NECMETTIN ERBAKAN UNIVERSITY

ICMADS

International Conference on Mathematics and Applied Data Science

ABSTRACTS BOOK

29-31 August 2025

Necmettin Erbakan University,
Ahmet Keleşoğlu Campus
Konya, Türkiye

SCAN ME!
icmads.org



KONYA METROPOLITAN MUNICIPALITY
sosyal inovasyon ajansı
KAPSUL
NEU PRESS
BULLETIN OF BIOMATHEMATICS

Yayınevi: NECMETTİN ERBAKAN ÜNİVERSİTESİ YAYINLARI
Publisher: NECMETTIN ERBAKAN UNIVERSITY PRESS (NEU PRESS)
Yaka Mah. Yeni Meram Cad. Kasım Halife Sok. B Blok No: 11 Meram / KONYA / TÜRKİYE
+90 332 221 0 575 www.neupress.org info@neupress.org
Sertifika No / Certificate Number: 49846
ROR ID: https://ror.org/013s3zh21
Crassref Funder ID: 501100016981
Genel Yayın Yönetmeni / Executive Editor:
Dr. Öğr. Üyesi/Asst. Prof. Dr. Fatih KALECİ, fkaleci@neupress.org
Telif ve Lisanslama Müdürü / Rights and Permission Manager:
Muammer KÖROĞLU, mkoroglu@neupress.org

Yayın No. / Publication Number: 440

Kitap Adı / Book Title: ICMADS'25 Abstracts Book
E-ISBN: 978-625-5777-32-4
Editörler/Editors
Prof. Dr. Mehmet YAVUZ
Prof. Dr. Stuart TOWNLEY
Tasarım/Design
Enes Malik YALÇIN, enesyalcin@neupress.org
Baskı Sorumluları / Printing Officers
Muhammed Sami TEKİN, muhammedsami@neupress.org
Nurullah DEMİR, nurullah@neupress.org
Baskı/Printing
Necmettin Erbakan University Press (NEU PRESS)
Yaka Mah. Yeni Meram Cad. Kasım Halife Sok. B Blok No: 11 Meram / KONYA / TÜRKİYE
0332 221 0 575 - www.neupress.org
Sertifika No / Certificate No: 48888
Yayın Türü / Publication Type: Kitap-Akademik Yayımlar / Book-Academic Publications
Yayım Tarihi / Publication Date: Ekim 2025/October 2025
Yayım Yeri / Place of Publication: Konya, Türkiye
Yayın Dili / Language: İngilizce/English
Ebat / Dimensions: 21x29.7 cm
Baskı Sayısı / Edition: 1
Sayfa Sayısı / Page Count: II+ 272
Kategori/Category: Fen Bilimleri/Science
Anahtar Kelimeler: Matematik, Veri bilimi, Yapay zeka, Makine öğrenimi, Uygulamalı matematik
Keywords: Mathematics, Data Science, Artificial Intelligence, Machine Learning, Applied Mathematics

Lisans Türü | OA License: CC BY 4.0
Erişim | Access: neupress.org
Copyright 2025

**This book is published under CC BY license, which means that you can copy, redistribute, remix, transform, and build upon the content for any purpose,* even commercially, as long as you give appropriate credit, provide link to the license, indicate if changes were made, and do not impose additional terms or conditions on others that prohibit them from exercising the rights granted by that license, including any effective technological measures.

PREFACE

We are delighted to express our sincere gratitude to all participants, speakers, and chairs for making The First **International Conference on Mathematics and Applied Data Science (ICMADS'25)** a memorable and successful event. The conference was held between 29–31 August 2025 at Necmettin Erbakan University, Ahmet Keleşoğlu Campus Congress Centre (Konya, Türkiye), and featured both onsite and online participation. ICMADS'25 brings together leading researchers, leading experts and academics in the field of Mathematics and Data Science in order to explore and exchange ideas at the intersection of mathematics and data science, fostering innovation and collaboration.

During the conference, 12 special sessions and 244 presentations (excluding invited/plenary talks) from 22 countries were delivered, creating a rich platform for sharing knowledge, fostering collaborations, and exploring the future of mathematics and applied data science. Also,

- 6 Plenary lectures by distinguished scholars,
- 8 Invited talks from leading researchers, and
- 7 parallel sessions (a total of 63 sessions) covering mathematics, artificial intelligence, machine learning, optimization, cryptography, fractional calculus, and many other topics were successfully presented.

ICMADS'25 represents a significant milestone in our ongoing efforts to foster and advance international cooperation. In this scope, on behalf of the organising committee of the conference, we extend our sincere appreciation to Plenary Speakers: Stuart Townley (University of Exeter, United Kingdom), Sihem Mesnager (The University of Paris VIII, France), Şeref Sağıroğlu (Gazi University, Türkiye), Hüseyin Merdan, (TOBB Economy and Technology University, Türkiye), Murat Sarı (Istanbul Technical University, Türkiye), Dumitru Baleanu (Lebanese American University, Beirut, Lebanon) and Invited Speakers: Yeliz Karaca (University of Massachusetts, USA), Jordan Hristov (University of Chemical Technology and Metallurgy, Bulgaria), Amin Jajarmi (University of Bojnord, Iran), Eray Cakici (Applied Materials, Frankfurt, Germany), Hossein Jafari (University of South Africa, South Africa), Jorge Eduardo Macias-Diaz (Autonomous University of Aguascalientes, Mexico), Carla M. A. Pinto (ISEP & CIDMA Polytechnic of Porto, Portugal) and Praveen Agarwal (Anand International College of Engineering, India). Also, we extend our gratitude to all authors for their valuable contributions and to the reviewers for their careful evaluations and constructive feedback. Our gratitude also goes to the members of the organizing and scientific committees for their commitment and tireless efforts in ensuring the success of this conference. We are equally thankful to the organisers of special sessions as well as our institutional partners, sponsors, and supporters for their continued encouragement and collaboration.

We extend our sincere best wishes to all participants, trusting that they departed with valuable insights, enriched ideas, and newly established or strengthened scientific collaborations. We hope the ICMADS'25 conference proved to be both enjoyable and memorable for everyone.

On behalf of the organisation committee,

Chair
Mehmet Yavuz
Necmettin Erbakan University, Türkiye;
Kyrgyz-Turkish Manas University
Kyrgyzstan

Co-chair
Stuart Townley
University of Exeter,
United Kingdom

Co-chair
Parvaiz Ahmad Naik
Youjiang Medical University
for Nationalities, China

CONFERENCE COMMITTEES

Honorary Chairs
Cem Zorlu - Rector of Necmettin Erbakan University, Türkiye
Alpaslan Ceylan - Rector of Kyrgyz-Turkish Manas University, Kyrgyzstan

Chair
Mehmet Yavuz
Necmettin Erbakan University, Türkiye; Kyrgyz-Turkish Manas University, Kyrgyzstan

Co-Chairs
Stuart Townley - University of Exeter, United Kingdom
Parvaiz Ahmad Naik - Youjiang Medical University for Nationalities, China

Organizing Committee
Mehmet Yavuz, Necmettin Erbakan University, Türkiye
Stuart Townley, University of Exeter, United Kingdom
Parvaiz Ahmad Naik, Youjiang Medical University for Nationalities, China
Necati Özdemir, Balıkesir University, Türkiye
Hardik Joshi, LJ University, India
Fatih Kaleci, Necmettin Erbakan University, Türkiye
Ercan Çelik, Kyrgyz-Turkish Manas University, Kyrgyzstan
Fuat Usta, Düzce University, Türkiye
Zakia Hammouch, Université Privée de Fez Morocco, Morocco
Fırat Evirgen, Balıkesir University, Türkiye
Amin Jajarmi, University of Bojnord, Iran
Yeliz Karaca, University of Massachusetts, USA
Ahmet Sınak, Akdeniz University, Türkiye
Samad Noeiaghdam, Henan Academy of Sciences, China
Serkan Aracı, Hasan Kalyoncu University, Türkiye

International Scientific Committee
Abdeljawad, Thabet, Prince Sultan University, Saudi Arabia
Agarwal, Praveen, Anand International College of Engineering, India
Aguilar, J. F. Gomez, Universidad Autónoma del Estado de Morelos, Mexico
Ahmad, Hijaz, Near East University, Türkiye
Akbıyık, Mücahit, İstanbul Beykent University, Türkiye
Akgül, Akif, Hitit University, Türkiye
Ak Gümüş, Özlem, Adıyaman University, Türkiye
Akgüneş, Nihat, Necmettin Erbakan University, Türkiye
Akleylek, Sedat, University of Tartu, Estonia
Araci, Serkan, Hasan Kalyoncu University, Türkiye
Atangana, Abdon, University of the Free State, South Africa
Avcı, Derya, Balıkesir University, Türkiye
Aydın, Bünyamin, Necmettin Erbakan University, Türkiye
Baleanu, Dumitru, Lebanese American University, Lebanon

Başkonuş, Hacı Mehmet, Harran University, Türkiye
Biswas, Md. Haider Ali, Khulna University, Bangladesh
Bulai, Iulia Martina, University of Sassari, Italy
Bulut, Hasan, Fırat University, Türkiye
Çelik, Ercan, Kyrgyz-Türkiye Manas University, Kyrgyzstan
Dassios, Ioannis, University College Dublin, Ireland
Desmettre, Sascha, Johannes Kepler University Linz, Austria
Durduran, S. Savaş, Necmettin Erbakan University, Türkiye
Erci, Fatih, Necmettin Erbakan University, Türkiye
Evkaya, Ozan, University of Edinburgh, Scotland, United Kingdom
Flaut, Cristina, Ovidius University, Romania
Genç, Aşır, Necmettin Erbakan University, Türkiye
Guran, Liliana, Babeș-Bolyai University, Romania
Gümüş, Mehmet, Zonguldak Bülent Ecevit University, Türkiye
Heydari, Aghileh, Amirkabir University of Technology, Iran
Hristov, Jordan, University of Chemical Technology and Metallurgy, Bulgaria
Imashkyzy, Meerim, Kyrgyz-Türkiye Manas University, Kyrgyzstan
Iskender Eroglu, B. Billur, Balıkesir University, Türkiye
Iyit, Neslihan, Selçuk University, Türkiye
Jafari, Husain, University of South Africa, South Africa
Jneid, Maher, Beirut Arab University, Lebanon
Kalidass, Mathiyalagan, Bharathiar University, India
Karabıyık, Ümit, Necmettin Erbakan University, Türkiye
Karateke, Seda, Atlas University, Türkiye
Konuralp, Ali, Manisa Celal Bayar University, Türkiye
Korn, Ralf, University of Kaiserslautern-Landau, Germany
Kumcu, Ş. Yurdagül, Necmettin Erbakan University, Türkiye
Laudagé, Christian, University of Kaiserslautern-Landau, Germany
Ramadani, Laurena, University of Kaiserslautern-Landau, Germany
Merdan, Hüseyin, TOBB Economy and Technology University, Türkiye
Mesnager, Sihem, University of Paris VIII, France
Mishra, Deeksha, Meta Inc., USA
Munoz-Pacheco, Jesus, Benemérita Universidad Autónoma de Puebla, Mexico
Noeiaghdam, Samad, Henan Academy of Sciences, China
Oturanç, Galip, Karamanoğlu Mehmetbey University, Türkiye
Özkan, Ozan, Selçuk University, Türkiye
Pak, Sedat, Karamanoğlu Mehmetbey University, Türkiye
Panigoro, Hasan, State University of Gorontalo, Indonesia
Peker, Haldun Alpaslan, Selçuk University, Türkiye
Pekgör, Ahmet, Necmettin Erbakan University, Türkiye
Pinto, Carla, M.A., ISEP-Polytechnic of Porto, Portugal
Pişkin, Erhan, Dicle University, Türkiye
Qureshi, Sania, Mehran University of Engineering and Technology, Pakistan
Sarı, Murat, Istanbul Technical University, Türkiye
Sarris, Ioannis, University of West Attica, Greece
Sene, Ndolane, Université Cheikh Anta Diop de Dakar, Senegal
Sınak, Ahmet, Akdeniz University, Türkiye

Stamova, Ivanka, University of Texas at San Antonio, USA
Valdés, Juan E. Nápoles, Universidad Nacional del Nordeste, Argentina
Weber, Gerhard Wilhelm, Poznan University of Technology, Poland
Yıldız, Mustafa, Bartın University, Türkiye
Yokuş, Asıf, Fırat University, Türkiye
Yumak, Yunus, Selçuk University, Türkiye
Zhang, Yudong, University of Leicester, United Kingdom

Local Organizing Committee

Akman, M., Türkiye
Coşar, F.Ö., Türkiye
Emanet, T., Türkiye
Karabıyık, Ü., Türkiye
Karaboğa, E.N.C., Türkiye
Karaboğa, K., Türkiye
Karakoyun, M., Türkiye
Özkaya, M., Türkiye
Öztürk, M., Türkiye
Varlı, M., Türkiye
Yaman, A.N., Türkiye
Yaşkıran, B., Türkiye

Comparative Analysis of Morphological and Reproductive Traits in Queens of Different Genotypes Reared in a Temperate Climate

Mahir Murat Cengiz1✉, Fatih Yıldırım[2]

[1] *Atatürk University, Vocational School of Technical Science, Department of Plant and Animal Production, Erzurum, Türkiye*

[2] *Atatürk University, Faculty of Veterinary Medicine, Department of Animal Science, Erzurum, Türkiye*

Abstract

The study conducted at the Atatürk University Food and Livestock Research and Application Center delved into the intricacies of queen bee quality assessment, focusing on both morphological and reproductive traits. Analysis of reproductive characteristics revealed significant differences among queen genotypes, particularly in pre-oviposition periods, emergence weight, spermatheca diameter, and spermatozoa count. Cold-climate queens, such as the Caucasian, Carniolan, and Carpathian genotypes, exhibited delayed egg-laying compared to other genotypes. Queens reared from 1-day-old larvae exhibited an average pre-oviposition period of 13.29±0.21days. Significant differences ($P<0.05$) were observed among genotypes regarding the pre-oviposition period. Emergence weight, a key indicator of queen quality, varied across genotypes. There was no difference between genotypes in terms of emergence weight, but larval age affected emergence weight. While the highest diameter of spermathecae value was obtained from the Italian genotype, the difference between the genotypes was found to be insignificant. The genotypes were divided into two groups in terms of spermatozoa number, and it was observed that the carpatian and carniolan genotypes were in the first place. The difference between genotypes was found to be significant ($P<0.05$). It was determined that the Caucasian genotype stood out in terms of head length, while the Carpatian genotype had the highest values in terms of head width. In this study, a significant amount of data was gathered by analyzing multiple parameters. To facilitate a clearer understanding of both the associations among the data and their distribution across analyzed parameters, principal component analysis (PCA) was applied. PCA has been highlighted as a valuable method for simplifying complex multivariate datasets by reducing them to a smaller set of principal components.

Keywords: Honeybee, Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (HCA), genotypes, queen reproductive traits, queen morphometry

References

[1] Ozbakir, G. O. (2021). Effects of rearing method on some morphological and reproductive organ characteristics of queen honey bees (Apis mellifera L.).

[2] Aktürk, S., Şekeroğlu, A., Okuyan, S., Akdeniz, G., Arıcı, Y. K., Solmaz, S., ... & Alparslan, S. (2023). The investigation of quality features of Turkish commercial honey bee queens (Apis mellifera L.) in different seasons. *Pakistan Journal of Agricultural Sciences*, *60*(2).

[3] Dias, W. C. S., Teixeira, É. W., & Serrão, J. E. (2024). Regenerative cells in the midgut of the honey bee Apis mellifera (Apidae: Apini) queens with different ages. *Brazilian Archives of Biology and Technology*, *67*, e24230473.

[4] Mochurad, L., Babii, V., Boliubash, Y., & Mochurad, Y. (2025). Improving stroke risk prediction by integrating XGBoost, optimized principal component analysis, and explainable artificial intelligence. *BMC Medical Informatics and Decision Making*, *25*(1), 63.

✉ *Corresponding Author Email: mcengiz@atauni..edu.tr*