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Research

Are mules or donkeys better adapted for Egyptian brick kiln work? (Until we can change the kilns)

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ABSTRACT

The working conditions of donkeys and mules in the Egyptian brick kilns are often very challenging. Common problems for these equids include the following: overloading, overworking, heat stress, harness lesions, poor body condition scores (BCSs), and poor treatment by handlers. However, mechanization of the Egyptian brick kilns is not yet realistic without entirely renovating all kilns for additional space requirements, which would be cost-prohibitive at this time. In the brick kilns in the Helwan area (approximately 185 kilns, supplying all bricks for the cities of Cairo and Giza), more than 2,000 donkeys and 400 mules move ~200 million bricks per month, year round. From July 2012 to December 2013, the first author assessed 1,140 donkeys and 250 mules to answer the question of whether donkeys or mules are better suited for brick kiln work. Health parameters were assessed (e.g., pulse and respiratory rate, rectal temperature, mucous membranes, skin tent test, and capillary refill time); body lesions and BCSs were assessed on a 5-point scale from 1 (poor) to 5 (obese). Several behavior parameters (e.g., animal demeanor and human-animal interaction) were also assessed. The data were analyzed using SPSS 17.1. There were (mean ± standard error) 32.6% ± 0.99% of kiln mules and 53.5% ± 0.98% of kiln donkeys scoring a BCS ≤2 ($P < 0.001$). Heat stress and fever indicators were separated from each other for each measure and then respective scores were aggregated. Again, mules showed more favorable scores with the average aggregate heat stress score of mules being 26.8 ± 0.15 and of donkeys being 48.3 ± 0.25 ($P < 0.001$). Mules also showed fewer overwork-type body lesions (19.1 ± 0.45) than donkeys (32.9 ± 0.74; $P < 0.001$). When all health parameters were considered, it was apparent that mules are faring better than donkeys in the brick kiln environment. Should the kiln owners decide to replace donkeys with mules, one problem will need to be addressed: Mules more frequently showed aggressive behaviors and avoidance behaviors to unfamiliar handlers (19.2% ± 0.17% aggressive mules versus 3.0% ± 0.02% aggressive donkeys; $P < 0.001$). Educational programs to assist with proper training and handling of mules should be implemented and then assessed for outcomes.

Introduction

Equids working in the brick kilns have multiple challenges. Their owners are resource-poor, and thus, these equids often receive inadequate nutrition, veterinary care, and other husbandry. They often wear poorly fitted, insufficiently padded harnesses and are hitched to poorly designed, sometimes dangerous, carts (de Aluja, 1998).

Adding to the challenges these brick kiln equids experience, is the temperature stress provided not only by high environmental temperatures, but the additional heat radiating from the kilns themselves. The terrain is often uneven and contains many inclines to navigate (Dennison et al., 2007). The typical driver of a brick kiln equid is an adolescent with very little experience in how to fairly handle equids and very little motivation to enhance the welfare of these equids. Most are hired by the owners and are expected to maximize daily production of bricks above all other goals (http://thebrookeegypt.org/web/?p=5527). The fact that most of the kilns are located in remote areas adds to the difficulty of the equids receiving adequate care because it is extra challenging for the

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mobile Non-Governmental Organizations (NGOs) clinics to visit these areas with any regularity.

The belief that donkeys and mules are more robust than horses contributes to a continuation of under nutrition, inadequate hydration, and in most cases, insufficient overall welfare conditions (Pearson et al., 1999). Several previous studies have found that problems such as mistreatment, overwork and faulty harness body wounds, poor body condition, heat stress, respiratory diseases, high parasite burdens, lameness, dental problems, and gastrointestinal illness in these animals are common (Tesfaye and Curran, 2005); consequently, the term "fit and feeling good" to illustrate that animal welfare includes both emotional and physiological components is not applicable here as their physical well-being is compromised by injury and disease, whereas emotional well-being is compromised by negative feelings such as fear, pain, and distress (Webster et al., 2004). Such problems are definitely reducing the well-being and subsequently the work efficiency of these animals. This, in turn, adversely affects the livelihood of the poor people who often rely on them (Kelley et al., 2003).

The lack of research work describing the adverse welfare status including deteriorated physical well-being of kiln donkeys and mules such as severity of body lesions often affecting them, the influence of improper nutrition and high parasite burden on the animals' body condition scores (BCSs), ratio of heat-stressed animals by studying the capability of animals there to withstand working through intense heat with water lack during working hours, studying ratio of kiln donkeys and mules suffering from infectious diseases, also poor emotional well-being of kiln donkeys and mules such as ratio of depressed animals during working hours, of animals that avoid human interaction and those that exhibit an aggressive interaction toward humans.

Because mechanization of Egyptian brick kilns is unrealistic for the foreseeable future, it is important to assess the welfare of the mules and donkeys being used and to work toward enhancing their welfare. Our objectives for this study were to assess the welfare of the mules and donkeys currently working in the brick kilns. On the basis of a holistic welfare assessment scheme, we wanted to determine whether mules or donkeys are better at handling the multiple challenges of the kiln environment. We wanted to identify the most pressing welfare problems affecting this subcategory of working equids.

Materials

Animals and observer

A total number of 1,140 donkeys and 250 mules were assessed in this study (constituting about 50% of all the donkeys and mules estimated to be working in Helwan brick kilns in Egypt) over the period from July 2012 to December 2013. Actually there are no official data for total number of factories or the population of working mules and donkeys in Helwan brick kilns. Estimates are based on either local knowledge or those estimates done by The Brooke (http://thebrookeegypt.org/web/?p=5527). Both have been used to make the best estimate of the total number of animals working there. All the animals working in each of the 92 factories (constituting about 50% of all factories) have been assessed except for 6 animals because of handlers' rejection of having their equids assessed.

The assessments were all done by the first author after 2 months' preliminary work in the kilns. The preliminary work helped postulate the most optimum selection and sequence of observations, ensure the main objective of the present study, refine the observations to meet with the nature of work style and the owners' culture in the brick kilns, and to reach the optimum speed and accuracy recording such observations as the assessments had to be done without interrupting the animals' work (only a minimal rest period could be used). During this period, the first author had also thoroughly studied and investigated the 102-page photographic guide for working equine welfare assessment of Pritchard and Whay (2004) and then carefully selected and modified the required parameters for collecting data in the present study. Moreover, a practical field training for measuring the selected parameters and verification of the observer reliability was done with a very experienced Brooke Egypt veterinarian, a highly experienced horse behaviorist (second author); additionally, >25% of the acquired data were fully verified, post hoc, for observer reliability with a working equine expert (fourth author).

Measuring parameters

Behavior parameters were measured according to Burn et al. (2010a) with some modifications to ensure meeting the main objective of the present study and to sustain a thorough assessment of the animals' state of alertness and response to both observer approach and contact. The body lesions were assessed according to Dennison et al. (2007). As a true lesion might include scars of old wounds, broken skin and/or subcutaneous tissue, visible muscle, and/or bone or tendons. Also the surface area of a recorded lesion must be of at least 2×2 cm^2 (quadratic lesion), 1×4 cm^2 (rectangular lesion), or 2.3 cm in diameter (circular lesion) to be recorded.

A specific sequence for measuring the parameters was developed so as to optimize efficiency while maintaining accuracy. Furthermore, it was imperative that the order did not influence the outcomes.

1 The observer started from a distance of 3 m away from the equid at an angle of 45° from the sagittal plane of the animal's body and maintained this position for 10 seconds without any disturbance, and the animal's attitude was observed. This was followed by 60 seconds counting the respiratory rate (RR) of the animal and recording any change of the animal's attitude. Animals' state of alertness and RR were assessed immediately after stopping their work to minimize confusion between depression and relaxation or sleep and also to prevent confounding of the results with a rise in respiration due to fear of observer approach and/or manipulation while measuring other parameters.
2 At the same distance but at an angle of 20° from the sagittal plane of the animal's head, the observer approached the animal with slow and calm-paced steps, stopped at about 30 cm away from the animal's head and recorded the animal's response while simultaneously observing any lesions on the animal's nasal bridge.
3 At the same position, the observer slowly raised his opened hand toward the animal's chin and touched it, then recorded the animal's response, followed by holding the animal's head and counting the animal's pulse from the external maxillary artery.
4 The observer then assessed the color of the oral mucus membranes according to Mekuria et al. (2013) followed by applying the capillary refill time (CRT) test according to the methods of Popescu et al. (2014).
5 The observer recorded any neck lesions followed by applying the skin tent test (STT) following the method of Pritchard et al. (2006).