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## REVIEW

of the Ph.D. dissertation by Mgr. Martina Kočová Veselská

Firstly I would like to express my gratitude for selection me, by Institute of Geology and Paleontology of the Faculty of Science of the Charles University in Prague, as reviewer of this dissertation, which is high honor for me and for my Institute and University. Similarly as Candidate, I also like crustaceans very much, both extant representatives (not only as sea-food) and especially extinct forms (mainly Jurassic and Cretaceous decapods) and their significance in fossil record of geological history of ancient oceans.

Secondly I would like to notice, that I observe Martina's work on the, let's say, "crustacean field" since several years and I'm admiring Her activity in science, when She is a great wife and mother, simultaneously. But my below review will be absolutely full scientific and as objective opinion will be free from emotions, I promise!

Thirdly I have to say at the beginning of this review that Her influence to our knowledge about Cretaceous decapod and cirripede crustaceans, and especially within Bohemian Basin, is unusual and progressed this part of palaeontological data in European scale at least.

Mgr. Martina Kočová Veselská's Ph.D. dissertation consists 9 published papers focused to Late Cretaceous both decapod and cirripede crustaceans of the Bohemian Cretaceous Basin (BCB) in Czech Republic. By this way, from systematic point of view it is mono-thematic description of this crustacean fauna, opposite to their palaeoecological significance which is subdivided by their different ethology as mobile benthic animals (decapods) and sessile ones (cirripedes). By this reason "philosophy" of palaeoecological interpretation(s) is(are) completely different and have important significance in wider, sedimentological and palaeoenvironmental conclusions, including basin history/evolution as well.

The all mentioned 9 papers have been published in peer-reviewed journals (some of them from so-called "Philadelphia list") and reviewed (or discussed and/or commented at least)

by the famous world-wide specialists of these two “crustacean groups” [e.g., John W.M. Jagt (Maastricht, The Netherlands) and Joe S.H. Collins (London, GB) – paper I; Adiël A. Klompmaker (Florida, USA) – paper II; John S. Buckeridge (Melbourne, Australia) and Andrew S. Gale (Portsmouth, GB) – paper III; Joe S.H. Collins (London, GB), John W.M. Jagt (Maastricht, The Netherlands) and Barry W. M. van Bakel (Boxtel, The Netherlands) – paper IV; John S. Buckeridge (Melbourne, Australia) – paper V; Günter Schweigert (Stuttgart, Germany) and Matúš Hyžný (Bratislava, Slovakia) – paper VII; other papers had an anonymous reviewers – papers VI and IX). On the other hand, some of them have been a co-authors of another papers (e.g., John S. Buckeridge (x 3), Joe S.H. Collins, Matúš Hyžný, John W.M. Jagt (x 2)). But one of the most frequent co-author has been Her husband (Tomáš Kočí – 7 times). In conclusion, by these reasons I would lack courage to be a reviewer of editorial reviewers and I wouldn't like to question of their reviews and some remarks of such prominent persons and their high knowledge on crustaceans and that's why I avoid, intentionally, to review remarks to isolated papers but try to present some general comments to all papers and general remarks to wider context of these crustacean remains. Therefore my below comments and remarks are mainly connected with Marina's “Resume” and only with selected technical arguments. On the other hand it is difficult to determine how big was, in detail, primary, original, personal participation of Candidate in examined papers, which without any indications (in percent for example and short descriptions of Her main ideas and/or work within them) it is a little bit enigmatic in some cases. It of course isn't regarding the papers where Candidate is a first Author (4 papers) all the more when list of Authors is not in alphabetic order which suggested a first position of Candidate as a leader both in conceptual, analytical and editorial work. Finally, I would like very much clearly to underline one more time that Martina Kočová Veselská's Ph.D. dissertation is original, as high quality effect of both field work by last several seasons, then elaboration of large material in laboratory (or in Her own ..... bathroom, where She was washing and sieving samples with Her sons together – see “Acknowledgements” of “Resume”) and then, finally, their good interpretations based on Her knowledge and state of art of this discipline based on world scientific literature. Selected papers are already being quoted in international palaeontological journals by foreign scientists (e.g., paper IV; based on Google Scholar database) in spite of their latest publishing.

My below critical remarks don't change my general positive opinion on this dissertation but only suggest for some future and next, similar interesting papers and their better organization and concept. Presented “Resume” is compilation of published papers practically and summarize a recent knowledge on these crustaceans of BCB.

1. No clear evidence of facies relationships between crustacean-bearing deposits across whole BCB and, consequently, some palaeoenvironmental and palaeobiological preferences of described faunas in space and time. The locations of profiles in such palaeo-reality are practically limited to general sketches of geographical position of sections and their schemes. Even if cirripede faunas are almost exclusively connected with rocky coast/near shore facies it could be very interesting to see facies pattern within BCB from the shallowest zone trough transition up to deeper/deepest one, both in palaeogeographical sketch and palinspastic one. In no paper, unfortunately, we can't see such reconstruction;

2. By this meaning, for example *Enoploclytia leachi* (Mantell, 1922) species, one of the most common lobster in hemipelagic facies of this area (or brachyuran crab *Secretanella buchii* (Reuss, 1845)), haven't any possibilities to comparison with another decapods, from opposite, extremely shallow-water species mentioned in this thesis. Such comparative studies, based on reconstruction of distribution of lithofacies in space of the BCB (see above) could be a crucial for better understanding of palaeoenvironmental preferences of studied fauna;

3. In “Taphonomy” chapter Candidate was omitting one of the most important paper focused on recent taphonomic processes on decapods (Plotnick, 1986) who studied taphonomy of modern shrimps and suggested that disturbances caused by scavengers and/or burrowing infauna are the major factor in destruction of buried arthropod remains. Additionally, in paper by Müller *et al.* (2000) I proposed taphonomic model of conditions of crab remains in relation to rate of sedimentation, physical and biological processes such as: bioturbation, microbiological decomposition and hydrodynamic energy *versus* burial speed (*op. cit.* Fig. 23) and final effects of crab remains (from perfect preservation to the worst one): (I) carapace with legs and abdomen, (ii) carapace without legs and abdomen, (iii) claws or tips with fingers and (iv) trace fossils of crabs respectively;

4. Some suggestions that “fossil material should be compared with modern genera” (p. 9 of “Resume”) are disputable especially between Cretaceous and Recent counterparts while some Miocene bivalve species from Parathetys changed their palaeoenvironmental preferences drastically in meantime (between shallow-water regimes during Miocene time and deep-water recently). Uniformitary/actualistic deduction sometimes could be proper but ..... sometimes is incorrect (even if Klompmaker *et al.*, 2013 are right and as Candidate related aptly – p. 10 and

then proper discussion; see also – paper VIII, p. 197), and therefore detail sedimentological analysis of fossil-bearing deposits are necessary (e.g., homolomiodroid “palaeoenvironmental evolution” between Jurassic and Recent times; Müller *et al.*, 2000; Krobicki & Zatoń, 2008, 2016);

5. In some cases Candidate mentioned another than crustaceans long list of marine invertebrates (corals, sabellid and serpulid worms, bryozoans, brachiopods, bivalves, gastropods, crinoids, echinoids) (papers V, VI) and practically have not been used for wider palaeoenvironmental interpretations (bathymetry, salinity, oxygenation etc etc).

6. Candidate mentioned about a huge amount of material, more than 3000 kg (full respect and congratulations!; fortunately, Her good friends helped Her in this part of investigations – including “my colleague Tomáš Kočí conducted several fieldworks .....”; p. 17), which then were amassed and screened, but never mentioned about proportional ratio of different kind of sediments during detail sampling methodology (let's say quantitative/qualitative “Klompmaker's method” = sampled different facies by the same time);

7. When we use a formal chronostratigraphical terms we can say – Lower and/or Upper, for example, Cretaceous. But if we want to describe/talk about fossils we have to use term – Early and/or Late, never opposite! In first sentence of “Aim of the thesis” (p. 8) we can see – “The present thesis aims to give a new look on the Upper Cretaceous crustacean fauna .....” but could be/have to be/must be – “The present thesis aims to give a new look on the Late Cretaceous crustacean fauna .....”. Then, we can interpret their Late (not Upper) Cretaceous palaeoenvironmental regimes, their Late Cretaceous palaeobiological relationships etc etc, but they (fossils) occur within Upper Cretaceous limestones/marls and/or conglomerates (as in several sections of BCB and in this case). Or – “Frequent migrations of marine animals during the Upper Cretaceous were possible due to the proximity of the continents to one another and the open communication among the basins during the Upper Cenomanian/Lower Turonian transgression....” and should be – “Frequent migrations of marine animals during the Late Cretaceous were possible due to the proximity of the continents to one another and the open communication among the basins during the Late Cenomanian/Early Turonian transgression....” (p. 10; see also – pp. 31, 46, 47);

8. The last remark/comment concerning style of using, or not, capital characters when are used formal names of stages (Lower, Upper and/or Early, Late). It is not independent on standard international rules for me. Especially when we have golden spikes on the boundaries between stages and using of capital characters in such position is obligatory. In this thesis (including published papers) is an absolute freedom in using small and/or capital characters (for example see and compare the titles of paper IV and V and numerous others).

In general conclusion of this review, after very precisely studying both personal “Resume” (= unpublished text of dissertation) and all 9 published papers I conclude that Ph.D. Dissertation by Mgr. Martina Kočová Veselská is meeting all criteria and put requirements for works of this type, in spite of some critical remarks, and is enough for next step of Ph.D. defense procedure.