

HYPP and HERDA – Quarter Horse Genetic Diseases and their affect on the Alberta Quarter Horse Industry

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Summary:

HYPP and HERDA are two genetic diseases that have been attributed to the Quarter Horse breed and as such have created tighter restrictions on DNA testing and registration within the Quarter Horse registries. Currently restrictions are in place that requires all progeny of Impressive, to be DNA tested and the results affect the saleability of these horses.

Introduction:

This genetic link has affected the prodigy of two prominent stallions in the QH industry, mainly Impressive (#0767246) and also Poco Bueno (#0078081). [1] With increased testing and tighter registration guidelines buyers and sellers in Alberta are gaining awareness of these diseases and may choose not to buy, sell or breed a horse with the affected bloodlines.

Discussion:

HYPP (hyperkalemic periodic paralysis) is an autosomal dominant trait determined to be a mutation in the gene that controls the sodium/potassium flow in muscle cells. It is interesting to note that homozygous (H/H) horses often show more severe symptoms than their heterozygous counterparts (N/H). [2] The positive news is that in the first four years of testing, only 1% were determined to be H/H and 36% proved to be N/H. [3] This trait is not “diluted” with breeding as show in Figure 1, from the Tuft Cummings School of Veterinary Medicine. [2]

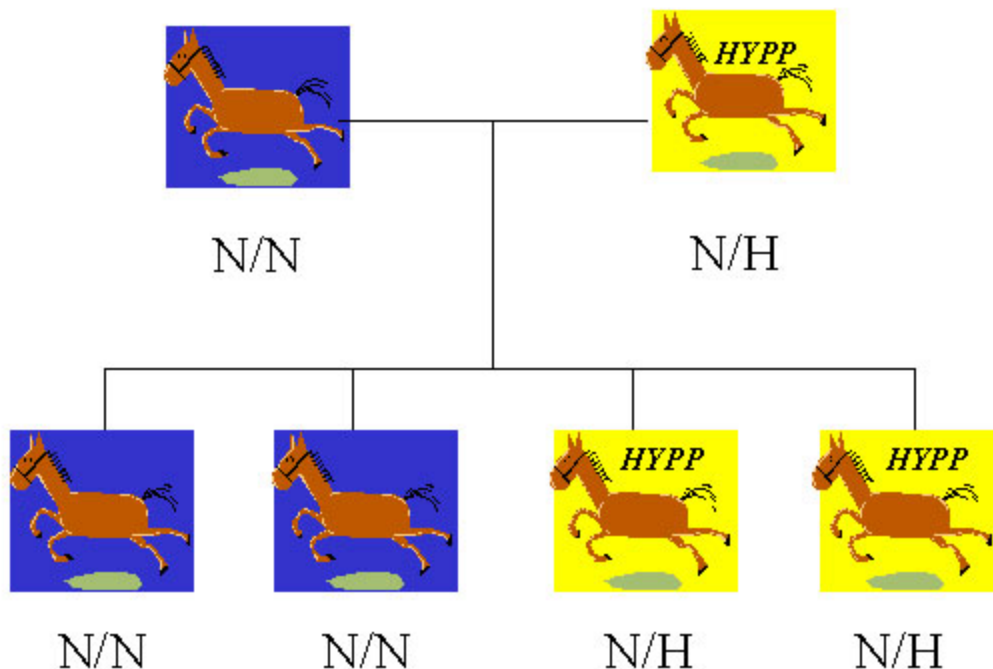


Figure 1: When a normal horse (N/N) is bred to a heterozygous HYPP horse (N/H), on average 50% of their offspring will be affected with HYPP

Signs of a HYPP attack can include: muscle trembling, prolapse of the 3rd eyelid, generalized weakness, weakness in the hind end, complete collapse and possibly an abnormal whinny. Attacks can range in severity from mild to severe. [4, 11]

A horse in the midst of a HYPP attack [11]



To diagnose a horse with HYPP the most reliable test is a genetic test, but there are also clinical signs and neurological tests that can be used by a veterinarian to diagnose a possible case.

Currently there is no cure for HYPP. However, with careful diet management and strict attention to a regular exercise schedule an owner may be able to cope with episodes and can reduce but not eliminate the chance of a fatal attack. [4]

HERDA (Hereditary Equine Regional Dermal Asthenia) or HC (hyperelastosis cutis) is a recessive genetic disease that is currently theorized to be passed along the Poco Bueno genealogy. [5] HERDA is an autosomal recessive disorder that affects the connective tissue between the deep and surface skin layers.

Signs of a horse with HERDA will include "extremely fragile skin that tears easily and exhibits impaired healing". [6] Examples below are as shown from the International Veterinary Information Service and their Equine Hyperelastosis Cutis Update page. (Figure 1-4) [7] Figures 5 and 6 are examples of the research done on a 50 horse sample at the U of C, Davis researching the HERDA disease. [8]



[Figure 1](#). A horse with HC. Note the dorsal lesions.



[Figure 2](#). Easily manipulated skin on the horse's dorsum.



[Figure 3](#). "Stretchy" skin on the horse's dorsum consistent with HC.



[Figure 4](#). Acute wounds associated with HC.



Figure 5. Two-year-old Quarter horse mare with HERDA. Note resolving seroma with loose skin. White hair occurred subsequent to seroma.

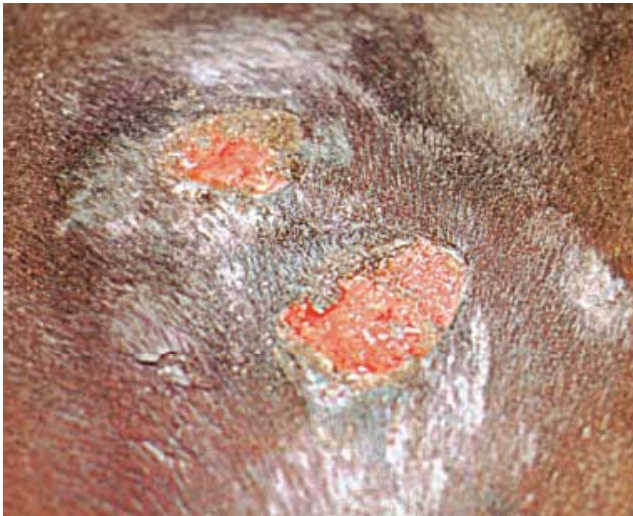


Figure 6. Three-year-old Quarter horse gelding with HERDA

Currently there is not a genetic test that can be done to determine a carrier of the HERDA gene and the only method to prevent future cases is a carefully managed breeding system. Palliative care can help to improve the quality of life for the animal; indoor stabling and being kept away from other horses are listed as the two main courses of action. [6]

In a 1996 census completed by the Government of Canada department of Agriculture and Agri-Food, Alberta was home to 34.88% of all the horses in Canada; making Alberta home to the highest number of horses in any of Canada's provinces. [9] In a 2003 report for the Horse Industry Association of Alberta, it was estimated that 38.3% of all horses in Alberta were Quarter Horses. [10] The same report estimated that 5+% of the horse population in Alberta consisted of 17,224 horses, making the estimated total population 344,480. The average value of a horse was reported as being \$4,267.

The Impressive breeding was very popular because of the large amount of muscle mass produced in his offspring. "Of the top 15 halter horses in 1992, 13 were descendants of Impressive. Even at the age of 23, Impressive himself was fourth on the list. In 1993, it was estimated that more than 55,000 Quarter Horses, Paints, and Appaloosas world-wide bore his pedigree." (Impressive picture to right) [11] Sadly enough once the HYPP gene was traced back to the Impressive bloodlines these horses were no longer desirable and lost



value almost immediately. [11] In a province where the estimated value of the average horse at \$4,267, the loss of value for any horse proven to be a carrier is quite devastating. All foals wishing to be registered in the American Quarter Horse Association (AQHA) must be genetically tested and any foal that is homozygous H/H will no longer be eligible for registration as of January 2, 2007. [1] With the crackdown on registration eligibility many Impressive foals that are heterozygous will no longer be viewed as a potential breeder for fear that the gene will be passed along.

The American Quarter Horse Association is currently financing more research at the U of C, Davis to determine whether the Poco Bueno bloodline is the direct cause of HERDA. [1] Owners of Poco Bueno descendants will continue to hold their breath and hope their investments do not end up in the same boat as the Impressive breeders. As stated on the foundation breeders website, "many owners of horses descended from Impressive have rushed to have their horses tested, hoping that a negative result would protect their considerable investment against the anticipated backlash. Breeders have purchased advertising in The Quarter Horse Journal touting their HYPP-negative test results, and privately have urged their peers to either test their Impressive bred horses, or remove them from breeding." [11] The cost of the genetic cost test is currently \$35 US and is available directly from the AQHA. [1] All Impressive bred horses must have the genetic test done to be eligible for registration. The cost of raising an Impressive horse and the risks involved may be too much for many owners, buyers and breeders.

Conclusion:

The Alberta Quarter Horse industry is currently recovering from the effects of mad cow disease, the west Nile virus scare, and the flood of PMU horses on the market; it would be quite devastating to find out that another one of core bloodlines is to blame for a very serious genetic disease. In the meantime breeders, sellers and buyers need to be aware of the signs of possible genetic disease and avoid breeding these horses and propagating the problem.

References:

1. American Quarter Horse Association, General Glossary. Retrieved November 29, 2006 from <http://www.aqha.com/association/registration/generalglossary>
- *2. Tufts Education, Hyperkalemic Period Paralysis (HYPP), Retrieved November 28, 2006 from <http://www.tufts.edu/vet/sports/hypp.html>
3. American Quarter Horse Association, HYPP Brochure. Retrieved November 28, 2006, from http://www.aqha.com/association/download/pdf/AQHA_HYPP_Brochure_Sm.pdf

- *4. Crabbe, Barb. "Living with HYPP." Horse & Rider 37.7 (1998): 38. MasterFILE Premier. 2 December 2006.
<http://search.ebscohost.com/login.ezproxy.library.ualberta.ca>
5. "HC linked to Poco Bueno line." Horse & Rider 43.5 (2004): 22-22. MasterFILE Premier. 2 December 2006.
<http://search.ebscohost.com/login.ezproxy.library.ualberta.ca>
6. Brown, Kimberly S. AAEP Convention 2004: Medicine –HC/HERDA. The Horse.com,
<http://www.thehorse.com/ViewArticle.aspx?ID=5425&kw=herda> Feb. 2005; article #5425.
7. IVIS.org, Equine Hyperelastosis Cutis Update. [50th Annual Convention of the American Association of Equine Practitioners, 2004 - Denver, CO, USA](#), (Ed.). Publisher: American Association of Equine Practitioners, Lexington KY. Internet Publisher: International Veterinary Information Service, Ithaca NY, P1409.1204 Retrieved November 29, 2006 from
<http://www.ivis.org/proceedings/AAEP/2004/Rashmir/chapter.asp?LA=1>
- *8. White, S.D., et al. "Hereditary equine regional dermal asthenia ('hyperlastosis cutis') in 50 horses: clinical, histological and ultrastructural findings." Veterinary dermatology 15, (2004): 207-217. Agricola. 2 December 2006.
<http://search.ebscohost.com/login.ezproxy.library.ualberta.ca>
9. Equestrian, Statistics. Retrieved on November 28, 2006 from
<http://www.equestrian.ca/EquineCanada/HORSES/Statistics/statistics3.html>
10. Alberta Horse Industry, Horse Industry Profile and Economic Impact Survey for Horse Industry Association of Alberta. Retrieved on November 30, 2006 from
http://www.albertahorseindustry.ca/economicsurvey/complete_profile.pdf
11. Foundation Horses, Impressive Syndrom. As quoted from Equus. Retrieved November 29, 2006 from
http://www.foundationhorses.com/impressive_syndrom.htm