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CONFERENCE ABSTRACTS

Abstracts of the Immature Beetles Meeting 2019 October 3–4, Prague, Czech Republic

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The seventh Immature Beetles Meeting was held in Prague on October 3–4, 2019 at the Faculty of Science of the Charles University in Prague. It was organized in cooperation with the Department of Entomology of the National Museum and the Crop Research Institute in Prague. In total, 58 participants from Asia, Europe and North and South America attended the meeting (see the list of participants and group photo in Fig. 1). About 20% of the participants attended the meeting for the first time, and we were pleased to see many of the 'veterans' attending the IBM again. Eighteen oral lectures and four posters were presented, covering a wide spectrum of topics concerning nearly all major clades of polyphagan beetles. The research presented comprised a total of fifteen families (Buprestidae, Chrysomelidae, Cerambycidae, Curculionidae, Dermestidae, Elateridae, Hydrophilidae, Leiodidae, Lycidae, Ripiphoridae, Scarabaeidae, Scirtidae, Silphidae, Staphylinidae, Trictenotomidae) plus two book reports on the guide and identification key to the larvae of the families and major subfamilies of British Coleoptera (book title: *British Coleoptera Larvae – A Guide to the Families and Major Subfamilies*) as well as immature stages of Neotropical beetles (book title: *The Neotropical Immatures Beetles*). All contributions covered a broad range of research topics such as unusual morphological adaptations, fossil larvae found in amber, immature beetles in environments such as dead wood and vertebrate carcasses, DNA barcoding as a tool to associate different life stages to adult specimens, maternal care and many more.

After the second day of the meeting, participants were able to visit the Coleoptera collection of the National Museum, which was enjoyed by all of the participating colleagues. As it has become a tradition for the Immature Beetles Meeting, the discussion about beetle topics continued in traditional Prague pubs on both evenings.

We proudly report that the meeting fulfilled again its primary aim – to bringing both established and newly starting scientists and students who share an interest in immature stages of beetles and associated topics. We hope that the participants were able to gain new insights into the field and that new contacts and cooperations with colleagues from across the world were forged.

For more details on the IBM and news related to immature beetles see the following online address: www.immaturebeetles.eu/ as well as our facebook page at www.facebook.com/ImmatureBeetlesMeeting/.

The next meeting is planned for autumn 2021 and will be probably held at the Charles University in Prague once more again. On the behalf of organizers, we would like to thank again all the participants and colleagues who attended the meeting, shared their research and most importantly contributed to an enjoyable and friendly atmosphere. We hope to see new and old faces again in 2021!

The organizers of the Immature Beetles Meeting

Acknowledgements

We thank all colleagues and students who supported the organization of the Immature Beetles Meeting 2019 by giving oral presentations, presenting posters or attending the meeting to enrich the discussions on the topics presented there. Furthermore, we are indebted to the students who took care of the refreshments and drinks for ensuring that the meeting ran smoothly. Last but not least, we are indebted to the senior team, namely Martin Fikáček, Jiří Skuhrovec and Petr Šípek.

Ivan Čepička (Head of the Department of Zoology, Charles University) kindly supported our initiative to organize the meeting with financial support and provided the space in which the meeting took place. The National Museum in Prague and the Crop Research Institute supported IBM 2019 as well. The meeting was organized as a part of the research activities of the organizers under the partial support of the grant SVV 260 434/2019 (from Charles University) to MS, EAV, DV and the grant of the Ministry of Culture of the Czech Republic (DKRVO 2019–2023/5.I.a, National Museum, 00023272) to MS and DV.

List of participants

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The abstracts should be cited as follows:

JALIL P. A., KARIM S. A & ALI W. K. 2019: New description of the larval stage of Sphenoptera (Tropeopeltis) servistana Obenberger, 1930 (Coleoptera: Buprestidae) in Erbil governorate, Kurdistan region-Iraq. Pp 573–574. In: SEIDEL M., ARRIAGA-VARELA E. & VONDRÁČEK D. (eds): Abstracts of the Immature Beetles Meeting 2019, October 3−4, Prague, Czech Republic. *Acta Entomologica Musei Nationalis Pragae* **59**: 569–582.

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ORAL PRESENTATIONS

British Coleoptera larvae: a guide to the families and major subfamilies

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In August 2019, a 280-page guide and identification key to the larvae of the families and major subfamilies of British Coleoptera was published by the Royal Entomological Society. Although the British fauna is impoverished at the species level, 103 families are present, so this guide is likely to be useful anywhere in the northern hemisphere at least. I will discuss the history of this work, initiated by and dedicated to Fritz van Emden (1898–1958) and completed over a period of 40 years by a team of six authors and editors.

HAMMOND P. M., MARSHALL J. E., COX M. L., JESSOP L., GARNER B. H. & BARCLAY M. V. L. 2019: *British Coleoptera Larvae. A guide to the families and major subfamilies.* Royal Entomological Society, St. Albans, 280 pp.

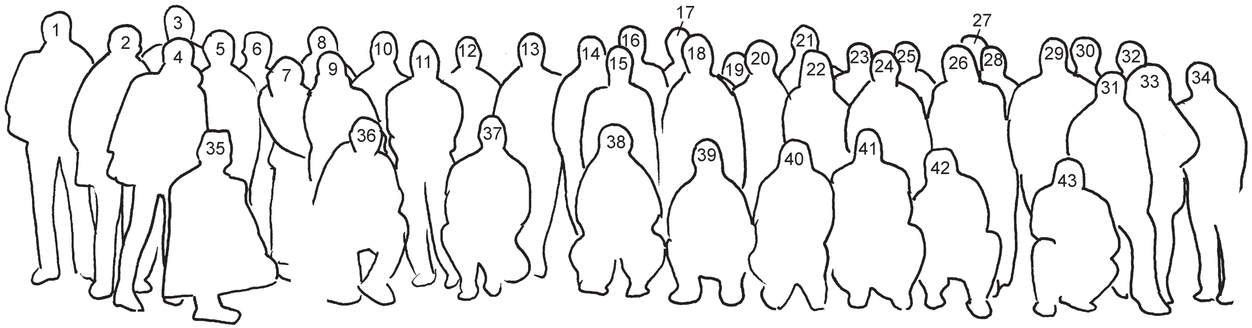

Fig. 1. Most participants of the Immature Beetles Meeting 2019 during the first day (Prague, 3rd October 2019): 1 – Petr Švácha, 2 – Jordan Rainey, 3 – Enrico Ruzzier, 4 – Aleksandra Kilian, 5 – Robert Angus, 6 – Fang-Shuo Hu, 7 – Alicia Hodson, 8 – Michel Perreau, 9 – Kolla Sreedevi, 10 – Petr Máslo, 11 – Eugenio Nearns, 12 – Jiří Hájek, 13 – Jiří Skuhrovec, 14 – Filip Trnka, 15 – Karolina Mahlerová, 16 – Albert Damaška, 17 – Rafał Ruta, 18 – Jan Růžička, 19 – Max Blake, 20 – Karol Szawaryn, 21 – Ondřej Kouklík, 22 – Ashleigh Whiffin, 23 – Michael Ivie, 24 – Josef Jelínek, 25 – Robin Kundrata, 26 – José Luis Navarrete-Heredia, 27 – Emmanuel Arriaga-Varela, 28 – Mark Volkovitsh, 29 – Vinicius Ferreira, 30 – Peter Hlaváč, 31 – Hume Douglas, 32 – David Sadílek, 33 – Brigitta Wessels-Berk, 34 – Donna Ivie, 35 – Matthias Schöller, 36 – Max Barclay, 37 – Lukáš Sekerka, 38 – Santiago Montoya-Molina, 39 – Hee-Wook Cho, 40 – Jarin Qubaiová, 41 – Wand Khalis Ali, 42 – Tomáš Lackner, 43 – Jiří Kolibáč.

ever examined, species diagnoses if provided, outline on the chaetotaxy pattern, as well as data on fungal hosts and behaviour for each species. The present work shed light on the previously unknown or misunderstood morphological details of the *Oxyporus* larvae. In particular, some setae, campaniform sensillae and also some undecided type of sensilla (*pls*) were explored on their tergites. As a result, larva of *O. maxillosus* is redescribed, larvae of *O. procerus* and *O.* (*P.*) *melanocephalus* are described for the first time. Morphological details of the larvae, the data on COI sequences, as well as noticeable difference in the female reproduction behaviour between some species from the subgenera *Oxyporus* s. str. and *Pseudoxyporus* suggest that they could be given a status of separate genera.

ASHE J. S. & WATROUS L. E. 1984: Larval chaetotaxy of Aleocharinae (Staphylinidae) based on a description of Atheta coriaria Kraatz. *Coleopterists' Bulletin* **38**: 165–179.

Larval morphology of the jewel beetles of the subfamily Polycestinae and its significance for the taxonomy and phylogeny (Coleoptera: Buprestidae)

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Jewel beetles (Buprestidae) is one of the largest coleopteran families (approx. 15,300 species). The subfamily Polycestinae (13 tribes, 82 genera, about 1300 species) which is considered rather primitive, takes the 4th place in the family being significantly inferior to Agrilinae, Buprestinae and Chrysochroinae. In the same time, polycestine larvae demonstrate almost the entire spectrum of morpho-ecological and functional adaptations and evolutionary trends inherent in Buprestidae and can serve as a model group for studying of morphogenesis of many larval characters, development of classification and phylogeny of the entire family. The larvae of about 100 (8%) species from 24 (29.6%) genera and 11 tribes of Polycestinae have been described so far; the larvae of Perucolini and Bulini are still unknown; the larvae of Acmaeoderini are best studied, while the larvae of other groups are known only for individual or very few species. Larval characters of some polycestine genera and tribes were analyzed by Volkovitsh & Hawkeswood (1999) and Volkovitsh & Bílý (2015).

General structure of buprestid larvae is determined by their endobiont habitat inside plant tissues or exobiont soil dwelling. Schizopoid, julodoid (both exobionts), buprestoid, agriloid, and trachyoid (all endobionts) morpho-ecological types of buprestid larvae are recognized; the polycestine larvae are predominantly buprestoid while the larvae of *Paratrachys* are trachyoid. Several morpho-ecological subtypes are distinguished within the buprestoid type depending on the habitats (subcortical, xylophagous or grassy stem borers, etc.) and the hardness of the food substrate (Volkovitsh 1979). Trachyoid type inherent to leaf-miners occurring only among Polycestinae and Agrilinae. Polycestine larvae can be recognized by a single pronotal groove (also Gabellinae) and presence of additional lobe on stipes (except prospherioid genera); from Galbellinae they differ by additional lobe on stipes, structure of palatine sclerites and latero-basal sclerite of maxillary cardo.

Three phyletic lineages are established within Polycestinae: prospherioid, polycestioid, and acmaeoderioid (Volkovitsh 2001). The grounds to distinguish polycestioid and acmaeoderioid lineages are supported by molecular studies (Evans et al. 2015) while the separation of presumably most primitive Gondwanian prospherioid lineage is supported only by absence of additional lobe on larval stipes (plesiomorphy), the most advanced larval states were found in Prospherini. Within polycestioid lineage, larval characters in part support the affinity of Thrincopygini and Polyctesini, while *Chrysophana* differs sharply from all other genera of Polyctesini. Unique larval synapomorphies were found in all studied genera of Polycestini and Tyndarini but these were not found within acmaeoderioid lineage, except Paratracheini. Within the latter the most primitive states are found in Ptosimini (*Ptosima* still retains microsetal areas on prementum, while in *Sponsor* these are completely lacking). Larvae of Acmaeoderina demonstrate the most advanced states of many characters, as such complete reduction of microsetal areas on labrum, prementum and integuments. The most advanced trachyoid larvae of *Paratrachys* in spite of extreme specialization resulting from leaf-mining habit, retain many states of buprestoid type (proventriculus, buprestoid spiracles etc.). Still enigmatic is a taxonomic position and relationship of Haplostethini which based on molecular study is suggested to re-surrect as a separate subfamily (Evans et al. 2015). However, the general larval morphology of *Mastogenius* is very similar to that in Polycestini and acmaeoderioid taxa which give grounds to treat Haplostethini as a member of acmaeoderioid lineage or as belonging to a separate phyletic lineage within Polycestinae. This study demonstrates a great importance of larval morphology for the taxonomy and phylogenetics not only in Polycestinae but of the entire Buprestidae family.

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EVANS A. M., McKENNA D. D., BELLAMY C. L. & FARREL B. D. 2015: Large scale molecular phylogeny of metallic wood-boring beetles (Coleoptera: Buprestoidea) provides new insights into relationships and reveals multiple evolutionary origins of the larval leaf-mining habit. *Systematic Entomology* **40**: 385–400.

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VOLKOVITSH M. G. 2001: The comparative morphology of antennal structures in Buprestidae (Coleoptera): evolutionary trends, taxonomic

and phylogenetic implications. Part 1. *Acta Musei Moraviae, Scietiae Biologicae* **86**: 43–169.
VOLKOVITSH M. G. & BÍLÝ S. 2015: Larvae of Australian Buprestidae (Coleoptera). Part 5. Genera Astraeus and Xyroscelis, with notes on larval characters of Australian polycestine taxa. *Acta Entomologica Musei Nationalis Pragae* **55**: 173–202.
VOLKOVITSH M. G. & HAWKESWOOD T. J. 1999: The larva of Prospheres aurantiopicta (Laporte & Gory) with comments on the larval characteristics of Polycestoid taxa (Insecta, Coleoptera, Buprestidae). *Mauritiana* (Altenburg) **2**: 295–314.

POSTERS

Morphological characters of immature stages of Palaearctic *Mecinus* species and their systematic value in Mecinini (Coleoptera, Curculionidae, Curculioninae)

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The Mecinini is a tribe of the subfamily Curculioninae (Curculionidae) and comprises six genera: *Cleopomiarus* Pierce, 1919; *Gymnetron* Schoenherr, 1825; *Mecinus* Germar, 1821; *Miarus* Schoenherr, 1826; *Rhinumiarus* Caldara, 2001 and *Rhinusa* Stephens, 1829. The larvae of Mecinini develop in roots, shoots, leaves and flowers, many of them causing the organs of the host plants to swell or develop into galls. Recently the mature larvae of five *Cleopomiarus* species and three *Miarus* species, and the pupae of four *Cleopomiarus* species and two *Miarus* species were described in detail for the first time.

Now, we start to study the material of mature larvae and pupae of 14 *Mecinus* species namely: *M. circulatus* (Marsham, 1802); *M. collaris* Germar, 1821; *M. heydenii* Wencker, 1866; *M. ictericus* (Gyllenhal, 1838); *M. janthiniformis* Toševski & Caldara, 2011; *M. janthinus* Germar, 1821; *M. kaemmereri* Wagner, 1927; *M. labilis* (Herbst, 1795); *M. laeviceps* Tournier, 1873; *M. pascuorum* (Gyllenhal, 1813); *M. peterharrisi* Toševski & Caldara, 2013; *M. pirazzolii* (Stierlin, 1867); *M. pyraster* (Herbst, 1795); and *M. sicardi* Hustache, 1920. Both larvae and pupae were redescribed or completely described and illustrated for the first time. The general shape of the bodies, the structure of the mouthparts, chaetotaxy, cuticular processes and colouration were studied and analysed in order to evaluate their taxonomic value.

The first result shows really huge morphological variety within genus in larval and pupal stages as well (e.g., the structure of spiracles, number and distribution of setae, presence/absence of asperities, number of labial and maxillary palpi, and shape of urogomphi). The division into species groups (e.g., *M. circulatus* group, *M. collaris* group, *M. heydenii* group, *M. janthinus* group and *M. simus* group) seems justified but final taxonomic order within *Mecinus* genus requires further investigations.

Reduction of eyes in last-instar beetle larvae: a special observation in Trictenotomidae, based on *Trictenotoma formosana* Kriesche, 1919

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The phylogenetic position of Trictenotomidae Blanchard, 1845 was a puzzle for coleopterists for over a century. The only larval description for this peculiar family was published in the early 20th century (Gahan 1908). However, Gahan's described specimen was in poor condition and the description itself is incomplete. Recently, Lin & Hu (2018, 2019) unraveled the biology of *Trictenotoma formosana* Kriesche, 1919. For the first time there is fresh immature stages material available for Trictenotomidae, including first- and last-instar larvae and pupae.

Stemmata, or simple eyes, are innervated laterally from the brain's optic lobes, and typically there is a group on each side of the head in larval Holometabola. The number of stemmata in larvae is used widely in morphology-based phylogenetic analysis. An uncommon difference between first-instar and last-instar trictenotomid larvae were uncovered during our study. While first instar larvae have 2–5 stemmata on each side of the head, stemmata are absent in last-instar larvae. The ontogenetic importance of this phenomenon remains unknown.

The presence of a series of longitudinal ridges on the tergites and sternites is one of the most important features of trictenotomid larvae compared with other Tenebrionoidea. The ridges are not present in first-instar larvae, but long setae are present instead. We herewith hypothesize