



## A new *Stemonitis* species and a new record of *Elaeomyxa* from China

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### Abstract

A new species, *Stemonitis planusis*, was collected in Shennongjia National Nature Reserve, Hubei Province, China; it has larger sporocarps that usually end in a plane at the apex of the sporotheca, and its capillitia are expanded at the axils. Additionally, *Elaeomyxa* Hagelst. was documented for the first time in China; *E. miyazakiensis* (Emoto) Hagelst. was identified based on material collected from Dasu Forest, Fushun City, Liaoning Province, China. This newly recorded species is characterised by the wax in its stalk, peridium, and capillitium, and spores (approximately 7–8 µm in diam.) marked with rows of warts. A description and scanning electron micrographs of the collected *Elaeomyxa* and *Stemonitis* are provided. All specimens are deposited in the Herbarium of the Mycological Institute of Jilin Agricultural University (HMJAU), Changchun, China.

**Key words:** *Elaeomyxa miyazakiensis*, *Stemonitis planusis*, SEM, Stemonitidaceae, taxonomy

### Introduction

Myxomycetes are common inhabitants of decaying plant material throughout the world. They are particularly abundant in forested regions where decaying logs, stumps, and dead leaves provide a plentiful supply of potential substrates (Eliasson 2013; Rollins 2013, Stephenson & Stempen 1994). This taxonomic group of organisms consists of more than 1000 species worldwide (Li & Li 1989; Kirk *et al.* 2008).

Stemonitidaceae are a common but important and beautiful family of Myxomycetes. Since Elias Magnus Fries established the family in 1829, 17 genera and 219 species have been reported worldwide (Kirk *et al.* 2008; Lado 2005–2016), of which 11 genera and 42 species have been reported in China (Li & Li 1989; Li 2007; Zhang & Li 2016).

*Elaeomyxa* was established by Robert Hagelstein in 1942, and four species—*E. australiensis* (S.L. Stephenson, G. Moreno & H. Singer) G. Moreno, H. Singer & S.L. Stephenson (Moreno *et al.* 2008), *E. cerifera* (G. Lister) Hagelst. (Hagelstein 1942), *E. miyazakiensis* (Emoto) Hagelst. (Hagelstein 1942), and *E. reticulospora* (Gilert) G. Moreno, H. Singer & S.L. Stephenson (Moreno *et al.* 2008)—are currently known (Kirk *et al.* 2008; Lado 2005–2016). Although not previously reported from China, *Elaeomyxa* sporocarps were found on the bark of a dead log in Liaoning Province, China in September 2012.

*Stemonitis* was established by Gleditsch in 1753. Approximately 18 *Stemonitis* species (Kirk *et al.* 2008, Lado 2001, 2005–2015, Zhang & Li 2016) have been reported worldwide, of which eight species (Li & Li 1989, Li 2007, Zhang & Li 2016)—*S. axifera* (Bull.) T. Macbr., *S. flavogenita* E. Jahn, Verh. Bot., *S. fusca* Roth., *S. herbatica* Peck, *S. pallida* Wingate, *S. splendens* Rostaf., *S. virginensis* Rex and *S. sichuanensis* B. Zhang & Yu Li—have been reported in China. *Stemonitis planusis*, a new species collected in Shennongjia National Nature Reserve, Shiyan City, Hubei Province, China, is described and illustrated below.

### Materials and methods

The fruiting bodies and microscopic structures were examined by light and scanning electron microscopy (Martin & Alexopoulos 1969; Zhang & Li 2012). Permanent slides were mounted in Hoyer's medium (Martin & Alexopoulos 1969), having been prepared according to Robbrecht (1974) by first dispersing capillitia in a drop of 94% alcohol

and determining the colour after one minute. The colour terms are those used in the *Flora of British fungi: colour identification chart* (Anonymous 1969). Observations and measurements of the morphological characteristics were done using a stereomicroscope (20×) and an optical microscope (100×). Approximately ten sporocarps of each collection were measured. About 20 spores and ornamentation measurements were made using an oil immersion objective. Sporocarps, capillitia, and spores were measured using a Nikon dissecting microscope and a Zeiss compound microscope. Photographs were taken with a Leica DM2000 microscope. For scanning electron microscopy (SEM), sporophores were attached to a holder, coated with gold using a Hitachi E-1010 sputter, and examined with a Hitachi S-4800 scanning electron microscope at 10 kV at the Changchun Institute of Applied Chemistry, Chinese Academy of Sciences. Specimens are deposited in the Herbarium of the Mycological Institute of Jilin Agricultural University (HMJAU).

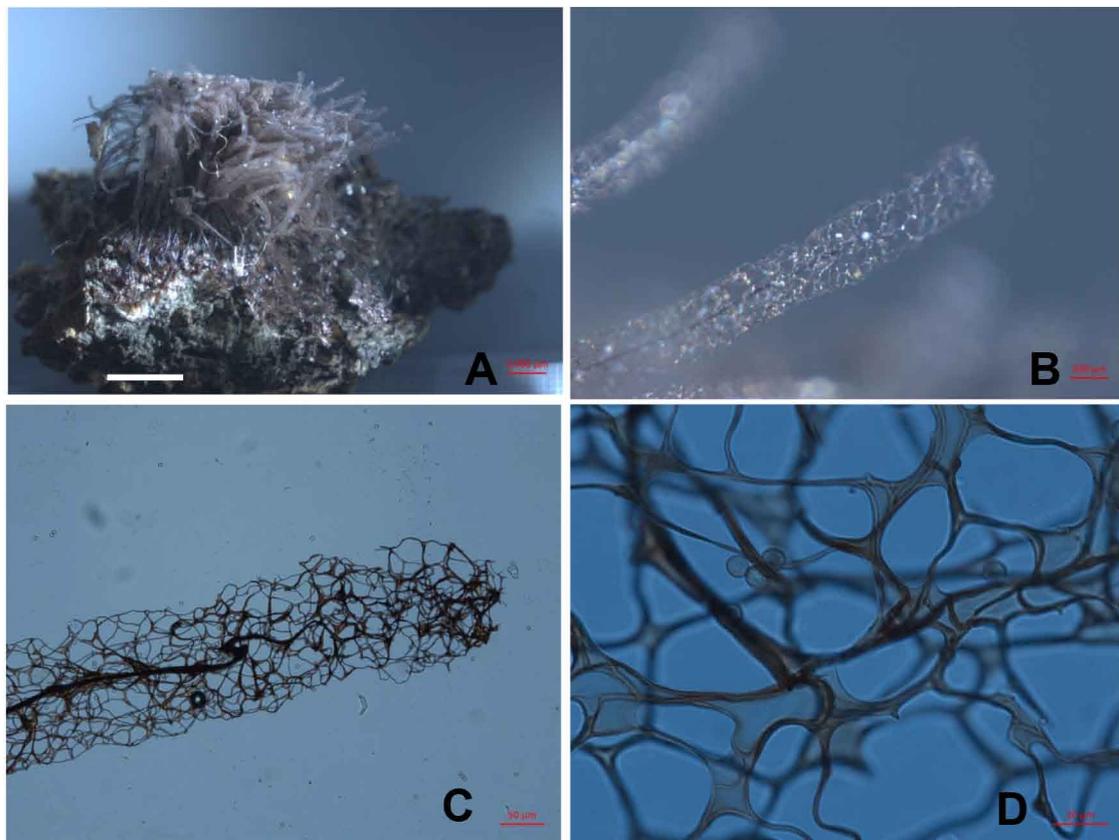
## Results

### Taxonomy

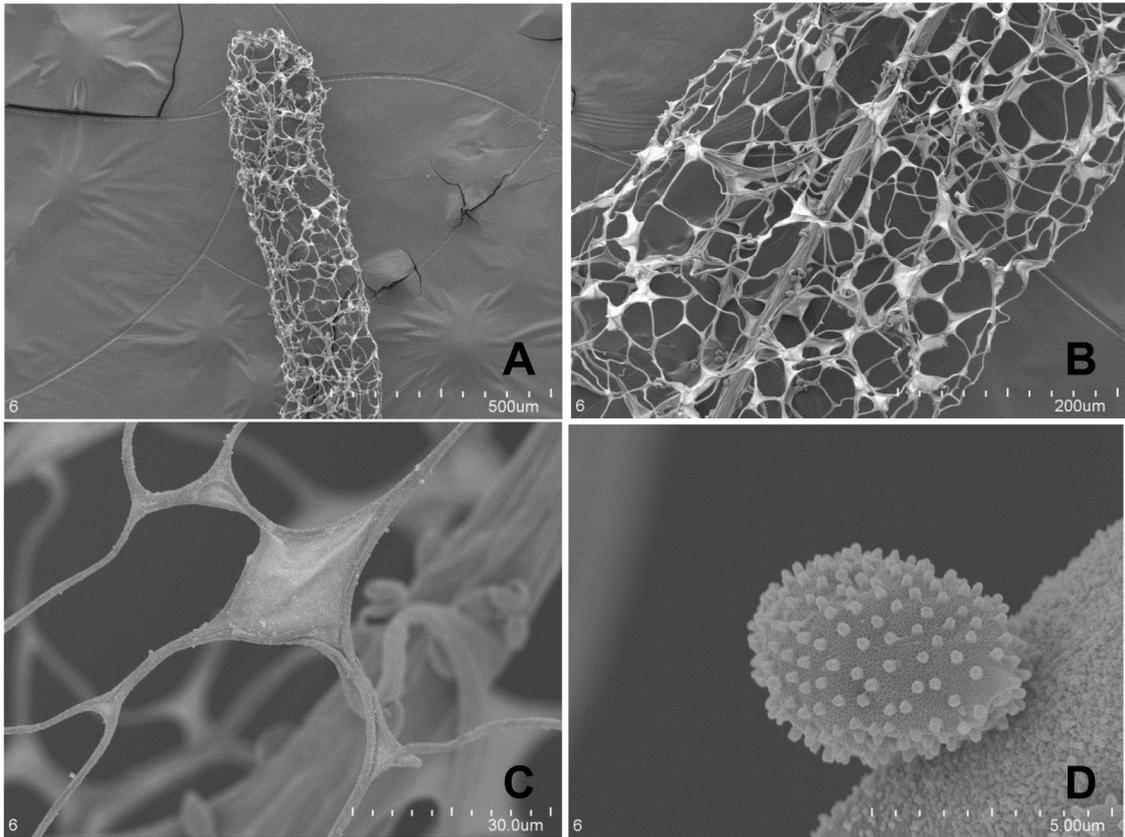
*Stemonitis planusis* B. Zhang & Yu Li, sp. nov. Figs 1, 2

Mycobank: MB 819533

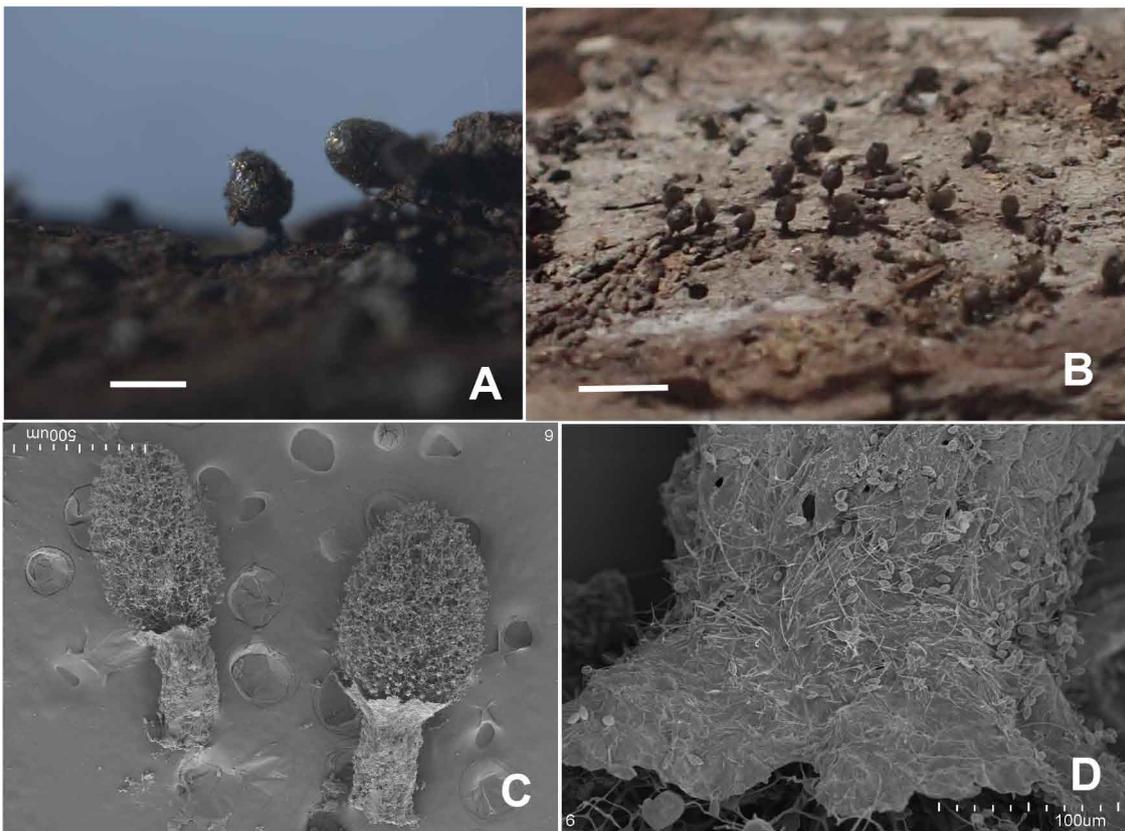
*Sporocarps* in dense tufts, slender, cylindrical, stalked, 10–13 mm in total height. *Sporocysts* 8–10 mm long and 0.5–0.7 mm in diam., usually plane at the apex of the sporotheca, brown to dark brown. *Hypothallus* membranous, transparent. *Stalk* black, polished, 2–4 mm long. *Peridium* early fugacious. *Columella* a continuation of the stalk in the sporocarps, attenuate upwards, dissipating into the capillitium near the apex. *Capillitium* forming a very lax, tubular net around the columella and below the periphery, surface net irregular, 60–300 µm in diam., many expansions in the axils of the surface net capillitium. *Spores* mass dark brown, 9–10 µm in diam., densely and minutely warted, brown in transmitted light.



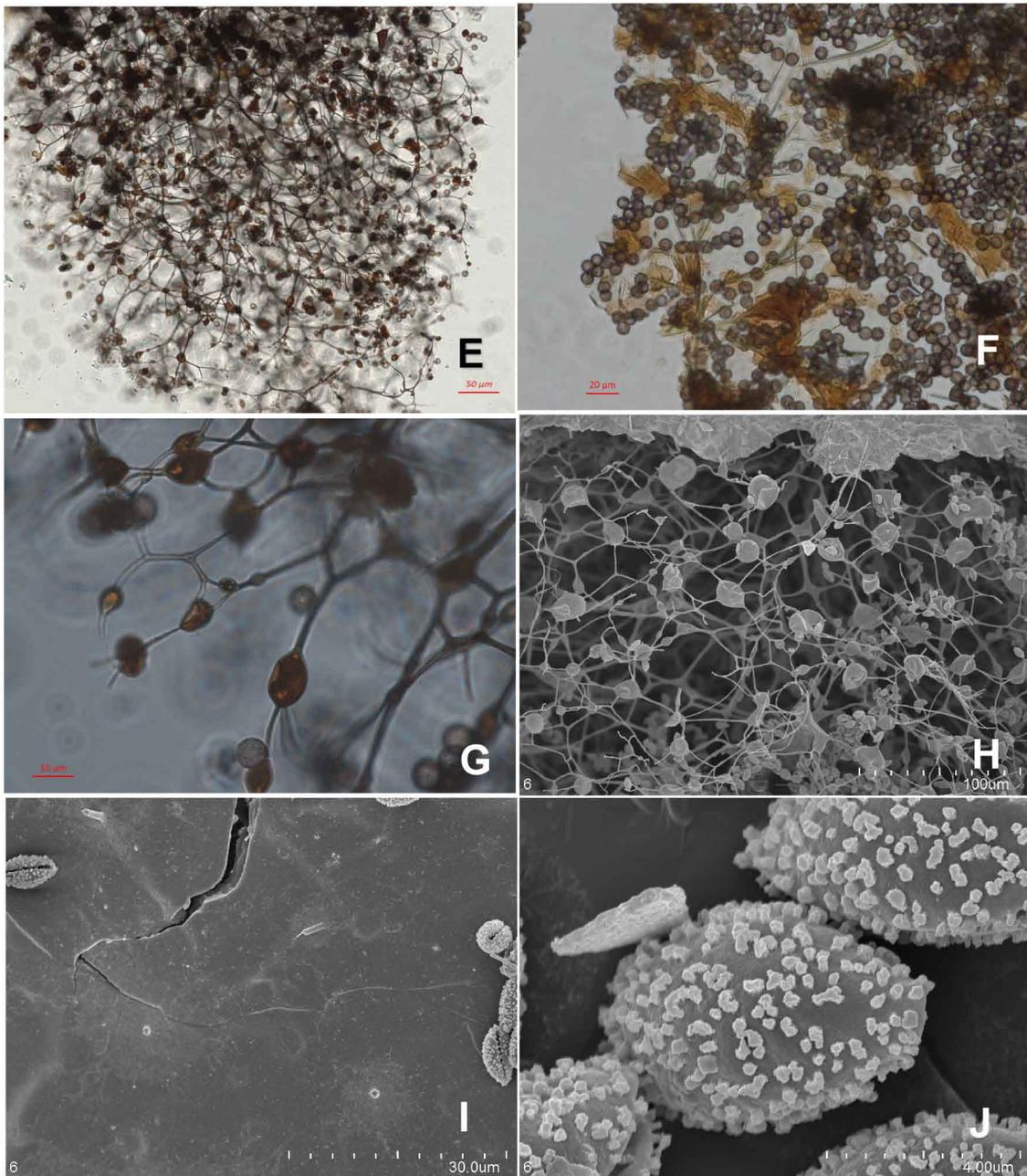
**FIGURE 1.** *Stemonitis planusis* (Holotype). A. Sporocarps. B. Apex of the sporotheca, usually plane. C. Part of the sporotheca under transmitted light. D. Part of the capillitium and some spores. Bar=1 mm



**FIGURE 2.** *Stemonitis planusis* (Holotype). A. Part of the sporotheca. B. Part of the capillitia and columella. C. Expanded axils of the capillitia. D. Spore marked with some warts.



**FIGURE 3.** *Elaeomyxa miyazakiensis*. A. Sporocarps. B. Sporocarps on bark of a dead log. C. Two sporocarps under SEM. D. Part of stalk and some spores. Bars: A=1 mm, B=1 cm.



**FIGURE 4.** *Elaeomyxa miyazakiensis*. E. Part of capillitia under transmitted light. F. Peridium and some spores by transmitted light. G. Part of the capillitia and nodules of pale orange or red wax in the axils by transmitted light. H. Part of the capillitia and nodules by SEM. I. Inner surface of peridium. J. Some spores marked by warts.

**HOLOTYPE.** CHINA, Shennongjia National Nature Reserve, Shiyan City, Hubei Province, on the bark surface of a dead log, 16 September 2013, Zhang Bo 2016120103 (Holotype, HMJAU11323).

**Etymology:**—*planusis* (Latin), referring to the plane at the end of sporocarps.

**Distribution:**—Currently known only from the type locality, Shennongjia National Nature Reserve, Hebei Province, China.

**Comments:** *Stemonitis* Gled. has been reported to contain 18 species, of which *S. flavogenita* E. Jahn (Jahn 1904), *S. capillitionodosa* G. Moreno, D. W. Mitch. (Moreno *et al.* 2010), and *S. sichuanensis* B. Zhang & Yu Li (Zhang & Li 2016) are similar to *S. planusis* based on the inflated capillitial axils and bigger sporocarps. However, *S. flavogenita* has a membranous expansion at the top of the columella, its surface net is much smaller (usually less than 25 µm in diam.), and its spore is slightly smaller (7–9 µm in diam.). *Stemonitis capillitionodosa* is characterised by its sporocarps aggregates, short stalk, capillitium with large meshes and prominent nodes, a columella that is widened at the apex, and densely spinose spores (approximately 9–11 µm in diam.). *Stemonitis sichuanensis* has larger sporocarps (approximately 10–13 mm in total height), a columella usually ending in an ovoid to triangular expansion at the

sporotheca apex, and smaller spores (approximately 6–7 µm in diam.). *Stemonitis planusis*, by comparison, has bigger sporocarps (approximately 10–13 mm total height) that usually ends in a plane at the apex of the sporotheca, expands in the axils of the capillitium, and has bigger spores (usually 9–10 µm in diam.).

*Elaeomyxa miyazakiensis* (Emoto) Hagelst., *Mycologia* 34(5):593 (1942) Figs 3, 4

*Sporocarps* gregarious, stalked, total height 1.1–1.5 mm. *Sporocysts* ovate or subcylindrical, bronze, blue, or violet. *Stalk* 0.5–1 mm long, up to 1/3 to 1/2 of total height, 0.2–0.4 mm diam., irregular cylindrical, often slightly swollen in the middle, brownish black, oily deposits. *Columella* absent. *Capillitium* dark brown to purplish brown in transmitted light, branched and anastomosed threads, and bearing nodules of pale orange or red wax in the axils, which are colourless at the tips. *Spores* mass dark brown. crystal violet, warted, 7–8 µm in diam.

**Specimens examined:**—CHINA. Liaoning Province: Wushun City, Qingyuan Country, Dasu Forest, on the bark of a dead log, 7 September 2012, Zhang Bo 2016121201 (HMJAU11032).

**Comments:**—Approximately four *Elaeomyxa* species have been reported worldwide (Kirk *et al.* 2008, Lado 2001, 2005–15), of which *E. reticulospora* have reticulated spores and three species have spines or verrucose spores. *Elaeomyxa miyazakiensis* was originally described by Emoto (1935) as having oil granules in the peridium and expansion of the capillitium. *Elaeomyxa miyazakiensis* has some resemblance to *Diachea*, but in that genus, there are no expansions in the capillitium and the material inside is lime. This species has been recorded in Japan (Emoto 1935) and America (Stephenson *et al.* 2001). The Liaoning specimens have smaller spores (7–8 µm in diam.) than other specimens (8–10 µm in diam.). The Liaoning and type specimens had a similar habitat (dead logs).

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