

# URINARY SLUDGE



IMAGE FROM MEDIRABBIT

## **Cause, clinical signs, treatment and prevention**

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# WHY IS THIS IMPORTANT TO YOU AND YOUR RABBIT?



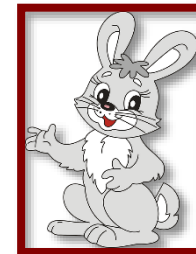
- Urinary tract disease
- Urinary sludge
- Scalding
- Urinary calculi
- Hematuria – blood in the urine

- Urinary problems are common in our pet rabbits.
- Significant source of pain.
- They can be a result of other conditions in your rabbit – these need to be addressed.
- We can do things to help treat your pets.
- There are things that can be done to help prevent this from happening.





# THE BORING STUFF – THE ROLE OF CALCIUM IN RABBITS.

- Calcium is the most abundant mineral in the body
- Found in bones, teeth – important for continued tooth eruption, muscles and blood.
- The absorption of calcium in the intestines is virtually complete – this makes the calcium levels directly proportionate to what your rabbit eats.
- Most other mammals excrete (get rid of excess calcium) through the intestines. Rabbits however, excrete their extra calcium through their kidneys and that goes to the bladder.
- Fun fact; a 2kg (4lb) rabbit can excrete more urinary calcium than an adult human!





# THE NORMAL BLADDER AND APPEARANCE OF RABBIT URINE

- In the normal rabbit – calcium going into the bladder forms calcium carbonate – when mixed with the alkaline urine, this creates very turbid urine. Normal looking rabbit urine.
- Calcium carbonate + alkaline urine = thick urine with particulates.
- Colour variation; can go from yellow  orange/brown  red. This occurs due to excretion of plant pigment.

## Plants that cause red urine;

- Beetroot
- Cabbage
- Broccoli
- dandelions

## Causes of red urine;

- Pigment from plant
- Infection
- Tumor – bladder or uterus
- Cystitis
- Sludge/stone in the bladder



# WHAT CAUSES CHANGES TO THE AMOUNT OF CALCIUM IN THE BLADDER?

- Young and pregnant rabbits produce clear urine
- Dehydration
- Housing
- Pain/discomfort
- Diet
- Phosphorous levels
- Urine retention



## Dehydration/blood flow to kidney

- When rabbits are dehydrated there is less fluid component in the urine therefore the turbidity in the urine is greater.
- Painful or stressed rabbits – have decreased amount of blood flow to their kidneys – this decreases the function of the kidney.



## Housing/pain/urine retention

- Wild rabbits urinate a lot but do not urinate in their burrow
- Solitary rabbits tend not to mark their territory the same thereby urinating less.
- Sedentary rabbits are often forced to urinate in a hutch – where they are housed. This is not their preference causing them to hold their urine as long as possible.
- Rabbits that are in pain – spondylitis, hock sores etc are reluctant to adopt the correct position to urinate – also results in holding their urine. This creates a more concentrated urine.

## Diet; phosphorus and calcium levels

- Phosphorus; when phosphorus levels are low – results in activation of a system that increases both phosphorus and calcium- excess calcium excreted in urine.
- Soils in parts of the world have lower phosphorus levels than others – causing hay and some veggies to be then be low in phosphorus.
- Calcium – as we know excess calcium is excreted in the urine
- Hay and veggies vary in the amount of calcium that they have – chart to follow.

# WHAT HAPPENS NEXT – WHEN WE HAVE ONE OR MORE OF THESE FACTORS

- There is increase in calcium carbonate ppt in the urine creating more turbid urine
- This is very irritating to the bladder and the urethra therefore resulting in painful urination – leading to further urine retention.
- When there is sediment in the urine – rabbits tend to void the supernatant (the liquid portion of the urine) they retain the sediment – creating sludge.
- This leads to
  - secondary bacterial infection
  - Painful urination
  - Incontinence issues



# WHAT ARE THE CLINICAL SIGNS ?

- Depression
- Hunched posture
- Painful urination – voiding small amounts
- Painful when the bladder is palpated
- Urine scalding
- The urine can look normal – or can have a pasty appearance
- Teeth grinding
- Decrease appetite
- Decrease in fecal production
- Drinking more than normal
- Peeing in abnormal spots

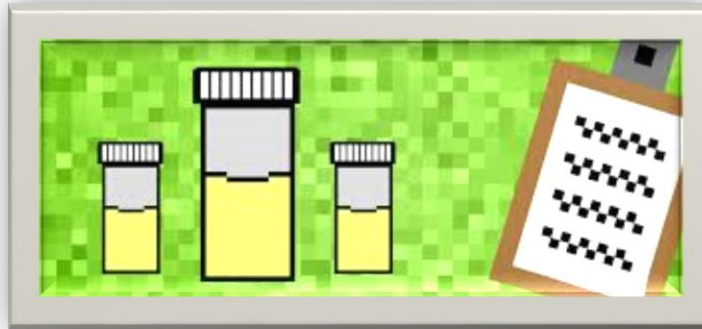




# DIAGNOSIS

## Physical examination;

- Abdominal palpation – sometimes expressing the bladder
- Location of pain/discomfort
- Examine the mouth/molars
- Assess mobility
- Urinalysis
- Radiographs
- Discuss husbandry
- Discussion of diet
- Testing for e-canaliculi
- Blood work



# TREATMENT

- Identify and treating the underlying condition
- Pain control
- Clean perineal area if there is scalding
- Under GA or sedation – expression of bladder to void the sludge from the bladder. This is very irritating and distressing for a rabbit therefore pain medication or GA is necessary (remember pain and stress decrease blood flow to kidneys)
- Antibiotics for secondary infection
- Clean dry bedding
- Increase water intake
- Diet!!! Increase the amount of greens – there are some that we want to avoid or use in lower amounts, and other greens we want to increase.



# GREENS – WHAT GREENS TO FEED,?

- Greens that can act as diuretics;
  - Dandelion – this is higher in calcium so use in moderation
  - Goosegrass
  - Pantain
  - yarrow

“For optimal health, an adult maintenance diet should contain sufficient, but not excessive, calcium (0.5%-1%) and the Ca:P ratio should be balanced between **1.2:1 to 2 :1**. A suitable diet must also contain vitamin D, which may be added to pellets or provided in dried vegetation such as hay. Commercial low-calcium diets that use timothy meal produce a pellet containing 0.4-0.8% calcium (i.e. Bunny Basics/T, Oxbow Hay Company).”  
LafeberVet

Select treats for adult rabbits and rodents that are high in fiber (\*), low in calcium, and low in carbohydrates and sugars.

## Calcium content of selected foods

Produce	Weight (grams)	Calcium (mg)
Carrots	110	36
Bok choy*	n/a	40
Chicory (Curly endive) *	n/a	40
Broccoli stalks	85	40
Garden cress*	50	40
Watercress*	34	40
Cabbage, green	89	42
Cabbage, red	89	45
Beet greens	38	46
Parsnips	133	47
Celery	120	48
Cucumber with peel	301	48
Broccoli	100	48
Brussels sprouts	100	48
Kiwi fruit	n/a	50
Swiss chard	100	51
Collard greens	36	52
Dock (Abyssinian spinach)	133	58
Mustard greens	56	58
Rutabagas	140	

Cilantro*	100	67
Celeriac (Celery root)	154	68
Pak-choi (Chinese cabbage)	70	74
Salsify (Goatsbeard)	133	80
Okra	100	81
Parsley	60	83
Borage (Starflower)	89	83
Kale	67	90
Dandelion greens	55	103
Turnip greens	55	104
Beet greens	100	119
Arugula	n/a	125
Scotch kale	37	137
Dill weed	100	209
Lambsquarter	100	309
Mustard spinach	150	315



Content of raw vegetables. Available at [rotcafe.com/f/calevel.html](http://rotcafe.com/f/calevel.html). Accessed Oct 4, 2009.



# SUMMARY

- Urinary sludge is frequently seen in our rabbits
- The problem may not just be bladder/kidney related – look for underlying problem.
- Pain control is vital
- Sludge can successfully be excreted.
- Dietary regulation of calcium, phosphorus and water intake is critical.



# THANK YOU

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