

## Husbandry and welfare aspects of urban draught horses in the south of Chile

### Aspectos de manejo y bienestar en equinos de tiro urbano en el sur de Chile

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#### RESUMEN

En el sur de Chile los equinos de tiro continúan siendo la fuente principal de ingreso para numerosas familias. En muchas ocasiones estos equinos de trabajo no son mantenidos en óptimas condiciones. El objetivo de este estudio fue determinar las prácticas de manejo y parámetros relacionados con bienestar animal en un grupo de sesenta y un equinos carretoneros, pertenecientes a cincuenta propietarios, de tres ciudades del sur de Chile (Valdivia, Osorno y Puerto Montt). Se utilizaron métodos directos (basados en el animal) y métodos indirectos. Estos incluyeron aspectos de salud, comportamiento y prácticas de manejo. La mayoría de los equinos presentaron una conformación masisa, pero más pequeña que la de las razas de tiro clásicas encontradas en otras áreas templadas en el mundo. En general presentaron buena condición corporal (59%) y alertas (92%), con sólo unos pocos animales que presentaron una respuesta agresiva al momento de evaluar su comportamiento. Los principales problemas encontrados están relacionados con el manejo de cascos y las prácticas de alimentación. No se encontró asociación entre buena conformación de cascos y el uso de herreros o experiencia de los dueños. Esto se debe principalmente a una carencia de conocimiento y comprensión de prácticas de manejo y trabajo adecuados que permitan obtener un mejor rendimiento de sus equinos sin poner en riesgo el bienestar de éstos. La comunidad de dueños de equinos de trabajo se vería beneficiada con la instauración de programas educacionales en el futuro.

*Key words:* draught horses, welfare, husbandry, Chile.

*Palabras clave:* equinos de tiro, bienestar, manejo, Chile.

#### INTRODUCTION

Animal power continues to be an important resource in agriculture and urban transport in developing countries worldwide. Most Latin American countries are undergoing development, but extensive poverty can still be found mainly because of an unequal distribution of wealth (Li Pun *et al* 1999). Chile, located in the south cone of the continent, is no exception, although it now has political and natural advantages that make it a more stable country than some others.

The Lake District, in the south of Chile, has a temperate climate. In this area it is commonplace to see urban draught horses. They are mainly used for the transport of goods, especially wood and products from agriculture for markets. The owners are usually from poor communities, regarded as lower class groups, that are located in the peri-urban areas of cities. They have a tradition of working with animals and their cart horses are their main source of income (MacLeod 1999).

Many studies have been undertaken to evaluate husbandry and welfare aspects of working equids, either used in farming systems or urban activities, in arid or semi-arid countries (Smith and Pearson 2003, Kay *et al* 2004, Pritchard *et al* 2005, Pearson and Krecek 2006). Only a few studies regarding draught horses have been undertaken in countries like Chile that have a rainy temperate climate with a Mediterranean influence in the south (Meyer 1992, Tadich *et al* 1997, 2007). The welfare problems and husbandry needs of these horses are likely to be different from those described for working animals in tropical and subtropical countries. Therefore the aim of this study was to investigate these parameters in a group of urban draught horses belonging to three cities (Valdivia, Osorno and Puerto Montt) of the south of Chile. These 3 cities have an average population of 153,000 inhabitants each, their main activities being aquiculture, agriculture and forestry (INE 2002).

Research strategies to assess welfare of animals have been based mainly on two types of data, indirect and direct measurements. Indirect methods evaluate the adequacy of the inputs and management practices that the animal receives indicating the risk of a welfare problem (Wood *et al* 1998). On the other hand direct methods use animal based parameters as a measure of the animal's welfare status (Pritchard *et al* 2005). In order to generate sufficient information direct and indirect methods were used. For both methods aspects of behaviour, feeding, mainte-

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nance and veterinary care were considered. According to Endenburg (1999), these four aspects are part of the field of knowledge that should be addressed to maintain horses in appropriate conditions.

## MATERIAL AND METHODS

### ANIMALS

Sixty one urban draught horses from 3 cities were studied: 22 two horses from Valdivia, 11 from Osorno and 28 from Puerto Montt. Horses were checked when they attended a programmed veterinary visit, provided by volunteers from the Veterinary School of the Universidad Austral de Chile (AMIVECC<sup>1</sup>). This was the first veterinary visit provided by AMIVECC for the cities of Osorno and Puerto Montt, and were run to recruit horses for the study. In Valdivia AMIVECC normally runs between March and December of each year.

### DIRECT (ANIMAL BASED) DATA

Information on the following aspects was collected with the help of volunteers from the Veterinary School of the Universidad Austral de Chile through direct assessment of horses.

*Identification of the horse:* Information about the breed, sex and age of horses was recorded.

*Conformation measurements:* The height to the withers was measured from the 5<sup>th</sup> thoracic vertebrae to the ground, parallel to the fore limb. Heart girth was measured in a circumference of the thorax behind the withers and elbows. Elbow to *tuber ischii* length was measured from the scapulo-humeral joint to the *tuber ischii*. Estimation of live weight was calculated using the following equation modified for Chilean Horses by Meyer (1992):

$$HG^2 \times EIL / 11,462.1$$

Where HG is the heart girth and EIL the shoulder-*tuber ischii* length, both are expressed in centimetres.

*Body condition score (BCS):* A score of poor, fair or good was given to the horses according to the system proposed by Henneke (1985) and adapted by Naour (2003) for Chilean draught horses.

*Behaviour parameters:* The protocol developed by Pritchard *et al* (2005) was modified to account for the type of work and animals used in Chile. Heat stress was not considered, neither were the indicators used for donkeys or pack work. The following ethogram was applied: response to observer approaching the head from 3-5 metres away at an angle of approximately 45 degrees, a friendly response was considered when the animal turned its head towards the observer and an avoidance / aggressive response was

considered when it did one or more of the following: turned the head away, moved away, flattened the ears or attempted to bite or kick. Response to the observer walking down the side of the animal's body, at a distance of 30 cm from its side, turning at the tail and walking toward the head, the response was that the horse acknowledged the observers presence e.g. ear turn, move away, kick. Avoidance of chin contact was the proportion of animals avoiding contact or withdrawing the head when the observer's hand was placed lightly under the chin.

*Health status:* The status of mucous membranes and eyes, presence or absence of lesions at the commissures of the lips, molar hooks and sharp edges on the teeth, ectoparasites and diarrhoea under the tail. Skin tent and condition of the coat (dry or uneven), feet/hoves conformation and the presence and location of wounds and scars were recorded.

### INDIRECT (OWNER BASED) DATA

Inputs affecting the horses' well-being, that is resources and husbandry practices, were determined through a survey of owners/users of the horses. The survey covered 34 questions about feedstuff, working practices, owner's experience, horse shoeing practices and veterinary consultations, and it was applied orally to every horse owner while their horses were being checked.

### STATISTICAL ANALYSIS

The data from the 61 horses examined and the 50 draught horse owners surveyed was incorporated into Excel sheets. Means, standard deviation and percentages were calculated using Microsoft Office Excel ® 2003 for Windows XP descriptive statistics function.

The interactions were examined using Chi-Square and Fisher's test. For significant differences between unbalanced groups, one way ANOVA and Mann-Whitney test were applied. For correlations Pearson's correlation was used. The significance level was set to  $P < 0.05$ . Analyses were performed with Minitab 14 ® 2006.

## RESULTS AND DISCUSSION

### ANIMAL BASED DATA

All horses included in the study are representative of the urban draught horses currently used in the assessed cities. The morphological and individual characteristics of horses give them aptitudes to perform work more quickly than oxen in addition to being easier to ride and pack (Beltrán 1954). According to Beltrán (1954) the optimum height to the withers of a horse performing light draught work is between 150-160 cm. All 61 urban draught horses included in this study were mixed breeds, with a mean height to the withers of 143 cm ( $\pm 5.4$  cm) and a mean

<sup>1</sup> AMIVECC: Amigos Veterinarios de los Caballos Carretoneros, grupo de estudiantes voluntarios pertenecientes a la Escuela de Medicina Veterinaria de la Universidad Austral de Chile.

estimated live weight of 371 kg ( $\pm$  59 kg), with only 8% of horses below 300 kg, leaving the studied horses out of the optimum range proposed by Beltrán (1954). The weight of the load carried by the horses had no correlation with the estimated weight of the horses (Pearson's correlation = 0.051,  $P = 0.695$ ) again similar to findings in Mexico (DeAluja 1998), suggesting that owners rarely adjust the load to the size of the animals.

There is a preference among owners for the use of geldings for draught work (62%). Geldings are easier to handle than stallions, and they also avoid the loss of working hours and loss of income that mares incur during pregnancy. A similar preference for male animals was found by Pearson *et al* (2001) for people using donkeys for work in urban areas in Ethiopia.

Horses reach maturity at approximately 4 years of age and working them before that stage can be detrimental for their health since skeletal development is not completed (Meyer 1992). The average age of horses in this study was found to be 8.5 years ( $\pm$  2.9 years) which is similar to the observation made by McLeod (1999) in the same area (7 years). MacLeod (1999) suggested horses work best when they are in the range from 4-12 years of age. In the present study 13% of horses were under 4 years of age and these young horses were pulling the same weight of load as older horses (Pearson's correlation = 0.031,  $P = 0.812$ ). Meyer (1992) and McLeod (1999) also found young horses working (7% and 19% of young horses, respectively) in a Chilean population of draught horses. Similar findings were reported by De Aluja (1998) in Mexico. This suggests people using working horses are interested in short

term immediate gain, rather than looking to the long term working life of their equids.

The majority of horses were in good BCS (59%), in contrast to the reported expectation of malnutrition in working equidae (Prentis 1994); only 8% of the horses were found in poor BCS at the time of the visit. This may be due to the time of year when they were assessed (April-May). This is the beginning of autumn, when the first rain falls and a second wave of grass growth is available. However a large percentage of owners provided supplementary feed which may also have contributed to the generally good BCS.

Behavioural observations are central to the evaluation of welfare (Webster 2005). Behavioural responses to different challenges were assessed since the horse's response is what allows it to cope with a challenge and to influence its well-being. Horses are flight animals, but in the captive environment in which they are kept, most challenges have been removed. Nevertheless the psychological need to respond to environmental factors might still exist leading to new behavioural responses like apathy, unresponsiveness, hyperresponsiveness, and stereotypic behaviour (Cooper and Albentosa 2005). This is why not responding to a challenge was also considered in this study.

The behaviour observations used (Pritchard *et al* 2005) give indications of the responsiveness of an animal to the environment and attempt to identify fearfulness. The behavioural observations made and the horse's responses are shown in table 1. Most horses had an alert attitude (92%) at the moment of examination. Only 31% presented avoidance-aggression responses, avoided chin contact or

**Table 1.** Behaviour observations, given in percentages, on 61 draught horses in the cities of Valdivia (22), Osorno (11) and Puerto Montt (28) in Chile.

Observaciones de comportamiento, expresados en porcentajes, en 61 equinos de tiro según ciudad de origen. Valdivia (22), Osorno (11) y Puerto Montt (28).

		Valdivia	Osorno	Pto. Montt	Total
General Attitude	Alert	82	91	100	92
	Apathetic/Severely depressed	18	9	0	8
Response to observer approach <sup>(1)</sup>	No response	0	0	11	5
	Friendly approach	55	64	71	64
	Avoidance / Aggression	46	36	18	31
Walk down side <sup>(2)</sup>	No response	18	55	32	31
	Responds	82	46	68	69
Avoids chin contact <sup>(3)</sup>	Yes	46	27	25	33
	No	55	72	75	67

<sup>(1)</sup> Response to observer approaching the head from 3-5 metres away at angle of approximately 45 degrees: *Friendly approach* = animal turns head towards observer

*Avoidance / Aggression* = animal does one or more of following: turns head away, moves away, flattens ears, attempts to bite or kick.

<sup>(2)</sup> Response to observer walking down the length of animal's body at a distance of 30 cm from its side, turning at tail and walking back toward the head.

*Responds* = any acknowledgment of observers presence e.g. ear turn, move away, kick.

<sup>(3)</sup> Proportion of animals avoiding contact or withdrawing the head when a hand was placed lightly under the chin.

**Table 2.** Health status on examination of the 61 draught horses from Valdivia, Osorno and Puerto Montt in Chile (N° and %).

Estado de salud al momento de la inspección de 61 equinos de tiro de las ciudades de Valdivia, Osorno y Puerto Montt. Resultados expresados en número y porcentajes.

	Valdivia		Osorno		Pto. Montt		Total	
	N°	%	N°	%	N°	%	N°	%
Mucous membranes abnormal	1	5	3	27	6	21	10	16
Lesions at commissures of lips	2	9	0	0	3	11	5	8
Molar hooks or sharp edges <sup>†</sup>	2	9	2	22	12	46	16	34
Eye (s) abnormal	1	5	2	18	3	11	6	10
Coat dry or uneven	3	14	5	46	7	25	15	25
Ectoparasites	2	9	0	0	0	0	2	3
Diarrhoea under the tail	0	0	0	0	0	0	0	0
Skin tent (loss of elasticity)	3	14	2	18	3	11	8	13

(<sup>†</sup>) Only 12 horses in Valdivia, 9 in Osorno and 26 in Pto Montt were checked for molar hooks or sharp edges.

showed no response at all. No association between avoidance of chin contact and horse-owning experience of the owner (less than 5 years) was found ( $P = 0.409$ ). For the same behaviour response there was no significant difference in the BCS of those horses that responded and those that did not ( $W = 1266$ ,  $P = 0.521$ ). Horses may have responded towards the observer in a different way than they would respond to their regular handler. This is a limitation of the observations (Pritchard *et al* 2005) as animals may present a fear response towards a possible danger, in this case the observer (Archer 1988, Broom 1991). The small number of horses that avoided chin contact could also imply that owners do not often handle the horses head in order to carry out painful or stressing procedures, so horses do not see this as a threat.

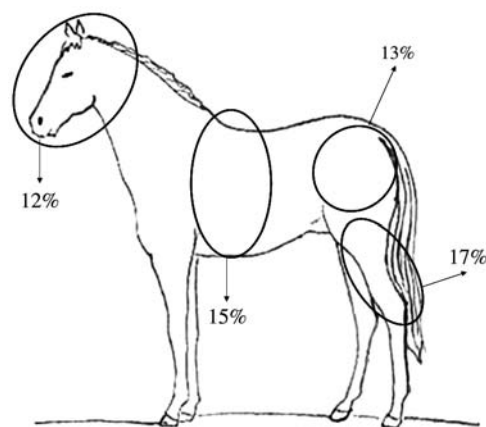
Health also has important implications on the welfare of animals (Broom 2006). Healthy animals are a prerequisite for the successful output of working animals (FAO 2006<sup>2</sup>) since disease can lead to a reduction in feed consumption, poor body condition and a subsequent decrease in working capacity (Pearson 2003). For most horses assessed this was their first veterinary check up. A summary of the health observations seen is given in table 2.

The presence of molar hooks or sharp edges on the teeth and dry or uneven coat were the main problems encountered at the time of examination. The presence of molar hooks and sharp edges on the teeth might be because none of these horses had ever had their teeth rasped. This may be due to lack of knowledge on the part of owners, the cost involved in this procedure or the lack of availability of the service. However, these teeth problems did not seem to be having a detrimental effect on nutrient intake as there was no significant difference in the BCS of horses associated

with the presentation of molar hooks and those without ( $W = 389$ ,  $P = 0.949$ ).

Dry or uneven coat can be directly related to the time of the year in which the study was undertaken (Autumn). Increased skin tent duration is a clinical sign of dehydration. A small percentage of horses showed this parameter compared with the high numbers encountered by Pritchard *et al* (2005) in tropical countries where heat stress is commonplace, suggesting that at the time of observation dehydration was not a major concern in the working horses that were checked.

The distribution of the main skin lesions (wounds and scars) observed is presented in figure 1. Only 13% of horses had wounds on the day of consultation but 38% presented scars. There was no significant association between the presence of skin lesions and owners having less than 5 years of experience handling horses ( $W = 1701.5$ ,  $P = 0.478$ ).



**Figure 1.** Location and percentage of the main skin lesions found according to body area, among 61 draught horses from Chile.

Ubicación anatómica y porcentaje de las principales lesiones de piel encontradas en 61 equinos de tiro en Chile.

<sup>2</sup> FAO: Food and Agriculture Organisation. 2006. Draught animal power, an overview. Agricultural engineering branch, FAO. Available at: <http://www.fao.org>

Injuries in draught horses usually vary from simple excoriations to deeper wounds sometimes affecting muscle and bone (Chavira-Sevilla 2003). The draught horses assessed presented a low percentage of wounds and scars at the moment of inspection, most of them being located on harness related areas. This is in agreement with the observation made by Hovell (1998) on the fact that wounds are mainly caused by badly fitting or poorly maintained equipment.

#### INDIRECT DATA

The group of urban draught horses studied belonged in their majority to families that are located in peri-urban areas or lower class neighbourhoods of bigger cities. In general, horse owners had more than 5 years of experience handling horses and working with a cart (88%). Even though draught horses are the main source of income for most owners (48%) included in this study, they only invest a small amount of money in their horses. The money spent on them involves mainly feedstuff and shoeing.

According to our survey horse owners spend an average of \$ 17,514 Chilean pesos (clp)(US\$ 35) on their horses monthly, which includes feedstuff and shoeing; this represents around 12% of their average income. Feedstuff accounts for the major part (mean of \$ 12,944 clp (US\$ 26)  $\pm$  \$ 7129 clp (US\$ 14). Ninety percent of owners provide some kind of supplementary feedstuff to their horses, commonly the use of forage plus grain (59%).

Working animals need to increase their food intake to match requirements produced by their work activities (Nengomasha 2003). Among the three cities studied only a small percentage of owners (10%) did not give any kind of supplementary feedstuff to their horses. In general they tried to provide their horses with the best feedstuff they could afford. However, the use of supplementary feedstuff had no significant effect on BCS of the horses assessed ( $W = 1720$ ,  $P = 0.683$ ). It may be speculated that owners could not afford sufficient amounts or quality of forage and grains to make a marked difference to BCS. Internal parasites could also have been affecting the BCS, but in the present study these were not evaluated. Water was provided by all owners, mainly at the end of each working day. Most of them brought water to their horses (54%) with only a few owners taking their horses to water points during the working day (16%). The small percentage (13%) of horses with signs of dehydration, evaluated through skin tent, suggest that they receive sufficient water.

Shoeing practices are of special importance in urban draught horses. The number of horses shod at the moment of inspection (95%) was much higher than figures reported for countries like El Salvador (Delgado 2002) but similar to the ones from Nicaragua (Bolaños 2002). The majority of horses were shod, with iron horse shoes, by their owners (70%) and only the remaining 30% by a farrier, every 15 or 30 days (25% and 38% respectively). This is

commonplace in developing countries where foot care and farriery are still based on tradition (Green 1994).

Shoeing should not be a problem if owners have a proper understanding of hoof balance and care, however high percentages of hoof/shoeing abnormalities were found. Hoof conformation was only ideal in 36% of the horses. The presence of long toes (43%) (figure 2) and upright hooves (44%) were the most common abnormalities seen. In this study, taking horses to a farrier had no significant association ( $X^2 = 0.000$ ,  $P=0.985$ ) with good hoof conformation. Hoof abnormalities had no association with owners having less than 5 years of experience (Fisher's test  $P = 1$ ) or with horses being shod every 15 days ( $X^2 = 0.002$ ,  $P = 0.962$ ). The reason for this could be the poor quality of service and low skill levels of the farriers due to a lack of farriery training courses in the country.

The urban draught horses assessed in this study were trained to work at a mean age of 3.2 years ( $\pm 1.6$  years) and started working with the cart at 3.7 years ( $\pm 1.7$  years). This means that they started working before reaching maturity. This finding is similar to that reported in the same area by Meyer (1992) and MacLeod (1999), and also in countries like Mexico, where animals are put to work when they are very young (De Aluja 1998). Overwork is a common problem encountered by working animals (De Aluja 1998), although in the south of Chile this does not seem to be a major problem as people are led to believe. Horses from this study were working an average of 4 hours/day ( $\pm 2.4$  hours) 3.6 days/week ( $\pm 2.1$  days).

Horses were used for carrying diverse types of loads, mainly wood for construction (44%) and wood for fuel (15%). This diversity of products has also been observed in Mexico (De Aluja 1998, Fall *et al* 2003). The estimated load weight was on average 415 kg ( $\pm 265$  kg), the most common range being between 301-400 kg (21%). There was no correlation between the age of horses and the



**Figure 2.** An example of a hoof abnormality (long toe) found among 61 draught horses in Chile.

Ejemplo de problema podal (pinza larga) detectado entre los 61 equinos de tiro en Chile.

weight of the load they carried (Pearson's correlation = 0.031,  $P = 0.812$ ) or between the horses estimated live weight and the weight of the load (Pearson's correlation = 0.051,  $P = 0.695$ ). Again, it would appear that there is little consideration given to the age, size or experience of horses when loading them for work.

The veterinary examination carried out for the purpose of this study was the first one for 46% of the horses. This was especially the situation for those horses from Osorno and Puerto Montt. In Valdivia, draught horses have had access to a healthcare and first aid volunteer programme (AMIVECC) since 1996. The effect of this programme can be seen in the lower percentages of animals with health abnormalities in this city. For two of the horses that had some health abnormalities this was the first time they visited the programme.

Despite the low number of veterinary consultations, only 12% of owners had never given their horses a product for internal parasites. The uncontrolled use of worming products can eventually lead to drug resistance. In Chile, internal parasite control systems for horses are based almost exclusively on the regular administration of products (Canales 2001) without testing to identify presence or type of parasite in most cases.

The small amount of health problems and negative behaviour responses found among horses of the three cities are a positive outcome related to their welfare. It shows that owners are aware of the need of keeping animals in good conditions in order to achieve efficiency in their work. Most of the problems found are due to a lack of understanding of basic husbandry practices. The main practices that could be affecting horses welfare at the moment are shoeing and feeding. Both could be addressed through the implementation of training courses for the draught horse owners and local farriers.

## SUMMARY

In the south of Chile draught horses are the main source of household income for many families and often these working horses are kept in conditions that are far from ideal. The aim of this study was to determine husbandry practices and welfare parameters for a group of sixty one urban draught horses belonging to fifty owners, from three cities (Valdivia, Osorno and Puerto Montt) in the south of Chile. Direct (animal-based) and indirect (owner based) methods were used to assess the welfare of the draught horses. Measurements included health status, behaviour and husbandry practices. Most animals were of a local sturdy type of horse, smaller than the large classical breeds of draught horses found in other temperate areas of the world. They were generally in good body condition (59%) and were alert (92%), with only a few showing aggressive responses when behaviour was assessed. The main problems found were related to hoof management and feeding practices. No association was found between taking horses to the farrier and good hoof conformation nor with the owner's horse-related experience. This was thought to be mainly due to the owner's lack of understanding of the husbandry, health and working practices needed to ensure that their horses performed well and met their requirements for work, without compromising their welfare. The community would benefit from an educational programme in the future.

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