MUNI

Annex No. 11 to the MU Directive on Habilitation Procedures and Professor Appointment Procedures

PUBLIC LECTURE EVALUATION

Masaryk University	
Faculty	Faculty of Science
Procedure field	Zoology
Applicant	Doc. Mgr. Jan Zukal, Dr. MBA
Lecture date	19/11/2026
Lecture topic	Bats and their pathogens
Persons present (number)	96 (on site) + 3 (online)
Designated evaluators (board members)	prof. Mgr. Stanislav Pekár, PhD. (on-site) prof. MVDr. Ivan Literák, CSc. (on-site) prof. MVDr. Emil Tkadlec, CSc. (online) prof. Tanja Straka (on-line)

In the beginning, the candidate introduced the current status of infectious diseases with zoonotic potential. Infectious and parasitic diseases remain among the leading preventable causes of mortality worldwide, accounting for approximately 17 to over 25% of global deaths annually, depending on regional healthcare conditions and disease classification. These diseases are typically transmitted through direct human-to-human contact, contaminated food or water, and vector-borne routes such as insect bites. In addition, many important infectious diseases have a zoonotic origin and can be transmitted from other vertebrate animals to humans.

Bats are well known as reservoirs of a wide range of pathogenic agents. While most recent research has focused on viruses, bats also harbour diverse bacteria, fungi, and protozoa. Over the past 15 years, he has investigated Palearctic bat populations across Central and Eastern Europe, the Caucasus, and Siberia for the presence of the fungus *Pseudogymnoascus destructans*, lyssaviruses (bat rabies), coronaviruses, the bacteria *Leptospira* spp. and non-tuberculous mycobacteria, and the protozoan parasites *Babesia* and *Trypanosoma*. A variety of samples were employed for the purpose of analysis, including blood, urine, wing swabs and droppings.

He gave two examples. The greater mouse-eared bat (*Myotis myotis*) exhibited the highest prevalence and infection intensity of the white-nose syndrome (WNS) pathogen, *P. destructans*, among European bat species. Despite this high infection burden, *M. myotis* generally survives *P. destructans* infection, although elevated fungal loads may result in measurable health deterioration. With his team, they newly detected rabies virus antibodies in seven bat species, corresponding to an overall seroprevalence of 3.2 %. Particularly noteworthy was the identification of a seroprevalence hotspot (73.1%) in a cave occupied by a maternity colony of the Lesser mouse-eared bat (*Myotis blythii*) in Altai Krai, Russia. Nevertheless, experimental studies using bat cell lines demonstrated a lower susceptibility of

bat brain cells to rabies virus infection, which may partly explain the relatively low incidence of clinical disease despite evidence of viral exposure.

In addition, they investigated members of the bacterial genera *Leptospira* and *Mycobacterium*. Four bat species were identified as novel hosts of the pathogenic bacterium *Leptospira interrogans*, and a putative new species closely related to *L. weilii* was also detected. At least 29 species, subspecies, and species complexes of non-tuberculous mycobacteria were identified in bat guano samples. Although the proportion of positive samples was similar between caves and attics, infection loads were significantly higher in cave-derived samples. Likewise, cultivation and microscopy positivity rates did not differ significantly between Bulgarian and South Caucasian localities; however, median locality-level mycobacterial loads were higher in Bulgaria. Finally, trypanosomes (predominantly *Trypanosoma dionisii*) occurred at high prevalence but showed no detectable effect on bat condition. In contrast, *Babesia vesperuginis* was associated with significant alterations in acid-base balance parameters during hibernation.

He concluded that active surveillance of bat pathogens is essential not only for safeguarding bat populations and public health but also for advancing our understanding of the mechanisms that enable bats to tolerate or resist infections. These mechanisms may offer promising leads for the development of innovative treatments for human diseases.

A fruitful discussion followed, where attendees asked 11 questions, which were readily answered by the candidate. There were questions, such as: Where did COVID-19 originate in? Is it possible to keep bats as pets? Do you think bats are more resistant to disease during hibernation than during season? How big impact has WNS on the US on agriculture production? Which vectors are more dangerous, humans or rats? Can UV be used to treat some microorganism? Can humans be transferring diseases to bats? What mechanism made north-American populations tolerant to WNS?

Overall, the lecture was presented as an impressive and complex story. The candidate spoke with great enthusiasm, showing that he is an expert in the selected topic. He is a talented speaker and invested lot of energy to attract the students and academics. The audience found the lecture attractive. The number of questions posed proves that the lecture was of broad interest.

Conclusion

The lecture delivered by Jan Zukal, entitled "Bats and their pathogens" and presented as part of the professor appointment procedure, **demonstrated the sufficient** scholarly qualifications and pedagogical capabilities expected of candidates in the field of Zoology.

The lecture was held in person as part of the Zoological seminar at 1 PM. The aforementioned boardmembers attended the lecture and provided its evaluation. All designated evaluators have read the evaluation and **concur with its content**.

Date: 19/11/2026

Stanislav Pekár

Ivan Literák