

***Dianema macrosporum*, a new myxomycete species from northern China**

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Zhang B. & Yu L. (2013) *Dianema macrosporum*, a new myxomycete species from northern China. – *Sydowia* 65 (1): 21–26.

Dianema macrosporum is described as a new taxon, characterized by large spores (about 15–19 µm in diam.) and mouse grey colour at the margin of the sporotheca, based on material collected from Liaoning Province in China. Description and illustration of the new species by means of scanning electron micrographs and a key to the species of the genus are provided herein. The holotype specimen has been deposited in the Herbarium of the Mycological Institute of Jilin Agricultural University (HMJAU), Changchun, China.

Keywords: Dianemaceae, sp. nov., taxonomy, SEM, slime molds.

Myxomycetes are a small, relatively homogeneous group of eukaryotic organisms and common inhabitants of decaying plant material found throughout the world. They are particularly abundant in forested regions where decaying logs, stumps, and dead leaves furnish a plentiful supply of potential substrates (Stephenson & Stempen 1994, Martin & Alexopoulos 1969). Because of their plasmodium characteristics that essentially represent a single giant cell, myxomycetes are often used in experimental studies of various aspects of cellular physiology and biochemistry. This taxonomic group consists of about 690 species (Lado 2012, Kirk *et al.* 2008).

The genus *Dianema* was established by Rex in 1891. Twelve species have been reported in the world (Kirk *et al.* 2008, Lado 2005–2012). Only one species, *Dianema microsporangium*, was reported in China (Li & Li 1989, 1990). The new species was found on the bark surface of a dead log in Laotudingzi Nature Reserve, Liaoning Province, China, in September 2010. It has an appearance different from all other members in this genus.

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Materials and methods

The sporocarps and microscopic structures were examined by light and scanning electron microscopes (Martin & Alexopoulos 1969, Zhang *et al.* 2012). Permanent slides were mounted in Hoyer's medium (Martin & Alexopoulos 1969). They were prepared according to Robbrecht (1974) by spreading capillitium in a drop of 94 % alcohol, determining colour after one minute and then mounting in Hoyer's medium. Colour terms are given according to Flora of British Fungi (Royal Botanic Garden Edinburgh 1969). Observations and measurements of the morphological characteristics were done under a stereomicroscope (20 ×) and optical microscope (objective 100 ×). About ten sporocarps of the collection were measured, and about 20 spore and ornamentation measurements were made under an oil immersion objective. Sporocarps, capillitium threads and spores were measured using a Nikon dissecting microscope, and photographs were taken with a Canon S70 camera. For SEM the sporocarps attached to the holder were coated with gold using a Hitachi E-1010 sputter and examined with a Hitachi S-4800 scanning electron microscope at 10 kV at Changchun Institute of Applied Chemistry, Chinese Academy of Sciences.

Material investigated. – *Dianema macrosporum* holotype (see below). *Dianema microsporangium*: CHINA, Fujian province, Sanming, on the bark surface of a dead log, 18 Jul 1974, *leg.* Li Hui-Zhong 152 (Holotype, HMAS59508).

Taxonomy

***Dianema macrosporum* Bo Zhang & Yu Li, sp. nov.** – Figs. 1–7.

Mycobank: MB 801904

Holotype. – CHINA, Liaoning province, Laotudingzi Nature Reserve, on the bark surface of a dead log, 12 Sep 2010, *leg.* Zhang Bo 2501 (Holotype, HMJAU10330).

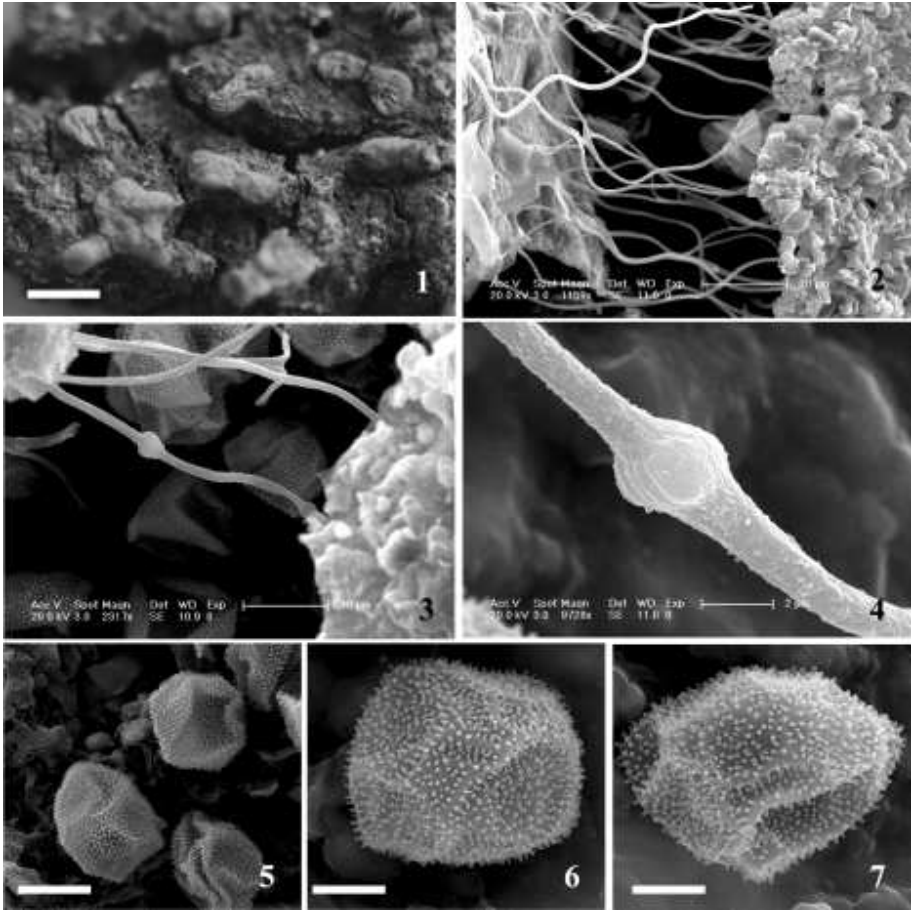
Etymology. – From Latin *macrosporus*, referring to the very large spores.

Distribution. – Up to now known only from the type locality, Liaoning Province in northern China.

Description. – Sporophores sporocarpic or plasmodiocarpic. Sporocarps aggregated, pulvinate, 0.8–1.0 mm in diam. Plasmodiocarps simple or branched, sometimes reticulate or effuse, spreading over 2–4 mm. Sporotheca smoke grey to drab, mouse grey at the margin. Hypothallus inconspicuous. Peridium thick, delicate, with abundant deposits of granular material, dull, pale yellow to dark yellow by transmitted light; dehiscence apical and irregular. Columella absent. Capillitium thread-like, scanty, pale yellowish brown by transmitted light, threads 2–2.5 µm in diam., straight or slightly flexuous, bifurcate to slightly penicillate, intermittently bearing enlarged nodes, 4–6 µm in diam., with broadened attachments to the peridium. Spores free, dark brown, reddish brown in mass, purplish brown by transmitted light, subglobose, 15–19 µm in diam., densely spinulose.

Key to the recognized *Dianema* species

1. Spores banded-reticulate, the reticulum sometimes interrupted..... 2
- 1*. Spores warted or spinulose..... 4
- 2(1). Sporocarps or plasmodiocarps, pulvinate, flattened on top
..... *D. depressum*



- | | | |
|--------|--|-------------------------|
| 2*. | Sporocarps sessile, hemispheric or pulvinate, rounded at the top..... | 3 |
| 3(2*). | Spore reticulum continuous, small-meshed, 7.5–9.5 µm in diam..... | <i>D. aggregatum</i> |
| 3*. | Spore reticulum incomplete, coarse, lax, interrupted by areas lacking ornamentation, 10.5–13 µm in diam..... | <i>D. subretisporum</i> |
| 4(1*). | Spores united into clusters of 2 to 12..... | 5 |
| 4*. | Spores free..... | 6 |
| 5(4). | Peridium thick, capillitium threads thin, without expansions. Spores clustered in groups of 2–6..... | <i>D. corticatum</i> |
| 5*. | Peridium thin, capillitium threads thick, with expansions. Spores clustered in groups of 4–12..... | <i>D. repens</i> |

6(4*). Non-nivicolous species.....	7
6*. Nivicolous species.....	9
7(6). Spores more than 15µm in diam.....	<i>D. macrosporum</i>
7*. Spores less than 15µm in diam.....	8
8(7*). Sporotheca brownish orange, coppery brown, reddish brown, iridescent. Spores 8–10 µm in diam.....	<i>D. harveyi</i>
8*. Sporotheca buff yellow or olivaceous buff yellow. Spores 11–13 µm in diam.....	<i>D. mongolicum</i>
9(6*). Sporotheca copper-coloured, pink.....	10
9*. Sporotheca not copper-coloured, pink.....	11
10(9). Sporotheca copper-coloured, iridescent green or gold. Spores greyish in mass, fading to yellow.....	<i>D. nivale</i>
10*. Sporotheca pink. Spores pinkish in mass.....	<i>D. andersonii</i>
11(9*). Sporotheca lead grey, shining. Spores 10–15 µm in diam.....	<i>D. microsporangium</i>
11*. Sporotheca brown.....	12
12(11*). Sporotheca dark red to brick red. Spores 10–11 µm in diam.....	<i>D. inconspicuum</i>
12*. Sporotheca olivaceous brown to yellowish brown. Spores 12–14 µm in diam.....	<i>D. leptotrichum</i>

Study of the holotype of *D. microsporangium* H. Z. Li & Yu Li

Characters. – Sporophores sporocarpic, flattened-pulvinate, minute, nearly elliptical, 0.2–0.4 mm in diam., mouse grey, shining. Peridium membranous, thin, nearly translucent, almost colourless, dehiscing irregularly at maturity. Capillitium loose, thread-like, colourless, shining, threads 1–1.5 µm in diam., bifurcate, attached to the peridium at the base. Spores free, mouse grey in mass, light brown by transmitted light, globose, warted, 10–14 µm in diam.

Discussion

Among the 12 accepted *Dianema* species, *D. depressum* (Lister) Lister, *D. subretisporum* Kowalski and *D. aggregatum* Kowalski have reticulate spores (Martin & Alexopoulos 1969). *Dianema nivale* (Meyl.) G. Lister has smaller spores (about 8–12 µm in diam.) and a copper-coloured sporotheca. *Dianema corticatum* Lister and *D. repens* G. Lister & Cran have spores all adhering in clusters. Although spores of *D. inconspicuum* Poulain, Mar. Mey. & Bozonnet are spinulose, the shape and colour of the sporotheca, capillitium characters, and colour of spores were distinct from those of the new species found in China. *Dianema andersonii* T. Macbr. differs in its colour of sporocarps and smaller spores (about 10–12 µm in diam.). *Dianema mongolicum* Novozh. can be distinguished from *D. macrosporum* by the rigid network of capillitial threads and smaller spores (about 11–12 µm in diam.). *Dianema leptotrichum* G. Moreno (Moreno *et al.* 2011) differs in the colour of

Tab. 1. Comparison of the most important morphological characters of *Dianema macrosporum* and *D. microsporangium*

	<i>Dianema microsporangium</i>	<i>Dianema macrosporum</i>
Sporocarps	Flattened pulvinate, nearly elliptical	Aggregate pulvinate
Sporocarp size	0.2–0.4 mm	0.8–1 mm
Plasmodiocarps	absent	Simple or branched, reticulate or effuse
Peridium	Membranous, thin, colourless	dull
Sporotheca	Thin	Thick, with granular material
Hypothallus	thin, shining, mouse-grey	inconspicuous
Spore size	10–15 μ m	15–19 μ m
Spore ornamentation	Globose, warted	Subglobose, densely spinulose
Capillitium	Loose, thread-like, bifurcate	Straight, slightly flexous, bifurcate to penicillate, enlarged nodes
Capillitium threads	1–1.5 μ m	2–2.5 μ m
Ecology	Nivicolous	Non-nivicolous

sporotheca and the spore size (about 11–12 μ m in diam.). The sporotheca of *D. harveyi* is ochraceous to dull red or brown, smaller (0.5–2 mm) and thicker (0.35–1 mm), and the spores of *D. harveyi* are smaller (about 8–10 μ m in diam.).

Dianema microsporangium H. Z. Li & Yu Li (Li & Li 1990) is the only species comparatively similar to *D. macrosporum* (Tab. 1), but *D. microsporangium* has a flattened-pulvinate, nearly elliptical smaller sporotheca (about 0.2–0.4 mm), almost colourless peridium, a thin, mouse grey, shining hypothallus and warted spores (about 10–14 μ m in diam.). While *D. macrosporum* has aggregated, pulvinate sporocarps (0.8–1.0 mm in diam.), simple or branched, sometimes reticulate or effuse plasmodiocarps (spreading over 2–4 mm), which are mouse grey at the margin, thick but delicate sporothecae with abundant deposits of granular material, dull peridium, straight or slightly flexous, bifurcate to slightly penicillate capillitium (threads 2–2.5 μ m in diam.), intermittently bearing enlarged nodes, 4–6 μ m in diam., with broadened attachments to the peridium and subglobose, densely spinulose, larger spores (15–19 μ m in diam.). So, *D. macrosporum* is a new species distinct from other *Dianema* species.

Acknowledgements

We thank Tianhao Li for his valuable revisions and kind help. This study was supported by funding from the Ministry of Agriculture of China.

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(Manuscript accepted 9 Nov 2012; Corresponding Editor: I. Krisai-Greilhuber)

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Band/Volume: [65](#)

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