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SHORT COMMUNICATION

Application of the Hands-On Donkey Tool for Assessing the Welfare of Working Equids at Tuliman, Mexico

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ABSTRACT

Equids are still used for diverse chores in Mexico and are essential for the livelihoods of numerous families. Appropriate health and behavior are prerequisites for performing work without affecting welfare. This study aimed to assess the welfare of working equids in Tuliman, applying the hands-on donkey tool. This tool evaluates five dimensions (behavior, body condition score [BCS], wounds, lameness, and other health issues) and was applied to 438 working equids (horses, mules, and donkeys). The Kruskall-Wallis test was applied to investigate differences between species and sex. Donkeys were more common; they also presented more positive behaviors and less lameness ($p < 0.05$). No differences were found for BCS among species on a scale ranging from 1 to 5 (mean BCS for donkeys = 1.9; mules = 2; and horses = 1.8). Mares had significantly lower BCS (mean = 1.5) than stallions ($p < 0.05$) and geldings (mean = 1.9). Overall mules had better welfare evaluations. The tool allowed detection of welfare issues in working equids; a practical outcome would be implementing local welfare strategies according to its results.

KEYWORDS

Animal welfare; hands-on donkey tool; welfare assessment; working equid

Over 85% of equids in the world are located in developing countries (FAOSTAT, 2008), where they are mostly used as working animals (Burn, Dennison, & Whay, 2010). Mexico is not an exception; donkeys, mules, and horses are used for draft power and as pack animals (De Aluja, 1998). These nonhuman animals are essential for the livelihoods of their caregivers, and an appropriate welfare state is required for performing work without repercussions on their health and mental state. The work environment for equids usually includes long working hours, harsh climate conditions, overuse, ill-fitting tack, and a lack of available and affordable veterinary and other services (De Aluja, 1998; Pritchard, Lindberg, Main, & Whay, 2005). These conditions may lead to welfare problems such as lameness, injuries, poor body condition, and skin problems (De Aluja, 1998; Pritchard et al., 2005; Tadich, Escobar, & Pearson, 2008).

The use of a combination of physical, behavioral, and mental parameters has been commonly used in the welfare assessment of working equids (Geiger & Hovorka, 2015; Popescu & Diugan, 2013; Pritchard et al., 2005; Reix, Burn, Pritchard, Barr, & Whay, 2014; Tadich et al., 2008). In the case of Mexico the Donkey Sanctuary (DS), together with the Universidad Nacional Autónoma de México (UNAM), is applying a welfare assessment tool called the "hands-on donkey tool," developed by the DS, that includes five dimensions associated with some aspects of the five freedoms developed by the Farm Animal Welfare Council in 1993. The assessment is presented in the form of a hand, where each finger represents one dimension.

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The thumb represents indicators associated with the behavior and quality of communication between the animal and caregiver (freedom to perform natural behaviors, freedom from fear); the index finger, the body condition score ([BCS]; freedom from hunger and thirst); the middle finger, the presence of wounds (freedom from pain and injuries); the ring finger, the presence of lameness (freedom from pain); the pinky, other signs of ill health (freedom from disease); and the palm of the hand, the life of the donkey (horse or mule) within the community, mainly resource-based indicators (freedom from discomfort) (Figure 1). The aim of this study was to apply the hands-on the donkey tool to evaluate the welfare state of working equids in the community of Tuliman in the state of Guerrero, Mexico.

Materials and methods

During the dry season (August 2013–February 2014), a total of 438 working equids were assessed in the area of Tuliman, Guerrero, Mexico. For this, caregivers were invited to a free veterinary clinic provided by the DS, together with the Veterinary Faculty of the UNAM. The free clinics were announced by microphone or loudspeaker, and, during these clinical services, individual information (sex, age, species) was registered and the hands-on donkey tool applied by one observer (veterinarian).

The tool was applied to 234 donkeys, 157 horses, and 47 mules. The assessment consisted of five dimensions, all with scores between 1 and 5:

(a) Behavior and quality of communication between animal and owner (freedom to perform natural behavior and freedom from fear and distress): The general attitude of the animal was observed, and his or her response to basic handling by the observer and the owner (caregiver) was registered. A score of 1 was given to an animal easy to handle by the owner and the observer, with friendly behavioral reactions when approached and touched. A score of 2 was given for an equid who resisted moving when handled by the owner and observer; 3 when the animal did not allow contact by the observer and the owner required the use of a rope to handle the animal (e.g., to lift a limb); and 4 when the equid threatened to kick the observer when approaching, and the owner needed to raise his or her voice and hold the ear of the animal tight to handle him or her. Finally, a score of 5 was given to an animal who the observer could not approach and handle, and who the owner needed to use excessive force for handling (i.e., uses a stick to hit animal); the equid had his or her ears pinned backward and threatened to kick or bite the owner.
(b) Body condition score (freedom from hunger and thirst): A 5-point BCS scale was applied, where 1 corresponds to an animal extremely emaciated and 5 to an obese equid.
(c) Wounds (freedom from pain and distress): A score of 1 was given to an animal with no lesions and a 5 to an animal with signs of pain who refused to work due to the extension and severity of the lesions.
(d) Lameness (freedom from pain and distress): A score of 1 was given to a horse who was sound and with proper limb conformation (properly angled front and hind legs) and cleanliness of the hooves while the maximum score of 5 was given to an animal who presented evident lameness, pain, and poor conformation and cleanliness of the hooves.
(e) Other signs of ill health (freedom from injury and disease): After physical examination of equids, a score of 1 was given to an animal who did not present any other physical or behavioral problems, excluding those described in the first four dimensions. A scores of 2 was assigned when an acute problem was present, but did not interrupt the ability of the equid to work; a score of 3 was assigned to an animal with an acute problem who showed difficulties performing his or her work activities; and 4 was assigned when a chronic health problem was present that did not allow the animal to work without affecting another dimension of the protocol. A score of 5 was given to animals who presented a problem not included in the other dimensions that did not allow him or her to properly work (i.e., infectious or non-infectious diseases), and the life of the animal was at risk.

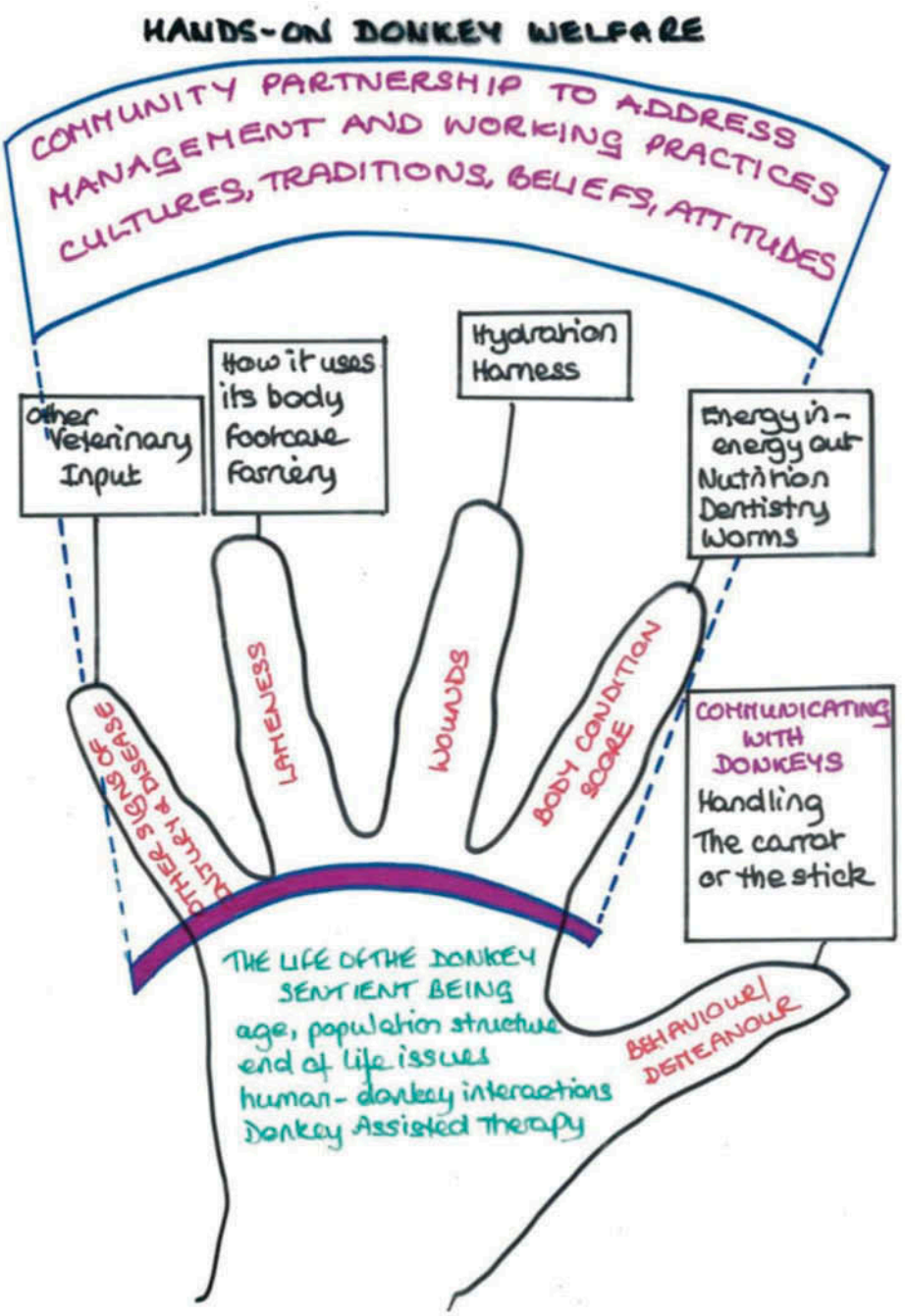

Figure 1. Description of the hands-on donkey tool for assessing animal welfare. Used with permission from "The Multi-dimensional Donkey in Landscapes of Donkey-Human Interaction," by S. Blakeway, 2014, *Relations: Beyond Anthropocentrism, 2*, p. 71 doi:10.7358/rela-2014-001-blak.

Statistical analysis

Descriptive statistics (frequencies, percentages, mean, standard deviation, median, and range) were calculated according to species and sex. For evaluating differences among species, and between sex within species, the Kruskal-Wallis test was applied and then an all pairwise

multiple comparison post hoc test. Pearson's correlation was used to assess correlation between dimensions. A p value of <0.05 was considered significant.

Results

In total, the tool was applied to 234 donkeys, 157 horses, and 47 mules. Table 1 shows a summary of the mean, median, and range for each dimension according to species, and for the age of the animals assessed. Mules (mean = 9 years) and horses (mean = 7.5 years) assessed were significantly (p = 0.0001) older than donkeys (mean = 6.4 years) (Table 1).

Of the five welfare dimensions assessed, significant differences among species were found for behavior and human-animal interaction, lameness, and other health problems. For behavior, mules and horses had significantly higher scores (p = 0.001) compared to donkeys (Table 1), meaning that they were more difficult to handle by the owner and the observer, and presented more negative behaviors. Horses presented more lameness and hoof problems than donkeys (p = 0.04) and, finally, donkeys presented more health problems than mules (p = 0.0091).

Table 2 shows the mean and standard deviation for each dimension according to sex within species. Although females, males, and castrated animals were present in the three species, castrated animals were more common in the case of mules and horses while entire males were more frequent in the case of donkeys. Castrated animals also tended to be older for the three species, with this difference being significant for donkeys (p = 0.006) and horses (p = 0.0026).

Within donkeys, jennies had significantly lower BCS than males and castrated animals (p = 0.033); the same was true in horses, where mares had the lowest BCS (p = 0.05). A correlation was found between age and lesions in horses (r = 0.26; p = 0.0009), age and lameness in donkeys (r = 0.144; p = 0.027), and age and other health issues for mules (r = 0.16; p = 0.048) (Table 3).

Discussion

Working equids make an essential contribution to the livelihoods of the poorest people around the world (Blakeway, 2014; Pritchard et al., 2005). Their work includes moving water and firewood, agricultural produce, building materials, and people (Blakeway, 2014; De Aluja, 1998; Pritchard et al., 2005; Tadich et al., 2008).

Table 1. Mean, standard deviation, median, and range of five welfare dimensions assessed, according to species.

	Age	Behavior	BCS	Wounds	Lameness	Other
Donkeys (N = 234)						
Mean (SD)	6.4(±3.8)[a]	1.3(±0.7)[a]	1.9(±0.6)[a]	1.5(±0.9)[a]	1.1(±0.3)[a]	2.2(±1)[a]
Median	5	1	2	1	1	2
Range	1–25	1–5	1–3	1–5	1–4	1–5
Mules (N = 47)						
Mean (SD)	9(±5.2)[b,c]	2(±1.3)[b]	2(±0.7)[a]	1(±0.9)[a]	1(±0.5)[a,b]	2(±0.9)[b]
Median	7	2	2	1	1	2
Range	1–21	1–5	1–4	1–5	1–4	1–5
Horses (N = 157)						
Mean (SD)	7.5(±4)[c]	1.7(±1)[b]	1.8(±0.7)[a]	1.6(±0.9)[a]	1.2(±0.5)[b]	2(±1.1)[a,b]
Median	7	1	2	1	1	2
Range	1–25	1–5	1–4	1–4	1–4	1–5
p value	0.0001	0.0001	0.3963	0.567	0.04	0.0091

[a, b, c] Different letters denote significant differences (p < 0.05) between species for each welfare dimension and age. BCS = body condition score.

Table 2. Mean and standard deviation for age and five welfare dimensions assessed, according to species and sex.

	Age	Behavior	BCS	Lesions	Lameness	Other
Donkeys (N = 234)						
Mares (jenny) (n = 36)	6.3(±4.6)[a]	1.5(±1.0)	1.6(±0.7)[a]	1.4(±0.9)	1.2(±0.6)	2.1(±0.9)
Stallions (jack) (n = 151)	5.8(±3.2)[a]	1.3(±0.7)	1.9(±0.6)[b]	1.5(±0.9)	1.1(±0.3)	2.1(±1)
Castrated (n = 47)	8.0(±4.2)[b]	1.4(±0.7)	1.9(±0.6)[a,b]	1.4(±0.8)	1.0(±0.2)	2.4(±1.1)
p value	0.006	0.09	0.033	0.617	0.94	0.108
Mules (N = 47)						
Mare mule (n = 15)	8.5(±4.4)	1.6(±1.0)	1.8(±0.6)	1.7(±1.1)	1.1(±0.4)	2(±1.1)
Male mule (n = 13)	8.7(±4.6)	2.5(±1.7)	2.4(±1)	1.2(±0.6)	1(±0)	1.4(±0.7)
Castrated mule (n = 19)	9.6(±6.3)	2(±1.1)	1.9(±0.4)	1.5(±1)	1.2(±07)	1.8(±0.9)
p value	0.936	0.46	0.15	0.389	0.37	0.176
Horses (N = 157)						
Mares (n = 18)	5.5(±3.2)[a]	1.6(±1.1)	1.5(±0.7)[a]	1.5(±0.9)	1.1(±0.5)	1.8(±1.1)
Stallions (n = 47)	7.1(±4.8)[a]	1.7(±1.1)	1.9(±0.7)[b]	1.6(±0.9)	1.6(±0.9)	2.1(±1.1)
Geldings (n = 92)	8.1(±3.6)[b]	1.8(±1)	1.9(±0.7)[b]	1.6(±0.8)	1.2(±0.5)	2.1(±1.1)
p value	0.0026	0.391	0.05	0.81	0.701	0.47

[a, b] Different letters denote significant differences ($p < 0.05$) between sex within species for each of the dimensions assessed. BCS = body condition score.

Table 3. Spearman correlations between age of individuals and scores for dimensions assessed, according to species.

	Age					
	Donkeys (N = 234)		Mules (N = 47)		Horses (N = 157)	
Dimension	r value	p value	r value	p value	r value	p value
Behavior	0.063	0.338	−0.28	0.056	0.059	0.46
BCS	−0.123	0.06	0.07	0.637	0.072	0.3
Lesions	0.099	0.137	0.045	0.759	**0.26**	**0.001**
Lameness	**0.144**	**0.027**	0.043	0.775	−0.055	0.489
Health	0.1	0.09	0.18	0.22	**0.16**	**0.048**

Note. Significant correlations ($p < 0.05$) are in bold. BCS = body condition score.

Welfare assessment of working equids is crucial for establishing welfare regulations, enacting legislation, and implementing welfare strategies aimed toward improving the quality of life of owners and equids within communities (Blakeway, 2014). The five freedoms framework has been widely used as a basic approach for assessing animal welfare. The hands-on donkey tool (Figure 1), developed by the Donkey Sanctuary, applied in this study involves the five freedoms and provides a holistic view of the animal's life and needs (Figure 1). It also allows identification of the animal's most affected dimensions (Table 1).

The Tuliman community relies on donkeys, horses, and mules for work, with donkeys being the predominant species. Mules are less available and are considered more valuable within the community. In relation to sex preference of working equids, most horses and mules were castrated (Table 2), except for donkeys. This tendency to use entire male donkeys for work is similar to the findings of Reix et al. (2014) for working donkeys in Pakistan where 80% were entire males. Castrated animals are easier to handle by owners, with a tendency worldwide to use them for work since they also avoid the loss of working hours and income that mares incur during pregnancy (Tadich et al., 2008). Also, castrated donkeys and horses in this study were significantly older ($p < 0.05$), and the same tendency was observed for mules. Further studies are required to explore if there is a causal effect of castration on longevity, as the mules and horses assessed were significantly older than the donkeys ($p < 0.05$). This could be related to better care being given by people to horses and mules who are considered more valuable compared to donkeys who are cheaper.

Differences in behavior and human animal interaction were found; mules and horses had significantly higher (negative) scores compared to donkeys (Table 1). These scores, although not significantly different, tended to be higher for male mules and horses, and for female donkeys (Table 2); and more difficult to handle mules tended to be younger (Table 3). These situations could also explain the decision of owners to castrate male mules and stallions and have fewer jennies.

These results differ from previous studies where aggressive and depression-like behaviors were more prevalent in working equids, and could be explained by the fact that the present study assessed the interaction of the owner and an observer with the equid. Other studies assessed interaction only with the observer (Pritchard et al., 2005), who could be perceived as a novel object by the animal, inducing fear and avoidance responses (Popescu & Diugan, 2013). Positive human-animal interactions in working equids are essential for facilitating daily activities, encouraging positive human attitudes, and improving animal welfare, as observed in other species (Kielland, Skjerve, Osteras, & Zanella, 2010).

The BCS assessment did not show differences among the three species (Table 1), with a median BCS of 2 points (poor; similar to the findings of Pritchard et al., 2005) and ranging from 1 to 4, indicating that individuals with a score of 1 (extremely emaciated) were present. Within donkeys, jennies had significantly lower BCS than males and castrated animals, the same being true for horses. This could be explained by the potential extra energy cost that breeding and lactation has for this group (Tadich et al., 2008). On the other hand, if owners attribute a higher value to mules, they may invest more in better forage and other resources for their maintenance.

Lesions are common in working equids (De Aluja, 1998; Pritchard et al., 2005; Tadich et al., 2008), and are usually associated with ill-fitting harness systems, or poor handling by owners (Tadich et al., 2008). In general, no differences were found among species or between sexes, with a median score of 1 (low presence of wounds), ranging from 1 to 5. A correlation was found between age and lesions in horses ($r = 0.26$; $p = 0.0009$), but not between age and BCS ($r = -0.08$; $p = 0.31$) or age and behavior ($r = 0.059$; $p = 0.46$). Older horses may have more a prominent bone structure, resulting in greater contact that creates lesions from ill-fitting tack. On the other hand, they could be the result of accumulated lesions over time. At the same time, animals who behave better and are easier to handle by owners may be kept longer for work while animals who are difficult to handle or have behavioral problems might be eliminated earlier in life.

Lameness, poor limb conformation, and poor hoof care are problems reported in working equids worldwide (De Aluja, 1998; Reix et al., 2014; Tadich et al., 2008); in the present study, scores ranged from 1 to 4, with the condition of horses being significantly worse than that of donkeys and mules, but with no differences due to sex. Limb conformation abnormalities are frequent in working equids. For example, in donkeys in Pakistan, over 70% had at least one type of conformation abnormality (Reix et al., 2014). The same authors reported that the relationship between conformation and lameness is still unknown, and requires further research through longitudinal studies. For example, Broster, Burn, Barr, and Whay (2009) reported a protective effect of carpal valgus for carpal pathologies; this effect was not found in the Reix et al. (2014) study.

In the case of other diseases and injuries that might affect working equids, donkeys had significantly higher scores than mules, but did not differ from horses, indicating that they had a disease present that did not allow them to work. One explanation could be the presence of leukoencephalomalasia in a group of donkeys, which was associated with the presence of the mycotoxin in the corn that was fed to the animals. The equine leukoencephalomalacia was diagnosed through postmortem examination of donkeys diseased during the program visit of the DS (R. Cagigas, personal communication, 19 October 2015). Improvement of husbandry practices associated with the storing of food could prevent this pathology, which has been previously reported in horses and donkeys in Mexico (Rosiles, Bautista, Fuentes, & Ross, 1998; Rosiles, Torres, & Ross, 1996). The distribution and frequency of Fusarium and Fumonisin B1 have been determined for various states of Mexico by Contreras, Rosiles, Rios, Muñoz, and

Fuentes (2007). The same authors concluded that the incidence should be continually monitored to control consumption of the fungus-infested corn in Mexicans' daily diets as well as in the horses' diets.

Some limitations of this study are associated with the limitations of the hands-on donkey tool. Since the tool has been developed for easy assessment of welfare in the field, and also to promote an instrument that can be easily understood by the owners, the simplification of the indicators does not allow researchers to have specific solutions for the problems observed. For example, it is not meant for making a specific diagnosis of a health problem, but it does allow us to have a first global view of some aspects of the life of the equids that might be compromising their welfare and then develop a second stage of more specific evaluations and establishment of a welfare strategy.

Conclusion

The hands-on donkey tool allowed for the detection of welfare issues in the working equids of the Tuliman community. The most affected domains were BCS and other diseases and injuries. Differences among species were also found that could be associated with rusticity and physical adaptation to work and local conditions (weather, resources available), and with local cultural beliefs granting higher values to some types (sexes, species) of animals. These differences should also be considered when assessing animal welfare.

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References

Blakeway, S. (2014). The multi-dimensional donkey in landscapes of donkey-human interaction. *Relations: Beyond Anthropocentrism*, *2*, 59–77. doi:10.7358/rela-2014-001-blak

Broster, C. E., Burn, C. C., Barr, A. R. S., & Whay, H. R. (2009). The range and prevalence of pathological abnormalities associated with lameness in working horses from developing countries. *Equine Veterinary Journal*, *41*, 474–481. doi:10.2746/042516409X373907

Burn, C. C., Dennison, T. L., & Whay, H. R. (2010). Relationship between behaviour and health in working horses, donkeys and mules in developing countries. *Applied Animal Behaviour Science*, *126*, 109–118. doi:10.1016/j.applanim.2010.06.007

Contreras, P. C., Rosiles, M. R., Ríos, R. C., Muñoz, R. C., & Fuentes, O. V. (2007). Geographic distribution and frecuency of Fusarium and Fumonisin B1 in Mexican corn. *Agricultural Journal*, *2*, 222–225.

De Aluja, A. (1998). The welfare of working equids in Mexico. *Applied Animal Behaviour Science*, *59*, 19–29. doi:10.1016/S0168-1591(98)00117-8

FAOSTAT. (2008). Food and Agricultural Organization of the United Nations. FAO Statistical Database, Rome, Italy. Retrieved from http://faostat.fao.org/site/409/default.aspx

Geiger, M., & Hovorka, A. J. (2015). Using physical and emotional parameters to assess donkey welfare in Botswana. *Veterinary Record Open*, *2*, 1–7. doi:10.1136/vetreco-2014-000062

Kielland, C., Skjerve, E., Osteras, O., & Zanella, A. J. (2010). Dairy farmer attitudes and empathy towards animals are associated with animal welfare indicators. *Journal of Dairy Science*, *93*, 2998–3006. doi:10.3168/jds.2009-2899

Popescu, S., & Diugan, E. A. (2013). The relationship between behavioral and other welfare indicators in working horses. *Journal of Equine Veterinary Science*, *33*, 1–127. doi:10.1016/j.jevs.2012.04.001

Pritchard, J. C., Lindberg, A. C., Main, D. C. J., & Whay, H. R. (2005). Assessment of the welfare of working horses, mules and donkeys, using health and behaviour parameters. *Preventive Veterinary Medicine*, *69*, 265–283. doi:10.1016/j.prevetmed.2005.02.002

Reix, C. E., Burn, C. C., Pritchard, J. C., Barr, A. R., & Whay, H. R. (2014). The range and prevalence of clinical signs and conformation associated with lameness in working draught donkeys in Pakistan. *Equine Veterinary Journal*, *46*, 771–777. doi:10.1111/evj.12231

Rosiles, M. R., Bautista, J., Fuentes, V. O., & Ross, F. (1998). An outbreak of equine leukoencephalomalacia at Oaxaca Mexico, associated with Fumonisin B1. *Journal of Veterinary Medicine Series A*, *45*, 299–302. doi:10.1111/tbed.1998.45.issue-1-10

Rosiles, M. R., Torres, M. G., & Ross, F. P. (1996). Confirmación fisicoquímica de la fumonicina B1 en maíz y alimento para équidos que murieron por leucoencefalomalacia. *Veterinaria México*, *27*, 111–113.

Tadich, T., Escobar, A., & Pearson, R. A. (2008). Husbandry and welfare aspects of urban draught horses in the south of Chile. *Archivos De Medicina Veterinaria*, *40*, 267–273. doi:10.4067/S0301-732X2008000300007