

## Contents

### Pandemic and bee research

#### **COLOSS survey: global impact of COVID-19 on bee research**

Raffaele Dall'Olio, Tjeerd Blacquiere, Maria Bouga, Robert Brodschneider, Norman L. Carreck, Panuwan Chantawannakul, Vincent Dietemann, Lotta Fabricius Kristiansen, Anna Gajda, Ales Gregorc, Aslı Ozkirim, Christian Pirk, Victoria Soroker, Geoffrey R. Williams, and Peter Neumann

731

#### **Hydroalcoholic gel with Argentine propolis: the potential for antimicrobial and antioxidant activities, stability evaluation, and *in vitro* phenolic release**

Ana Lilia Salas, Florencia Maria Correa Uriburu, Iris Catiana Zampini, Myriam Arias, María Inés Nieva Moreno, Antonella Santillán Deíu, Walter Bravo, Luis Maldonado, Virginia Salomón, and María Ines Isla

735

### Bee management

#### **Honey bee colony winter loss rates for 35 countries participating in the COLOSS survey for winter 2018–2019, and the effects of a new queen on the risk of colony winter loss**

Alison Gray, Nouredine Adjlane, Alireza Arab, Alexis Ballis, Valters Brusbardis, Jean-Daniel Charrière, Robert Chlebo, Mary F. Coffey, Bram Cornelissen, Cristina Amaro da Costa, Bjørn Dahle, Jiří Danihlík, Marica Maja Dražić, Garth Evans, Mariia Fedoriak, Ivan Forsythe, Anna Gajda, Dirk C. de Graaf, Aleš Gregorc, Iliyana Ilieva, Jes Johannesen, Lassi Kauko, Preben Kristiansen, Maritta Martikkala, Raquel Martín-Hernández, Carlos Aurelio Medina-Flores, Franco Mutinelli, Solenn Patalano, Aivar Raudmets, Gilles San Martin, Victoria Soroker, Jevrosima Stevanovic, Aleksandar Uzunov, Flemming Vejsnaes, Anthony Williams, Marion Zammit-Mangion, and Robert Brodschneider

744

#### **Influence of winter feeding on colony development and the antioxidant system of the honey bee,**

##### ***Apis mellifera***

Amer I. Tawfik, Zeinab H. Ahmed, M. F. Abdel-Rahman, and A. M. Moustafa

752

#### **Summer brood interruption as integrated management strategy for effective *Varroa* control in Europe**

Ralph Büchler, Aleksandar Uzunov, Marin Kovačić, Janez Prešern, Marco Pietropaoli, Fani Hatjina, Borce Pavlov, Leonidas Charistos, Giovanni Formato, Egoitz Galarza, Dariusz Gerula, Ales Gregorc, Valeria Malagnini, Marina Meixner, Nebojša Nedić, Zlatko Puškadija, Jorge Rivera-Gomis, Mira Rogelj Jenko, Maja Ivana Smodiš Škerl, Julien Vallon, Denis Vojt, Jerzy Wilde, and Antonio Nanetti

764

#### **Essential oils against *Varroa destructor*: a soft way to fight the parasitic mite of *Apis mellifera***

Barbara Conti, Rossella Bocchino, Francesca Cosci, Roberta Ascrizzi, Guido Flamini, and Stefano Bedini

774

#### **Supplemental feeding solutions do not improve honey bee (*Hymenoptera*: *Apidae*) foraging on cranberry (*Vaccinium macrocarpon*)**

Abby N. Lois, Benjamin Jaffe, and Christelle Guédot

783

### Pathology and parasitology

#### **Co-incubation of dsRNA reduces proportion of viable spores of *Ascosphaera apis*, a honey bee fungal pathogen**

James P. Tauber, Ralf Einspanier, Jay D. Evans, and Dino P. McMahon

791

#### ***Clostridium difficile* in bee products: assessing the spread of the bacterium**

Joanna Wojtacka, Beata Wysok, Marta Sołtysiuk, Joanna Sztejn, Aiste Kabašinskienė, and Aleksandr Novoslavskij

800

#### **Temperature-dependent development and survival of small hive beetle, *Aethina tumida* (*Coleoptera*: *Nitidulidae*)**

Muhammad Noor-ul-Ane and Chuleui Jung

807

#### **The effect of diet on *Apis mellifera* larval susceptibility to *Paenibacillus larvae***

María de la Paz Moliné, Natalia J. Fernández, Natalia Damiani, M. Sandra Churio, and Liesel B. Gende

817

#### ***In vitro* antagonistic potential of gut bacteria isolated from indigenous honey bee race of Saudi Arabia against *Paenibacillus larvae***

Ahmad Al-Ghamdi, Amal Abdullah Al-Abbadi, Khalid Ali Khan, Hamed Ali Ghramh, Ashraf M. Ahmed, and Mohammad Javed Ansari

825

### Toxicology

#### **Is a strobilurin fungicide capable of inducing histopathological effects on the midgut and Malpighian tubules of honey bees?**

Ana Carolina Batista, Caio Eduardo da Costa Domingues, Monica Jones Costa, and Elaine Cristina Mathias Silva-Zacarin

834

<b>Are plant extracts safe for honey bees (<i>Apis mellifera</i>)?</b> Michele Potrich, Rita Tatiane Leão da Silva, Rodrigo M.A. Maciel, Fabiana M. Costa-Maia, Everton R. Lozano, Robson M. Rossi, Jackelinny R. Martins, and Sidinei Dallacort	844
<b>Hive science products</b>	
<b>Main honey botanical components and techniques for identification: a review</b> Ralitsa Balkanska, Katerina Stefanova, and Radostina Stoikova – Grigorova	852
<b>The influence of storage conditions on invertase, glucose oxidase activity and free acidity of bee bread and bee-collected pollen mixed with honey and vegetable oils</b> Violeta Čeksterytė, Bogumila Kurtinaičienė, Kristina Jaškūnė, and Justinas Kretavičius	862
<b>Consumption, digestion, and utilization of beeswax by greater wax moths (<i>Galleria mellonella</i> L.)</b> Mubasshir Sohail, Muhammad Anjum Aqueel, James D. Ellis, Abubakar Muhammad Raza, and Sami Ullah	876
<b>Antioxidant, antiradical and antipyretic effects of olive oil extract of propolis</b> Sibel Silici and Mehmet Baysa	883
<b>Insight into the chemical composition and biological properties of Mediterranean royal jelly</b> Soukaina El-Guendouz, Badiâa Lyoussi, and Maria Graça Miguel	890
<b>Physicochemical and bioactive properties of Southern Brazilian <i>Apis mellifera</i> L. honeys</b> Viviane Maria Rizelio, Laura Tenfen, Luciano Valdemiro Gonzaga, Graciele da Silva Campelo Borges, Fabiola Carina Biluca, Mayara Schulz, Ana Carolina Oliveira Costa, and Roseane Fett	910
<b>Ethanol extract of Tunisian propolis: chemical composition, antioxidant, antimicrobial and antiproliferative properties</b> Raja Béji-Srairi, Islem Younes, Majdi Snoussi, Khaoula Yahyaoui, Gerrit Borchard, Riadh Ksouri, Véronique Frachet, and Megdiche Ksouri Wided	917
<b>Comparative study of labelled bee honey from Poland and the result of the melissopalynological analysis</b> Anna Puścion-Jakubik, Katarzyna Socha, and Maria H. Borawska	928
<b>Polish honey as a source of antioxidants – a comparison with Manuka honey</b> Katarzyna Pentoś, Deta Łuczycza, Jan Oszmiański, Sabina Lachowicz, and Gerard Pasternak	939
<b>Authentication of the botanical and geographic origin of Egyptian honey using pollen analysis methods</b> Attia El-Sofany, Yahya Al Naggar, Elsaied Naiem, John P. Giesy, and Amal Seif	946
<b>Knowledge and opinions about apitherapy among the term I and term 6 medical students</b> Mustafa Ünal and Onur Öztürk	956
<b>Combinations of Iranian propolis and <i>Leishmania</i> proteins have the potential to influence IL-4 and IFN-<math>\gamma</math> in immunized Balb/c mice</b> Maral Choopanizadeh, Manoochehr Rasouli, Maryam Keshavarz, and Mehdi Kalani	960
<b>Heating of bee venom before injection enhances its anti-nociceptive property and reduces the local adverse side effects</b> Ramakanta Lamichhane, Se-Gun Kim, Prakash Raj Pandeya, Kyung-Hee Lee, Kang-Kyung Sung, Sangkwan Lee, Kyung-Hee Choi, Yun Kyung Kim, and Hyun-Ju Jung	968
<b>Ecology and conservation</b>	
<b>Flower visitors in agricultural farms of Nilgiri Biosphere Reserve: Do forests act as pollinator reservoirs?</b> Poornima Viswanathan, Christos Mammides, Pratim Roy, and Manju V. Sharma	978
<b>Diversity of pollen sources used by managed honey bees in variegated landscapes</b> Annalie Melin, Jonathan F. Colville, Gregory D. Duckworth, Res Altwegg, Ruhana Slabbert, Jeremy J. Midgley, Mathieu Rouget, and John S. Donaldson	988
<b>Aberrant cocoons found on honey bee comb cells are found to be <i>Osmia cornifrons</i> (Radoszkowski) (Hymenoptera: Megachilidae)</b> Francisco Posada-Florez, Barbara Bloetscher, Dawn Lopez, Monica Pava-Ripoll, Curtis Rogers, and Jay D. Evans	1000
<b>Pollen preference of stingless bees (<i>Melipona rufiventris</i> and <i>M. quadrifasciata anthidioides</i>) inside an urban tropical forest at Rio de Janeiro city</b> Ortrud Monika Barth, Alex da Silva de Freitas, and Barth Vanderborgh	1005
<b>Genetics and breeding</b>	
<b>The sperm of <i>Apis mellifera siciliana</i> and <i>Apis mellifera ligustica</i>: A preliminary and comparative note</b> Marco Quartuccio, Santo Cristarella, Andrea Scrofani, Vito Biondi, Massimo De Majo, Cornelia Mannarino, Cristina Cravana, Pietro Medica, and Esterina Fazio	1011
<b>Genetic structure of the Africanized <i>Apis mellifera</i> L. in a river valley in the semi-arid region of Brazil</b> Fábio Barros Britto, Eliene Pereira de Oliveira, Sinevaldo Gonçalves de Moura, Jesuíno da Silva Costa Martins, André Felipe Barbosa Coelho de Resende, José Lindenberg Rocha Sarmiento, and Darcet Costa Souza	1017
<b>Physiology, biochemistry, and chemical ecology</b>	
<b>Effect of cold narcosis on foraging behavior of European honey bees (<i>Apis mellifera ligustica</i>) tracked using a radio-frequency identification (RFID) system</b> Satoru Okubo, Mikio Yoshiyama, Aoi Nikkeshi, Nobuo Morimoto, and Kiyoshi Kimura	1027
<b>Neutral sterols in honey bee (<i>Apis mellifera</i>) feces</b> Mark F. Feldlaufer and Dawn J. Harrison	1033
<b>Morphology and chemical composition of the Koschewnikow gland of the honey bee <i>Apis mellifera</i> (Hymenoptera: Apidae) workers engaged in different tasks</b> Alice Figueiredo Camargos, Jamile Fernanda Silva Cossolin, Luis Carlos Martínez, Wagner Gonzaga Gonçalves, Marcelo Henrique dos Santos, José Cola Zanuncio, and José Eduardo Serrão	1037
<b>Purification and characteristics of individual major royal jelly protein 1–3</b> Xueyu Wang, Jie Dong, Jiangtao Qiao, Gensheng Zhang, and Hongcheng Zhang	1049

Translations of abstracts can be accessed online via the translation service at the button to the left of the English abstract on Taylor & Francis Online.