



# All Equids are Not Equal (donkeys are different)

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# Outline

- ◆ Background information/donkey terminology
- ◆ Roles of donkeys in U.S. and abroad
- ◆ Behavior
- ◆ Nutrition
- ◆ Anatomy
- ◆ Other considerations







## Donkeys and horses are different species

- ◇ Equidae Family = horses, donkeys, zebras
- ◇ *Equus asinus* = donkey (or burro)
- ◇ *Equus caballus* = horse



# Mini, standard, and mammoth



Mini—36  
inches or less  
at withers



Standard—  
between 36 and  
54 inches



Mammoth—  
greater than 54  
inches



## More Definitions

Donkey- worldwide common name

- ◇ Jack, Jackass—intact male
- ◇ Jennet, Jenny—female
- ◇ Burro—another name for donkey, commonly thought of as feral asses
- ◇ Donkey gelding/Gelded jack—castrated male





## More definitions

- ◇ Hinny—hybrid cross from stallion breeding a jenny
  - ◇ Mare hinny- a female hinny
  - ◇ Horse hinny- a male hinny
- ◇ Mule—hybrid cross from breeding mare to a jack
  - ◇ Mare mule/Molly mule- female mule
  - ◇ Horse mule/John mule- male mule
- ◇ Looks are variable



# Genetic makeup:

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Domestic horses- 64 chromosomes

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Domestic donkey- 62 chromosomes

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Mule / Hinny- 63 chromosomes

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Both crosses considered sterile even though there are some documented cases of fertility in the female mule & hinny





Companion donkeys



# Companion donkeys: rescues





# Companion donkeys: packing/racing





# Companion donkeys: other sports



# Companion donkeys: riding







**Feral and abandoned populations**



# Working Donkeys







**Donkeys in Production: ejiao & meat**





Donkeys in Production: milk



# Donkey Behavior





# The origin of donkey behavior:

- Beasts of burden since earliest human civilizations
- First domesticated equine species ~7,000 years ago!
- From the Somali wild ass
- Limited food and water
- Graze and browse on low nutritional forage for 14-18 hrs/day
- Walking 20-30 km/day



## The genomic history and global expansion of domestic donkeys

Todd *et al.*, *Science* **377**, 1172–1180 (2022)

9 September 2022

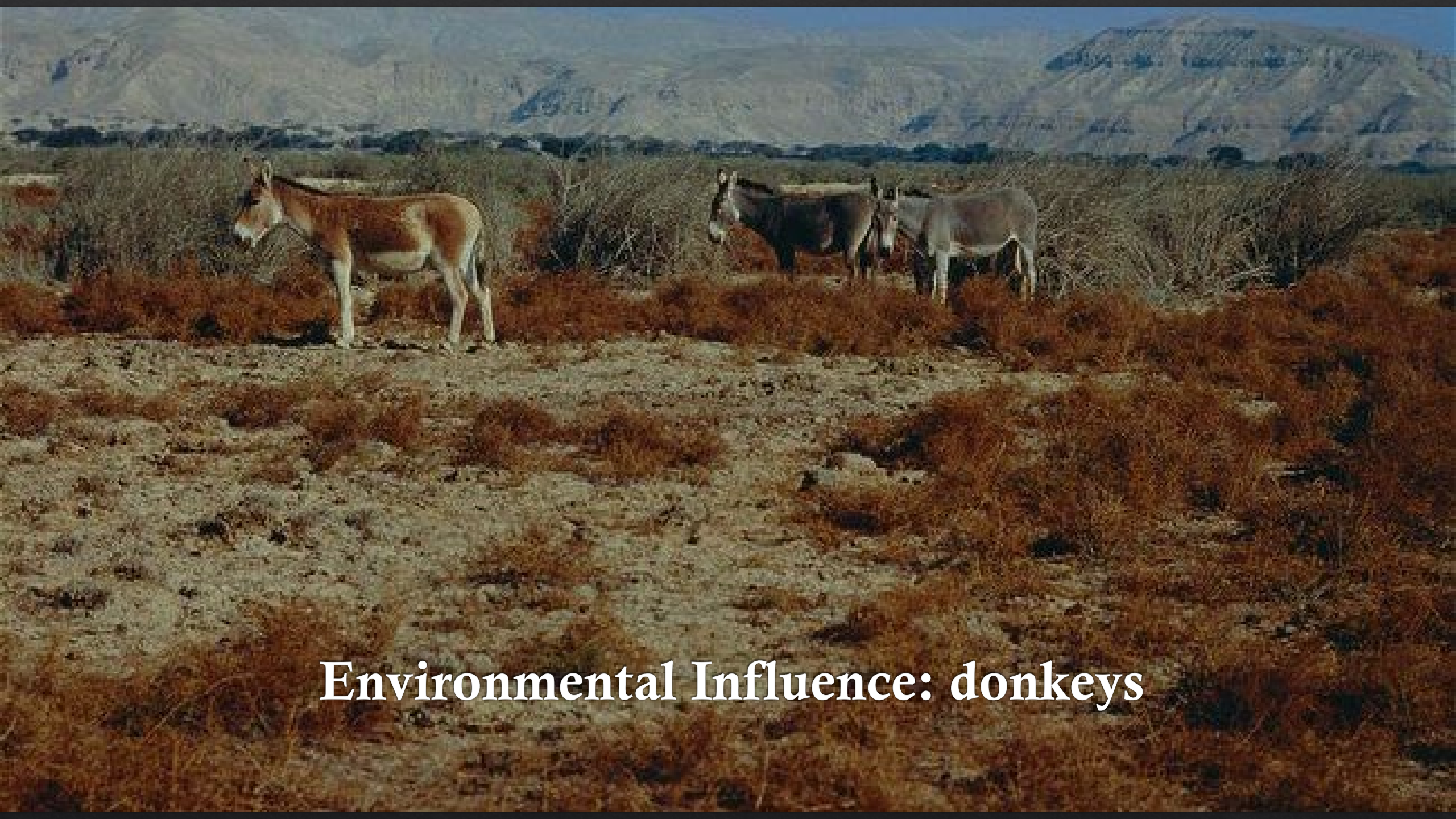


# The origin of donkey behavior:

- Males form territories
- Females in small groups
- Heightened fight response







**Environmental Influence: donkeys**



# FIGHT vs Flight: donkeys







**Environmental influence: horses**



A photograph of a brown horse running on a sandy beach. The horse is captured in mid-stride, with its front legs extended forward and its back legs pushing off. Its mane and tail are blowing in the wind. The background is a bright, sandy beach.

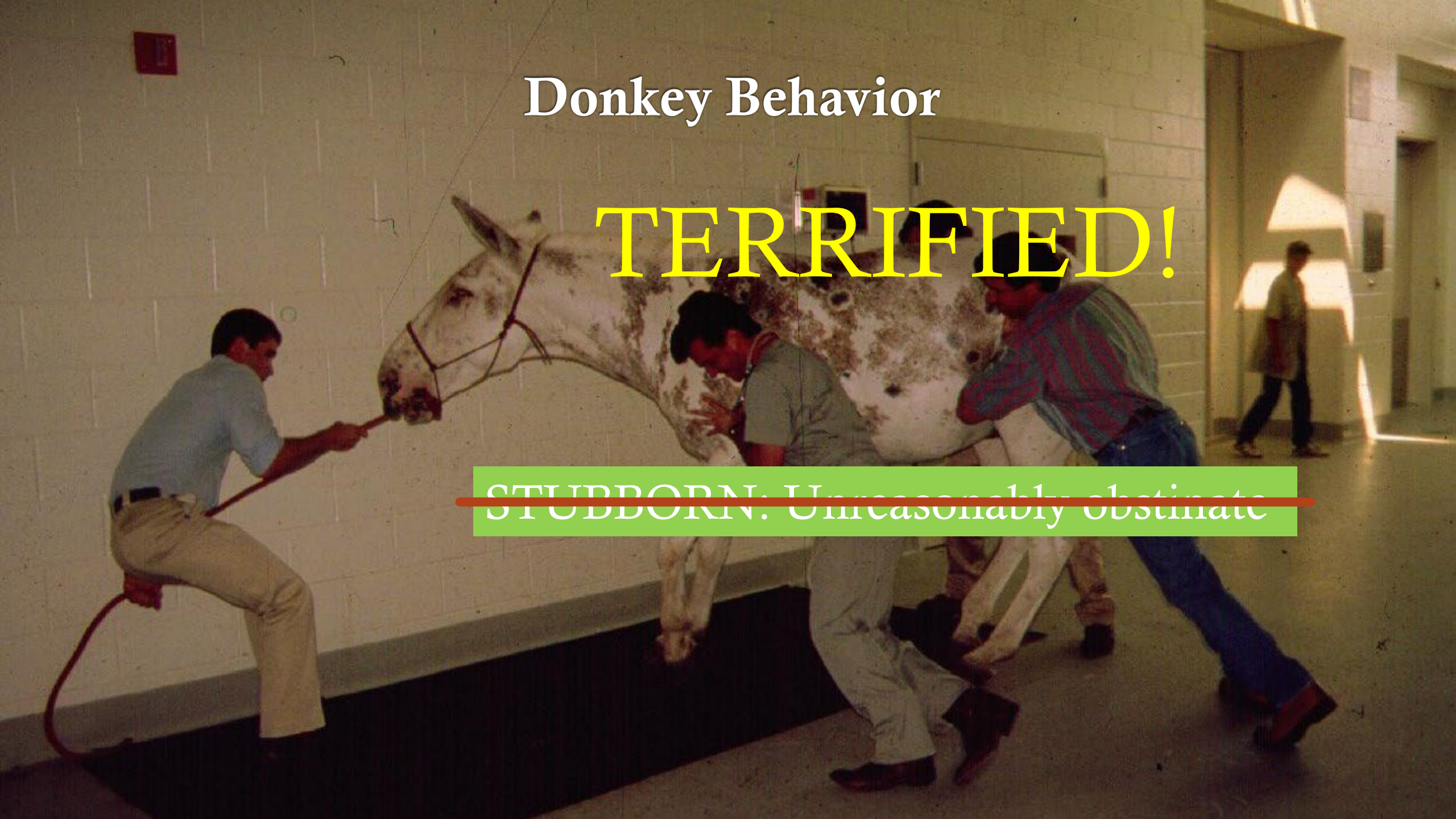
Fight vs **FLIGHT**: horses



# Donkey Behavior

TERRIFIED!

~~STUBBORN: Unreasonably obstinate~~





# Subtle signs of fear/stress

Clamped nostrils

Tension around mouth











Uneven nostrils

Semi-closed eyes

Visible sclera

The Donkey Sanctuary. **The Clinical Companion of the Donkey**. 1<sup>st</sup> Edition. Leicestershire (United Kingdom): Matador, 2017. p. 14.

The differences in facial expressions of a relaxed donkey compared to that same donkey exhibiting signs of fear/stress/anxiety.

Relaxed facial expressions	Facial expressions associated with fear/stress
<p>Relaxed, open nostrils</p> 	<p>Nostrils clamped tightly shut</p> 
<p>Relaxed muzzle - no visible wrinkles</p> 	<p>Tension around mouth leading to wrinkles forming around nostril and lips</p> 
<p>Relaxed nostrils, even in shape</p> 	<p>Uneven nostrils due to facial tension on right hand side leading to right nostril being drawn upwards</p> 
<p>Eyes open, muzzle relaxed</p> 	<p>Eyes semi-closed with tense muzzle</p> 
<p>Sclera not visible (care in some donkeys with sclera visible due to eye conformation)</p> 	<p>Palpebral fissure widened, sclera visible</p> 



# Donkey stoicism

- ◇ Predator-avoidance behavior
- ◇ NOT a lessened ability to experience pain!
- ◇ Unfortunately, can lead to misdiagnosis or missed detection of illness
- ◇ The dull, quiet donkey = veterinary emergency
  - ◇ Frightened can appear relaxed
  - ◇ Sick can appear healthy
  - ◇ Lamé can appear sound







# Behavioral signs of pain and/or sickness in the donkey

- Inappetence
- Dullness
- Sham eating
- Lowered head (swelling of muzzle)
- Unresponsive ears
- Lowered ear carriage (“helicopter”)
- Social isolation
- Increased recumbency
- Decreased recumbency
- Weight shifting
- Hypersalivation, drooling, difficulty chewing
- Tail twitching (different from tail swishing associated with aggression)



Play fighting





# Pair-bonds

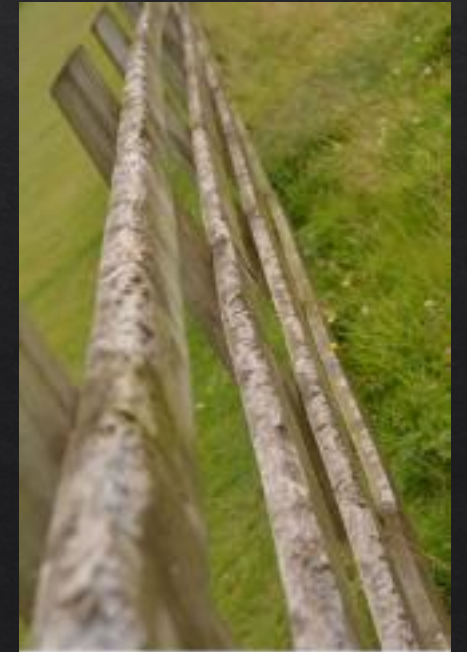
- ◆ Despite the solitary life in the wild, donkeys form pair-bonds
- ◆ Donkeys, horses, mules often housed together, but it appears that they prefer to associate with members of their own equid type
- ◆ Death or removal of a bonded companion can cause significant stress
- ◆ Take this into consideration when one needs to be hospitalized (best to send with bonded companion for company)





# Donkey Nutrition

- ◆ Browse and graze
- ◆ In wild, spend 14-16 hrs/day eating while traveling 20-30 km/day
- ◆ Narrow muzzle (good for sorting)
- ◆ Energy requirements = 50-75% that of a horse of a same size
- ◆ Obesity = major welfare concern in the US
- ◆ Lower protein requirement than horse
- ◆ Retain forage longer = pot bellied appearance





# How to appropriately feed donkeys

- ◇ Need high fiber forages of low nutritional value
- ◇ Barley straw would be ideal (difficult to find)
- ◇ Wheat straw is second-best (more fibrous, can be harder to chew)
- ◇ Low energy (mature) grass hay is next best option
  - ◇ TEST YOUR HAY!
- ◇ Pasture must be very limited! Pro=exercise, Con=high nutritional value
  - ◇ limit turnout, or strip graze
- ◇ Regular dental examinations







# Carbohydrates

- ◇ Test your hay (or straw)
- ◇ Non structural carbs = bad (NSC; starch and sugar)
  - ◇ NSC should be < 10-12%
- ◇ Structural carbs = good (ADF & NDF; lignin and cellulose)
- ◇ If tests high, don't feed; or consider soaking?



# How much forage to feed?

- Ideally nutritional value low enough to allow free feeding
- Often have to restrict intake due to forage quality being too high
- Use small holed haynets to make hay last longer
- Donkeys eat ~1.5 to 2.0% of body weight/d DM
  - Stay above the lower end of this range
- To prevent destructive tendencies feed non-toxic browse (brambles, safe evergreen trees, etc)





# Other nutrition considerations

- ◆ Forage will cover protein and calorie needs (1.5-2% of body weight)
- ◆ Likely won't provide adequate vitamins and minerals
- ◆ Most ration balancers for horses are high in protein; not appropriate for donkeys
- ◆ Balancers do exist that are low in protein and good options for use in donkeys
- ◆ Feeding cereal grains associated with laminitis, hyperlipidemia, gastric ulcers, and colic in donkeys
- ◆ Very well adapted to withstand dehydration, but they still need water!





# Body condition scoring






- UK Donkey Sanctuary BCS system (1-5 scale)
- Requires look and feel
- Fat pads may never go away even after dieting



Burden, F. Practical feeding and condition scoring for donkeys and mules. *Equine vet Educ* 2012; 24 (11) 589-596.



# Donkey Body Condition Score Chart

Condition score	Neck and shoulders	Withers	Ribs and belly	Back and loins	Hindquarters
<b>1. Poor (very thin)</b> 	Neck thin, all bones easily felt. Neck meets shoulder abruptly, shoulder bones felt easily, angular.	Dorsal spine and withers prominent and easily felt.	Ribs can be seen from a distance and felt with ease. Belly tucked up.	Backbone prominent, can feel dorsal and transverse processes easily.	Hip bones visible and felt easily (dock and pin bones). Little muscle cover. May be cavity under tail.
<b>2. Moderate (underweight)</b> 	Some muscle development overlying bones. Slight step where neck meets shoulders.	Some cover over dorsal withers, spinous processes felt but not prominent.	Ribs not visible but can be felt with ease.	Dorsal and transverse processes felt with light pressure. Poor muscle development either side of midline.	Poor muscle cover on hindquarters, hip bones felt with ease.
<b>3. Ideal</b> 	Good muscle development, bones felt under light cover of muscle/fat. Neck flows smoothly into shoulder, which is rounded.	Good cover of muscle/ fat over dorsal spinous processes, withers flow smoothly into back.	Ribs just covered by light layer of fat/muscle, ribs can be felt with light pressure. Belly firm with good muscle tone and flattish outline.	Can feel individual spinous or transverse processes with pressure. Muscle development either side of midline is good.	Good muscle cover over hindquarters, hip bones rounded in appearance, can be felt with light pressure.
<b>4. Overweight (fat)</b> 	Neck thick, crest hard, shoulder covered in even fat layer.	Withers broad, bones felt with pressure.	Ribs dorsally only felt with firm pressure, ventral ribs may be felt more easily. Belly over developed.	Can only feel dorsal and transverse processes with firm pressure. May have slight crease along midline.	Hindquarters rounded, bones felt only with pressure. Fat deposits evenly placed.
<b>5. Obese (very fat)</b> 	Neck thick, crest bulging with fat and may fall to one side. Shoulder rounded and bulging with fat.	Withers broad, bones felt with firm pressure.	Large, often uneven fat deposits covering dorsal and possibly ventral aspect of ribs. Ribs not palpable dorsally. Belly pendulous in depth and width.	Back broad, difficult to feel individual spinous or transverse processes. More prominent crease along mid line fat pads on either side. Crease along midline bulging fat either side.	Cannot feel hip bones, fat may overhang either side of tail head, fat often uneven and bulging.





# Feed selection for obese donkeys

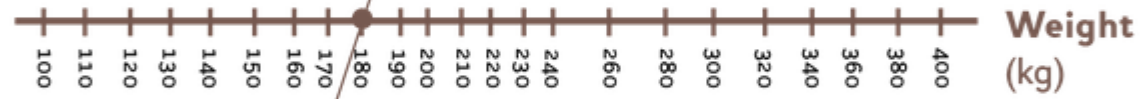
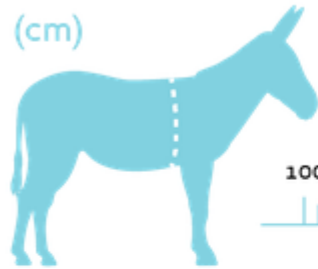
- ◇ Gradual changes (over 4-6 weeks)
- ◇ Check triglyceride concentrations
- ◇ Restrict grazing (area, not just time)
- ◇ Exercise
- ◇ Work for their food
  - ◇ Sloping pastures
  - ◇ Spread out feedstuffs
  - ◇ Toys
  - ◇ Strip grazing



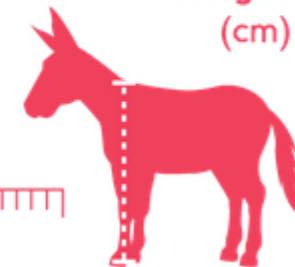
# Monitoring weight in donkeys

Weight loss should be gradual, no more than 2% BW lost per month

Heart Girth  
(cm)



Height  
(cm)



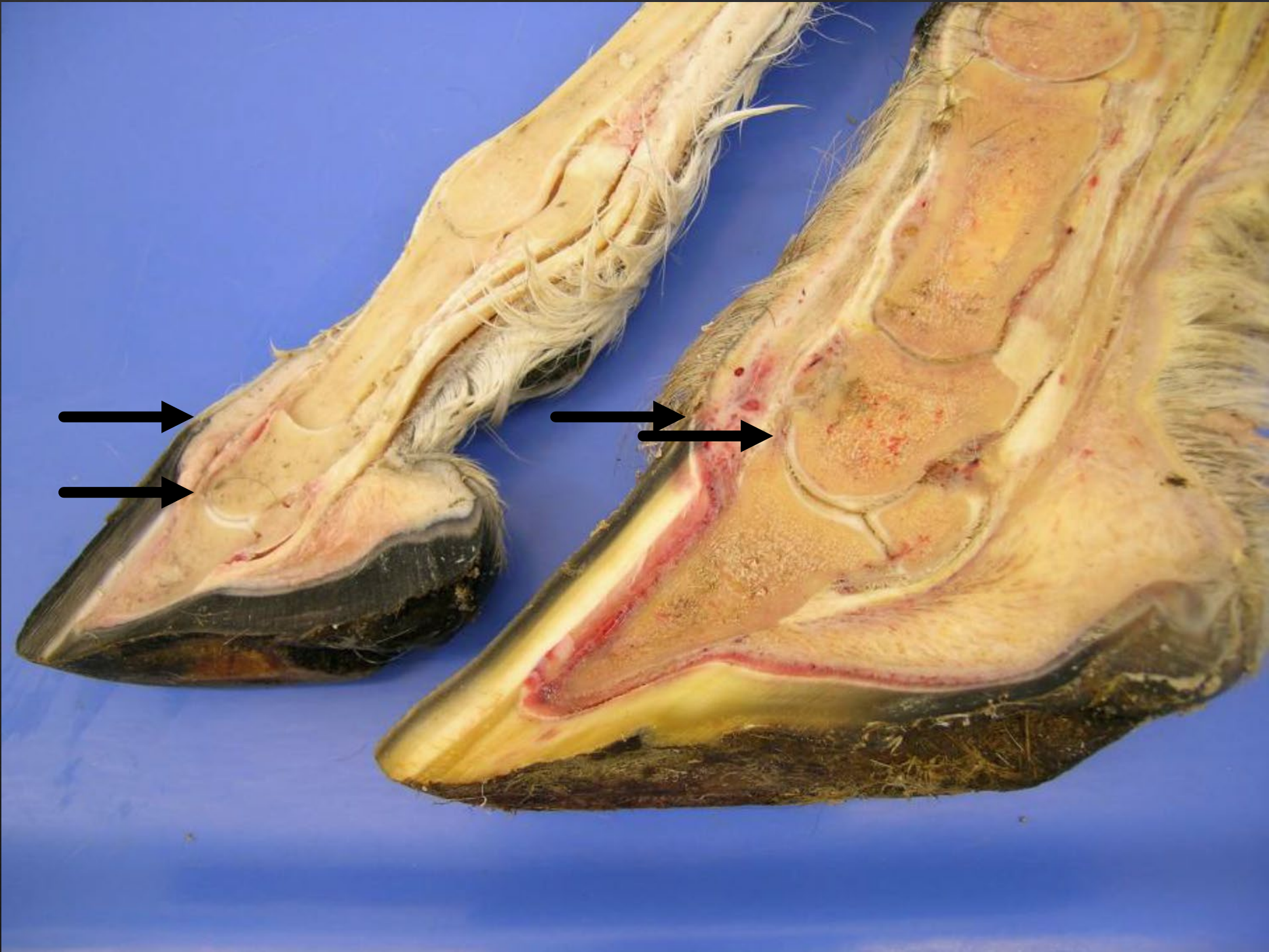


# Anatomical differences

- ◇ Pastern angles are very different from horses
- ◇ Foot shape differs requiring different trimming techniques
- ◇ Frog set more caudally
- ◇ Thicker hoof walls









**Donkey hooves are adapted for the desert...not  
upstate NY**







## Donkey teeth

- ◇ UK Donkey Sanctuary: dental disease is 2<sup>nd</sup> most common vet problem of the donkey (after disorders of the feet)
- ◇ Do not always see classic clinical signs of disease—need regular dental exams!
- ◇ A thorough oral exam is indicated as part of every clinical examination of a sick donkey
- ◇ Upper jaw (maxilla) is about 30% wider than lower jaw (mandible); in contrast to the horse where it is only 5-7% wider
  - ◇ This may contribute to overgrowths; pathologic or physiologic?
- ◇ Eruption of permanent incisors tends to be 6-8 months later in donkeys than in horses and ponies



# Age estimation

**Table 1. Comparison of age related dental features between the donkey and the horse [30,32-34]**

<b>Donkey</b>	<b>First (Central) Incisors</b>	<b>Second (Middle) Incisors</b>	<b>Third (Corner) Incisors</b>
Deciduous Incisors	0 - 2 weeks of age	2 months	12 months
Permanent Incisors	3 - 3-1/2 years	4 years	5 - 5-1/2 years
Appearance of the Dental Star (Inferior Arcade)	3-1/2 - 4 years	4 - 4-1/2 years	5-1/2 - 7 years
<b>Horse</b>	<b>First (Central) Incisors</b>	<b>Second (Middle) Incisors</b>	<b>Third (Corner) Incisors</b>
Deciduous Incisors	0 - 1 week of age (6 days)	4 - 6 weeks (6 weeks)	6 - 9 months (6 months)
Permanent Incisors	2-1/2 years	3-1/2 years	4-1/2 years
Appearance of the Dental Star (Inferior Arcade)	5 years	6 years	7-8 years







# Other Anatomical Differences

- ◇ Narrower nasal passage and deeper pharyngeal recess can make passing a stomach tube more difficult
- ◇ Donkeys do not have chestnuts in the rear
- ◇ Ergots tend to be more prominent
- ◇ Male donkeys have teats on their sheath
- ◇ Thick muscle over the entire jugular vein can make blood draws and injections more difficult
- ◇ Flatter withers—cannot hold saddle as well
- ◇ And more...



# Normal physiological parameters

	Pulse (beats/min)	Respiration (breaths/min)	Rectal Temp (°F)	Reference
<b>Horse</b>	28-44	8-15	99-101	Smith, B.P. (2020) LA Int Med, Elsevier, St. Louis, MO
<b>Donkey</b>	31-53	13-31	97.7-99.9	Burden F, Thiemann A. Donkeys are different. J Eq Vet Sci 2015; 35:376-382
<b>Mule</b>	29-37	8-16	98.8-100.6	Brooke. The working equid veterinary manual. 8 <sup>th</sup> ed. Essex (UK); Whittet Books Ltd; 2013. p. 15.



# Veterinary care: other considerations

A light-colored donkey, possibly a Burro, is shown in profile, facing right. It is wearing a dark halter with a metal ring on its nose. The background consists of a wooden and wire mesh fence, suggesting a stable or barn environment. The lighting is somewhat dim, and the overall tone is muted.

- ◆ Must understand the differences in behavior
- ◆ Subtle cues are important
- ◆ Many reference ranges differ from those for the horse
- ◆ Donkeys have a less developed cough reflex
- ◆ Hyperlipidemia (complex metabolic disturbance) common in donkeys; especially with concurrent clinical issues
- ◆ Differences in drug metabolism
- ◆ Increased risk of hemorrhage during castration
- ◆ Reservoir host for equine lungworm
- ◆ Susceptible to *Parascaris equorum* (equine roundworm) even as adults



# Donkey welfare

- Recognizing their differences is step one
- Meeting their basic needs is important
- But what makes a donkey happy?



## ENVIRONMENT ENRICHMENT



THE DONKEY SANCTUARY'S GUIDE TO ENRICHING  
THE LIVES OF DONKEYS AND MULES



"Are my donkeys happy?" - a question that most donkey carers ask themselves from time to time. Often, donkeys are well fed and physically want for very little, but once their basic needs have been met is there anything more that can be done to help donkeys and mules enjoy their lives with us?

**> Find out more  
inside**





# Housing for Donkeys

- ◇ Difference in behavior means housing can be quite different than that required for horses
- ◇ Open areas
- ◇ Entrances/Exits
- ◇ Height of stalls
- ◇ Bedding
- ◇ Footing



# Housing







# Housing



# Housing







## Donkeys vs Mules: Shelter Use





## Grooming/Enrichment



# Conclusions – (Don)Keys to success

- ◆ Donkeys are not small horses with big ears
- ◆ Remember their desert origins
- ◆ Be patient, have fun





# Trusted donkey resources:

- ◆ Clinical Companion of the Donkey: <https://www.thedonkeysanctuary.org.uk/what-we-do/for-professionals/resources/clinical-companion>
- ◆ Clinical Companion of Donkey Dentistry: <https://www.thedonkeysanctuary.org.uk/what-we-do/for-professionals/resources/clinical-companion-dentistry>
- ◆ Donkey Care Handbook: <https://www.thedonkeysanctuary.org.uk/what-we-do/knowledge-and-advice/for-owners/donkey-care-handbook>
- ◆ Health and welfare: <https://www.thedonkeysanctuary.org.uk/what-we-do/knowledge-and-advice/for-owners/donkey-health-and-welfare>
- ◆ Feeding Advice: <https://www.thedonkeysanctuary.org.uk/what-we-do/knowledge-and-advice/for-owners/feeding-your-donkeys>
- ◆ Donkey Welfare Symposium: <https://vimeo.com/donkeywelfare>



# THANK YOU!



“To be yourself in a world that is constantly trying to make you something else is the greatest accomplishment.”

-Ralph Waldo Emerson