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**INTRODUCTION**

Members of the red algae are widely distributed in oceans around the world. More than 200 taxa of red algae are found in freshwater habitats. They are reported to appear in moving water and attached to rocks and other substrata (Kumano, 2002). The Batrachospermales is the most important group of freshwater red algae, and the *Batrachospermum* is the largest genus among them.

The genus *Batrachospermum* Roth (1797) was established over 200 years ago. To date, more than one hundred species have been reported, and they are distributed worldwide. The *Batrachospermum* is distinguished from other Rhodophyte genus based on a heterotrichous life history phase, lack of tetraspore production, and carposporophytes that have a definite shape. Most taxa are classified into seven sections based on the shape of their trichogyne and carpogonial branch, but some taxa have remained difficult to place (Entwisle and Foard, 1997; Kumano, 2002). Twenty-six species have been previously recorded in China (Hua and Shi, 1996; Jao, 1940, 1941; Shi et al., 1993, 2006; Xie et al., 1999, 2003; Xie and Shi, 2003, 2004, 2005).

In 2006, we discovered a *Batrachospermum* in the Shanxi province of China which did not match any species description. Therefore, we describe it as a new species based on the combination of *B. carpoonvolucrum* Sheath et Vis-like involucral filaments with apical carpogonia and *B. debile* Entwisle et Foard and *B. kraftii* Entwisle et Foard-like long carpogonia (Vis and Sheath, 1996; Entwisle and Foard, 1997; Kumano, 2002).

**Batrachospermum hongdongense** S. L. Xie et J. Feng, sp. nov.—TYPE: CHINA. Shanxi Province, Hongdong County, Guangsheng Temple (111°47’49.86”N, 36°14’23.18”E), on stones and rocks in a stream, 3 Apr 2006, SAS06009 (holotype, SXU). Figures 1, 2

Frons diocea, caespitosa, mucosa, purpurea, 2.5-3.5 cm alta, irregularibus ramosissima. Verticilli globosi, remoti, fere 350-380 μm crassi, ramuli primarii dichotome vel trichotome ramose, 10-12-cellulares, cellulis longi-abovatis, 6-12 μm longis, 4-6 μm latis; secundarii nulli, pili pauci. Cellalae axiales 100-120 μm longae; 30-40 μm latae. Flia corticalia cylindrical, 45-55 μm longis, 4-6 μm in latis.

Spermatangia globosa, singulata vel binata, terminalia vel lateralia in ramulisprimariis, 5-7.5 μm diametro. Ramuli carpogoniferi recti, e cellulis basalis vel terminalia filis bracteatis. Carpogonium 45-52 μm longum, 5-6 μm in latum, trichogyne longi-scimitaria, haud pedicellato. Carposporophyta 1-3, globosi, sparsa in et out verticillis, 65-100 μm diametro, carposporangia ovoidea, 5-7.5 μm lata, 8.5-15 μm longa.

**Description.** Thalli dioecious, gelatinous, caespitose, violet-red, approx. 2.5-3.5 cm high, irregularly branched (Figure 1A, B). Whorls globose, 350-380 μm in diameter, slightly separated, internodes approx. 150-300 μm (Figure 1C). Fascicles 2-3 dichotomously branched, 10-12 cells long; cells long ovoid, 6-12 μm long, 4-6 μm in diameter.

**KEYWORDS:** *Batrachospermum hongdongense,* Batrachospermaceae; China; Rhodophyta.
Secondary fascicles absent. Terminal hairs rare. Axial cells 100-120 μm long, 30-40 μm in diameter, and main axis with cortication consisting of cylindrical cells only, 45-55 μm long, 4-6 μm in diameter.

Spermatangia globose, single or in pairs, terminal or lateral on fascicles, 5-7.5 μm in diameter (Figure 2A). Carpogonial branches straight, arising from the base of fascicles or terminating in involucral filaments, 5-12 cells long; carpogonia 45-52 μm long, 5-6 μm in diameter; trichogyne narrowly long-scimitar, without a stalk (Figure 1B-F). Carposporophytes definitely shaped, spherical, 1-3 per whorl, scattered in inner or outer parts of the whorl, 65-100 μm in diameter; carposporangia ovoid, 8.5-15 μm long, 5-7.5 μm in diameter (Figure 1D).

Ecology. This species grows on rocks and stones in a stream in Guangsheng Temple, Hongdong County, Shanxi, China. The stream is about 10 m wide, 30 cm in depth, and the water is clear, temperature is 11.5°C, pH 6.5.

Distribution. Hongdong County, Shanxi, China (Figure 3); known only from the type locality.

Etymology. The specific epithet is derived from the county name of the type locality.

Relationship to other species. Batrachospermum hongdongense clearly belongs to sect. Batrachospermum given its carpogonial branches are long, straight, and not distinct from the primary fascicles cells (Vis and Sheath, 1996; Vis et al., 1995).

This species is similar to B. carpoinvolucrum in being dioecious, and in the carpogonial branch having some involucral filaments terminated by carpogonia. Batrachospermum hongdongense differs from B. carpoinvolucrum in having narrowly long-scimitar trichogyne, 5-6 μm in diameter, carpogonia 45-52 μm long, and long carpogonial branch, about 5-12 cells long while the latter’s trichogyne is clavate, 7-8.5 μm in diameter, only 15-26 μm long, carpogonial branch 6-7 cells long. This taxon is also similar to B. debile and B. kraftii in the length of carpogonia, about 40-60 μm. Batrachospermum hongdongense differs from B. debile and B. kraftii in having carpogonia terminate some involucral filaments. In addition B. debile trichogynes are narrow club-liner, 3-5 μm in diameter, and the carpogonial branch is typically only 5-7 cells long. B. kraftii trichogynes are oblique-ellipsoidal to scimitar, and 6-11 μm in diameter (Table 1).

In conclusion, because B. hongdongense has whorls
developed normally, carpogonium-bearing branches not spirally twisted, and carposporophyte consisting of gonimoblast filaments and carposporangia distributed in whorls, it was considered to belong to the section *Batrachospermum*. So far eleven species have been reported in this section from China (Hua and Shi, 1996; Jao, 1940, 1941; Shi et al., 1993; Xie et al., 1999; Xie and Shi, 2003, 2004) (Table 2).

**Figure 2.** A. Primary fascicle, showing spermatangium (arrow); B, C, D, E, F. Carpogonial branch and carpogonium (arrow) with long involucral filaments terminated with carpogonia (large arrows).
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LITERATURE CITED


Table 2. Distribution of *Batrachospermum* section *Batrachospermum* in China.

<table>
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<tr>
<td><em>B. anatinum</em></td>
<td>Shanxi (Taiyuan), Anhui (Chuzhou), Henan (Linxian), Chongqing</td>
<td>Water temperature 9-15°C, pH 6-7, on rocks, sands and stone wall in streams</td>
<td>Jao, 1941</td>
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<td><em>B. arcuatum</em></td>
<td>Shanxi (Lucheng), Hunan (Jishou)</td>
<td>Water temperature 16°C, pH 7.5, on rocks in streams</td>
<td>Xie et al., 1999</td>
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<td><em>B. boryanum</em></td>
<td>Shandong (Ji’nan)</td>
<td>Water clear, water temperature 17°C, pH 6, on rocks in streams</td>
<td>Xie and Shi, 2003</td>
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<tr>
<td><em>B. gelatinosum</em></td>
<td>Shanxi (Pingding), Heilongjiang (Shangzhi), Jiangsu (Nanjing), Henan (Xinyang), Hubei</td>
<td>Water temperature 10-22.5°C, pH 6.5-7.8, on rocks and stone wall in streams and mountain streams</td>
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<td><em>B. heteromorphum</em></td>
<td>Hubei (Luotian)</td>
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<td><em>B. hongdongense</em></td>
<td>Shanxi (Hongdong)</td>
<td>Water clear, water temperature 11.5°C, pH 6.5, on rocks and stone in a stream</td>
<td></td>
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<tr>
<td><em>B. involutum</em></td>
<td>Helongjiang (Ning’an)</td>
<td>Water temperature 18°C, pH 7.4, on rocks in waterfall</td>
<td>Xie and Shi, 2003</td>
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<td><em>B. lochmodes</em></td>
<td>Hubei (Changyang)</td>
<td>Water temperature 16.5°C, pH 6.5, on rocks in a mountain stream</td>
<td>Xie and Shi, 2003</td>
</tr>
<tr>
<td><em>B. longipedicellatum</em></td>
<td>Jiangsu (Xuzhou)</td>
<td>Water temperature 16-17°C, pH 7.5, on calcareous land in a spring stream</td>
<td>Hua and Shi, 1996</td>
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<td><em>B. pengzhouense</em></td>
<td>Sichuan (Pengzhou)</td>
<td>Water clear, water temperature 17.8°C, on land in a spring stream</td>
<td>Xie and Shi, 2004</td>
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<td><em>B. szechwanense</em></td>
<td>Chongqing (Beibei)</td>
<td>On cement wall in a rush stream</td>
<td>Jao, 1941</td>
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中國串珠藻屬一新種：洪洞串珠藻

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本文報道了串珠藻屬一新種：洪洞串珠藻 Batrachospermum hongdongense，該種採自山西省洪洞縣廣勝寺。此種雌雄異株，在果胞體的苞片上長有果胞，與 Batrachospermum carpoinvolucrum Sheath et Vis 相似，受精絲形狀與 B. debilis Entwisle et Foard 和 B. kraftii Entwisle et Foard 相似。它與 B. carpoinvolucrum 的區別在於受精絲為曲劍形，末端尖細，直徑 5-6 µm，果胞長 45-52 µm，而 B. carpoinvolucrum 爲柱形，直徑 7-8.5 µm，果胞長僅 15-26 µm；與 B. debilis 和 B. kraftii 的區別在於後兩者雌雄同株，苞片上不長有果胞，並且 B. debilis 的受精絲為細的杆狀，直徑 3-5 µm，B. kraftii 的受精絲為斜橢圓形，直徑 6-11 µm。

關鍵詞：洪洞串珠藻；串珠藻屬；中國；紅藻門。