

---

## True Bugs (Heteroptera) of the Middle-East

---

Hassan Ghahari •  
Pierre Moulet •  
J. E. McPherson  
Editors

# True Bugs (Heteroptera) of the Middle-East

With 28 Figures and 5 Tables

 Springer

*Editors*

Hassan Ghahari  
Department of Plant Protection  
Islamic Azad University, Yadegar-e-Imam  
Khomeini (RAH) Shahre Rey Branch  
Tehran, Iran

Pierre Moulet  
Museum Requien  
Avignon, France

J. E. McPherson  
Southern Illinois University  
Carbondale, IL, USA

ISBN 978-981-97-1816-0      ISBN 978-981-97-1817-7 (eBook)

<https://doi.org/10.1007/978-981-97-1817-7>

© Springer Nature Singapore Pte Ltd. 2024

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.

The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

If disposing of this product, please recycle the paper.

---

## Dedication

*This book is dedicated to curious individuals and explorers of Entomology who always tirelessly try to provide valuable findings to the science, especially all the people who have had roles in discovering the Heteroptera of the world.*



***Eurydema ornata*** (Linnaeus, 1758) (Pentatomidae) – [Photo courtesy of Torsten van der Heyden]

---

## Preface

The Heteroptera (true bugs) is a highly diverse insect taxon with more than 45,000 described species worldwide. These insects live in virtually all terrestrial and aquatic ecosystems, and their adaptations to do so are unparalleled in the living world. Many species have a serious negative impact on human lives because they are destructive agricultural and forest pests or transmit infectious diseases to plants, livestock, and humans. Many other species are predators that are economically important biological control agents of key agricultural pests. It has been estimated that 65% of all families of Heteroptera are partially or entirely composed of carnivorous species. Additionally, several heteropteran families display trophic omnivory (also called zoophytophagy), allowing them to exploit both plant and prey resources.

This handbook is the first to furnish a comprehensive treatment of the Middle East bugs (Heteroptera) and includes taxonomy, applied aspects, and general biology. It is divided into seven parts (infraorders) to cover the related families (chapters). Apart from providing a taxonomic treatment of all the families known from the Middle East, information is provided on Iranian and general geographic distributions, bionomics, ecology, natural enemies, prey records, and plant associations for the various species. General discussion also is included on morphology, economic importance, family characters of each group, and affinity with related groups.

This handbook includes detailed information on 3079 species and subspecies of Heteroptera from the Middle East in 751 genera and 58 families. An exhaustive bibliography (over 4000) has been provided to facilitate studies of chosen aspects of the various species. Up-to-date information for the various species has been provided as far as possible.

Finally, *True Bugs (Heteroptera) of the Middle East* is the only book that is exclusively on the Heteroptera of the Middle East. It is believed that it will be an indispensable resource for a large section of teachers at universities; agricultural researchers in natural biological control, pest management, and crop management; and students (Agriculture and Zoology in general and Entomology in particular).

Tehran, Iran  
Avignon, France  
Carbondale, USA  
November 2024

Hassan Ghahari  
Pierre Moulet  
J. E. McPherson



***Graphosoma semipunctatum*** (Fabricius, 1775) (Pentatomidae) – [Photo courtesy of Torsten van der Heyden]



***Acanthochila armigera*** (Stål, 1873) (Tingidae) – [Photo courtesy of Cyrille A. D'Haese]

---

## Acknowledgments

The first editor of the book wishes to express his sincere gratitude and appreciation to several heteropterists who kindly identified heteropteran specimens of the Iranian fauna. Some of them have passed away, but I do not forget their invaluable roles on recent progress in documenting the fauna of Iranian Heteroptera: Izyaslav M. Kerzhner (Russia; 1936–2008), Carl W. Schaefer (USA; 1934–2015), Yuri Alexandrovich Popov (Russia; 1936–2016), Pavel Štys (Czech Republic; 1933–2018), Rauno E. Linnavuori (Finland; 1927–2019), Pierre Moulet (France), Jakob Damgaard (Denmark), Paride Dioli (Italy), Petr Kment (Czech Republic), Jerzy A. Lis (Poland), Ernst Heiss (Austria), Pavel V. Putshkov (Ukraine), and Geoffrey G.E. Scudder (Canada). Also thanked for their support are: J. E. McPherson (USA), David A. Rider (USA), Robert W. Sites (USA), Attilio Carapezza (Italy), Frédéric Chérot (Belgium), Bill Dolling (UK), and Harry Brailovsky (Mexico).

The authors also would like to express their sincere thanks to colleagues who edited different chapters or gave us insightful comments, though they are not co-authors of the mentioned chapters: David R. Horton, Tamera Lewis, and Franz Schmolke (Anthocoridae); Kazutaka Yamada (Anthocoridae, Dipsocoridae); Michael D. Schwartz (Introduction); Wan-Zhi Cai (Reduviidae); Diego Leonardo Carpintero and Katrina Menard (Miridae); Paula L. Mitchell (Coreidae); Sara I. Montemayor (Tingidae); Felipe Ferraz Figueiredo Moreira (Veliidae); Ljiljana Protić (Pyrrhocoridae); Geoffrey G.E. Scudder (Berytidae, Gerridae, Tingidae); Stephen W. Chordas (Veliidae, Schizopteridae); and Jakob Damgaard (parts Cimicomorpha and Pentatomomorpha).

This study also benefitted from generous contributions of heteropteran material from several sources, especially the BMNH (Natural History Museum of London, UK); NMPC (National Museum of Prague, Czech Republic); MNHN (Muséum National d'Histoire Naturelle, Paris, France), UMRM (W.R. Enns Entomology Museum, University of Missouri, Columbia, USA); SIZK (Schmalhausen Institute of Zoology, Kiev, Ukraine); RBCM (Royal British Columbia Museum, British Columbia, Canada); NDSU (North Dakota State University, North Dakota, Fargo, USA); NHMW (Naturhistorisches Museum Wien, Austria); ZIN (St. Petersburg Zoological Institute, Russia); SIUC (Southern Illinois University, Research Museum of Zoology, Illinois, USA); NHMD (Natural History Museum of Denmark, University of Copenhagen, Denmark (former ZMUC)); ZMUT (Zoological Museum,

University of Turku, Finland); and several private collections of heteropterist colleagues.

We would like to extend our sincerest thanks to Vladyslav Mirutenko (Uzhgorod National University, Ukraine), Jian Huang (Fujian Agriculture and Forestry University, China), and Shaaban Abd-Rabou (Ministry of Agriculture, Dokki-Giza, Egypt) for the translation of Russian, Chinese, and Arabic data, respectively.

Many thanks are due also to Petr Kment (Czech Republic), Dmitry A. Gapon (Russia), Herbert Zettel (Austria), Hadi Ostovan (Shiraz Islamic Azad University, Iran), Fedor V. Konstantinov (Russia), and Mahdi Modarres Awal (Ferdowsi University of Mashhad, Iran) for providing necessary papers.

We also are grateful to Robert W. Sites (University of Missouri, USA), Torsten van der Heyden (Hamburg, Germany), and Cyrille A. D'Haese (Muséum national d'Histoire naturelle, France) for providing the images used in different parts of the book.

This work was supported by Islamic Azad University, Yadegar-e-Imam Khomeini (RAH) Shahre Rey Branch (Iran), and Museum Requien (France).

Finally, we would like to thank everyone else who provided us with advice, support, and assistance throughout our study, and the staff at Springer Publishing.



---

# Contents

## Volume 1

<b>1</b>	<b>Introduction to Heteroptera</b> .....	<b>2</b>
	Hassan Ghahari, J. E. McPherson, Jakob Damgaard, and Pierre Moulet	
<b>Part I</b>	<b>Infraorder Enicocephalomorpha Stichel, 1955</b> .....	<b>45</b>
<b>2</b>	<b>Family Enicocephalidae Stål, 1860</b> .....	<b>53</b>
	Hassan Ghahari, Jakob Damgaard, Pierre Moulet, and J. E. McPherson	
<b>Part II</b>	<b>Infraorder Dipsocoromorpha Miyamoto, 1961</b> .....	<b>59</b>
<b>3</b>	<b>Family Ceratocombidae Fieber, 1860</b> .....	<b>65</b>
	Jakob Damgaard, Pierre Moulet, Hassan Ghahari, and J. E. McPherson	
<b>4</b>	<b>Family Dipsocoridae Dohrn, 1859</b> .....	<b>69</b>
	Hassan Ghahari, Jakob Damgaard, and Pierre Moulet	
<b>5</b>	<b>Family Schizopteridae Dohrn, 1859</b> .....	<b>75</b>
	Jakob Damgaard, Hassan Ghahari, and Pierre Moulet	
<b>Part III</b>	<b>Infraorder Gerromorpha Popov, 1971</b> .....	<b>79</b>
<b>6</b>	<b>Family Mesoveliidae Douglas and Scott, 1867</b> .....	<b>89</b>
	Jakob Damgaard, Hassan Ghahari, Pierre Moulet, J. E. McPherson, and Hamid Sakenin	
<b>7</b>	<b>Family Hebridae Amyot and Serville, 1843</b> .....	<b>99</b>
	Hassan Ghahari, Dan A. Polhemus, Jakob Damgaard, and Pierre Moulet	

<b>8</b>	<b>Family Hydrometridae Billberg, 1820</b> .....	109
	Jakob Damgaard, Hassan Ghahari, Felipe Ferraz Figueiredo Moreira, and Pierre Moulet	
<b>9</b>	<b>Family Veliidae Brullé, 1836</b> .....	117
	Hassan Ghahari, Dan A. Polhemus, Jakob Damgaard, Pierre Moulet, and J. E. McPherson	
<b>10</b>	<b>Family Gerridae Leach, 1815</b> .....	135
	Hassan Ghahari, Dan A. Polhemus, Jakob Damgaard, Pierre Moulet, and Felipe Ferraz Figueiredo Moreira	
<b>Part IV</b>	<b>Infraorder Nepomorpha Popov, 1968</b> .....	<b>163</b>
<b>11</b>	<b>Family Belostomatidae Leach, 1815</b> .....	175
	Hassan Ghahari, Jakob Damgaard, José Ricardo Inacio Ribeiro, and Pierre Moulet	
<b>12</b>	<b>Family Nepidae Latreille, 1802</b> .....	187
	Hassan Ghahari, Jakob Damgaard, Robert W. Sites, Pierre Moulet, and J. E. McPherson	
<b>13</b>	<b>Family Micronectidae Jaczewski, 1924</b> .....	203
	Jakob Damgaard, Hassan Ghahari, Pierre Moulet, and J. E. McPherson	
<b>14</b>	<b>Family Corixidae Leach, 1815</b> .....	215
	Hassan Ghahari, Jakob Damgaard, Pierre Moulet, Stephen W. Chordas, and Hadi Ostovan	
<b>15</b>	<b>Family Ochteridae Kirkaldy, 1906</b> .....	239
	Hassan Ghahari, Dan A. Polhemus, Jakob Damgaard, and Pierre Moulet	
<b>16</b>	<b>Family Naucoridae Leach, 1815</b> .....	245
	Hassan Ghahari, Daniel Reynoso–Velasco, Robert W. Sites, Pierre Moulet, and Jakob Damgaard	
<b>17</b>	<b>Family Aphelocheiridae Fieber, 1851</b> .....	253
	Jakob Damgaard, Hassan Ghahari, Pierre Moulet, and J. E. McPherson	
<b>18</b>	<b>Family Notonectidae Latreille, 1802</b> .....	259
	Hassan Ghahari, Jakob Damgaard, Pierre Moulet, Julianna Freires Barbosa, and Stephen W. Chordas	
<b>19</b>	<b>Family Pleidae Fieber, 1851</b> .....	277
	Pierre Moulet, Hassan Ghahari, Jakob Damgaard, Robert W. Sites, and J. E. McPherson	

<b>20</b>	<b>Family Helotrephidae Esaki and China, 1927</b> .....	<b>283</b>
	Jakob Damgaard, Hassan Ghahari, Pierre Moulet, and Felipe Ferraz Figueiredo Moreira	
<b>Part V Infraorder Leptopodomorpha Popov, 1971</b> .....		<b>293</b>
<b>21</b>	<b>Family Leptopodidae Brullé, 1836</b> .....	<b>297</b>
	Hassan Ghahari, Dan A. Polhemus, Jakob Damgaard, and Pierre Moulet	
<b>22</b>	<b>Family Omaniidae Cobben, 1970</b> .....	<b>307</b>
	Jakob Damgaard, Hassan Ghahari, Pierre Moulet, and J. E. McPherson	
<b>23</b>	<b>Family Saldidae Amyot and Serville, 1843</b> .....	<b>311</b>
	Hassan Ghahari, Nikolay N. Vinokurov, Jakob Damgaard, Pierre Moulet, and Wolfgang H. O. Dorow	
<b>Part VI Infraorder Cimicomorpha Leston, Pendergrast and Southwood, 1955</b> .....		<b>329</b>
<b>24</b>	<b>Family Pachynomidae Stål, 1873</b> .....	<b>335</b>
	Pierre Moulet, Hassan Ghahari, and Hécio R. Gil-Santana	
<b>25</b>	<b>Family Reduviidae Latreille, 1807</b> .....	<b>339</b>
	Hassan Ghahari, Paride Dioli, Pierre Moulet, Pavel V. Putshkov, Hécio R. Gil-Santana, Stephen W. Chordas, and J. E. McPherson	
<b>26</b>	<b>Family Microphysidae Dohrn, 1859</b> .....	<b>421</b>
	Pierre Moulet, Rauno E. Linnavuori, Hassan Ghahari, and Michael D. Schwartz	
<b>27</b>	<b>Family Nabidae A. Costa, 1853</b> .....	<b>427</b>
	Pierre Moulet, Hassan Ghahari, Tania Novoselsky, Stephen W. Chordas, and Hadi Ostovan	
<b>28</b>	<b>Family Cimicidae Latreille, 1802</b> .....	<b>451</b>
	Hassan Ghahari, Pierre Moulet, and Hadi Ostovan	
<b>29</b>	<b>Family Anthocoridae Fieber, 1836</b> .....	<b>457</b>
	Hadi Ostovan, Hassan Ghahari, Pierre Moulet, J. E. McPherson, and Diego Leonardo Carpintero	
<b>30</b>	<b>Family Thaumastocoridae Kirkaldy, 1908</b> .....	<b>505</b>
	Pierre Moulet, Hassan Ghahari, J. E. McPherson, and Harry Brailovsky	

- 31 Family Miridae Hahn, 1833** ..... 509  
Attilio Carapezza, Hassan Ghahari, Pierre Moulet, and  
Michael D. Schwartz
- 32 Family Tingidae Laporte de Castelnau, 1833** ..... 769  
Eric Guilbert, Hassan Ghahari, Barbara Lis, Pierre Moulet, and  
J. E. McPherson

## Volume 2

- Part VII Infraorder Pentatomomorpha Leston, Pendergrast and  
Southwood, 1955** ..... **817**
- 33 Family Aradidae Brullé, 1836** ..... 827  
Ernst Heiss, Hassan Ghahari, Dawid H. Jacobs, Pierre Moulet, and  
Hamid Sakenin
- 34 Family Acanthosomatidae Signoret, 1864** ..... 837  
David A. Rider, Hassan Ghahari, Pierre Moulet, Gimena Dellapé, and  
J. E. McPherson
- 35 Family Cydnidae Billberg, 1820** ..... 847  
Jerzy A. Lis, Hassan Ghahari, and Pierre Moulet
- 36 Family Thaumastellidae Seidenstücker, 1960** ..... 877  
Jerzy A. Lis, Hassan Ghahari, and Pierre Moulet
- 37 Family Thyreocoridae Amyot and Serville, 1843** ..... 881  
Hassan Ghahari, Jerzy A. Lis, Pierre Moulet, and Stephen W. Chordas
- 38 Family Dinidoridae Stål, 1868** ..... 885  
Jerzy A. Lis, Pierre Moulet, and Hassan Ghahari
- 39 Family Pentatomidae Leach, 1815** ..... 889  
David A. Rider, J. E. McPherson, Hassan Ghahari, and Pierre Moulet
- 40 Family Plataspidae Dallas, 1851** ..... 1061  
Jerzy A. Lis, Hassan Ghahari, Pierre Moulet, and Reza Monaem
- 41 Family Scutelleridae Leach, 1815** ..... 1067  
Hassan Ghahari, Attilio Carapezza, Pierre Moulet, and  
J. E. McPherson
- 42 Family Largidae Amyot and Serville, 1843** ..... 1099  
Pierre Moulet, Najmeh Samin, J. E. McPherson, and Hassan Ghahari
- 43 Family Pyrrhocoridae Amyot and Serville, 1843** ..... 1103  
Hassan Ghahari, Pierre Moulet, Reza Monaem, and J. E. McPherson

<b>44</b>	<b>Family Alydidae Amyot and Serville, 1843</b> .....	1113
	Hassan Ghahari, Attilio Carapezza, Pierre Moulet, Diego Leonardo Carpintero, and Hadi Ostovan	
<b>45</b>	<b>Family Coreidae Leach, 1815</b> .....	1131
	Pierre Moulet, Hassan Ghahari, J. E. McPherson, Pavel V. Putshkov, Harry Brailovsky, and Stephen W. Chordas	
<b>46</b>	<b>Family Rhopalidae Amyot and Serville, 1843</b> .....	1163
	Hassan Ghahari, Barbara Lis, Pierre Moulet, and Majid Navaeian	
<b>47</b>	<b>Family Stenocephalidae Dallas, 1852</b> .....	1189
	Hassan Ghahari, Dawid H. Jacobs, Pierre Moulet, and Vahid Zarrinnia	
<b>48</b>	<b>Family Artheneidae Stål, 1872</b> .....	1199
	Pierre Moulet, Geoffrey G. E. Scudder, Harry Brailovsky, and Hassan Ghahari	
<b>49</b>	<b>Family Berytidae Fieber, 1851</b> .....	1207
	Hassan Ghahari, Dawid H. Jacobs, Pierre Moulet, and J. E. McPherson	
<b>50</b>	<b>Family Blissidae Stål, 1862</b> .....	1221
	Pierre Moulet, Hassan Ghahari, Harry Brailovsky, and Geoffrey G. E. Scudder	
<b>51</b>	<b>Family Cymidae Baerensprung, 1860</b> .....	1227
	Pierre Moulet, Harry Brailovsky, Hassan Ghahari, and Geoffrey G. E. Scudder	
<b>52</b>	<b>Family Geocoridae Baerensprung, 1860</b> .....	1233
	Pierre Moulet, Dawid H. Jacobs, Hassan Ghahari, Geoffrey G. E. Scudder, and Harry Brailovsky	
<b>53</b>	<b>Family Heterogastridae Stål, 1872</b> .....	1259
	Pierre Moulet, Geoffrey G. E. Scudder, Harry Brailovsky, and Hassan Ghahari	
<b>54</b>	<b>Family Lygaeidae Schilling, 1829</b> .....	1265
	Hassan Ghahari, Pierre Moulet, Torsten van der Heyden, and Geoffrey G. E. Scudder	
<b>55</b>	<b>Family Malcidae Stål, 1865</b> .....	1299
	J. E. McPherson, Pierre Moulet, and Hassan Ghahari	
<b>56</b>	<b>Family Oxycarenidae Stål, 1862</b> .....	1303
	Hassan Ghahari, Dawid H. Jacobs, Wolfgang H. O. Dorow, Pierre Moulet, and Geoffrey G. E. Scudder	

---

<b>57</b>	<b>Family Pachygronthidae Stål, 1865</b> .....	1319
	Pierre Moulet, Hassan Ghahari, Geoffrey G. E. Scudder, and Harry Brailovsky	
<b>58</b>	<b>Family Piesmatidae Amyot and Serville, 1843</b> .....	1325
	Ernst Heiss, Hassan Ghahari, Pierre Moulet, and Najmeh Samin	
<b>59</b>	<b>Family Rhyparochromidae Amyot and Serville, 1843</b> .....	1333
	Hassan Ghahari, Pierre Moulet, Paride Dioli, Geoffrey G. E. Scudder, Rauno E. Linnavuori, and Stephen W. Chordas	
<b>60</b>	<b>Diversity of Heteroptera of the Middle East with Emphasis on Iran</b> .....	1414
	Hassan Ghahari, Pierre Moulet, J. E. McPherson, and Jakob Damgaard	
<b>Index</b>	.....	1432

---

## About the Editors



**Hassan Ghahari** is currently working as Associate Professor of Entomology at Plant Protection Department, Yadegar-e-Imam Khomeini (RAH) Shahre Rey Branch, Islamic Azad University, Tehran (Iran). He received his B.S. degree in Plant Protection from Urmia University, M.Sc. in Entomology from Isfahan University of Technology, and Ph.D. in Entomology from Tehran Islamic Azad University.

Dr. Ghahari is an accomplished scholar and expert in the field of insect systematics and biological control. He teaches several courses in Entomology and has guided many M.Sc. and Ph.D. students. He has received several research grants from Islamic Azad University as well as many Iranian prestigious awards and coveted honors.

Dr. Ghahari has authored or co-authored more than 200 scientific papers in peer-reviewed international journals together with several authorized entomologists from different countries. He has served as editor for several books and co-authored book chapters for various publishers (e.g., CABI, Elsevier, IAU Press, Magnolia Press, Springer) on various topics related to insect systematics and biological control. He also is a member of the editorial board of many agricultural scientific journals in different countries.

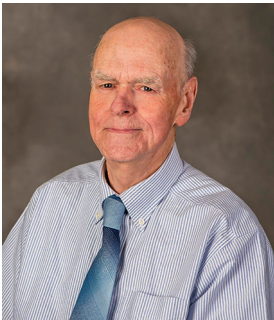


**Pierre Moulet** spent his entire career as the curator of the Museum Requier (Natural History Museum of Avignon). He received an EPHE diploma (Ecole Pratique des Hautes Etudes) on Coreoidea (Heteroptera) from the MNHN (National Museum of Natural History, Paris) and his Ph.D. thesis (on Reduviidae) from the University of Avignon (France). He retired in 2023 but has continued to conduct research.

Dr. Moulet has specialized in the taxonomy and bioecology of the Heteroptera (true bugs). He has authored or co-authored more than 170 taxonomic papers published in peer-reviewed journals as well as books about the Heteroptera (e.g., Coreoidea and Reduviidae in the well-known series “Faune de France”). He has described several new species of Heteroptera, especially in the Anthocoridae and Reduviidae. In addition, he now has expanded his interests to include the aquatic bugs (Nepomorpha and Gerromorpha) from the Palaearctic region.

As curator of the museum, Dr. Moulet guided several students in the fields of conservation of natural heritage and bioecology of the true bugs.

Finally, as a side interest, Dr. Moulet has authored papers on the biographies of E. Requier and J. H. Fabre and works on the history of Avignon.



**J. E. McPherson** is Professor Emeritus of Zoology at Southern Illinois University, Carbondale (SIU). He obtained his Ph.D. in entomology from Michigan State University in 1968 and joined SIU in 1969 as Assistant Professor. He was promoted to Associate Professor in 1974 and to Professor in 1979. He retired in July 2012 but has continued to conduct research, maintaining the same office and laboratory space he had during his employment, and still is managing the entomology collection.

Dr. McPherson has written broadly on the ecology and systematics of the Heteroptera, particularly the Pentatomoidea, Reduvidae, and various aquatic and semiaquatic taxa. He has authored or co-authored 200 refereed journal articles and four books, presented papers at both national and regional meetings, and given invited lectures at various universities. He has received several research grants, primarily from the USDA Forest Service.

Dr. McPherson is a member of the Entomological Society of America (ESA) and has served on numerous ESA national and branch committees. He was the recipient of an ESA National Service Award in 1991 for his work on the Editorial Board of the *American Entomologist*, the society's flagship publication, and served as editor of that publication from 1993 through 2001.



He was the 1993 recipient of the Distinguished Achievement Award in Teaching, the 1997 recipient of the C. V. Riley Achievement Award, and the 2006 Award of Merit, all from the ESA North Central Branch. He also was the 1996 recipient of the Outstanding Teacher in the College of Science, SIU. He served 6 years on the ESA Governing Board, 3 (1994–1996) as Section A (now Systematics, Evolution, and Biodiversity) representative and 3 as an officer (Vice-President, 2001; President, 2002; Past-President, 2003). He was elected an Honorary Member in 2004 and a Fellow in 2007 of the ESA. Recently, he received the 2017 Michigan State University Entomology Distinguished Alumnus Award.

Dr. McPherson has been a member of several additional societies including the Entomological Society of Washington, Florida, Michigan, and New York. A Festschrift issue of the *Great Lakes Entomologist* was dedicated to him in 2012 by the Governing Board of the Michigan Entomological Society and was composed of a series of papers, primarily on the Pentatomidae, contributed by colleagues including some former graduate students.

---

## Contributors

**Julianna Freires Barbosa** Universidade Federal do Rio de Janeiro, Instituto de Biologia, Departamento de Zoologia, Rio de Janeiro, Brazil

**Harry Brailovsky** Department of Zoology, Universidad Nacional Autonoma de Mexico, Mexico City, Mexico

**Attilio Carapezza** University of Palermo, Palermo, Italy

**Diego Leonardo Carpintero** Division of Entomology, Museo de Ciencias Naturales Argentino, Buenos Aires, Argentina

**Stephen W. Chordas** Center for Life Sciences Education, Ohio State University, Columbus, OH, USA

**Jakob Damgaard** Natural History Museum of Denmark, Copenhagen, Denmark

**Gimena Dellapé** División Entomología, Museo de La Plata, Universidad Nacional de La Plata, La Plata, Buenos Aires, Argentina

**Paride Dioli** Museo di Storia Naturale, Milano, Italy

**Wolfgang H. O. Dorow** Senckenberg Forschungsinstitut und Naturmuseum Frankfurt, Frankfurt, Germany

**Hassan Ghahari** Department of Plant Protection, Yadegar-e-Imam Khomeini (RAH) Shahre Rey Branch, Islamic Azad University, Tehran, Iran

**Hélcio R. Gil-Santana** Laboratório de Díptera, Instituto Oswaldo Cruz, Rio de Janeiro, Brazil

**Eric Guilbert** Muséum national d'histoire naturelle, Paris, France

**Ernst Heiss** Tiroler Landesmuseum, Innsbruck, Austria

**Torsten van der Heyden** Immenweide 83, Hamburg, Germany

**Dawid H. Jacobs** Department of Zoology and Entomology, University of Pretoria, Pretoria, South Africa

**Rauno E. Linnavuori** Raisio, Finland

**Barbara Lis** Institute of Biology, University of Opole, Opole, Poland

**Jerzy A. Lis** Institute of Biology, University of Opole, Opole, Poland

**J. E. McPherson** Department of Zoology, Southern Illinois University, Carbondale, IL, USA

**Reza Monaem** Department of Agriculture, Yadegar-e-Imam Khomeini (RAH) Shahre Rey Branch, Islamic Azad University, Tehran, Iran

**Felipe Ferraz Figueiredo Moreira** Laboratório de Biodiversidade Entomológica, Fundação Oswaldo Cruz, Rio de Janeiro, Brazil

**Pierre Moulet** Museum Requien, Avignon, France

**Majid Navaeian** Department of Biology, Yadegar-e-Imam Khomeini (RAH) Shahre Rey Branch, Islamic Azad University, Tehran, Iran

**Tania Novoselsky** The Steinhardt Museum of Natural History, Israel National Center for Biodiversity Studies, Tel Aviv University, Tel Aviv, Israel

**Hadi Ostovan** Department of Entomology, Shiraz Branch, Islamic Azad University, Shiraz, Iran

**Dan A. Polhemus** Department of Natural Sciences, Bishop Museum, Honolulu, HI, USA

**Pavel V. Putshkov** Schmalgausen Institute of Zoology, Kyiv, Ukraine

**Daniel Reynoso–Velasco** Red de Biodiversidad y Sistemática, Instituto de Ecología, El Haya, Xalapa, Mexico

**José Ricardo Inacio Ribeiro** Laboratório de Estudos em Biodiversidade do Pampa, Universidade Federal do Pampa, São Gabriel, Rio Grande do Sul, Brazil

**David A. Rider** Department of Entomology, North Dakota State University, Fargo, ND, USA

**Hamid Sakenin** Department of Plant Protection, Qaemshahr Branch, Islamic Azad University, Qaemshahr, Iran

**Najmeh Samin** Young Researchers and Elites Club, Science and Research Branch, Islamic Azad University, Tehran, Iran

**Michael D. Schwartz** Division of Invertebrate Zoology, American Museum of Natural History, New York, NY, USA

**Geoffrey G. E. Scudder** Department of Zoology and Beaty Biodiversity Centre, University of British Columbia, Vancouver, BC, Canada

---

**Robert W. Sites** Enns Entomology Museum, Division of Plant Sciences, University of Missouri, Columbia, MO, USA

**Nikolay N. Vinokurov** Institute of Biological Problems of Cryolithozone, Siberian Branch of the Russian Academy of Sciences, Yakutsk, Russia

**Vahid Zarrinnia** Department of Plant Protection, Science and Research Branch, Islamic Azad University, Tehran, Iran