Journal of Wildlife and Conservation Medicine
p-ISSN: 3090-5656; e-ISSN: 3109-8436
https://journal.ipb.ac.id/index.php/jwcm

Dondini *et al.*
Vol 2 No 1, June 2026, Pp 7–10
DOI: 10.29244/jwcm.2.1.7

Short communication **OPEN ACCESS**

First report of *Porphyromonas pogonae* infection in a bat (*Nyctalus noctula*): implications for wildlife health and zoonotic potential

Gianna Dondini[1], Ratti Gabriele[2], Marcello Consolo[1], Clarissa Giacolini[1], Simone Vergari[1]*

[1] Museo Naturalistico Archeologico Appennino Pistoiese, via Orange, I-51028 Gavinana, Pistoia, Italy
[2] I-VET s.r.l., Laboratorio di Analisi Veterinarie, via Ettore Majorana 10, I-25020 Flero, Brescia, Italy

Abstract

Porphyromonas pogonae is an anaerobic, Gram-negative coccobacillus originally isolated from the oral cavity of bearded dragons (*Pogona vitticeps*) and occasionally associated with opportunistic infections in humans. Here, we report the first documented case of P. pogonae infection in a mammalian species, the common noctule (*Nyctalus noctula*). In 2024, a male bat admitted to a wildlife rescue center in northern Italy for a fractured wing developed a persistent wrist abscess. Bacteriological examination revealed a pure culture of *P. pogonae*, identified by MALDI-TOF MS. Antimicrobial susceptibility testing showed susceptibility to amoxicillin/clavulanic acid, clindamycin, and metronidazole, and resistance to penicillin and ampicillin. Following targeted antimicrobial therapy, complete clinical recovery was achieved. This report expands the known host range of *P. pogonae* and highlights the importance of microbiological diagnostics in wildlife medicine. The detection of this bacterium in a chiropteran host suggests potential ecological and zoonotic implications that warrant further investigation.

Keywords Chiroptera | *Nyctalus noctule* | *Porphyromonas pogonae* | wildlife | zoonosis

Porphyromonas pogonae is a Gram-negative, microaerotolerant bacterium belonging to the genus *Porphyromonas*, originally described from isolates obtained from central bearded dragons (*Pogona vitticeps*) (Bemis *et al.*, 2011; Kawamura *et al.*, 2015; Wang *et al.*, 2023). Subsequently, the bacterium has been implicated in sporadic human infections, including wound abscesses and a fatal prosthetic aortic graft infection (Schröttner *et al.*, 2017; Romero de Oliveira *et al.*, 2019). The organism appears adapted to low-oxygen environments and is regarded as an opportunistic pathogen.

To date, infections in non-reptilian hosts have been rarely documented, and no reports have described *P. pogonae* in wild mammals (Kawamura *et al.*, 2015; Schröttner *et al.*, 2017; Romero de Oliveira *et al.*, 2019; Wang *et al.*, 2023). Bats (Order Chiroptera) are recognized as reservoirs of a wide diversity of microorganisms, including bacteria, viruses, and fungi, some of which have zoonotic potential (Mühldorfer, 2013; Brook & Dobson, 2015; Hayman, 2016). Documenting emerging or unexpected pathogens in bats is therefore essential for understanding their ecological role and their relevance in zoonotic spillover dynamics (Luis *et al.*, 2013; Plowright *et al.*, 2017). This study reports the first isolation of *P. pogonae* from a bat (*Nyctalus noctula*), expanding its known host spectrum.

On April 29, 2024, a male *Nyctalus noctula* was admitted to the Wildlife Rescue Center of Vicenza "Difesa Natura 2000" (Italy) following a closed compound fracture of the left wing. The bat weighed 14.19 g, with a forearm length of 51 mm. The fracture involved the carpal region, which was markedly swollen at presentation (**Figure 1**).

Over the following weeks, the carpal region developed a persistent abscess characterized by swelling and purulent exudate. Standard immobilization and supportive care were provided according to rehabilitation guidelines for bats (Lollar, 2023), but the lesion failed to resolve. Initial therapy followed established guidelines for the management of bacterial infections in bats (Lollar, 2023). Despite multiple courses of empirical antibiotic treatment, the bat developed a persis-

***Corresponding author** Email: sim.vergari@gmail.com

Figure 1 Common noctule (*Nyctalus noctula*) left wrist in the acute phase of the infection.

tent and recurrent abscess at the wrist. The treatment timeline and clinical response are summarized in **Table 1**.

On July 1, 2024, due to persistence of the lesion, a sterile swab was collected from the abscess for bacteriological examination. The swab was collected using an e-Swab® system (Copan, Brescia, Italy) and submitted to a diagnostic laboratory (I-Vet s.r.l., Flero, Italy) for bacteriological analysis.

Samples were inoculated onto tryptic soy agar supplemented with 5% sheep blood and MacConkey agar (Becton Dickinson®, Heidelberg, Germany) and incubated at 37°C under both aerobic and anaerobic conditions for up to 72 hours. Pure bacterial growth was observed on blood agar under anaerobic conditions after 72 hours.

Bacterial identification was performed in duplicate using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS; Sirius MALDI Biotyper®, Bruker Daltonik, Bremen, Germany), yielding identification scores of 2.19 and 2.14 for *Porphyromonas pogonae* (**Supplementary File 1**). The obtained spectra were also compared with the reference libraries available in MicrobeNet (https://microbenet.cdc.gov/; Centers for Disease Control and Prevention, USA), which provided concordant identification results (**Supplementary File 2**).

Antimicrobial susceptibility testing was carried out using the disk diffusion method (Liofilchem®, Roseto degli Abruzzi, Italy) in accordance with EUCAST guidelines for anaerobic bacteria (EUCAST, 2024). The isolate was susceptible to amoxicillin/clavulanic acid, clindamycin, and metronidazole and resistant to penicillin and ampicillin.

Table 1 Series of antibiotic treatments administered and clinical response

Date	Drug classes	Active ingredient	Dose	Treatment efficacy
April 29–May 8, 2024	Quinolones	Pradofloxacin	125mg/kg SID	Infection not resolved
May 9–18, 2024	Cephalosporin	Cephalexin PO	25mg/kg SID	Infection not resolved
May 19–June 7, 2024	Aminoglycoside	Gentamicin ointment 1%	local use (BID)	Infection not resolved
June 8–28, 2024	Quinolones	Pradofloxacin	125mg/kg SID	Infection not resolved
July 1, 2024		Swab sampling		
July 11, 2024		Antibiogram production		
July 11–13, 2024	Beta lactams	amoxicillin + clavulanic acid PO	15 mg/kg TID	Infection resolved
July 13–29, 2024	Beta lactams	amoxicillin + clavulanic acid PO	10 mg/kg BID	Infection resolved
September 22, 2024		Follow-up		Wrist fully healed (see **Figure 2**)

Following bacteriological identification and antimicrobial susceptibility testing, targeted therapy with amoxicillin/clavulanic acid (Synulox®) was initiated and administered for 15 days. During the first two days, the drug was given at a dose of 15mg/kg TID followed by a dose of 10 mg/kg BID.

The lesion progressively resolved during treatment. By the end of therapy, swelling had completely disappeared. At follow-up (September 22, 2024), the wrist was fully healed and functional (**Figure 2**). The bat's body weight had increased to 29.76 g.

This report documents the first confirmed occurrence of *Porphyromonas pogonae* infection in a mammalian host, expanding its known host range beyond reptiles and humans. The case highlights this bacterium's adaptability across diverse host environments and underscores the importance of microbiological diagnostics in wildlife medicine.

The isolate was identified using MALDI-TOF MS, yielding high-confidence scores (>2.0), which generally indicate reliable species-level identification. MALDI-TOF MS has been validated as an accurate method for the identification of anaerobic bacteria, including members of the genus *Porphyromonas* (Barreau *et al*., 2013; Rams *et al*., 2016). *P. pogonae* has previously been correctly identified using MALDI-TOF MS, as reported by Schrottner *et al*. (2017), further supporting the reliability of this approach. Nevertheless, molecular analysis, such as 16S rRNA gene sequencing, would have been valuable to confirm the species-level identification. Further studies are needed to evaluate the performance and reliability of MALDI-TOF MS for the correct identification of clinical isolates originating from wildlife.

The persistence of infection despite prolonged empirical therapy highlights the limitations of non-targeted antimicrobial use and emphasizes the importance of culture-based diagnosis and susceptibility testing in wildlife medicine. The successful response to amoxicillin/clavulanic acid is consistent with previously reported susceptibility patterns in reptile and human isolates (Kawamura *et al*., 2015; Bemis *et al*., 2011). However, genomic detection of bla_OXA-347 in some isolates suggests potential variability in β-lactam resistance (Huang *et al*., 2024), reinforcing the need for susceptibility testing whenever feasible.

The detection of *P. pogonae* in a free-ranging bat raises ecological and epidemiological questions. Possible sources of infection include environmental exposure, prey-associated transmission, or opportunistic colonization during rehabilitation (Schröttner *et al*., 2017; Wang *et al*., 2023). Further microbiological surveys are required to determine whether P. pogonae represents an incidental finding or an under-recognized component of bat microbiota.

The common noctule (*Nyctalus noctula*) is a widespread Palearctic species with predominantly forest-associated ecology. This finding broadens the known host spectrum of *P. pogonae* and supports continued surveillance of emerging bacterial pathogens at the human–wildlife interface.

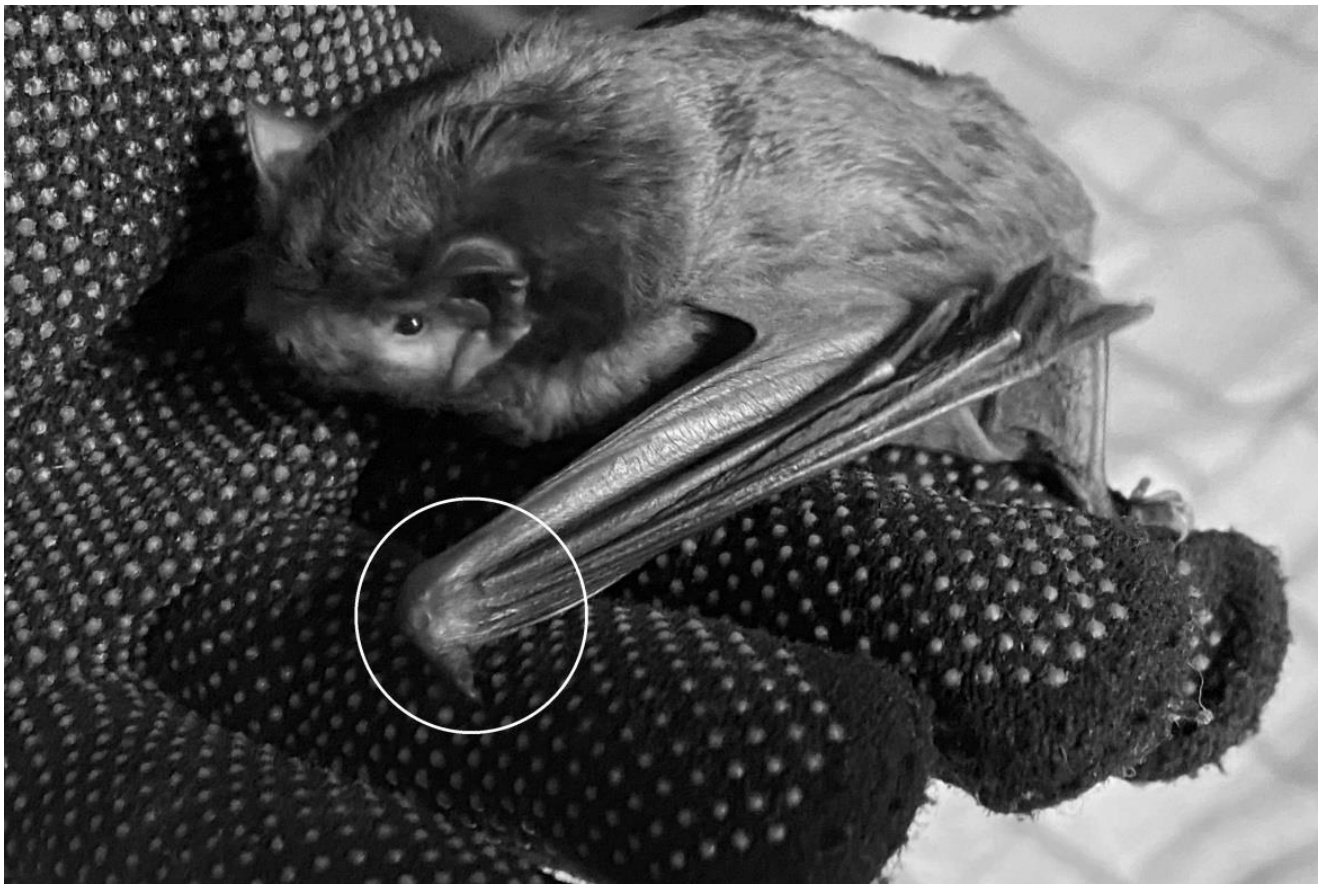

Figure 2 Common noctule (*Nyctalus noctula*) wrist at the end of antibiotic treatment with amoxicillin and clavulanic acid.

Acknowledgments We would like to express our sincere gratitude to the Wildlife Recovery Centre "Difesa Natura 2000" in Arcugnano VI (Italy), and to the veterinarians Enrica Rigolon and Ferdinando Zanin, for their invaluable support and collaboration during this study.

Specimen collection This study was conducted in full compliance with current Italian legal and ethical regulations. As members of the Wildlife Recovery Center, we hold official authorization to rescue and manage wild animals in distress.

Funding This research received no funding from any organization, and there are no financial interests to disclose.

Conflict of interest The authors declare no conflict of interest in this research. This study was conducted with full scientific integrity and no competing financial or personal relationships influenced the findings or conclusions.

Author contribution GD: Scientific coordination and supervision, manuscript writing and review. RG and CG: Analysis and identification of the bacterium and review. MC: Material collection and review. SV: Data processing and manuscript drafting.

Availability of data and materials The data that support the findings of this study are available within the article and supplementary files in the publication.

Received 16 January 2026 | **Revised** 9 March 2026
Accepted 30 March 2026 | **Published online** 12 May 2026

References

Barreau M, Pagnier I, La Scola B. 2013. Improving the identification of anaerobes in the clinical microbiology laboratory through MALDI-TOF mass spectrometry. *Anaerobe*, 22:123–125. DOI: 10.1016/j.anaerobe.2013.04.011.

Bemis DA, Greenacre CB, Bryant MJ, Jones RD, Kania SA. 2011. Isolation of a variant *Porphyromonas* sp. from polymicrobial infections in central bearded dragons (*Pogona vitticeps*). *Journal of Veterinary Diagnostic Investigation,* 23:99–104. DOI: 10.1177/104063871102300116.

Brook CE, Dobson AP. 2015. Bats as 'special' reservoirs for emerging zoonotic pathogens. *Trends in Microbiology,* 23(3):172–180. DOI: 10.1016/j.tim.2014.12.004.

EUCAST [European Committee on Antimicrobial Susceptibility Testing]. 2024. EUCAST clinical breakpoints and dosing of antibiotics, version 14.0. Link https://www.eucast.org. Accessed August 2025.

Hayman DTS. 2016. Bats as viral reservoirs. *Annual Review of Virology*, 3:77–99. DOI: 10.1146/annurev-virology-110615-042203.

Huang J, Zhu Y, Gong D, Ma S, Wu C. 2024. Whole-genome sequence of *Porphyromonas pogonae* PP01-1, a human strain harbouring $bla_{OXA-347}$ and tet(Q) with chromosomal location. *Journal of Global Antimicrobial Resistance*, 38:103–105. DOI: 10.1016/j.jgar.2024.04.015.

Kawamura Y, Kuwabara S, Kania SA, Kato H, Hamagishi M, Fujiwara N, Sato T, Tomida J, Tanaka K, Bemis DA. 2015. *Porphyromonas pogonae* sp. nov., an anaerobic but low-oxygen-tolerant coccobacillus isolated from lizards (*Pogona vitticeps*) and human clinical specimens, and emended description of the genus *Porphyromonas*. *Systematic and Applied Microbiology*, 38:104–109. DOI: 10.1016/j.syapm.2014.11.004.

Lollar A. 2023. Rehabilitation and captive care of insectivorous bats. Revised edition. Texas (US): A Bat World Sanctuary Publication. 198 Pp.

Luis AD, Hayman DTS, O'Shea TJ, Cryan PM, Gilbert AT, Pulliam JRC, Mills JN, Timonin ME, Willis CKR, Cunningham AA, Fooks AR, Rupprecht CE, Wood JLN, Webb CT. 2013. A comparison of bats and rodents as reservoirs of zoonotic viruses: are bats special? *Proceedings of the Royal Society B*, 280(1756):20122753. DOI: 10.1098/rspb.2012.2753.

Mühldorfer K. 2013. Bats and bacterial pathogens: a review. *Zoonoses and Public Health*, 60:93–103. DOI: 10.1111/j.1863-2378.2012.01536.x.

Plowright RK, Parrish CR, McCallum H, Hudson PJ, Ko AI, Graham AL, Lloyd-Smith JO. 2017.Pathways to zoonotic spillover. *Nature Reviews Microbiology*, 15:502–510. DOI: 10.1038/nrmicro.2017.45.

Rams TE, Sautter JD, Getreu A, van Winkelhoff AJ. 2016. Phenotypic identification of *Porphyromonas gingivalis* validated with matrix-assisted laser desorption/ionization time-of-flight mass spectrometry. *Microbial Pathogenesis*, 94:112–116. DOI: 10.1016/j.micpath.2016.01.021.

Schröttner P, Heidrich K, Rudolph WW, Stölzel F, Jacobs E, Gunzer F. 2017. First report on sepsis caused by *Porphyromonas pogonae*. *Anaerobe,* 44:96–98. DOI: 10.1016/j.anaerobe.2017.02.016.

Romero de Oliveira A, Nürmberger JM, Issa M, Pinto V, Bond MMK, Rabelato JT, Meirelles MB, Miglioli L, Abboud CS. 2019. Late ascending aortic prosthesis infection by *Porphyromonas pogonae*: an unexpected infectious complication. *Anaerobe*, 56:106–108. DOI: 10.1016/j.anaerobe.2019.01.006.

Wang X, Liu L, Lu B, Duan X, Zhou X, Huang D, Wu H. 2023. Thoracoabdominal wall abscess and sepsis caused by *Porphyromonas pogonae*: case report and literature review. *Heliyon,* 9:e14860. DOI: 10.1016/j.heliyon.2023.e14860.