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Q An exceptionally beautiful Quarter Horse eats a banana, goes into uncontrollable muscle spasms and paralysis, suffers irregular heartbeat and obstructed airways, then topples over and dies. What was wrong with the banana?

A What was wrong with the horse? It had a defective gene--the same one responsible for its beautiful musculature--giving it "Hyperkalemic Periodic Paralysis." Evidence suggests these horses inherited the gene from one particular Quarter Horse stallion, Impressive, used as a stud in the 1970s and 1980s. Impressive was famed for his outstanding musculature, and since this trait was passed to his offspring, he became a popular stud. Unfortunately it is now known that the disease HYPP has passed through his genetics as well, affecting 50,000 horses, or .25% to .40% of Quarter Horse bloodlines. The defect is found in the DNA coding for the protein that regulates the concentrations of sodium and potassium on either side of cell membranes. Also called a sodium-potassium pump, this mechanism keeps sodium in high concentrations outside the cell, and high potassium concentrations inside the cell. When the pump opens to allow the passage of these two elements, the rush to balance the concentrations on either side of the cell causes an electric charge, which in turn allows for muscle contraction. Unfortunately in horses with HYPP, the sodium leaks into the cell at a faster rate, which alters the time it takes to build up voltage for a muscle contraction. During an attack, the blood is saturated with potassium in an effort to maintain the equilibrium.

The effects of this defect are apparent in the most common symptom of the disease: muscle trembling. Other signs are: prolapse of the third eyelid, stiff jaw, increased respiratory rate, generalized weakness or specifically weakness in the hind end (dog-sitting), complete collapse, and an abnormal whinny. These symptoms are visible only during an attack. The high potassium concentration is exclusive to an attack as well, and under normal conditions an afflicted horse would

show regular blood potassium levels. Tests can be done to identify the gene, so it could be eliminated in a single generation. Horse owners, however, may not want to get rid of the gene, which adds to the muscling of the Quarter Horses, raised as much for show as for racing. Alternatively, the disease can be controlled via diet (i.e. low potassium) and diuretics.

Q Are there any liquid herbicides available (natural or chemical) that can be applied to pastures without having to keep horses off of the pasture until it rains significantly (1 inch)? Any advice would be appreciated.

A Yes, there are herbicides you can use on horse pastures that do not require a long grazing restriction. However, it is most important to select an herbicide based on the type of weed you are trying to control. Some herbicides have greater efficacy on certain weeds, and do not control other weeds at all.

For information about this, contact your Cooperative Extension county agricultural agent for weed identification and recommendations for your specific location and situation. Remember that some of the herbicides listed are restricted use and must be applied by a licensed applicator. It is also important to note that on pastures, regular mowing can be a very effective form of weed control. Mow weeds before they go to seed and many will die out, while grasses will thrive with the extra mowing. However, you do need a good stand of grass to replace the weeds, so make sure your pastures are healthy and soils are tested and limed/fertilized according to the soil test results. Good, lasting weed control is a matter of maintaining pastures so that the grasses out compete the weeds. Otherwise you will find yourself spraying frequently.

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For more information, consult the following resources which can be found online:

Rutgers Fact Sheets:

- Grazing Restrictions for Pasture Herbicides
- Establishing and Managing Horse Pasture
- Equine Pasture Management “A Year-Round Approach”

Penn State Extension:

- Grazing and haying restrictions for grass forage and pasture herbicides

Q My 25 year old Saddlebred has been diagnosed with kidney disease. I was able to get him to eat rolled oats and a little bit of sweet feed and first cutting grass hay. He’s eating the hay well. However, I am not sure if this is the best low protein, phosphorus and calcium diet.

A You actually have the horse on a very good low protein ration right now. On the east coast, grass hay is usually less than 10% protein and less than 0.6% calcium if grown locally. Oats are about 12% protein; if lower protein is desired, you could use cracked corn (8 to 9% protein) instead. However, be aware that one “scoop” of corn will weigh almost twice as much as oats and provide more than twice the energy. Corn is actually a preferred feed choice for kidney failure, because it is a great source of calories with very little volume and extremely low calcium. Protein is only of major concern in advanced stages of kidney failure as a rule. The horse should definitely have access to a salt block and free access to water.

If your horse is maintaining weight on the current regimen, don’t change it. If it is underweight or losing condition, try switching (gradually) to the corn. If the horse’s hair coat starts to look dull and coarse, more protein may be needed. In that case, switch back to the oats or add in 4 to 8 ounces of soybean meal daily.

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