Bemisia tabaci* (Hemiptera: Aleyrodidae), 2023. Penerbit Universiti Kebangsaan Malaysia.
10.	**Ali, A., Mansol, A. S., Khan, A. A., Muthoosamy, K., & Siddiqui, Y**. Electronic nose as a tool for early detection of diseases and quality monitoring in fresh postharvest produce: A comprehensive review. Comprehensive Reviews in Food Science and Food Safety, 22(3), 2408-2432, 2023. doi:10.1111/1541-4337.13151
11.	N**aidu, Y., Siddiqui, Y., Sundram, S.** Profiling of oxidative enzymes and structural characterization of biologically pretreated oil palm wood chips. Eur. J. Wood Prod. 81, 1277–1289, 2023. doi:10.1007/s00107-023-01936-5
12.	**Lim, F. H., Rasid, O. A., Idris, A. S., As'wad, A. W. M., Vadamalai, G., Parveez, G. K. A., and Wong, M. Y.** Induced expression of *Ganoderma boninense* Lanosterol 14α-Demethylase (ERG11) during interaction with oil palm. Molecular biology reports, 50(3), 2367–2379 2023. doi:10.1007/s11033-022-08131-4
13.	**Go WZ, Chin KL, H'ng PS, Wong MY, Lee CL, Khoo PS.** Exploring the Biocontrol Efficacy of *Trichoderma* spp. against *Rigidoporus microporus*, the Causal Agent of White Root Rot Disease in Rubber Trees (*Hevea brasiliensis*). Plants. 2023; 12(5):1066. doi:10.3390/plants12051066
14.	**Neda S., Chai-Ling Ho, Nur Ain Izzati M. Z., Mohd As'wad A. W. and Wong M. Y.** Plant defense inducers and antioxidant metabolites produced during oil palm-*Ganoderma boninense* interaction in vitro. Chemistry Africa, 2023 6: 499-511
15.	**Ganesan V., Neda Naderali, T.M.N.D. Tennakoon, N. N.** Chapter 9 - Diversity, distribution, and status of phytoplasma diseases in Malaysia, Editor(s): A.K. Tiwari, Kadriye Caglayan, Abdullah M Al-Sadi, Mehdi Azadvar, Saman Abeysinghe, In Phytoplasma Diseases in Asian Countries, Diversity, Distribution, and Current Status, Academic Press, Volume 1, 2023, Pages 191-209,ISBN 9780323918961, doi:10.1016/B978-0-323-91896-1.00013-1.
16.	**Mohd Rafein Z., Mohammad Abdillah A. F., Yoshito A., Irmawati R., Mohd Ali H.** Production of biochar and activated carbon from oil palm biomass: Current status, prospects, and challenges, Industrial Crops and Products, Volume 199, 2023, 116767, ISSN 0926-6690, doi:/10.1016/j.indcrop.2023.116767.
17.	**Ibrahim M.F., Khairunniza-Bejo S., Hanafi M., Jahari M., Ahmad Saad F.S., Mhd Bookeri M.A.** Deep CNN-Based Planthopper Classification Using a High-Density Image Dataset. Agriculture. 2023; 13(6):1155. doi:10.3390/agriculture13061155

18.	**Hashim, I.C., Shariff, A.R.M., Bejo, S.K., Muharam, F.M., Ahmad, K**. Basal Stem Rot Disease Classification by Machine Learning Using Thermal Images and an Imbalanced Data Approach. In: Ahamed, T. (eds) IoT and AI in Agriculture. Springer, Singapore,2023. doi:10.1007/978-981-19-8113-5_20
19.	**Azmi, A.N.N., Khairunniza-Bejo, S., Jahari, M., Yule, I**. Early Detection of Plant Disease Infection Using Hyperspectral Data and Machine Learning. In: Ahamed, T. (eds) IoT and AI in Agriculture. Springer, Singapore, 2023. doi:10.1007/978-981-19-8113-5_21
20.	**Johari S.N.A.M., Khairunniza-Bejo S., Shariff A.R.M., Husin N.A., Masri M.M.M., Kamarudin N**. Automatic Classification of Bagworm, Metisa plana (Walker) Instar Stages Using a Transfer Learning-Based Framework. Agriculture. 2023; 13(2):442. doi:10.3390/agriculture13020442
21.	**Lai Z. Y., Khairunniza-Bejo S., Mahirah J., and Farrah M. M**. Automatic detection of an early stage of basal stem rot disease infection using VGG16 and mask R-CNN. IOP Conf. Ser.: Earth Environ. Sci. 2023. doi:10.1088/1755-1315/1133/1/012076
22.	**Yong L.Z., Khairunniza-Bejo S., Jahari M., Muharam F.M**. Automatic Disease Detection of Basal Stem Rot Using Deep Learning and Hyperspectral Imaging. Agriculture. 2023; 13(1):69. doi:10.3390/agriculture13010069
23.	**Asma A., Nur Ain I. M. Z., and Mohd H. I.** Growth and photosynthetic performance of *Fusarium solani* infected *Cucumis sativus* L. treated with *Trichoderma asperellum*, Journal of Taibah University for Science, 17:1, 2023. doi:10.1080/16583655.2022.2161292
24.	**Shashikant, V., Shariff, A.R.M., Wayayok, A., Kamal, M.R., Lee, Y.P., Takeuchi, W**. Strategic Short Note: Comparing Soil Moisture Retrieval from Water Cloud Model and Neural Network Using PALSAR-2 for Oil Palm Estates, In: Ahamed, T. (eds) IoT and AI in Agriculture. Springer, Singapore ISBN 978-981-19-8112-8. doi:10.1007/978-981-19-8113-5_18
25.	**Paramalingam P., Baharum N.A., Abdullah J.O., Hong J.K., Saidi N.B**. Antifungal Potential of Melaleuca alternifolia against Fungal Pathogen *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4. Molecules. 2023; 28(11):4456. doi:10.3390/molecules28114456
26.	**Jamil, F. N., Hashim, A. M., Yusof, M. T., and Saidi, N. B**. Association of soil fungal community composition with incidence of Fusarium wilt of banana in Malaysia. Mycologia, 115(2), 178–186, 2023. doi:10.1080/00275514.2023.2180975
27.	**Nadia Y.O., Muhammad S.H., Siti N.O., Dzarifah M.Z. and Noor B.S**. Biological Control Strategies of Purple Witchweed, *Striga hermonthica*: A Review. Pertanika Journal of Tropical Agricultural Science, Volume 46, Issue 1, February 2023. doi:10.47836/pjtas.46.1.10
28.	**Noor Baity Saidi, Jameel R. Al-Obaidi, Ahmad Faiz bin Che Fisol**. *Rigidoporus microporus* and the white root rot disease of rubber. Forest Pathology. Volume53, Issue1, February 2023. doi:10.1111/efp.12794
29.	**Ng L.C., Mohd N.M., Azhari S.B., Mohd Afandi P. M, and Minato W.** Progress on Lipase Immobilization Technology in Edible Oil and Fat Modifications, Food Reviews International, 2023. doi:10.1080/87559129.2023.2172427
30.	**Piji Mohd A.A.F., Mat Yunus A. M., Noor Azmi S., Chai-Ling H., Abd Manaf M.A., Ghulam K.A.P.** Efficient PEG-mediated transformation of oil palm mesophyll protoplasts and its application in functional analysis of oil palm promoters, South African Journal of Botany, Volume 155, 2023, Pages 187-195, ISSN 0254-6299, doi:10.1016/j.sajb.2023.02.025.
31.	**Khalid F.E., Zakaria N.N., Azmi A.A., Shaharuddin N.A., Sabri S., Khalil K.A., Gomez-Fuentes C., Zulkharnain A., Lim S., Ahmad S.A**. Guinea Grass *(Megathyrsus maximus)* Fibres as Sorbent in Diesel Bioremediation. Sustainability. 2023; 15(5):3904. doi:10.3390/su15053904
32.	**Abubakar A.I., Khairulmazmi A., Yasmeen S., Muhammad A.A.W., Abdulaziz B.K., Adamu A., Syazwan A.M.Z., Arifin A., Siti N.A.A.**. Fusarium wilt of banana: Current update and sustainable disease control using classical and essential oils approaches, Horticultural Plant Journal, Volume 9, Issue 1, 2023, Pages 1-28, ISSN 2468-0141, doi:10.1016/j.hpj.2022.02.004.
33.	**Murnita M.M.,, Aizat S.N.,, M. Zamir H.I.,, Khairulmazmi A.** Chapter 18 - Diseases of rubber trees: Malaysia as a case study, Editor(s): Fred O. Asiegbu, Andriy Kovalchuk, In Forest Microbiology, Forest Microbiology, Academic Press, Volume 3, 2023, Pages 401-414, ISBN 9780443186943, doi:10.1016/B978-0-443-18694-3.00017-1.

REAPPOINTMENT, STAFF DEPARTURE AND NEW MEMBER OF IKP

YBhg. Prof. Dr. Shaufique Fahmi Ahmad Sidique has been reappointed as Director, Institute of Plantation Studies (IKP), effective from January 3, 2023, until January 2, 2026.

In early 2023, two staff members of IKP, namely Mr. Wan Mohd Radzi Wan Ismail (Senior Assistant Registrar) and Mr. Izamri Md. Nor (Administrative Assistant-Clerical/ Operation), were transferred to the Centre for Management of Waqf, Zakat, and Endowment (WAZAN) and the Sultan Abdul Samad Library, respectively. All IKP satff would like to express their gratitude to them and appreciate their excellent services and contributions to IKP.

As a replacement, IKP welcomed two new staff members: Mrs. Haliena Azhar (Senior Assistant Registrar) and Mr. Hanafiah Ismail (Administrative Assistant-Clerical/Operation). Mrs. Haliena started her service on 16th January 2023, and Mr. Hanafiah on 20th March 2023. IKP also received a new Assistant Science Officer, Mr. Hishamuddin Hashim, who started his service on 3rd April 2023. All IKP staff would like to extend a very warm welcome to them. Hopefully, by having new staff members, IKP will continue to strive for excellence in services.

MAIN EVENTS