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SOME NEW AND RARE RECORDS OF ASCOMYCETES IN UKRAINE

Key words: Ascomycota, anamorphic ascomycetes, *Robergea*,
Typanis, *Sirodothis*, distribution.

Abstract

Records of ascomycetes including anamorphic ascomycetes, *Robergea cubicularis* (Fr.) Rehm, *Typanis saligna* Tode and *Sirodothis saligna* (Höhn.) B. Sutton & A. Funk, new for Ukraine are reported. For each the taxonomic position, description, distribution and illustrations are given. Brief comments on related species and on other species of these genera occurring in Ukraine are provided. Two infrequently recorded species, *Cytonaema spinellum* (Kalchbr.) Höhn. and *Trimmatostroma scutellare* (Berk. et Broome) M.B. Ellis, are also reported.

Introduction

During mycological observations in Crimea (Mys Martian Nature Reserve) and Podillya region (National Nature Park «Podilski Tovtry») in 2001 some specimens of interesting tree-inhabiting ascomycetes were collected. After microscopic investigation, database search and bibliographic data examination, several of the species identified have proved to be hitherto unreported in Ukraine. Three of them are presented in this paper with two other species recorded for a second time in Ukraine.

Materials and Methods

All described specimens from Ukraine were collected by the author. Specimens were examined using standard techniques for microscopic fungi. Photographs were taken with a microscope using phase contrast. The descriptions given below are based on the original collections. The specimens are deposited in the Mycological Herbarium of the M.G. Kholodny Institute of Botany, Kiev, Ukraine (KW). The taxonomic position of the species described below follows the 9th edition of the Dictionary of the Fungi [3].

Description of species and discussion

Ascomycota

Ascomycetes

Ostropales

Stictidaceae

Robergea cubicularis (Fr.) Rehm, Ber. Bayer. Bot. Ges., 13: 163 (1912) [Fig. 1]

= *Sphaeria cubicularis* Fr., Syst. Mycol., 2 (2): 477 (1823)

= *Robergea unica* Desm., Ann. Sci. Nat. Bot., sér. 3, 8: 177 (1847)

Fig. 1. *Robergea cubicularis*: A — cross section of ascoma; B — ascus and discharging ascospores; C — detail of ascospore

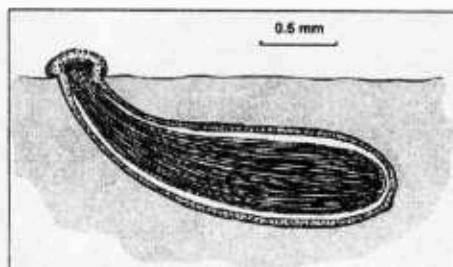
On attached dead twig of *Arbutus andrachne* L. — Ukraine, Crimea, Yalta, Mys Martian Nature Reserve, 44°34'N, 34°16'E, 11.04.2001 (KW).

Ascomata immersed in wood, consisting of a flask-shaped cavity, 2.0–3.0 mm long and up to 0.5 mm wide, lying almost parallel to the substratum surface, with a short neck at one end curved at right angles, opening through a round pore visible on the surface as a white pruinose disc, about 0.2 mm diam., with a dark central transverse slit. **Ascomatal walls** widening towards the ostiole, with numerous periphysoids on inner side in the upper part and a prominent external layer containing crystalline inclusions. **Paraphyses** also numerous, slender, filiform, rarely septate. **Asci** long-cylindrical, arranged lengthwise in the cavity, eight-spored, with thickened apices, each with a broad J-pore, 900–1100 × 9–10 μm. **Ascospores** parallel, smooth, filiform, hyaline, multiseptate, 800–1000 × 1.5–2.0 μm, with separate cells ca 5 μm long.

On small twigs of trees and shrubs: *Acer pseudoplatanus*, *Arbutus andrachne*, *Carpinus*, *Fraxinus*, *Lonicera*, *Ostrya*, *Ptelea*, *Syringa*, *Ulmus*.

Distribution. Europe (Belgium, France, Germany, Italy, Switzerland, UK, Ukraine), North America (Canada).

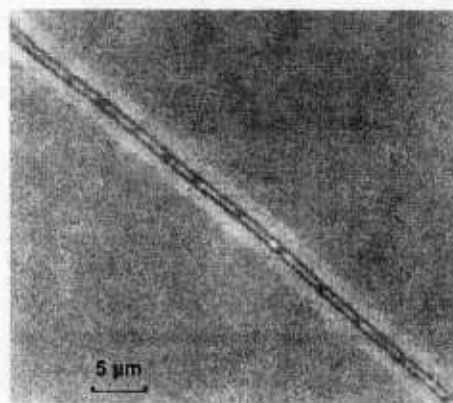
In her revision of Ostropales [11] Sherwood reported ten species of *Robergea* Desm. Since they are generally inconspicuous and collected only occasionally, little is known so far of their distribution. Most *Robergea* species are known only from the type specimen and a few other collections. Type specimens of four of those ten species were not deposited in herbaria and therefore have not been examined. Some are regarded as doubtful. Another four are restricted in distribution to North America



A



B



C

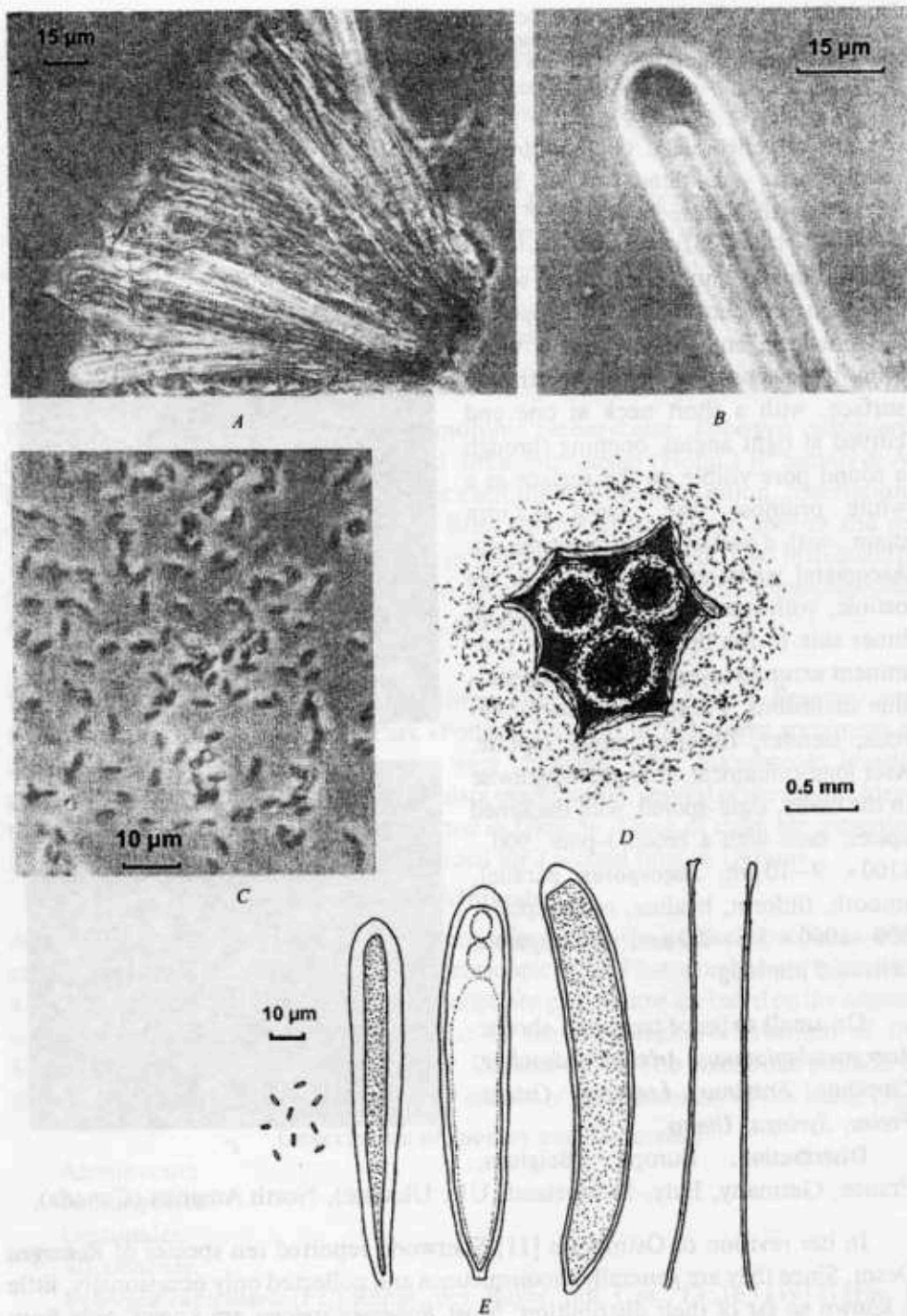


Fig. 2. *Tympanis saligna*: A — ascoma squash illustrating asci and paraphyses; B — ascus tip; C — ascospores; D — ascostroma and apothecia; E — asci, paraphyses and ascospores

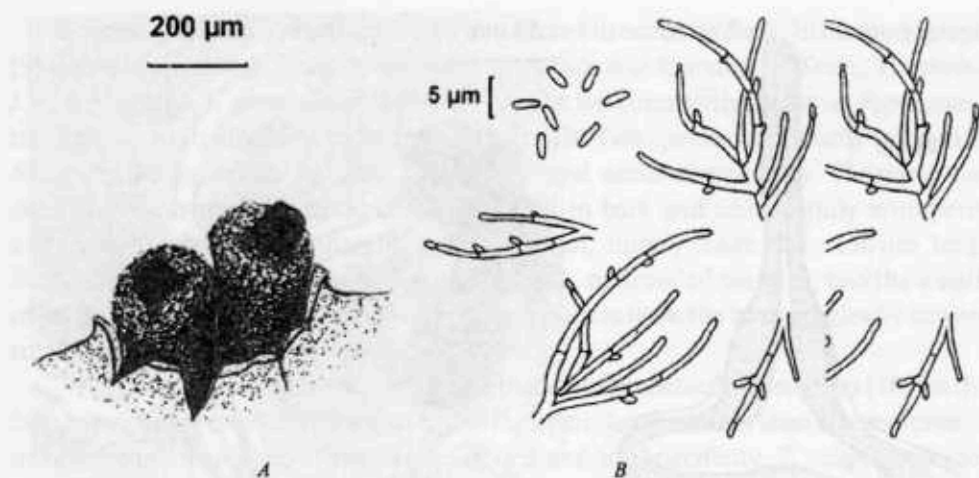


Fig. 3. *Sirodothis saligna*: A — conidiomata; B — conidiophores and conidia

and one other — to Africa. *Robergea cubicularis* is the only species occurring in Europe.

Robergea cubicularis is distinguished by its extremely long ascospores, the longest recorded in the Ostropales. According to Sherwood [11], ascospores are nearly as long as asci, i.e. up to 2 mm. Dennis [5] observed spores about 600 µm long. Spore length in a specimen on *Acer pseudoplatanus* was reported as ca 800 µm [7]. In the Crimean specimen the length of spores varies between 800 µm and 1 mm.

Ascomata of *R. cubicularis* are apothecia but look almost perithecioid due to the elongated flask-shaped form of the cavity embedded in the wood and stretched in parallel with the twig axis. The best way to observe the entire ascoma is through a longitudinal section of substratum made through the ostiole. The ostiole itself, the only visible superficial part of ascoma, is quite inconspicuous despite the white furfuraceous rim around. Dennis [5] suggested this species seemed rare because of easily overlooked ostioles.

This species is usually found on small corticated twigs. Interestingly, in the case of the present specimen collected on *Arbutus andrachne*, a tree with flaking bark, ascomata are mainly embedded in bare wood but still sometimes underneath slight remains of bark.

Leotiomycetidae

Helotiales

Helotiaceae

Tympanis saligna Tode, Fungi Mecklenb. Selecti (Lüneburg), 1: 24 (1790) [Fig. 2] soc. *Sirodothis saligna* (Höhn.) B. Sutton & A. Funk, Can. J. Bot., 53(6): 526 (1975) [Fig. 3].

= *Pleurophomella saligna* Höhn., Sber. Akad. Wiss. Wien. Abt. 1, 125: 6 (1916).

On attached dead twigs of *Salix purpurea* L. — Ukraine, Khmelnytskyi oblast, near Kamianets-Podilsky, National Nature Park «Podilski Tovtry», Surzhynetskyi Yar, along the Ternavka river, 48°37'N, 26°32'E, 08.06.2001 (KW).

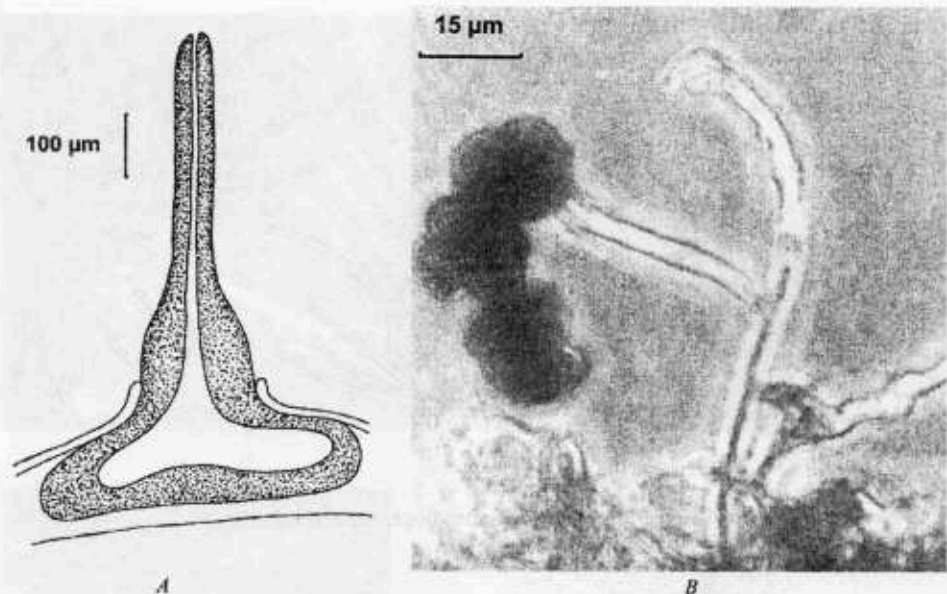


Fig. 4. *A* — section through conidioma of *Cytonaema spinellum*; *B* — conidiophore of *Trimmatostroma scutellare* with attached chain of conidia

Apothecia immersed, erumpent, rarely separate, more frequently caespitose in groups of (1)2–4(5), 0.5–0.8 mm diam., circular, densely greyish-pruinose and horny when dry, blackish and cartilaginous when moist. Disc concave, black to pruinose, with a thick persistent inrolled margin. Receptacle sessile, narrowed below. Medullary excipulum of interwoven brownish hyphae. Ectal excipulum of angular cells with thin light brown walls becoming thicker, dark brown and agglutinated towards the surface. **Paraphyses** hyaline, filiform, simple, sometimes branched, 1.5–2.0 mm diam., slightly swollen at the tips and immersed in a matrix forming an epithecium. **Asci** cylindrical, short-stalked, at first with a thick gelatinized wall, later with thinner walls, multispored, $155\text{--}210 \times 15\text{--}21 \mu\text{m}$. **Ascospores** ephemeral, asci later filled with numerous, hyaline, unicellular, cylindrical to allantoid secondary spores, $2.0\text{--}3.5 \times 1.5 \mu\text{m}$.

Conidiomata first submerged, later erumpent, caulicolous, consisting of one or rarely few pycnidium-like structures with one locule each sitting on basal stroma, glabrous, black, sometimes pruinose, up to 1 mm high and 0.5 mm wide, without any definite ostiole, dehiscent by irregular rupture of the upper wall. Wall composed of brown pseudoparenchyma. **Conidiophores** hyaline, filiform, septate, branched mostly at the base, $25\text{--}50 \times 2.0\text{--}2.5 \mu\text{m}$. Conidiogenous cells monophialidic, apical or intercalary, produced below the transverse septa. **Conidia** hyaline, aseptate, cylindrical, $3\text{--}4 \times 1.5 \mu\text{m}$.

Occurs on branches of *Salix* spp.

Distribution. Europe (Georgia, Germany, Russia, Sweden, Ukraine), North America (USA, Canada), Australia.

Several species of *Tympanis* are now considered to occur on *Salix*. In his monograph [9] Groves reported *T. saligna*, on which the genus was founded by Tode, *T. salicina* J.W. Groves and *T. spermatiospora* (Nyl.) Nyl. The last commonly occurs on *Populus* and has only occasionally been recorded on *Salix*. The two species commonly inhabiting *Salix* are distinguished by gross appearance and ascus dimensions: *T. saligna* has densely greyish-pruinose apothecia, embedded in bark and only slightly erumpent, with persistently inrolled margins and large asci, mostly more than 150 μm long; *T. salicina* has black strongly erumpent apothecia, no inrolled margins, and the length of its asci is less than 135 μm . *T. spermatiospora* differs from the both species by its very small asci, 70–90 μm long.

When a reassessment of the genus was made by Ouellette & Pirozynski [10] on the basis of ascospore characters and patterns of their germination rather than classical criteria of dimensions of apothecia, asci and ascospores and host specificity, *T. saligna*, together with *T. myricariae* Rehm and *T. pulchella* Ouell. & Piroz., were shown to have ascospores remaining one-celled throughout the budding phase, germinating from one or both ends of each ascospore, budding of cylindrical or clavate, curved secondary spores. Another species, *T. heteromorpha* Ouell. & Piroz. was described on *Salix* sp. in Canada (and repeatedly collected on *Populus* and *Salix* in North America) distinguished from the European species *T. saligna* by its consistently immersed solitary apothecia and irregularly twisted cells budded from one end of germinating ascospores.

One more *Tympanis* species apparently recorded on *Salix* in Canada [10] and Britain [14] is *T. alnea* (Pers.) Fr., common on *Alnus* and *Betula*. It has asci 135–190 μm long and its apothecia sometimes can be greyish-pruinose but, unlike *T. saligna*, they are usually caespitose in large clusters of 10–20 or more which occasionally can reach 4 mm diam.

As is typical for species of *Tympanis*, *T. saligna* has asci containing eight ellipsoid ascospores which early on are replaced by numerous small secondary spores, or «ascoconidia». Although no asci with eight well-developed short-lived ascospores were observed in the material from Ukraine, in some younger asci a few of those spores were seen, being soon replaced by countless minute secondary spores. In all other respects the specimen matches well the descriptions of *T. saligna* given by Groves [9] and by Ouellette & Pirozynski [10].

Groves [9] reported that *T. saligna* did not appear to be common since, apart from several European specimens, only one collection was made in Canada and one in the United States. Recently the species was also recorded from the Russian Far East [1]. However, no good material of the anamorph was found in any of the examined specimens and the anamorph has been reported solely from pure culture [9].

In the collection from Ukraine the teleomorph is accompanied by conidiomata of *Sirodothis saligna*. They are not numerous and are located both separately in erumpent conidial stromata and among apothecia in clustered stromata of *T. saligna*. The same position of pycnidia, or pycnidium-like structures, was noted in isotype of *S. populi* by Sutton and Funk [13]. Conidiogenous cells are clearly monophialidic, producing minute conidia, and on intercalary cells the apertures arise immediately below the transverse septa. Conidiophores up to 50 μm long were observed in the present work although Sutton

[12] reports as maximum length of 32 μm . Other taxa accepted in *Sirodothis* are not clearly separable by morphological characteristics so that without teleomorph it is often difficult to identify the species [12].

Anamorphic *Tympanis* species in Ukraine have been previously reported only twice: *Sirodothis populnea* (Thüm.) B. Sutton & A. Funk (as *S. populi* Clem., or *Dothiorella populnea* Thüm.) and *S. inversa* (Fr.) B. Sutton & A. Funk (as *D. inversa* (Fr.) Höhn.). The former is an anamorph of *T. spermatispora*, the latter — of *T. alnea*. For other *Tympanis* species known in Ukraine (*T. conspersa* (Fr.) Fr. and *T. corylina* (Sacc.) Rehm) anamorphic material has not been collected. In addition, *T. alnea* and *T. corylina* are known only from single collections [8].

There are two other specimens of interesting fungi collected during the same observations. One was found on attached dead twigs of *Salix purpurea* and *Salix* sp. in proximity to the location of *T. saligna*. It is *Cytonaema spinellum* (Kalchbr.) Höhn., a coelomycete with unilocular conidiomata and rostrate ostioles up to 600 μm long, usually covering whole twig (Fig. 4A). Previously it was collected in western Ukraine, Zakarpatska oblast [8]. This is therefore the second record of *C. spinellum* in the country.

Défago [4] placed *Cytonaema* Höhn. as a synonym of *Cytospora* Fr. Later it was excluded from the list of synonyms and maintained as distinct by Sutton [12]. *Cytonaema* differs from *Cytospora* in non-stromatic unilocular conidiomata, hyaline conidia in mass and very long rostrate ostioles. The species occurs on branches of *Salix* and is known from Austria, Georgia, Latvia, Poland, Russia and Ukraine [2, 12].

Another species is *Trimmatostroma scutellare* (Berk. et Broome) M.B. Ellis, collected on dead twigs of *Larix decidua* Miller, on Ai-Petri yaila in Crimea. It has black shining sporodochia, brown conidiophores and lobed conidia in chains [Fig. 4B]. The species was originally described on *Larix* and is regarded as common on twigs and fallen cones of *Pinus* spp. [6]. It is believed to be also common in Ukraine, however, it was recorded only once before in Volyn oblast during the Ralph Brown expedition to Prypiat marshes (<http://www.minter.demon.co.uk/brown/results/specelist.htm>).

1. Богачева А.В. Дискомицеты Лазовского государственного заповедника (Дальний Восток России) // Микол. и фитопатол. — 2003. — 37, в. 6. — С. 12—21.
2. Мельник В.А., Попушой И.С. Несовершенные грибы на древесных и кустарниковых породах. — Кишинев: Штиинца, 1992. — 368 с.
3. Ainsworth & Bisby's Dictionary of the Fungi, 9th edition / Ed. by P.M. Kirk, P.F. Cannon, J.C. David. — Wallingford: CABI Bioscience, 2001. — 655 p.
4. Défago G. Seconde contribution à la connaissance des Valseés von Höhnel // Phytopath. Z. — 1944. — 14. — P. 103—147.
5. Dennis R.W.G. British Ascomycetes. 2nd edition. — Vaduz: Cramer, 1978. — 585 p.
6. Ellis M.B., Ellis J.P. Microfungi on Land Plants. An identification handbook. — Slough: The Richmond Publishing Co LTD., 1997. — 870 p.
7. Fungi of Switzerland. Vol. 1. Ascomycetes / Breitenbach J., Kranzlin F. — Luzern: Verlag Mykologia, 1984. — 310 p.
8. Fungi of Ukraine. A Preliminary Checklist / Minter D.W., Dudka I.O., eds. — Egham: IMI, 1996. — 361 p.
9. Groves J.W. The genus *Tympanis* // Can. J. Bot. — 1952. — 30, N 5. — P. 571—651.

10. Ouellette G.B., Pirozynski K.A. Reassessment of *Tympanis* based on types of ascospore germination within asci // Can. J. Bot. — 1974. — 52, N 8. — P. 1889—1911.
11. Sherwood M.A. The Ostropalean fungi // Mycotaxon. — 1977. — 5, N 1. — P. 1—277.
12. Sutton B.C. The Coelomycetes // Kew: Commonwealth Mycol. Institute, 1980. — 690 p.
13. Sutton B.C., Funk A. Conidial states of some *Pragmopora* and *Tympanis* species // Can. J. Bot. — 1975. — 53, N 6. — P. 521—526.
14. Yao Y.-J., Spooner B.M. Notes on British species of *Tympanis* (Leotiales) with *T. prunicola* new to Britain // Kew Bull. — 1996. — 51, N 1. — P. 187—191.

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ДЕЯКІ НОВІ ТА РІДКІСНІ АСКОМИЦЕТИ В УКРАЇНІ

Наведено знайдені вперше в Україні види аскомицетів *Robergea cubicularis*, *Tympanis saligna* і *Sirodothis saligna*. Подано їх описи, таксономічне положення, поширення та ілюстрації. Розглянуто близькі та інші види цих родів, які трапляються в Україні. Для двох інших видів вказано друге місце знаходження.

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НЕКОТОРЫЕ НОВЫЕ И РЕДКИЕ АСКОМИЦЕТЫ В УКРАИНЕ

Приводятся найденные впервые в Украине виды аскомицетов *Robergea cubicularis*, *Tympanis saligna* и *Sirodothis saligna*. Даны их описания, таксономическое положение, распространение и иллюстрации. Рассмотрены близкие и другие встречающиеся в Украине виды этих родов. Для двух других видов указано второе местонахождение.