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CONTENTS

[11] Flora and correlation of Lower Cretaceous deposits of the central and eastern Transbaikalia

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The fossil flora from the Lower Cretaceous deposits of the Okino-Klyuchi, Chikoi, Tugnui, Tarbagatai, Bada, Chita-Ingoda, Bukachacha, and Turga-Kharanor basins of the Transbaikalia were studied.

The flora of the Selenga Formation of the Okino-Klyuchi Basin includes ferns *Scleropteris dahurica* Prynada, *S. tarbagataica* Prynada, *Birisia onychioides* (Vassilevskaja et Kara-Mursa) Samylina, *Asplenium dicksonianum* Heer (Skoblo et al., 2001). The main coal-forming plants in this basin are *Nilssoniopteris* sp., *Phoenicopsis* sp., *Czekanowskia* cf. *communis* Kiritchkova et Samylina, *Ginkgo* sp., *Taxus huolingolensis* Dong, Shi, Herrera, Wang, Wang, Zhang, Xu, Herendeen et Crane (Fig. I).

The flora of the Tugnui Formation in the basin of the same name was dominated by ferns, ginkgophytes (Pseudotorellia sp.) and conifers. The age of this stratigraphic unit was considered as the Jurassic (Skoblo et al., 2001), but we found pollen of early angiosperms, which indicates the Early Cretaceous age.

The flora of Kuti Formation of the Tarbagatai Basin is represented by *Sphenopteris tenuissima* Prynada, *Scleropteris tarbagataica* Prynada, *Scleropteris dahurica* Prynada, *Czekanowskia vachrameevii* Kiritchkova et Samylina, *Podozamites eichwaldii* f. *major* Schimper. The coal-forming plants in this basin are *Anomozamites* sp. (rare), *Czekanowskiales* sp.ind. (rare), *Ginkgo* cf. *insolita* Samylina (common), *G.* cf. *coriacea* Florin (common), *Pseudotorellia* sp. (abundant), *Pityophyllum* sp.1. (common), *Athrotaxites* (?) sp. (rare).

The plants produced the base of coals of the Tignya Formation (Khalyarty coal mine, Bada Basin) are conifers *Arctopitys* sp. A, *Tarphyderma* sp. A (Fig. I).

It was revealed from the coals of the Chernovskoe and Tataurovo coal mines (Chita-Ingoda Basin) the following plants: *Czekanowskia vachrameevii*, *Phoenicopsis parva* Vassilevskaja, *Ginkgo manchurica* (Yabe et Oishi) Meng et Chen, *Pseudotorellia palustris* Shi, Herrera, Herendeen, Leslie, Ichinnorov, Takahashi et Crane, *Ps. resinosa* Shi, Herrera, Herendeen, Leslie, Ichinnorov, Takahashi et Crane, *Elatides* cf. *zhoui* Shi, Leslie, Herendeen, Ichinnorov, Takahashi, Knopf et Crane. In the clastic deposits of the Chernovskoe coal mine Baisia hirsuta Krassilov has been found

The Early Cretaceous flora of the Chikoi Basin was composed of lower plants, ferns, *Pseudotorellia* sp., *Leptotoma kryshtofovichii* Srebrodolskaja et Samylina, *Phoenicopsis tchikoensis* Kiritchkova et Jadrischenskaja, *Ph. baicalensis* Kiritchkova et Jadrischenskaja, *Ph.* cf. *vassilevskiana* Samylina, *Czekanowskia bugdaevae* Kiritchkova et Samylina, *Cz. jacutica* Kiritchkova et Samylina, various conifers, and *Baisia hirsuta* (Atlas of fauna and flora of Transbaikalia, 2002).

We have established that the main coal-forming plants of the Turga Formation in the Bukachacha Basin are *Pseudotorellia transbaikalica* Bugdaeva, *Ginkgo* sp., *Mirovia* sp., *Elatides asiatica* (Yokoyama) Krassilov, *Pagiophyllum* sp. (*Farndalea fragilis* Bose). We found the bennettite *Vitimia doludenkoae* Vachrameev, leptostrobalean *Czekanowskia* aff. *communis* Kiritchkova et Samylina, conifer Schizolepidopsis canicularis Leslie, Glasspool, Herendeen, Ichinnorov, Knopf, Takahashi et Crane.

Among the coal-forming plants of the Kuti Formation in the Turga-Kharanor Basin – bennettite *Nilssoniopteris* aff. *prynadae* Samylina, leptostrobalean *Phoenicopsis* sp., ginkgophytes *Pseudotorellia* sp., *Ps. kharanorica* Bugdaeva, conifers *Elatocladus* sp., *Athrotaxites* (?) sp., *Pagiophyllum* sp., *Holkopitys* sp.

Czekanowskia vachrameevii was first described from the Baisa locality (Zaza Formation of the Vitim Plateau), later found in the Tarbagatai and Chita-Ingoda basins. Another species, *Cz. bugdaevae*, described from the Semyon locality of the Elizavetino Basin in Central Transbaikalia, was found in the Chikoi Basin. The species *Cz. communis* has a wide geographic distribution in Siberia, but a narrow time range, usually the Aptian (Samylina, Kiritchkova, 1991).

Elatides asiatica occurs in the Barremian-Albian flora of South Primorye and China. In the Transbaikalia this species was found in the Bukachacha Basin – the most northern and eastern locality.

A very unusual plant, *Tarphyderma* sp. A, with adaptations to an extremely dry climate was found in the coals of the Lipovtsy Formation (Aptian) of the Razdolnaya River Basin of Southern Primorye and the Tignya Formation of the Bada Basin of Transbaikalia.

Baisia hirsuta had a wide geographical distribution - the localities of Baisa, Semyon, Shivia, Turga, Chernovskoe and Chikoi coal mines (Zaza and Turga Formation, Transbaikalia), Sihetun (Yixian Formation, China).

The Early Cretaceous flora of Transbaikalia has a number of taxa in common with the floras of Siberia.

Phoenicopsis parva, occurring in the coals of the Chita-Ingoda Basin, was described from the Aptian Silyap Formation of the Indigirka River Basin (Samylina, 1993). The ferns *Scleropteris dahurica* and *Birisia onychioides* are widespread in the Aptian–Albian floras of the Lena River Basin (Kiritchkova, 1985). Initially, the previous species was described by V.D. Prynada (1962) from the Tarbagatai Basin, the latter also found in the Okino-Klyuchi Basin (Skoblo et al., 2001).

Nilssoniopteris prynadae is known from the Early-Middle Albian Buor-Kemyuss Formation of the Zyryanka Basin; we identified this taxon in the Kuti Formation of the Turga-Kharanor Basin.

The Transbaikalian flora is similar to the Early Cretaceous flora of Mongolia by such common taxa as *Pseudotorellia palustris*, *Ps. resinosa*, *Schizolepidopsis canicularis* (Aptian-Albian Tevshiin Govi Formation), *Elatides zhoui* (Aptian-Albian Huhteg Formation), with the Early Cretaceous flora of China - *Taxus huolingolensis* and *Ginkgo* manchurica (Huolinhe Formation, Inner Mongolia Province, Northeast China). The latter species is also common in the coal-bearing Fuxin Formation (Liaoning Province, Northeast China).

Previously, the flora of the Zaza and Turga formations of Transbaikalia was compared with the flora of the Jehol Biota (the Yixian, Jiufotang, and Shahai formations of Northeast China), whose age varies from the Barremian to the beginning of the Albian (Bugdaeva, Markevich, 2012). Common species are *Baikalophyllum lobatum* Bugdaeva, *Neozamites verchojanensis* Vachrameev, *Nageiopsis transbaikalica* Srebrodolskaja, *Baisia hirsute* and others. Considering that the sequence of these formations begins mainly with volcanic deposits, which are replaced by coal-bearing deposits up the section, the absolute age of the latter is determined as Aptian-Albian, it can be assumed that the coal-bearing deposits of Transbaikalia with a flora similar in composition are also of the same age as the Jiufotang and Shahai formations.

Keywords: Early Cretaceous, coal-bearing deposits, fossil flora, stratigraphic correlation, Transbaikalia.

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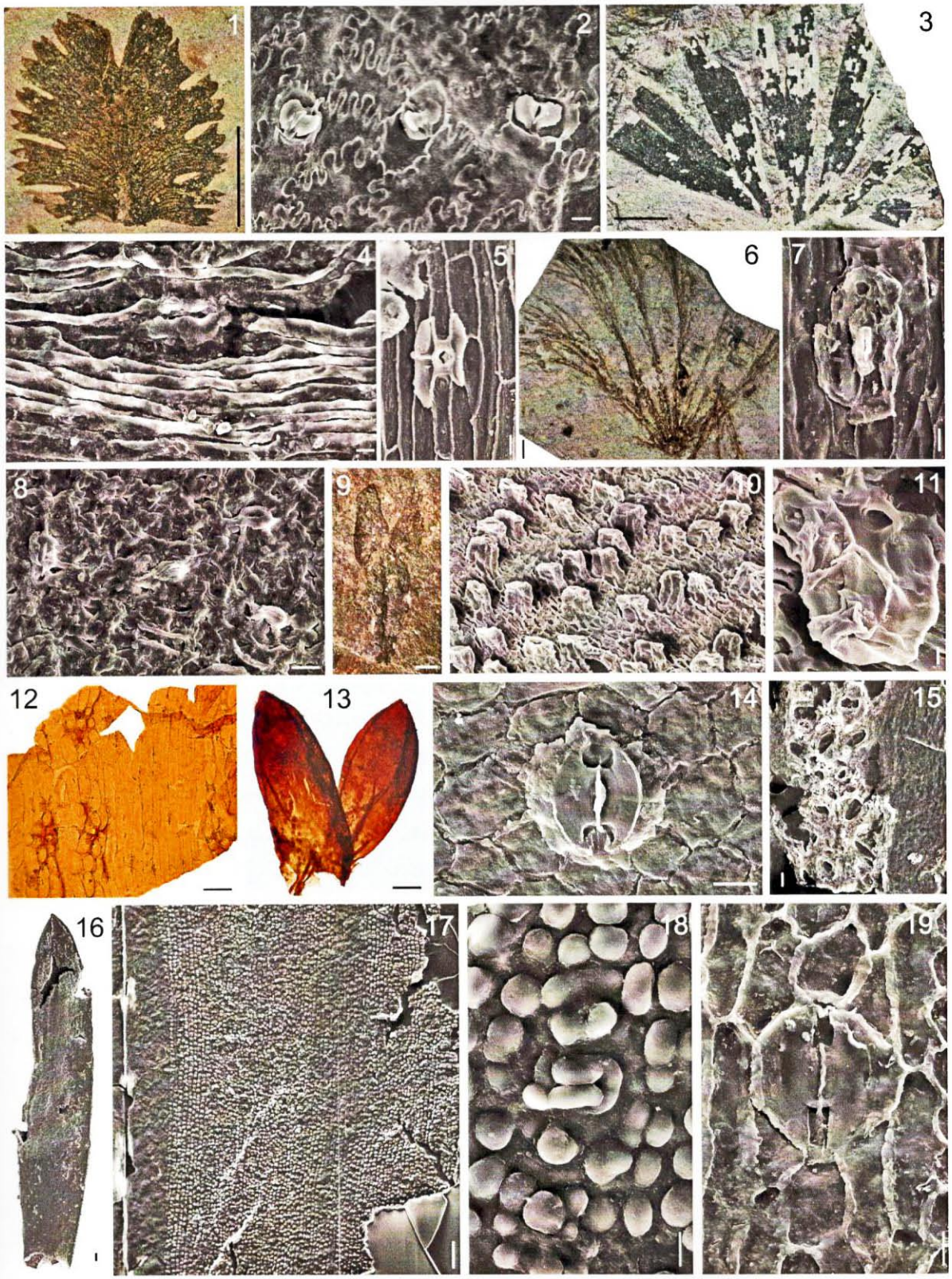

Fig. 1. Fossil plants important for the correlation of the Lower Cretaceous deposits of Central and Eastern Transbaikalia.

1. *Baikalophyllum lobatum*. 2. *Nilssoniopteris* aff. *Prynadae* (SEM). 3. *Ginkgo manchurica*. 4. *Pseudotorellia palustris* (SEM). 5. *Czekanowskia vachrameevii* (SEM). 6-7. *Czekanowskia bugdaevae*: 6 – bundle of leaves, 7 – leaf cuticle (SEM). 8. *Ginkgo manchurica* (SEM). 9. *Schizolepidopsis canicularis*. 10-11. *Tarphyderma* sp. A

(SEM): 10 - cuticle, 11 - suprastomatal chamber. 12. *Phoenicopsis parva* (LM). 13-14. *Elatides asiatica*: 13 – two leaves (LM), 14 – stoma (SEM). 15. *Elatides* cf. *zhoui* (SEM). 16-19. *Taxus huolingolensis* (SEM): 16 – leaf, 17 – outer surface of the lower cuticle, 18 – outer surface of the lower cuticle with abundant papillae, in the center - the entrance to the stoma, covered by two polar papillae, 19 – stoma, inside view. Bars: 1 – 1 cm, 2 – 10 μm, 3 – 1 cm, 4 – 10 μm, 5 – 10 μm, 6 – 1 cm, 7 – 10 μm, 8 – 20 μm, 9 – 1 mm, 10 – 20 μm, 11 – 10 μm, 12 – 50 μm, 13 – 0,5 mm, 14 - 20 μm, 15 – 10 μm, 16 – 100 μm, 17 – 100 μm, 18 – 10 μm, 19 – 10 μm.

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