Workshop 5

Emergenza specie esotiche

Infectious and parasitic diseases in non traditional pets

Ludovico Dipineto, Laura Rinaldi
Department of Veterinary Medicine and Animal Productions, University of Naples Federico II, Italy

Non-traditional pets include exotic animals, defined either as imported, non-native species or species that originally were non-native but now are bred in Europe; indigenous wildlife; and wildlife hybrids (wildlife crossbred with domestic animals producing offspring known as hybrids) (1). The definition of non-traditional pets includes certain species of mammals (e.g. rabbits, ferrets, rodents) and birds (especially parrots), reptiles and amphibians. Infectious and parasitic diseases of non-traditional animals include both typical diseases of the species and zoonoses. Concerning infectious diseases, rabbits can be affected by rabbit hemorrhagic disease caused by a Calicivirus or by myxomatosis, a Leporipoxvirus-induced disease but also by potential zoonotic agents as *Salmonella* spp. and *Encephalitozoon cuniculi* (2). The main infectious diseases of ferrets are distemper and epizootic catarrhal enteritis as well as influenza which may be transmitted from ferret to human and vice versa. An important disease of parrots is the psittacine beak and feather disease caused by a circovirus which attacks cells of the immune system and those cells that produce the feathers and the beak. Parrots may serve as a reservoir of zoonotic agents as *Campylobacter* spp., *Salmonella* spp. and *Chlamydophila psittacii*. Reptiles and amphibians may act as a reservoir of zoonotic agents as *Salmonella* spp. and Shiga toxin-producing *Escherichia coli* (3,4). One of the most serious diseases of snakes, primarily boas and pythons, is the inclusion body disease which affects the nervous system and other organs and has been recently associated with Arenavirus infections. Amphibians can be infected by *Pseudomonas* spp. and *Aeromonas* spp. which have been indicated as the causal agents of the red leg syndrome.

Similarly, non-traditional pets may harbor a variety of ectoparasites (e.g. lice, fleas, ticks and mites) and endoparasites (protozoa, nematode, cestoda and trematoda); some of them may have a zoonotic potential as *Giardia, Cryptosporidium, Dirofilaria* and other helminths and arhtropoda. Interestingly, co-infections by viruses/bacteria and parasites may occur in non-traditional pets. As an example, a significant positive correlation between *Salmonella* spp. and oxyurids was demonstrated in turtles (5). However, while knowledge of the husbandry and veterinary care of non-traditional pets is increasing, still little information is available on the presence and prevalence of parasitic diseases.

Most importantly, diagnosis and control of parasitic infections are often neglected in pet exotic animals. For these reasons the multivalent FLOTAC and Mini-FLOTAC techniques (6,7) were recently introduced also in exotic pet medicine in order to improve diagnostic performance of parasitic infections.

FLOTAC has been validated as to detect parasitic infections in pet lizards and snakes (8), ferrets (9), squirrels (10), rodents (11), and other exotic pets. Regarding small mammals, surveys performed in southern Italy by FLOTAC showed the presence of intestinal parasites in 30% of pet ferrets (infected by ancylostomids and *Sarcocystis*), 18% of pet squirrels (infected by *Dicrocoelium dendriticum, Syphacia, Strongyloides* and other nematoda). Furthermore, FLOTAC and Mini-FLOTAC techniques have been recently used for the diagnosis of parasitic elements and yeast infection (*Macrorhabdus ornithogaster*) in pet birds (12).

In conclusion, it is mandatory to collect data and to study in depth the epidemiology and clinical significance of infectious and parasitic diseases in non-traditional pets using accurate methods in order to improve diagnosis and better planning control measures.

References

1. E.M. Paul, A.J. Ricco, M.S. Wrighton. *J Phys Chem.* (1985), 89:144-148.
2. L. Dipineto, L. Rinaldi, A. Santaniello, et al. *Zoonoses Public Health.* (2008), 55:173-175.
3. L. Dipineto, T.P. Russo, M. Calabria, et al. *Lett Appl Microbiol.* (2014), 58:462-465.
4. L. Dipineto, A. Gargiulo, T.P. Russo, et al. *J Wildl Dis.* (2010), 46:944-946.
5. L. Dipineto, M. Capasso, M.P. Maurell, et al.. *BMC Vet Res* (2012), 28:69.
6. G. Cringoli, L. Rinaldi, M.P. Maurelli, J. Utzinger. *Nat Protoc* (2010), 5:503-515.
7. G. Cringoli, L. Rinaldi, M. Albonico, et al. *Geospat Health* (2013), 7:399-404.
8. L. Rinaldi, A.D. Mihalca, R. Cirillo, et al. *Exp Parasitol* (2012), 130:282-284.
9. D. d'Ovidio, P. Pepe, D. Ianniello, et al. *Vet Parasitol* (2014), 203:227-230.
10. D. d'Ovidio, L. Rinaldi, D. Ianniello, et al. *Vet Parasitol* (2014), 200:221-221.
11. D. d'Ovidio, E. Noviello, P. Pepe, et al. *Parasitol Res* (2015), 114:4381-4384.
12. L. Borrelli, L. Dipineto, L. Rinaldi, et al. *J Clin Microbiol* (2015), 53:3448-3350.