

Science@CornellVet

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"How do you vaccinate a clouded leopard?" Training zoo animals to be active participants in their veterinary care (part 2)

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Previously, we discussed the importance of animal training in zoos to the care of animals in captivity. Over the past 30 years, zoo veterinarians have utilized behavioral conditioning to better care for animals in captivity. By using positive reinforcement training to cue desirable behaviors from captive wildlife, preventative medicine tasks become much simpler, safer, and less stressful for the animal – often avoiding or minimizing restraint and sedation, and thus allowing more frequent examination, preventative medicine, and earlier detection of disease.

For example, by linking a tiger's natural behavior of yawning to a cue, veterinarians can ask the tiger to open its mouth for a quick visual exam of its teeth – without stress, without sedation, and in a positive environment. Keepers at the Columbus Zoo in Ohio trained captive black rhinos to allow teeth-brushing without sedation, helping to prevent gum disease. And even birds can be trained to assist veterinarians, by perching for observation or allowing handling and treatment.

I sat down with veterinarian Dr. Noha Abou-Madi, Associate Clinical Professor of Zoological Medicine at Cornell University College of Veterinary Medicine, to discuss how zoo veterinarians establish this important form of communication with the animals in their care.

To introduce training to an animal that isn't used to human contact, veterinarians work closely with zookeepers. Animals form trusting relationships with the keepers that work with them day-in and day-out, and will more readily accept direction and training from their favorite keeper.

First, the keeper offers the animal a reward just for approaching. "Usually, the initial reward is food-based – a treat, something unique that they only get during this special time," says Dr. Abou-Madi. Then, the keeper links this food-based reward to a signal, like a clicker, that provides a recognizable landmark for the animal to remember. The animal learns that whenever a click happens, food is coming immediately afterwards. This allows the trainer to signal "approval" of the behavior.

Then, the animal is asked to touch a target, like a stick, flag, or the keeper's hand, using a specific part of their body – an ear, hand, or nose, for example. Each time they touch the target with the appropriate part of their body, they are rewarded. They learn the command "target" which allows the trainer to move the animal from one area to another, and from one position to another. This targeting training is itself extremely useful: the ability to quickly move animals for transport or during emergency situations, like natural disasters, is critical for both animal and human safety.

Next, the trainer chooses a behavior to capture. "Think about what the animal already does in nature, and how you could co-opt this behavior," says Abou-Madi. Even simple behaviors can provide benefits to veterinary care – simply tolerating the presence of veterinarians in close proximity, for example, is invaluable for routine observation.

Zoo animal training - clouded leopard



The waiting game

And then, it's time to wait. When the animal happens to do the behavior, the action is positively reinforced with the clicker and the food reward. Eventually, the trainer links the behavior to a verbal or visual cue – for instance, a hand gesture or a word that tells the animal what to do. This creates a language that can be used to ask the animal for something, and for which they can receive a highly valued reward in exchange. If the animal ever refuses not to perform the behavior, there is no negative consequence – the trainer just tries again later. “But every time the animal does the correct behavior during a training session, you must positively reinforce it immediately,” says Abou-Madi. The more consistently the trainer reinforces the behavior, the more likely the animal is to form an association between the behavior, the reward, and the cue.

Even when all these steps are followed, it is hard to predict how long it will take to reliably capture a behavior in a particular animal. Collecting blood from a panda could take three weeks, two months, or not happen at all,” says Abou-Madi. “It is always up to the animal whether or not they want to perform the behavior. But it is important to do the training in a positive, engaging way so that the animal accepts it as something that is fun to do, and that they look forward to in their routine. We often see them excited at the time of training. For many animals, training is a game.”

It is also important to reinforce trained behaviors over time, and in different situations. The most critical time to have a behavior is in an emergency, but the animal may not reliably perform in such circumstances. It is also not the time to be teaching a new behavior. “This can drastically change our approach and plans. By reinforcing the behavior frequently, we can increase the odds that the animal can reliably recall the behavior when we really need it.”

Feeding and training shows at zoos thus serve a dual purpose – to highlight the abilities of these amazing animals to foster an emotional and educational connection with the public, and also to positively reinforce trained behaviors in different contexts, with high-value rewards. Not only that, but the training itself can provide valuable information about the health of the animal – if they appear weak while performing the behavior or suddenly do not want to do a behavior that has been reliably performed in the past, it may be a sign of a health problem.

Zoo animal training - otters



Improving individual care and contributing to species conservation

Not only is training beneficial to the care of individual animals in captivity, but it can also provide important information about that species as a whole, and aid in the conservation of free-ranging animals.

Looking at behavior in the wild and comparing it to behavior in captivity can help us make decisions about management of both populations. "Any time we are able to get a sample without the animal being anesthetized or sick, it allows us to establish normal values. Anything that allows us to understand "normal" for the species helps us manage the population, and vice versa – when we know what is normal in captivity, we can compare it to the samples obtained in the field, and by that comparison, improve healthcare both ways," says Abou-Madi.

Blood samples, for instance, are an important part of routine health screening, research, and monitoring. But a blood sample from an individual animal is meaningless without being able to compare that sample to a "reference range" – the range of values expected from the majority of healthy animals of that species. We often take these reference ranges for granted in human and domestic animal medicine, where huge number of samples have firmly established both normal and abnormal ranges. But these "normals" vary considerably between wildlife species, and sometimes even between individual animals. If an animal is trained to allow blood collection, these samples can be obtained more frequently, and reference ranges compiled more accurately and quickly. Chimpanzees, lions, dolphins, and birds are just a few species that can be trained to present a limb, tail, flipper, or wing.

Obtaining samples from healthy animals in captivity yields baseline information that allows veterinarians not only to monitor the health of the individual over time, but also to establish reference ranges that can be used to evaluate their wild counterparts. This information is compiled by "Species 360" (formerly the International Species Information System), a coalition developed in 1974 by 55 member zoos to maintain a database of zoological medicine records, including reference intervals, anesthesia protocols, and treatment protocols.

Through communication and collaboration, the information obtained from individual captive animals can benefit captive and free-ranging wildlife populations all over the world. Without behavioral training, much of this baseline data would not exist.

See Part 1 of this blog: [How do you trim an elephant's nails?](#) The importance of zoo animal training to the care and conservation of wildlife species

-By Isabel Jimenez, third-year DVM student

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