Botanica Pacifica
A JOURNAL OF PLANT SCIENCE AND CONSERVATION
VOLUME 3, NO. 2 2014

Botanica Pacifica (BP) publishes peer-reviewed, significant research of interest to a wide audience of plant scientists in all areas of plant biology (structure, function, development, diversity, genetics, evolution, systematics), organization (molecular to ecosystem), and all plant groups and allied organisms (cyanobacteria, fungi, and lichens). Indexed by Russian Science Citation Index (http://elibrary.ru/title_about.asp?id=34460)

© Botanica Pacifica 2014. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the written permission of the copyright holder. Requests for permission must be addressed to the editor.

© Botanica Pacifica 2014. Все права защищены. Ни одна часть данного издания не может быть воспроизведена или передана в любой форме и любыми средствами (электронными, фотографическими или механическими), или представлена в поисковых системах без письменного разрешения издателя авторских прав, за которым следует обращаться к редактору.

Chief editors:
Pavel V. KRESTOV – Botanical Garden-Institute FEB RAS, Vladivostok, Russia
Peter G. GOROVOI – Pacific Institute of Bio-Organic Chemistry FEB RAS, Vladivostok, Russia
Vadim A. BAKALIN – Botanical Garden-Institute FEB RAS, Vladivostok, Russia

Editorial board:
Zumabeka AZBUKINA – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Vyacheslav Yu. BARKALOV – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Nadezhda I. BLOKHINA – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Sergei Yu. GRISHIN – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Dmitrii E. KISLOV – Botanical Garden-Institute FEB RAS, Vladivostok, Russia
Andrei E. KOZHEVNIKOV – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Yuri I. MANKO – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Alexander M. OMELEKO – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Boris S. PETROPAVLOVSKII – Botanical Garden-Institute FEB RAS, Vladivostok, Russia
Nina S. PROBATOVA – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia
Yuri N. ZHURAVLEV – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia

Editorial council:
Konstantin S. BAIKOV – Institute of Soil Science and Agrochemistry SB RAS, Novosibirsk, Russia
Tatiana A. BLYAKHARCHUK – Tomsk State University, Tomsk, Russia
Elgene O. BOX – University of Georgia, Athens, USA
Victor V. CHEPINOGA – Irkutsk State University, Irkutsk, Russia
Klaus DIERSSEN – University of Kiel, Kiel, Germany
Nicolai B. ERMAKOV – Central Siberian Botanical Garden SB RAS, Novosibirsk, Russia
Andrew N. GILLISON – Center for Biodiversity Management, Yungaburra, Australia
Andrew M. GRELLER – Queens College, The City University of New York, New York, USA
Michael S. IGNATOV – Main Botanical Garden RAS, Moscow, Russia
Woo-Seok KONG – KyungHee University, Seoul, Republic of Korea
Nadezhda A. KONSTANTINOVA – Polar-Alpine Botanical Garden-Institute KSC RAS, Kirovsk, Russia
Ilya B. KUCHEROV – Institute of Botany RAS, St-Petersburg, Russia
Yukito NAKAMURA – Tokyo University of Agriculture, Tokyo, Japan
Vladimir G. ONIPCHENKO – Moscow State University, Moscow, Russia
Dmitrii D. SOKOLOFF – Moscow State University, Moscow, Russia
Byung-Yun SUN – Chongbuk National University, Chungju, Republic of Korea
Hideki TAKAHASHI – The Hokkaido University Museum, Hokkaido University, Sapporo, Japan
Stephen S. TALBOT – US Fish and Wildlife Service, Anchorage, USA
Gennadii P. URBANAVICHUS – Institute of the Industrial Ecology Problems of the North KSC RAS, Apatity, Russia

Secretariat:
Ekaterina A. BERESTENKO – Botanical Garden-Institute FEB RAS, Vladivostok, Russia
Eugenia V. BIBCHENKO – Botanical Garden-Institute FEB RAS, Vladivostok, Russia

ISSN: 2226-4701

Journal Secretariat:
Botanica Pacifica
Botanical Garden-Institute FEB RAS
Makovskii Str. 142
Vladivostok 690024 RUSSIA
http://www.geobotanica.ru/bp
botanica.pacifica@icloud.com
krestov@biosoil.ru
vabakalin@gmail.com

Eugene A. Borovichev 1,2*, Vadim A. Bakalin 3,4 & Yuriy S. Mamontov 1,2

ABSTRACT
The genus Plagiochasma Lehm. et Lindenb. counts two species in Russia. In the course of the present study, many specimens were re-identified and distribution patterns were defined more exactly. Identification key to the species known in the treated area is compiled. The species descriptions based on specimens from Russia are provided, and the data for distribution, ecology preferences and specific morphological characteristics are described for each taxon.

Keywords
Plagiochasma, Aytoniaceae, Russia, taxonomy, phytogeography, Hepaticae

RéSUMÉ

Проведена ревизия рода Plagiochasma Lehm. et Lindenb., представленного в России двумя видами. В ходе проведенного исследования значительное количество изменений было переопределено и, таким образом, распространение видов существенно уточнено. Составлен ключ для определения видов рода в России. Рассмотрены распространение признаваемых таксонов в России, а также их экологические предпочтения и специфические черты морфологии.

Ключевые слова
Plagiochasma, Aytoniaceae, Россия, таксономия, фитогеография, печеночники

This paper continues a series of works dealing with the taxonomy of Marchantiales in Russia (Borovichev et al. 2009, 2012, Borovichev & Bakalin 2013). Plagiochasma Lehm. et Lindenb. is a relatively large genus of thallose hepatics and includes 16 species (Bischler 1998). The genus is one of the most distinctive within the genera of Marchantiales in Russia due to dorsal short-stalked female receptacles (sometimes almost sessile) without rhizoidal furrow; large, fleshy and almost globose involucres which beyond the margin of the receptacles. However, when sterile, species of Plagiochasma may be mistaken with Reboulia hemisphaerica (L.) Raddi or even Prestia quadrata (Scop.) Nees.

This study is largely based on a critical revision of ca. 50 specimens that are kept in the Botanical Garden-Institute, Vladivostok (VGBI, with incorporated collection from VLA) and the herbaria of the Polar-Alpine Botanical Gar.


Thalli drought-tolerant; small- to medium-sized, (3–) 5–15 (~24) mm long, (1.5–) 2–5 (~6) mm wide; forming more or less pure mats; simply or sparingly dichotomously branched, sporadically with ventral innovations; usually yellow to yellow-green, with often red-brown to purple secondary pigmentation, especially along margins, but never grayish blue or violet; thallus dorsal surface not reticulate; flat, sometimes slightly concave. Dorsal epidermis firm, with thin- to thickened cell walls, with or without trigones; pores elevated above epidermis; simple, surrounded by (1–) 2–3 concentric rings of (5–) 6–8 cells in each, with or without trigones. Rhizoids smooth and pegged, densely covering ventral surface of midrib of thallus. Thallus underside with ventral scales in two rows on each side to margins from midrib; with numerous scattered mainly hyaline oil-cells; each scale with 1–3 appendages, narrow to broad, often constricted at base; appendage margins often sinuous-dentate and bearing slime-papillae. Monoicus (autoisous). Antheridia in sessile receptacles on terminal or ventral branches. Female receptacle dorsal on leading thallus; stalk of receptacle hyaline to, sometimes, purple at the base; subsessile; without rhizoid furrow; carpacephalum disc with 3–4 lobes and 1–4 involucres, with single sporophyte in each; pseudoperianth lacking. Spores yellow to brown; distinctly tetrahedral, with a wide, the faces usually with coarse, rather regular areolae. Elaters yellowish; without spiral thickenings. [The description include features observed in the species of Plagiochasma recognized in Russia.]


© Botanical Garden-Institute FEB RAS. 2014
According to the current systematics the genus contains two subgenera: subgen. Plagiochasma and subgen. Microphyllum Bisch. (Bischler 1977) that differ from each other in pore morphology. Subgen. Plagiochasma characterized by pores somewhat elevated above the surface of dorsal epidermis and surrounded by several rings of cells. Contrary, subgen. Microphyllum characterized by not elevated pores surrounded by only single ring of small cells, sometimes with conspicuously thickened radial walls.

Two species of Plagiochasma were reported from Russia: Plagiochasma pterospermum C. Massal. and Plagiochasma japonicum (Steph.) C. Massal. (Konstantinova, Bakalini et al. 2009). Both of them belong to the subgen. Plagiochasma.

Key to the species already known in Russia or may be found here

1. Thalli apical segments similar in length to other segments; ventral scales with 1–2 triangular to widely triangular, hyaline to rose, pink or violet appendages, appendage length/width ratio 1.5–2.5: 1, appendage apex not acuminate ........................................................................ ............................. P. japonicum (Steph.) C. Massal.

- Thalli apical segments 2–4 times shorter than other segments; ventral scales with 1–3 narrowly-triangular (sometimes even linear) hyaline to reddish or rusty appendages, appendage length/width ratio 3 and more, appendage apex long acuminate ................................................................................. P. pterospermum C. Massal.


Illustrations: Kashyap, 1929 (pl. XVI, fig. 1–3 as P. articulatum); Horikawa 1934 (p. 110, fig. 1 (as P. sessilephalum); Horikawa 1937 (p. 427, fig. 1; p. 428, fig. 2 (as P. nipponicum); Bischler 1979 (p. 57, fig. XI; p. 59, fig. XII; p. 63, fig. XIII); Bapna & Kachroo 2000 (p. 417, fig. 249A); Singh & Singh 2009 (p. 350, fig. 96; p. 351, pl. 89).

Map: Bischler 1979 (p. 60, carte 5).


Description (Fig. 1): Thalli small- to medium-sized, 5–15 (–24) mm long, 2–4 (–6) mm wide, forming more or less pure mats; dichotomously branched, rarely with ventral innovations; segments oblong; apical segments frequently 2–4 times shorter than other segments; apex notched; upper surface not reticulate, flat, sometimes slightly concave; upper surface yellowish-green to olive-green or strongly yellowish, sometimes with red-brown secondary pigmentation; thallus margins undulate to crenate, strongly incurved when dry; purplish to red-brown tinged. Dorsal epidermis firm; cells (15–) 25–30 (–45) × (10–) 15–24 (–35) μm, with thin- or thickened cell walls and large nodulose trichomes; oil-cells sparsely distributed; pores elevated above epidermis; hole (15–) 20–28 (–32) μm in diameter, surrounded by (1–) 2–3 concentric rings of 5–7 cells in each, with thickened radial walls. Acrenychma occupying 1/2 – 2/3 (–3/4) of the thallus height and 3–5-layered in the middle; air chambers small and empty. Ventral tissue parenchymatous, absent beneath the wing; consisting of small, thin-walled cells. Midrib relatively ill-defined, thallus over midrib (270–) 320–480 (–620) μm thick. Rhizoids smooth and pegged, densely covering ventral surface of midrib of thallus. Ventral scales shiny, purple, reddish to carrot-red at margin; asymmetrically lunate; (700–) 1000–1600 μm long and (300–) 600–800 (–1000) μm wide, cells 20–30 μm long and (10–) 15 (–20) μm wide, with numerous scattered hyaline oil-cells; appendage 1–2 (–3) per each scale, plane, narrowly-triangular or lanceolate to linear; hyaline or reddish to carrot red; appendage cells (20–) 25–35 (–40) μm long and 20–25 μm wide; with few marginal slime papillae; appendage apex long acuminate, terminated by 1 cell; base neither narrow nor plicate but appendage sometimes longitudinally plicate; length/width ratio 3–6 : 1. Sexual condition autoicous. Male receptacle on terminal or ventral branches, situated after female receptacle and always at base of articulation; forms V- to hoof-shaped or reniform disk or rarely loosely dispersed group in center of thallus; antheridia scales red or hyaline, acuminate at apex, margin with short slime-papillae. Female receptacle dorsal on leading thallus, situated at the base of articulation or in median part of the thallus; stalk of receptacle hyaline to, sometimes, purple at the base; subsessile, up to 6 mm long, 0.5–0.8 mm wide; with 2–4 air chambers over midrib (270–) 320–480 (–620) μm thick. Carpocephalum disc with 3–4 lobes and 1–4 involucres, with single sporophyte in each. Capsule brown, globose. Spores 56–82 μm in diameter; light- to dark brown; reticulated; wing margin well defined, 8–10 μm wide. Elaters yellowish, 200 to 250 μm long and 12–14 μm wide; without spiral thickenings.

Differentiation and variation. P. pterospermum hardly differs from P. japonicum and P. articulatum Lehm. et Lindenb. and may be easily mistaken with them. The main differentiation features are given in the key. The misidentification of P. pterospermum seems to be very easy when sterile plants are in the hand. In the latter case the main attention should be paid to thallus size and epidermal cells features. P. articulatum has a wider, 4–6 (–7) mm wide and freely

Botanica Pacifica. A journal of plant science and conservation. 2014. 3(2): 19–26
Plagiochasma in Russia

Botanica Pacifica. A journal of plant science and conservation. 2014. 3(2): 19–26

branched thallus, yellowish-green to dark green of thallus upper surface coloration, epidermal cells without distinct trigones and epidermal pores with thin radial walls with never nodulose trigones. Contrary, P. pterospermum characterized by narrower, rarely branched thallus, 2–4 (–6) mm wide, mostly with yellowish upper surface coloration, dorsal epidermal cells with nodulose trigones and pores with thickened radial walls.

When sterile, P. pterospermum and P. japonicum may be confused with Reboulia hemisphaerica or even Pressia quadrata. From Reboulia hemisphaerica the species of Plagiochasma differ in: 1) ventral scales with 1–3 widely to narrowly-triangular or lanceolate appendages (may be linear, but very rarely) vs. ventral scales with 2–3 (–4) narrow linear to long filiform appendages in R. hemisphaerica; 2) epidermal pores surrounded by (1–) 2–3 concentric cell rings vs. (3–) 4–6.

Figure 1 Plagiochasma pterospermum C. Massal. (1,3–4, 6–9, 12 – from Primorsky Province, Nakhodka City Area, Borovichev, 30.X.2013 (VBGI); 2, 5, 10–11 – from Primorsky Province, Dalnegorsk Town Area, Bakalin, 16.IX.2011 (VBGI). 1 – habit of plant, dorsal view; 2–4 – air-pores from dorsal epidermis of thallus; 5 – dorsal epidermis of thallus; 6 – part of transverse section with air-pore; 7–8, 10–11 – ventral scales with appendages; 9 – body of ventral scale; 12 – appendages of ventral scale. Scale bars: 3 mm for 1; 0.5 mm for 7–8, 10–11; 300 µm for 6; 80 µm for 3–5; 50 µm for 2, 9, 12.
concentric cell rings in R. hemi sphäria. From Pressia quadrata the Plagiochasma species differ in: 1) pores not visible with hand-lens vs. pores visible on the dorsal thallus surface with hand-lens as whitish or grayish colored points in Pressia; 2) simple pores vs. barrel-shaped pores in Pressia; 3) ventral scales with 1–3 widely triangular to narrowly-triangular or lanceolate appendages vs. single lanceolate appendage in Pressia; 4) presence oil-cells in ventral scales vs. lacking oil-cells in ventral scales in Pressia.

Ecology: P. pterospermum prefers Ca-rich substrates, commonly growing in rock cracks and crevices filled with fine-grained soils; more rarely it occurs on steep fine soil slopes to watercourses. It forms pure mats or sometimes associated with Rebulia hemisphaerica and Mannia fragrans (Bakl.) Frye et L. Clark.


Kamimura (1939) recorded Plagiochasma intermedium Linden. et Gottschke for Moneron Island, a small island near Sakhalin, the Russian Far East. Later Bischler (1979) studied 21 specimens identified as P. intermedium from Asia (but not that from Moneron Island) and found most of them belong to P. japonicum, also P. pterospermum, and (only two specimens) to P. cordatum. In the same paper Bischler also writes (1979: 45): «Par contre, sa [P. japonicum] présence à Sakhalin où le climat est nettement continental, paraît peu probable». This was the reason the record of P. japonicum from Sakhalin was tentatively regarded by Bakalin (2006)

Seventy years later Andrejeva (2009) recorded this species from Republic of Altai, Irkutsk and Chita Provinces (South Siberia, Russia). We were able to study only one specimen identified as P. intermedium from Sakhalin that was tentatively regarded by Bakalin (2006) and Konstantinova, Bakalin et al. (2009) at the record of P. pterospermum. Whether this suggestion is correct or not we could not check in the present study.


Illustrations: Kashyap 1929 (pl. XV, fig. 9–12 as P. intermedium); Udar & Chandra 1964 (p. 216, fig. 1 as Plagiochasma parvum); Udar & Chandra 1965 (p. 77, fig. 1: p. 79, fig. 2: p. 81, fig. 3: p. 83, fig. 4: p. 85, fig. 5: p. 88, fig. 6, p. 91, fig. 7 as P. intermedium); Bischler 1977 (p. 73, pl. II, fig. 5–6, 10–15, 17; p. 83, pl. V; p. 47, fig. 7–9; p. 85, pl. VI, fig. 10–11); Bischler, 1979 (p. 40, fig. IV, p. 43, fig. VI, p. 47, fig. VII); Bapna & Kakchoo 2000 (p. 416, fig. 248); Kazanovskiy 2008 (p. 639); Singh & Singh 2009 (p. 347, fig. 95; p. 348, pl. 88 as P. intermedium).
**Map:** Bischler, 1979 (p. 44, carte 3).

**Description** (Fig. 2, 3): Thalli small- to medium-sized, (3–) 5–15 (–20) mm long, (1.5–) 3–5 (–6) mm wide, forming more or less pure mats; simply or sparingly dichotomously branched, sporadically with ventral innovations; segments lingulate; apex emarginated or notched; upper surface not reticulate, plane; color of upper surface yellowish-green to dark green, frequently with reddish secondary pigmentation; thallus margins relatively broad, slightly undulate to crispate; suberect to strongly incurved (convex dorsally) when dry; purplish. Dorsal epidermis firm, not nodulose trigones; oil-cells sparsely distributed; pores slightly to conspicuously elevated above epidermis; 18–30 (–38) μm in diameter, surrounded by (1–) 2–3 concentric rings of (5–) 6–8 cells in each, with moderately to strongly thickened radial walls. Aerenchyma 1/2 – 2/3 of thallus height in the middle, where 3–4-layered; air chambers small and empty. Ventral tissue parenchymatous, disappear to the wing; consisting of small, thin-walled cells, with solitary oil-cells. Midrib relatively ill-defined, thallus over midrib (320–) 400–600 (–720) μm thick. Rhizoids smooth and pegged, densely covering ventral surface of midrib of thallus. Ventral scales shiny, pink to violet; asymmetrically lunate; (860–) 1200–1600 μm long and (600–) 800–1000 μm.

**Fig. 2.** *Plagiochasma japonicum* (Steph.) C. Massal. (1, 4–6 – from Khabarovsk Territory, Komsomol’sk District, Gambaryan, 2.IX.1987 (VBGI); 2–3, 7–9 – from Primorsky Province, Khasan District, Bakalin, 20.IX.2010 (VBGI). 1–2 – habit of plant, dorsal view; 3 – part of transverse section with air-pore; 4–5 – air-pores from dorsal epidermis of thallus; 6 – dorsal epidermis of thallus; 7, 9 – ventral scales with appendages; 8 – appendages of ventral scale. Scale bars: 3 mm for 1–2; 0.5 mm for 7, 9; 300 μm for 8; 150 μm for 3; 50 μm for 4, 6; 40 μm for 5
wide; ventral scales body asymmetrically crescentic with sinusous- entire margins or with sporadic development of irregularly projecting teeth; **cells size** 20–25 μm long and 15–20 μm wide; with numerous scattered hyaline or (rarely) silvery-shine oil-cells; marginal cells more slender and sometimes obliquely disposed; rarely with few marginal one-celled slime papillae; ventral scales appendages 1–2 per scale; plate; fragile; triangular to widely triangular; **appendage cells size** 20–30 μm long and 18–30 μm wide; **appendage apex** not acuminate; hyaline to pink or violet; length/width ratio 1.5–2:1; slightly constricted at the base. **Sexual condition** autoicus, sometimes early decaying thallus bases gives an aspect of dioicoic inflorescence. **Male recep tacle** on terminal or ventral branches; V- or horse-shoe shaped; antheridia in loosely dispersed group; antheridal scales red to pink, sometimes hyaline, with slime papillae. **Female receptacle** dorsal on leading thallus; stalk of receptacle hyaline, but sometimes purple at the base; subesuissile, 0.2–2.0 mm long, 0.5–0.8 mm wide; **arechogonal scales** at base and rarely at apex of receptacle stalk numerous, hyaline to rose; narrow lanceolate to almost linear, with slime papillae. *Carpocephalum* disc concave, medially, with 3–4 lobes; involucres 1–3, with a single sporophyte in each. **Capsule** brown, globose. **Spores** 60–90 μm in diameter; light- to dark brown; reticulated; wing margin well defined, 12–15 μm wide. Elaters yellowish, to 300 μm in long and 10–15 μm in diameter, without spiral thickenings. **Variation:** Margin of ventral scales varies from entire (#P140-1-04) to dentate, where teeth vary from 1–2-celled (#P46-2-10) to long 3–8-celled (#26-08-1/1). Color of ventral scale oil-bodies varied from colorless to (rarely) silvery-shine (#26-08-1/1). **Variation in sexuality:** Most authors regarded *Plagiochasma japonicum* as autoicus (Bischler 1977, 1979, Bapna & Kachroo 2000). Studying the material from Trans-Baikal and Primorski Territories we found the male and female plants often growing in separate patches. Probably it is a result of destruction basal parts of normally autoicus-rosettes. Similar pseudodiosicous cases were described for some species of Marchantiidae (Schuster 1992, Borovichev et al. 2012, 2014). **Distribution:** The area covers Southern (Bhutan, India), South-Eastern (Philippines, Hawaiian Islands) and Eastern (China, Mongolia, Japan, Taiwan, Korea and Asian part of Russia) Asia (Bischler 1979, Pippo 1990, Long & Grolle 1990, Meinunger et al. 1991, Yamada & Choe 1997, Katagiri & Furuki 2012, Konstantinova, Bakalin et al. 2009). Earlier, the species was reported in Russia from Altay (Potemkin 2010) and Buryatiya Republics (Kazanovskiy & Potemkin 1995), Zabaikal斯基 (Afonina et al. 2012) and Primorskii (Gambaryan 1992) Territories. In Siberia, *Plagiochasma japonicum* is widely distributed in the South of Trans-Baikal (Zabaikal’skii) Territory, although not found northward of 54°N. In the course of the present study this species was additionally found in Khabarovsk Territory and Irkutsk Province. This species was recorded before for the Russian Far East from the only one locality in Partizanskii District of Primorski Territory (Gambaryan 1992). However, the cited specimen (VBGI) contains plants of *P. pteraspermum*. Due to data in hand this species is more or less common in low elevations of mountainous system of the Russian Asia. **Ecology:** In Siberia, the species occurs usually on South-facing rock outcrops, and grows on soil in rock niches or over thin soil layer over rocks, usually in part shade on slopes of mountains with forest or steppe communities. *Reboulia hemiphteraria*, *Elevena nana* (Shimizu et S. Hatt.) Borovich. et Bakalin, *Mannia fragrans* and *Targionia hypophylla* L. usually occur in the same places, and sometimes growing together with *Plagiochasma japonicum*. Altitude range in Siberia is about 600–1300 m a.s.l. In Trans-Baikal Territory and Irkutsk Province, *P. japonicum* was collected mostly in pure mats, usually bearing archeogonia, but very rarely with antheridia and sporophytes. In the Russian Far East this is the species of broadleaved deciduous temperate forest belt. It occurs mostly in open to semi-shaded sites, in pure mats or in association with *Targionia hypophylla* and *Reboulia hemiphteraria*, on steep slopes to watercourses (aside of direct impact of the running water), in cliff crevices of different reaction (both of acidic tufts and Ca-rich limestone). *Plagiochasma japonicum* included to the Red Data Book of Russia as rare species (Kazanovskiy 2008). Indeed, before it was known from very limited localities in Primorski Territory (indication based on misidentification, see above) and area near Baikal Lake. Currently many additional localities for this species were found and we have not seen reasons to regard this species as rarity in the Russian liverwort flora. **Specimens examined:** RUSSIA (newly reported areas marked by asterisk). **Altay Republic,** Altay State Nature Reserve, Chuylyshman River valley, left bank of Kurkure River, waterfall, on wet slope, with gyroscia, 23.V.1982, Zolotuhin & Koroleva (MHA, as *Reboulia hemi-pteraria*); ibidem, Tokpak Creek, in the middle course, fine-earth on wet cliff, 23.VII.1993, Ignatov #36/29 (MHA, as *Pelotkęd quadrate*). **Irkutsk Province,** Slyudyanskii District, Khamar-Daban Range, Mangaran River Valley, rocky steep slope, on soil, with antheridia and sporogonia, VIII.2002, Kazanovskiy # T1/29 (IRK). **Khabarovsk Territory,** Komsomol’sk District, Tambovka Settlement, 50°55′11″N 138°11′28″E, rocky bank of Amur River, on humus, 2.1X.1987, Gambaryan (VBGI, duplicate in KPABG #11619); **Primorski Territory,** Khaban District, Kravtsovka Village, Kravtsova’s waterfalls Area, wet tuft cliff near waterfalls, with juvenile female receptacle, in moisture with *Targionia hypophylla* L., 20.IX.2010, Bakalin ##P 46-2-10, 46-3-10 (VBGI); Southern macroslope of the Astaf e-v’s Mt. near Sealsity Cape, cliff, on fine-grained soil in crevice, tangle of shrub, 15.X.2004, Bakalin #P140-1-04 (VBGI, KPABG; as *Reboulia hemiphteraria*); Primalskii District, southern slope of the Chandolaz Mt., cliff crevices, on fine-grained soil, 26.VIII.2007, Cherdantseva #26-08-1/1 (VBGI, KPABG); **Trans-Baikal Territory,** Kyara District, Sokhondinskiy State Biosphere Reserve, Khentey-Chikovskoye Nagorie Uplands, Agutsa Forest Station, Kumyl-Aliva River Valley, Glubokaya Pad’, L.IX.2009, Yakovchenko (VBGI); Agutsa River Valley, granite outcrops on slope, 18.VIII.2010, Afonina #A3510-2 (KPABG, LE); Endive River Valley, rocks on steep slope, 14.VII.2010, Afonina #A2710-1 (KPABG, LE); bank of river, on fine-grained soil in a crack of the rock, with sporogonia, 24.08.2011, Mamontov #YuSM-171-11-1 (KPABG, LE); lower of Khukhje-Bajtsa Brook, southern facing rock outcrops on the mountain slope, on fine-grained soil between large boulders, with sporogonia, 27.VIII.2011, Mamontov #YuSM-181-4 (KPABG, LE); Kyara Settlement vicinity, Kyra River Valley, willow stand in the valley of the river, on fine-grained soil in the clefts and on ledges, 17.VIII.2011, Mamontov #YuSM-111-1-1 (KPABG, LE); 8 km NW of Mangut Settlement, on rocks, 25.VIII.2006, Afonina #47306-1, 47306-3 (KPABG, LE); Karymskoye District, Daruskri Range, Aratsagon Mt., moss talus steppe, on soil in cleft of dry rock outcrops, with archeogonia, 14.VII.2012, Mamontov #YuSM-265-3 (KPABG, LE); Aksha District, Akshe Settlement vicinity, Onon River valley, bank of the river, outcrops of schist in base of slope with bushes thicket,
21.VII.2006, Afonina #A5806-1 (KPABG, LE); National Park “Alhanai”, Ilya River Valley, Daurskiy Range, *Larix dahurica* forest in lower part of the mountain, on rock-blocks, 9.VII.2006, Afonina #A2206-2 (KPABG, LE); Gazimurskiy Zavod District, Gazimurskiy Range, Prjamoy Mul’day Brook Valley, southern facing rock outcrops on mountain slope, on soil in the cliff crack, with archegonia and antheridia, 22.VII.2012, Mamontov #YuSM-278-2 (KPABG, LE); Kalganskiy District, Nerchinskiy Range, southern facing rock outcrops on mountain slope, steppe herb community, with sporogonia, 26.VII.2012, Mamontov #YuSM-289-2 (KPABG, LE); Uljetovskiy District, Cherskiy Range, Ingoda River Valley, shrub-grass forest on southern facing mountain slope, on soil in rock niche, with archegonia, 05.VIII.2011, Mamontov, #YuSM-72 (KPABG, LE); CHINA. INNER MONGOLIA PROVINCE, Great Khingan Range, Saliharmula Nature Reserve, spores of Han Mt., northern facing slope covered by dry steppe, fine-soil in dry crevices in full sun, 3.VIII.2010, Bakalin #China-30-7-10 (VBGI); JAPAN. SAITAMA PREFECTURE, Nakatsugawa, Ohtaki-mura, Chichibu, 3.V.1955, Inoue (TNS#204651; as *Plagiochasma pterospermum*); ibidem, 10.X.1959, Inoue (TNS#204660; as *Plagiochasma pterospermum*).

**Figure 3** *Plagiochasma japonicum* (Steph.) C. Massal. (All from Primorsky Territory, Partizansk District, 26.VIII.2007 Bakalin #K66-14b-05 (VBGI). 1 – air-pore from dorsal epidermis of thallus; 2–3 – appendages of ventral scale; 4, 5, 7–8 – margins of ventral scale body; 6 – ventral scales with appendages. Scale bars: 0.5 mm for 6; 400 µm for 8; 200 µm for 3–4, 7; 100 µm for 2; 50 µm for 1

We are greatly indebted to the curators of IRK (S.G. Kazanovskii), MHA (M.S. Ignatov) and TNS (M. Higuchi) as well as Dr. S.-S. Choi (JNU) for specimen loans. The figure was kindly prepared by Mr. M.A. Bakalin to whom authors are sincerely grateful. We thank reviewers for a careful revision of the manuscript and valuable comments. The work was partially supported by the Russian Foundation for Basic Researches (grants no. 12-04-01476, 13-04-00775, 13-04-01427, 14-34-50143).

**LITERATURE CITED**


Bischler, H. 1998. Systematics and evolution of the genera of the...


