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To whom it may concern:

We have been asked by Ann Olson from Animal Folks to review the expert opinion letter authored by Dr. Carol Cardona April 3, 2018 regarding induced death by drowning of pigeons, and to comment on this method of euthanasia for the species.

There are factual omissions and inaccuracies in the provided opinion letter by Dr. Cardona that should be clarified, in order to shed a more balanced, scientific light on the issues being addressed. It would be erroneous to accept this forwarded opinion as-stated, due to these problems. For best understanding, we are quoting statements from Dr. Cardona's letter, in italic and prior to my comments below.

"Instantaneous death is consistent with the practices employed in pest control industries for killing vertebrate pests."

This sentence is fair, accurate, and consistent with AVMA 2013 guidelines for euthanasia, as long as the stress and distress of the animal(s) are also considered. These discussions are available for your review in the guidelines provided by the American Veterinary Medical Association (AVMA), page 13. "An understanding of the continuum that represents stress and distress is essential for evaluating techniques that minimize any distress experienced by an animal being euthanized. Stress has been defined as the effect of physical, physiologic, or emotional factors (stressors) that induce an alteration in an animal's homeostasis or adaptive state." It does not appear that the stress and distress of the birds being subjected to drowning have been fully considered in the opinion provided. Further, a flawed premise that death would be instantaneous is being used to justify the opinion.

"What you do at the Bio Corporation should be considered pest control and I think the practice of drowning pigeons is consistent with what the industry standard is."

On a veterinary medical, ethical, and scientific basis, we disagree if this is referring to the use of drowning of conscious birds as a means of euthanasia. Drowning is not listed as an accepted means of euthanasia for terrestrial vertebrates in the AVMA guidelines. Regardless of the "pest" label of a species intended to be euthanized, these core veterinary guidelines must be employed as a means of best practice.

"Diving birds, like ducks, can hold their breath and in fact some, like cormorants don't have external nares (nostrils) to facilitate diving."

Cormorants, in fact, do have external nares. The external nares are not patent in adults, and they lack an infraorbital sinus, both of which are irrelevant to this discussion. The external nares have no direct role

in how birds may or may not hold their breath. It is understandably true that diving bird species can hold their breath longer than non-diving species. The ability of a bird to hold its breath is the function in large part of the larynx and glottis, which is at the opening of the trachea, located at the base of the tongue. As in mammals, the main function of the larynx is to prevent the entrance of extraneous material into the lower respiratory tract, by reflex constriction of the glottis.[1] Birds can breathe through the nares or mouth. The oronasal cavity is separated from the trachea by the larynx, which opens into the trachea through the slit-like glottis. The laryngeal muscles contract with breathing, to open the glottis during respiration and decrease the resistance to inspiratory air flow.[2]

In essence: Birds (pigeons included) can and do hold their breath, voluntarily and out of normal physiological events, and this has nothing to do with nostril anatomy. This is commonly seen in clinical practice with pigeons when mask inducing with volatile anesthetics; apnea and breath holding are also commonly encountered. Pigeons do have normal drinking behaviors, with their heads immersed in water, which is not accompanied by instantaneous death by drowning.[3,4]

We are not (yet) aware of any studies of how long it takes for a pigeon to drown. We are also not aware of any vertebrate species where drowning is an accepted means of euthanasia unless the birds were rendered unconscious beforehand. This is consistent with the AVMA guidelines for animal euthanasia. It is understandable that an animal (or person) that dies by drowning would be subjected to considerable panic, stress, and anxiety. This should be the case with pigeons as well. The duration of this panic and anxiety may be open for debate, but there should be little room for debate about the nature of the experience of any terrestrial vertebrate being forced underwater until it dies by drowning.

"This is very unlike pigeons which are great flying birds and do not dive and have an open nostril in their cere."

These statements are true. Pigeons fly well, do not dive, and have an open nostril in their cere. This does not, however, imply or support the claim that pigeons cannot hold their breath and is misleading.

"It is my understanding that non-aquatic birds, including pigeons, do not hold their breath when they enter water and that death by drowning would be nearly instantaneous."

This understanding is incorrect. Non-aquatic birds can and do enter water and can hold their breath (intentionally or unintentionally through physiological mechanisms). The premise based on the presence or absence of nostrils as a key differentiation is anatomically and physiologically flawed, is scientifically erroneous and misleading.

"In light of this, I don't think that this form of inducing death should be classified as animal cruelty."

Based on the flawed arguments posed above, there is no support of this claim.

References cited:
1. King AS, McLelland J: Birds - Their Structure and Function. Balliere Tindall, 1984, p 115
2. Powell FL: Respiration. In: Sturkie PD Fifth Edition. Avian Physiology. Academic Press. 2000. P 235
3. Zweers, GA. Drinking in the pigeon (Columba livia). Behavior. 80.3: 1982;274-316.
4. Bermejo RM, Zeigler HP. Jaw movement kinematics and jaw muscle (EMG) activity during drinking in the pigeon (Columba liva). J Comp Physiol: 170.3;303-309.

Sincerely,



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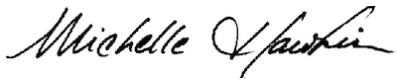

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