УДК 636.1.083.38:591.1

HEMATOLOGICAL PROFILE OF ENGLISH HALF-BREED HORSES REARED POMERANIAN REGION (NORTHERN POLAND)

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Breed, age, and gender are important factors to be considered when interpreting hematology and clinical biochemistry profiles in veterinary medicine. Hematology may provide information about health states, performance, and fitness in horses. Assuming that the hematological indices are strongly influenced by the lifestyle to which horses are subjected, the aim of this study was to report the normal values of hematological indices for Pomeranian English half-breed horses in resting period, in order to understand their welfare conditions. Nine healthy English half-breed horses (7 mares and 2 stallions) reared in village Karlikowo, in the administrative district of GminaKrokowa, within Puck County, Pomeranian Voivodeship, in northern Poland, aged 7.6±0.9 years old, were used in this study. All horses participated in recreational horseback riding. The K_3-EDTA-treated tube of whole blood was used to measure hematological profiles by using a hematology analyzer (Abacus Junior Vet, Austria). Measurements included total red blood cells number (RBC; M/μL), hemoglobin (HB, g/dL); hematocrit (HCT, %); mean corpuscular volume (MCV, fL); mean corpuscular hemoglobin (MCH, pg); mean corpuscular hemoglobin concentration (MCHC, g/dL); width of RBC volume distribution (RDW; %); total number of white blood cells (WBC, K/μL); neutrophils (NEU, K/μL and % of WBC); lymphocytes (LYM, K/μL and % of WBC); monocytes (MON, K/μL and % of WBC); eosinophils (EOS, K/μL and % of WBC); basophils (BAS, K/μL and % of WBC); total platelet number (PLT, K/μL); and mean platelet volume (MPV, fL). In our study, all hematological indices of English half-breed horses were within the reference values specified for horses, which proves good health and proper condition of the tested animals. In the present study, granulocytes constituted more than 50% of leukocytes in the studied horses. The resting values of the number of circulating red blood cells, hematocrit and hemoglobin concentration determined in the current experiment for horses were close to those obtained in earlier studies. Platelet number of studied horses are within the interval found in literature. Hematological variables showed a possible adaptation to work by the horses but were not sufficient to diagnose a welfare problem. Management practices and other animal-based indicators should be included in further studies to obtain a holistic conclusion.

Keywords: **English half-breed horses, blood, hematological profile, Pomeranian region, recreational horseback riding.**

Hematological profile is frequently used in horses to provide significant information about the response to treatment, the severity of the process and the metabolic state of an animal. Moreover, it can also use as an aid for the diagnosis and/or consequences of systemic, infectious and some parasitic diseases. Despite the wide use of hematology, interpretation is challenging because many exogenous and endogenous factors significantly modify blood parameters [43].

Breed in horses exerts a significant effect on the erythron [the number of circulating red blood cells (RBC), hemoglobin concentration (HB), packed cell volume (PCV), volumetric indices, such as mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC)] [43]. Light horse breeds or 'hot-blooded breeds' have higher RBC, HB and PCV and blood volume compared to draft horses or 'coldblooded breeds' [20, 24]. Thus, PCV as low as 24 % can be found in healthy draft horses and pony breeds. Further, Thoroughbreds have smaller MCV than draft horses. Breeds ancestrally closer have minor differences in HB, MCH and MCHC [22]. American miniature horses have lower RBC, HB and PCV but higher MCV, MCH and MCHC than other breeds [21]. Donkeys have similar RBC, HB and PCV than ponies, but much higher MCV [23].

The term leukon refers to the set of data derived from total and differential count of white blood cells (WBC) and the analysis of WBC morphology [20]. Circulating WBC represents the outcome of the dynamic production of the bone marrow, the release of the cells to the peripheral blood and, the storage in different organs or pools [43]. Cells can coexist in different stages of maturation, being fully mature cells (neutrophils, NEU, eosinophils, EOS, monocytes, MON, lymphocytes, LYM and basophils, BAS) and immature (band neutrophils, metamyelocytes, myelocytes and progranulocytes) [20]. Minor differences have been found among equine breeds in relation to WBC, with the hot-blooded horses having higher WBC compared to cold-blooded horses (Jain, 1986; Harvey et al., 1984). Thoroughbreds and Arabian have a mean NEU/LYM ratio of 1.0, whereas coldblooded horses and miniature horses have ratios of 1.7 and 0.67, respectively [22].

Equine platelet concentrations are some of the lowest reported for mammals. Mean platelet volume (MCV) and mean platelet mass have been reported in horses: 4.3-5.6 fL and 0.47-0.96 10^6/fL, respectively [17]. In Quarter Horses, Jeffcott (1977) found that the number of platelets in this breed was higher than in other equine breeds [23]. A clear explanation for this result is lacking, although factors others than the breed should be taken into consideration. Assuming that the hematological indices are strongly influenced by the lifestyle to which horses are subjected, the aim of this study was to report the normal values of hematological indices for Pomeranian English half-breed horses in resting period, in order to understand their welfare conditions.

Materials and methods. Horses. Nine healthy English half-breed horses (7 mares and 2 stallions) reared in village Karlikowo, in the administrative district of GminaKrokowa, within Puck County, Pomeranian Voivodeship, in northern Poland (village Karlikowo, Puck County, 54°44′12″N 18°09′00″E), aged 7.6±0.9 years old, were used in this study (Fig. 1). All horses participated in recreational horseback riding. Horses were housed in individual boxes, with feeding (hay and oat) provided twice a day, at 08.00 and 18.00 h, and water available ad libitum. All horses were thoroughly examined clinically and screened for hematological, biochemical and vital indices, which were within reference ranges. The females were non-pregnant.

Blood samples. Blood was drawn from jugular veins of the animals in the morning, 90 minutes after feeding, while the horses were in the stables (between 8:30 and 10 AM). Blood was stored into tubes with K_3-EDTA.

Hematological Profiles. The K_3-EDTA-treated tube of whole blood was used to measure hematological profiles by using a hematology analyzer (Abacus Junior Vet, Austria). Measurements included total red blood cells number (RBC; M/μL), hemoglobin (HB, g/dL); hematocrit (HCT, %); mean corpuscular volume (MCV, fL); mean corpuscular hemoglobin (MCH, pg); mean corpuscular hemoglobin concentration (MCHC, g/dL); width of RBC volume distribution (RDW; %); total number of white blood cells

(WBC, K/μL); neutrophils (NEU, K/μL and % of WBC); lymphocytes (LYM, K/μL and % of WBC); monocytes (MON, K/μL and % of WBC); eosinophils (EOS, K/μL and % of WBC); basophils (BAS, K/μL and % of WBC); total platelet number (PLT, K/μL); and mean platelet volume (MPV, fL).

Fig. 1. Map of Poland. Marked village Karlikowo in the administrative district of GminaKrokowa, within Puck County, Pomeranian Voivodeship, in northern Poland (54°44′12″N 18°09′00″E) where blood samples of horses were collected.

Statistical analysis. Results are expressed as mean ± S.E.M. All variables were tested for normal distribution using the Kolmogorov-Smirnov test ($p>0.05$) [48]. All statistical analyses were performed using STATISTICA 8.0 software (StatSoft, Poland).

Results and discussion. Breed, age, and gender are important factors to be considered when interpreting hematology and clinical biochemistry profiles in veterinary medicine. Hematology may provide information about health states, performance, and fitness in horses. Hematologic data are available for horses in general, but they are mainly referred to horses reared in their native English countries [30]. Moreover, the adaptation of working horses to hot climate and endurance work from an early age influenced their hematological and biochemical basal ranges [39]. Based on the assumption that age, sex, and management, as well as geographical location of the breeding sites may affect hematologic values [38], this study focused on the hematology of English half-breed horses reared in northern Poland.

The hematological and biochemical parameters can provide significant information about the specific changes in an organ or body systems, general response of the individual to some physiological or pathological conditions and the metabolic state of horses [1-15, 25, 32, 33, 43, 44, 46]. In additional blood hematological and biochemical parameters can be a good indicators of the response to treatment, the severity and the systemic effects of a disease, as well as horse welfare, health and fitness levels of horses [25, 35-37, 43]. In our study, all hematological indices of English half-breed horses were within the reference values specified for horses [45], which proves good health and proper condition of the tested animals (Tables 1, 2, 3).

Table 1

Values of white blood cell indices in English half-breed horses (n=9, M±m)

White blood cell indices	English half-breed horses	Reference values
Total number of white blood cells (WBC), [K/μL]	7.07±0.62	5.4-14.3• 5.5-12.0••
Total lymphocyte number, LYM [K/μL]	2.33±0.26	1.5-7.7•
Total monocytes and some eosinophils number, MID [K/μL]	0.21±0.05	0-1.5•
Total granulocytes (neutrophils, eosinophils and basophils) number, GRA [K/μL]	4.52±0.51	2.3-9.5•
Percentage of lymphocytes, LY%	33.24±2.92	17-68•
Percentage of monocytes and some eosinophils, MID%	2.98±0.62	0-14•
Percentage of granulocytes, GR%	63.77±2.86	22-80•

Legend: • – reference values according to the Operating Instructions of Hematology Analyzer Abacus Junior Vet; •• – reference values according to A. Winnicka (2008).

The leukocyte values found for the studied horses are within the interval found in literature [18, 43]. In the present study, granulocytes constituted more than 50 % of WBC in the studied horses, which agreed with the results obtained by Krumrych (2006) [25], Bis-Wencel and co-workers (2009) [16] and Burlikowska and co-workers (2015) [18]. Neutrophils constitute 50-60 % of the circulating blood leukocytes pool and play an important role in innate immunity and provide a major defense system against microorganisms [23, 24]. They act as the first line of defense against infectious agents and are involve in the muscle tissue inflammatory response to exercise-induced injury [19, 43].

Table 2

Values of red blood cell indices in English half-breed horses (n=9, M±m)

Red blood cell indices	English half-breed horses	Reference values
Total red blood cells (RBC) number, [M/μL]	7.95±0.26	6.8-12.9• 5.5-10.0••
Hemoglobin level, HB [g/dL]	12.58±0.40	11-19• 8-18••
Hematocrit, HCT [%]	34.59±1.25	32-53• 24-52••
Mean Corpuscular Volume, MCV [fL]	43.70±1.57	34-58• 35-58••
Mean Corpuscular Hemoglobin, MCH [pg]	15.87±0.41	12.3-19.7• 10-20••
Mean Corpuscular Hemoglobin Concentration, MCHC [g/dL]	36.44±0.42	31-39• 31-37••
Red Blood Cell Distribution Width, RDW [%]	19.81±0.34	11-17•

Legend: •, •• – see Table 1.

Certain cardiovascular and hematological adaptations are necessary to guarantee the correct oxygen and blood-borne substrates supply to active muscles during exercise and the release of metabolites [36]. The resting values of RBC number, HCT and HB concentration determined in the current experiment for horses were close to those obtained in earlier studies [18, 25, 36, 43]. The resting HCT value and HB concentration give information on blood oxygen capacity [23, 24].

Significant increase of the above mentioned parameters measured at rest are noted in sport horses under the influence of an intensive training process as a result of regular repeated hypoxia stimulating erythropoiesis and causing increase in the number of circulating erythrocytes [1-15, 29, 44]. Although training has limited effects on RBC parameters at rest, some differences are found between horses undergoing high-intensity and endurance training. Speed-trained horses have higher RBC, HB and PCV, which is considered an adaptation for a greater demand for oxygen uptake, stimulating RBC production [43]. On the other hand, regular monitoring of the hemogram during training has little value for assessing the fitness of the horse, but it is very helpful in order to detect subclinical problems that can significantly reduce exercise performance. Endurance-trained horses have lower resting RBC, HCT and HB than sprint-trained horses [27, 28, 40]. Also, it should be noted that separate studies have describe normal hematological values in different populations of Thoroughbreds as high as 11.6 M/μL, depending of age and training status of horses [85]. Whereby, mainly younger horses upon introduction on training displayed higher normal hematological values at rest than older thoroughbreds [41, 42]. Platelet number of studied horses (Table 3) are within the interval found in literature [43].

Table 3

Values of platelet indices in English half-breed horses (n=9, M±m)

Platelet indices	English half-breed horses	Reference values
Total platelet (PLT) number [K/μL]	170.54±9.21	100-400• 150-400••
Mean platelet volume, MPV [fL]	10.43±0.33	9.7-12.8•
Platelet distribution width, PDW [%]	32.40±1.59	24-72•

Legend: •, •• – see Table 1.

It was demonstrated that platelet age and size are independent determinants of platelet function [47]. Platelets produced under condition of stimulated platelet production, called “stress” platelets by Penington and co-workers (1976), show an increase in the MPV, which is the most accurate measure of platelet size compared with the normal circulating platelets [34]. Platelet number can increases in exercise and this might also be associated with fresh release of platelets from the spleen, bone marrow and other reservoir [47].

The hematological and biochemical parameters are useful tools for clinics and feeding management of athlete equines. The population of high-performance horses consists of different breed groups, displaying specific phenotypic and metabolic characteristics related to the type of sport activity they perform. For example, Padalino and coworkers (2014) focused on the hematology of Standardbred trotters reared in southern Italy [30]. Blood samples were collected from 100 apparently healthy trotters, reared in different horse stables. Hematologic parameters were screened, and microscopic evaluation for parasites in the red cells was performed. Descriptive statistics were estimated for the hematologic data, and variance analysis was performed by the general linear model procedure, including adjustment for gender and age. Standardbred trotters reared

in southern Italy showed some peculiarities in their hematology compared with reference values. Young racing trotters (aged 3 and 4 years) reported a mean corpuscular volume value lower than other age categories and reference ranges. This finding could be explained in several ways: it could be hypothesized that the lower volume (MCV) was offset by a greater number of RBCs, which would permit a sufficient delivery of oxygen to muscles and other tissues; or that a large number of RBCs temporally sequestered in the spleen had been rapidly transferred into the circulation in response to excitement, as younger horses were not completely habituated to this procedure. Therefore, a less intensive training and a balanced nutritional plan were suggested to improve their welfare and performance. In conclusion, this study provides new reference values useful for veterinarians and equine technicians [30].

The study of Pritchard and co-workers (2009) was carried out during the Muslim holy month of Ramadan, when most horses work fewer hours than at other times of year, and environmental temperatures are moderate for Pakistan [38]. This served two purposes: 1) it maximized our chances of finding healthy subjects, rather than simply 'average' ones, and 2) the sample was relatively unlikely to include overworked or dehydrated animals, potentially allowing us to differentiate between the baseline reference intervals and values found in animals with those conditions. Pakistan was chosen because it has a large working horse population (approximately 339,000 horses), because equine welfare there is similar to that in at least four other developing countries (Afghanistan, Egypt, India and Jordan: Pritchard et al., 2005). Any differences between UK reference ranges and the resulting Pakistan ranges could not only offer information on chronic sub-clinical abnormalities and deficiencies in the latter population, but could also offer insights into the physiological adaptations enabling these horses to cope with their living conditions. The study of Pritchard and co-workers (2009) aimed to establish comprehensive reference values for horses working in developing countries, and to compare them against accepted values for horses in developed countries, supporting diagnosis and clinical decision-making. Horses in developing countries usually perform strenuous work in hot, resource-limited conditions, so their 'normal' blood parameters may differ from other horses. Blood was analyzed from 203 working horses in Pakistan, meeting defined clinical criteria. Age, sex, body condition and work-type showed small significant effects, but none were clinically relevant. Of the 32 reference intervals, 28 overlapped those of UK horses. However, the entire reference interval for creatine kinase was higher than for UK horses, while those for erythrocytes, albumin and albumin:globulin ratio were lower. Haematocrit and haemoglobin concentrations were also low. In particular, the relatively low reference intervals for red cell parameters and haemoglobin suggest that sub-clinical anaemia may be common even in apparently healthy working horses; this could be a harmful consequence of disease or malnutrition, or could be an adaptive response to work, dehydration, or chronic disease. Therefore, apparently healthy working horses may have chronic muscle damage from overwork, and may have sub-clinical anaemia. Interventions combating these conditions could improve animal welfare, although it is unclear whether differences between UK and Pakistan reference values reflect chronic abnormalities, or are in fact physiological adaptations enabling horses to cope with the challenging conditions [38].

In order to assess which laboratorial parameters need specific age- and/or gender-related reference values, hematological and biochemical profiles (including hormones) were performed by Muñoz and co-workers (2012) in 205 Spanish foals of 5 groups: A (1–2 months; 20 fillies, 10 colts), B (2–3 months; 24 fillies, 18 colts), C (3–6 months; 25 fillies, 16 colts), D (6–9 months; 20 fillies, 23 colts) and E (9–12 months; 25 fillies, 15 colts) [27]. Additionally, 120 adult horses were sampled in order to establish

baseline data for this breed. Group E had lower red blood cell number and mean cell volume than B, C and D, and neutrophil count was lower in A. Albumin was lower in A than in D, lactate was higher in B, C and D, creatine kinase, aspartate transaminase and potassium were higher in C. In D and E, cortisol was lower and adrenaline was higher. Urea progressively increases, whereas alkaline phosphatase decreases with age. Packed cell volume was higher in fillies of group A, creatinine was higher in colts of group E and fillies of groups B, C, and D had higher aldosterone than colts. In comparison to Spanish adult horses, mean cell volume, albumin, urea, creatine kinase, aspartate transaminase, lactate dehydrogenase, and alkaline phosphatase requires specific ranges for foals. Although it is recommended that each laboratory develop its own reference intervals from samples obtained from clinically normal individuals, practitioners that work with Spanish foals can use these reference intervals as guidelines for a more precise interpretation of hematology, serum biochemical tests and hormones in these animals. MCV values required specific reference ranges for the Spanish foals in comparison with adults of the same breed, RBC, MCV, MCH, NEU were affected by age, whereas PCV was affected by gender. HB, MCHC, WBC, LYM were not affected by age and gender [27].

The study of Lacerda and co-workers (2006) investigated the hemato-biochemical parameters in three high-performance horse breeds from Southern Brazil [26]. In the state of Rio Grande do Sul, in the South of Brazil, racing, jumping, polo, endurance, reigning, and dressage are the main activities. A total number of 154 horses belonging to the breeds Thoroughbred, Brasileiro de Hipismo, and Criollo, were selected for this study. Within each breed, samples were collected from males (n=12) and non-pregnant females (n=12) of two ages: 1 to 3 years of age (n=12) and over five years of age (n=12). Hematological (total count of erythrocytes and leukocytes, blood cell volume, hemoglobin, and differential count of leukocytes) and biochemical (lactate, fructosamine, glucose, cholesterol, total protein, albumin, globulins, fibrinogen, urea, calcium, magnesium, phosphorus, and enzymes LDH, AST, GGT, and CK) parameters were analyzed. Significant differences were observed in hematological and biochemical parameters, except for calcium and albumin, among breeds. There was no significant effect of age or sex within breed. This study shows that the local population, the breed and the type of sport activity are important variables to be considered in the analysis of blood parameters of horses [26].

In study of Paden and co-workers (2014), the hematological and biochemical parameters in the blood of indigenous Croatian working horse breeds were investigated [31]. The Posavina and Croatian Coldblood horses are adapted to harsh environmental conditions and their blood parameters might differ from other horse breeds. The study was carried out on 100 mares and 12 stallions of ages from 2 to 19 years. Fifteen hematological and 19 biochemical parameters were analyzed. Values of 22 parameters showed considerable overlapping with values obtained for other horse breeds, and substantial resemblance is evident with values reported for Pakistani working horses. Several reference values showed statistically significant effect of sex. None of the parameters studied showed any differences associated with age. The adaptation of Posavina and Croatian Coldblood horses to the harsh environment of flooded pastures and the way of breeding might be reflected in their specific reference values [31].

Conclusions. In our study, all hematological indices of English half-breed horses were within the reference values specified for horses, which proves good health and proper condition of the tested animals. The leukocyte values found for the studied horses are within the interval found in literature [23, 24, 43, 45]. In the present study, granulocytes constituted more than 50 % of WBC in the studied horses. The resting values of

RBC number, HCT and HB concentration determined in the current experiment for horses were close to those obtained in earlier studies [18, 25, 36, 43]. The resting HCT value and HB concentration give information on blood oxygen capacity.Platelet number of studied horses are within the interval found in literature [43].Physiological variables showed a possible adaptation to work by the carriage horses but were not sufficient to diagnose a welfare problem. Management practices and other animal-based indicators should be included in further studies to obtain a holistic conclusion.

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ГЕМАТОЛОГИЧЕСКИЙ ПРОФИЛЬ АНГЛИЙСКИХ ПОЛУКРОВНЫХ ЛОШАДЕЙ ИЗ ПОМЕРАНСКОГО РЕГИОНА (СЕВЕРНАЯ ПОЛЬША)

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Порода, возраст и пол являются важными факторами, которые следует учитывать при интерпретации гематологического профиля в клинической биохимии и ветеринарии. Гематологические параметры могут предоставить информацию о состоянии здоровья, работоспособности и пригодности лошадей. Предполагая, что на гематологические показатели сильно влияет образ жизни, которым подвергаются лошади, цель этого исследования заключалась в том, чтобы проанализировать значения гематологических показателей у английских полукровных лошадей из померанского региона Польши в период покоя, чтобы оценить их физиологическое состояние. В этом исследовании использовали девять здоровых английских полукровных лошадей (7 кобыл и 2 жеребца) в возрасте (7,6 ± 0,9) лет в деревне Карликово, в административном округе Крокова, в округе Пуцк, Поморское воеводство, в северной Польше. Все лошади участвовали в рекреационных конных прогулках. Цельную кровь использовали для определения гематологических показателей с использованием гематологического анализатора (AbacusJuniorVet, Austria). Измерения включали общее количество эритроцитов (RBC, М/мкл), содержание гемоглобина (HB, г/дл); гематокрит (HCT, %); Средний объем эритроцита (MCV, фл); Среднее содержание гемоглобина в 1 эритроците (MCH, пг); Средняя концентрация гемоглобина в эритроцитах (MCHC, г / дл); ширина распределения эритроцитов (RDW; %); общее количество лейкоцитов (WBC, К/мкл); нейтрофилов (NEU, К/мкл и % WBC); лимфоцитов (LYM, К/мкл и % WBC); моноцитов (MON, К/мкл и % WBC); эозинофилов (EOS, К/мкл и % WBC); базофилов (BAS, К/мкл и % WBC); общее количество тромбоцитов (PLT, К/мкл); и средний объем тромбоцитов (MPV, фл). В нашем исследовании все гематологические показатели английских полупородных лошадей находились в пределах контрольных значений, что свидетельствует о хорошем здоровье и надлежащем состоянии испытуемых животных. В настоящем исследовании

гранулоциты составляли более 50 % пула лейкоцитов. Значения количества циркулирующих эритроцитов, концентрации гемоглобина и гематокритабыли близки к полученным в более ранних исследованиях. Число тромбоцитов находилось в пределах интервалов, найденных в литературе. Гематологические показатели показали возможную адаптацию к физической нагрузке лошадей, но не были достаточными для диагностики их физиологического состояния.

Ключевые слова: английские полукровные лошади, кровь, гематологический профиль, Поморское воеводство, рекреационная верховая езда

ГЕМАТОЛОГІЧНИЙ ПРОФІЛЬ АНГЛІЙСЬКИХ НАПІВКРОВНИЙ КОНЕЙ З ПОМЕРАНСЬКОГО РЕГІОНУ (ПІВНІЧНА ПОЛЬЩА)

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Порода, вік і стать є важливими факторами, які слід враховувати при інтерпретації гематологічного профілю в клінічній біохімії та ветеринарії. Гематологічні параметри можуть надати інформацію про стан здоров'я, працездатність та придатність коней. Припускаючи, що на гематологічні показники сильно впливає спосіб життя, яким піддаються коні, мета цього дослідження полягала в тому, щоб проаналізувати значення гематологічних показників у англійських напівкровних коней з померанского регіону Польщі в період спокою, щоб оцінити їх фізіологічний стан. У цьому дослідженні використовували дев'ять здорових англійських напівкровних коней (7 кобил і 2 жеребця) у віці (7,6±0,9) років в селі Карликово, в адміністративному окрузі Крокова, в окрузі Пуцьк, Поморське воєводство, в північній Польщі. Всі коні брали участь в рекреаційних кінних прогулянках. Цільну кров використовували для визначення гематологічних показників з використанням гематологічного аналізатора (Abacus Junior Vet, Austria). Визначали загальну кількість еритроцитів (RBC, М/мкл), вміст гемоглобіну (HB, г/дл); гематокрит (HCT, %); Середній об'єм еритроцита (MCV, фл); Середній вміст гемоглобіну в 1 еритроциті (MCH, пг); Середня концентрація гемоглобіну в еритроцитах (MCHC, г/дл); ширина розподілу еритроцитів (RDW; %); загальну кількість лейкоцитів (WBC, К/мкл); нейтрофілів (NEU, К/мкл і % WBC); лімфоцитів (LYM, К/мкл і % WBC); моноцитів (MON, К/мкл і % WBC); еозинофілів (EOS, К/мкл і % WBC); базофілів (BAS, К/мкл і % WBC); загальну кількість тромбоцитів (PLT, К/мкл); і середній об'єм тромбоцитів (MPV, фл). У нашому дослідженні всі гематологічні показники у коней знаходилися в межах контрольних значень, що свідчить про їх задовільний фізіологічний стан. У цьому дослідженні гранулоцити становили понад 50 % пулу лейкоцитів. Значення кількості циркулюючих еритроцитів, концентрації гемоглобіну і гематокриту були близькі до отриманих в більш ранніх дослідженнях. Число тромбоцитів знаходилося в межах інтервалів, знайдених в літературі. Гематологічні показники показали можливу адаптацію коней до фізичного навантаження, але не були достатніми для діагностики їх фізіологічного стану.

Ключові слова: англійські напівкровні коні, кров, гематологічний профіль, Поморське воєводство, рекреаційна верхова їзда