The samples were analyzed using a standard optical microscope (Nicon Eclipse E200) at following magnifications: x10, x20, x40 and x100 with immersion oil. Parallel, Computer Assisted Semen Analysis was performed using CASA Sperm Class Analyzer 5.4.0.0 SCA Research Edition – Morphology module (Microptic, Spain) at x100 magnification with immersion.

The sperm measurements were focused on: sperm head length, head breadth, sperm head area, perimeter and acrosome. All data was analysed and counted for teratozoospermic index.

During the study a significant difference was noticed between the two stains by using CASA System alone in visualization of following abnormalities: acrosome distortions, vacuoles presentation (immaturity), midpiece malformations, cytoplasmic droplet presentation, coiled tail, as well as asymmetric, thin, paint-brush shaped sperm heads. Sperm head measurements (head length, breadth, head area and perimeter) were successfully measured using both stains and no significant differences were noticed. Although the samples preparations using both stains are fast and uncomplicated, in case of Sperm-Stain® the sample was more visible due to the clearer marking of the sperm head. The morphology of the head was more visible, as well as the acrosome was better marked. Sperm with morphological defects were easier to identify. Similar effect was observed using a standard optical microscope. On the other hand Sperm Blue® stain was easier to work with for measurement of sperm head perimeters, due to more intensive contrast staining.

The research shows that in particular veterinary practice the Sperm-Stain® might be a better dye for a fast, in-house sperm analysis presenting statistically more malformations in ejaculates, although Sperm Blue® might be a choice for quick, clinical review of sperm morphometric evaluation.

On the occasion of the conducted research, we noticed a qualitative difference in the semen of dogs of different breeds. It was related to the sperm count in the fraction and semen motility and morphology, which may be useful in follow-up studies.

Trojakowska A., *Third-year student of the Institute of Veterinary Medicine*
Zuchniak A., *Second-year student of the Instituite of Veterinary Medicine*
Scientific supervisor - M. Domino, DVM, PhD hab. in Veterinary Medicine, Assist. Prof.; M. Maśko, PhD in Animal Science, Assist. Prof.
Institute of Veterinary Medicine Warsaw University of Life Sciences, Warsaw, Poland

THE DIFFERENCES BETWEEN TERMOGRAPHIC IMAGES OF EQUINE METACARPUS VIEWED FROM THE DORSAL, PALMAR, LATERAL, AND MEDIAL ASPECT

Infrared thermography (IRT) is a non-invasive technique of detection and measuring infrared radiation emitted spontaneously from a certain object, which is turned into a visible image afterward. When used in animals, thermal imaging provides a pictorial representation of the body surface temperature distribution. In recent years, IRT has increasingly gained an important position in equine medicine as it has proven particularly useful in the diagnostic field. As the skin temperature is correlated with the

presence of various inflammatory and autonomic disorders which affect blood flow in the skin or underlying superficial structures, IRT can allow early detection of subclinical inflammations or injuries, which has proved especially useful in performance horses (Purohit et al., 1980; Soroko et al., 2013; 2014). One of the areas of most interest in IRT in the equine is distal parts of the limbs, in particular fetlock and carpal joints, which are the most common sites of injury and inflammation (Dyson, 2000). To perform IRT correctly it is essential to thoroughly understand not only the normal temperature distribution across the body surface but also the likely impact of environmental factors, to which the distal parts of the limbs are specifically sensitive. A strong correlation between distal forelimb temperature and ambient temperature has been proved in a few studies (Palmer, 1983; Soroko et al., 2016). This study aimed to find out if this correlation is dependent on the aspect of the limb from which the temperature is measured and determine which aspects are the most and least vulnerable to environmental factors. In our study 14 healthy recreation horses underwent 8 weekly sessions, which included lunging exercise of the same duration and intensity each time for each horse and surface temperature measurements before and after the exercise. The measurements were made from regions of interest (ROIs) covering the carpal and fetlock joints and the metacarpal bone, viewed dorsally, primarily, laterally, and medially. For each of the four aspects of the forelimb, the maximal temperature was determined. The obtained data were analyzed statistically to compare the temperatures measured from different aspects before and after exercise. The maximal temperature in each ROI differed significantly among individual days of the experiment ($p<0.0001$). However, in all ROIs, these differences were less substantial after exercise. The variance was most visible in the lateral ROI and the least in the dorsal aspect. For each ROI there was a substantial difference between the maximal temperature before and after exercise. The temperatures varied significantly also among ROIs. The differences between the results obtained each day of the experiment from a single ROI are most probably related to the gradual rise of environmental temperature. The distal parts of the limbs play an important role in thermoregulation, which makes their surface temperature particularly sensitive to ambient temperature. In a cool environment to maintain a stable core temperature the central blood volume is increased, which leads to peripheral vasoconstriction and therefore a drop in the surface temperature of peripheral body parts. As the dorsal aspects of the limbs are situated away from major blood vessels, their surface temperature remains relatively stable regardless of the environmental temperature, while the lateral aspect is more likely to be influenced by vasomotor changes (Soroko et al., 2017). The results of this study also suggest that physical effort during exercise leads to a rise in local metabolism and vasodilatation, minimalizing this influence. In conclusion, body surface temperature overlying the carpal and fetlock joints, and the metacarpal bone is strongly correlated with environmental factors that are likely to be associated with the vascular anatomy of the distal limb. It is important to properly adjust thermal imaging protocols to limit any confounding influence from the environment. Thermal measurements from the dorsal aspect of the limb seem to be the most reliable.

References:

1. Purohit, R.C., McCoy, M.D. Thermography in the diagnosis of inflammatory processes in the horse. Am. J. Vet. Res. (1980) 41,1167-1174.
2. Soroko, M., Henklewski, R., Filipowski, H., Jodkowska, E. The effectiveness of thermographic analysis in equine orthopedics. J. Equine Vet. Sci. (2013) 33,760–762.

3. Soroko, M., Dudek, K., Howell, K., Henklewski, R., Jodkowska, E. Thermographic evaluation of racehorse performance. J. Equine Vet. Sci. (2014) 34, 1076–1083.
4. Dyson, S. Lameness and poor performance in the sports horse: dressage, show jumping and horse trials (eventing). Proc. Ann. Conv. Am. Assoc. Equine Pract. (2000) 46, 308–315.
5. Palmer, S.E. Effect of ambient temperature upon the surface temperature of equine limb. Am. J. Vet. Res. (1983) 44, 1098–1101.
6. Soroko, M., Howell, K., Dudek, K., Henklewski, R., Zielińska, P. The influence of breed, age, gender, training level and ambient temperature on forelimb and back temperature in racehorses. Anim. Sci. J. (2016) http://dx.doi.org/10.1111/asj.12631.
7. Soroko M, Howell K, Krzysztof D. The effect of ambient temperature on infrared thermographic images of joints in the distal forelimbs of healthy racehorses. J Therm Biol. (2017) 66:63–7. doi: 10.1016/j.jtherbio.2017.03.018

Trojakowska A., *Third-year student of the Institute of Veterinary Medicine*
Scientific Supervisor: Jarosław Olszewski*, MSc, Aleksandra Piecuch**, DVM,
*Institute of Veterinary Medicine
Warsaw University of Life Sciences WULS-SGGW, Poland
**Wrocław University of Environmental and Life Sciences, Poland

EQUNE ASTHMA: OVERVIEW OF NOVEL DIAGNOSTIC METHODS

Respiratory disease in horses is one of the most important problems which veterinarians, owners and breeders have to manage. One of the most frequent if not dominant condition is known as equine asthma syndrome (EAS) or severe equine asthma (SEA). Before 2016 there were plenty of terms that referred to the same disease such as IAD (Inflammatory Airway Disease), RAO (Recurrent Airways Obstruction) SP-RAO (Summer Pasture Associated RAO) or COPD (Chronic Obstructive Pulmonary Disease). Recent research has proven that mechanism of these syndromes is similar enough to consider it as one disease that belongs to the group of noncontagious diseases of the respiratory track. Asthma as a heterogeneous group of conditions induced by IgE-mediated reactions and type III hypersensitivity that can affect 10 - 30 % of horses. However, depending on the population and geographical region, some studies have found that EA can occur in 60-100% of adult horses. The clinical symptoms include dyspnea, coughing and loss of performance, caused mainly by the bronchoconstriction and the compromised gas exchange. The widespread occurrence and ambiguous diagnosis, combined with progressive nature of equine asthma, determines seriousness of the problem. Therefore, new therapies and diagnostic methods are urgently needed.

Based on gathered data, the aim of this paper was to investigate early identification of EA using the newest techniques. Although severely asthmatic horses often show visible signs of disease, mild or moderate form of EA sometimes occurs subclinically. Also, patients during clinical examination might present a temporary remission which makes preliminary scoring difficult and often results in false negative diagnosis. The most often used diagnostic procedure includes cytological analysis of tracheal wash (TW) and bronchoalveolar lavage fluid (BALF). TW method in horses was first