DOI: https://doi.org/10.59913/dagr.2026.24254

Donkey (Equus asinus) welfare in contemporary husbandry systems

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Abstract

The welfare of donkeys (Equus asinus) in contemporary husbandry systems is shaped by the interaction of biological, behavioural, and environmental factors. Their evolutionary adaptation to arid environments has led to high metabolic efficiency and specific behavioural traits that may become risk factors under modern conditions. Abundant feeding and reduced activity often result in metabolic disorders such as obesity, insulin resistance, and hyperlipemia, increasing the risk of laminitis and compromised welfare. Assessment is complicated by their stoic nature, as donkeys rarely show clear signs of pain. Therefore, traditional evaluation methods are often insufficient, requiring objective approaches based on subtle behavioural changes, body condition, and physiological indicators. Integrated assessment enables early detection and prevention of chronic disorders. Environmental conditions are also critical. Despite their perceived resilience, donkeys are sensitive to moisture and low temperatures, while poor housing increases the risk of respiratory and hoof diseases. The shift from working roles to milk production, tourism, and therapy introduces additional challenges, including reduced activity and increased stress. Improving welfare requires species-specific management and better education of owners. In conclusion, donkey welfare depends on an integrated approach combining scientific knowledge, objective assessment, and management aligned with species-specific needs.

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Keywords: donkey welfare; Equus asinus; metabolic disorders; husbandry systems; welfare assessment

Introduction

The donkey (Equus asinus) has had a key influence on the development of human civilization as a primary labour force in transport and tillage. Despite their importance for economic stability, donkeys have been systematically neglected in scientific and social circles throughout history in favour of horses (MCLEAN et al., 2018). The misperception of donkeys as "small horses with big ears" leads to inappropriate treatment in feeding and care. Such an approach directly threatens their welfare under modern husbandry and breeding settings (THE DONKEY SANCTUARY, 2015). Animal welfare is today defined as a state in which an animal is healthy, nourished, safe and able to express its innate behaviour, without suffering pain or fear. This concept is most often applied through the "Five Freedoms" model, which integrates the physical health and emotional state of the individual (FAWAC, n.d.). The importance of protecting working animals is globally recognized, as highlighted in the FAO report on the role, impact and welfare of traction and transport animals (FAO, 2014). In developing countries, welfare is primarily impaired by overwork and inappropriate equipment. On the contrary, in developed parts of Europe, donkeys face metabolic diseases and obesity due to overfeeding (TUČKORIĆ, 2021). In the Republic of Croatia, indigenous donkey breeds represent an invaluable genetic heritage and have become key factors in environmental conservation and tourism. It is precisely this change in role that requires the adjustment of housing standards, since donkeys have a specific resistance to climatic conditions (OSTHAUS et al., 2018).

The aim of this research is to analyse the welfare factors of donkeys through the identification of their biological and ethological needs. Special emphasis is placed on the application of objective scientific parameters such as the Animal Welfare Indicators (AWIN) system and the definition of guidelines for improving care in order to prevent suffering of this species.

Welfare assessment in donkeys

Objective assessment of donkey welfare represents one of the most complex challenges in modern veterinary medicine and zootechnics. Donkeys have a unique behavioural repertoire that often masks states of severe pain or chronic stress, which requires the use of precise, scientifically based instruments (DALLA COSTA et al., 2021). The development of standardized systems has enabled the transition from momentary observation to quantitative analysis of parameters that encompass physical health, emotional state and the quality of the environment in which the

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animal resides. This approach eliminates guesswork and subjective assessments that have often been the cause of erroneous conclusions. The system is based on objective evidence collected during field research by the authors who have addressed this topic. According to research by MASEBO et al. (2025), the use of such indicators allows for the early recognition of metabolic and psychological deviations before they become irreversible. The application of the AWIN system represents a state-of-the-art approach to objective assessment, as it integrates direct observations of the animal with an assessment of housing conditions, focusing on proper nutrition, housing, health and appropriate behaviour (DALLA COSTA et al., 2021). The protocol is designed to be easily applied in different breeding settings. It provides clear guidelines for assessing welfare regardless of the breed or purpose of the donkeys. This specific model allows owners and veterinarians to recognize subtle signs of impaired welfare through the assessment of skin cleanliness, hooves and gait (DAI et al., 2016). The Donkey Grimace Scale (DGS) further facilitates the recognition of suffering (ORTH et al., 2020), and the application of this protocol has proven to be crucial because signs of pain in donkeys are often more difficult to detect than in horses. Each assessment requires a high level of observer education. FARIAS et al. (2021) emphasize that such systematic application is not only a diagnostic tool, but also a preventive mechanism that allows owners to timely adjust living conditions, thereby raising welfare standards in the long term. The Body Condition Scoring (BCS) system is a key method for indirect assessment of nutritional status, using a scale from 1 to 5 (THE DONKEY SANCTUARY, 2015). The assessment procedure should be carried out regularly at intervals of several weeks. In this way, trends in the animal's weight change can be more easily monitored. The implementation requires physical palpation of the neck, withers and loins, since MANDIĆ et al. (2025) point out that it is precisely palpation of the neck that reveals specific fat deposits that are a permanent indicator of obesity and metabolic stress. Since the ribs in donkeys are not often visible due to the thickness of the skin, palpation remains a necessary step to avoid erroneous assessments (TUČKORIĆ, 2021). Systematic condition monitoring prevents the development of subclinical inflammatory processes associated with obesity (MASEBO et al., 2025), while behavioural indicators, such as ear position and muscle tension around the eyes, serve as precise indicators of acute pain (DALLA COSTA et al., 2021). Visual monitoring of behaviour within the herd provides additional information about the psychological state. When animals show apathy or withdrawal from the herd, this is a clear sign of impaired welfare (ARTEMIOU et al., 2021). Elevated levels of cortisol in the hair confirm chronic stress in animals exposed to adverse husbandry conditions (BUKHARI et al., 2025), and by monitoring metabolic parameters such as urea and ACTH hormones (ZHAO et al., 2020), experts can make an accurate diagnosis and provide a comprehensive assessment of the condition of each individual. LÉNÁRT et al. (2017) draw attention to the frequent constitutional faults, organismal weaknesses in donkeys. A significant part of the population consists of

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individuals with the defects toeing out forelimb, sickle-hocked hind limb, and X-leggedness. Extreme physical deformities are also related to the well-being of the animals and affect their performance and lifespan.

Sustainable donkey husbandry

Understanding the welfare of donkeys in modern husbandry systems requires an analytical review of the interaction between their inherited biological mechanisms and the conditions imposed on them by humans. The greatest challenges in practice often arise from anthropocentric errors, where these animals are imposed with standards of housing developed for horses, which is unsustainable in the long term. As MASEBO et al. (2025) point out, ensuring adequate welfare is not only the absence of disease, but a comprehensive approach that includes nutritional, environmental and husbandry conditions adapted to the specific needs of this species. The differences in anatomy and physiology between these species are often ignored in everyday practice. According to research conducted by THE DONKEY SANCTUARY (2015), inadequate nutrition and exposure to adverse climatic conditions are the most common causes of chronic health impairment in European farms. An additional difficulty in assessment is represented by husbandry conditions, because environmental stressors directly affect the immune system and homeostasis of the organism (ZHAO et al., 2020). Feeding represents one of the greatest challenges in modern donkey husbandry due to their exceptional metabolic efficiency. Adapting to the specifics of conditions of constant scarcity, donkeys have developed a digestive system that can extract nutrients from very poor and fibrous forage, which makes them susceptible to serious disorders in conditions of abundance. The incidence of colic in older donkeys is often associated with dental diseases and the absence of molars. As stated by THIEMANN and SULLIVAN (2019), the incidence of colic regularly results in secondary hyperlipemia, which critically threatens the chances of a successful treatment outcome. According to research conducted by MANDIĆ et al. (2025), obesity in donkeys, and especially in dairy donkeys, is directly associated with subclinical metabolic disorders. Their research highlights that elevated levels of urea and uric acid in obese individuals can be used as early biomarkers of inflammatory processes that precede clinical symptoms of laminitis. To maintain optimal welfare, feeding must be based on voluminous forage with a high crude fibre content and strictly limited access to new grass (THE DONKEY SANCTUARY, 2015). When exposed to rain without adequate shelter, the donkey loses its ability to retain body heat, which leads to hypothermia and chronic physiological stress. The problem of inadequate drainage systems, highlighted in dairy husbandry by KOVANDŽIĆ et al. (2024), has serious consequences for the hooves. The resting area must be clean and spacious enough to allow all individuals to lie on dry bedding. There is a clear correlation between the weight of the load carried by the donkey and the concentration of cortisol in its hair, which confirms chronic stress (BUKHARI et al., 2025). ZHAO ET AL (2020) found

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that long-term transport drastically changes the composition of the nasal microbiota and increases the level of the hormone ACTH, while JIANG et al. (2021) prove that transport stress negatively affects the intestinal microflora. The introduction of standardized assessment protocols is therefore a key factor in the long-term improvement of living conditions (FSAHAYE et al., 2018). The status of donkeys in Croatia is deeply connected to cultural identity, but mechanization has led to the threat of indigenous breeds. The change in the purpose of breeding has brought new risks, with the transition to dairy systems requiring new standards adapted to the reduction of the animal's physical activity (MASEBO et al., 2025). The change in the animal's primary function often results in reduced supervision by the owner. In indigenous breeds, the risk of metabolic disorders that impair their welfare increases (MANDIĆ et al., 2025), while adequate drainage is often lacking on dairy farms (KOVANDŽIĆ et al., 2024). Stress caused by poor housing or rough treatment inhibits the milk release reflex, and tourist use without rest additionally exhausts the animals (TUČKORIĆ, 2021). The legislative framework provides basic protection, but hidden signs of impaired welfare often remain beyond the reach of inspection. Lack of understanding of specific ethology is a major cause of subclinical diseases, therefore standardized assessment programs play a key role in raising standards (ARTEMIOU et al., 2021). In addition to regulations that condition incentives on compliance with zootechnical standards (ANIMAL PROTECTION LAW, 2017, 2019), systems such as AWIN need to be introduced to enable more objective assessment (DALLA COSTA et al., 2021).

Conclusion and recommendation

Research to date clearly indicates that moving away from the traditional, anthropocentric identification of donkeys with horses is a key prerequisite for achieving an appropriate level of their welfare. The specific physiology, extremely energy-efficient metabolism and characteristic stoic way of expressing pain require completely different zootechnical standards from those applied in horse breeding. It is precisely this stoicism that represents the greatest diagnostic challenge, because the ability to conceal pain often leads to late recognition of serious health conditions, which makes it necessary for the veterinary profession and breeders to apply objective assessment methods. In modern breeding, and especially in the Republic of Croatia, we are witnessing a significant change in the role of the donkey from an exclusively working animal to an animal for dairy and tourist purposes, which brings new risks. Obesity, insulin resistance and laminitis are becoming dominant threats to welfare due to inadequate energy-rich nutrition and reduced physical activity, which is why the systematic application of scientifically based systems, such as the AWIN system and BCS scoring, is necessary, which enable early detection of impaired welfare through subtle changes in facial expression and analysis of body

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condition. Improving the welfare of donkeys in Croatia must not rely solely on strict legal frameworks, but primarily on continuous and professional education of owners, which is key to recognizing the specific needs of the species. A deep understanding of the fact that donkeys require dry shelter due to their specific hair structure, fibre-based nutrition and the necessary preservation of social bonds through the phenomenon of permanent pair bonding, is the only way to sustainable breeding. Only by working together with scientific knowledge, objective indicators and an educated ethical approach can we ensure the long-term survival and quality of life of these unique indigenous breeds in the future.

References

ARTEMIOU, E. – HUTCHISON, P. – MACHADO, M. – ELLIS, D. – BRADTKE, J. – PEREIRA, M.M., CARTER, J. – BERGFELT, D. (2021): Impact of human-animal interactions on psychological and physiological factors associated with veterinary school students and donkeys. Frontiers in Veterinary Science, 8, Article 701302. https://doi.org/10.3389/fvets.2021.701302

Animal Welfare Indicators. (2015): AWIN welfare assessment protocol for donkeys. https://doi.org/10.13130/AWIN_DONKEYS_2015

BUKHARI, S.S.U.H. – LI, C.M. – KENÉZ, Á. – STEAGALL, P.V. – MCELLIGOTT, A.G. – PARKES, R.S.V. (2025): Donkey hair cortisol concentrations are associated with carrying heavy load and being beaten at work. BMC Veterinary Research, 21, Article 582. https://doi.org/10.1186/s12917-025-05021-2

DAI, F. – DALLA COSTA, E. – MURRAY, L.M.A. – CANALI, E. – MINERO, M. (2016): Welfare conditions of donkeys in Europe: Initial outcomes from on-farm assessment. Animals, 6(1), Article 5. https://doi.org/10.3390/ani6010005

DALLA COSTA, E. – DAI, F. – MURRAY, L.M.A. – CANNAS, S. – CANALI, E. – ZANELLA, A.J. – MINERO, M. (2021): The development of the AWIN welfare assessment protocol for donkeys. Brazilian Journal of Veterinary Research and Animal Science, 58 (Special Issue), Article e173333. https://doi.org/10.11606/issn.1678-4456.bjvras.2021.173333

FARIAS, S. de S. – GAMEIRO, M.B.P. – MONTECHESE, A.C.D. – BERNARDINO, T. – OLIVEIRA, C.A. de A. – ZANELLA, A.J. (2021): Case report: The use of the AWIN welfare assessment protocol to monitor a group of abandoned donkeys. Brazilian Journal of Veterinary Research and Animal Science, 58, Article e174701. https://doi.org/10.11606/issn.1678-4456.bjvras.2021.174701

FARM ANIMAL WELFARE ADVISORY COUNCIL [FAWAC] (n.d.): Animal welfare guidelines for horses, ponies and donkeys. Department of Agriculture, Food and the Marine.

DOI: https://doi.org/10.59913/dagr.2026.24254

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS [FAO] (2014): The role, impact and welfare of working (traction and transport) animals: Report of the FAO–The Brooke Expert Meeting (Animal Production and Health Report No. 5).

FSAHAYE, S. – KUMAR, N. – KEBEDE, E. – ABEBE, N. (2018): Health and welfare assessment of working donkeys in and around Rama town, Tigray, Ethiopia. Ethiop. Vet. J., 22(1):26–39. https://doi.org/10.4314/evj.v22i1.3

JIANG, G. – ZHANG, X. – GAO, W. – JI., C. – WANG, Y. – FENG, P. – FENG, Y. – ZHANG, Z. – LI, L. – ZHAO, F. (2021): Transport stress affects the fecal microbiota in healthy donkeys. Journal of Veterinary Internal Medicine, 35(5):2449–2457. https://doi.org/10.1111/jvim.16235

KOVANDŽIĆ, M. – PINTARIČ, Š. – ĐORĐEVIĆ, J. – LEDINA, T. – SAVIĆ RADOVANOVIĆ, R. – ČOBANOVIĆ, N. (2024): On-farm welfare conditions of dairy donkeys: A case study in Northern Serbia. Meat Technology, 65(2):146–153. https://doi.org/10.18485/meattech.2024.65.2.8

LÉNÁRT, Z. – ERNST, M. – GÁSPÁRDY, A. (2017): Preliminary results on body conformation of Hungarian Fallow Donkey. Danubian Animal Genetic Resources. 2:51–58. https://www.dagene.eu/docs/pazin_2017/dagene_pazin_2017.pdf

MANDIĆ, A. – MATORKIĆ, B. – SPARIOSU, K. – RADAKOVIĆ, M. – MITROVIĆ, A. – NENADOVIĆ, K. – KOVAČEVIĆ FILIPOVIĆ, M. (2025): Obesity, urea and uric acid: Potential indicators of subclinical metabolic imbalance in donkeys (Pilot study). Pakistan Veterinary Journal, 45(3):1415–1418. https://doi.org/10.29261/pakvetj/2025.246

MASEBO, N.T. – BENEDETTI, B. – ANGELONI, M.G. – LEE, L. – BIGI, D. – PADALINO, B. (2025): Systematic literature review on donkeys (Equus asinus): Husbandry and welfare in Europe. Animals, 15(19), Article 2768. https://doi.org/10.3390/ani15192768

MCLEAN, A.K. – NAVAS GONZÁLEZ, F.J. (2018): Can scientists influence donkey welfare? Historical perspective and contemporary view. Journal of Equine Veterinary Science, 65, 25–32. https://doi.org/10.1016/j.jevs.2018.03.008

Zakon o zaštiti životinja (Animal protection act) (2017, 2019): Narodne novine, Zagreb, Croatia.

ORTH, E.K. – NAVAS GONZÁLEZ, F.J. – IGLESIAS PASTRANA, C. – BERGER, J.M. – JEUNE, S.S.L. – DAVIS, E.W. – MCLEAN, A.K. (2020): Development of a Donkey Grimace Scale to Recognize Pain in Donkeys (Equus asinus) Post Castration. Animals (Basel). 10(8):1411. https://doi.org/10.3390/ani10081411

OSTHAUS, B. – PROOPS, L. – LONG, S. – BELL, N. – HAYDAY, K. – BURDEN, F. (2018, June 28). Weathering the weather: Effects of the environment on donkey, mule and horse welfare [Conference presentation]. UFAW Animal

DOI: https://doi.org/10.59913/dagr.2026.24254

Welfare Conference: Recent Advances in Animal Welfare Science VI, Newcastle upon Tyne, United Kingdom.

THE DONKEY SANCTUARY. (2015): The donkey care handbook (4th ed.). The Donkey Sanctuary.

THIEMANN, A.K. – SULLIVAN, R.J.E. (2019): Gastrointestinal disorders of donkeys and mules. Veterinary Clinics of North America: Equine Practice, 35(3):419–432. https://doi.org/10.1016/j.cveq.2019.08.001

TUČKORIĆ, A. (2021): Metabolički poremećaji u magaraca i važnost magarećeg mlijeka u ljudskoj prehrani [Diplomski rad, Sveučilište u Zagrebu, Veterinarski fakultet]. Repozitorij Veterinarskog fakulteta Sveučilišta u Zagrebu.

ZHAO, F. – JIANG, G. – JI, C. – ZHANG, Z. – GAO, W. – FENG, P. – LI, H. – LI, M. – LIU, H. – LIU, G. – MAGALHAES, H.B. – LI, J. (2020): Effects of long-distance transportation on blood constituents and composition of the nasal microbiota in healthy donkeys. BMC Veterinary Research, 16, Article 338. https://doi.org/10.1186/s12917-020-02563-5