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CLYPEOCOCCUM CETRARIAE (*DACAMPIACEAE, ASCOMYCOTA*) IN THE UKRAINIAN CARPATHIANS

Pirogov M.V. ***Clypeococcum cetrariae* (*Dacampiaceae*, *Ascomycota*) in the Ukrainian Carpathians**. — Ukr. Bot. J. — 2015. — **72**(6): 585—587.

Clypeococcum cetrariae Hafellner is a new species for biota of Ukraine. The specimens of *Cetraria islandica* (L.) Ach. infected by this fungus were collected in the Chornohora Mts. (Eastern Carpathians, Ukraine). *Clypeococcum cetrariae* is a little known species of lichenicolous fungi in the world, therefore in the paper a description of this species and figures are given. A key to *Clypeococcum* D. Hawksw. species is also provided.

K e y w o r d s: lichenicolous fungi, *Cetraria islandica*, Chornohora, Eastern Carpathians, Ukraine

The genus *Clypeococcum* D. Hawksw. was described in 1977 (Hawksworth, 1977). The species of the genus have numerous black spherical pseudothecia that are united in groups by a common black clypeus (*C. galloides* Etayo and *C. grossum* (Körber) D. Hawksw. form convex galls); pseudothecial wall composed of brown to dark brown pigmented cells, textura intricata-like but sometimes becoming pseudoparenchymatous at maturity; hymenium I- and KI- (in *C. galloides* I+ and KI+ violaceous); pseudoparaphyses remaining distinct, filiform, hyaline, septate, sparsely branched and anastomosing; periphyses not clearly defferentiated or having short periphysoids; asci subcylindrical, short-stalked, bitunicate, with a distinct internal apical beak, 2-, 4- or 8-spored; ascospores dark brown, uniseptate, ellipsoid, with delicately verruculose walls; conidiomata pycnidial, immersed; conidia hyaline, simple, bacilliform (Ertz, 2004). At present, 9 species of the genus *Clypeococcum* are known: *C. bisporum* Zhurb., *C. cetrariae* Hafellner, *C. cladonema* (Wedd.) D. Hawksw., *C. epimelanostolum* (D. Hawksw. & Øvstedal) Grube & Hafellner, *C. galloides*, *C. grossum*, *C. hypocenomycis* D. Hawksw., *C. placopsiiphilum* Øvstedal & D. Hawksw. and *C. psoromatis* (A. Massal.) Etayo (Lawrey, Diederich, 2011). The *Clypeococcum* species grow on thallus of lichens from the genera: *Buellia* De Not., *Cetraria* Ach., *Cetrelia* W.L. Culb. et C.F. Culb., *Flavocetraria* Kärnefelt et A. Thell, *Hypocenomyce* M. Choisy, *Lecidea* Ach., *Xanthoparmelia* (Vain.) Hale, *Placopsis* (Nyl.) Linds., *Squamarina* Poelt, *Umbilicaria* Hoffm., etc. *Clypeococcum* species are distributed in North Africa, North and South Americas, Europe, Antarctica and New Zealand.

The genus *Clypeococcum* was first time reported for Ukraine in 2010 from the Ukrainian Roztochia (Pirogov, 2010). In this paper *Clypeococcum hypocenomycis* collected on thallus of *Hypocenomyce scalaris* (Ach. ex Lilj.) M. Choisy is reported.

In 2012, the second species of *Clypeococcum, C. cladonema*, was found in Kyiv Region (Prekrasna et al., 2012). This species was collected on thallus of *Cetraria islandica* by O. Nadeina. In 2013 we collected *Cetraria islandica* (L.) Ach. with lichenicolous fungi in the Chornohora Mts. (Eastern Carpathians, Ukraine). The detailed study of these herbarium specimens showed that this fungus is *Clypeococcum cetrariae*, a new species of lichenicolous fungi for Ukraine. This fungus is a little known species in the world. The description and figures of *Clypeococcum cetrariae* are given in this short report. At the end of the paper, a key for identification of all *Clypeococcum* species is given.

The herbarium specimens were collected and studied according to standard methods (Smith et al., 2009). The ascomata details of *Clypeoccum cetrariae* were examined on handmaid sections in water. The herbarium collections are deposited in the Herbarium of Ivan Franko National University of Lviv (*LW*).

***Clypeococcum cetrariae* Hafellner**

Mitt. naturw. Ver. Steierm. 125: 83 (1996)

Mycelium: immersed in the thallus of lichen. **Hyphae**: brown, flexuous, frequently branching, thin-walled. **Pseudothecia**: immersed, globose, ostiolate, young 35—50 × 41—50 µm, mature 65—75 × 85—90 µm, arising in groups united by a common clypeus that remains largely immersed, the clypeus comprising hyphae of the host and invading fungus, finally dark brown to

black. **Pseudothecial wall**: 6–15 μm thick, thickest near the ostiole where it is scarcely delimited from the tissues of the clypeus, formed of intertwined thick-walled, dark brown hyphae. **Hymenium**: hyaline, 50–60 μm tall. **Subhymenium**: hyaline, 10–15 μm thick. **Pseudoparaphyses**: distinct, persistent, filiform, branched and anastomosing, septate, 1–2 μm thick. **Periphyses**: not clearly differentiated (?). **Asci**: cylindrical, with a distinct internal apical beak when young, 43–46 × 10–13 μm, 4-spored. **Ascospores**: olivaceous brown, 1-septate, ellipsoid to soleiform, rounded at the apices, slightly constricted at the septum, the lower cell often somewhat narrower, often guttulate, weakly verruculose, 14–16(–17.1) × (4.9–)5–6(–6.2) μm. **Pycnidia**: not seen in the Ukrainian sample (see color figure on supplementary sheet).

Host: thalli of *Cetraria islandica*.

World distribution: Austria (Hafellner, 1996); Estonia, Latvia, Poland (Suija, 2005); Siberian Arctic, Russia (A checklist ..., 2009), and Ukraine (this paper).

Specimens studied: Ukraine, Zakarpattia Region, Rakhiv District, neighborhood of Kvasy village, Sheshul Mt., 48°09'01.6"N 24°21'41.1"E, 1683 m alt., 28.06.2013, M. Pirogov (2668, 2669 *LW*).

Key to *Clypeococcum* species

1. Asci at the beginning with 8 spore initials, but constantly 2-spored when mature, ascospores (17–)20–27(–35) × (4–)5–5.5(–6) μm, on thallus of *Cetraria laevigata* and *Flavocetraria cucullata* ..... ***Clypeococcum bisporum* Zhurb.**

— Asci with (2)4 ascospores 2

— Asci with 8 ascospores 3

2. Asci with 4 ascospores, ascospores 8–10 × 5–7 μm, on the thallus of *Buellia melanostola* ..... ***Clypeococcum epimelanostolum* (D. Hawksw. & Øvstedal) Grube & Hafellner**

— Asci with (2)4 ascospores, ascospores 11.5–14(–16) × 5.5–7(–8) μm, on thallus of *Lecidea* sp. ... ***Clypeococcum galloides* Etayo**

— Asci with 4 ascospores, ascospores 14–16(–17.1)×(4.9–)5–6(–6.2) μm, on thallus of *Cetraria islandica* ..... ***Clypeococcum cetrariae* Hafellner**

3. Ascospores mainly exceeding 7 μm wide 4

— Ascospores less than 7 μm wide 5

4. Ascospores (15–)19–22(–26) × (6–)7–9(–10) μm, ascomata 60–120(–150) μm diam., arising in necrotic patches on several *Squamarina* species .... ***Clypeococcum psoromatis* (A. Massal.) Etayo (= *C. epicrassum* (H. Olivier) Hafellner & Nav.-Ros.)**

— Ascospores 14–17(–21)×7–10 μm, ascomata convex gall-like structures 250–350(–700) μm diam., on *Umbilicaria vellea* and *Umbilicaria cinereascens* ..... ***Clypeococcum grossum* (Körber) D. Hawksw.**

— Ascospores (15–)15.5–21(–25) × (7–)7.5–8.5(–9) μm, on thallus of *Placopsis* species ..... ***Clypeococcum placopsiiphilum* Øvstedal & D. Hawksw.**

5. Ascospores (13.5–)14–16(–18) × (5.5–)6–7(–7.5) μm, ascomata mainly 60–150 μm, aggregated in groups of 10–20, parasitic on *Cetrelia olivetorum* on which it forms neat round holes in the thallus, and also on *Xanthoparmelia pulla* ..... ***Clypeococcum cladonema* (Weddell) D. Hawksw.**

— Ascospores (9–)10–12(–13) × (4–)5–6(–6.5) μm, ascomata 50–100 μm, aggregated in groups of less than 10, parasitic on *Hypocenomyce scalaris*, infected squamules becoming brown, bleached and finally dead ..... ***Clypeococcum hypocenomycis* D. Hawksw.**

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Clypeococcum cetrariae Hafellner — новий вид для біоти України. Гербарні зразки лишайника *Cetraria islandica* (L.) Ach., інфіковані грибом, зібрані на території хребта Чорногора (Східні Карпати, Україна). *Clypeococcum cetrariae* є маловідомим видом ліхенофільних грибів у світовій біоті, тому в статті подано його опис, матеріал ілюстрований оригінальними фотографіями. Також наведено ключ для визначення видів роду *Clypeococcum* D. Hawksw.

К л ю ч о в і с л о в а: ліхенофільні гриби, *Cetraria islandica*, хребет Чорногора, Східні Карпати, Україна

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Clypeococcum cetrariae Hafellner — новый вид для биоты Украины. Гербарные образцы лишайника *Cetraria islandica* (L.) Ach., инфицированные грибом, собраны на территории хребта Черногора (Восточные Карпаты, Украина). *Clypeococcum cetrariae* является малоизвестным видом лихенофильных грибов в мировой биоте и поэтому в статье дано его описание, материал иллюстрирован оригинальными фотографиями. Также приведен ключ для определения видов рода *Clypeococcum* D. Hawksw.

К л ю ч е в ы е с л о в а: лихенофильные грибы, *Cetraria islandica*, хребет Черногора, Восточные Карпаты, Украина.

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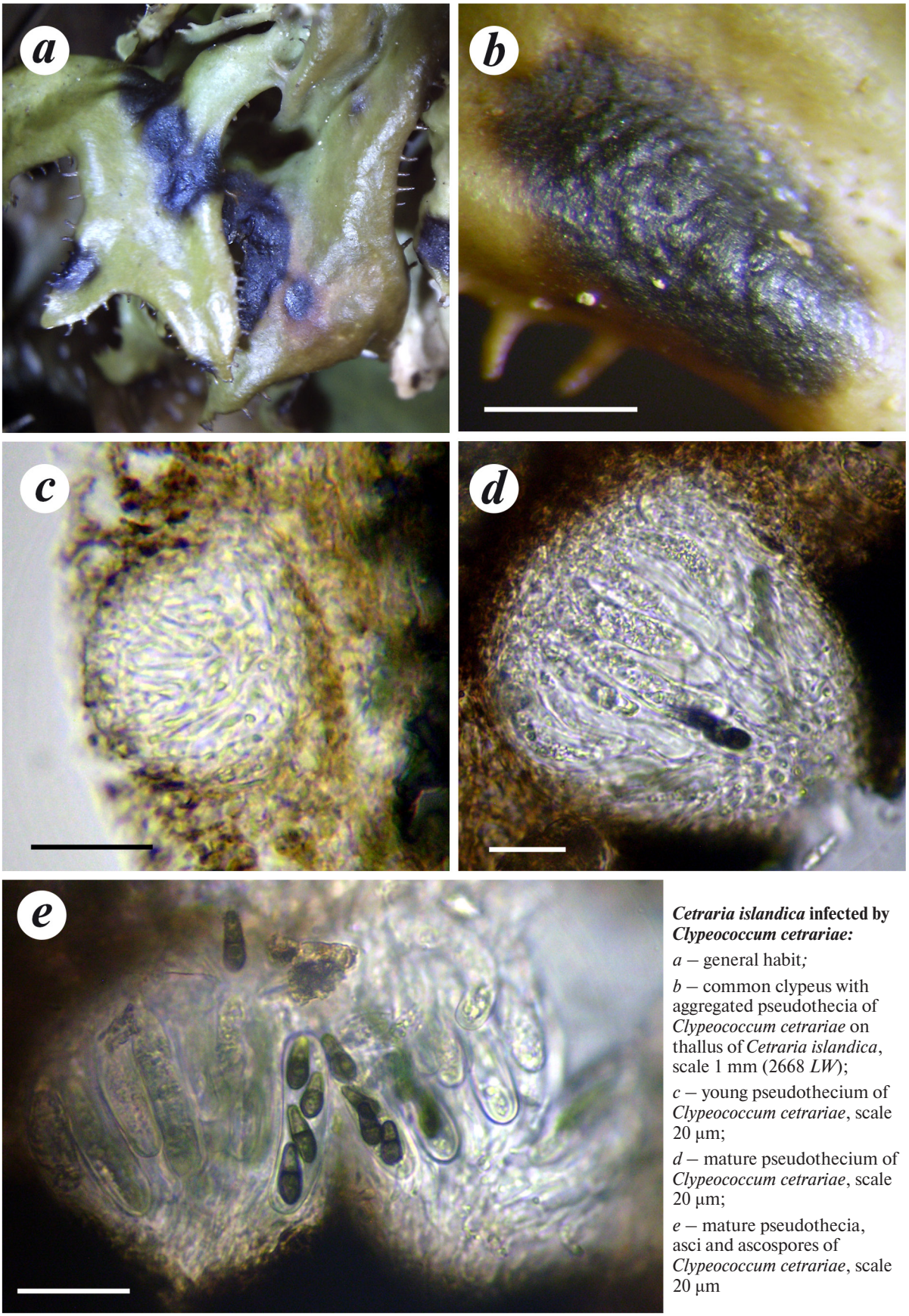

***Cetraria islandica* infected by *Clypeococcum cetrariae*:**

a – general habit;

b – common clypeus with aggregated pseudothecia of *Clypeococcum cetrariae* on thallus of *Cetraria islandica*, scale 1 mm (2668 *LW*);

c – young pseudothecium of *Clypeococcum cetrariae*, scale 20 μm;

d – mature pseudothecium of *Clypeococcum cetrariae*, scale 20 μm;

e – mature pseudothecia, asci and ascospores of *Clypeococcum cetrariae*, scale 20 μm