

CAPTIVE REARING OF EASTERN COTTONTAIL RABBITS



Lisa Fosco (*Elisa*)
Director of Animal Care
Walden's Puddle, Nashville TN

BABY RABBITS...



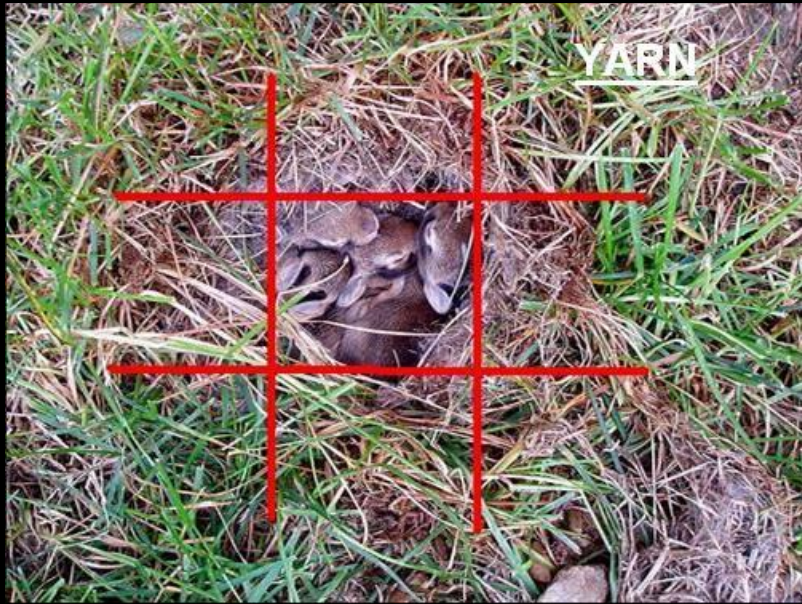
- **Have no scent**
- **Cannot be moved**
- **Are rarely orphaned due to nest disturbance**
- **Are easily found in urban/populated areas**
- **Are abundant in residential habitats**
 - **Commonly in 'dog yards'**
- **Seem poorly guarded during the day**
- **Are likely the most commonly kidnapped North American mammal species**

WORKING WITH THE PUBLIC



The only rabbits that should be accepted are those...

- Caught by a cat**
- With visible injuries**
- Attracting flies**
- With a dead adult within 15ft of the nest**
- With confirmed absence of the mother for one entire night**



DEVELOPMENTAL CONSIDERATIONS

- **Birth weight 26-34g***
- **Eyes open**
 - 9.5 days in the wild
 - 7 days in captivity
- **14 days**
 - Fully furred
 - Eliminating on own
- **21 days**
 - Reliably self feeding
 - Eyes bright and alert
 - Reportedly “weaned”
- **26 days**
 - Actual age rabbits are observed dispersing from unmolested nest sites



DEVELOPMENTAL CONCERNS

Rabbits...

Have no functional pancreas until after they disperse from the nest.

- Pancreatic enzymes are necessary to break down sugars and starches.
- Feed ONLY formula, greens, and rabbit pellets.
- Fruits and vegetables CAN NOT be broken down or digested.



DEVELOPMENTAL CONCERNS

Rabbits...

- Are born with a benign gut with a neutral pH
- This environment is vulnerable to almost any pathogen



- » Clean cage floor at all times
- » Fresh (uncontaminated) greens
- » CLEAN FEEDING EQUIPMENT
- » Pay extra attention to cleanliness when working with baby rabbits!

DEVELOPMENTAL CONCERNS

Rabbits...

- Are hind gut fermenters and have a caecum.
- The caecum contains unique flora (yeast, enzymes, and bacteria) that helps digest their high fiber diet.
- Unbalanced digestive flora affects digestive efficiency and therefore reduces the actual caloric intake.

DEVELOPMENTAL CONCERNS

Rabbits...



- Have bladders that can easily hold very large volumes of urine compared to other mammals.
- This is the reason that they **MUST** be stimulated to be accurately weighed!
- Adults and sub-adults rely on caecotropes for optimal nutrition.

COMMON (WIDELY ACCEPTED) MYTHS...

- “Rabbits are easily stressed and have an accepted high mortality rate when reared in captivity.”
- “They usually die, so prepare yourself before you even try.”
- “Handle them as little as possible!”
- “They usually get diarrhea before they die.”
- “They do not take formula well, do the best you can, it’s all you can do.”

MY THEORY...

Stress is rarely the cause of mortality in captive E. C. rabbits.



Actual Caloric Intake is the limiting factor of successfully 'growing' healthy Eastern Cottontail Rabbits.

***In the 2 years following our study period,
OWC admitted 1310 / 1292 Cottontails***

***79% / 84% (-DPE) were reared successfully and
released***

OUR (CLEAN) STATS FOR THE PAST 3 SEASONS...

2016: (378) 35.71%

2017: (173) 43.03%

- Aggressive reuniting enforced
- Seasonal limits implemented

2018: (109) 69.02%

- Smooth running reuniting protocols
- Seasonal limits in place
- 1st full season with new protocols implemented





**Captive Rearing
Considerations**

INTAKE

- ❑ Stimulate elimination in newly admitted rabbits of any age
- ❑ Record accurate body weight (preferably in grams)

Once warm and stable...

- Hydrate *aggressively*
 - Oral Fluids
 - Pedialyte™ or equivalent (10% bw)
 - Injectable Fluids
 - Administer a bolus of **warm** SQ fluids
- Evaluate and do a quick gross exam on each animal



PHYSICAL EXAM CONSIDERATIONS



- Body Temperature
- Overall attitude
- General body condition
- Eyes
 - Clarity, blood, nystagmus
- Mouth
 - Teeth Alignment
 - Color of mucous membranes
 - Pink and moist is best
- Fullness of belly
 - milk line vs. bloat
- Fullness of bladder
- Any sign of diarrhea
- External parasites
- Wounds
 - Often found by feeling dried blood



IDENTIFICATION MARKS



We have tried many methods.....

IDENTIFICATION MARKS

We have had the best results using the following:

- For low numbers- **permanent marker** dot on inside of ear.
- For higher numbers-
 - Pet quality (non-toxic, quick dry) **nail polish**
 - Pet hair dye
- Each group is assigned a color and a whole foot is polished.
- i.e. If there are 5 litter or cage mates, they may be marked as:
 - RIGHT FRONT ORANGE(RF)
 - LEFT FRONT (LF)
 - RIGHT REAR (RR)
 - LEFT REAR (LR)
 - RIGHT EAR (RE)



FEEDING CONSIDERATIONS

- The first 2 feedings should be (uncontaminated) electrolytes followed by undiluted formula.
- If hand feeding, estimate and account for any formula not ingested.
- **Always feed *no less than 10% bw in grams.***
 - *i.e. Remove the last digit from the number of grams*
 - $100g = 100 = \geq 10cc$
 - $86g = \geq 8cc$
 - $42g = \geq 4cc$

FEEDING CONSIDERATIONS

- For hairless neonates, feed TID
- Once fully furred, and gaining weight daily, feed BID
 - TID for very thin rabbits
- If weight gain is not consistent, can add a third feeding until good weight curve or reliably self feeding
- **No change in weight after the first 24 hours should be interpreted as weight loss**
- **Feeding frequency should be based on weight gain**



FEEDING CONSIDERATIONS

**RABBITS
SHOULD
HAVE
FRESH
GREENS AT
ALL TIMES!**



Case # 164

Cage / Location: AQ 18

ID. MARK R ear green

Meds: Yes, see chart None

Eastern Cottontail Rabbit

Feeding Plan BID

Date	Weight	Time		Amount	Stim (u/f)	Notes	Init.
4/22	69.2g	10:15am	<u>Ped</u>	7cc (T)	U++		
		2:40	<u>Ped</u>	7cc	U/F		
		9pm	100P	7cc	U		
4/23	69.0	8am	100P	7cc (T)	U/F		
		7:45	100P	7cc	U		
4/24	73.9	8:15am	100P	7.4cc	U		
		6:50	100P	7.5cc	U		
4/25	82.1	8:45	100P	8.3cc	U		
			100P				

FEEDING CONSIDERATIONS

- All formula and feeding utensils should be handled and kept as aseptically as possible.....
- **The temperature of the formula must be monitored closely**
 - 100°-102°F (~38°C) is optimal
 - Temperature is critical **as ingested!**
 - Common issue in rehabilitation
- **Probiotic Considerations**
 - *We typically do not use, but if so I have had the best results with full fat greek yogurt regardless of age*

FORMULA CONSIDERATIONS

Fox Valley™ 32/40

OR

1 part KMR™ : 1 part Ultra-Boost™ : 2 parts Water



RABBIT HOUSING



Eyes CLOSED



Eyes OPEN





NEWBORNS AND INFANTS (0-10 DAYS)

- Feed 2* times daily.
- Space 6-8 hours between feedings.
- ALWAYS feed until total amount consumed is no less than 10% bw in grams.
- Stimulate at every feeding.



10-14 DAYS

Development

- Fully furred
- Eyes and ears open
- Should still be stimulated at every feeding

Feeding

- Offer solid food (fresh greens) as soon as eyes open on the eldest rabbit in the group
- Continue to feed formula BID until rabbit begins to nibble
- Keep fresh greens available at all times and offer rabbit pellets



10-14 DAYS

Additional Considerations

- Cover nest (in heated area of cage for weaker rabbits) with a small 'hidey box'
- Monitor hydration status, injectable fluids may be helpful
- Keep cage clean and dry
 - they tend to randomly nibble on the ground
 - Very susceptible to *E. coli* and *Clostridium* spp



14-21 DAYS



Development

- Fur is filling out and eyes are bright
- Mobile / exploring space
- Daily weight gain increasing significantly
- Drinking
- Responsive to visual and tactile stimuli
- Learning / absorbing sensory and environmental information

Feeding

When wt is increasing consistently and nibbling behavior is observed / evident, ↓feeding to SID, with meals no more than 8 hours apart.

Closely monitor weight, if no gain in 24 hours, feed BID for 2 more days before trying again.



14 - 21 DAYS (WEANING)

- This age has a relatively high mortality rate
- Cage MUST be clean and dry
- Fresh greens* should be available at all times
- Ideally, a pile of greens that is 3X the body size of the group should be offered again at night
- Move outdoors as early as possible, even if supplemental heat is necessary
- Weight curve should be watched closely and is the best indicator of true health status



Food items should be chosen to maximize fiber and minimize carbohydrates and sugars



ACCEPTABLE FORAGE FOODS

- Clover
- Dandelion
- Fresh and dried field grasses
- Timothy hay

ADDITIONAL FOOD ITEMS

- Rabbit pellets
- Dark green leafy vegetables
 - Kale, green/red leaf and romaine lettuce, carrot tops
 - Parsley and cilantro (in small amounts to avoid soft stool)
 - Rose petals

UNACCEPTABLE FOODS...

- Iceberg lettuce
- Any kind of fruit
- Any kind of root vegetables
 - Carrots, radishes, yams, beets, etc
- Nuts
- Grains (including corn)
- Seeds or seed mixes

WEANING RABBITS OFF FORMULA

- Contrary to most other species, rabbits should never be aggressively weaned.
- Because caloric intake is so critical to their early survival, diet should be supplemented with formula until consistent weight gain is confirmed.
- Body weights should not be used to determine age or weaning plan, only use **changes** in weight.
- If body weight does not increase DAILY, do not decrease formula!

Remember... no change in weight is considered a **loss and formula should be given TID!!!**



ADDITIONAL CONSIDERATIONS BASED ON TRENDS OBSERVED



- Minimum release weight 140g*.
- Rabbits over 165g* must be housed alone!
- Those with abdominal wounds rarely survive (especially those <21 days of age).
- Compromised rabbits commonly have low levels of blood sugar, can stabilize with digestible forms of glucose.
 - i.e. 50% Dextrose PO
- Degloved tissue tends to heal very well.

ADDITIONAL CONSIDERATIONS CURRENTLY UNDER REVIEW

- **Diarrhea!!!**
 - Diet (Formula) vs. Husbandry (Bacteria)
- **Mineral Needs**
- **Water Quality**
- **Use of Caecotropes**
- **Antimicrobial Use**
- **Exercise Requirements**



IN SUMMARY...



- **Feed as much as you can! No meal should be less than 10% bw.**
- **Focus on the calories, not the stress factors.**
- **Get them outside as early as possible once self feeding.**
- **Always monitor body weight, it has proven to be the most reliable indicator in this species.**
- **A high mortality rate should NEVER be accepted as a standard, just a reason to try harder and learn more.**
- **Don't give up on them because they are rabbits, without them, the entire food chain suffers.**
- **We are their last resort, they deserve the best we can provide!!!**



*Thank
You!*