

A photograph of a brown mule or donkey standing in a grassy field. The animal is facing left and has a dark brown coat with some lighter patches. It is wearing a dark halter with a silver bell. A person's leg in blue jeans is visible on the right side, holding a dark lead rope. In the background, there is a white barn with red trim and a dark doorway. The text "Preventative Health and Nutrition of Mules and Donkeys" is overlaid in white, bold, italicized font across the middle of the image.

***Preventative Health and Nutrition
of
Mules and Donkeys***

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Intro to Preventative Health and Nutrition of Mules and Donkeys

- The key to preventative health care of mules and donkeys is knowing their behavior!
- When an owner notices signs of a donkey being ill, it's often too late, especially in terms of colic
- Mules tend to exhibit more signs of pain but still those signs may be subtle
- Mules and donkeys are very stoic animals, an intuitive owner will be able to pick up on any behavioral changes
- Some research has suggested higher levels of pain tolerance



Intro to Preventative Health & Nutrition of mules and donkeys

- Very little of what we know about the care of mules and donkeys comes from research.

- Will share:

- Personal Experiences
- Studies
- Research Articles

- We will discuss management concerns associated with the well being of both donkeys and mules

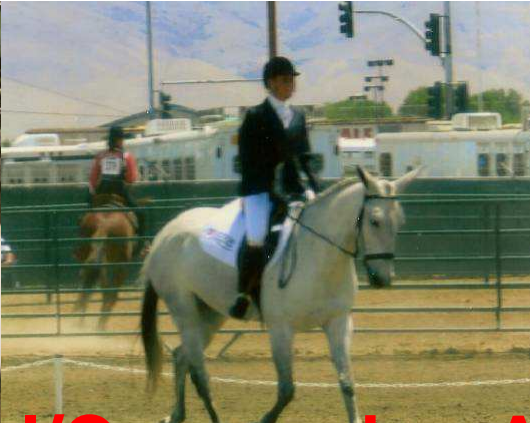
- Keeping in mind there is even less information available on mules



Beast of Burdens

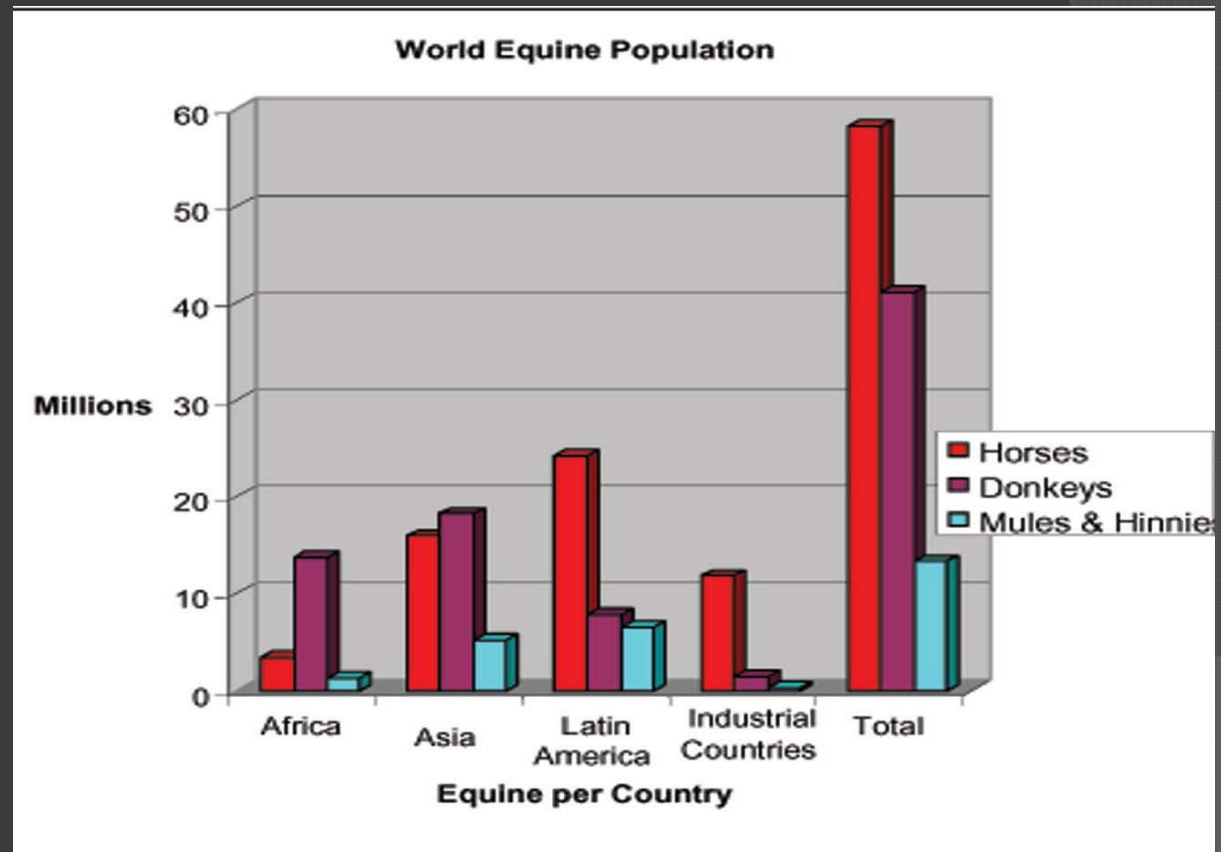


Recreational/Companion Animals



Introduction – To donkeys & mules

- Approximately 55 million horses in the world
- Approximately 54 million donkeys, mules & hinnies
- > 90% are working animals in developing regions of the world



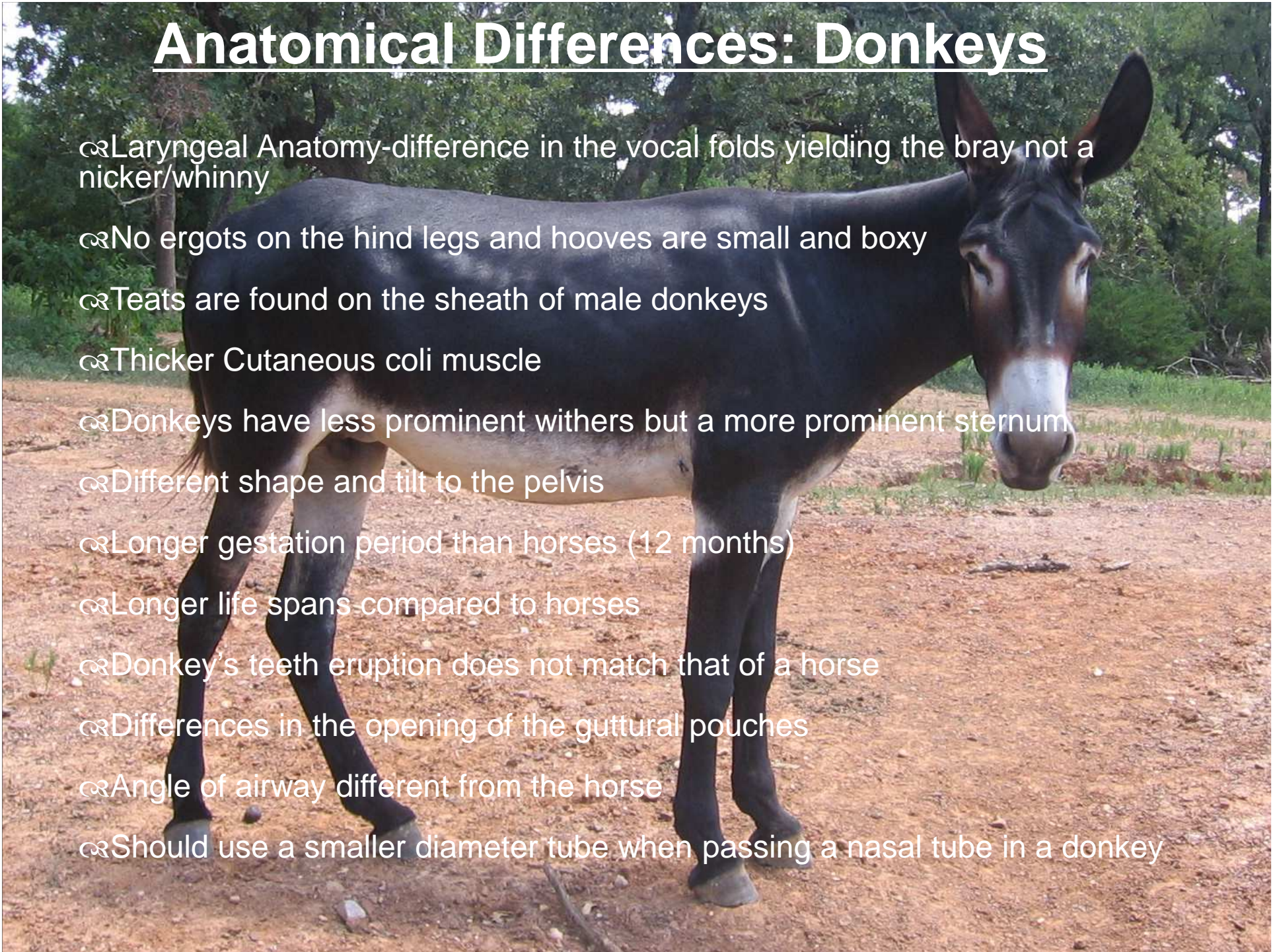
FAO Statistics, 2002

Anatomical Differences: Donkey vs. Mule vs. Horse



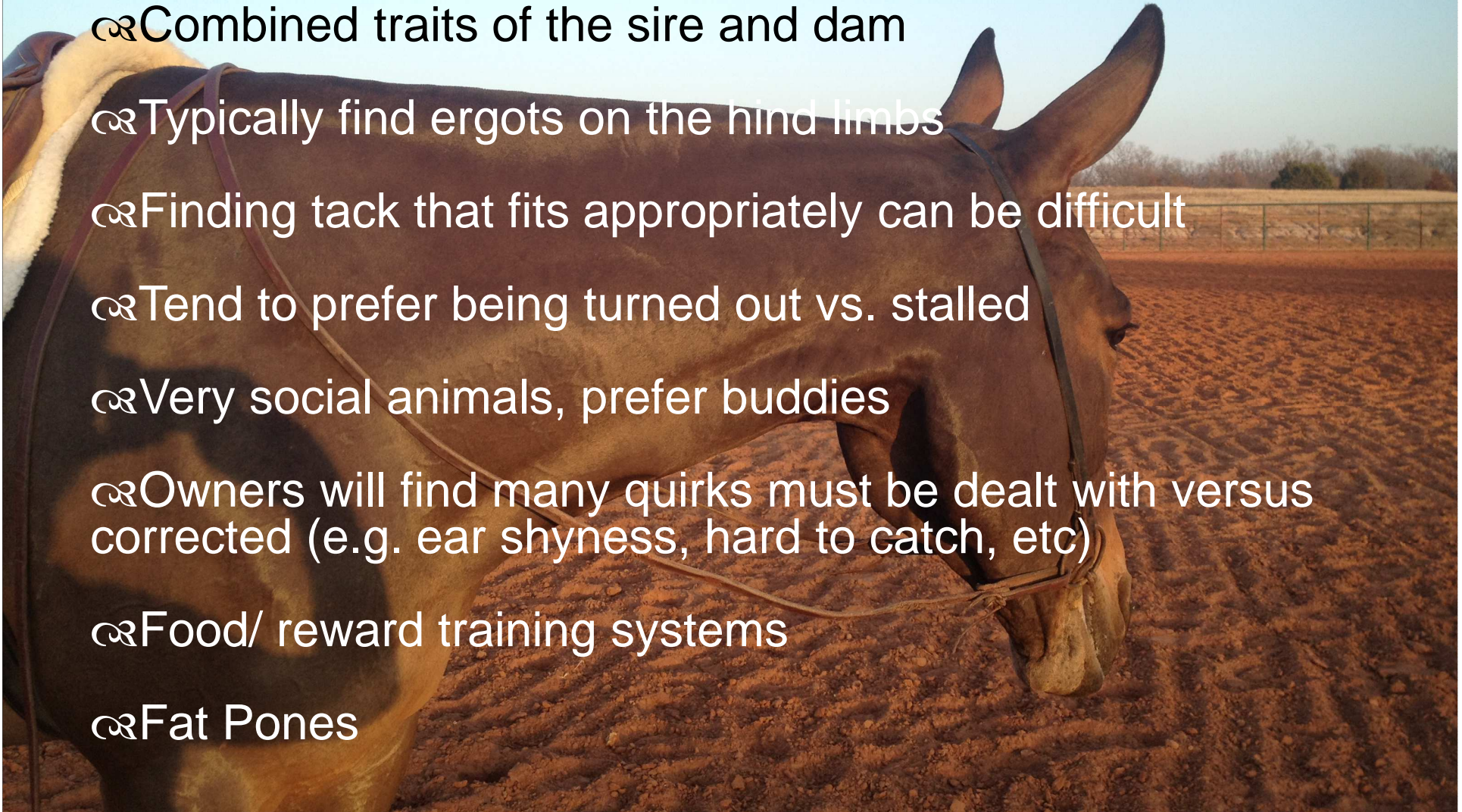
Anatomical Differences: Donkeys

- ∞ Laryngeal Anatomy-difference in the vocal folds yielding the bray not a nicker/whinny
- ∞ No ergots on the hind legs and hooves are small and boxy
- ∞ Teats are found on the sheath of male donkeys
- ∞ Thicker Cutaneous coli muscle
- ∞ Donkeys have less prominent withers but a more prominent sternum
- ∞ Different shape and tilt to the pelvis
- ∞ Longer gestation period than horses (12 months)
- ∞ Longer life spans compared to horses
- ∞ Donkey's teeth eruption does not match that of a horse
- ∞ Differences in the opening of the guttural pouches
- ∞ Angle of airway different from the horse
- ∞ Should use a smaller diameter tube when passing a nasal tube in a donkey



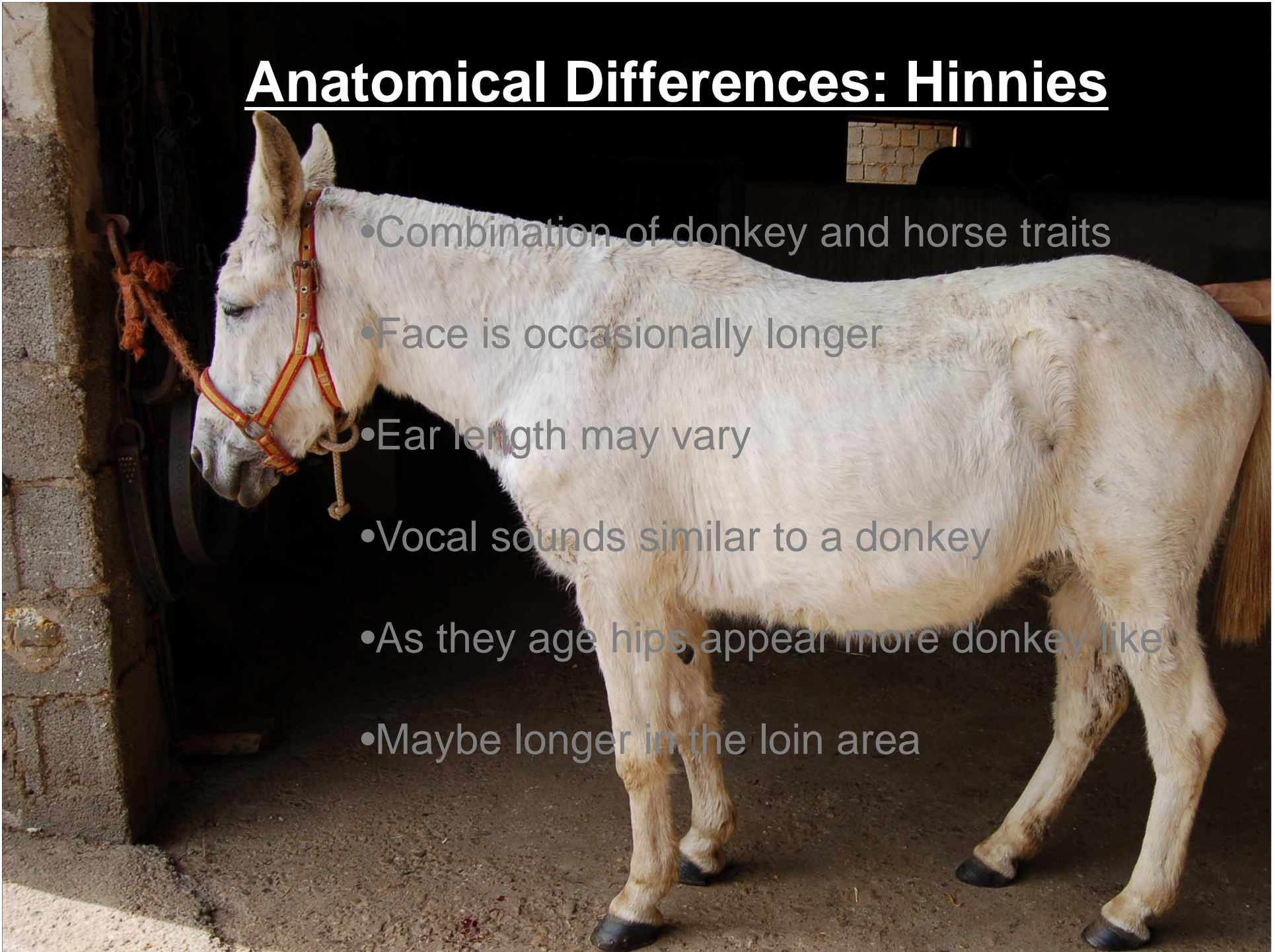
Anatomical Differences: Mule

- ∞ Combined traits of the sire and dam
- ∞ Typically find ergots on the hind limbs
- ∞ Finding tack that fits appropriately can be difficult
- ∞ Tend to prefer being turned out vs. stalled
- ∞ Very social animals, prefer buddies
- ∞ Owners will find many quirks must be dealt with versus corrected (e.g. ear shyness, hard to catch, etc)
- ∞ Food/ reward training systems
- ∞ Fat Ponies



Anatomical Differences: Hinnies

- Combination of donkey and horse traits
- Face is occasionally longer
- Ear length may vary
- Vocal sounds similar to a donkey
- As they age hips appear more donkey like
- Maybe longer in the loin area



Body Condition Scoring System

- Donkeys use Donkey Sanctuary/Anne Pearson's method 1 to 5
- Mules can use Henneke et al., 1983
 - Adipose tissue may vary across the neck, ribs and croup and use common sense



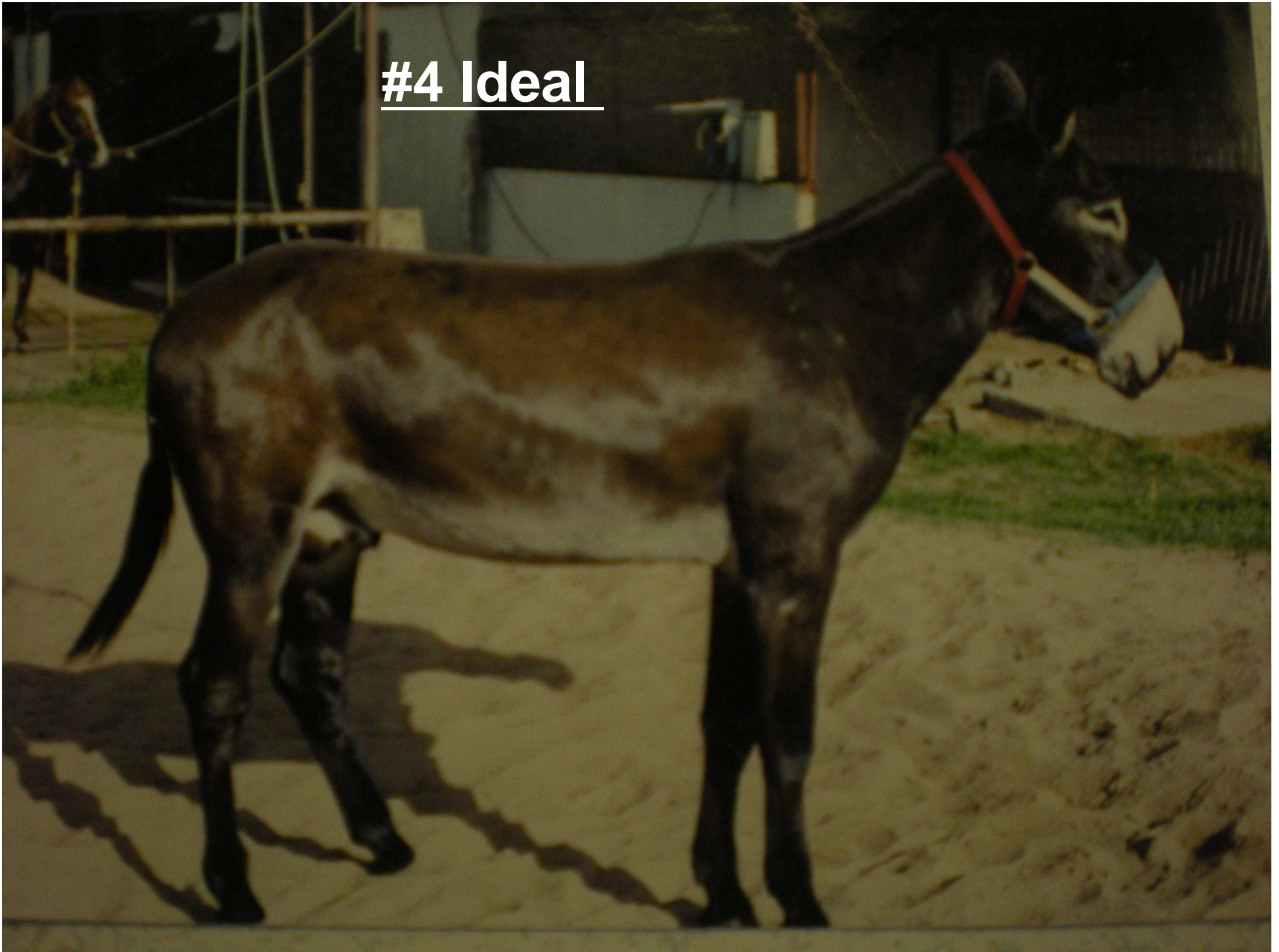


#1 - Thin

#2 Moderate



#4 Ideal



#4 Fat



#5 Obese



Feeding Behavior...

Grazing- preferred means of ingestion in adult equine

Browsing- seeking out specific plants (more common in donkeys) adopted when grass or grazing source is scarce

Donkeys tend to select (**browse**) for coarse grasses

Will readily consume plants with tannins

Greater danger of selecting poisonous plants due to consuming a larger variety of plants

Horses prefer legumes (clover or alfalfa) and grasses


Young plants (short grass) vs. more mature plants with greater fiber (steams)

Young plants or plants with increased leaf % increases intake/bite

Timothy and White Clover favorites

Bark, root, soil, acorns and aquatic plan

Nutritional Differences and Information:

- ⌘ Compared to small ruminants:
 - ⌘ Digest poor quality feeds, meaning feeds/forages that are high in fiber
 - ⌘ Can survive on less feed when compared to a horse
 - ⌘ Slower Gastrointestinal transit time
 - ⌘ Ability to recycle urea
 - ⌘ Continue to eat during dehydration/heat dissipation
 - ⌘ Diets in developing countries:
 - ⌘ Very high in fiber
 - ⌘ Low in protein
 - ⌘ Low in energy
 - ⌘ Donkeys often browse on a variety of plants including the bark of trees or wooden fences
 - ⌘ Not uncommon for donkeys to consume plants high in tannins
- 
- A photograph of a brown and white donkey grazing in a green field. The donkey is facing right, and its head is lowered towards the grass. The background shows a line of trees under a clear sky.

Nutritional Care and Recommendations

- #1 Rule when feeding mules and donkeys is to not OVER feed them!
 - This is generally not a problem in developing countries where they are still used as beast of burdens
- In general young, growing mules and some donkeys tend to be harder to keep weight on
- Once both have matured keeping weight OFF tends to be the issue if they are not being properly feed, exercised, or managed

Nutritional Care and Recommendations

THEY ARE NOT HORSES with BIG EARS!

- ∞ Monitor their grass intake
- ∞ Graze in the morning
- ∞ Limit grazing for minis and standards
- ∞ Mules generally all day, may need grain supplement
- ∞ Feed based on weight and not volume
 - ∞ **BUT MONITOR BODY CONDITION**
 - ∞ **And** Feed at the rate of least
1/2 the recommended rate for horses



Nutritional Care and Recommendations

∞ High Fiber and Fat diets work well for both Mules and Donkeys

∞ Don't over feed Carbohydrates and Protein

∞ Donkeys have a unique ability to recycle high levels of urea

∞ Don't attempt to rapidly decrease weight!

Can lead to hyperlipidemia then hyperlipemia!

∞ Watch for laminitis in hind limbs 1st



Nutritional Care and Recommendations

- In 2007 Nutritional Requirements for Donkeys were included in the **National Research Council for Nutrient Requirements of Horses 6th edition**
- However, no to little nutritional information is available for feeding mules!



Species Difference Blood Chemistry: Donkeys, Mules, Hinnies and Horses



○ Many differences in blood chemistry:

- Red Blood Cells
- Hemoglobin
- Hematocrits
- Mean corpuscular volume
- White Blood Cells

Species Difference Blood Chemistry: Donkeys, Mules, Hinnies and Horses



- Many differences in blood chemistry:
 - Magnesium
 - Creatine
 - Glucose
 - Fibrogen
 - Triglycerides
- Enzymes:
 - Creatinine phosphorus
 - Aspartate Aminotransferase
 - Lactate dehydrogenase
 - Gamma Glutamate transferase

Species Difference: Donkey Blood Chemistry



- Donkeys lack the presence of reticulocytes
- Fewer but larger erythrocytes
- Higher mean value for corpuscular volume (MCV)
- Serum lactate dehydrogenase higher for miniature donkeys
- Higher plasma triglyceride levels
- Liver enzymes higher (creatinase and glutamyltransferase)

Species Difference: Mule Blood Chemistry



- ❧ Higher Mean value for corpuscular volume (MCV) ~48.4
- ❧ Lower White Blood Cell count (5.86)
- ❧ Lower Lymphocytes (2.9)
- ❧ Lower monocyte (0.29)
- ❧ Red blood cell tend to be lower than horses (6.74)
- ❧ Mean Platelet volume tends to be lower (8)

**Recommend getting a copy of the AAEP Proceedings from 2002/vol 48: In Depth Mule/Donkey Medicine and Surgery*

Species Differences TPR: Donkeys, Mules & Hinnies



- Donkey:
 - T= Temperature: 98.6° F (lower than a horse)
 - P= Heart Rate ~ 48 bpm
 - R= Respiration ~ 21 breathes/min
- Mule:
 - T = 99.18 (similar to a horse)
 - P = 43.3 bpm
 - R = 34.5 breathes/min
- Hinny:
 - T = 98.7 (closer to donkey)
 - P = 42.6 bpm
 - R = 29.5 breathes/min

(McLean et al., 2014)

Other Management Areas: Health Care

- ⦿ Consider using a de-wormer at least 1x a year with Ivermectin
 - Lungworms
- ⦿ Donkeys are susceptible to skin parasites- lice and flies
- ⦿ Jack sores treated with ivermectin or moxidectin due to stomach worm (Cutaneous habronemiasis)



Pharmacokinetics in Long ears

- Anesthetizing donkeys and mules proves to be different than horses
 - Various genetic backgrounds
 - Some meds may cause respiratory problems
- Quicker to metabolize pharmaceutical products
 - May give more frequently
 - May need larger dose
- May need to use a larger dose
Example: Mini Donkey
Mule

Refer to the AAEP Proceedings/Vol 48/2002 "Anesthesia of donkeys and mules: how they differ from horses" by Dr. Nora Matthews

Other Management Areas: Health Care

- Beware of keeping donkeys in wet conditions often leads to hoof issues (i.e. abscesses, white line disease)
- Watch for founder/laminitis on the hind hooves as well as the front
- Caution should be exercised when castrating jacks so they don't bleed to death
 - Speak with your veterinarian about ligating
 - Or tying off the spermatic vessels



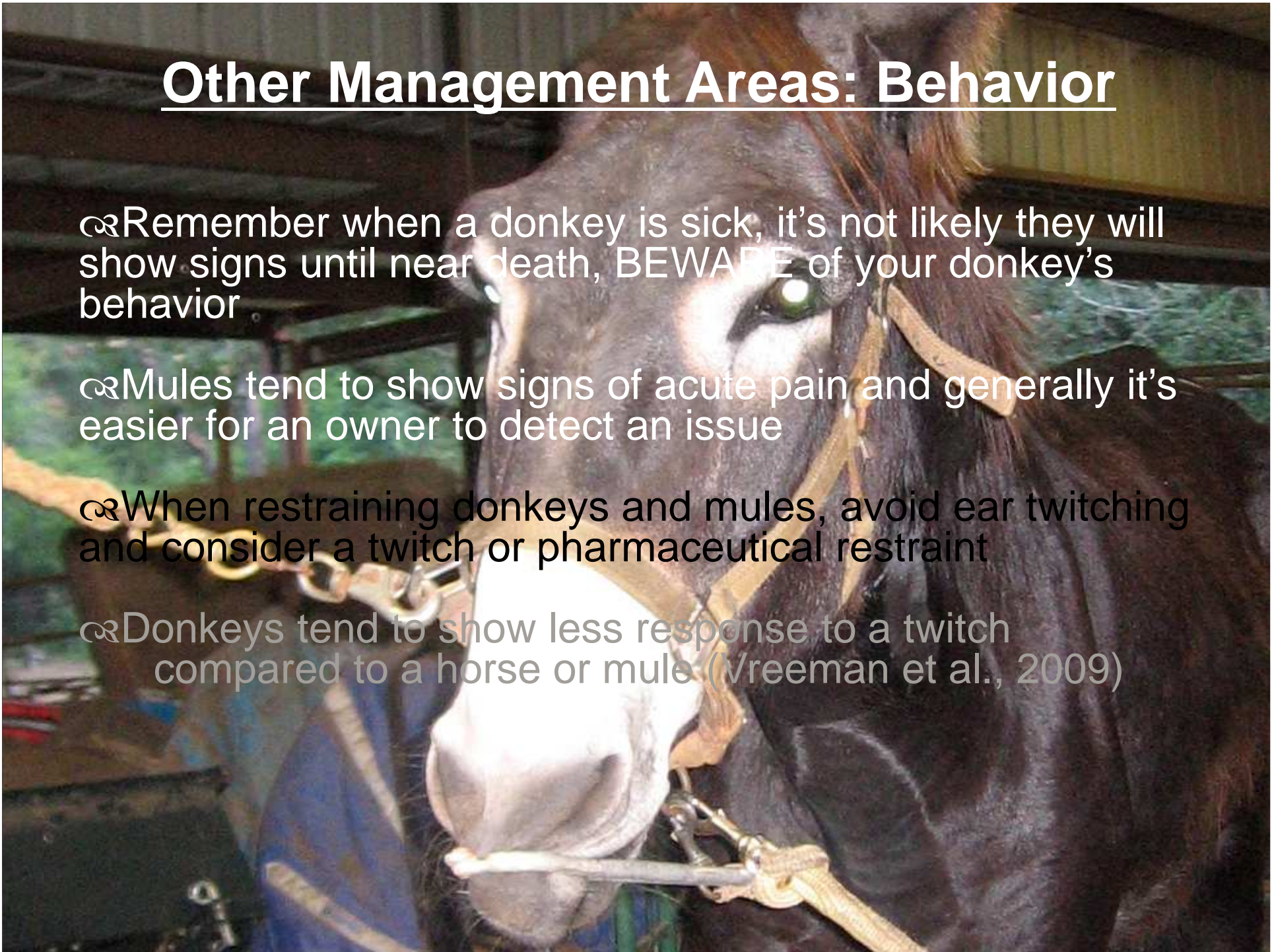
Other Management Areas: Behavior

⌘ Remember when a donkey is sick, it's not likely they will show signs until near death, BEWARE of your donkey's behavior

⌘ Mules tend to show signs of acute pain and generally it's easier for an owner to detect an issue

⌘ When restraining donkeys and mules, avoid ear twitching and consider a twitch or pharmaceutical restraint

⌘ Donkeys tend to show less response to a twitch compared to a horse or mule (Vreeman et al., 2009)



Other Management Areas: Behavior

- When working with both donkeys and mules remember to be patient!
-
- Try the reward system- food
- Be smarter than your mule or donkey, so think your plan through before attempting to execute it
- Donkeys and mules hardly ever forget so once they've had a bad reaction or got away with something they will not forget
- Get your hands on your mule foal! Don't wait until it's a yearling to touch it



Other management areas: Reproduction

- ⌘ Consider behavioral differences when breeding
 - ⌘ Sensitive to environment
 - ⌘ Don't be in a rush
 - ⌘ Not all jacks will breed mares vice versa jennies\
 - ⌘ Some maybe very aggressive
 - ⌘ Jack semen doesn't freeze like stallion semen
- ⌘ Some jennies may cycle all year
- ⌘ Beware of twinning in donkeys especially mammoths
- ⌘ NI maybe an issue in mule foals consider having the mare tested prior to foaling

Resources

∞ AAEP Proceedings

∞ www.ivis.org/proceedings/aaep/2002/910102000110.PDF

∞ www.ivis.org/proceedings/AAEP/2002/910102000102.PDF

∞ www.ivis.org/proceedings/aaep/2002/910102000115.PDF

∞ www.ivis.org/proceedings/aaep/2002/910102000113.PDF

∞ Donkey Sanctuary,

∞ <http://www.thedonkeysanctuary.org.uk/>

∞ International Veterinary Information Service <http://www.ivis.org/home.asp>

Thank you,

TLAXCALA
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