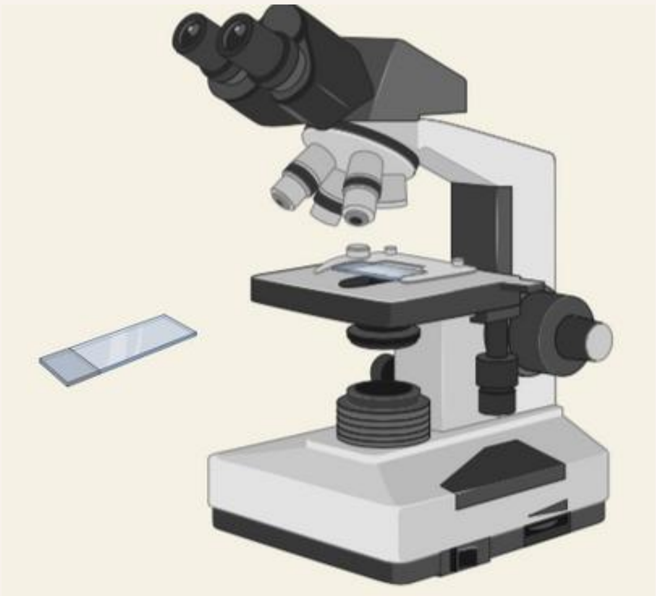
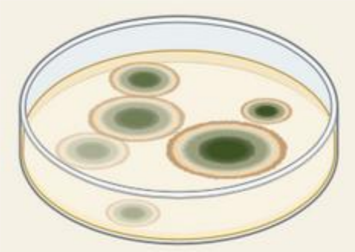
RELAZIONE ANNUALE
ANNO ACCADEMICO 2023-2024

Titolo del Progetto:

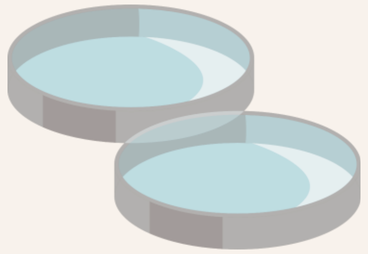


ASPERGILLOSI NEGLI ANIMALI: RISVOLTI DIAGNOSTICI ED EPIDEMIOLOGICI IN UNA PROSPETTIVA ONE HEALTH

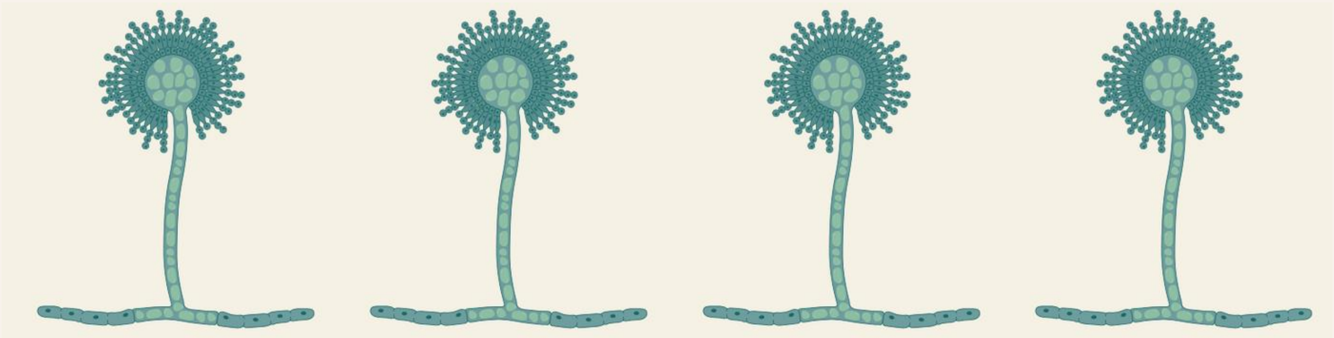
Talita Bordoni (39° ciclo)

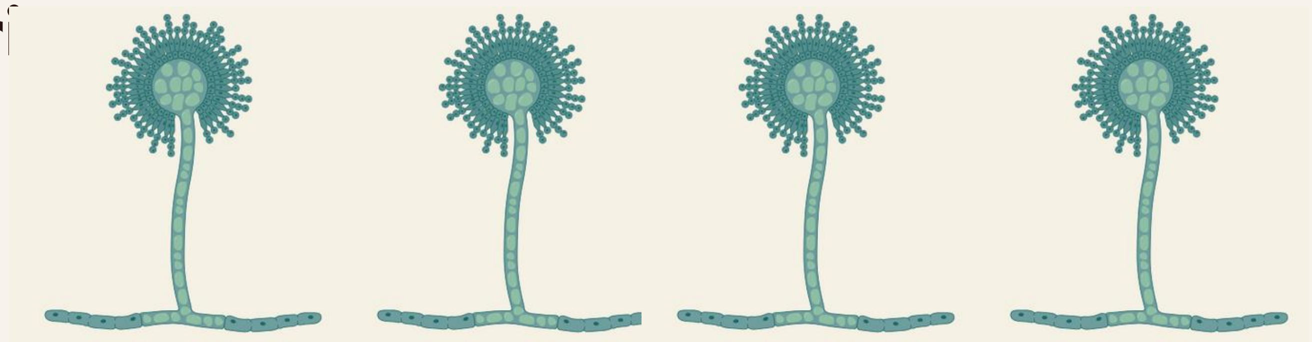


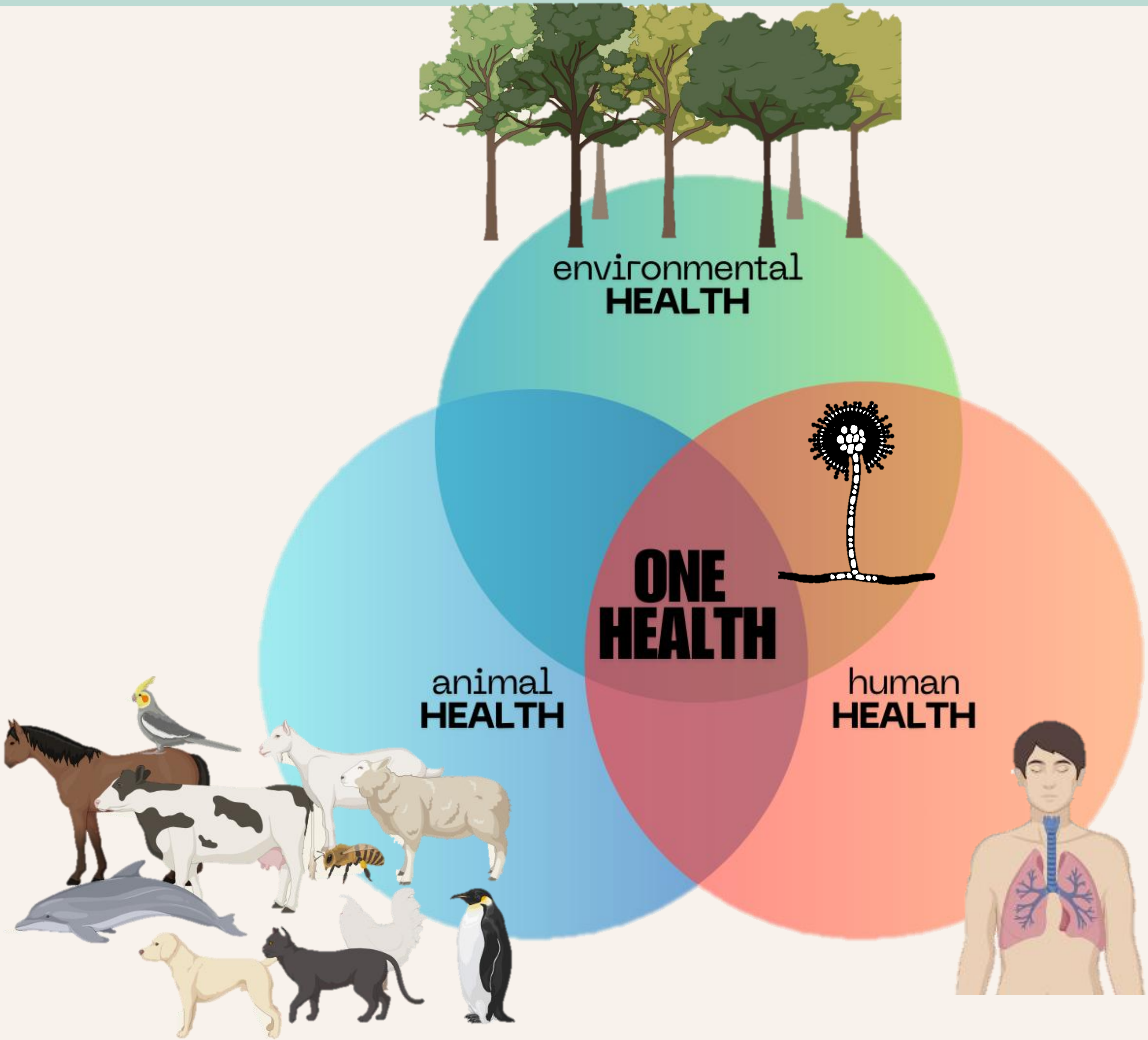
Supervisore: Roberta Galuppi **Co-Supervisore: Monica Caffara**



Curriculum: Sanità Animale
Posizione: Ordinari







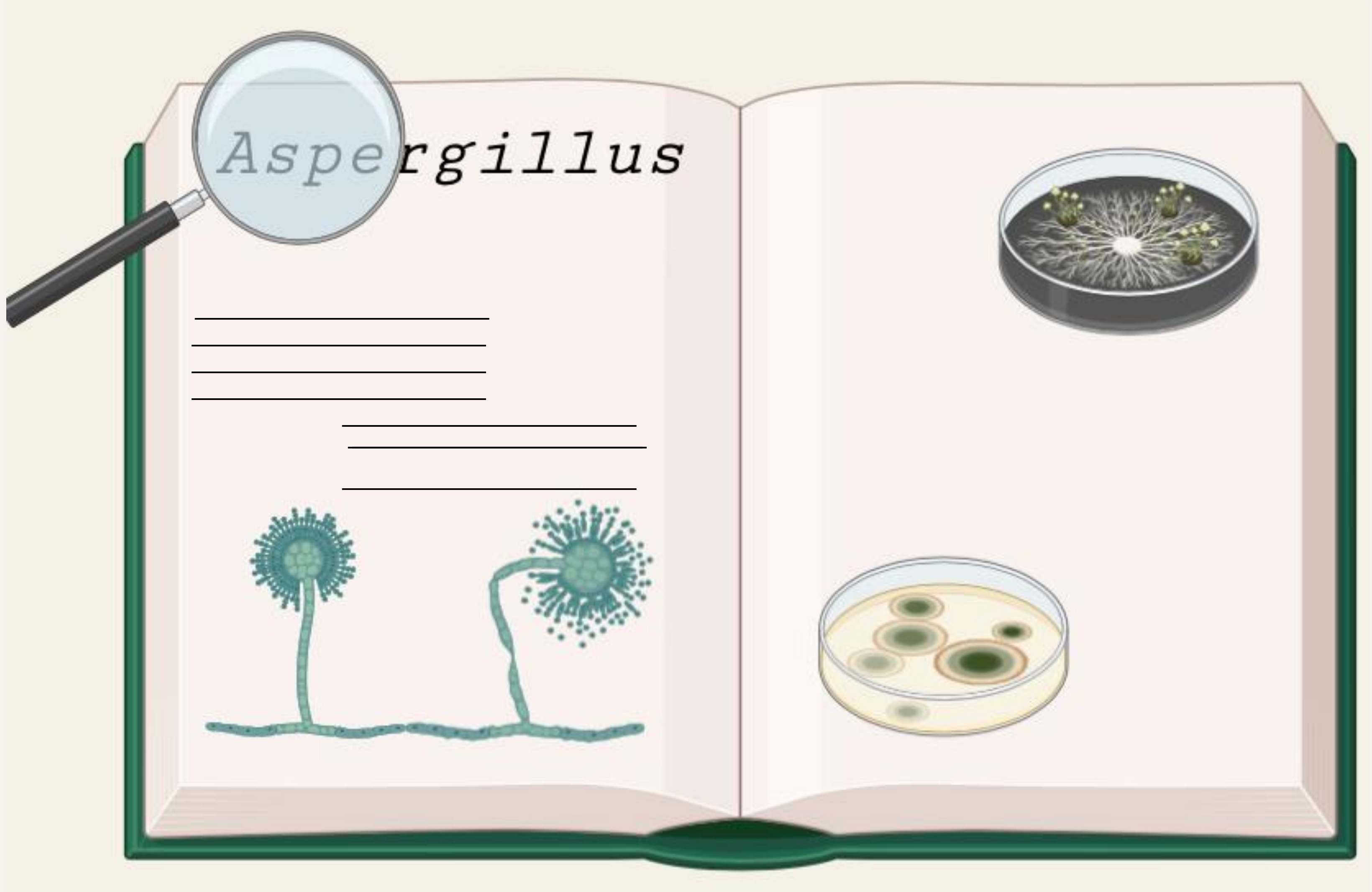
Obiettivi dello studio

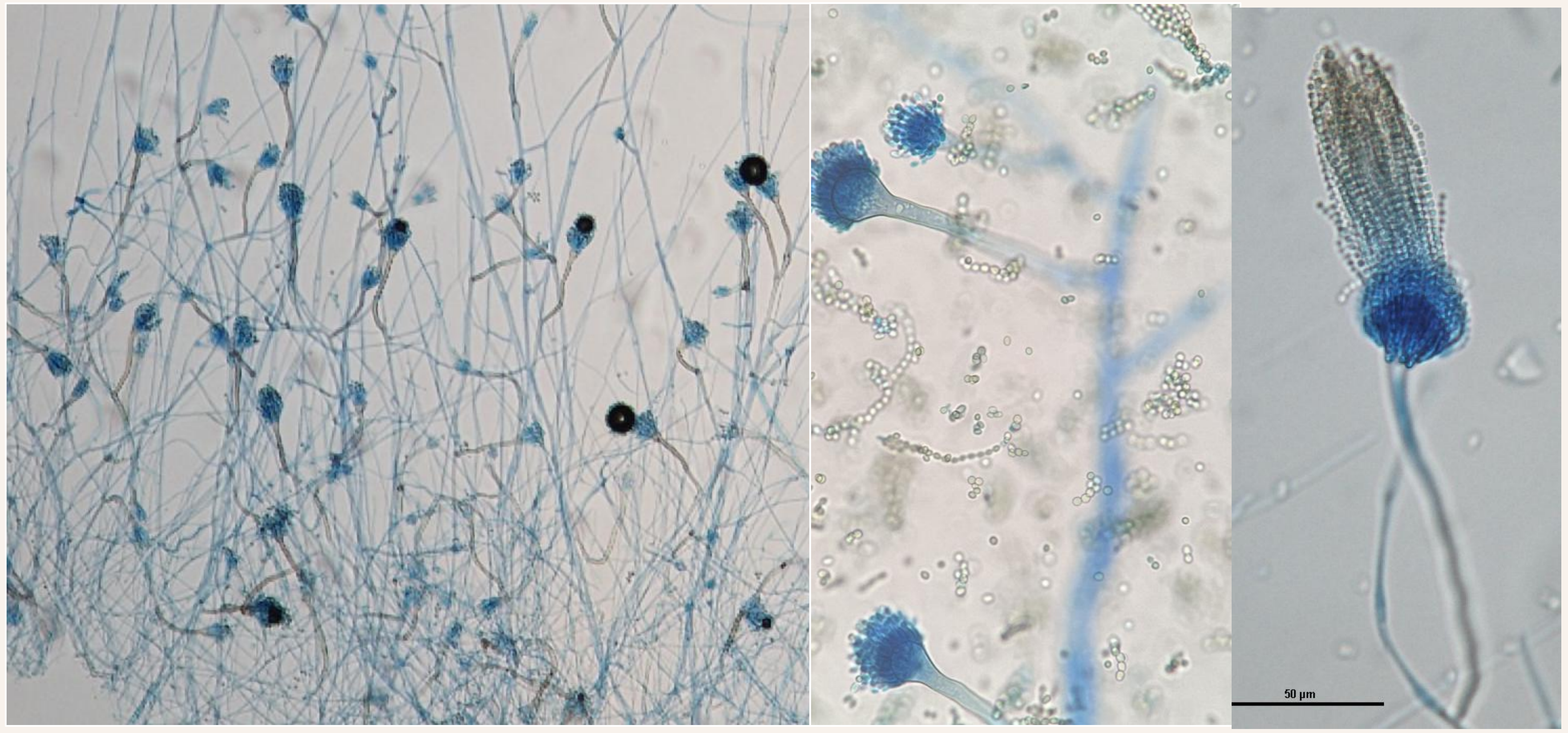
Capire la reale DIFFUSIONE delle aspergillosi negli animali

Evidenziare la presenza di NICCHIE ECOLOGICHE che possono costituire una comune fonte di infezione per l'uomo e gli animali

Scoprire eventuali cluster di ANTIMICOTICO-RESISTENZA

Ricerca bibliografica





Eziologia

Epidemiologia

Patogenesi e segni clinici

Diagnosi

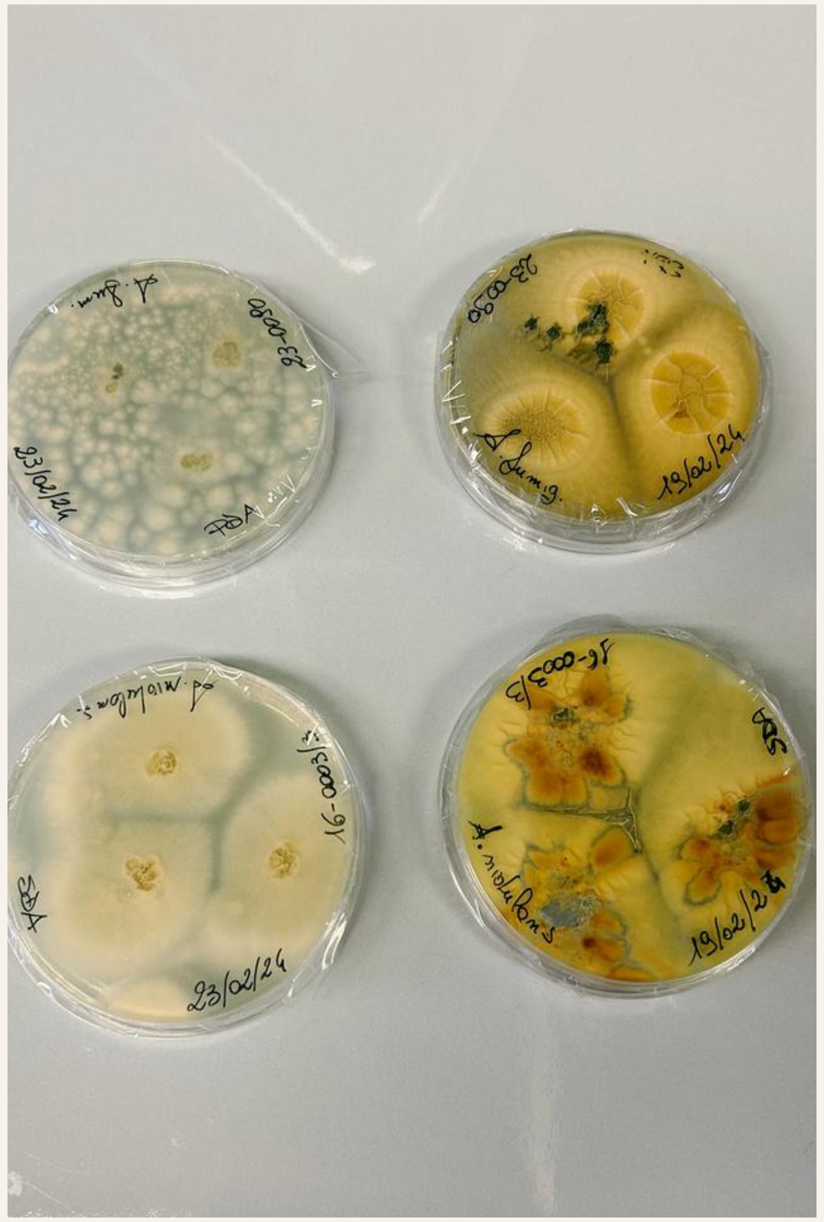
Biologia Molecolare

Resistenza ai farmaci

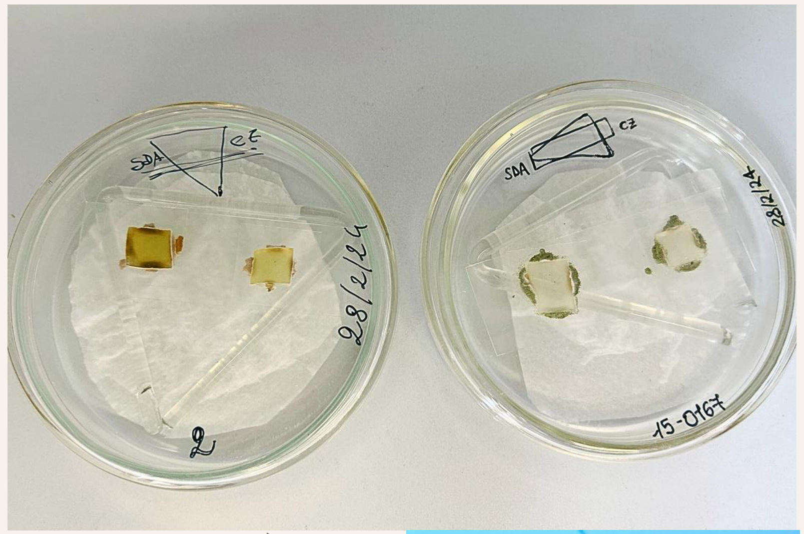
Training presso il Laboratorio di Micologia Medica del Dipartimento di Scienze Biomediche per la Salute dell’Università degli Studi di Milano

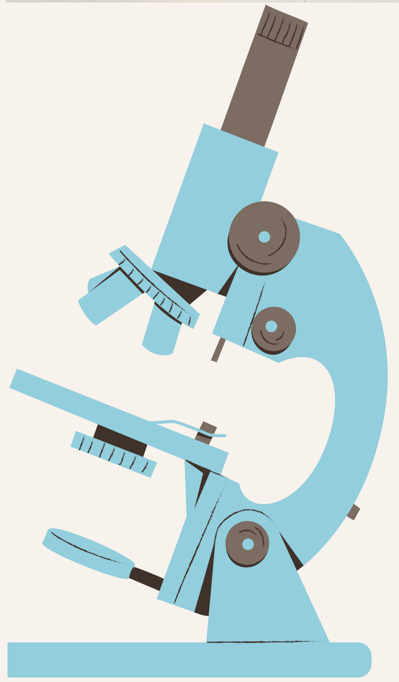
Approfondimenti su…

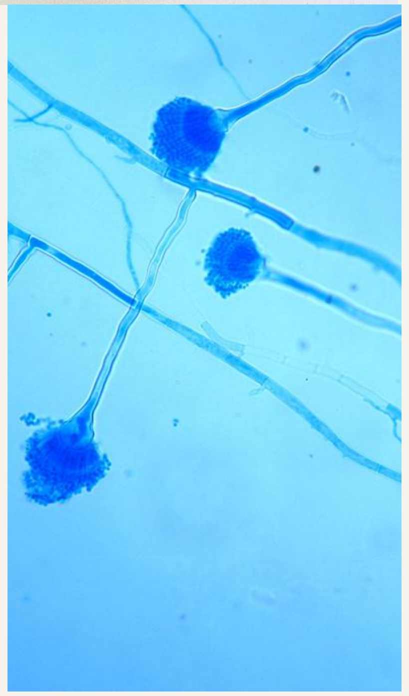
27/2/24 - 5/3/24



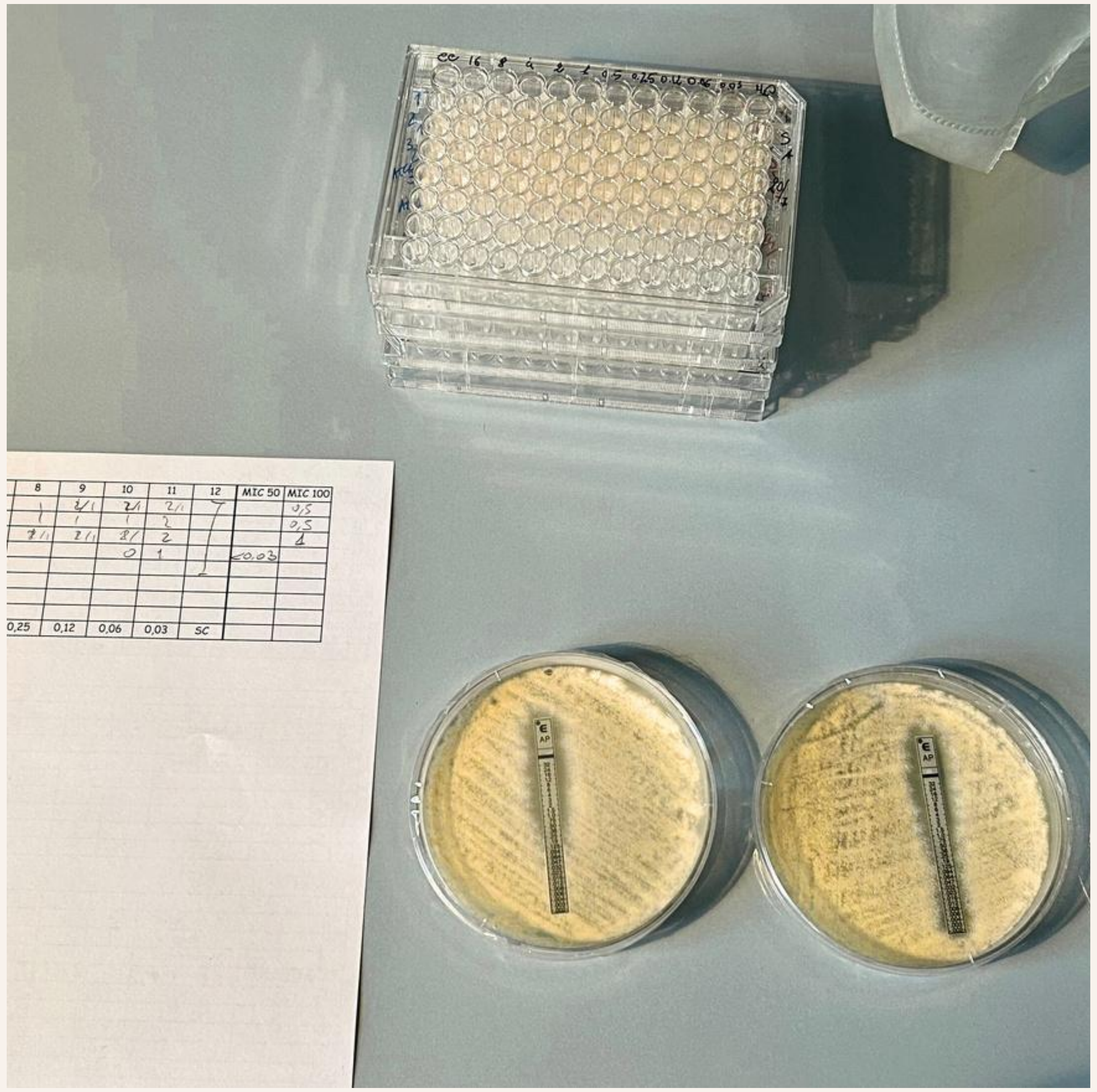
Identificazione macroscopica





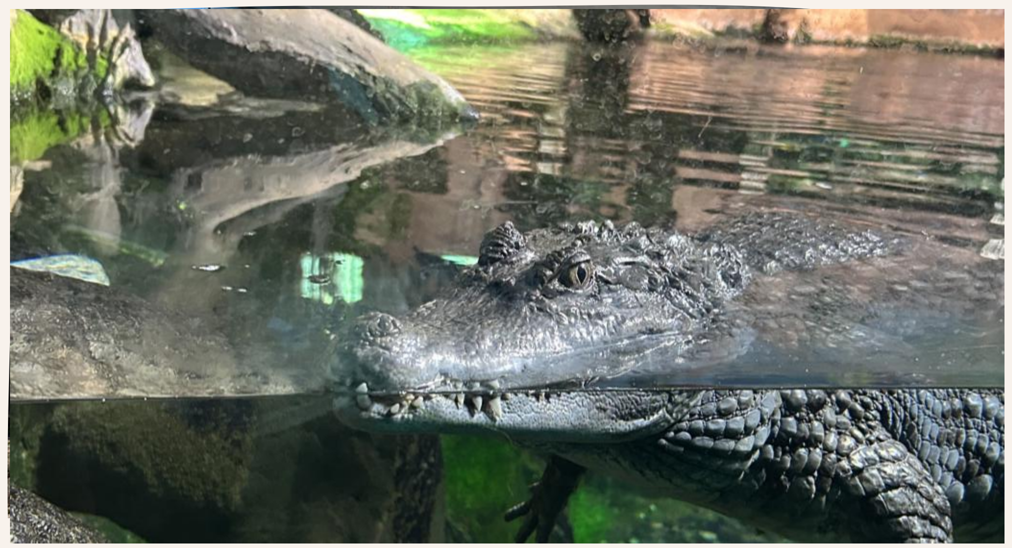


Identificazione microscopica



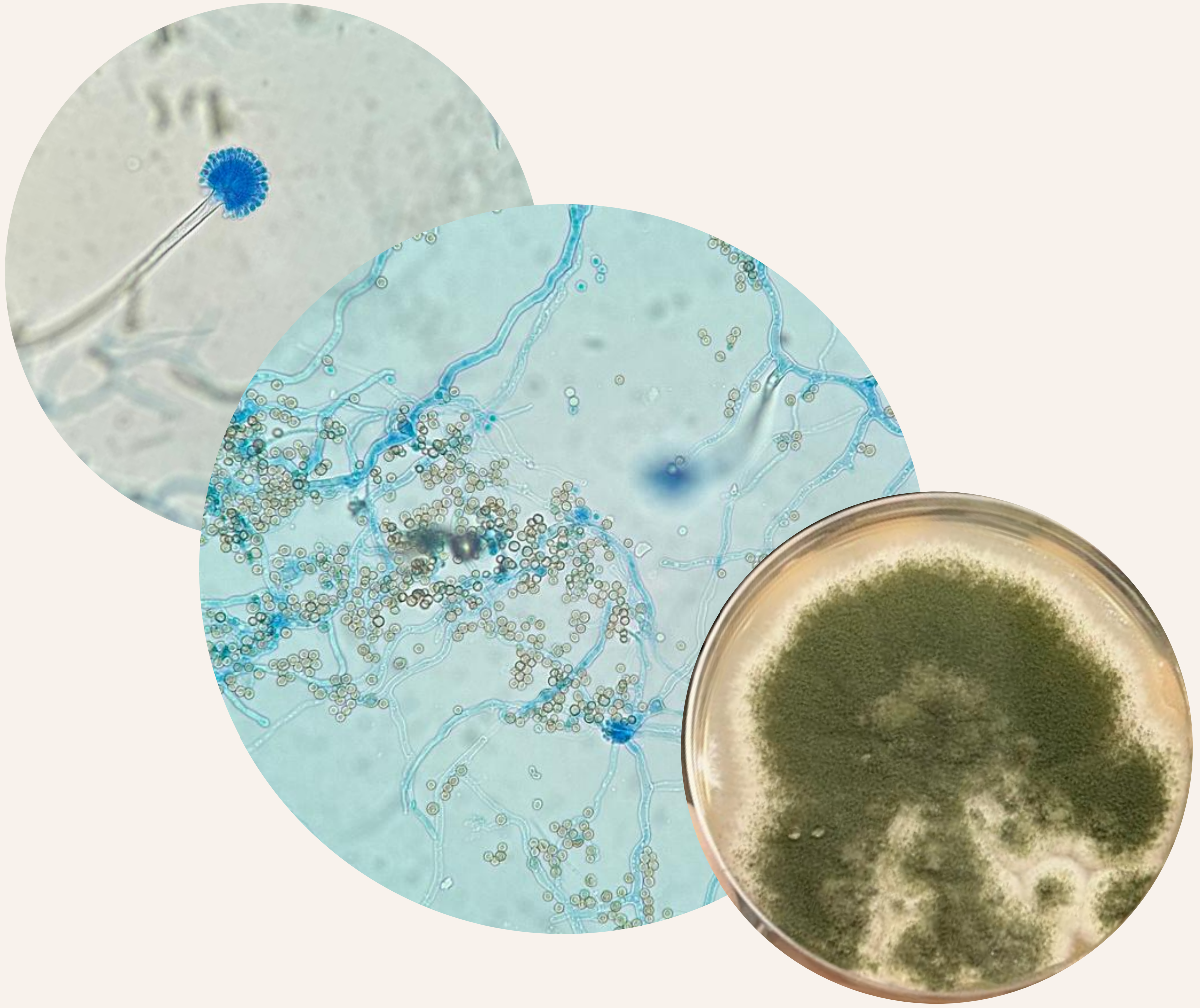
Prove in vitro di sensibilità agli antimicotici

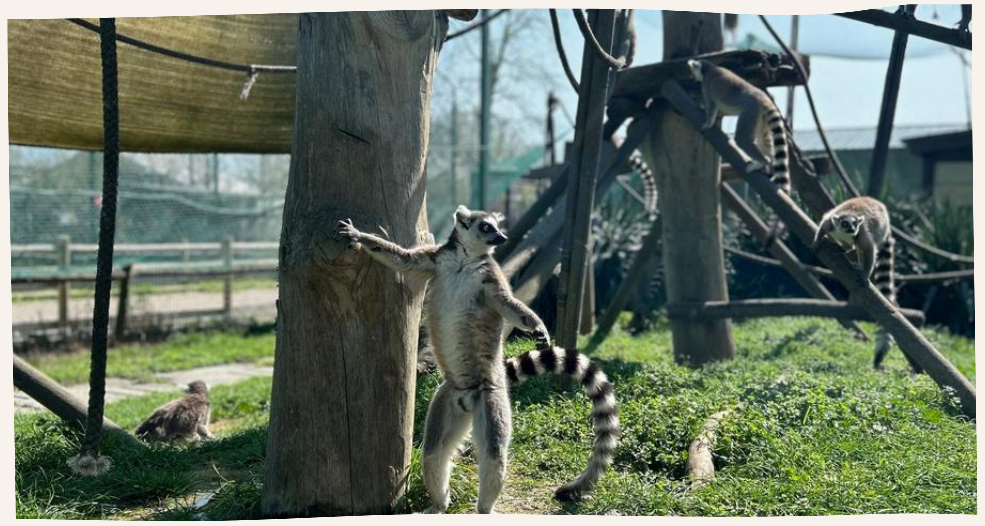
Creazione di una rete di collaborazione

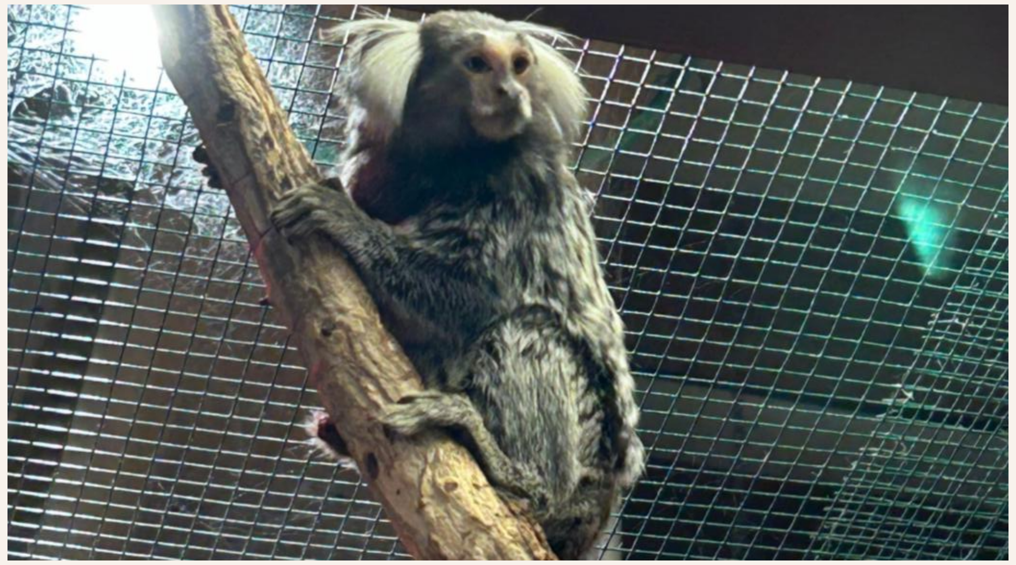


Campionamenti ambientali

Acquario di Cattolica
&
Zoosafari di Ravenna

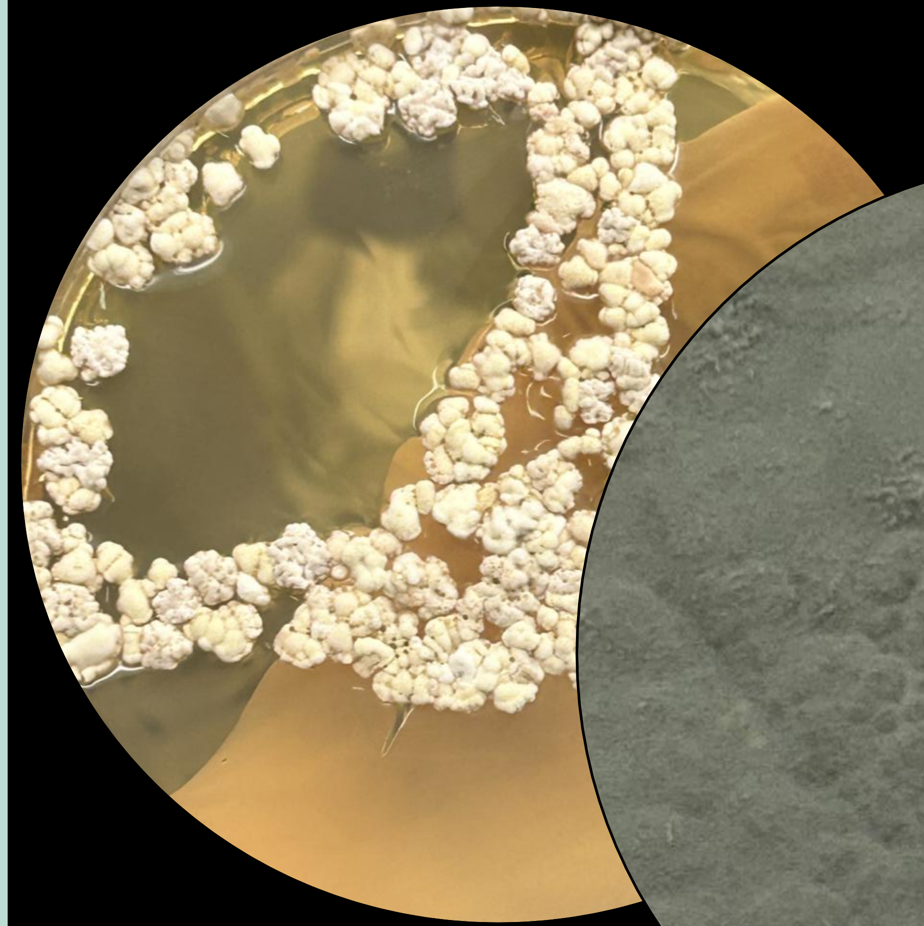




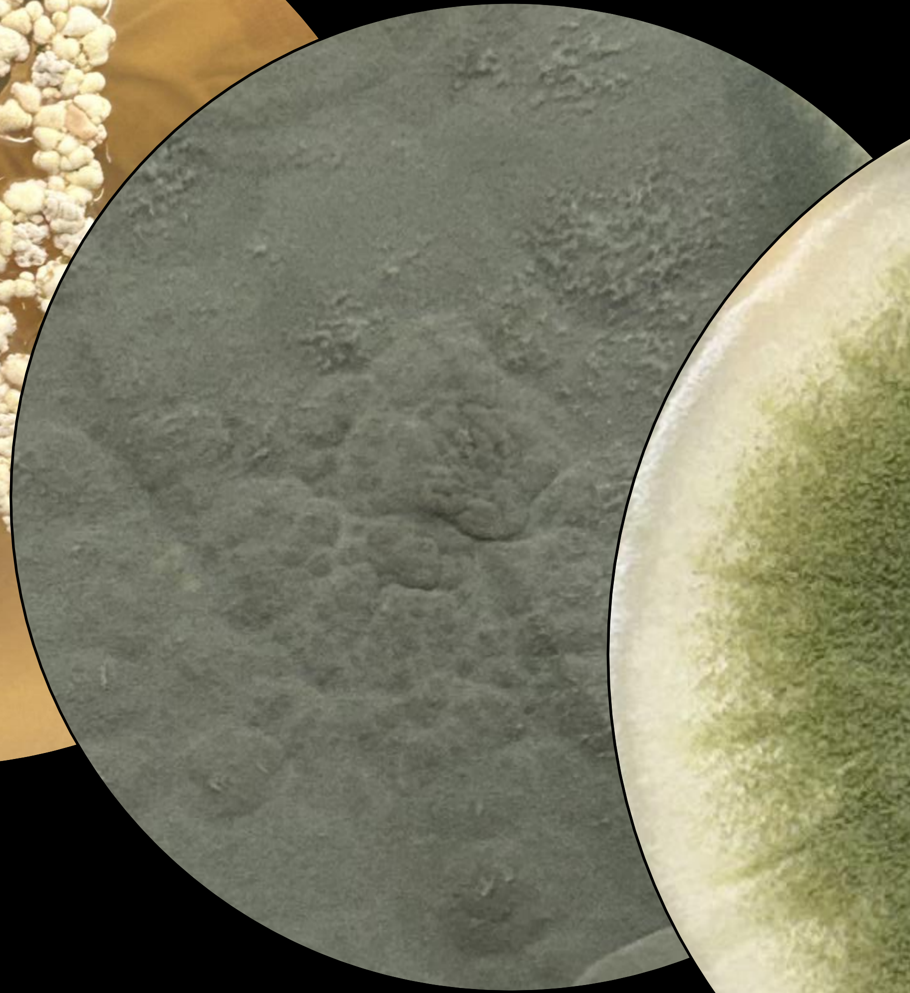


Identificazione morfologica dei ceppi
MACROSCOPICA

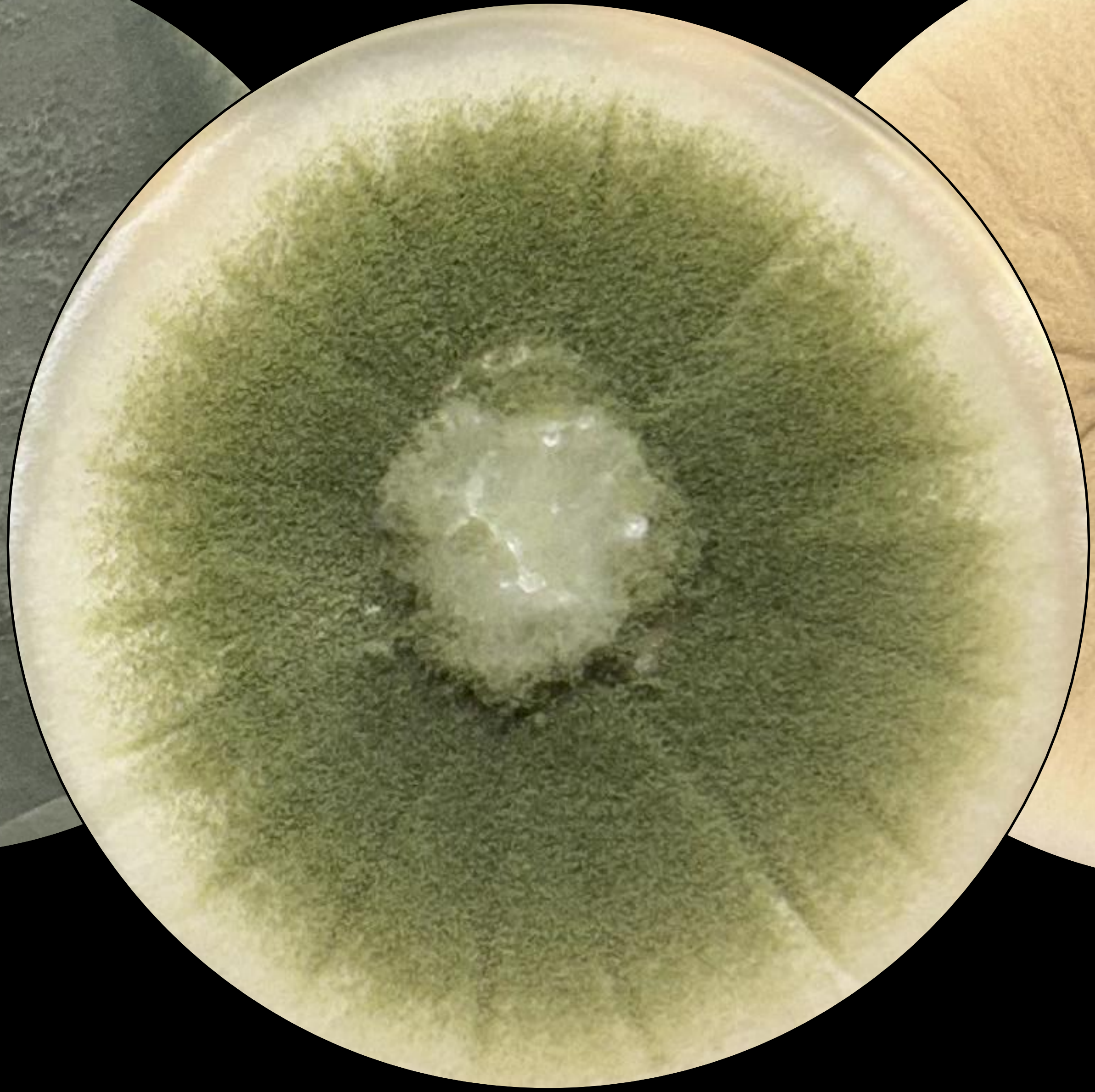
GRANDE VARIABILITA' MORFOLOGICA TRA LE DIVERSE SPECIE



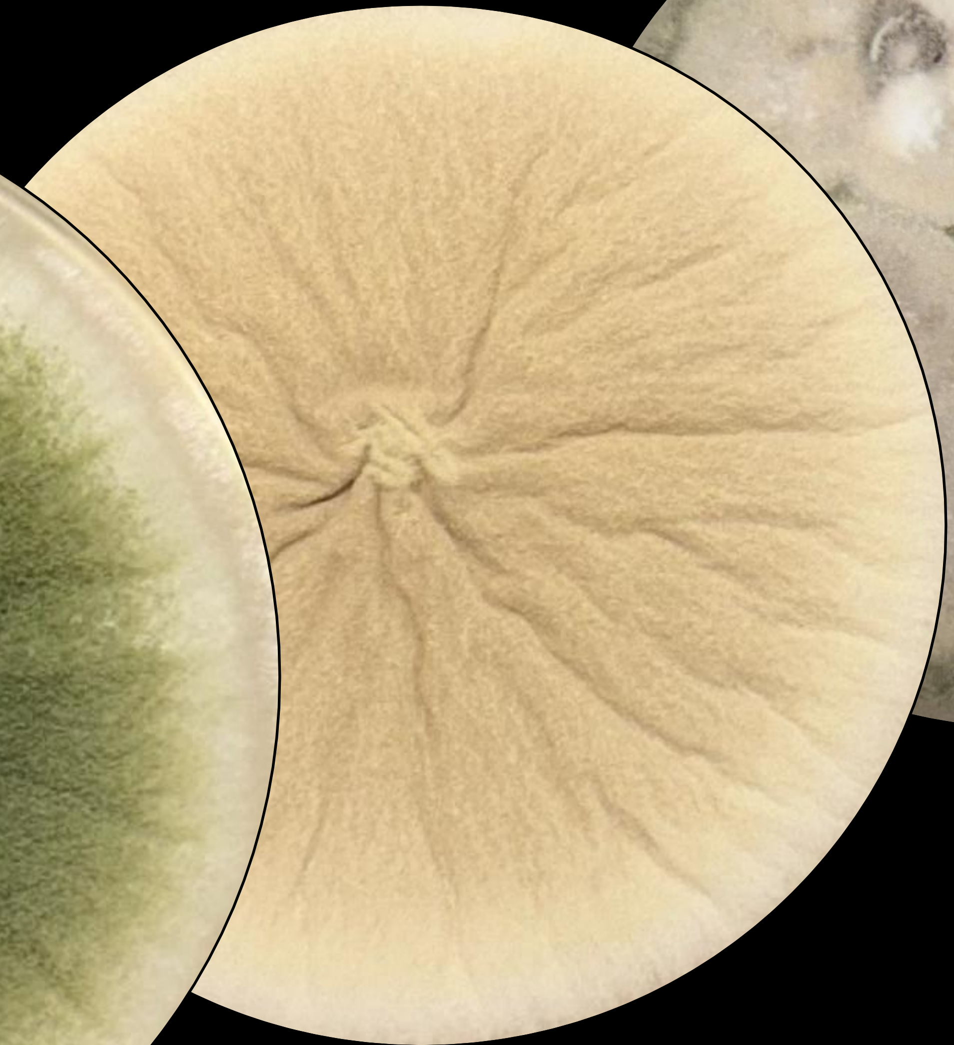
A. floccosus



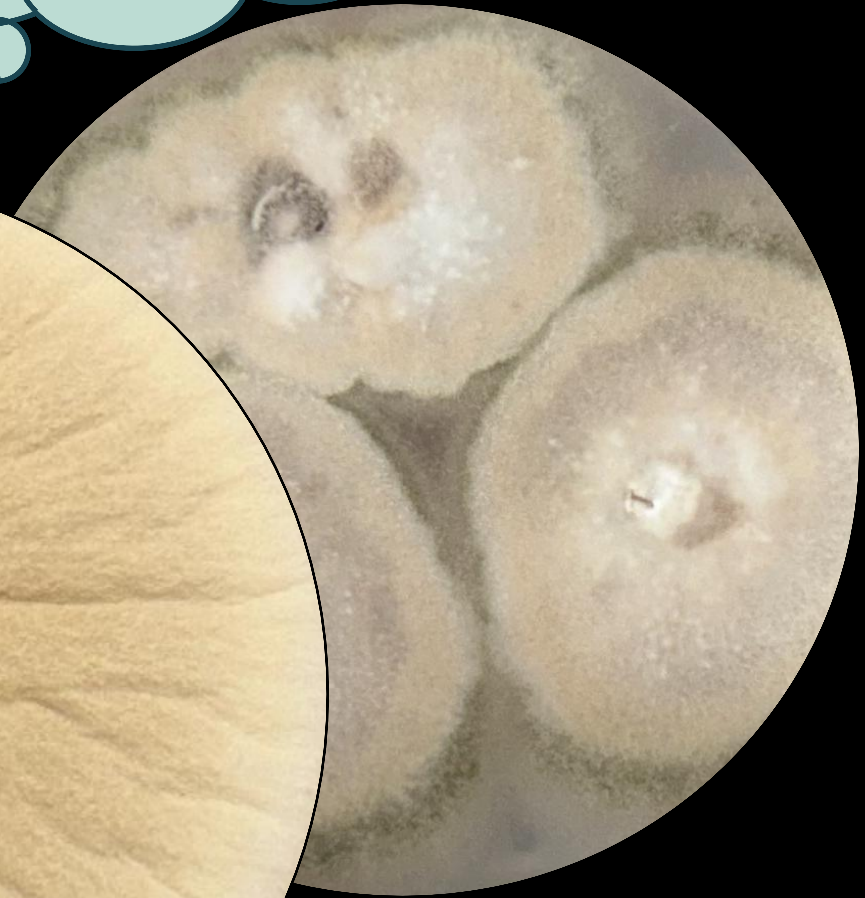
A. fumigatus



A. flavus

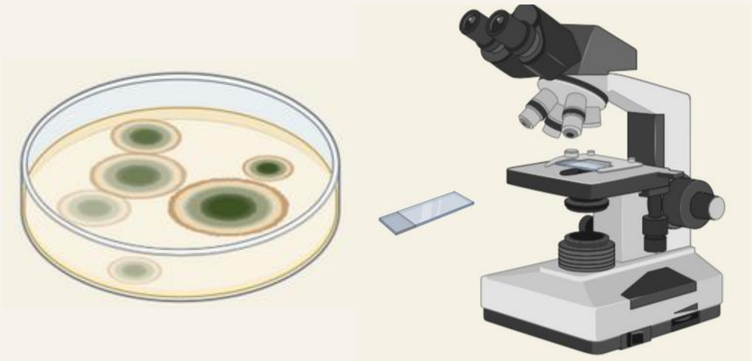


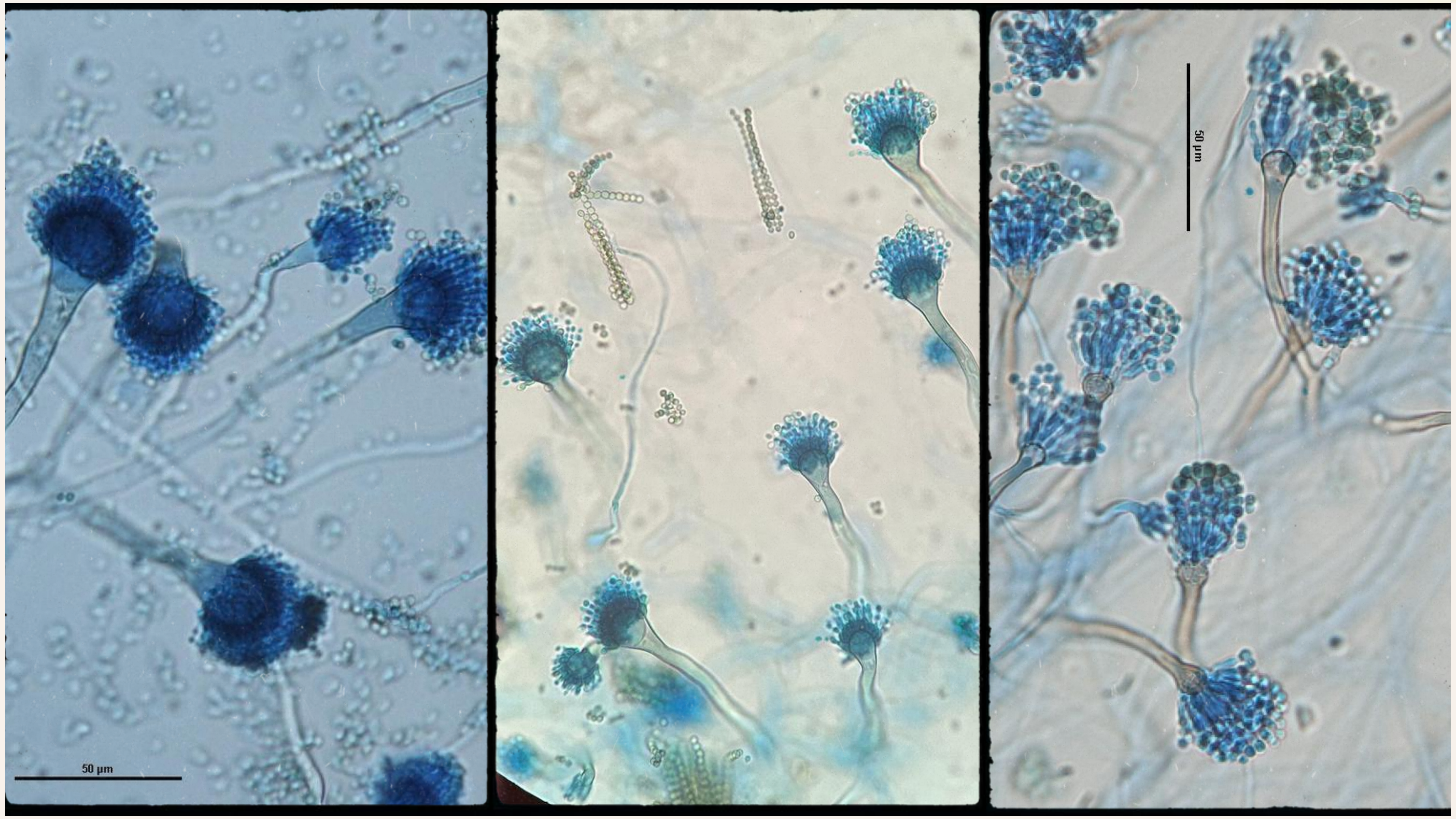
A. terreus



A. nidulans

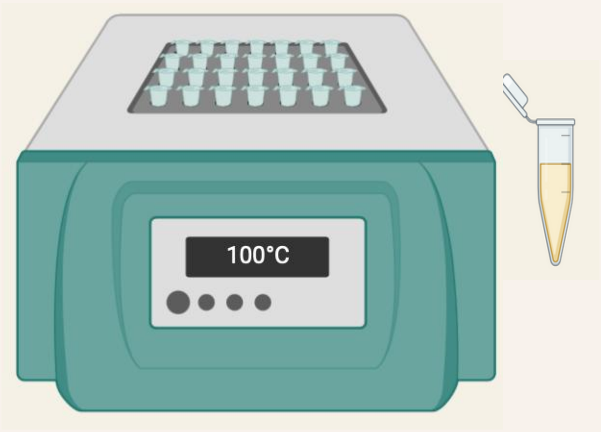
Identificazione morfologica dei ceppi
MICROSCOPICA





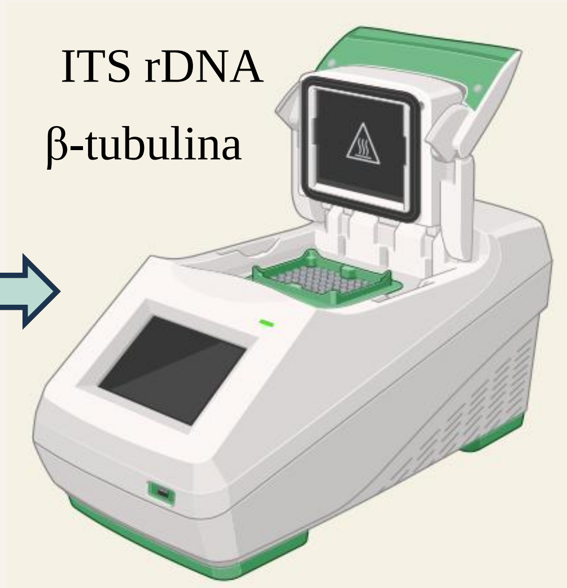
Coltura su vetrino secondo il metodo di Riddel

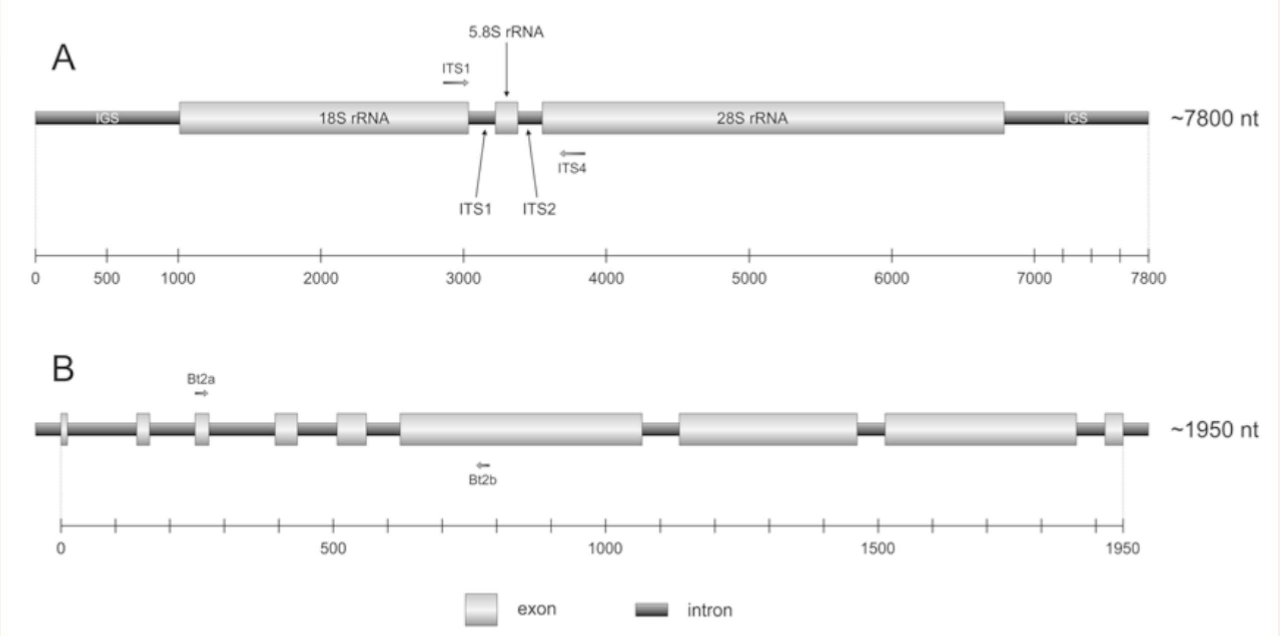
Applicazione di protocolli di biologia molecolare per il gene Beta-tubulina e per la regione ITS

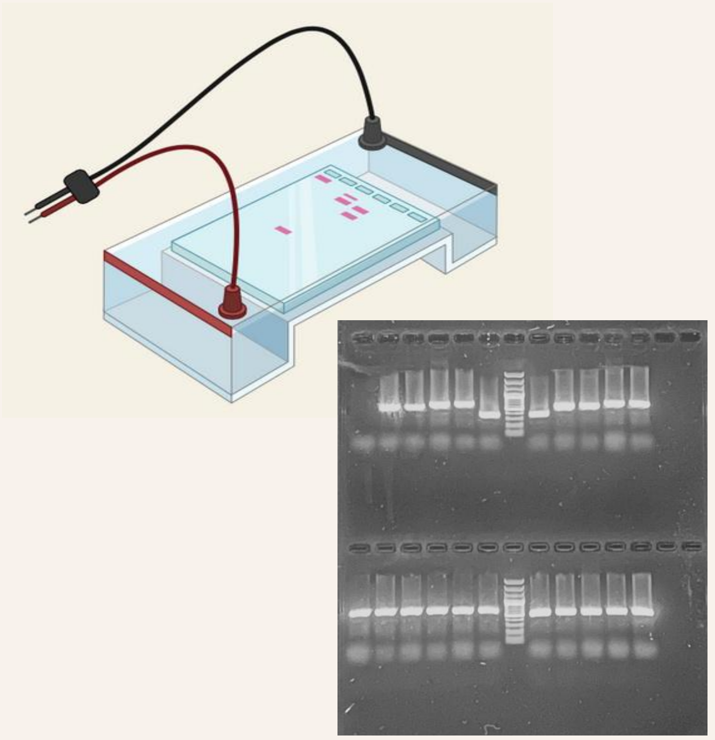


VS

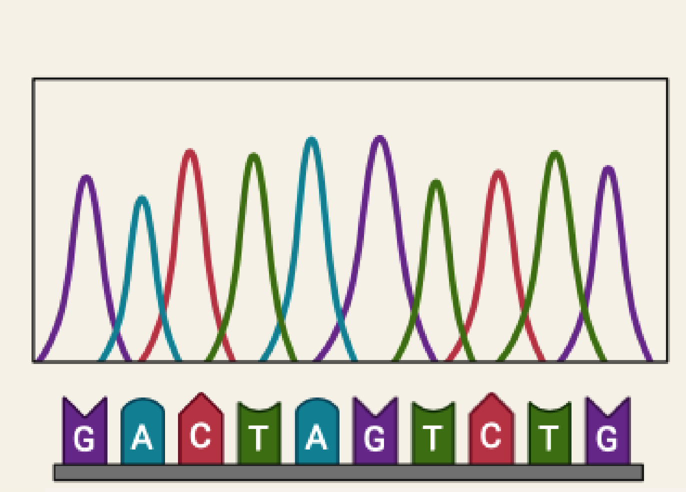
Comparazione differenti protocolli di estrazione DNA

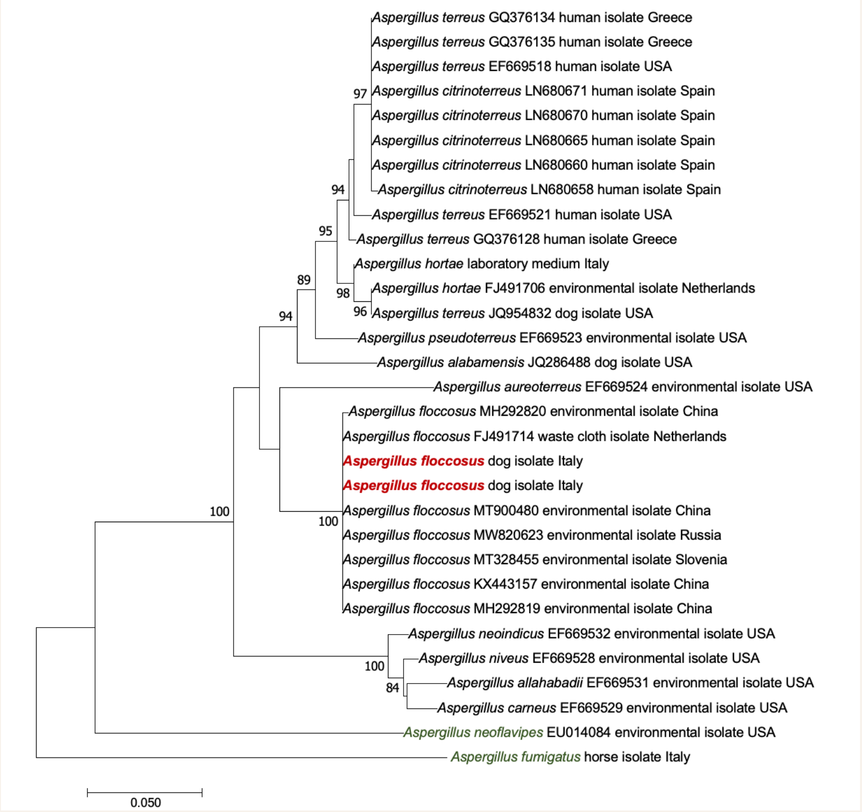






Purificazione del DNA

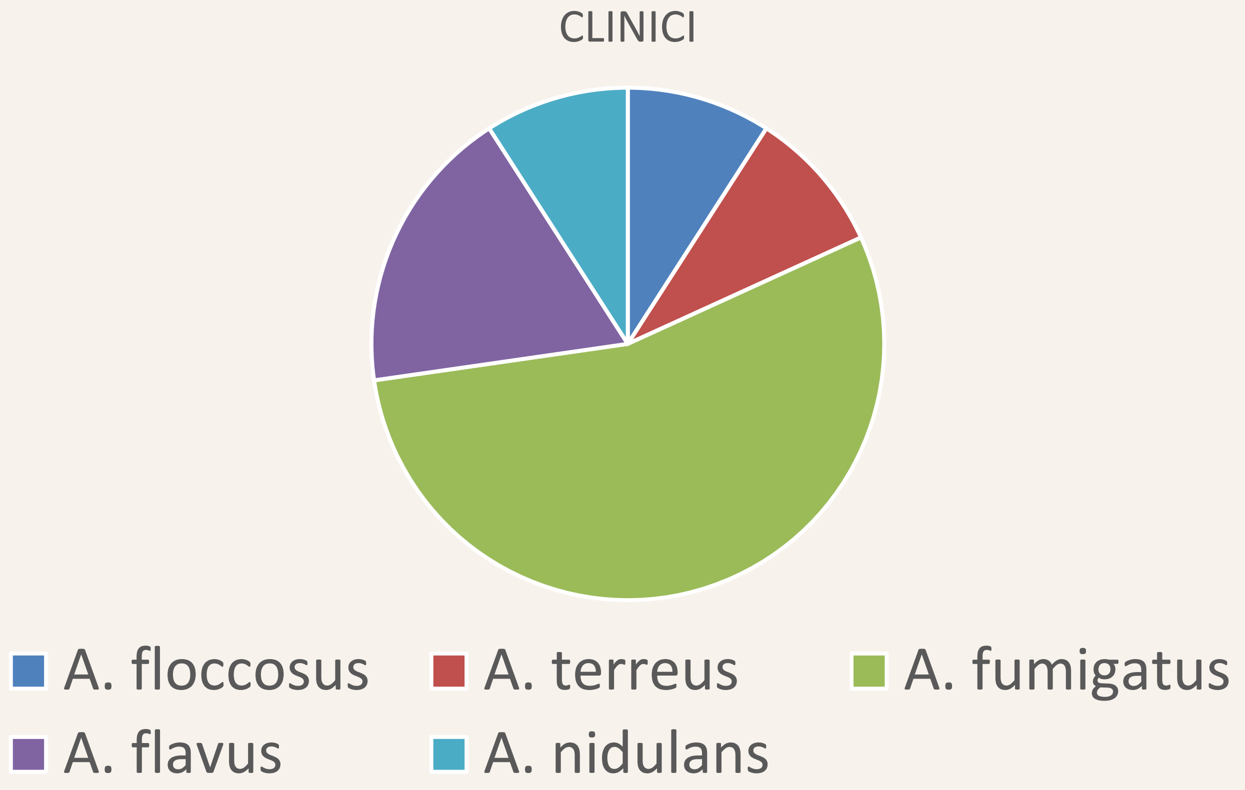


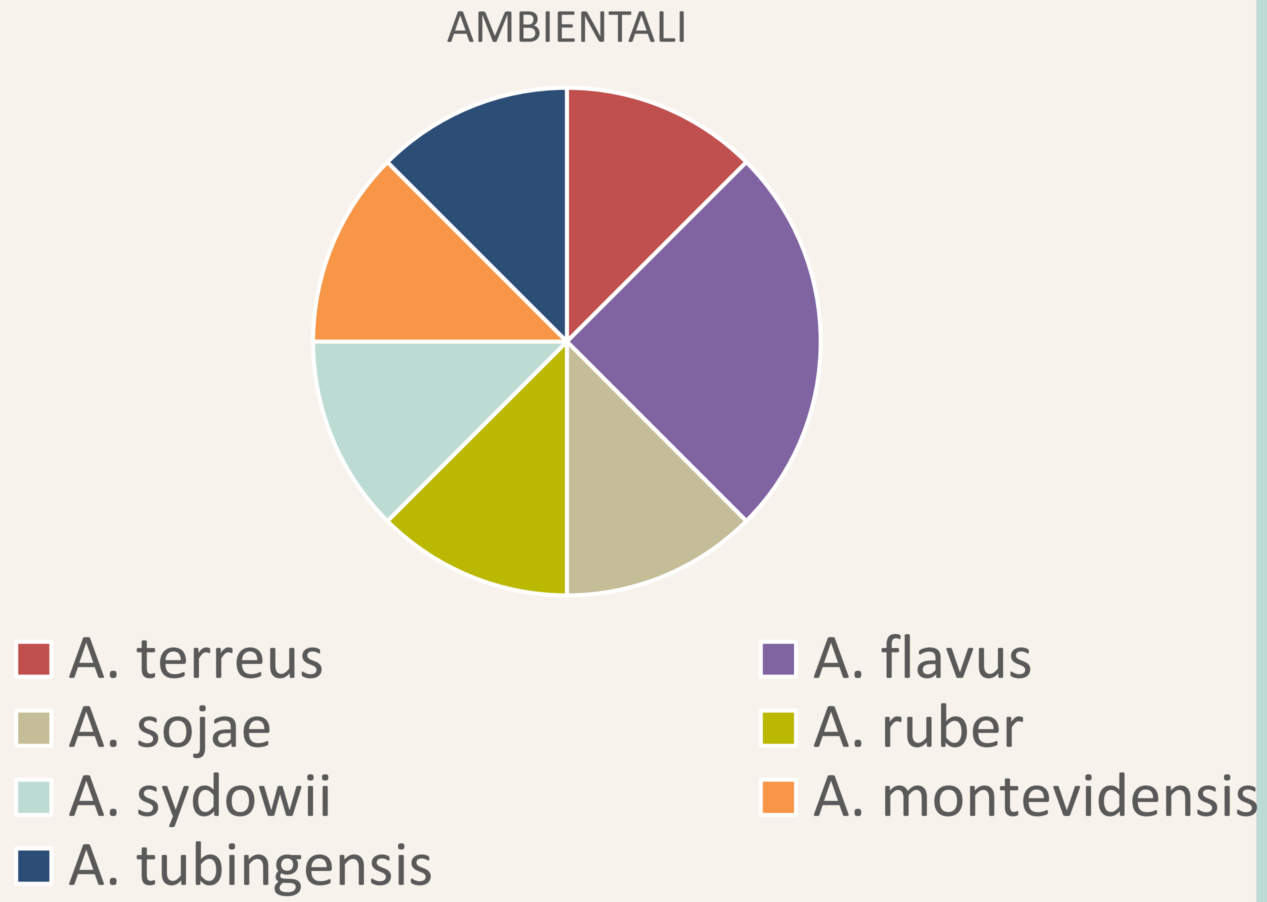


Sequenziamento, allineamento e analisi filogenetiche

Tramite indagini macroscopiche, microscopiche e molecolari sono stati identificati i seguenti ceppi di derivazione clinica e ambientale:

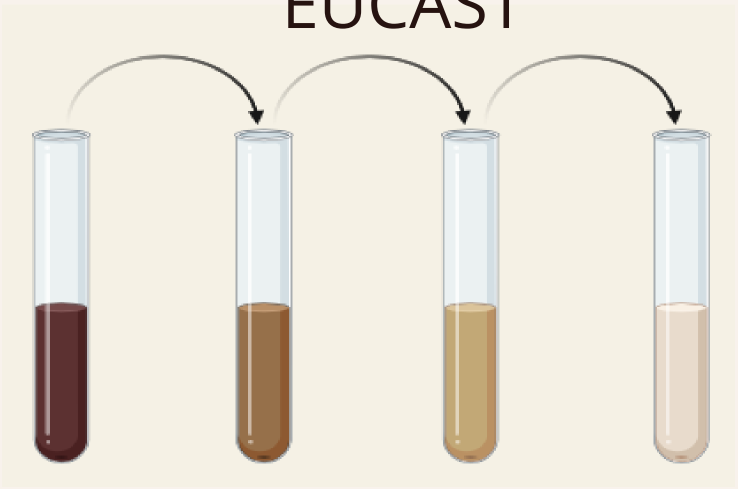
SPECIE	CLINICI		AMBIENTALI	%
A. floccosus	1	*sistemica cane*	0	(1/19) 5,3%
A. terreus	1	*sistemica cane*	1	(2/19) 10,5%
A. fumigatus	6	*Rinosinusale cane, seno frontale cavallo, BAL cavallo*	0	(6/19) 31,5%
A. flavus	2	*Cheratite cavallo, BAL cavallo*	2	(4/19) 21%
A. nidulans	1	*Micetoma cutaneo cavallo*	0	(1/19) 5,3%
A. sojae	0		1	(1/19) 5,3%
A. ruber	0		1	(1/19) 5,3%
A. sydowii	0		1	(1/19) 5,3%
A. montevidensis	0		1	(1/19) 5,3%
A. tubingensis	0		1	(1/19) 5,3%



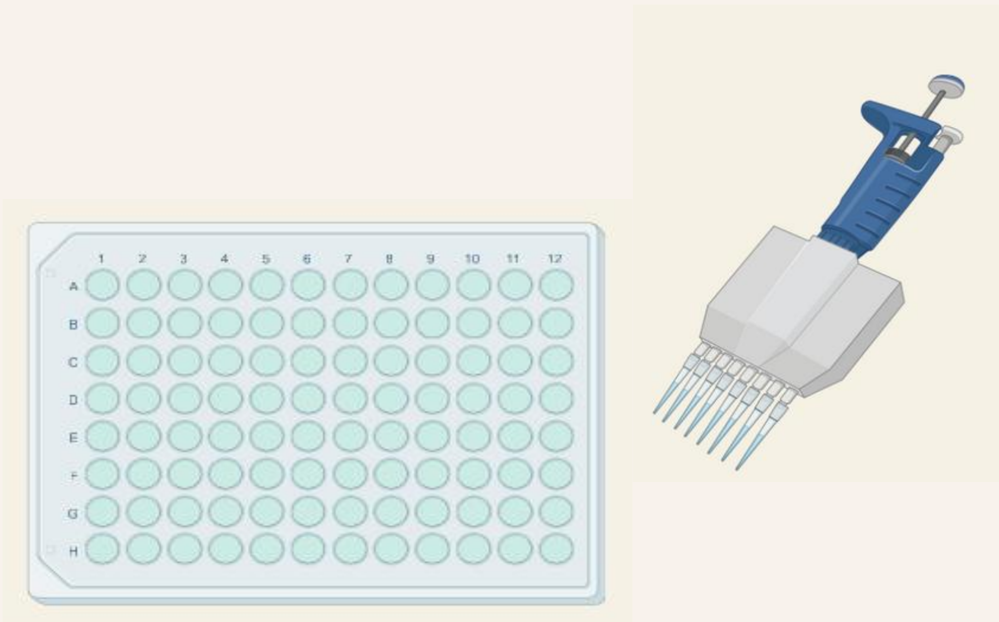


Test in vitro per valutare l’antimicotico-resistenza

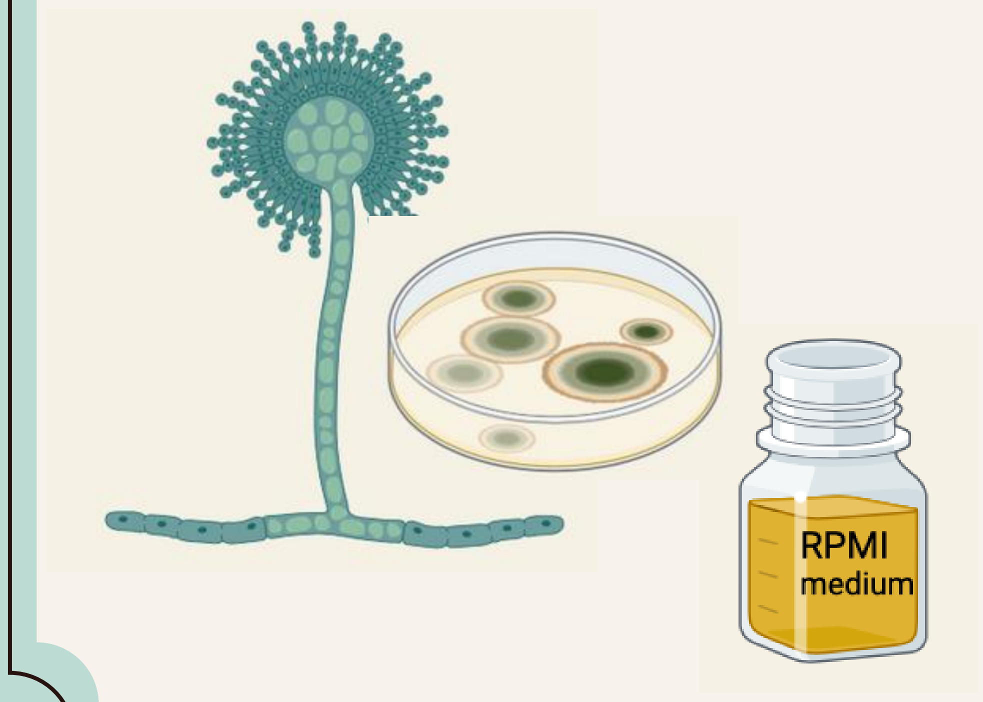
Microdiluizione in brodo secondo metodica EUCAST

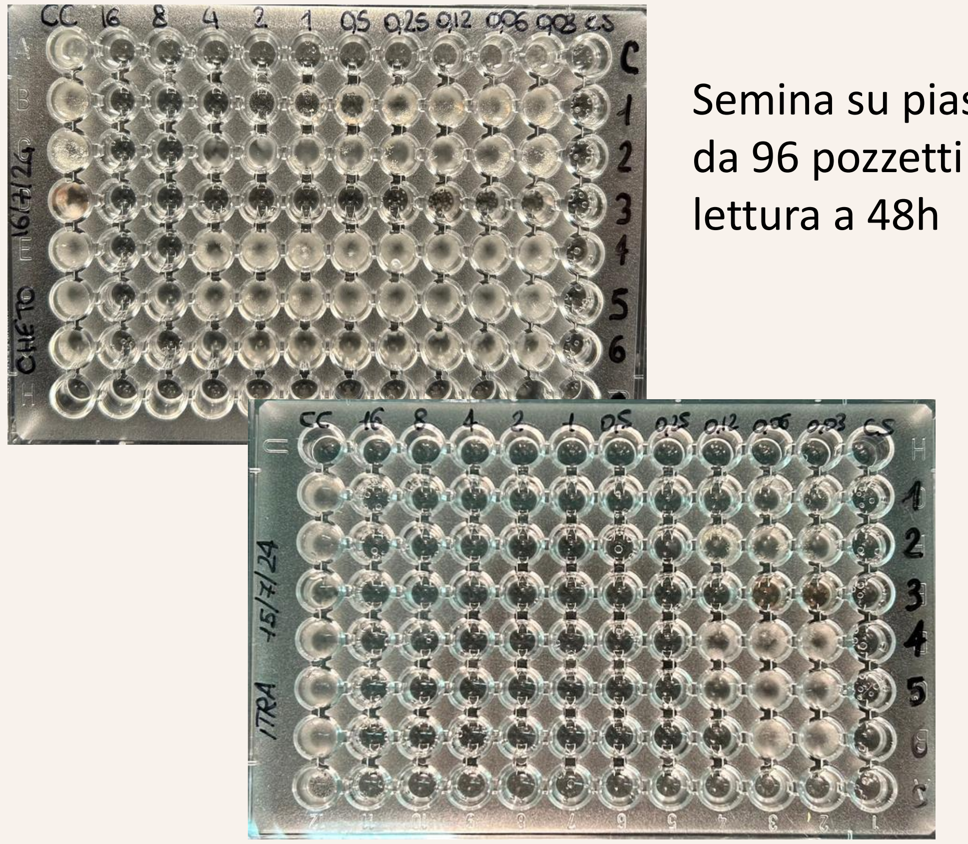


Diluizioni seriali di farmaco

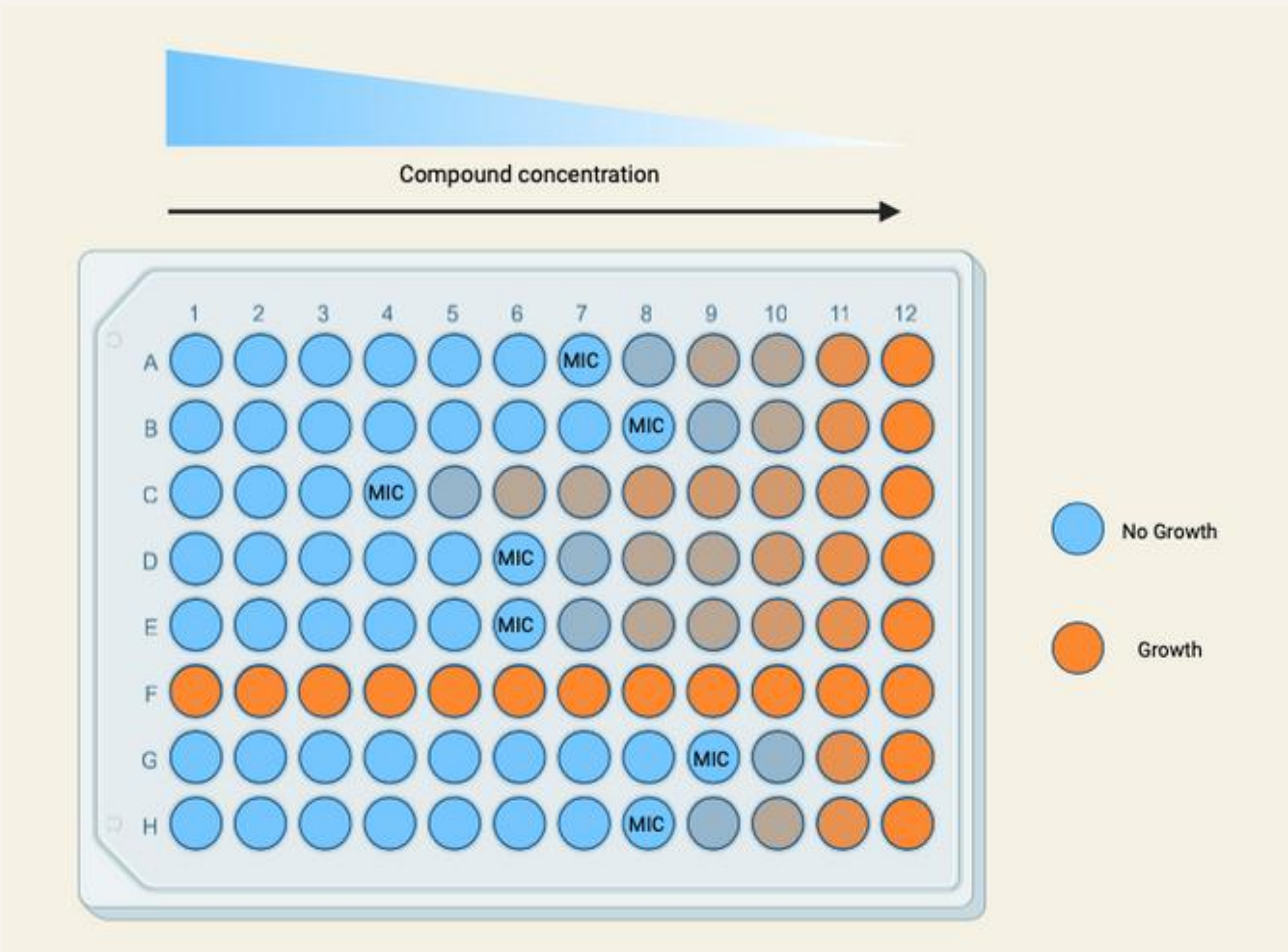


Preparazione dell’inoculo





Semina su piastre da 96 pozzetti e lettura a 48h



Atti di congresso

XXXIII CONGRESSO NAZIONALE SOIPA
Padova, 18-21 giugno 2024

AN UNUSUAL *ASPERGILLUS* SP. SECTION *TERREI* ISOLATE IN A CASE OF SYSTEMIC ASPERGILLOSIS IN DOG

Bordoni T., Dini F.M., Okonji S., Cola V., Gandini G., Pisoni L. Galuppi R.

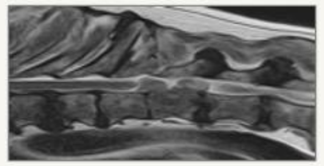
Department of Veterinary medical Sciences-University of Bologna

INTRODUCTION

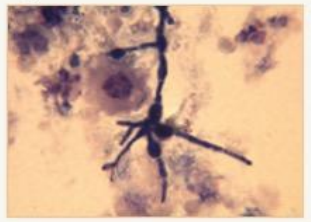
Canine aspergillosis in its systemic form represents a serious disease often resulting in a fatal outcome. *Aspergillus terreus* has been reported as the most frequent agent, with the German Shepherd being the most commonly affected breed. Occasionally, *A. versicolor*, *A. alabamensis*, and *A. deflectus* are reported in some cases. We report a case of discospondylitis in an 8-year-old female German Shepherd with severe neck pain, lameness of the forelimb, and progressive pelvic limb proprioceptive ataxia and paresis.

MATERIALS AND METHODS

The dog was referred to the University Veterinary Hospital of Alma Mater Studiorum – University of Bologna.



The MRI revealed severe and diffuse changes in signal intensity of the intervertebral discs and multiple lytic lesions, confirming the suspicion of discospondylitis and C6-C7 epidural empyema.

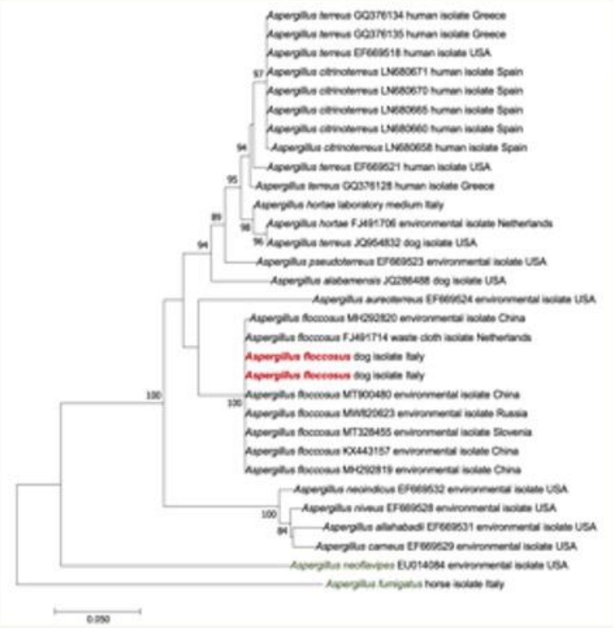


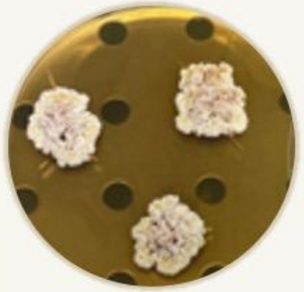
Microscopic examination of the urinary sediment stained with MGG revealed the presence of short hyphae with chlamydospores.

The culture on Sabouraud medium with Chloramphenicol (SAB-CAF) at 26° exhibited slow growth and an atypical rugose appearance.

Microscopic examination of the culture revealed the presence of numerous hyphae with chlamydospores.

Sequencing of the ITS region identified the genus as *Aspergillus*, while benA sequences showed 100% similarity with *Aspergillus floccosus* (section *Terrei*).

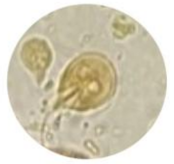




This case highlighted that **urine specimens** can be highly indicative and minimally invasive. Additionally, the identification of *A. floccosus*, not previously described in systemic mycoses of dogs, confirms that Aspergillus spp. involved in canine systemic aspergillosis often belong to the section *Terrei*.

Furthermore, the atypical morphology of the fungus made identification challenging. Previous studies have described the presence of morphological mutations in *A. terreus* as an adaptation of the fungus to changed environmental conditions, which significantly differ from laboratory growth conditions in terms of nutrient availability and physiological factors (Jukic et al., 2017. Antimicrob. Agents Chemother. 61:12).

Molecular analyses indicate Low Zoonotic Risk Associated with *Giardia* infection in Dogs and Cats from a Veterinary Teaching Hospital



Lattanzi A[1]., Dini F.M[1]., Bordoni T[1]., Caffara M[1]., Galuppi R[1].

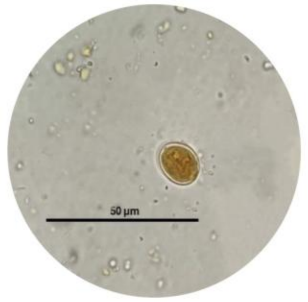
[1]Dept. of Veterinary Medical Sciences, University of Bologna, Ozzano dell'Emilia – Italy

INTRODUCTION: *Giardia duodenalis* (syn. *G. lamblia* and *G. intestinalis*) causes giardiasis in humans and most mammals, representing one of the most common intestinal parasites in humans. Giardiasis has a significant impact on public health due to its high prevalence and tendency to cause severe epidemics mainly food and waterborne [1]. Although infections in dogs and cats are often asymptomatic, giardiasis can lead to clinical gastrointestinal manifestations in pets [2-3]. Considering the potential presence of zoonotic assemblages of *G. duodenalis* in companion animals and to assess the possible risk for pet owners, the aim of this study was the molecular identification of *Giardia* spp. in dogs and cats using the triosephosphate isomerase (TPI) gene, selected for its high genetic variability allowing differentiation of assemblages through sequencing

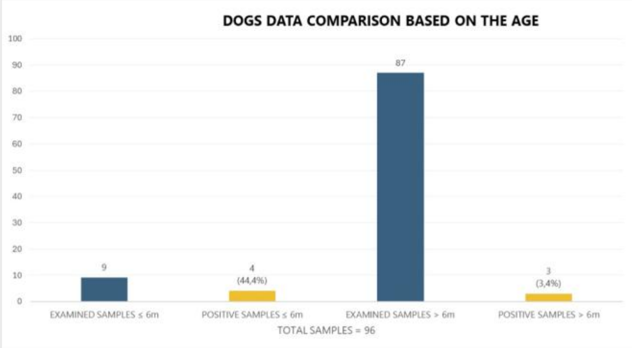
MATERIALS AND METHODS: From June 26 to October 12, 2023, a total of 139 samples were microscopically analysed during parasitological diagnostic routine upon clinical suspicion in the Laboratory of Parasitology and Parasitic Disease of the Department of Veterinary Medical Sciences of the University of Bologna. These comprised 96 fecal samples from dogs and 43 from cats, that were investigated for *Giardia* presence using Lugol-stained sediment analysis. Positive samples underwent PCR targeting the giardia TPI gene for molecular characterization. In addition to these samples, 28 previously positive samples by microscopy were also subjected to the same PCR

G. duodenalis trophozoites

RESULTS: Of the total 139 fecal samples tested microscopically for *Giardia* sp. presence during the study period, 5 (5.2%) samples from dogs and 4 (9.3%) samples from cats tested positive. A prevalence of 44.4% was observed in dogs ≤ 6 months old and 3.4% in dogs > 6 months old, with statistical significance (P<0.01). PCR conducted on a total of 37 samples (28 from dogs and 9 from cats) targeting the TPI gene resulted in amplification of 22 samples, from which 14 readable sequences were obtained. These confirmed the species as *Giardia duodenalis* and revealed the presence of Assemblage C in 9 dog samples, D in 1 dog sample, and F in 4 cat samples, all species-specific assemblages.



G. duodenalis cyst



Results molecular investigations targeting the TPI gene	
Assemblage C	9 dog samples
Assemblage D	1 dog sample
Assemblage F	4 cat samples

CONCLUSION: Based on our laboratory diagnostic experience, no zoonotic assemblages were detected, although sporadic reports of zoonotic assemblages in pets have been noted in Italy [4-7]. Based on these preliminary results, we can conclude that in our specific case, giardiasis in pets is likely transmitted through species-specific routes that do not contribute significantly to the epidemiology of human giardiasis

XXXIII CONGRESSO NAZIONALE SOIPA
Padova, 18-21 giugno 2024

GASTROINTESTINAL PARASITES INFECTING CALVES FROM DIFFERENT FARMING SYSTEMS IN NORTHERN ITALY: PRELIMINARY RESULTS

Dini F.M., Bordoni T., Massmannn A. J., Galuppi R.

Department of Veterinary medical Sciences-University of Bologna

INTRODUCTION

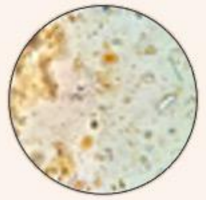
Various intestinal protozoan parasites, such as *Cryptosporidium* spp., *Eimeria* spp., and *Giardia* spp, are known to cause outbreaks of intestinal diseases in both humans and animals (Thomson et al., 2017, Vet Res. 48:42; Ryan et al., 2021, Int J Parasitol. 51:1099-1119;). Protozoan parasites are frequently found in the digestive tract of cattle, particularly in the rumen and intestines, and they can significantly impact the health of these animals. Their presence in the calves are commonly associated with intestinal diseases and potentially contribute to increased mortality in calves affected by gastrointestinal diseases, often alongside other non-eukaryotic enteropathogens (McGuirk, 2008, Vet Clin North Am Food Anim Pract, 24:139–53). In the frame of a study on the effect of feeding and management activities on the spread of these parasites, an epidemiological investigation was conducted to assess the presence of primary intestinal parasites in calves.

MATERIALS AND METHODS

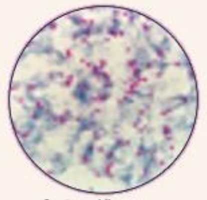
Fecal samples were collected from calves on **nine farms** with different production systems (milk or beef) located in the provinces of **Bologna** and **Cremona**. Whenever possible, samples were obtained from all calves present in each barn. A check list about management and biosecurity data was filled out.

Amoebae cyst

Amoebae cyst



Giardia sp.



Cryptosporidium spp.

The fecal samples underwent parasitological microscopic examination, which included sediment analysis using Lugol and Ziehl-Neelsen staining, as well as a flotation technique. Samples that tested positive using the flotation technique were further analyzed using Mc Master quantitative analysis to quantify the parasitic burden. For fecal samples that tested positive for *Giardia* sp., DNA extraction was performed to conduct a nested PCR targeting the TPI gene in order to genotype the strains.

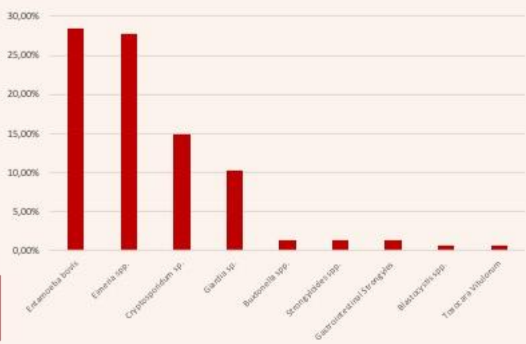
Preliminary molecular results indicated that the genotype of ***Giardia duodenalis*** in tested calves was **Assemblage E**.

Quantitative coprological analysis revealed that *Eimeria* oocyst counts ranged from <20 to 50120 oocysts per gram, while all detected helminths showed egg counts of less than 20 eggs per gram.

RESULT AND DISCUSSION

A total of 155 calves, both with and without diarrhea, were sampled, ranging in age from one week to six months.

The prevalence of parasitic protozoa observed was: 28% for ***Eimeria* spp.**, 28% for **amoebae cysts**; 15% for ***Cryptosporidium* spp.**; 10% for ***Giardia duodenalis***, 1.29% for ***Buxtonella* sp.**, 0.65% for ***Blastocystis* sp.** In some calves also ***Strongyloides papillosus*** *(1.29%)*,and ***Toxocara vitulorum*** (0.65%) were found.



Eimeria* spp.** was detected in all sampled farms, ***Cryptosporidium in 89% of the barns, and ***Giardia* sp.** in 67%. **Amoebae cysts**, rarely described in cattle, were recorded in 56% of the investigated farms; in particular, in two dairy barns of the province of Bologna, they were found in 41.17% and 59.45% of the calves.

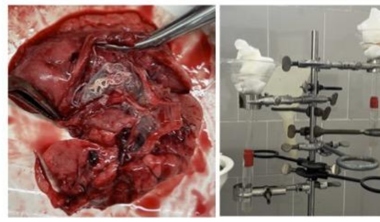
Preliminary results on con
European hedgehog (*Erinac*

Siviglia Y., Dini FM

Department of Veterinary Medical S

Introduction

The European hedgehog (*Erinaceus europaeus*)
Europe. In Italy, it is present throughout the p
common in suburban and rural areas. The frequen
public parks and gardens (Mizgajska-Wiktor et a
329-32) has led to a high level of interaction wit
important component of the epidemiology of
zoonotic ones (Ruszkowski et al., 2021, Animals
study is to obtain an overview of the parasitic
affect the European hedgehog, investigating their
zoonotic potential.



Results and Conclusions

Four (19%) hedgehogs tested positive for *T.*
positive for *L. infantum*, showing the presence o
Emilia-Romagna region (Magri et al., 2022,
Additionally, nine hedgehogs (42.8%) tested pos
seven (33.3%) had gastrointestinal parasites, id
and *Capillaria erinacei*, similarly to previous s
while a greater helminth species richness was fo
(Poglayen et al. 2003 Vet Rec 152: 22-24; Ma
3171). Furthermore, eleven specimens (52.4%)
including fleas (*Archaeopsylla erinacei*), mites
reported in southern Italy (Bezerra-Santos et al.,
Wildlife, 15: 95-104), and ticks (*Ixodes ricinus*
confirms the high prevalence of multiple endop
which are highly pathogenic for hedgehogs and i
such as *C. striatum*, while others with potential z

Brachylaima sp.

Atti di congresso

ES INFECTING CALVES FROM DIFFERENT FARMING SYSTEMS THERN ITALY: PRELIMINARY RESULTS

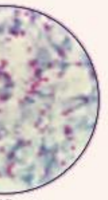
F.M., Bordoni T., Massmannn A. J., Galuppi R.

ent of Veterinary medical Sciences-University of Bologna

as *Cryptosporidium* spp., *Eimeria* spp., and *Giardia* spp, are known to cause outbreaks of
als (Thomson et al., 2017, Vet Res. 48:42; Ryan et al., 2021, Int J Parasitol. 51:1099-1119;).
n the digestive tract of cattle, particularly in the rumen and intestines, and they can
mals. Their presence in the calves are commonly associated with intestinal diseases and
ty in calves affected by gastrointestinal diseases, often alongside other non-eukaryotic
orth Am Food Anim Pract, 24:139–53). In the frame of a study on the effect of feeding and
ese parasites, an epidemiological investigation was conducted to assess the presence of

on **nine farms**
beef) located in
enever possible,
ent in each barn.
curity data was

ebae cyst



idium spp.

The fecal samples underwent parasitological microscopic examination, which included sediment analysis using Lugol and Ziehl-Neelsen staining, as well as a flotation technique. Samples that tested positive using the flotation technique were further analyzed using Mc Master quantitative analysis to quantify the parasitic burden. For fecal samples that tested positive for *Giardia* sp., DNA extraction was performed to conduct a nested PCR targeting the TPI gene in order to genotype the strains.

Preliminary molecular results indicated that the genotype of ***Giardia duodenalis*** in tested calves was **Assemblage E**.

Quantitative coprological analysis revealed that *Eimeria* oocyst counts ranged from <20 to 50120 oocysts per gram, while all detected helminths showed egg counts of less than 20 eggs per gram.

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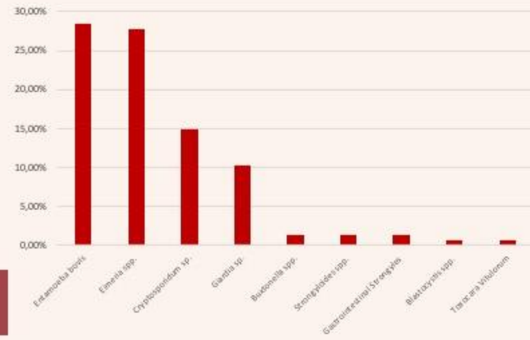
uodenalis,
***ystis* sp**. In
.29%),and



Eimeria* spp**. was detected in all sampled farms, ***Cryptosporidium in 89% of the barns, and ***Giardia* sp**. in 67%. **Amoebae cysts**, rarely described in cattle, were recorded in 56% of the investigated farms; in particular, in two dairy barns of the province of Bologna, they were found in 41.17% and 59.45% of the calves.

Preliminary results on comprehensive parasitological evaluation of European hedgehog (*Erinaceus europaeus*) in Emilia-Romagna region.

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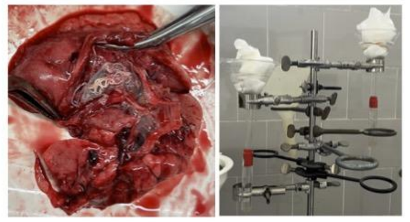
Introduction

The European hedgehog (*Erinaceus europaeus*) is a widespread mammal in Europe. In Italy, it is present throughout the peninsula and is particularly common in suburban and rural areas. The frequent presence of hedgehogs near public parks and gardens (Mizgajska-Wiktor et al., 2010, Wiad Parazytol, 56: 329-32) has led to a high level of interaction with humans. This species is an important component of the epidemiology of various parasites, including zoonotic ones (Ruszkowski et al., 2021, Animals, 11, 1754). The aim of this study is to obtain an overview of the parasitic agents that most frequently affect the European hedgehog, investigating their epidemiological aspects and zoonotic potential.



Material and Methods

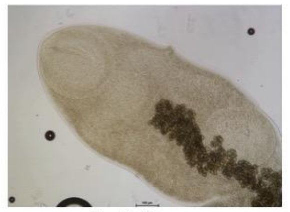
A total of 21 specimens of *E. europaeus*, collected from roadsides in the provinces of Bologna and Ferrara between 2006 and 2023 following road accidents or poisoning. During necropsy, tissue samples from the brain, heart, and tongue were subjected to qPCR and nested PCR targeting the B1 gene of *Toxoplasma gondii.* Ears, liver, spleen, and popliteal lymph nodes were used for qPCR targeting a fragment of kinetoplast minicircles DNA and nested PCR targeting the cysteine peptidase B (cpb) gene for *Leishmania* spp. Spleen tissue was utilized for PCR targeting the 18S rDNA of pyroplasms. The trachea and lungs were collected to search for pulmonary parasites using macroscopic dissection and the Baerman technique. The intestines were opened and examined for gastrointestinal helminths, whose identification was confirmed through sequencing different molecular markers (18S rDNA and COI). Lastly, skin samples were collected to search for ectoparasites through maceration in sodium hydrate followed by the flotation technique.

Results and Conclusions

Four (19%) hedgehogs tested positive for *T. gondii*, and seven (33.3%) tested positive for *L. infantum*, showing the presence of the two strains circulating in the Emilia-Romagna region (Magri et al., 2022, Int J Parasitol 52: 745-750). Additionally, nine hedgehogs (42.8%) tested positive for *Crenosoma striatum*, and seven (33.3%) had gastrointestinal parasites, identified as *Brachylaemus erinacei* and *Capillaria erinacei*, similarly to previous studies in Emilia-Romagna region, while a greater helminth species richness was found in Central Italy and the Islands (Poglayen et al. 2003 Vet Rec 152: 22-24; Mariacher et al., 2021, Animals, 11, 3171). Furthermore, eleven specimens (52.4%) tested positive for ectoparasites, including fleas (*Archaeopsylla erinacei*), mites (*Caparinia tripilis*), previously reported in southern Italy (Bezerra-Santos et al., 2021, Int J Parasitol: Parasites and Wildlife, 15: 95-104), and ticks (*Ixodes ricinus* and *Ixodes hexagonus*). This study confirms the high prevalence of multiple endoparasites in *E. europaeus*, some of which are highly pathogenic for hedgehogs and important in wildlife rescue centers, such as *C. striatum*, while others with potential zoonotic risks.

Crenosoma striatum

Archaeopsylla erinacei



Brachylaima sp.

Capillaria sp.

Caparinia tripilis

Synantropic rodents and their ectoparasites: a focus on five provinces of Northern-Central Italy

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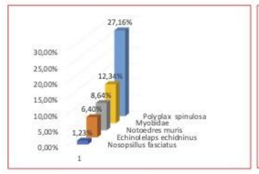
Department of Veterinary Medical Sciences, *Alma Mater Studiorum* - University of Bologna

Introduction: Synanthropic rodents, such as mice and rats, rank among the 100 most invasive and harmful species worldwide, according to the IUCN list. These species can alter ecosystems, change vegetation, and cause the decline or extinction of native species, both through direct predation and by depleting trophic resources (Gotti et al., 2022 L' eradicazione del Ratto nero (*Rattus rattus*) dalle isole del Mediterraneo: linee guida, buone pratiche, casi di studio.» *Ispra, Manuali e Linee Guida 199*). Furthermore, due to their close contact with humans, have always been a concern because of their substantial impact on public health. This study aims to investigate the presence of ectoparasites in rodents captured during pest control campaigns in various Italian provinces (Bologna, Forlì-Cesena, Rimini, Ravenna, Arezzo).

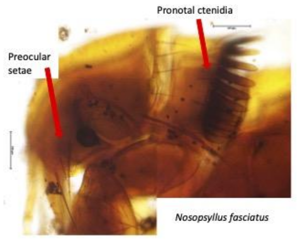
Materials and Methods: A total of 140 samples of skin from synanthropic rodents were examined, specifically 49 *Rattus rattus*, 81 *Rattus norvegicus*, and 10 *Mus musculus*, originating from the provinces of Bologna, Forlì-Cesena, Ravenna, Rimini, and Arezzo. During the necropsies, the skin was visually examined to collect macroscopic ectoparasites and skin samples measuring about 3x3 cm were collected from the caudal-dorsal area. The skin flaps were submerged in a 10% aqueous solution of sodium hydroxide (NaOH) and incubated for 4 hours at 37 °C to facilitate dissolution. Following the removal of coarse material, the resulting suspension underwent washing cycles via centrifugation and final flotation using a 1300 PS solution (Di Felice & Ferretti, 1962, Nuovi ann. Ig. Microbiol., 13:414-21), followed by microscopic examination.

Results and Conclusions: A total of 61 rodents (44%) tested positive for ectoparasites. Specifically, *Polyplax spinulosa* lice were found in 36 subjects (26%), comprising 22 *R. norvegicus*, 13 *R. rattus*, and 1 *M. musculus*. Myobiidae mites were detected in 15 subjects (11%), including 10 *R. norvegicus*, 3 *R. rattus*, and 2 *M. musculus*. Laelapidae mites, particularly *Echinolaelaps echidninus*, were identified in 7 subjects (5%) (6 *R. norvegicus* and 1 *R. rattus*). Mites causing scabies, notably *Notoedres muris*, were found in 7 *R. norvegicus*, and other mite genera such as *Steatonyssus* sp. were discovered in 1 *R. norvegicus* and 2 *R. rattus*. *Liponyssoides muris* (syn. *Dermanyssus muris*) was observed in a single *R. rattus*. Additionally, *Nosopsyllus fasciatus*, known for its potential role as a vector of *Yersinia pestis*, was found in one *R. norvegicus*. Other insects and acari, likely due to environmental contamination, were sporadically detected. This research provides a comprehensive overview of the arthropods present on the fur of synanthropic mice and rats in the surveyed provinces. The study represents a valuable baseline investigation, particularly given the lack of nationwide data.

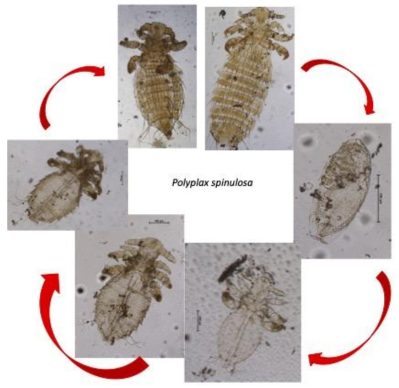


Rattus norvegicus

Rattus rattus

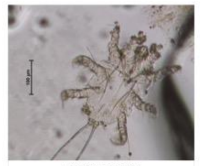


Nosopsyllus fasciatus



Polyplax spinulosa

Notoedres muris



Myobia musculi

Echinolaelaps echidninus

Radfordia sp.

Environmental contaminant

Dermacarus sp. - Hypopus | *Hypopus of Saproglyphidae* | *Steatonyssus sp.* | *Balaustium murorum* | Fragment of *Liposcelis sp.*

Survey on sarcoptic mange in ibex (*Capra ibex* L. 1758) of the Friulian Dolomites Regional Nature Park

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2 Responsabile scientifico - Parco Naturale Regionale delle Dolomiti Friulane

INTRODUCTIONS

The establishment of the ibex (*Capra ibex*) colony within the Friulian Dolomites Nature Park dates back to 1985-87 and it started with the release of 26 specimens sourced from the surviving population of the western Alps. Initially, the colony experienced steady growth, but in 2011, the onset of sarcoptic mange led to a progressive decline in population numbers. In fact, the inherent co-evolutionary dynamics between the parasite and its host gives rise to a cyclical pattern characterized by periodic epidemic outbreaks, although with reduced incidence rates affecting the population. This study aimed to determine the current population size and the trend of the sarcoptic mange epidemic within the ibex colony of the Friulian Dolomites Nature Park.

MATERIALS AND METHODS

Figure 1

Figure 2 – Summer transect

Figure 3 – Winter transects

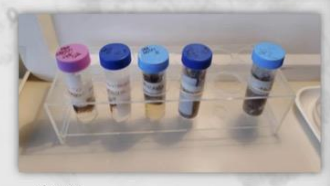


Figure 5

The study began with a retrospective analysis of data collected from annual censuses between 2012 and 2023. Additionally, it involved a longitudinal survey conducted from February to October 2023 in the Salta-Borgà area (Figure 1), located in the southwest sector of the Park. This survey is the result of monthly monitoring of ibex through direct observation aided by optical instruments along established transects (Figure 2, 3). These observations were carried out daily for several consecutive days, spaced one month apart. Each observation session included photographic documentation for subsequent health analysis of the animals, resulting in classification into four degrees of mange severity based on skin lesions (Figure 4). During the survey, biological samples were collected from the environment and from carcasses exhibiting mange-related lesions. These samples underwent laboratory analysis to detect *Sarcoptes scabiei* using a maceration in sodium hydrate (Figure 5) followed by a flotation technique.

Figure 4

RESULTS AND CONCLUSIONS

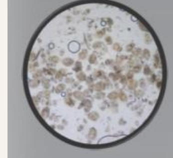


Figure 6

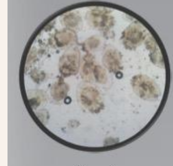
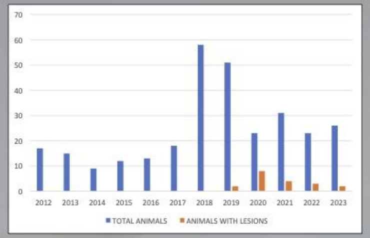
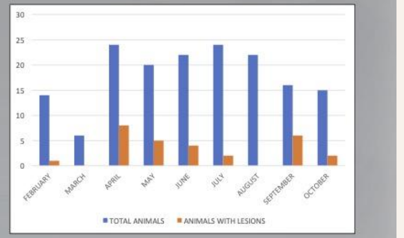


Figure 7

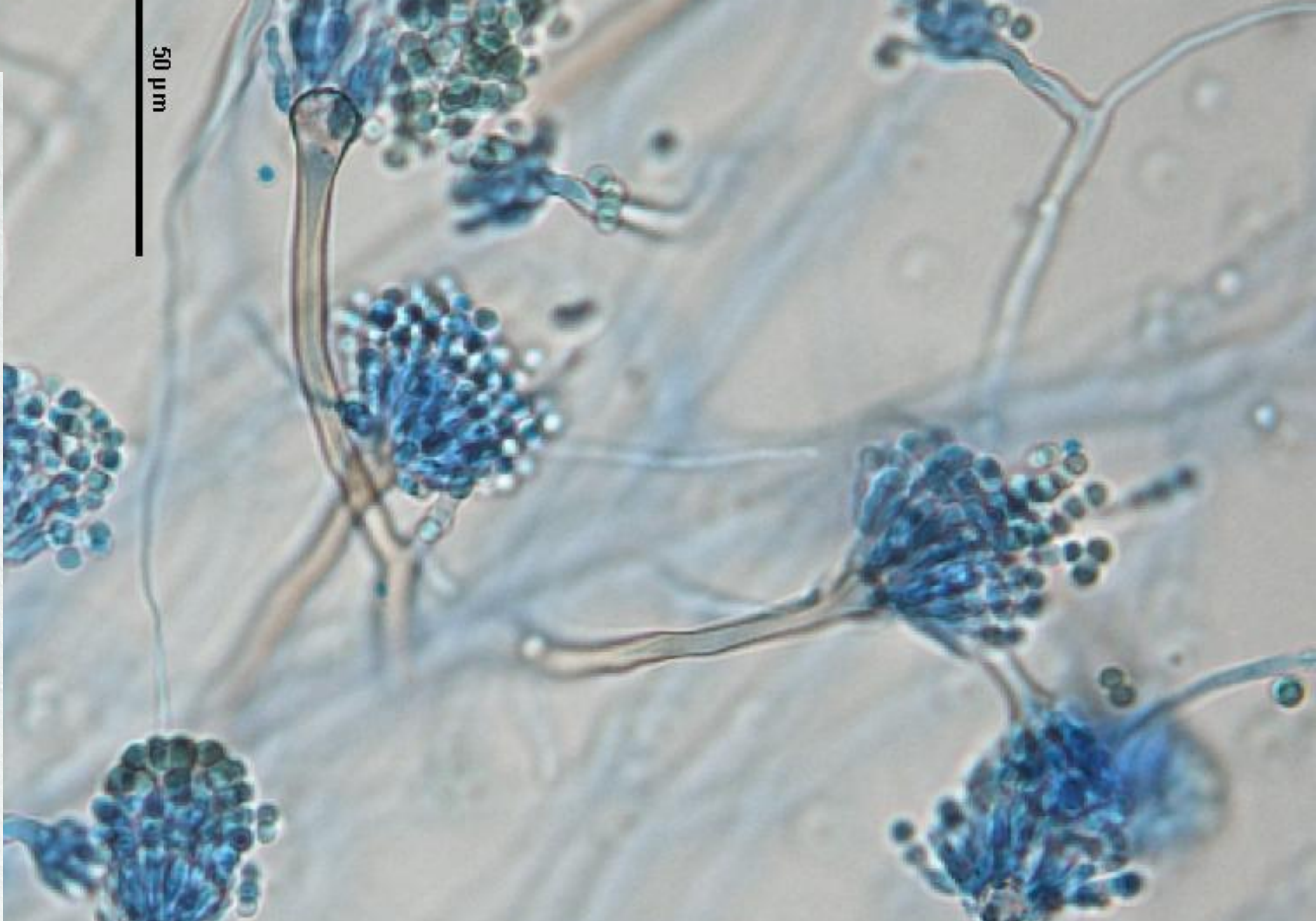
The findings confirmed the presence of a second sarcoptic mange outbreak, commencing in 2019 within the Salta-Borgà area. While resulting in a reduced demographic decline compared to the initial outbreak, this recovery failed to facilitate a positive population trend. Laboratory analysis of samples revealed *S. scabiei* presence both in carcasses (Figure 6) and environmental samples (Figure 7), indicating potential transmission through various indirect sources. Despite milder cutaneous lesions, this secondary wave of sarcoptic mange propagated throughout the Park's ibex colony. Considering the population´s characteristics – relatively young, genetically restricted and territorially isolated – future cyclical waves with low incidence can be foreseen due to the disease´s natural evolution. Hence, the recommendation from this study is to enhance genetic variability through reintroducing individuals from colonies with prolonged exposure to sarcoptic mange, potentially exhibiting an efficient coevolutionary response to the parasite.



Number of animals observed and number of individuals with evident sarcoptic mange in the ibex population in the Salta-Borgà area, observed during the summer surveys from 2012 to 2023



Monthly number of animals observed and number of individuals with evident sarcoptic mange in the ibex population in the Salta-Borgà area in 2023



Grazie per l’attenzione