

Between the sewer rat welfare and public health, should we choose?

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The sewer rat proliferates worryingly in large cities, Paris, particularly. Whether called *Rattus norvegicus*, brown rat or Norway rat, it is the most harmful of human commensal species due to its great adaptability, its food requirements, its intense prolificity and, especially, the bacterial, viral and parasitic zoonoses of which it can be the vector.

Sewer rats proliferate in urban areas where they find food, water and nesting sites. With a ratio of 1.5 to 1.75 rats per inhabitant, Paris and Marseille would be among the 10 most infested cities in the world. At such a high level of population density, these nocturnal rodents emerge from basements and sewers and become visible during the day in streets, parks and gardens, all places where they can find food and water (gutters, rubbish bins, picnic areas, markets, homes, etc.).

Some animal rights activists argue that *Rattus norvegicus* is the species from which the farmed domestic rat is derived, easily tamed as a laboratory rat or a new pet. Advocating that the relationship between the sewer rat and humans should no longer be considered as a harmful commensalism, but as a true symbiosis, an elected representative of this school of thought in the capital recently asked to "legitimize the place of rats in the city", to recognize their usefulness as "auxiliaries in urban waste management", to name them "surmulots to avoid stigmatizing them", and to stop eliminating them in the name of "animal welfare".

Faced with the ingenuity of these remarks, which are sometimes favorably received, it is important to recall that rats remain a threat to human health because of the many zoonoses transmitted by its exoparasites, its droppings, its bites or its scratches.

- The rat flea, *Xenopsylla cheopis*, transmits bubonic plague due to *Yersinia pestis*, murine typhus due to *Rickettsia typhi* and bartonellosis due to *elizabethae*.
- Rats' urine can contaminate the environment with leptospira; it is the world's main reservoir of leptospirosis, a dreadful disease for people exposed professionally as sewer workers, or pet owners [1].
- Its faeces can contaminate the food chain with salmonella, especially raw eggs and egg products [2].
- A rat bite can inoculate a bacterium present in its saliva, *Streptobacillus moniliformis*, which can cause a rapidly fatal septicemia if an early antibiotic therapy is not provided.
- Rats can also host many other bacteria pathogenic to humans, such as *Staphylococcus aureus*, *Escherichia coli*, *Mycobacterium bovis*, *Streptococcus pneumoniae*, *Campylobacter*, *Yersinia pseudotuberculosis* and *Clostridium difficile*. They are thus a major source of antibiotic-resistant bacteria in human environment.

- Several viral zoonoses are attributable to rats: hemorrhagic fever with renal syndrome (hantavirus) due to Seoul virus, hepatitis E due to a hepevirus (HEV-C) [3], lymphocytic choriomeningitis due to an arenavirus. Rats can also be asymptomatic carriers of Orthopoxvirus (cowpox, monkeypox) [4]. In France, rats are also involved in some parasitic and mycotic zoonoses (trichinellosis, toxoplasmosis, capillariosis, cryptosporidiosis, ringworm).

The overpopulation of sewer rats in large cities, such as Paris and Marseille, is a real danger to public health. This is why the **French National Academy of Medicine recommends:**

- that city councils implement a rigorous and permanent urban cleanliness plan to eliminate food waste accessible to rodents, essentially cleaning of roads, parks and gardens, as well as collection of household waste;

- that town halls undertake, in conjunction with trustees and landlords, a vigorous deratting campaign in homes and the urban environment whenever an overpopulation of rodents is observed (rats visible during the day);

- that sewer rats be captured regularly to monitor their carriage of pathogens and detect their possible emergencies;

- to improve, in a "One Health" context, the dissemination of knowledge in human and veterinary medicine on the zoonoses carried by these rodents, especially for pet owners.

References

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