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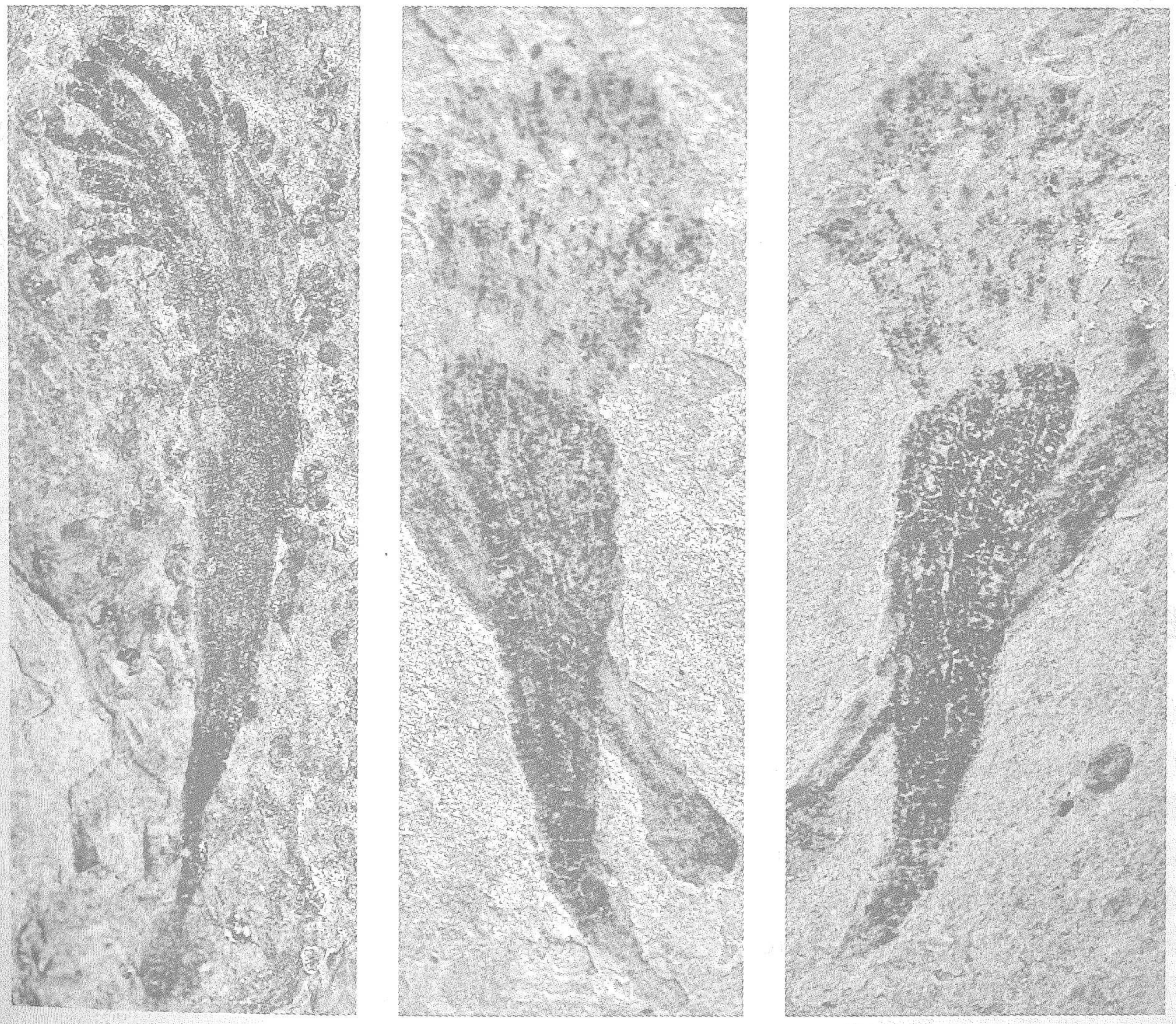

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内 容 简 介

本书是关于地球历史的关键时期与古生物革新领域的高水平国际论文专集，反映近几年来德国及德语系其他国家和我国古生物学工作者所取得的最新成果，是世界范围内该领域的最新著作。内容涵盖领域主要包括：早期生命演化、寒武纪特异化石库及埋藏学、晚古生代生物多样性与环境、二叠纪－三叠纪之交生态系演变、热河与燕辽生物群研究进展、三叠纪－侏罗纪转换时期生物多样性变化及环境、侏罗纪－白垩纪之交陆地生态系统、新生代生物多样性与环境变化、综合地层学、古生物化石数据库、定量地层学与定量古地理学、旋回地层与高分辨率地层、微体古生物学及应用 、古生态古地理与古气候、古脊椎动物与古人类的起源与演化、分子生物学、地球生物学、青藏高原地层古生物研究进展、古生物博物馆与科普教育、古生物化石及其保护、古生物学研究中的新技术与新方法等。

本书可供相关领域学者参考引用。

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Amber as document of the evolutionary history of the Hemiptera

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ABSTRACT

The Hemiptera is an unbelievably diversified and successive group, inhabiting all terrestrial and some marine habitats. Being one of the Big Five insect orders, after Coleoptera, Diptera, Hymenoptera, and Lepidoptera, it is the most diversified group of non-endopterygote insects, with diversity maybe surpassed only by the Diptera.

The most striking feature of the group is the presence of a segmented rostrum with a multisegmented sheet-like labium covering the mandibular and maxillary stylets; these stylets, being the mandibles and maxillary laciniae are modified and formed into a concentric bundle, the mandibular enclosing the maxillary ones, both forming the food and salivary channels. The maxillary and labial palpi are always absent. Such unified mouthpart allows the Hemiptera to uptake variable food. Feeding habits of the Hemiptera range from phytophagy to predation, including ectoparasitism and hematophagy; many of them are pest species of cultivated crops, vectors of plant pathogens and diseases and some are vectors of human diseases.

Evolutionary history of the Hemiptera could be traced back to the Carboniferous, but these beginnings are documented only as sedimentary rock fossils. During the Permian the major radiation and diversification is documented for extinct Palaeorrhyncha, and early Cicadomorpha. It was also the period in which Sternorrhyncha ap-

peared. Fulgoromorpha (planthoppers) and Coleorrhycha (moss bugs) were not numerous, and the true bugs (Heteroptera) are absent in Permian fossil record. Terminal Permian extinction wiped out the Palaeorrhyncha, but the other lineages survived; it was the Triassic when the oldest true bugs, the Nepomorpha appear in fossil record, various Cicadomorpha lineages evolved and diversified, including the ancestors of the only recent survivors—the Clypeata. Fulgoromorpha are very rare in fossil material from these times, also Coleorrhyncha record is scarce. Triassic is believed to be period of first major divisions within the Sternorrhyncha, with ancestors of scale insects (Coccidomorpha) shift to underground conditions, diversification of extinct Pincombeoidea and Naibioidea, and diversification of various aphids (Aphidomorpha) lineages. Triassic amber brought the oldest inclusions of insects, alas no single hemipteran. Jurassic is a period of enormous diversity of all hemipteran lineages, the ancestors of the modern groups appeared and are relatively well documented in fossil material, but there is still a lot of work to be done, ahead of full comprehension and description of this stage of evolution of the Hemiptera. Jurassic fossils exhibit both groups no longer present in modern fauna (e. g. Cicadomorpha: Palaeontinidae), and the oldest representative of the modern descendants of various groups. The oldest fossil records of the sternorrhynchan hemipterans attributed to whiteflies (Aleyrodomorpha) and psyllids (Psylloidea) come from the Jurassic deposits.

The Cretaceous was period of dramatic change—most lineages well represented in the Triassic and Jurassic, became extinct by the Middle Cretaceous. The Cretaceous brought the first inclusions of various Hemiptera in fossil resins. The oldest inclusions come from the Lebanese amber, aged Barremian—representatives of various groups-scale insects, whiteflies (Aleyrodomorpha), aphids, moss bugs, true bugs and planthoppers are known. Surprisingly, no leafhoppers were found yet among these inclusions. The fossil record of the Early Cretaceous Hemiptera documented in sedimentary rocks is rich, but still not fully elaborated. It must not to be underestimated in respect to amber inclusions.

The Burmese amber, aged earliest Cenomanian appear the most crucial source of information for understanding the origins of diversity of the modern faunas of the Hemiptera. Sternorrhyncha, especially scale insects are relatively abundant as Burmese amber inclusions, presenting high taxonomic diversity. Amber from Myanmar preserved also the oldest unequivocal proof of maternal care in insects. Various sternorrhychans preserved as inclusions in Burmese amber need further attention and full elaboration. This amber documents prolific diversification of the planthoppers (Ful-

goroidea), with many groups endemic to the Cretaceous strata on one hand and the record of modern families on the other. The Middle Cretaceous biotic reorganization seriously affected the evolution of the Cicadomorpha—the Mesozoic lineages as Palaeontinidae gone extinct, and the Clypeata lineage comprising the modern groups rapidly diversified. Burmese amber inclusions brought the record of ancient Tettigarctidae (hairy cicadas) and the oldest supposed singing cicadas (Cicadidae). The record of froghoppers (Cercopoidea) is better documented in sedimentary rocks, but Burmese amber inclusions document the last record of the extinct family Sinoalidae. The Cicadellidae inclusions in Burmese amber are not abundant, but seem to be highly diversified taxonomically and morphologically. Various groups of the Heteroptera are reported from Burmese amber, both terrestrial and aquatic, e. g. Aradidae, Enicocephalidae, Gelastocoridae, Hydrometridae, etc. .

Burmese amber is at the moment the richest source of the Hemiptera inclusions, but very important ones are to be found in ambers of Spain-ambers from Peñacerrada and San Just, France-amber from Charente-Maritime. Few more Hemiptera inclusions were reported from the other Upper Cretaceous ambers: Taimyr, New Jersey and Canadian.

The sedimentary deposits of the Cretaceous period should not to be abandoned, as rich and important data on the Hemiptera, their diversity and disparity can be taken from this source. The strata of Crato Formation, Yixian Formation, Baissa, Koonwarra yield numerous fossils of great importance, representing groups from various terrestrial biota and conditions, different from these of amberiferous forests.

The knowledge of the Hemiptera in the Palaeogene comes from both sedimentary deposits and fossilized resins. The hemipterans of the important fossil sites as Fur Formation of Denmark, Palaeocene strata of Chubut province (Patagonia) are weakly known and claim further attention, the others as e. g. Florissant Formation (USA), Bembridge Marls of Isle of Wight, United Kingdom are better elaborated.

The knowledge about Hemiptera from the Eocene is biased towards Baltic amber, but the others—ambers of Oise, Cambay, Fushun, Claiborne brought important findings of the various Hemiptera groups. Baltic amber inclusions of the Hemiptera are the best known, with numerous aphids, scale insects, planthoppers, leafhoppers and true bugs, less numerous psyllids and whiteflies. The knowledge of these fossils is still far from complete, more and more outstanding and important inclusions must be thoroughly elaborated.

Numerous of Neogene records of the various Hemiptera in sedimentary deposits

need to be revised, the fossils re-examined and the taxa critically redescribed. The data are not scarce, the importance of these fossils is enormous, but unforunatelly the interest in detailed studies of these fossils decreased.

Miocene findings of various Hemiptera groups in Dominican and Mexican ambers are sometimes spectacular. Many groups of the Hemiptera are known as inclusions in these resins, representing all Recent infraorders except of Coleorrhyncha. We still know very little about inclusions of the hemipterans in the other Miocene ambers, these from Zhangpu, Indonesia, Cape York, New Zealand, but preliminary reports are very promising. Amber inclusions preserved not only data about taxic diversity, morphological disparity, palaeodistributions of the Hemiptera, but also important data about habitats they lived and behaviors they presented

KEYWORDS: Hemiptera, evolution, amber, sedimentary deposits.

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Hook-bearing sea cucumbers (Echinodermata, Holothuroidea): modern *Versus* fossil perspective

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ABSTRACT

Since Middle Ordovician times, sea cucumbers can be revealed in the fossil record, especially in micropalaeontological samples. Species and genera determinations are based on morphological characters besides modern DNA analyses. In this respect, the determination relies heavily on the calcareous hard parts besides other anatomical features. But problematically is the fact that a lot of recent species determinations of holothurians are established in former times when researchers had highly limited potential of investigation as well as presentation methods of smallest examples and ob-