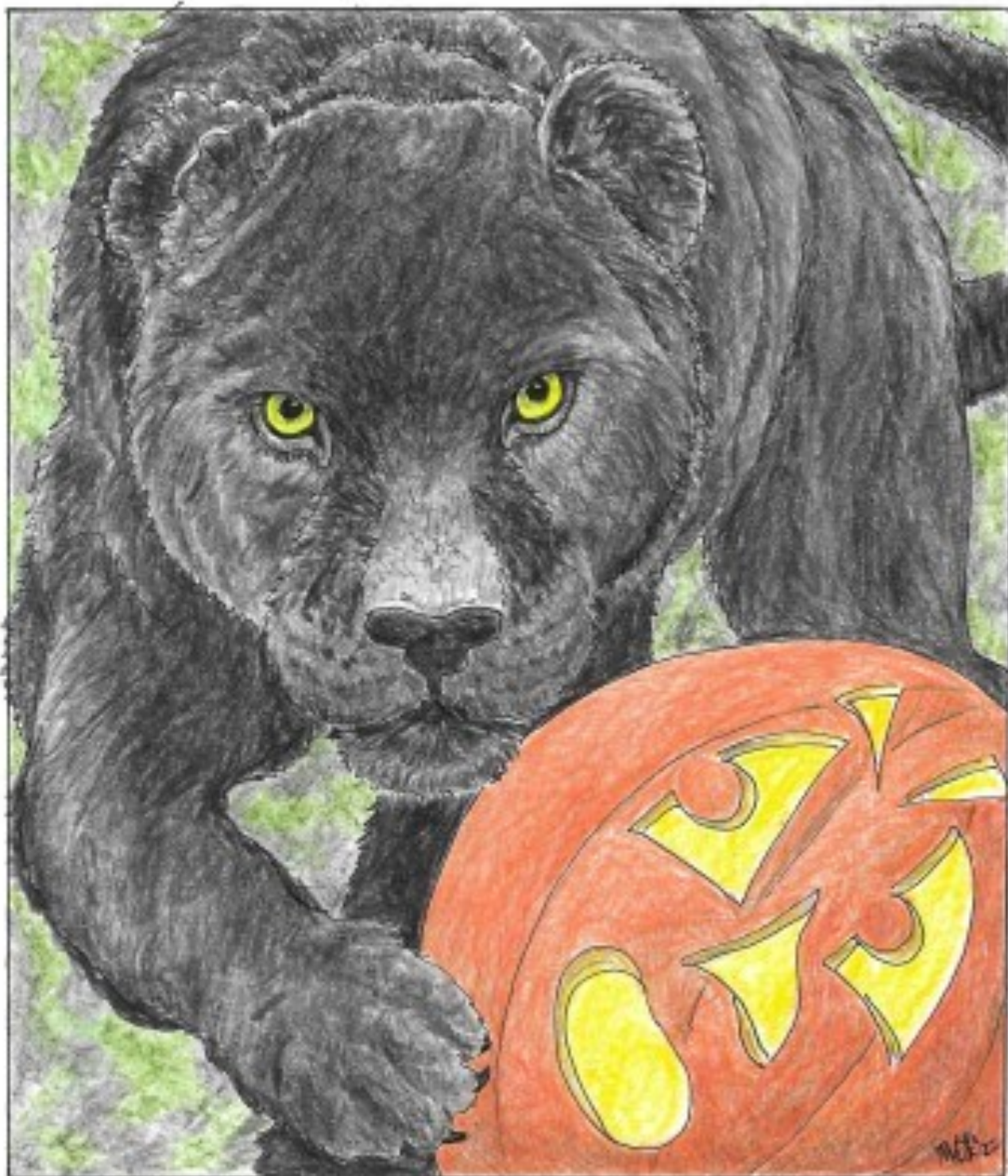
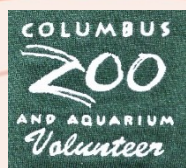


October 2022

The Columbus Zoo
and Aquarium
Volunteer Newsletter

ZooNews





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The mission of ZooNews is to promote awareness, education, preservation and conservation of our natural world.

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this issue

From the President /CEO	2-3
Communiqué	3
A Long Winter's Nap	3-4
Amazing Marsupials	6-7
The Eyes Have It!	8-11
Hoo-Knew	11, 12
Book Review	12
Docent, Diver and Adult Volunteer Awards	13-19



FROM THE PRESIDENT AND CEO



Greetings,

Welcome to Fall! As I reported back in August, despite softer than projected attendance at all of our parks and properties, we continue to do well in terms of operating revenue. With operating expenses on track, we will finish 2022 in a strong financial position.

Now, a few updates:

We have submitted our application to the AZA for the Zoo, and we anticipate an inspection team of our peers to arrive sometime in November. The Zoo looks great, and with strong new policies and procedures in place, I am confident we will once again be accredited by the AZA in the spring of 2023.

Our planning, operations and animal care teams have been busy this summer developing the conceptual plan of a major renovation to our North America region. This will be the most significant project we have undertaken since Adventure Cove. In fact, it is so large that we are breaking it up into two phases. Phase 1 will include new habitats for our Mexican grey wolf, North American River Otter, and our bald eagles. We anticipate breaking ground in the late summer or early fall next year, with completion in early 2025. In preparation of this major construction project, we are beginning to plan for the relocation of some of the animals that currently call the North America region home. In addition to relocating our wolves, we will be finding new homes for our beavers, and our bison. Prairie dogs will move to back of house habitats, and we will discontinue our pony rides.

I'm really excited about the new North America region; all of the habitats will be much improved over what we currently have, for both our animals and for

Tom Schmid photo courtesy of Graham S. Jones

Continued on page 3

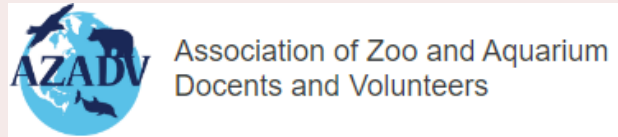
Communiqué



Fall is here and it is the most wonderful time of the year! Boo at the Zoo will be the three weekends from October 14 through October 30. On Fridays Boo hours will be 5pm to 8pm; on Saturdays Boo hours will be 10am to 8pm; on Sundays Boo hours will be 10am to 5pm. You are more than welcome to wear a costume but please remember we are merry, not scary; delightful, not frightful. You can use face paint but no masks and your name badge must be visible.

The Toledo Zoo is hosting the AZADV (Association of Zoos and Aquariums Docents and Volunteers) Conference this year. On Sunday October 16, there will be a group of approximately 100 docents and volunteers from other national and international zoos

and aquariums visiting our facility as part of the AZADV Post-trip. It would be great to have a strong docent and volunteer turnout in the regions and in the animal contact areas to share with others how great our Zoo truly is.



Speaking of AZA, our accreditation packet has been submitted. Our inspection will take place before the end of the year and then we will learn the results in the Spring. There is a possibility one of the inspectors will ask you a question or two if you are on grounds when they are here. Some things to reacquaint yourself with are: the Emergency Response Plan (this can be found in the Volunteer Handbook) and the Animal Wellbeing Plan, Wellbeing Assessments and the Animal Wellbeing Concern reporting process ("Wellbeing" has replaced "Welfare" which is the term we previously used). This information can all be found on the Volunteer Portal.

Happy Halloween!

Ginger, Carole, Mary, Kathy and Rachel

From the President and CEO, continued from page 2

our guests. We are also adding a new children's play area in conjunction with the North American river otter habitat. We are also hoping to build a new restaurant that would be able to serve our guests all year long.

Finally, you may have noticed some construction activity at our nocturnal building. We now have some amazing new fish, Weedy Sea Dragons, which will make their debut next year. Related to the seahorse, these fish have leaf like appendages that resemble kelp, which makes for some very effective camouflage.

Stay tuned for more information as we develop these projects.

Tom Schmid, President/CEO

A LONG WINTER'S NAP

If you volunteer at the Zoo during the colder months of the year, you are likely to encounter the "hibernation question." Many guests forgo the trek to North America, presuming the bears are off view hibernating, but they aren't. There are behavior and activity changes that occur from now until sometime next spring, and they are different for each species of bear.

BLACK and BROWN BEARS

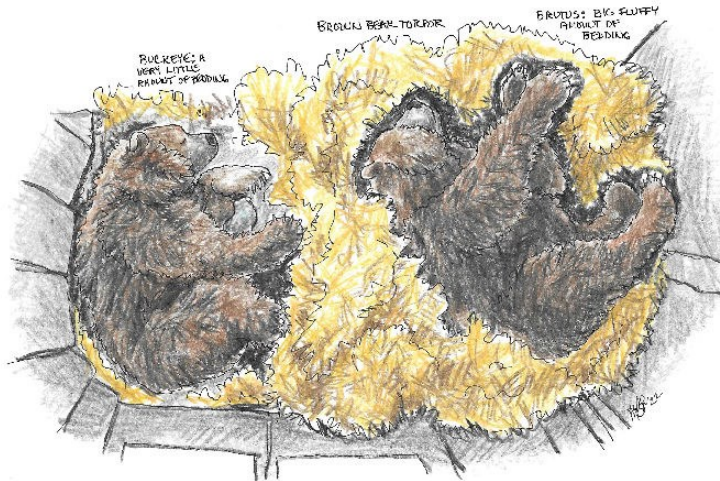
The colder fall temperatures and decrease in the amount of daylight are triggers that cause the bears to start spending more and more time in their dens. They aren't hibernating, however, they're in **torpor**, a state of dormancy and inactivity where the animal's metabolism slows down, but only a little. Bears can enter and wake from torpor quickly and do throughout winter. Animals that hibernate are small, such as chipmunks. They have a large drop in temperature and metabolism, do not drink or eat, are inactive for weeks or months at a time and wake slowly in the spring. Torpor is like a long winter nap, not as demanding on the body as hibernation.

Torpor is preceded by a late-summer and early-fall feeding frenzy, when their rations are increased and bears gorge on as much food as possible. Keepers describe the brown bear "boys" as ravenous at this time. This is an adaptation, known as hyperphagia, in which the bear gains weight and stores fat to help it through the colder months when high-quality food is scarce or, in their native ranges, where deep snow limits a bear's mobility to search for food.

The bears continue to be fed, and medicated if need be, every day, although the amount is decreased from the fall feast. So, while they are getting calories, the amount isn't enough to support normal activities, thus the need to "den up" and conserve energy. They continue to urinate and defecate too, although the quantity is less and in the case of the brown bears, in locations closer to the den.

Brutus and Buckeye brown bear must leave their cave to go to the bear building to get meat or fish. This gets them up and moving, and on warm, sunny days they will be out of the cave for longer periods. Occasionally on the coldest days they decide to sleep in, but for the most part they eat daily and can be seen daily.

It's harder to see Joanie and Stevie black bear. Their den and feeding location are inside, so viewing opportunities are more weather dependent.



FUN FACTS

- Extra bedding is provided in the dens. Brutus steals bedding while Buckeye is in the yard searching for food possibly left from fall feeding, thus Brutus' bed is usually much, much bigger.
- The black bears usually stay in torpor longer and are slower to emerge in the spring.
- Black bears in southern United States and in southern zoos might not go into torpor at all if there is sufficient food.



POLAR BEARS

Only pregnant female polar bears "den up" in the fall, awaiting the birth of and then caring for any cubs. Since there are no pregnancy tests for polar bears, any female that has bred will get extra food in the fall just in case she needs the extra calories to meet the demands of pregnancy, birth and nursing cubs. Females in a den get offered dry, pelleted food and water daily.

Males and females that haven't bred or did not implant will be on view all winter but with access inside on the coldest days. Their winter activity is usually somewhat less than in the summer, probably due to the extra pounds they packed on in the fall. Females with cubs won't be on view until the spring.

—Nancy Mulholand and Sue Allen

Sources: Stephen Frey, Devon Sabo, Ellie Shriver, animal care staff, Columbus Zoo and Aquarium

The Bear Almanac, Gary Brown, The Lyons Press, 2009

Polar Bears, Ian Stirling, Univ. of Michigan Press, 1998

COLUMBUS ZOO FAMILY OF PARKS



COLUMBUSZOO.ORG





Did You Know?

There are 300 or so species of marsupials, about 99 of which are threatened. That number is about 7% of the world's existing mammals. The name marsupial comes from the Latin word *marsupium* which means purse or pouch. Makes sense, but just like there are exceptions to so many rules, there are some marsupials which are pouchless!

The pouchless murine or mouse opossum is an example. It is found in Mexico, Central and South America. There is a ring of muscles in the skin surrounding the nipples. These muscles contract to provide cover for the joey. Pouchless mothers leave their young in a nest after 4-10 weeks, during which time the joeys continue to nurse.

Range

All marsupials in the Americas are referred to as opossums. Opossums range from 49° 41' N in Canada to 47° 6' S in Argentina. North America has only one species, the Virginia opossum, with which we are all familiar.

Opossum diversity increases in latitudes just below the equator. The number of species decreases below 20°S. The total in the Americas is about 70 species. So where are the other 230 or so?

There is probably no need to answer that question, but just in case someone has forgotten – they live in Australia and the New Guinea region. Marsupials are found throughout all of the continent and on many surrounding islands. They range in size from the 4.5 gram long-tailed planigale, a mouse-like carnivore, to the male red kangaroo. Many of the small-to-medium-sized species are referred to as possums.

Miscellaneous Marsupial Fun Facts

I always thought that joeys left the birth canal and headed for the pouch with no help or awareness from mom. However, hormonal changes cause uterine contractions which cause the female to become very intent on licking the urogenital opening and the pouch area. She often will crouch over or curl up to bring the opening closer to the pouch.



Photo courtesy of Columbus Zoo and Aquarium

Marsupials invest very little energy in the young during the short gestation period. During the time the joey is nursing, the vast majority of the maternal energy investment occurs during lactation.

Composition of milk changes as the joey grows. In fact, in those species that can have both a newborn and an older joey in the pouch two different kinds of milk are produced.



Pouches come in two “styles” – front facing and rear facing. Most of the rear-facing pouches are in burrowing marsupials such as the wombat. The reason is somewhat obvious. This position keeps the dirt from entering the pouch while the mother is digging. So why does the koala, which lives in trees, have a rear-facing pouch? Possibly it reflects the koala’s shared ancestry with wombats. Another theory is that it allows the joey access to the mother’s feces. This facilitates the inoculation of the gut with the microbes necessary for the digestion of eucalyptus leaves.

Diapause, which is similar to delayed implantation in placental mammals, occurs in all kangaroos studied except the western gray. During this period the embryo develops to the early blastocyst stage. The presence of the nursing joey suppresses the growth of the embryo at this stage. The end of nursing allows the blastocyst to continue development.

Wombats’ teeth grow continuously throughout life, a feature found only in this marsupial group. The incisors and molars wear away so as to maintain sharp, shearing faces.

Many marsupials benefit the ecology of their habitats. One example is the brush-tailed bettong which is important in seed dispersal of the large seeds of Western Australian sandalwood trees. In addition, the foraging digs of these bettongs alter the water repellency of the soil. Without their digs the repellency of the soil increases below 10 cm. The soil then becomes so hard-packed that water will not penetrate. The 38 to 114 holes an individual bettong makes in one night displace about 4.8 tons of soil annually. Quite the little engineers!

Status of our Marsupials + One Fun Fact Each

- Brush-tailed Bettong – IUCN critically endangered – If no male is present female will not go into estrus.
- Feather-tail Glider – IUCN least concern – Can glide up to 65 feet.
- Eastern Grey Kangaroo – IUCN least concern – Expend less energy the faster they are moving.
- Red Kangaroo – IUCN least concern – Known as the “white tailed deer” of Australia.
- Queensland Koala – IUCN vulnerable – Opposing “thumbs” enables the koala to grip branches.
- Tasmanian Devil – IUCN endangered – Infants are called “imps.”
- Matschie’s Tree Kangaroo – IUCN endangered – Can jump down as much as 59 feet without injury.
- Southern Hairy-nosed Wombat – IUCN near threatened – Scat is cube shaped so it stays in place.
- Virginia Opossum – IUCN least concerned – Have opposable toes on each foot which help when climbing.

— Karen Linn

Sources:

Nowak, Ronald M. 2005, *Walker’s Marsupials of the World*, The Johns Hopkins University Press
Amati, Patricia, Dickman, Chris, and Hume Ian, 2013, *Marsupials*, Cambridge University Press
Mammals of Ohio Field Guide, Ohio Division of Wildlife
Volunteer Portal – Zoo Info



*Have a little fun at Halloween time at the Zoo
and talk to guests about animal eyes!*

Overview

Have you noticed that the shapes of animals' pupils differ? They do! So, do you wonder if there are explanations for these variations? Well, some studies have been done on just that. A rather comprehensive study by Banks et.al. discovered some striking relationships between pupil shape, foraging behaviors, and the time-of-day animals are active. Banks and associates studied 214 species of terrestrial animals.

There are a number of different pupil shapes. To keep the design fairly simple, the researchers limited the study to three common shapes: vertical, round, and horizontal. Foraging animals were divided into two categories: herbivores and carnivores. Carnivorous species were further divided into active foragers (those that actively pursue their prey) and ambush predators (those that wait for their prey to come to them).

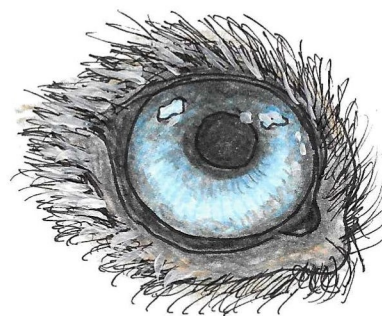
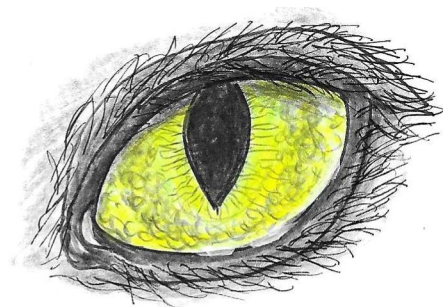
Herbivores or prey animals generally have either round or horizontal pupils, most falling into the horizontal category. Active forager predators are more likely to have round pupils while ambush predators that are active both day and night were more likely to have vertical pupils.

Round pupils are found in "active foragers" and provide good binocular vision for judging distances. Examples of animals with round pupils are tigers, lions, leopards, dogs, and birds.

The following can help you understand this relationship of horizontal and vertical pupils to behavior.

Vertical and Horizontal Pupils

Vertical and horizontal pupils have some common optical characteristics that may be advantageous from a survival standpoint. These pupils are

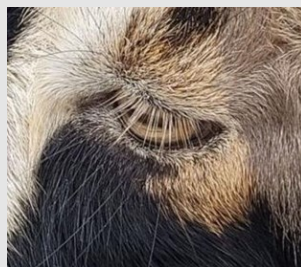


generally found in animals with **multifocal optic systems**. Multifocal systems result in better color vision both in low and bright light conditions. Good color vision allows predators to see their prey against its surroundings and to do so both during the day and at night. Color vision may also be important for herbivores who use it to detect certain food items, such as colored berries.

Another advantage of vertical and horizontal pupils is that they can expand/dilate more than round pupils. For example, it is estimated that the human pupil (round) can dilate ~ 10 - 15X. The domestic cat's vertical pupil can expand more than 100X. This adaptation allows for additional light to reach the retina in low-light conditions.



*Goat eyes dilated
and constricted.*



Photos courtesy of Sally Rudmann

Horizontal Pupils (Horizontal elongated pupils)

Animals with horizontal elongated pupils and side-facing eyes are generally grazing prey animals. Horizontal pupils allow for a wider effective field-of-vision (more light from the front, back and sides) and limit the amount of light glare from the sun. This allows prey animals to visualize predators more easily with fewer blind spots. When they need to escape, the horizontal pupils provide better focused vision of the ground and terrain to help them run and jump. The horizontal shape also limits the amount of light entering the pupil from above limiting sun glare. Many of these animals are grazers and are able to maintain the horizontal aspect by rotating their eyes when they lower their heads to the ground. According to Banks, they are able to rotate their eyes by 50 degrees or more, which is 10 times greater than that of the human eye. This ability to rotate can be easily observed when watching the My Barn goats feed in their yard. Horizontal pupils sacrifice some



Photo courtesy of Cindy Wesney

Main Points—Horizontal Elongated Pupils

- **Generally grazing prey animals**
- **Wider field of vision**
- **Can rotate eyes when grazing**
- **Easier to see prey**
- **Vision of ground aids escape**

vertical sharpness and distance perception which would be important for ambush predators. For prey animals, distance perception and focus are less critical. It is far more important for them to spot the predator and run. Prey animals would generally prefer NOT to see the predator close up. Examples of animals with horizontal pupils are horses, goats, and antelope.

Vertical Pupils (Vertical elongated pupils)

Animals with vertical pupils and front-facing eyes are predominantly ambush predators, often nocturnal or crepuscular



Photo courtesy of Jane Cirigliano

(most active at dawn and dusk). They are found most often in animals that are close to the ground such as domestic cats and less so in larger predators, such as lions and tigers who have round pupils. Other animals that have vertical pupils include small canids, small felids, red deer, reindeer, elk, geckos, crocodiles and slow lorises. Canada lynx, a medium-sized ambush predator, has intermediate-shaped oval pupils. The same size relationship is true of canines. The small European red fox has vertical pupils, while the larger gray wolf and domestic dog have round pupils. Vertical pupils allow for a greater depth-of-field especially for vertical objects (such as potential prey). Animals with vertical pupils are able to judge the distance of prey more accurately

without moving their heads and giving away their position. Of those reported in the Banks study, 36 of the 44 (82%) ambush predators with vertical pupils were less than 16.5 inches tall. It is hypothesized that vertical pupils are more important for small predators who need to visualize the horizontal movement of prey in sharp focus from low to the ground. It may be less useful for taller predators whose head is higher with respect to the horizontal plane of the ground. The vertical shape allows animals to dilate and constrict their pupils to a greater extent than round pupils, allowing for adaptation to hunting at night and during the day. Another possible benefit of the vertical pupil may be that round pupils are more visible than vertical slit pupils.

Interesting Talking Point: Despite the fact that they are ambush predators, active both in the day and night and small in size, **Pallas' cats** have round pupils rather than vertical pupils. This makes them more similar to larger cats, such as lions and tigers, than to smaller domesticated cats. The jury is out on why this is so.

Main Points—Vertical Pupils

- Predominantly ambush predators
- Usually small (<16.5 inches tall)
- Can accurately gauge the distance from prey
- Dilate more than round pupils to allow for low light vision



Photo courtesy of Columbus Zoo and Aquarium

Summary

Round pupils found in “active foragers” provide good binocular vision for judging distances. Examples of animals with round pupils are tigers, lions, leopards, dogs, and birds. Although round pupils may be effective for some species, the

Continued on page 11

advantages of horizontal and vertical pupils may provide selective advantages for others. A number of hypotheses have been developed over the years. Additional research is necessary to fully understand how pupil shape impacts ecological niche.

— Sally Rudmann

What is Ecological Niche?

<https://biologydictionary.net/ecological-niche>

<https://video.search.yahoo.com/search/video?fr=mcafee&ei=UTF-8&p=ecological+niche&type=E211US105G91710>

Contains List of Some Animal Pupils

<https://pawversity.com/history-and-society/animal-pupil-shapes>

Sources:

Banks MS, Sprague WW, Schmoll JA, Parnell JAQ, Love GD. Why do animal eyes have pupils of different shapes? *Sci Adv.* 2015, August 7; 7(1); 1-9. <https://www.science.org/doi/pdf/10.1126/sciadv.1500391> Accessed August 5, 2022.

Land MF. Visual optics: the shapes of pupils. *Curr Biol.* 2006, 7 March; 16(5) R167-168. <https://www.sciencedirect.com/science/article/pii/S0960982206011961> Accessed August 15, 2022

Malmström T, Kröger RHH. Pupil shapes and lens optics in the eyes of terrestrial vertebrates. *J Exp Biol.* 2006, 209(1); 18-25. <https://journals.biologists.com/jeb/article/209/1/18/33400/Pupil-shapes-and-lens-optics-in-the-eyes-of> Accessed August 12, 2022

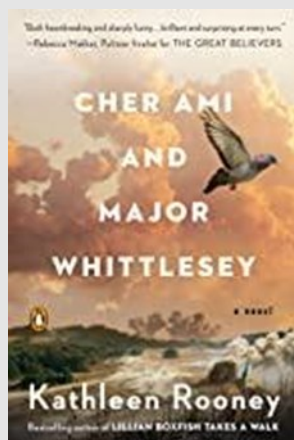
Yang, S. Pupil shape linked to animals' place in ecological web. *Berkeley News* August 7, 2015. News <https://news.berkeley.edu/2015/08/07/pupil-shape-and-ecological-niche/> Accessed August 15, 2022.



Kangaroo Walkabout
Did you know that because kangaroo tails are so long and strong that they cannot hop backwards?



Book Review: Cher Ami and Major Whittlesey



The story of **Cher Ami and Major Whittlesey** by Kathleen Rooney is told through the perspectives of the two main characters, a homing pigeon named Cher Ami and an American soldier, Charles Whittlesey, whose lives are intertwined by their time in France during World War I, in an incident that gained international notoriety, called “the Lost Battalion.”

Naval aviation recognized carrier pigeons for service in the last year of WWI. Cher Ami was on his last mission on October 4, 1918 and the message he carried was from the "Lost Battalion" of the Seventy-seventh Infantry Division that had been isolated from other American forces. Major Whittlesey was the commander who ordered the bird released to alert the other Americans that they were shooting at their own soldiers. Though wounded, Cher Ami delivered his message requesting a ceasefire and rescue. Both requests were immediately granted and brought about the relief of the 194 battalion survivors. They were safe behind American lines shortly after the message was received. The military denied that mistakes were made and publicly blamed the barrage on the Germans.

Not only a good story, but an interesting look at the breeding, nurturing, training, and racing of homing pigeons, as well as their use in warfare. According to the U.S. Army Signal Corps, carrier pigeons had a 95% success rate of delivery across Europe during the First World War.

A great website with photos of some of the pigeons and the messages they carried in WWI can be found at <https://www.iwm.org.uk/history/the-incredible-carrier-pigeons-of-the-first-world-war>

—Sheila Campbell

Cher Ami can be found at the National Museum of American History in Washington, DC.

https://www.si.edu/object/cher-ami%3Anman_425415



Asia Quest Aviary

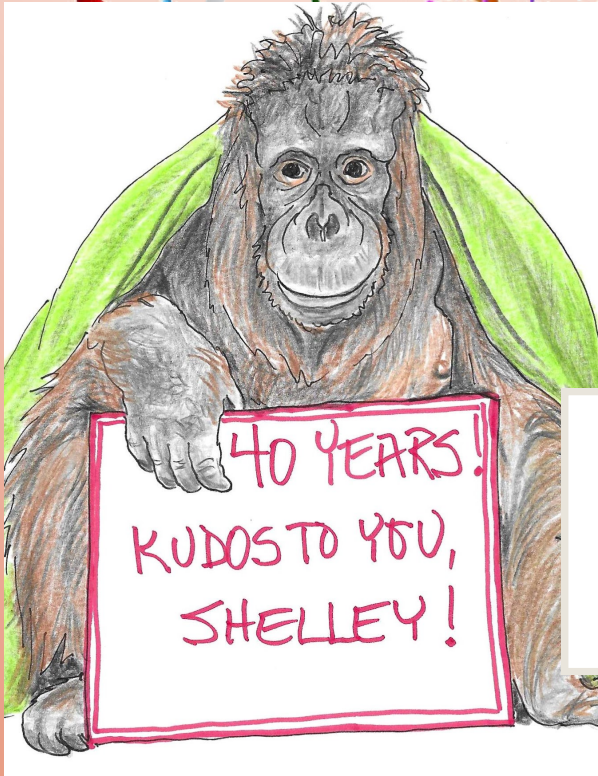
Did you know that muntjacs are sometimes called barking deer because they make deep bark-like sounds when they're on alert?



Thank You for Your Dedicated Service!

50 year Docent Award

Jeana Price



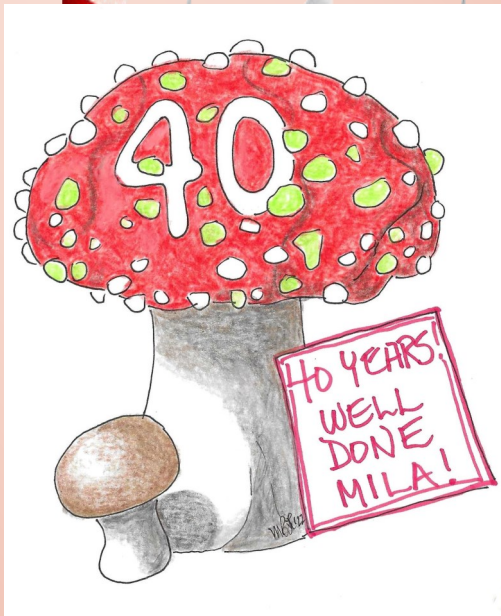
40 year Docent Award

Shelley Snyder

40 year Docent Award

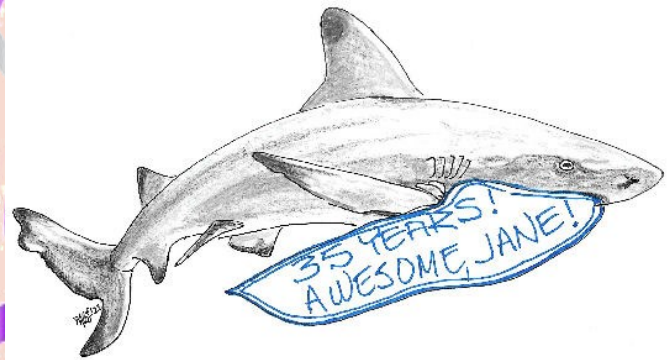
Carol Rieser, Emeritus

Thank You for Your Dedicated Service!



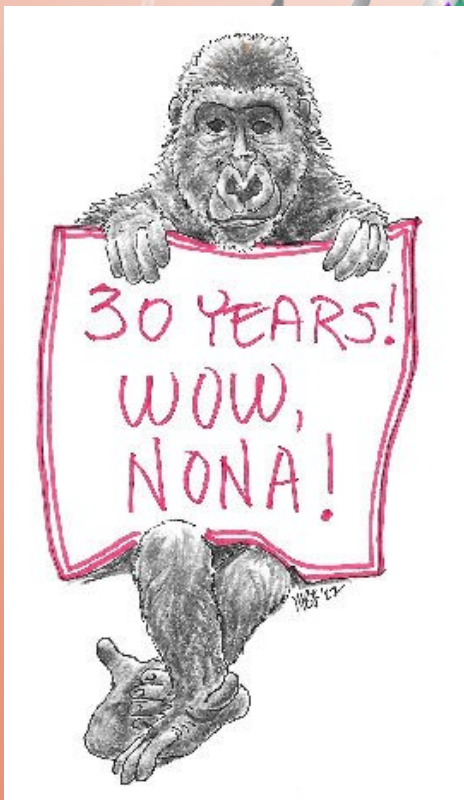
40 year Docent Award

Mila Wheeler-Hall



35 year Diver Award

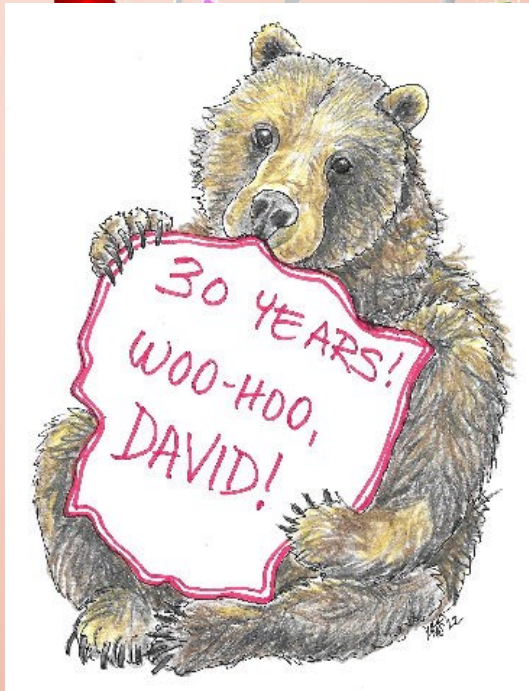
Jane Price



30 year Docent Award

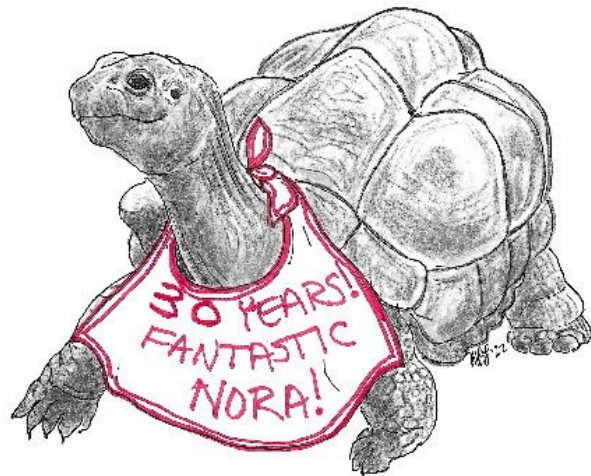
Nona Hunt

Thank You for Your Dedicated Service!



30 year Docent Award

David Marhover



30 year Docent Award

Nora Potter

Thank You for Your Dedicated Service!

30 year Docent Award

Heide Pozderac



30 year Docent Award

Jason Smith

Thank You for Your Dedicated Service!

25 year Docent Award

Janet Eads
Debbie Giddings
Penny Hoffman
Carol Huddleston
Lynne Messner
Ken Tramel

20 year Docent Award

Bruce Bergmann
Martino Wicks

15 year Docent Award

Marcie Anderson	Julie Breeding
Pat Conrad	Barb Emmets
Barbi Kealy	Nancy Traub
Lorraine Ziegler	

Thank You for Your Dedicated Service!

15 year Diver Award

Rob Miller
Michael Strauss
Paul Willette

10 year Diver Award

Terry Woodford

10 year Docent Award

Carole Barkley	Sarah Cline
Susan Fagan	Kelly Hanlin
Georgene Jones	Sherry Mullett
Doug Pittsenbarger	Joy Remley
Lyn Seiple	Jack Shinnock
Tammy Stein	Lori Summers
Dianna VanBuren	Adrian Waters

5 year Diver Award

Ryan Burky	Chris Courtney
Michael Montgomery	Megan Perkins

Thank You for Your Dedicated Service!

5 year Docent Award

Carol Hadley

Beth Horner

Pam Markley

Claudia Murray

Gary Pedersen

Paul Ries

Sally Rudmann

Pat Ruhl

Michael Sliclen

Barney Wolf

Judi Wolf

5 year Adult Volunteer Award

Richard Adams

Leslie Ferry

Fred Habenschuss

Mark Johnson

Bruce Leider

Jean Mitchell

Candace Patterson

Catherine Peterfish

Carol Roy

Jane Taylor

Janet VanGordon