The Oldest Coast Redwoods from the Middle Jurassic of North China and Its Environmental Significance

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This project focuses on a pair of fossil materials (part and counterpart) from the Middle Jurassic at the village Daohugou, Ningcheng County, Inner Mongolian Autonomous Region, China. The cell information of leaf surface is crucial for identifying fossil conifer shoots. The present work is to classify the shoots and insects occurred on the fossil materials and to probe into the environments of Daohugou during the Middle Jurassic. The fossil and comparative living leaves were treated with chemical segregation to obtain epidermis. The cell information in the epidermis was collected under light microscope and scanning electron microscope. The shoots on the fossil materials were identified as coast redwoods (Sequoia) by comparing with similar genera in shape, arrangement, decurrent base of leaves, and features of epidermal cell and stomata. The four insects on the fossil materials were assigned to Mecoptera, Hemiptera, and Hymenoptera based on the shapes of body, antennae, mouthpart, and wings. The former two records of coast redwoods from the Later Jurassic were not supported by cell information. The present fossil shoots are the oldest record of coast redwoods. It is the first time to obtain cell information of coast redwoods from Jurassic. Both fossil and living coast redwoods require warm and humid climates by comparing the environments of Daohugou during Middle Jurassic to those of the natural distribution of the living coast redwood. The relationship between insects and conifers during the Middle Jurassic could be symbiosis , since some insects might get food from the conifers as the pollinators.

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