

Final Evaluation Report

Your Details	
Full Name	Nedim Jukić
Project Title	Assessment of Diversity of Ascomycetous Fungi in several potential protected territories in Bosnia and Herzegovina
Application ID	23133-2
Grant Amount	£4995
Email Address	nedim@mycobh.com
Date of this Report	01.03.2019.

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
To organize 18-22 field trips and field research				We have organised more field trips than previously planned. A total of 31 field trips in different parts of Bosnia and Herzegovina were organised. We have exceeded our plans because we have had to repeat field trips to some areas where we were faced with poor weather conditions at first but also due to the fact that more and more interesting areas with relict refugia were popping out.
Provide preliminary check-lists of fungi for protected areas as well as for areas evaluated for the protection				Short version of check-list for nine areas/habitat of highest importance for fungi assessed in Bosnia and Herzegovina is given within the final book. The most important indicator species are described, their risk assessment statuses are proposed and conservation measures are recommended. Morphological (macro and micro) characters are described, illustrated or presented too. A more comprehensive list of recorded fungal species will be given to the local authorities and ministries in both entities.
Organization of mycological workshop				A mycological workshop was held from 8 th to 12 th of August 2019 in the village Tušila (Visočica Mt.) in the mountain home "Vrela". During the workshop we visited the Igman, Bjelašnica and Visočica Mt. which are areas of a potential future national park. Scientists and mycologists from three countries took part. Numerous rare and/or endangered fungal species were recorded during the workshop

			<p>and some of them will be additionally analysed time.</p> <p>During the workshop, promotional material, leaflets and posters were presented and given to the visitors/local people/stakeholders.</p>
To film documentary movie			<p>We have filmed two documentary movies (c. 30 minutes each) instead of one as previously planned. Documentaries have been filmed by Public Broadcasting Service of Bosnia and Herzegovina and broadcast on national television (BHRT) in the prime time on Monday night.</p> <p>Nihad Zečević, very well-known documentarist in Bosnia and Herzegovina, was the director and screenwriter of both movies. We had a very positive reaction after documentaries were broadcast. Scenes have been filmed in different parts of Bosnia and Herzegovina (Lisina – Mrkonjić Grad, Ravna vala virgin forest – Igman Mt., Orlija river – Olovo, virgin forest Perućica – National park Sutjeska).</p> <p>Documentaries can be found on following links:</p> <p>http://www.bhrt.ba/bht1-emisije/nova-avantura/nova-avantura-01-10-2018-2/</p> <p>http://www.bhrt.ba/bht1-emisije/nova-avantura/nova-avantura-24-09-2018-2/</p>
To publish scientific book about important fungus area and species inhabiting those areas			<p>Book: <i>Diversity of Ascomycetous Fungi in the Territories of Protected Areas and in the Areas Evaluated for the Protection in Bosnia-Herzegovina - Establishing Important Fungus Areas (IFA)</i> was published at the end of the project with total of 200 copies.</p> <p>Within the book, the most important fungus areas (IFA) are presented (nine areas) with the most significant indicator fungal species recorded for each area.</p> <p>In total more than 150 fungal species are presented, described, illustrated</p>

			<p>or mentioned in the book.</p> <p>For every species a risk assessment status is given (based on IUCN criteria) along with recommendations for protection and conservation measures.</p> <p>New scientific concept and methodology for IFA identification is presented and explained in the introduction.</p> <p>The book will be distributed to all groups of stakeholders in Bosnia and Herzegovina and abroad: local authorities, ministries, NGOs, students, faculties, member of Mycological Society MycoBH and others.</p> <p>The book will be sent with official letters to the all local authorities.</p>
Cooperate with local authorities and give them valuable data for future conservation plans and recommended measures			<p>As previously planned in the project proposal, cooperation with the authorities in both entities will be established especially after the project implementation. In the Republic of Srpska all recorded endangered and rare fungal species will be treated as update of the regulation on protected and strictly protected species of Republic of Srpska and sent to the Republic Institute for Protection of cultural, historical and nature heritage (Ministry of Education and Culture). Results from several field trips will be included (virgin forest Reserve Janj, virgin forest Janj, territory around cities of Bijeljina, and Mrkonjić-Grad). After this project, cooperation with this institution will be continued with evaluation of fungal diversity in some other potentially protected areas highlighted.</p> <p>In the Federation of Bosnia and Herzegovina, establishing cooperation with the local authorities has not been successful enough during the project implementation. Still, all relevant institutions in this entity will receive a copy with an</p>

			<p>official letter and explanation of implemented activities for the last 3 years.</p> <p>In the area around the capital Sarajevo, cooperation with the public institution which manages protected areas is established and fungi inventory in three protected areas will be done in the near future with adequate conservation measures given to the management.</p>
To organize educational lecture and exhibition			<p>In June 2018 on World Environment Day - Movie Night (organised by Open Regional Fund Implementation of Biodiversity Agreements - ORF BDU, GIZ) we took part in the exhibition and display photos of some of the most interesting photos of registered rare and endangered fungal species within the project activities.</p> <p>During the mycological workshop in Tušila promotional material was presented to the local inhabitants with the importance of fungal life form for all ecosystems being emphasised.</p> <p>Additionally, educational lectures were not held. Instead extra promotion and educational lectures will be organised together with the book promotion after it is published.</p>
To publish at least one scientific paper			<p>I have been author or co-author on two published scientific papers in the last year, both very important for mycobiota of Bosnia and Herzegovina in general: 1) Notes on some bryophilous Pezizales (Fungi) in the Mediterranean part of Bosnia and Herzegovina, 2) Dinaric karst poljes and their importance for mycobiota. - in press.</p> <p>One scientific poster and conference proceeding was published within the project activities.</p>

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

We have been faced with poor weather conditions in some period of the project implementation (period of quite long drought as well as periods of surprisingly cold weather) which at the end results with small number of fungal species that could be found during some of the field research.

Still, this have been compensated in the most productive part of the year (August and September) with great number of species recorded in different localities.

On the other side due to the great number of samples taken in the field and requirements for additional time for micro analysis as well as the increased volume of the manuscript/book that represents final stage of the project completion and review process prolongation project report deadline have been exceeded.

Thanks to the understanding from your side we have been able to coordinate everything properly and we have managed to put all of the most important pieces together.

3. Briefly describe the three most important outcomes of your project.

a). We have created new principles and new methodology when evaluation of the most important fungal species in the IFA/IPA process is considered. These new postulates generally increase the roll of fungi in the conservation and management plans and still acknowledges importance of all other elements and arguments when biodiversity assessment is happening.

Along with new methodology, the most important indicator fungal species are presented within the book with risk assessment status given and recommended for most of them. Results from this project combined with the outputs from the previous (published in Jukić & Omerović, 2017) gives great and solid basis for re-evaluation of the Red List of Fungi in both entities and provides great opportunity to include all or most of the proposed species.

Two projects supported by Rufford are most important activities and initiatives regarding fungal conservation in Bosnia and Herzegovina ever.

b). Raising the awareness about importance of fungal diversity and protection among all interested stakeholders through different type of channels (documentary movies, promo leaflets and posters, exhibition, web site and social media posts, published book, etc.).

Most significant habitats like karst poljes or virgin forests have been particularly emphasised and the importance of their conservation have been raised.

c). General contribution to the knowledge of mycobiota in Bosnia and Herzegovina is significant. Almost 100 new species for Bosnia and Herzegovina have been described or presented within the book or scientific papers more or less in detail.

Project results will serve as solid basis for the revision and reassessment of Red list of Fungi in Federation of Bosnia and Herzegovina and for the update of Regulation on protected and strictly protected species of Republic of Srpska.

Scientifically based conservation measures and guidelines will be proposed and given to all relevant local authorities.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

During the project implementation local communities have been enrolled in a couple of specific activities. Particularly the most powerful tool to make strong influence and to raise awareness about importance of fungi among local community was broadcasting two documentaries on the national channel (BHRT).

Importance of conservation of endangered and rare fungal species and protection of sensitive belonging habitats have been emphasised in the documentaries while some of the most important habitats in different parts of Bosnia and Herzegovina have been presented (area around Olovo city, virgin forest Ravna vala on Mt. Igman, Mt. Lisina near Mrkonjić-Grad, virgin forest Perućica in National Park Sutjeska, etc.).

Besides documentaries, an exhibition of photos of rare and endangered species of fungi have been displayed within the World Environment Day - Movie Night (organised by Open Regional Fund Implementation of Biodiversity Agreements - ORF BDU, GlZ) where a lot of visitors could see amazing world of small ascomycetous fungi through the photos made with high-quality macro lenses.

Promo leaflet and brochure have been distributed to the interested stakeholders especially to the local community during mycological workshop in village Tušila (Mt. Visočica). Rest of the material will be distributed on the book promotion day which will be held in the first half of April 2019.

At the end it is important to highlight that final publication/book will be distributed to all relevant organizations and individuals in order to introduce them with IFA concept, advantages of its usage and implementation and with importance of adequate conservation of all rare and endangered fungal species.

5. Are there any plans to continue this work?

Definitely, promotion of the new IFA methodology and conservation concept will be continued. We want to properly investigate all other interesting and important habitats and ecosystems in Bosnia and Herzegovina.

Nevertheless, we have already started with implementation of new projects co-financed by local authorities concerning mycobiota inventory in certain areas in both entities (Federation of Bosnia and Herzegovina and Republic of Srpska).

During these two new projects we will create preliminary check-list of the fungi for some protected and planned protected territories that were not investigated in this project (future protected territory of Mt. Orijen and protected areas around Sarajevo – Natural Monuments Skakavac and Vrelo Bosne).

6. How do you plan to share the results of your work with others?

Most of the results will be presented in the final conservation book where the most important indicator fungal species will be presented and described (macro and micro characters). Besides description their endangerment status will be assessed with main threats mentioned and conservation measures recommended for each presented species. The book will be distributed to the Faculty of Natural Sciences, Faculty of Forestry, National Library, similar NGOs, all relevant local authorities, some schools, individual scientist, professors, scientist from the abroad and member of Mycological Society MycoBH.

Besides this some of the most important results are/will be published in the couple of scientific papers that are or will be published soon. Some really rare records of endangered fungi are presented in the broadcasted documentaries too.

At the end we want to emphasise that the most important results will be presented during lecture and book promotion where all interested stakeholders will be invited.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

Grant was used from the end of January 2018 to the mid-March 2019 and this is matched by actual length of the project activities.

Slight extension of the project activities and small delay in project final reporting are mainly caused by the completion of the conservation book at the end of the project activities. The content of the book increased compared to the previously planned and conservation methodology presented in the book became explained more in detail.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
ISSN number for Final publication	30	30		
Brochure and poster printing	120	97	-23	
Honorarium for TV Team	225	602	+377	The costs for TV Team were more than double than expected. We shoot two documentaries instead of one and we organize more field trips than previously planned.
Macro Twin Light (Flash)	780	679	+101	We have managed to get additional discount for Macro Flash.
Adapter for Macro Ring		32	+32	Part of the saved money for Macro Flash was used to buy necessary adapter.
International Mycological Workshop (food and accommodation)	440	417	-23	
Honorarium for Collaborators	425	463	+38	
Daily Allowance	400	400		
Final publication	905	1157	+252	The number of book pages has increased. Instead of 200 as previously planned we have finished with 235 pages in total.
Accommodation	320	106	-214	Most of the field trips were one day forays.
Fuel Costs	500	884	+384	We have organized more field research and fuel costs gone up due to the increased fuel costs for the TV Team too.

Microscope	1100	370	-730	We have found used Olympus microscope BH-2 in great shape which is more than enough for laboratory analysis.
OM L Adapter + AF		122	+122	Saved money for microscope was used to buy necessary adapter for camera/DSLR mount.
Micrometre glass		17	+17	Micrometre scale have been bought for the new microscope.
TOTAL	5245	5377	+132	

The difference in costs of extra £132.47 than previously planned was covered by the project participants. For calculation cost exchange rate of 2,160710 KM for 1£ on 20th of January 2018 were used.

9. Looking ahead, what do you feel are the important next steps?

One of the most important future steps should be lobbying with local authorities and promotion of the conservation of endangered/rare/or indicator species within very sensitive and important habitats types. We will aim our main efforts towards proclamation of certain number of IFA territories in Bosnia-Herzegovina through constant work on promoting this idea and new updated corresponding methodology. IFA methodology and principles have certain advantages if compared with other conservation methods. The most important that specific identified and evaluated area can keep the same status as it had before with new way of managing applied within boundaries. This fact should be one of the most comparative advantages when negotiating with authorities and government is undertaken.

Through implementation of this project we have created preliminary check-list of fungi for some of the most important fungus areas in Bosnia-Herzegovina, identified these areas in Bosnia-Herzegovina and recommended adequate measures and management methods in order to protect this specific habitats and make sustainable coexistence of humans and nature. The results achieved through project implementation represents solid basis for the all projects to come.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford logo was used on every material (printed/electronic/social media/web page) produced during this project. Apart from visual publicity we have also acknowledged Rufford support in every single scientific publication we have published (two original scientific works: 1) Notes on some bryophilous Pezizales

(Fungi) in the Mediterranean part of Bosnia and Herzegovina, 2) Dinaric karst poljes and their importance for mycobiota. - in press; one poster presentation: Mycobiota of Mediteranetum Neum-Klek as important argument for area protection; conservation book: Diversity of Ascomycetous Fungi in the Territories of Protected Areas and in the Areas Evaluated for the Protection in Bosnia-Herzegovina - Establishing Important Fungus Areas (IFA).

Special thanks were given to the Rufford Foundation in two documentary movies (ending credits) about fungi which were filmed during the project. These two documentaries were filmed, produced and broadcasted by Public Broadcasting Service in Bosnia and Herzegovina (BHRT).

Rufford logo was also used in the promotional leaflet that have been printed in the first phase of the project.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Nedim Jukić, MSc in Biology – Project manager, financial planning and implementation, organizing of field research, sampling, laboratory analysis, author or co-author of books and papers that have been published, project promotion through social media, promo material and photo exhibition, main narrator in two filmed documentaries, workshop organisation, book promotion and lectures.

Smiljan Tomić, Bachelor in Biology (Kakanj, Bosnia and Herzegovina) – participating in most of the field research, sampling material, poster presentation during Rufford Conference in Serbia (Explore and protect the natural beauty of Balkans), participating in workshop and co-author of one scientific paper and book, participating in the documentaries shooting.

Nihad Omerović, Agronomists (Olovo, Bosnia and Herzegovina) – participating in the field research, sampling and laboratory analysis, participating in the documentaries shooting, participating in workshop and co-author of one scientific paper and book.

Neven Matočec, Mycologist (Croatia) – expert in mycology (with ascomycetous fungi as the main field of interest), co-author of the final conservation book, participant in the mycological workshop contributing with his valuable experience and skills.

Ivana Kušan, PhD, Mycologist (Croatia) – expert in mycology (with ascomycetous fungi as the main field of interest), co-author of the final conservation book, participant in the mycological workshop contributing with her valuable experience and skills.

Rade Gašić, (Mrkonjić-Grad, Bosnia and Herzegovina) – participating in the field research in the area around Mrkonjić-Grad, participating in the documentaries shooting.

12. Any other comments?

I would like to sincerely thank to the Rufford Trustees for supporting scientific efforts of mine and all of the project team and for strongly encouraging me to look even closer and further. Two implemented project provide me with much needed scientific experience and great opportunity to travel and discover many great places and area of great importance for fungal diversity as well as for biodiversity of my country in general.

This enables me to cooperate with many great scientists from the region and other European countries and to promote and raise awareness about importance of fungal life form.

At the end I strongly believe that overall results and data from both project summarised in two conservation books will provide necessary starting point for the adequate changes regarding conservation of the fungi and their habitat in Bosnia-Herzegovina. All published scientific papers and books as well as the promotion through different kind of lectures, promotional materials, web channels or social media should encourage some of the young mycologist that will come.

I am most thankful to the Rufford Foundation because you've made some of my dreams to come true. I will continue my dedicated and passionate work with aim to discover as many as amazing facts possible about mycological ocean its vastness and all of its unexplored beauty.

**Diversity of Ascomycetous Fungi in the Territories of
Protected Areas and in the Areas Evaluated for the
Protection in Bosnia-Herzegovina**

- Establishing Important Fungus Areas (IFA) -

JUKIĆ N., MATOČEC N., KUŠAN I., GAŠIĆ R., OMERVIĆ N. I TOMIĆ S.



**Diverzitet gljiva odjeljka Ascomycota na teritoriji zaštićenih
područja i područja u evaluaciji za zaštitu u Bosni i Hercegovini**

- Uspostava područja važnih za gljive (IFA) -



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Mycological Society MYCOBH



Figure 1. – Book cover: Diversity of Ascomycetous Fungi in the Territories of Protected Areas and in the Areas Evaluated for the Protection in Bosnia-Herzegovina - Establishing Important Fungus Areas (IFA)

I Mikološka ekspedicija i radionica - AscoBH 2018
First Mycology Workshop & Scientific Expedition - AscoBH 2018

 **Chloroscypha alutipes**

Datum/Date: 08-12 August 2018

Lokacija/Location: Tušila, Visočica

- 8 August -	- 9 August -	- 10 August -
1. Dolazak i smještaj učesnika u planinarski dom Tušila;	1. Doručak;	1. Doručak;
2. Večera;	2. Teren (dvije opcije):	2. Teren (dvije opcije):
3. Predstavljanje plana i programa radionice; (prezentacije)	• Tušila-Jelenjača-M.Vrelo;	• Prašuma Ravna Vala;
4. Druženje i upoznavanje;	• Kanjon rijeke Rakitnice;	• Javornik-Međeđa Lokva;
	3. Večera;	3. Večera;
	4. Laboratorijski rad + slobodne aktivnosti;	4. Prezentacija;
		5. Laboratorijski rad + slobodne aktivnosti;

- 11 August - Doručak/ Teren - jezero Blace/ Večera + slobodne aktivnosti (po dogovoru);

- 12 August - Doručak/ Odlazak i oproštaj učesnika radionice

* smještaj i hrana su obezbjeđeni za sve učesnike radionice *

* u okviru slobodnih aktivnosti moguće je organizovati i posjetu gradu (Konjic ili Sarajevo) *

* za vrijeme trajanja radionice biće izloženi poster i fotografije rijetkih i ugroženih gljiva *

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Figure 2. – Promo poster and invitation card – Mycological Workshop and expedition MycobH



Figure 3. – Diversity of ascomycetous fungi in Bjelašnica and Igman Mt. near Sarajevo

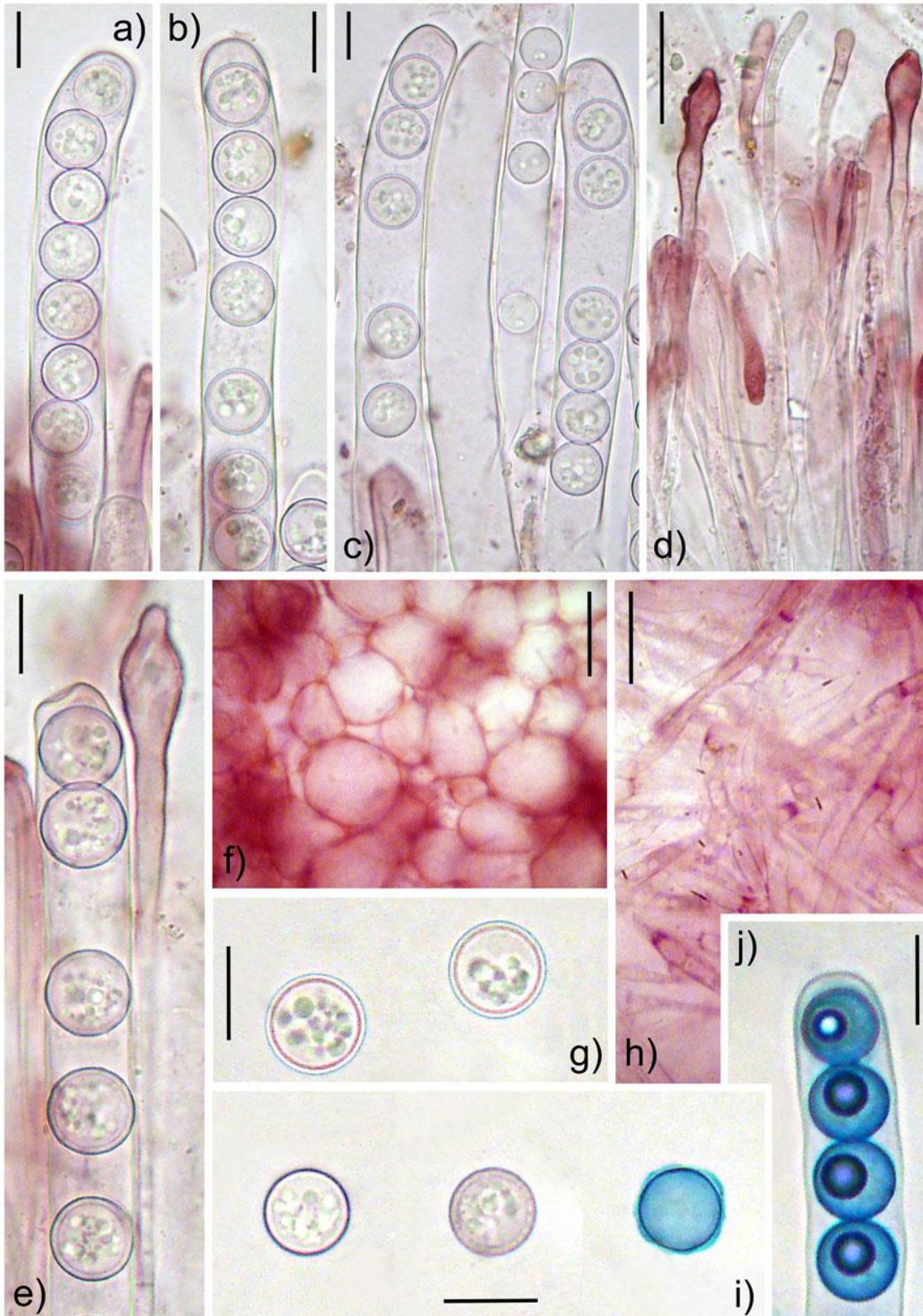


Figure 4. – *Smardea planchonis* micro characters (Neum, Klek) (example of the micro plate made from photos recorded during analysis).