

each examination day. Foals were euthanized at ages ranging from 169 to 293 days and full worm counts performed. For the second part of the study, fifteen foals were randomly allocated to three treatment groups; ivermectin, oxbendazole, and no treatment. Blinded ultrasound examinations were performed daily for five consecutive days following treatment. Foals were both ultrasounded twice by the same investigator, and by two different investigators. Two consecutive examinations were found to reliably detect worm burdens larger than ten ascarids. Ascarid scores declined in response to both anthelmintic treatments, although differences were not statistically significant. Kappa values indicated fair to moderate intra- and inter-observer agreements. The ultrasonographic screening techniques can be a useful tool for monitoring ascarid burdens in foals.

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The perfect tripod for raising healthy horses: simple management, good diagnostic, and a smart team

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The objective towards resilient farms is one of the challenges for the future farmer focusing on animal welfare. Parasite infections are responsible for important economic losses in horse farming, either directly in animals that develop clinical signs or indirectly by increasing treatment cost. Cyathostomins (small strongyles) are recognized as one of the main parasitic pathogens of horses and are associated with several clinical and sub-clinical effects in young and adult animals. The objective of this study was to evaluate the body growth and development of horses naturally infected with cyathostomins, including their hematological parameters. The survey was conducted from August 2014 to January 2015 with 30 Thoroughbred horses (21 females and 9 males), eight to 12 months of age and naturally infected with >98% of cyathostomins. The animals belonged to Sao Jose da Serra Stud, in Sao Jose dos Pinhais, Brazil. Animals stayed on pasture (*Lolium multiflorum* and *Paspalum notatum*) and received 15 to 30% protein in the diet 2x/day plus hay of *Cynodon dactylon* depending on age. Weight and height data and stool samples were collected monthly. The faecal egg count (EPG) exam was performed using mini-FLOTAC (x10). All animals were dewormed with ivermectin plus pyrantel in September/2014 as a routine spring-preventive treatment. Individual blood samples were collected every two months (July, September, November and January). The blood samples were performed for leukocyte count and the percentage of packed cell volume. From August to January the weight gain and the monthly growth of the animals was on average 16.6; 28.2; 20.9; 14.0; and 17.3 kg and of 1.9; 1.6; 1.0; 1.6; and 0.3 cm, respectively. The five-month EPG average was 291.0; 0.0 (IVM+PYR treatment); 635.7; 1230.7; 986.0; and 2064.7. Although the highest monthly weight gain was observed in September, the month in which the animals had zero EPG, did not improve the growth of the foals. There was no correlation ($p>0.05$) between EPG and body growth during the period. The EPG did not differ between males and females and did not affect their development when evaluated separately. Despite the high EPG, all animals were clinically healthy and the relative leukocyte count was within the reference values for Thoroughbred horses. We found no significant ($p>0.05$) correlation between EPG and the eosinophil count. Packed cell volume was within the reference values for all months. In the present study, the evaluated hematologic parameters did not change according to EPG, preventing their use as diagnostic

markers even for animals with different cyathostomin EPG counts. Although factors like time and money have to be considered, we conclude that foals that are raised under a well-defined set of management practices can have little or no signs of impairment due to worm infections, whilst parasite load was not determined on pasture or in the animals.

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Anthelmintic resistance in horse nematodes: Where does it come from?

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Nematode infections impair health of horses worldwide. Anthelmintic therapy is most often the only way to treat infected animals in order to prevent the onset or further progress of disease. As seen with other chemotherapeutic compounds used for the treatment of parasitic infections, a few years after the introduction of the macrocyclic lactones (ML) a loss of efficacy or even the occurrence of resistance became apparent. Underlying mechanisms of this process are still not completely elucidated, but altered activity of transmembrane efflux pumps like P-glycoproteins (Pgps) are considered a potential mechanism of ML-resistance. Pgps reduce the intracellular accumulation of xenobiotics including drugs by an ATP-dependent transport. This in turn impedes the achievement of effective drug concentrations at the target site as demonstrated for ivermectin (IVM) in mammalian cells earlier. IVM is a ML frequently used for deworming horses e.g. in case of an infection with *Parascaris* sp. This parasite is found in the small intestine predominantly of young horses where it may lead to intestinal obstructions or rupture of the intestinal wall. Apart from its pathogenicity, high prevalence and worldwide occurrence, *Parascaris* sp. came into focus as several cases of IVM-resistance became apparent. After identifying two genes coding for *Parascaris* Pgps (Pgp-11 and Pgp-16), they were analysed regarding morphological and quantitative changes presumably being associated with anthelmintic resistance: By comparing the amino acid sequences of Pgp-11 and Pgp-16 from different *Parascaris* populations, three amino acid changes within Pgp-11 were found in all investigated populations with decreased ML susceptibility, but were absent in susceptible populations. Furthermore, in a group of worms with reduced IVM susceptibility, a statistically significant over-expression was observed for pgp-11 compared to a randomly selected group. Another evidence for the participation of Pgps in ML resistance was given by their heterologous expression in two model organisms. While the transporter activity of *Parascaris* Pgp-11 was analysed in the model nematode *Caenorhabditis elegans*, the impact on ML susceptibility was also investigated for Pgp-9 of another horse nematode (*Cylicocyclus elongatus*) in a yeast strain lacking endogenous efflux transporters. Both assays were suitable to investigate the impact of Pgps on MLs and vice versa.

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A field survey to investigate the anthelmintic efficacy against equine strongyles in Romania

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