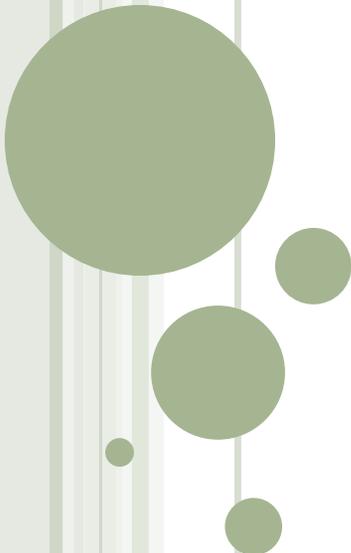




# REHABILITATION OF VIRGINIA OPOSSUMS



## QUICK FACTS

- Only marsupial in the United States
- Typical fur color is white with gray/black tips but variants exist: all white, all black, albino, and even cinnamon colored
- Recognizable long snout and pink nose
- Prehensile scaly tail sparsely covered with hair
- Females have a pouch which contains 13 teats where the young feed



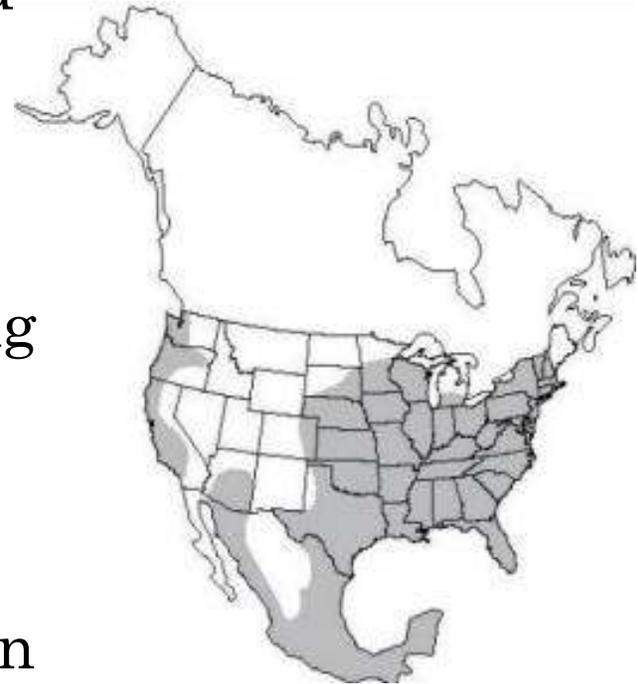
## QUICK FACTS

- Males generally larger than females
- Average weights of adults:
  - Females range from less than 1lb to 8lbs
  - Males range from 2lbs to 14lbs
- Total body length from 14in. to over 3ft long
- Adult males are referred to Jacks, adult females are called Jills, and the offspring are called Joeys



# NATURAL HISTORY

- Found throughout most of United States
- Typical home territory is 300 acres
- Will travel up to 2 miles searching for food
- Solitary creature except for breeding season, but home territories will overlap on occasion



## NATURAL HISTORY

- Average lifespan is 3-4yrs in captivity, 2yr average in the wild
- Omnivorous creatures, generally considered scavengers
  - Will eat fruits, vegetables, insects, small mammals, and birds
- Make dens in old burrows, hollow logs, and man-made structures
- Primarily terrestrial and nocturnal



## CHARACTERISTICS

- Well developed senses of smell
- Have extremely poor eyesight
- Main defense mechanisms are their numerous teeth and “playing possum”
- Use urine, fecal matter, and glandular secretions to mark territory
- Males will salivate and rub head and neck on objects, referred to as “sliming”
- Secretions stain fur yellow color
- Anal secretions upon capture that emit musky scent



## BE FRUITFUL AND MULTIPLY

- Possible to have two litters per year, more common in southern climates
- Most only have 1 litter survive to weaning age
- Reproduction usually begins in January with the litter being born only 12-13 days later
  - About size of a bumblebee
- Upon arrival young latch on to teats, once attached the lips of young fuse around teat
- Young will feed in this state for 2 months or what's known as fixation period



## JUVENILES

- Once moving to and from the pouch, mothers become more attentive
- Will use “clicking” vocalizations
- Young respond with similar sounds, but stay in close proximity
- Weaning process begins about day 95
- Begin to independently search for food, and are on own when body length minus tail reaches approximately 6 inches
- Mortality rates rise during this developmental period



# CARING FOR THE YOUNG JOEY



# REHYDRATION

- Do not start formula too soon
- Never give anything by mouth if its temperature is below normal
- Rehydration solution – every 1-2 hours for first 12 to 24 hours (depending on level of dehydration)
- Give 5% of body weight
- Once stabilized, begin giving dilute formula (25%, 50%, 75%, 100%)
- Gradually thicken as tolerated without diarrhea



## PROPHYLACTICS?

- National Opossum Society calls for use in every single infant, despite lack of any symptoms
- Reasoning
  - Lack of umbilicus, born immune deficient
  - Gain immunity from mother's milk, possible to ingest bacteria from a dead mother
  - Believed to prevent many bacterial problems including "Crispy Ear"
- Recommend Amoxicillin, sometimes in conjunction with Nystatin
- Talk with your vet prior to any use



## INFANTS (0-2 ½ MONTHS)

- ~1/2 inch long blind and naked
- membrane along the sides of their mouths
- babies live in mother's pouch for 2 ½ months
- can grasp with hands and feet
- sleep most of time except when eating
- at 2 months they are the size of grown mice, still blind and very sparsely furred
- they are unable to regulate their temperature



# WHAT ARE MY FORMULA OPTIONS

Wombaroo

Fox Valley 32/40 (opossums under 45 grams)

Fox Valley 25/30 (opossums over 45 grams)

Esbilac

KMR

Milk Matrix

Do your research before choosing a formula



# FORMULA COMPARISON

## ○ Fox Valley 32/40

- Crude Protein min. 32%
- Crude Fat min. 40%
- Ash Max. 9%
- Moisture Max 5%

## ○ Fox Valley 25/30

- Crude Protein min. 25%
- Crude Fat min. 30%
- Ash max. 9%
- Moisture max. 5%

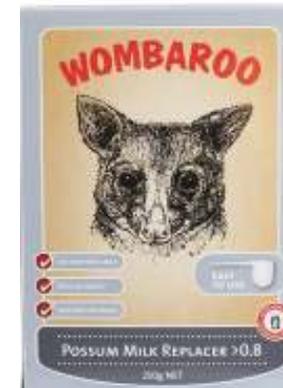


## ○ Esbilac

- Crude Protein min. 33%
- Crude Fat min. 40%
- Ash max. 7%
- Moisture max. 5%

## ○ Wombaroo >80%

- Protein 30%
- Fat 35%
- Carbohydrates 20%



# FEEDING STYLES

- Tube feed or syringe feed?
- Age and stress dependant
- Syringe is less invasive, but may take more time, more stressful, and messy
- Tube feed very invasive, risk of esophagus rupturing, but very efficient in delivering full amounts of formula
- Do what you're comfortable with



# FEEDING YOUR INFANT

- The moral dilemma, do I even try
- Gather what you'll need
  - Feeding utensils (syringe, nipple, tube, formula)
  - Stimulating utensils(cotton ball, q-tip, paper towel, cloth)
  - Gram scale(for daily weights)
  - Hot plate or hot water dish for formula
  - Extra bin with heat
  - Garbage can
  - Disposable gloves
  - Fresh bedding



## FEEDING YOUR INFANT



- Weigh each individual daily
  - Determine safe way to differentiate (nail polish, marker, shave)
- Gently stimulate, should urinate and defecate each feeding
- Feed 5% of the body weight at each feed
- Depending on size, may need to feed as many as 6-8 times in a day
- Never feed cold formula or a cold infant!
- After feeding dispose of heated formula
- Watch for full stomach, infants should be sleepy when full



# FEED CHART COMPARISON

## R-Paws Manual, Virginia Opossum

**VIRGINIA OPOSSUM FEEDING CHART**

Body Weight (g)	Daily Caloric Intake (Kcal/day)	Amount to Feed (cc)	
		5X/day	6X/day
10	4.42		0.6
15	5.99		0.9
20	7.43		1.1
25	8.78		1.3
30	10.07	1.8	1.4
35	11.30	2.0	1.6
40	12.49	2.2	1.8
45	13.64	2.4	1.9
50	14.77	2.6	2.1
55	15.86	2.8	2.3
60	16.93	3.0	2.4
65	17.98	3.2	2.6
70	19.00	3.4	2.7
75	20.01	3.6	2.8
80	21.01	3.7	3.0
85	21.98	3.9	3.1
90	22.95	4.1	3.3
95	23.90	4.2	3.4
100	24.83	4.4	3.5



# FEED CHART COMPARISON

National Opossum Society, Orphan Care Handbook

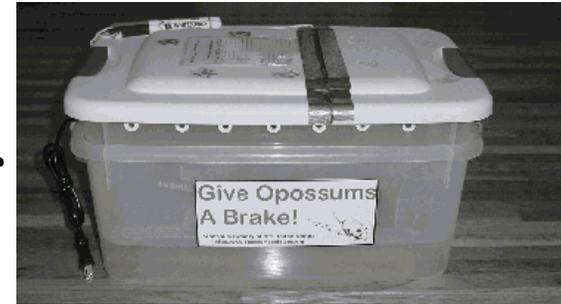
Baby's Weight in Grams (1 oz. = 28 grams)	Growth Stage	CC's of Formula (or rehydration solution)			
		Every 2 or 3 hours (see discussion below)	Every 4 hours	Every 5 hours	Every 6 hours
10	Pink - no hair				
15	*	50			
20	"Painted on" fur	75			
25	Begins to get hair	1.00			
30	Eyes begin to open	1.25			
35	Fully furred. Should begin learning to lap on own; monitor closely and "top off" infants who are not eating on own.	1.50			
40	*		2.00		
45	*		2.25		
50	*			2.50	
55	* but should be fully able to eat on own.			2.75	
60	See Note 1				3.00
65	See Note 1				3.25
70	See Note 1				3.50
75	See Note 1				3.75
100	See Note 1				5.00

**NOTE 1:** When little ones are able to eat on their own, leave food out for free feeding, replace at 2 or 3 hour intervals to prevent spoilage.

**NOTE 2:** Up to about 40-45 grams, one is able to see a "milk line" just below the breastbone when stomach has formula in it. When this disappears, it is safe to feed. However, when rehydrating infants with clear fluids, one is not able to see the milk line, so feed on the 2-hour schedule.

# HOUSING

- If small enough may need incubator
  - Water incubator
  - Home-made incubator
- Covered clam shell, small crate or aquarium with half of a heating pad underneath
  - Anything large enough to be divided into a heated and an unheated space
- Keep cage in doors, away from drafts
- Imitation pouch or blankets
- Maintain at temperature 80-90 degrees Fahrenheit
- Mother's pouch is moist, need to duplicate the moisture content (careful not to get babies damp)



## JUVENILES (2 ½ MONTHS – 4 MONTHS)

- lightly furred
- eyes open at about 2 ½ months
- membrane around mouths are gone
- can crawl and walk around
- they still sleep a lot
- may crawl out of pouch and want to sleep in a cloth nest
- in wild, can be found clinging to mother's back
- can now regulate body temperature
- Will use “clicking” vocalizations



# FEEDING

- Will begin to lap from a small dish
  - baby food or peanut butter jar lid works well
  - Recommend one dish for each individual
- Still offer 5% of weight, weighing once daily
- Stimulate only if not going on own
- Tube or syringe feed as needed until lapping from dish consistently
- Feed 4 to 5 times a day
- Clean each joey after feeding as they will get messy



# HOUSING

- 3'x3'x3' cage with ½ inch hardware cloth
- Use the same heat set up for infants
- When ready opossums will leave heat source and artificial pouch
- Line bottom of cage with sheets/cloths
- Provide a pile of cloths for them to nest in once they leave pouch
- Add few sticks or branches



## SUB-ADULTS (4 MONTHS-)

- fully furred and well coordinated
- can use tails to help guide/grasp while climbing
- ears, feet and tail have no fur
- all adult teeth are present and they are needle sharp



# FEEDING

- Should be completely self-feeding
- Gradually decrease amount of formula
- Offer more solid and natural foods, variety is the spice of life
- Dry cat food, insects, crayfish, raw eggs, dead rodents, raw dead fish, fruit, vegetables, non-flavored yogurt
- Be sparing with sources of Vitamin A (liver, mackerel, leafy green and orange vegetables)
- Can put food in large pan of dirt with rocks so they can learn to forage on their own
- Decrease amount of feedings, 1-2 times a day, 3 at most, and at normal activity periods(nocturnal)



# HOUSING

- 4'x4'x8' with 1"x 1 ½" mesh
- Half of cage should be covered with tarp
- Offer 2 water sources, will use one as latrine
- A few play items can be useful:
  - Pan of dirt to scratch in, hollow log, 1" manila rope strung across cage, branches, logs with bark, rocks to turn over
- Acclimate to outdoor cage gradually



# OUTDOOR CAGING



# OUTDOOR CAGING



# RELEASE



## Recommendations:

- At about 5 months of age, opossum should be over 6" excluding tail
- Some recommend later release, 12-14" excluding tail
- Should show fear when humans approach
- Nocturnal, release at dusk
- Can leave extra food at site so they have an assured food source for a day or two



# ILLNESS AND PROBLEMS

- Dermal Septic Necrosis (Crispy Ear)
- Metabolic Bone Disease
- Coccidia
- Dry Skin
- Bloat
- Aspiration
- Cannibalism



## DERMAL SEPTIC NECROSIS (CRISPY EAR)

- Dermal = Skin
- Septic = Systemic infection, an infection throughout the body
- Necrosis = Death
- Describes crispy brown edges on the tip(s) of an opossum's ear(s)
- **Do not assume because the opossum has crispy looking brown edges on the tips of its ears that it must have “Crispy Ear”.**
  - The crispy edges can indicate frostbite, a local, topical bacterial infection or a fungal infection.



## DERMAL SEPTIC NECROSIS (CRISPY EAR)

- Tissue death resulting from a systemic infection
  - Bacteria can enter the body a number of ways, especially when young
  - Necrosis of the tip of the ear, digits and tail possible
- If left untreated, organ damage and death may occur
- A correct diagnosis must be made in order to develop the proper treatment plan
  - **Work with your Veterinarian**
  - Treatment often involves amoxicillin, Baytril or other antibiotics used in combination with close monitoring
  - If no improvement first 2-3 days consult vet for further treatment



# METABOLIC BONE DISEASE

- Serious disease which can result in severe crippling or death
- Primarily due to poor husbandry, feeding improper diet
- Due to not enough calcium in the diet, too much phosphorous, too much protein and/or too many fruits
  - Moderation is the key
- PREVENTABLE and REVERSIBLE
- A low calcium diet can result in weakening of bones, increasing risk of fractures



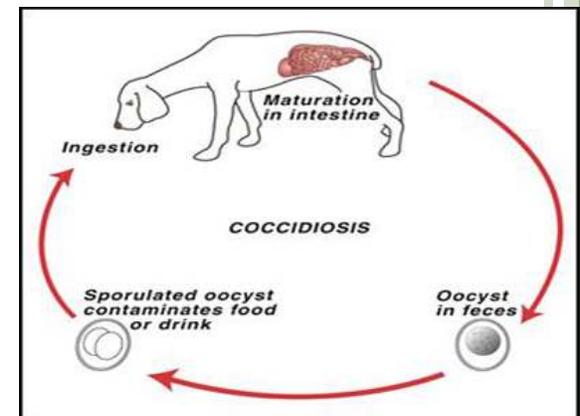
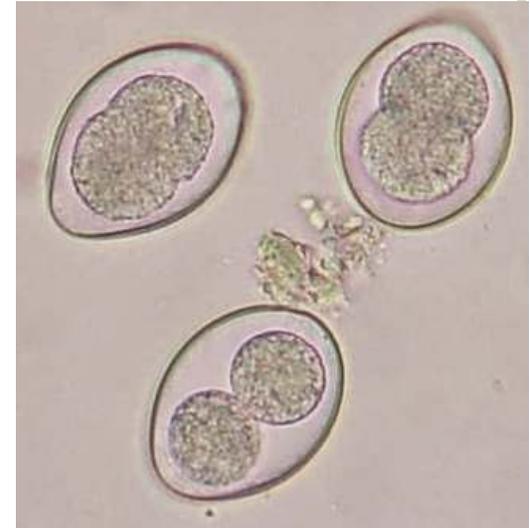
# METABOLIC BONE DISEASE

- Early signs
  - loss of grip in the feet, tremors, twitching, decreased activity, sleeping more, uncoordinated gait, decreased appetite
- Advanced signs
  - difficulty walking and climbing, crawling or dragging its limbs, bowing of the legs
- Diet must be corrected and supportive care offered
  - Feed food high in calcium
    - Kale, cabbage, bok choy
  - Feed meat with bones
  - Exposure to sunlight (vitamin D)
- Recovery over time
  - caught early enough can be released
  - More advance cases, may not recover sufficient motion for release
    - may be candidate for captive program, educational animal
  - Severe cases may require euthanasia



# COCCIDIA

- Protozoan parasite that affects the intestinal tract
- Causes foul smelling diarrhea, lack of nutrient absorption, weight loss, lack of appetite
- Can be fatal if undetected or left untreated
- Typical causes: too high humidity in enclosure, poor sanitary practices(not changing bedding often, using same utensils with different litters, not cleaning utensils well enough)



# COCCIDIA

- Work with your veterinarian on treatment, may need fecal test to confirm
- Typically Albon works well to treat, long treatment course but effective
- Make sure to keep hydrated and well fed as they are losing fluids and nutrients quickly
- Have used LA200 (*Lactobacillus acidophilus*) first to help stool consistency



**Day One**  
**Formula LA 200 gram**  
**ORAL ONLY**  
**(6.6 oz)**



## DRY SKIN

- Use lanolin to keep babies' skin from drying out
- Make sure there is enough moisture in cage.
  - If there is not enough moisture in the cage, the tail will develop rings and the tail ends will sluff off
- Ways to increase humidity
  - Baby food jar with holes in lid and soaked sponge inside
  - Piece of cloth dampened with warm water
  - Use incubator with automatic humidifier
  - Use humidifier in room
  - Vary hole sizes and location



# BLOAT

- Firm, distended abdomen, may appear filled with air, lethargic, not eliminating
- Possible Causes:
  - Feeding too much or too often
  - Lack of elimination, failure to stimulate
  - Feeding wrong or spoiled formula
- Ways to Prevent/Treat
  - Stimulate infants at every feed
  - Make sure infant is warm prior to feeding
  - Do not let formula sit out at room temperature
  - Gently massage abdomen
  - Give rehydration fluids for 12-24hrs and restart gradations
  - Consult your veterinarian if no improvement or worsens



# ASPIRATION

- Will occur if the animal is getting formula too fast
  - formula dispersing from the nostrils and possibly back into the lungs
- When this occurs stop feeding immediately
  - Turn animal upside down and gently pat on back
  - Wipe formula from the nose
  - Continue the patting until no more formula is coming from nose
- Can lead to aspiration Pneumonia
  - Difficulty breathing, crackling sounds when breathing, lack of appetite, lethargy
  - Work with veterinarian, may need to treat with antibiotics



# CANNIBALISM

- Cannibalism is **NOT** a natural behavior of opossums
- **Common causes:**
  - Overcrowding, insufficient quantity of food/water
  - Stress
  - Improper diet
  - Mixing litters or different sized animals
  - Placing sick/injured opossum in cage with healthy litter
- **Prevention**
  - Provide adequate cage space
  - Minimize stress
  - Provide a proper diet in an adequate amount
  - Avoid mixing litters
    - If limited caging, introduce the young before the eyes have opened
    - If introducing after eyes have opened, monitor carefully



## NON-RELEASABLE OPOSSUMS

- Unable to be released due to habituation, medical condition, does not have full wild attributes
- Candidate for captive program, educational ambassador
- Things to consider
  - Stress level
  - Quality of life in captivity
  - Temperament
  - Space availability
- If not a good candidate for captivity, euthanasia is only remaining ethical and humane option



## CAPTIVE OPOSSUMS



- Can make excellent animal ambassadors
- Make sure to give adequate space for daily exercise
  - Exercise wheel works well
- Offer well rounded diet accounting for decreased activity
  - Fruits, vegetables, protein
  - Consult vet on proper diet and supplements
- Monitor weight
- May see medical issues normally wouldn't see in young animals (cancer, organ failure)
- Enrichment critical to mental and overall health







# QUESTIONS?

