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S.Y. KONDRATYUK

M.G. Kholodny Institute of Botany, NAS of Ukraine

Tereshchenkivska str., 2, 01601, Kyiv, Ukraine

ksya_net@ukr.net

AGONIMIA BLUMII SP. NOV. (VERRUCARIALES, LICHEN-FORMING ASCOMYCOTA), A NEW TAXON FROM EASTERN ASIA

Kondratyuk S.Y. Agonimia blumii sp. nov. (Verrucariales, Lichen-Forming Ascomycota), a new taxon from Eastern Asia. — Ukr. Bot. J. — 2015. — 72(3): 246—251.

A species new for science, *Agonimia blumii* S.Y. Kondr. sp. nov., differing from all known members of the genus *Agonimia* in having three distinct different stages of thallus development, i.e. areolate thallus, dense isidious tufts, and totally soredious scattered and distant convex ‘pseu-doareoles’, from Kedrovaya Pad’ Nature Reserve, Khasan District of Primorsky Region, Russian Far East, is described, compared with closely related taxa and illustrated.

Key words: *Agonimia*, *Russian Far East*, *new species*, *thallus development*

Introduction

The genus *Agonimia* (*Verrucariaceae*, *Ascomycota*) was rather popular among lichenologists during last decades. However, only a few species of this genus were so far included into the molecular phylogeny studies (Muggia et al., 2009, 2010; Guzow-Krzeminska et al., 2012).

Among 10 species of this genus in the world, distribution of *Agonimia allobata* (Stizenb.) P. James in Coppins et al., described in 19th century as a species of the genus *Polyblastia* and transferred to *Agonimia* in 1992 (Coppins et al., 1992), was discussed in the most numerous publications (Kondratyuk, Blum, 1991, Tretiach & Carvalho, 1993; Berger & Turk, 1994, 1995; Holien, 1994; Gustavsson, 1995; Wirth, 1997 b; Longan & Gomez-Bolea, 1998; Guttova & Palice, 1999; Palice, 1999; Fryday, 2001; Halda, 2001; Suija & Juriado, 2003; Alstrup et al., 2004, Dolnik, 2005; Bogdanov & Urbanavichus, 2008, Halda & Muller, 2012 etc.). *A. allobata* is hitherto known from Europe, Asia, and North America. The species *Agonimia opuntiella* (Buschardt & Poelt) Vezda, originally described as a member of the genus *Physcia*, was transferred to *Agonimia* in 1997 (Vezda, 1997). It is widely distributed in Atlantic Europe, Near East and Eastern Asia, North and South America, and Australia (Wirth, 1997a; van den Boom et al., 1998; Aptroot, 2002, 2011; Thus & Dornes, 2003; John & Breuss, 2004; Hitch, 2006; Kondratyuk et al., 2013 etc). *Agonimia tristicula* (Nyl.)

Zahlbr. (Zahlbruckner, 1909), was an object of various morphological and mapping observations (Coppins & Bennell, 1979; McCarthy, 1991, 1996, 2001; Harada, 1993; Goward et al., 1994; Cieslinski & Faltynowicz, 1999; Olech & Kiszka, 1999; Zhurbenko & Gavrilov, 2005; Zhurbenko et al., 2005; Vondrak & Liska, 2013; Kristinsson et al., 2014). It is known from Europe, Asia, and North America.

There are three more species of the genus *Agonimia*, i.e. *A. gelatinosa* (Ach.) Brand & Diederich, *A. globulifera* Brand & Diederich, and *A. repleta* Czarnota & Coppins, rather well known from literature while they were described or combined to this genus in 1999 or 2000 (Serusiaux et al., 1999, Czarnota & Coppins, 2000). Of them, *A. gelatinosa* is so far known in Europe from Belgium, Luxembourg, the Netherlands, northern France and the Czech Republic (Sparrus, 2000; Serusiaux et al., 2003; Vondrak et al., 2010; Vondrak & Liska, 2013), *A. globulifera* – from a wider range of European counties: from Spain to Svålbard and from Belgium to Estonia (Sparrus, 2000; Wirth, 2000; Aptroot et al., 2001; Aragon et Sarrion, 2003; Guttova & Palice, 2004; Suija et al., 2005; Dengler & Boch, 2007; Malicek et al., 2008; Zhurbenko & von Brackel, 2013), and *A. repleta* – from European countries from the British Isles to Poland and Ukraine, and from Portugal to Sweden (Lambley, 2000; Guttova & Palice, 2001; Nordin, 2002; Berger & Priemetzhofer, 2005; van den Boom, 2005; Vondrak et al., 2010; Malicek et al., 2012; Malicek & Vondrak, 2012).

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The next five species, i.e.: *Agonimia pacifica* (Harada) Diederich, *A. octospora* Coppins & P. James, *A. vouauxii* (B. de Lesd) Braud & Diederich, *A. papillata* (O.E. Erikss.) and *A. wheldonii* (= *Atla wheldonii* (Travis.) Savic et Tibell) are known only from a few publications. Three of these species, *A. pacifica*, *A. octospora* and *A. papillata*, are reported mainly from tropical and subtropical regions (Coppins & James, 1978; Aptroot et al., 1997; Aptroot, 2002; Aptroot & Rodrigues, 2005; van den Boom, 2005; Kalb et al., 2012; Kondratyuk et al., 2013), while *A. wheldonii* was recorded from Spain (Serusiaux et al., 1999), and *A. vouauxii* from Europe and Asia (Aptroot, Sipman, 2001; Ratzel et al., 2004; Vondrák et al., 2010; Czarnota & Hernik, 2014).

Five recently described taxa are reported only in original papers, of which two species, i.e. *A. borys-thenica* L.V. Dymytrova, O. Breuss & S.Y. Kondr. and *A. flabelliformis* Halda, Czarnota & Guzow-Krzeminska are known from European countries (Dymytrova et al., 2011, Guzow-Krzeminska et al., 2012). Three other species, *A. coreana* Kashiwadani & Moon, *A. deguchii* H. Harada, and *A. cavernicola* S.Y. Kondr., L. Lokos & J.-S. Hur, are recorded only in the Eastern Asian region (Kashiwadani, 2008; Moon & Aptroot, 2009; Harada, 2013; Kondratyuk et al., 2015).

However, there are still several taxa from East Asia which status should be clarified.

The aim of this article is to provide the formal description, comparison with closely related species, and illustrations of the taxon described below as *Agonimia blumii*.

Material and methods

A new taxon was found among the unidentified collections from the Russian Far East made in 1960s and 1970s by various Ukrainian lichenologists and cryptogamists (O.B. Blum, N.P. Massjuk, O.G. Roms etc.) and kept in the Lichen Herbarium of the M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine (*KW-L*).

Material was investigated and illustrated with stereoscopic microscope Zeiss Stemi 2000-C with digital camera in the Lichen Herbarium of the Institute of Botany of the Slovak Academy of Sciences (*SAV*).

Results

During revision of the Russian Far Eastern collections, several taxa were selected for the further detailed study.

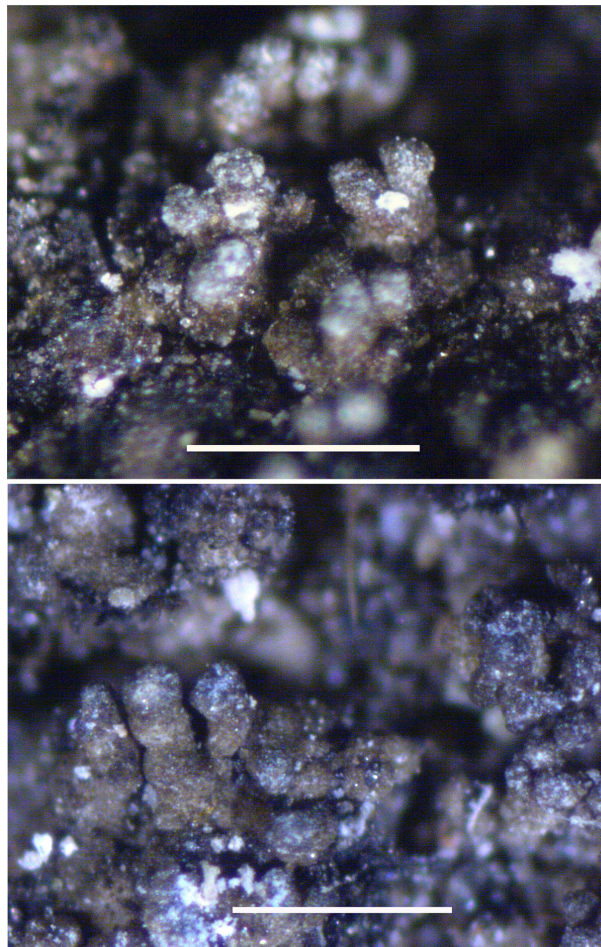


Fig. 1. *Agonimia blumii*, enlarged thalline areoles and separate isidia (Holotype, *KW-L*), scale 0.5 mm

Results of the revision of the *Agonimia* species are provided here.

Taxon description

Agonimia blumii S.Y. Kondr. sp. nov.

Mycobank number MB 812905

Differs from all members of the genus *Agonimia* in having three distinct different stages of thallus development, i.e. areolate thallus, dense isidious tufts, and totally soredious scattered and distant convex ‘pseudo-areoles’.

Type: [Russia:] Primorsky Region, [Khasan District], Kedrovaya Pad’ Nature Reserve, rock outcrops in the upper portion of the mountains near the Primorskaya station, 27.08.1965. O.B. Blum 22 (*KW-L*, as ‘*Lepraria*’ – holotype).

Thallus of three different age stages, first areolate, then more or less tufts of erect isidia and to leprose habit at overmature stage. At first stage thallus plane,

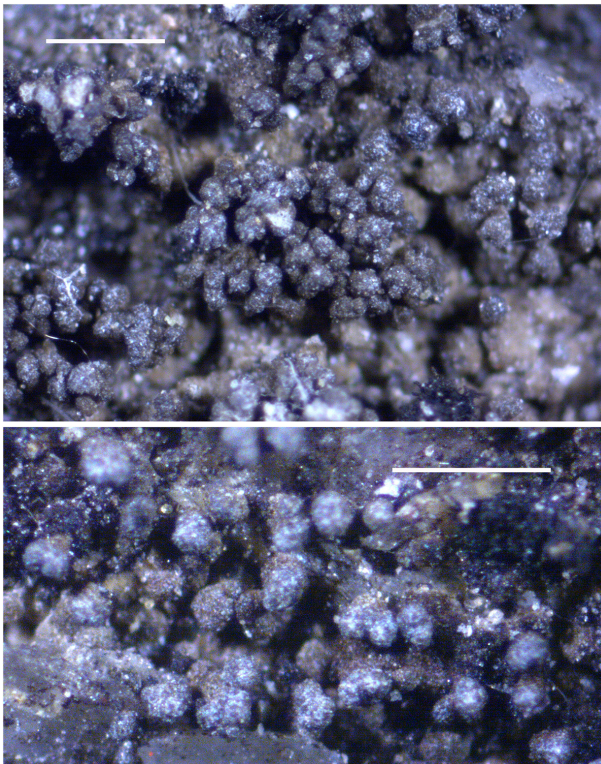


Fig. 2. *Agonimia blumii*, enlarged thalline areoles with numerous isidia (Holotype, *KW-L*), scale 0.5 mm

consisting of distant or aggregated areolae 0.2-0.3(-0.5) [-1] mm across, flat, matt, brownish-greyish or grey to dark greyish or dark brown; soon forming in the middle of each areole a single erect finger-like, pustule- or protuberance-like formation / isidia 0.05-0.2 mm high, and to 0.1 mm diam., slightly swollen towards the tips to 0.125(-0.175) mm diam., straight and not branched or somewhat weakly to richly branched, at the tips blackish or bluish-blackish or whitish-blackish or whitish-bluish-blackish, at first single per areole, then several isidia per areole observed.

The second stage is represented by entirely isidious portions of more or less dense tufts of numerous highly uplifted erect isidia, where thalline areoles are not seen at all.

At the final or at overmature stage, erect isidia totally disaggregating into very fine whitish-greyish-brownish or dirty light grey to brownish-light greyish soredious mass; however, soredious mass usually not becoming confluent, while forming scattered and distant, very convex soredious 'pseudoareoles' (0.2-)0.75-1.5(-2) mm across, with cracks to 0.5(-0.75) mm wide between 'pseudo-areoles' where substrate surface well observed;

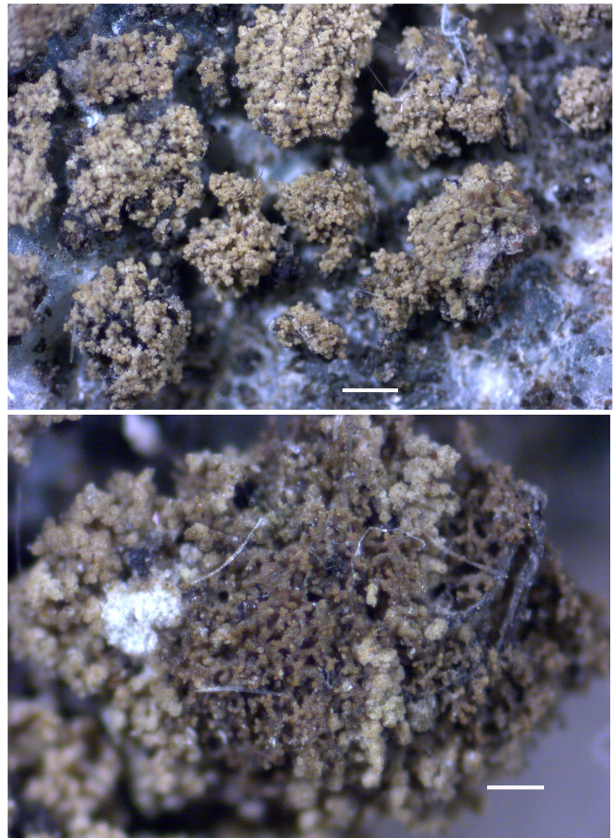


Fig. 3. *Agonimia blumii*, enlarged soredious 'pseudo-areoles' (Holotype, *KW-L*), scales: 0.5 mm (upper) and 200 μ m (lower)

soredia irregular, a. 15-20 μ m diam., often seem to be isidious, sometimes portions with very narrow isidia to 10-20 μ m diam./wide forming fine network and filling in to a half of soredious protuberances observed.

Ecology: on rock surface.

Distribution: It is so far known from the type locality, i.e. *Zemlia Leoparda* (Land of Leopard) National Nature Park, Kedrovaya Pad' Nature Reserve, Primorsky Region, Russian Far East.

Etymology: It is named after Oleg Blum, a known Ukrainian lichenologist who collected the type specimen of this lichen.

Taxonomical notes:

Agonimia blumii differs from all known members of the genus *Agonimia* in having three distinct different stages of thallus development, i.e. areolate thallus of plane scattered or aggregated thalline areoles; dense isidious tufts where thalline areoles with 1-3 erect isidia present, and totally soredious scattered and distant convex 'pseudoareoles'.

Agonimia blumii is similar to recently described *Agonimia cavernicola* from maritime conditions of the Republic of Korea, but differs in having erect (not horizontally oriented) and considerably wider finger-like isidia, forming much thicker and dense isidious tufts, as well as in having isidia disaggregating into convex soredious mass at overmature stage and forming *Lepraria*-like habit.

The specimen was kept among unidentified specimens from the Russian Far East in the Lichen Herbarium of the Kholodny Institute of Botany (KW-L) under the field name '*Lepraria*'. However, it differs from representatives of the genus *Lepraria* in having well developed corticated thalline areoles and well developed erect isidia at first stages, forming soredious mass only at the overmature stage. Furthermore, soredious mass is not confluent like in other representatives of *Lepraria*, but represented by distant convex 'pseudo-areoles', between which wide cracks with well seen substrate surface are present.

It should be mentioned that thalline areoles and erect isidious tufts are rather indistinct owing to their very small size as well as dark brownish or blackish-brownish colour, so they can be easily overlooked, while lighter soredious 'pseudo-areoles' are rather distinct and easily recognized in the field.

Revision of the further collections from Eastern Asian region will hopefully allow to clarify distribution of *Agonimia blumii* and other recently described Eastern Asian taxa.

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I.O. Dudka

Кондратюк С.Я. Agonimia blumii sp. nov. (Verrucariales, Lichen-Forming Ascomycota) – новый вид зі Східної Азії. – *Укр. ботан. журн.* – 2015. – **72**(3): 246–251.

Інститут ботаніки імені М.Г. Холодного НАН України, м. Київ

Подано опис нового для науки виду лишайника – *Agonimia blumii* S.Y. Kondr. sp. nov. з природного заповідника «Кедровая Падь» Хасанського р-ну Приморського краю Росії. Він відрізняється від усіх відомих видів роду *Agonimia* тим, що має три різні стадії розвитку слані: ареольовану слань, густі скупчення /дернинки ізидієподібних виростів і цілковито соредіозну масу, згруповану в «псевдоареолі». Наведено також порівняння *Agonimia blumii* з близькими видами та ілюстрації нового таксона.

К л ю ч о в і с л о в а: *Agonimia*, *Російський Далекий Схід*, *новий вид, розвиток слані.*

Кондратюк С.Я. Agonimia blumii sp. nov. (Verrucariales, Lichen-Forming Ascomycota) – новый вид из Восточной Азии. – *Укр. ботан. журн.* – 2015. – **72**(3): 246–251.

Інститут ботаніки імені Н.Г. Холодного НАН України, г. Киев

Дано описання нового для науки виду лишайника – *Agonimia blumii* S.Y. Kondr. sp. nov. из природного заповідника «Кедровая Падь» Хасанського р-на Приморського края России. Он отличается от всех известных видов рода *Agonimia* тем, что характеризуется наличием трех разных стадий развития слоевища: ареолированное слоевище, довольно плотные скопления изидиевидных выростов и соредиезная масса, сгруппированная в «псевдоареолы». Приведены также сравнение *Agonimia blumii* с близкими видами и иллюстрации нового таксона.

К л ю ч е в ы е с л о в а: *Agonimia*, *Российский Дальний Восток*, *новый вид, развитие слоевища.*