

## Information on atypical myopathy in grazing horses

Atypical myopathy is a severe rhabdomyolysis in grazing horses. Clinical signs can deteriorate rapidly and affected horses may die from respiratory and cardiac failure within 12 to 72 hours.

Horses with atypical myopathy show initially a stiff gait, sweating, muscle fasciculations and weakness and will eventually become recumbent. They suffer from a generalized rhabdomyolysis, which also affects the myocardium and respiratory musculature. The urine has a dark, often almost black colour. This discoloration is due to myoglobin, a pigment of muscle tissue, which is released from the affected musculature and excreted through the kidneys into urine. Often, several horses are affected on the same pasture.

The cases occur all over Europe, but cumulate regionally. In Switzerland most cases have been reported in the Swiss Jura, as well as the Fribourg foothills. Typically, cases occur with the first fall frost. A large outbreak in late fall is often followed by a second smaller outbreak in spring. Unfortunately, continued grazing of horses on premises with previous outbreaks of atypical myopathy carries an increased risk for new outbreaks in the following years. Further risk factors include young age, introduction of horses of any age to a new pasture, pastures with a lot of leaves and dead wood and extensive husbandry.

The main cause for atypical myopathy is the consumption of seeds of the Sycamore maple (*Acer pseudoplatanus*) which is native to central and Eastern Europe. The seeds of the Sycamore maple contain a toxic substance, hypoglycin A, which is quickly metabolized into the toxic metabolite MCPA (Methylene-Cyclopropyl-Acetyl-Coenzyme A) in the horse's body. The concentration of hypoglycin A varies strongly from maple seed to maple seed, but 30 to 40 seeds can be sufficient to poison a 500kg-horse, if they contain high concentrations of hypoglycin A. The intoxication with hypoglycin A causes lipid metabolism derangements in the musculature (lipid storage myopathy). Blood analysis reveals an abnormal concentration of acyl-carnitines and abnormal concentrations of organic acids are found in urine. Seeds of the Japanese maple (*Acer palmatum*) and the boxelder maple (*Acer negundo*) contain hypoglycin A as well. However, seeds of the Norway maple (*Acer platanoides*) and the field maple (*Acer campestre*) are harmless. Further trigger factors for atypical myopathy such as bacterial toxins in the soil, fungal diseases of the maple trees (tar spot), selenium deficiency and climate change are discussed.

Special labs offer tests for determination of hypoglycin A and MCPA concentrations in blood and urine as well as serum acyl-carnitine profiles and urine organic acid profiles. Since lab analyses typically take several days, the first presumptive diagnosis is based on typical clinical signs and medical history (affection of several horses on the same pasture; season and region at risk, presence of sycamore maples on the pasture, extensive husbandry).

The therapy is symptomatic. Affected horses should not be stressed. The veterinarian in charge has to decide on-site, if a horse should and can be transported to a clinic for intensive care or if it can be treated in the field. If the disease has progressed to an advanced stage, euthanasia must often be considered.

In case of an outbreak, all horses from the same pasture should be immediately removed from the affected fields and stabled. If this is not possible, they should be supplemented with sufficient amounts of feed on the pasture. A sufficient supply of fibers, preferably good quality hay, can reduce

the risk of a consumption of maple seeds. Pastures on which outbreaks have occurred in previous years should not be used for grazing during spring and autumn. If this is not possible, additional feed, as described above, should be offered.

The University of Liège offers a European-wide network <http://labos.ulg.ac.be/myopathie-atypique/> where all veterinarians and horse owners can report cases. Questionnaires are available in several languages. This network provides a valuable overview of the European-wide distribution of the disease and the spatial and temporal occurrence of new cases. Once registered, all subscribers receive e-mail alerts about new cases and outbreaks.

ISME does not have current projects on atypical myopathy; but we are available for any questions at [lucia.unger@vetsuisse.unibe.ch](mailto:lucia.unger@vetsuisse.unibe.ch) or phone no. 031 631 22 43 (front office). We can also recommend labs that offer specific tests for diagnosis of atypical myopathy in serum and urine.

#### **List of publications:**

- Unger-Torroledo L, Straub R, Lehmann A, Graber F, Stahl C, Frey J, Gerber V, Hoppeler H, Baum O, Lethal toxin of *Clostridium sordellii* is associated with fatal equine atypical myopathy. *Veterinary Microbiology* 2010, 144(3-4): 487-492.
- Van Gahlen G, Amory H, Busschers E, Cassart D, De Bruijn M, Gerber V, Keen J, Lefere L, Pitel CM, Marr C, Müller JMV, Pineau X, Saegerman C, Sandersen C, Serteyn D, Torfs S, Unger L, Verwilghen D, Votion DM, 2010, European outbreak of atypical myopathy in the autumn 2009. *Journal of Veterinary Emergency and Critical Care*, 20(5): 528-532
- Unger L, Gerber V, 2011, Search for the cause of Equine Atypical Myopathy, *Equine Disease Quarterly*, Vol 20, No 2
- Van Galen, G, Marcillaud Pitel, C, Saegermann C, Patarin F, Amory, H, Baily, JD, Cassart, D, Gerber, V, Hahn, C, Harris, P, Keen, JA, Kirschvink, N, Lefere, L, McGorum, B, Muller, JMV, Picavet, MTJE, Piercy, RJ, Roscher, K, Serteyn, D, Unger, L, van der Kolk, JH, van Loon, G, Verwilghen, D, Westermann, CM, Votion, DM, 2012, European outbreaks of atypical myopathy in grazing equids (2006-2009): Spatiotemporal distribution, history and clinical features. *Equine Veterinary Journal*, Vol 44(5): 614-620.
- Van Galen, Saegermann C, G, Marcillaud Pitel, C, Patarin F, Amory, H, Baily, JD, Cassart, D, Gerber, V, Hahn, C, Harris, P, Keen, JA, Kirschvink, N, Lefere, L, McGorum, B, Muller, JMV, Picavet, MTJE, Piercy, RJ, Roscher, K, Serteyn, D, Unger, L, van der Kolk, JH, van Loon, G, Verwilghen, D, Westermann, CM, Votion, DM, 2012. European outbreaks of atypical myopathy in grazing horses (2006-2009): Determination of indicators for risk and prognostic factors. *Equine Veterinary Journal*, Vol 44(5): 621-625.
- Unger, L, Nicholson, A, Jewitt, EM, Gerber, V, Hegeman, A, Sweetman, L, Valberg, S, 2014. Hypoglycin A concentrations in seeds of *Acer pseudoplatanus* trees growing on atypical myopathy-affected and control pastures. *J Vet Intern Med*; 28(4): 1289-93.