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New data on the Early Cretaceous flora of Transbaikalia

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The Early Cretaceous flora of Transbaikalia has been studied since the 19th century. The paleobotanists V.D. Prynada, V.A. Vachrameev, V.A. Krassilov, I.N. Srebrodolskaya made a great contribution to its study, revealed its taxonomic diversity and defined the geological age of the plant-bearing beds. Our study focuses on the fossil plants from the coal-bearing deposits widely distributed on the rift basins of the Buryat Republic and Transbaikalian Region. Previously, the findings of fossil plants have been known from the clastic beds. We undertook a study of cuticles macerated directly from coals. Thus, we obtained much more information about the composition of swamp vegetation and coal-forming plants.

The newly discovered recent specimens suggest there is even greater taxonomical diversity of the Early Cretaceous flora than are previously thought. Some fossil plants have a high correlative potential and are valuable for stratigraphic correlation purposes.

We collected abundant collections from the Gusinoe Ozero Basin in the Buryat Republic. Here the coal-bearing Selenga Formation yields abundant remains of leaves *Pseudotorellia* sp. and *Phoenicopsis* cf. *krassilovii* Kiritch. The findings of *Pityophyllum* ex gr. *nordenskioldii* (Heer) Nath. are common, *Coniopteris setacea* Vachr., *Sphenopteris* (*Ruffordia*) cf. *goeppertii* Dunk., *Hymenophyllum iwatsukii* Herrera, R.C. Moran, Shi, Ichinnorov, Takahashi, Crane et Herendeen, *Cladophlebidium dahuricum* Pryn., *Cyparissidium gracile* Heer, *Podozamites lanceolatus* (L. et H.) F. Braun, *Samaropsis aurita* Krassil., *Nilssoniopteris* sp., *Baisia* cf. *hirsuta* Krassil., *Umaltolepis* sp., *Ixostrobus* sp., *Krassilovia mongolica* Herrera, Shi, Leslie, Knopf, Ichinnorov, Takahashi, Crane et Herendeen are rare.

The bulk maceration of coals of Selenga Formation has revealed that they are composed mainly of leaves *Pseudotorellia* sp. A. and fossil wood of Pinaceae

The numerous leaves of *Pseudotorellia* sp. and *Ginkgo coriacea* Florin were revealed in the Kholboldzhin Formation. Next in abundance in the burials are the remains of *Pityophyllum* ex gr. *nordenskioldii* (Heer) Nath., *Pityocladus* sp., *Cyparissidium gracile* Heer, and *Podozamites lanceolatus* (L. et H.) F. Braun. The plant basis of coals comprises mainly leaves *Pseudotorellia* sp. B. and wood of Pinaceae in this formation

It was revealed that the main coal-forming plants of the Tugnui Basin were ginkgophytes *Pseudotorellia* sp., ferns, and Pinaceae.

Previously, from the deposits of the Tarbagatay coal Basin, such fossil plants as *Sphenopteris tenuissima* Prynada, *Scleropteris tarbagataica* Prynada, *S. dahurica* Prynada, *Czekanowskia vachrameevii* Kiritch et Samyl., *Podozamites eichwaldii* f. *minor* Schimp. were described. Among the dispersed cuticles, revealed from the coals of this basin, it was recognized *Pseudotorellia* sp. (abundant), *Anomozamites* sp. (rare), *Czekanowskia* sp.ind. (rare), *Ginkgo* cf. *insolita* Samylinina (common), *G.* cf. *coriacea* Florin (common), *Pityophyllum* sp.1. (common), *Pagiophyllum* sp. (rare).

The coals of the abandoned Khalyarta mine of the Bada Basin are composed of the remains of the plants *Arctopitys* sp. A, *Tarphyderma* sp. nov.



In the Chita-Ingoda Depression, coals from the Chernovskie and Tataurovo mines are studied. The plants that were as the basis for coal are following: *Bennettiales* sp. indet., *Czekanowskia vachrameevii*, *Phoenicopsis parva* Vassilevskaja, *Phoenicopsis* sp., *Sphenobaiera* sp., *Ginkgo* sp., *Pseudotorellia palustris* Shi, Herrera, Herendeen, Leslie, Ichinnorov, Takahashi et Crane, *Ps. resinosa*, Shi, Herrera, Herendeen, Leslie, Ichinnorov, Takahashi et Crane, *Pseudotorellia* sp., *Elatides* cf. *zhoui* Shi, Leslie, Herendeen, Ichinnorov, Takahashi, Knopf et Crane, *Pagiophyllum* sp.

N.G. Yadrishchenskaya found in Zashulan Coal Mine of the Chikoy Basin *Baisia hirsuta*, *Czekanowskia bugdaevae* Kiritchkova et Samylina, *Cz. jacutica* Kiritchkova et Samylina. The cuticle of *Pseudotorellia* sp. was macerated from the coals of the Zashulan and Krasny Chikoy mines. The coal-forming plants also included those having affinity with Cyatheaceae and Dicksoniaceae, Pinaceae, as well as phytoplankton and remains of Ginkgocycadophytus-producing plants.

In the coals of the Bukachacha Basin were found the cuticles of *Pseudotorellia transbaikalica* Bugdaeva, *Elatides asiatica* (Yokoyama) Krassilov, *Pagiophyllum* sp., *Pityophyllum* sp.1., cf. *Farnsdalea fragilis* Bose. The palynospectra are dominated by cyatheaceous ferns, *Ginkgocycadophytus*, conifers (mainly having affinity with Araucariaceae and Pinaceae).

The main coal producers of the Kharanor Coal Mine in the Turga-Kharanor Depression are the bennettite *Nilssoniopteris* aff. *prynadae* Samylina, ginkgophyte *Pseudotorellia kharanorica* Bugdaeva, conifers *Elatides* sp.A, *E. cf. zhoui*, *Holkopitys* sp. A, *Pagiophyllum* sp. In the clastic beds the remains of *Ginkgo manchurica* (Yabe et Oishi) Meng et Chen, plants having affinity with Taxaceae (*Tomharrisia* sp.A) and Pinaceae have been found.

Thus, we found in the Lower Cretaceous coal-bearing deposits the plants previously unknown for this region. Such taxa, as *Hymenophyllum iwatsukii*, *Phoenicopsis krassilovii*, *Pseudotorellia palustris*, *Ps. resinosa*, *Samaropsis aurita*, *Krassilovia mongolica*, *Elatides* cf. *zhoui* were described from the Early Cretaceous of Mongolia.

Phoenicopsis parva was described by N.D. Vassilevskaya and V.A. Samylina from the Silyap Formation of the Aptian age (Zyryanka Coal Basin, North-East Russia).

Czekanowskia bugdaevae was described by A.I. Kiritchkova and V.A. Samylina from the Early Cretaceous Semen locality (Central Transbaikalia). This species was found in the Bukachacha and Chikoy basins. *Cz. jacutica* occurs in the Batylykh Formation (Eastern Siberia). *Cz. vachrameevii*, described by V.A. Vachrameev from Baisa locality in headwaters of the Vitim River, later was discovered in the Tarbagatay and Chita-Ingoda basins of the Central Transbaikalia.

Elatides asiatica (Yokoyama) Krassilov is widely distributed in China, South Primorye, Amur River Region (Bureya Basin). For the first time its remains found in the most eastern locality of the Transbaikalia, in the Bukachacha Basin.

Arctopitys sp.A, *Tarphyderma* sp.nov., *Holkopitys* sp.A are very unusual coal-forming plants for the Early Cretaceous of Transbaikalia with adaptations to dry conditions.

Based on the paleobotanical data we can conclude that the Early Cretaceous coal formation was widely manifested in the Central and East Asia.

Acknowledgments: The present study was supported by the Russian Foundation for Basic Research (project 17-04-01582).

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