



Original Research

Feeding Practices and Nutrient Intakes Among Elite Show Jumpers



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ABSTRACT

The objective of this study was to quantify feed and macronutrient intake, as well as generate information regarding nutritional concerns, in 34 elite-show jumper horses. All feed was weighed and used to determine digestible energy (DE), crude protein (CP), Ca, and P amounts offered to the horses daily. Questions to the horse's representative generated information regarding nutrition-related concerns, such as colic or gastric ulcers. Total feed intake averaged 14.9 ± 2.8 kg and was fed at $2.8 \pm 0.5\%$ of body weight (BW) on an as-fed basis. The DE offered met $119 \pm 4.8\%$ of the National Research Council (NRC) (2007) requirements for a horse at heavy work or $94.2 \pm 17\%$ of recommendations for very heavy work. Crude protein offered was also between these two classifications of workload. When expressed on a per kilogram BW basis, DE in the offered diet was 62.5 ± 11.4 kcal/kg BW and CP was 2.0 ± 0.5 g/kg BW. Ca in the diets offered more than two times the NRC requirements, while the diets only contained on average 87% of the NRC P requirements. Nutrition-related concerns were low, in part due to the widespread preventative use of ulcer medications and joint supplements (or injections). Colic concern was also low in this group of horses, despite frequent travel and sudden changes to new feeds. This study highlights a need for horse representatives to be mindful of feed selection when traveling to different venues where different feeds are available.

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1. Introduction

Athletic horses have nutritional requirements above their more sedentary counterparts. The National Research Council (NRC) (2007) categorizes equine work into four levels: light, moderate, heavy, and very heavy [1]. Both the moderate and heavy categories include show jumping (or rather, show horses) as an example of the type of discipline represented by the category. Elite show jumpers, however, (e.g., those that compete in Olympic level of events) may likely be included in the heavy work category.

Although nutrient requirements are largely based on controlled, scientific research studies, it is of interest to determine how these requirements are met in the field. Verhaar et al [2] reported feeding practices in New Zealand, in sport horses the week before competition. Most horses were kept on pasture for 24 hours day and were also fed an average of 1.8 kg (DM) of concentrate per day. Total calorie intake was estimated to be 25.5 Mcal per day. Martin et al [3] reported nutrient intakes of 20 show jumpers competing in France. It was reported these horses were offered on average 6.0 kg of roughage and 4.9 kg of concentrate, equating to an average of 27.4 Mcal per day and 1,220 g of crude protein (CP) per day. Brunner et al [4] gave a questionnaire to trainers of show jumpers in Switzerland, and the findings reported an average of 6.9 kg of roughage and 3.1 kg of concentrates.

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The objective of the present study was to add to the body of knowledge regarding nutrient intake and feeding practices of elite-level show jumper horses, by directly assessing the horses and feeds, and by questioning the horse's representatives. A unique contribution for the present study was to generate information regarding nutrition-related concerns in these horses [5].

2. Materials and Methods

The study was conducted at an international equestrian facility in summer of 2014 during a 4-day competition. Over the week, there were four competitions ≥ 1.5 m, with one event being a 1.6-m event (Concours de Saut International, CSI, Olympic Level), two 1.5-m events, and one 1.55-m event. Permission was obtained from the facility manager, and Fédération Equestre Internationale clearance was secured for the author to gain access to the horses and their representatives.

2.1. Data Collection

Each morning of the competition, the author obtained "daily sheets" with information of the horse and rider competing in classes with jumps reaching 1.5 m or higher. The author then approached the horse's representative (the rider, barn manager, head groom, or owner) and asked for permission and informed consent for their horse to be included in the study. A total of 34 horses representing eight countries were participated. The data provided on the daily sheets also indicated the horse's age, sex, and breed.

Each horse underwent a physical examination by the author. The examination included an estimation of body weight (BW), where $BW \text{ in lbs} = (\text{heart girth} \times \text{heart girth} \times \text{body length})/330$, with measurements in inches. Body condition score [6] and other morphometric measurements [7] such as cresty neck score and neck circumference were obtained.

The horse representative identified all feed (hay and concentrates) and supplements offered to each horse at each meal. These were weighed using a portable digital kitchen scale or by use of a hanging portable electronic scale (JMT 40 KG Portable Digital Scale, Insten, El Monte, CA) and hay net. Feed tag information was recorded. Supplements were recorded, and photographs were taken of the labels. When hay was offered "free choice," the amount added to the horse's hay net each day was weighed. Many horses were hand-walked daily, and this often included an opportunity to graze; however, this was considered to be a minimal component of the overall diet and was excluded from analysis.

Thirty-two of the 34 horses were offered timothy grass hay that was provided by the equestrian venue in the week of the event. An analysis of the hay that was offered the week of the study reported 5.0% CP, 52.4% neutral detergent fiber, 18.2% water soluble carbohydrate, 1.97 Mcal digestible energy (DE)/kg, 0.47% Ca, and 0.06% P on an as-fed basis (Equi-Analytical, Ithaca, NY). Digestible energy of the hay was calculated using the following equation: $DE \text{ (kcal/kg dry matter)} = 2,118 + 12.18 \text{ (CP \%)} - 9.37 \text{ (acid detergent fiber \%)} - 3.83 \text{ (hemicellulose \%)} + 47.18 \text{ (fat \%)} + 20.35$

$\text{(non-structural carbohydrate \%)} - 26.3 \text{ (ash \%)}$. The remaining two horses were fed a mixed grass hay.

The representative was also questioned about the horse's health history and any medications including Gastroguard (Merial, Duluth, GA). Nutritional concerns including colic, gastric ulcers, weight loss, anorexia, tying up, orthopedic issues, or hoof issues were rated on a Likert-type scale, with 1 indicating no concern and a 5 representing a severe concern. A general discussion regarding perceptions of the horse's nutritional status also took place.

2.2. Data Analysis

Descriptive statistics were analyzed to report mean \pm standard deviation of variables including horse weight, total feed offered, hay offered, concentrate offered, and so forth. Similar summaries were conducted on the Likert scale data regarding nutritional concerns.

All feed (hay and concentrate) offered to the horses were entered into the program of www.feedxl.com to summarize the amount of DE, CP, Ca, and P provided in the diet. The program includes a database of all the feeds used by this group of horses, with information generated from feed manufacturer. When supplements included nutrients, these were also included in the program. The hay analysis results were entered as a custom feed for the program for those horses consuming that hay. Nutrients offered in the diets for each horse were compared to its NRC requirements [1], using the horse's BW and estimated "heavy work" and "very heavy work" categories.

3. Results

A summary of the horse information is provided in Table 1. There were 19 geldings, 7 mares, and 8 stallions in the study. There were 30 warmblood breeds, including Dutch Warmbloods, Zengersheide, Belgium Warmbloods; 3 Irish sport horses; and 1 non-European breed (LaSilla). Twenty-two horses competed in more than one event.

Table 2 shows the amounts of hay and concentrate offered to these horses. The mean hay to concentrate ratio was $3.26 \pm 1.49:1$. Total feed intake averaged 14.9 ± 2.8 kg and was fed at $2.8 \pm 0.5\%$ of BW on an as-fed basis.

All horses were fed at least one commercially available mixed feed. Twenty-three of the 34 horses had two or more different feeds in each ration. Fourteen of the horses were offered feeds that were not commercially available mixed feeds, including oats, beet pulp, bran, or alfalfa cubes. Nine horses were offered vegetable oil daily. The majority of horses were fed two concentrate meals per day but were

Table 1
Summary of horse information.

Horse information	Mean \pm SD	Range
Age (y)	11.4 \pm 2.2	8–18
Weight (kg)	530.5 \pm 45.8	444–643
Body condition score [6]	5.3 \pm 0.7	3.5–6.5
Cresty neck score [7]	2.4 \pm 0.6	1–3.5
Height (cm)	167.1 \pm 4.8	160.0–177.8

Abbreviation: SD, standard deviation.

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