



PENGUIN CLASSICS

## MARCH MAMMAL MADNESS

### Connoisseur Critters

Gird Your Stomachs for these 'Culinary' Curiosities

Energy and nutrients are essential to all living beings. Some carnivores have particularly specialized traits for acquiring, chewing, or digesting their meals. Similarly, some herbivores can safely consume high levels of toxins. And some truly fascinating species have adapted to dietary niches of really, really specific foods. Gird your stomachs and get ready to toast these combatants and their comestible curiosities in the **CONNOISSEUR CRITTERS DIVISION!** Tonight, there will be BLOOD!

**Great Skua (2) vs. Parasitic Guest Ant (15)** - Great Skua (*Stercorarius skua*) is a predatory seabird that nests primarily on remote islands of the North Atlantic. Skua typically head south for the winter, hunting for fish and floating the pelagic waves off the European & Northwest African coasts. A mottled brown bird, thick-shouldered and barrel-chested, with 4.5 foot wingspan, the powerful Great Skua can throw its 1.5 kg weight around to get the food it wants-whether stealing food from other seabirds or turning other seabirds into food!



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Now, the next combatant needs some extra explaining in a complex "Three's a crowd" system. First, MEET the FUNGUS FARMER! In Central America, workers of an ant colony of *Sericomyrmex amabilis* farm fungus by gathering decaying plant material to feed to fungus in a garden inside their nest and the ants eat the fungus for nutrition. Second, MEET THE RAIDER! Agro-predator ants (*Gnamptogenys hartmani*) raid colonies of fungus-farming *Sericomyrmex*

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"to usurp their fungus gardens & nest structures with remarkable efficiency" (Adams et al. 2013). NOW, MEET THE COMBATANT! After stealth infiltrating the fungus-farming ant colony, Parasitic Guest Ant (*Megalomyrmex symmetochus*) eats the host's brood & fungus...BUT will also instantly attack raider scouts of agro-predator *G. hartmani*, usually preventing an invasion!

Parasitic Guest Ant, looking at host ant, "It would be a real unfortunate situation for yoose if we weren't here to protect yoose." Parasitic Guest Ant sits back & takes a bite of a host brood egg dipped in fungus. #AdaptiveProtectionRacket

Tonight our battle takes place in the Pelagic Zone of the Atlantic Ocean, as sea birds gather around a fishing trawler. Great Skua watches for some delicious fish offal to fall overboard from fish

processing on deck. MEANWHILE, in Panama, Parasitic Guest Ant, with two compatriots, patrol the host nest and encounter two raider scout agro-predator ants. Parasitic Guest Ant lunges forward, stabbing a raider with a specialized venom sting! As the raider ant falls, Parasitic Guest Ant pincher snaps off the raider ant's antennae and two legs! A MMMagic Portal translocates Parasitic Guest Ant from the host nest in Panama to the open deck of the fishing trawler in the ocean.

Parasitic Guest Ant attempts to get her bearings amongst the fish guts, as a fisherman squeegees the fish offal overboard and into the water! Great Skua, on wing, plunges into the water, getting a beak full of fish guts...and Parasitic Guest Ant! GREAT SKUA BYCATCHES PARASITIC GUEST ANT! Narrated by Katie Hinde.



**Kob Antelope (1) vs. Bear's Head Fungi (16)** – Kob antelope (*Kobus kob*) are medium sized antelopes, standing nearly 105cm (41 inches) at the shoulder and weighing up to 120kg (265 lbs). Males have characteristic "S" shaped horns curving up towards the tips that can grow to over

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over 68 cm (27 inches). Kob regularly ingests soil (**geophagus**), which has higher concentrations of vital minerals like calcium and iron not found in their typical foods.



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Bear's Head Fungi (*Hericium abietis*) is a type of "tooth fungi." Instead of a stem and cap mushroom, Bear's Head grows outward from logs forming cascading spines 75cm (30 inches) long. Those spines, similar in color to a roasted marshmallow, are covered in spores. Although Bear's Head Fungi are edible, that is not what makes them connoisseurs. Bear's Head Fungi eat decaying wood! As a decomposer, consuming coarse woody debris is vital for concentrating key nutrients and replenishing nutrients in soil. Just like bears (the mammal), Bear's Head Fungi is both scavenger and predator! Besides eating dead wood, Bear's Head Fungi also attacks and eats living trees! By parasitically absorbing nutrients, Bear's Head Fungi creates wood decay, causing standing dead limbs or even standing dead trees.

These dead and dying standing trees can be important habitats for small mammals, birds, and insects.

Tonight's battle occurs in Kob's habitat in Kainji National Park. Established by combining several reserves, this is now the oldest national park in Nigeria. Here, where the rolling hills accentuate the deep savannah forests punctuated by many waterways, is where the Kob calls home. Currently near the end of the dry season, Kob needs to replenish key nutrients and craves mineral licks. Kob preferentially seeks a known soil sites for specific minerals to meet his nutritional needs. MMMagic transports Bear's Head Fungi, still clinging to rotting wood, from the lush woods of western Oregon to Kob's forest with braided streams. The dense fungal threads (mycelium) that can grow from a single spore and the tooth-like "Bear's Head" fruiting body settles into the dirt and onto the roots of a hardwood tree. BUT Bear's Head Fungi is a conifer specialist, and spores can only "hunt" and "scavenge" on evergreens! Bear's Head Fungi is powerless against the hardwood, the Fungi will have to sustain on the dwindling evergreen grasped by the mycelium! Whock-cracklesplint-puff! WITH HOOF AND TEETH, and and a dirt-eating grin, Kob tears through Bear's Head Fungi to reach the mineral-laden soil below.. Kob doesn't notice the mix of churned soil, rotten wood, and... microscopic spores now clinging to his hoof. KOB TRAMPLES BEAR'S HEAD FUNGI!! Narrated by Brian Tanis.

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**Crested Porcupine (3) vs. Velvet Worm (14)** – Crested Porcupines (*Hystrix cristata*) are one of the largest rodents in the world and can weigh up to 60 lbs, with females being larger. They are covered in sharp quills, some of which can be raised into a crest along the head / back, giving them their name. Primarily herbivorous, Crested Porcupines also eat a variety of plants with antiparasitic properties, especially during times of high parasite risk.

Velvet Worms (*Peripatopsis overbergiensis*) look like a slug crossed with a carton caterpillar and are covered in tiny, bristle-like structures giving them a grey-brown, velvet appearance. Velvet Worms have two high-speed "slime cannons" on their heads that



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shoot sticky slime at prey from a foot away. The quick-drying slime hardens so the Worm can use its saliva to start digesting the trapped insect.

Tonight's battle takes place in the foothills of Monti Sibillini National Park, in central Italy. This culturally rich area is home to many animals, including bobcats, wolves, boars and our Crested Porcupine. It is well past sunset and our Velvet Worm awakes beneath the leaf litter to find itself MMMagically transported to a chilly version of the South African woodlands it normally calls home. Prone to dehydration in dry/cold conditions, the Worm considers just hunkering down in this new place when the ground begins to vibrate. Whuff. Snuff! Whuff! The leaves begin to shift overhead as our Porcupine rifles through the ground litter in search of roots and tubers. The Porcupine's long whiskers brush against the scales of the Worm. Two streams of sticky slime shoot from the Worm...STRAIGHT INTO THE PORCUPINE'S EYE! Porcupine jerks her head back as the slime quickly hardens, gluing her eye shut! Turning and stumbling she tries to paw at her eye, the long needle-like quills on her side dig into the ground, piercing straight through the Worm! PORCUPINE IMPALES VELVET WORM!!  
Narrated by Alyson Brokaw.

**Koala (4) vs. Cobra Lily (13)** – Koala (*Phascolarctos cinereus*) are Australian marsupials and these Connoisseur Critters are highly specialized to feed only on eucalyptus, called gum trees Down Under. There are hundreds of

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different types of eucalyptus trees in Australia. Digesting eucalyptus is tricky business because it is high in fiber, low in protein and has toxic compounds. Koalas have a long digestive tract and lots of microbial buddies in a big caecum to digest cellulose and Koala has special traits to metabolize toxins.



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Cobra Lily (*Darlingtonia californica*) aka California Pitcher Plant is a large (up to 3ft tall) carnivorous plant in northern California and SW Oregon. Its curved bulbous top and wing-shaped leaves look like a rearing cobra, complete with forked snake tongue. Cobra Lily lures and traps insects in the fluid-filled pitcher-shaped leaves. Insects drown in the bacteria-laden fluid of the pitcher. Bacteria help to further breakdown and digest the insects, providing the plant with dietary nitrogen.



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Tonight's battle occurs in the Morano region of New South Wales, Australia, a high elevation plateau of grassy woodlands. Our large, 10kg Koala male awakes after a long day of sloooooooooooooow digesting. Cobra Lily is MMMagically transported to this "horrible" subalpine habitat. Cobra Lily needs to be cool and wet to survive. Near the foot of an eucalyptus, Cobra Lily stretches its extensive rhizome root system out for water, but finds none. Abandoning his daytime sleeping spot in a manna gum tree (*Eucalyptus viminalis*), Koala clambers to earth. Koala is adapted for tree living with long limbs, strong muscles, and specialized gripping feet, but he can still effectively locomote on the ground. Koala takes long, slow strides through the moonlight approaching Cobra Lily, but Koala's vision, best suited for night-time, does not fully perceive the vibrant red coloration of the fully mature plant. Cobra Lily's roots are beginning to be stressed without water and cool soils.

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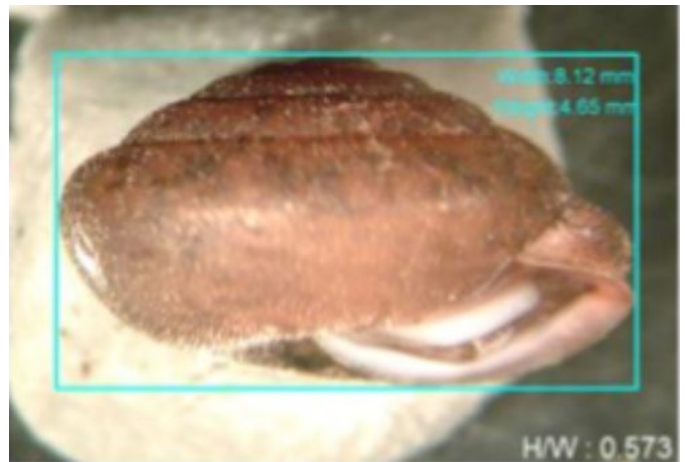
At least the daytime sun is not adding to the challenge of this new environment. Koala strolls closer as Cobra Lily droops! Koala shuffles well beyond Cobra Lily in search of a brittle gum tree (*Eucalyptus mannifera*) to chew on high-sodium bark, since manna gum leaves are low in sodium and Koala needs his nutrients. Cobra Lily remains desiccating on the field of battle as Koala strolls away! COBRA LILY OUTLASTS KOALA!  
Narrated by Jessica Light.

**Tufted Ground Squirrel (5) vs. Wichita Mountains Pillsnail (12)** – Tufted Ground Squirrel (*Rheithrosciurus macrotis*) is known for elongated hairs at the tips of its ears and a ginormous tail. Squirrel measures >600mm (>23 inches) tail and body combined and weighs in at over 1kg (over 2 pounds). Tall tales of assassin strikes from the canopy notwithstanding, Squirrel is a Connoisseur Critter because it has specialized tooth, jaw, and skull strength to access very hard seeds.



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Wichita Mountains Pillsnail (*Euchemotrema wichitorum*) was described relatively recently from the semiarid Wichita Mountains of Oklahoma. This small, 10mm diameter mollusk is an air-breathing land snail and is identifiable by a strongly depressed shell and small number of whorls. Land snails are primarily detritivores, feeding on decaying matter and vegetation, fruit, and fungi in the leaf litter. These snails serve important ecosystem functions contributing to nutrient cycling, soil formation, and fungal dispersal.



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Home habitat advantage goes to the Tufted Ground Squirrel, so the combatants will meet on the Southeast Asian island of Borneo. Squirrel is foraging at the base of a *Canarium decumanum* tree searching for its favorite hard seeds. Meanwhile, Pillsnail is gliding along the Wichita Mountains Wildlife Refuge understory, using its “tongue” (toothy radula), that mollusks have for feeding, to scrape up delicious decaying detritus. One imagines Pillsnail humming to itself "Oklahoma, where the littered leaf can sure taste sweet". Suddenly,

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Pillsnail is MMMagically transported to the humid, tropical forest of Borneo! Pillsnail instantly appreciates the higher humidity, and since leaf litter and detritus is pretty much the same everywhere, Pillsnail continues to forage contentedly. Squirrel is stirring up the leaf litter, trying to find a *Canarium* seed. Squirrel feels something with his dexterous hands and pulls the seed-like object from the leaf litter. It's Pillsnail! Without hesitation, Squirrel gives Pillsnail an exploratory test bite. Land snail shells are HARD, with 3 layers that protect Pillsnail from predators. CRRAAACK!!!! Squirrel's INCISORS break through Pillsnail's SHELL! Squirrel's incisors are unique among tree squirrels, with many ridges that create saw-shaped sharp edges. A meal of Pillsnail delivers some much needed calcium to Squirrel's diet. SQUIRREL CHOMPS SNAIL!!!! Narrated by Jessica Light.

**Chestnut-headed Bee-eater (8) vs. Hairy-legged Bee (9)** – Chestnut-headed Bee-eater (*Merops leschenaulti*) has a bright red head, reminiscent of (\*checks notes)... a chestnut! It also has a yellow throat that ends in a dark black band of feathers called a “necktie”, because being a connoisseur means dressing up for fine dining. The Chestnut-headed Bee-eater is a connoisseur that eats... (\*checks notes)... Bees! While the Chestnut-headed Bee-eater will eat any large flying insect, 20-90% of their diet falls in the bee order Hymenoptera.

Hairy-legged Bees (*Centris* spp.) are around 3cm long with... (\*checks notes)...hairy legs! These



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hairs are frequently used to gather oils off flowers which can help grab pollen and helps waterproof the burrows they live in. What really makes Hairy-legged Bees connoisseurs is lachryphagy aka TEAR DRINKING! These Bees get essential nutrients like sodium, potassium, and proteins not found in pollen by lapping eye secretions from larger vertebrates like reptiles and mammals

Tonight's battle location is The Sundarbans, a UNESCO world heritage site in southeastern Bangladesh, conserving one of the largest continuous mangrove forests on the planet. It is a vital habitat for a large diversity of threatened species. Amid the winding estuarine mudflats, the Chestnut-headed Bee-eater is sitting on the bare branch of a lychee tree (Genus Litchi). This is Chestnut-headed Bee-eater's home habitat, spending the majority of its time perched in the tree near water, scanning for a quick meal. Meanwhile in northern Brazil, researchers are watching a tick-laden iguana sunning itself in the sand, when a

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large female Hairy-legged Bee starts hovering around its head. With > 200 species of these bees, it is hard to identify them midflight and from a distance. Hairy-legged Bees don't need to make their host cry because turtles, iguanas, and some lizards produce salt-rich fluids from special glands near their eyes and nose as a way to shed waste. The iguana is "somewhat disturbed" and mostly closes its eyes as the bee approaches. But that won't stop the Hairy-legged Bee! It slowly lands near the eye, "inserts its mouthparts beneath the eyelid" and laps up those delicious tears (Sazima 2020).

Much to the joy of the iguana, a MMMagical portal opens and transports the Hairy-legged Bee away to the field of battle. As a solitary bee, the Hairy-legged Bee is not too concerned, particularly as the tropical climate feels fairly similar to northern Brazil. Hairy-legged Bee feels even better when it detects a very large reptilian basking nearby. It's a saltwater crocodile, a "salty" Down Under! Bee has never encountered one before, only caiman live in the region of the Arapiuns River it calls home. But tears are tears, so Hairy-legged Bee flies in for a salty snack!

Above the bank, Bee-eater has taken flight! Preferring to search for prey on the wing, Bee-eater circles with quick wingbeats and notices Hairy-legged Bee hovering near the face of the crocodile! Bee-eater doesn't recognize the bee, but doesn't need to know the species to know it's going to BEE a delicious dinner! Bee swoops for crocodile tears BUT WHERE ARE THE SALTY'S SALTY TEARS!? Saltwater crocodiles secrete

their excess salt not from their tears, but from glands inside their mouths! Bee drifts from the eye and gets closer to the open jaw of the crocodile... closer... SNAP!!!! Skillfully darting in, Chestnut-headed Bee-eater snatches Hairy-legged Bee out of air with its tweezer-like bill! Flying up to a perch, Bee-eater smashes Bee into the branch to ensure it is dead before swallowing it up! BEE-EATER EATS BEE! Who could have predicted such an outcome from the exact names of these combatants?!? Narrated by Brian Tanis.



M. C. Cavalcante, F. F. Oliveira, M. M. Maués, and B. M. Freitas / Wikimedia Commons / CC BY 3.0

## Fork-Marked Lemur (6) vs. Batfly(11)

While the etymology of the genus name *Phaner* comes, unexpectedly, from an 1870 W.S. Gilbert play, the fork-marked lemur's common name is inspired by the black stripe that runs along its spine, forks at the crown of its head, and continues down its face. Covered in long, dense, mostly brownish-grey fur, the Fork-Marked Lemur (*Phaner furcifer*) has a head-to-tail length of ~25 inches (1.9 stoats) & weighs in at 1.1 pounds (2.3 stoats). Like all lemurs, it's from Madagascar.



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Batfly (*Nycteribiidae*) feed only on the blood of bats. They are wingless and their flattened bodies give them a spider-like appearance, living their adult lives crawling through a bat's fur. Unique among flies, developing larva are fed by a "milk" produced by special glands INSIDE the mum. The pupa are then left on bat roost walls to emerge and find their own bat host to survive on bat blood. #LifetimeLiquidDiet

Tonight's battle occurs in northeastern Madagascar, home of the Lemur. The warm rainy season is upon us. With the arrival of dusk, Fork-Marked Lemur stretches her legs and emerges from a sleeping hole

in a baobab to forage. Fork-Marked Lemur will consume fruit and insects, but her diet is mostly eating the sap of trees (gumivory). And 90% of sap is made of sugars.

MEANWHILE, not far away in a cave near Antonibe, Madagascar, Batfly (*Eucampsipoda madagascarensis*) has been drinking blood from his host bat (*Rousettus madagascariensis*). Batfly's host bat is preparing for an evening of foraging. The 63 gram bat drops from the ceiling roost toward the crack exit from the cave system into the misty warm night... DIRECTLY INTO THE HUNTING PATH OF A PREDATORY BARN OWL WITH A TASTE FOR THIS BAT SPECIES! (Batfly is merely bycatch). Back at the Field of MMM BATTLE, Fork-Marked Lemur reaches one of her favorite Terminalia trees, with globs of sap leaking out from the wood burrowing activity of beetle larvae.

MEANWHILE: THE NOBLE STEED'S FAST EVASIVE MANEUVERS KEEP THE BATFLY JUST BEYOND THE TALONS OF THE BARN OWL! Back on the Field of MMM Battle, Fork-Marked Lemur shimmies about the tree to her known spots, scooping up globs of that sweet sweet sugar.

MEANWHILE: Noble Steed with Batfly pivots in the air just as #MMMagic portal translocates Batfly & Noble Steed to the Terminalia tree where the Lemur is sap-eating!

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Noble steed, breathing heavy, alights near the clumped leaves at the end of a branch, settling just above the Fork-Marked Lemur. Batfly clings to his noble steed. Batfly takes a sip of blood. Fork-Marked Lemur ignores the fruit bat as she noisily slurps up the last of the available sap. With the sap seeps tapped, Fork-Marked Lemur quickly descends the tree. She has a very precise series of sap spot visits for her nighttime foraging: "Each individual has a routine foraging itinerary between trees." (Nash 1986). Off to the next Terminalis tree, Fork-Marked Lemur quits the Field of Battle! Batfly, atop Noble Steed, OUTLASTS Fork-Marked Lemur!!! Narrated by Alyson Brokow, Laura Durgavich, Katie Hinde.



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**Pitcher Plant (7) vs. Northern Short-tailed Shrew (10)** – Pitcher Plants (*Nepenthes rajah*) are adapted for CARNIVORY as their source of key nutrients, such as phosphorus and nitrogen, not available in the soils where they grow. During development, *Nepenthes rajah* are still small and their pitcher captures invertebrates with hard

exoskeletons (**chitin**) that have the minerals plants crave. Once *N. rajah* matures, the pitchers become larger and their dietary targets expand.



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The Northern Short-tailed Shrew (*Blarina brevicauda*) is widely distributed across the Midwest and New England, with fur colors silver to black with brown tips. They have a notably short tail, which is only 20% of its body length. Northern Short-Tailed Shrew could be mistaken for a rodent, but belongs to the order Eulipotyphla and typically hunts for earthworms, centipedes, and insects. BUT they have been known to take down baby rabbits, small snakes, and salamanders.

Tonight's battlefield is Mount Kinabalu in Malaysian Borneo, where Pitcher Plant's sweet-scented nectar wafts as a siren call, enticing its nutrient delivery system closer. Meanwhile in North America, combatant Northern Short-Tailed Shrew is one of only 10% of shrews to have survived the winter. He is on the hunt when

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MMMagic translocates him to a lushly forested mountain. Nearby, a subadult mountain treeshrew has climbed onto the Pitcher of the Pitcher Plant, and stands with back legs spread to carefully balance on the slippery lip of the large pitcher. Mountain treeshrew reaches up with his snout and licks nectar from the leaf that serves as the lid of the Pitcher. While standing, the mountain treeshrew pees and poops into the deep pitcher of the Pitcher Plant, providing nitrogen and other nutrients not available in the nutrient poor soil! The Northern Short-Tailed Shrew sizes up this novel mammal, about the size of a meadow vole, which is one of NST Shrew's mammal prey! NST Shrew jump attacks the subadult mountain treeshrew WITH A BITE THAT DELIVERS TOXIC SALIVA! NST Shrew's venom is most similar to the venom of cobra and coral snake!



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Together the two shrews tumble INTO THE PITCHER PLANT in a gruesome fluid stew of poop, pee, bug sludge and digestive enzymes!

NST Shrew is trapped beneath his prey in the bottom of the fluid-filled Pitcher, struggling for air! The toxin from the NST Shrew's venomous bite is slowly killing the mountain treeshrew. The treeshrew is going into respiratory failure and blood flows freely from the bite wounds. The weight of the dying prey grows heavier on the NST Shrew. NST Shrew twists to scrape his claws against the PITCHER PLANT! At home he digs 2.5 centimeters a minute, but no time for his typical breaks to rest now! NST Shrew's robust CLAWS BREAK THROUGH THE PITCHER. Doing the sideways somersault that pushes dirt out of his tunnels, NST Shrew kicks hard with his back feet against the dying mountain treeshrew to push his way through the rip in the Pitcher Plant!! SQUELCH!! In a gush of bug sludge and toilet gunk, NST Shrew slides through the tear in the Pitcher Plant! NST Shrew runs away from the field of battle leaving behind a damaged plant and the digesting remains of one of the \*extremely\* rare instances of a mammal being digested in the world's largest carnivorous plant. PITCHER PLANT OUTLASTS NORTHERN SHORT-TAILED SHREW!!!! Narrated by Katie Hinde.

**READ ALL ABOUT IT** by Katie Hinde, Margaret Janz, Melanie Beasley, Anali Perry, Anthony Costantini, & William Yates

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## #2024MMM CRITTER CONNOISSEURS



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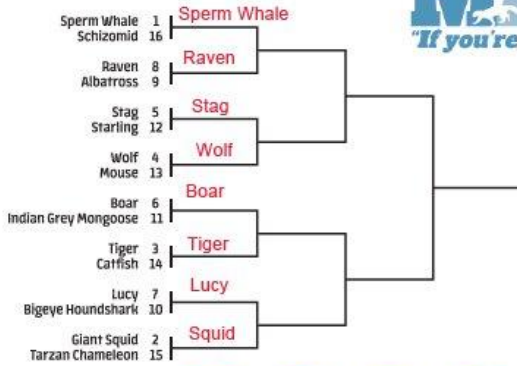
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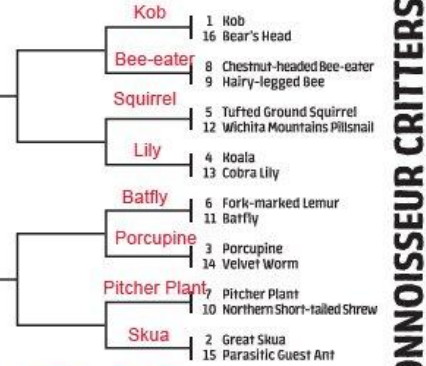
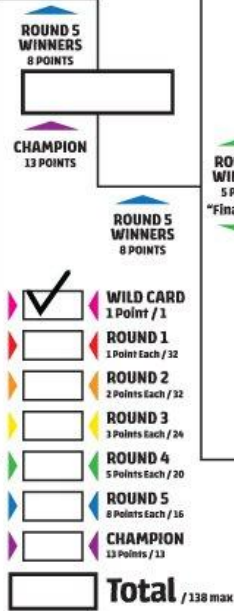
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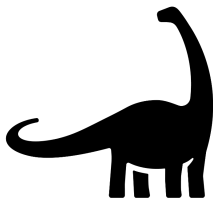


CONNOISSEUR CRITTERS

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