

Contents

Dedication xi

Raymond J. Geor

Preface xiii

Raymond J. Geor

Clinical Assessment of Nutritional Status and Feeding Programs in Horses 1

Iveta Becvarova, R. Scott Pleasant, and Craig D. Thatcher

Veterinarians are a primary source of nutritional information and advice for horse owners. This article reviews methods for clinical assessment of nutritional status and feeding programs that can be applied to an individual horse or group of horses. Physical examination, including measurement of body weight and evaluation of body condition score, estimation of nutrient requirements and the nutrient content of the horse's diet, and evaluation of the feeding method are important components of the assessment. Ongoing clinical assessment of health and body condition will gauge the need for reassessment of the feeding plan. Obvious indications for prompt reevaluation of diet and feeding include changes in health status (eg, body condition), life stage or physiologic state (eg, pregnancy), or performance status.

Primer on Dietary Carbohydrates and Utility of the Glycemic Index in Equine Nutrition 23

Patricia Harris and Raymond J. Geor

The feeding of "low carbohydrate" or "low glycemic" diets has been recommended for management of horses with metabolic and endocrine disorders in which insulin resistance is a component. A "low carbohydrate" diet is a misnomer, however, because horses require that a significant proportion of their daily ration comprises structural carbohydrates (fiber/forage) to maintain gut health and mental wellbeing. This article provides a detailed description of the different carbohydrates in equine feeds. It also reviews the terminology used to describe glucose and insulin responses to the ingestion of carbohydrates, in particular the concept of the glycemic index. Some of the factors that influence glycemic index in humans and the glycemic response to a meal in horses are also discussed.

Pasture-Associated Laminitis 39

Raymond J. Geor

Laminitis is a painful and debilitating condition of horses and ponies that has major economic and welfare implications. Anecdotal observations and the results of survey studies have indicated that most laminitis cases

occur in horses and ponies kept at pasture (hence, the term pasture-associated laminitis). Risk for development of pasture-associated laminitis represents a dynamic interaction between animal predisposing factors (an insulin-resistant phenotype commonly termed equine metabolic syndrome) and environmental conditions, particularly the nonstructural carbohydrate (simple sugars, starches, and fructans) content of pasture forage. Countermeasures for avoidance of pasture-associated laminitis involve (1) mitigation of metabolic predisposition (insulin resistance and obesity) in high-risk horses and ponies and (2) dietary and pasture grazing management strategies that minimize exposure to the dietary conditions known to trigger laminitis in susceptible animals.

Dietary Management of Obesity and Insulin Resistance: Countering Risk for Laminitis 51

Raymond J. Geor and Patricia Harris

Insulin resistance (IR) and hyperinsulinemia increase risk for development of laminitis in horses and ponies. Obesity also has been associated with heightened risk for laminitis, likely by means of development of IR. Dietary factors, particularly the nonstructural carbohydrate (NSC) load, modulate risk for laminitis in these animals by means of exacerbation of IR or gastrointestinal disturbances that trigger the condition. Specific dietary management strategies to lessen risk for laminitis include caloric restriction to promote weight loss and improve insulin sensitivity in obese animals and strict control of dietary NSCs, with elimination of grains and sweet feeds from the ration and restricted access to pastures that may be rich in NSCs. Medical treatment with levothyroxine or metformin may be indicated in animals that do not respond to conservative dietary management.

The Role of Nutrition in Colic 67

Andy E. Durham

Nutritional intolerances manifesting as colic in the horse may be largely explained by divergence from the diet and ingestive behaviors to which the feral ancestors of modern domesticated equids had become accustomed and adapted. High-starch diets and abrupt dietary changes are probably foremost in the risk factors for diet-associated colic in the horse and have their basis in disruption of the stability of microbial populations resident within the equine hindgut. Although some general associations between colic and diet may be inferred from several epidemiologic studies, data derived from studies of single and specific disease processes associated with colic allow more effective practical application of corrective dietary management strategies in situations where colic risk is judged to be increased.

Nutrition and Dietary Management of Equine Gastric Ulcer Syndrome 79

Rilla E. Reese and Frank M. Andrews

Equine gastric ulcer syndrome (EGUS) is common in horses. Diagnosis is based on history, clinical signs, gastroscopic examination, and response

to treatment. Effective pharmacologic agents are available to treat EGUS, but more comprehensive measures of environmental and dietary management are needed to decrease ulcer severity and recurrence. This article provides an understanding of dietary components and how feeds interact with stomach mucosal barrier function to cause EGUS. In addition, a secondary goal is to provide information on how diet and environmental management can reduce ulcer severity and prevent recurrence in horses with EGUS.

Nutrition of Critically Ill Horses

93

Elizabeth A. Carr and Susan J. Holcombe

Nutritional supplementation is becoming the standard of practice in equine medicine, although there are minimal data on nutritional support in critically ill horses and its association or effect on morbidity and mortality or length of hospital stay. Horses can be fed orally and when that is not possible, intravenously or parenterally. Enteral feeding is less expensive, more physiologic, improves immunity, and is easier and safer. This article reviews available information on the development of a nutritional plan for critically ill horses, and describes methods for and complications of enteral and parenteral feeding.

Feeding Management of Sick Neonatal Foals

109

Harold C. McKenzie III and Raymond J. Geor

Nutritional support of the foal can be challenging because of the constant changes in nutritional requirements and dietary composition during the transition from neonate to weanling. Additional complexity arises because of dilemmas regarding the means and route of delivery of nutrition to the foal, and the possibility that metabolic dysfunction may impair the ability of the foal to use nutrients appropriately. This article provides practical information on enteral and parenteral nutritional support of sick neonatal foals. The potential benefits of a conservative, hypocaloric feeding strategy, particularly in the very sick patient, are also discussed.

Optimal Diet of Horses with Chronic Exertional Myopathies

121

Erica C. McKenzie and Anna M. Firshman

Chronic exertional rhabdomyolysis represents a syndrome of recurrent exercise-associated muscle damage in horses that arises from a variety of etiologies. Major advances have been made in the understanding of the pathophysiology of this disease, and causative genetic defects have been recently identified for two conditions—polysaccharide storage myopathy of quarter horses, paints, warm bloods, and draft breeds. Dietary management in combination with a regular exercise regimen comprises the most effective means for control of clinical signs.

Feeding Management of Elite Endurance Horses

137

Patricia Harris

This article reviews the principles of feeding management for endurance horses. The amount and type of dietary energy (calories) are key considerations in dietary management, because (1) there is evidence that the body condition score, an indicator of overall energy balance, influences endurance exercise performance, and (2) the source of dietary energy (ie, carbohydrate versus fat calories) impacts health, metabolism, and athletic performance. Optimal performance is also dependent on provision of adequate feed, water, and electrolytes on race day.

Nutrition of the Aged Horse

155

Nicola G. Jarvis

This article reviews current thoughts on nutrition of the older horse in health and disease. Common causes of weight loss and poor body condition in old horses include dental or oral cavity abnormalities, pituitary pars intermedia dysfunction, and reduced feed intake attributable to competition from herd mates or pain associated with osteoarthritis. Feed intake and body condition may improve after institution of management changes. Thin but otherwise healthy old horses can benefit from a diet that provides 12% to 16% crude protein and includes highly digestible feedstuffs. In horses with severe irreversible dental problems, long-stem fiber (hay) should be replaced by soaked hay cubes, short chopped hay, or heavily soaked sugar beet pulp. Evidence of chronic endocrine, hepatic, or renal disease dictates dietary modifications.

Role of Diet and Feeding in Normal and Stereotypic Behaviors in Horses

167

Becky Hothersall and Christine Nicol

This article reviews the effects of diet on equine feeding behavior and feeding patterns, before considering the evidence that diet affects reactivity in horses. A growing body of work suggests that fat- and fiber-based diets may result in calmer patterns of behavior, and possible mechanisms that may underpin these effects are discussed. In contrast, there is little evidence that herbal- or tryptophan-containing supplements influence equine behavior in any measurable way. The role of diet in the development of abnormal oral behaviors, particularly the oral stereotypy crib-biting, is also reviewed, and suggestions for future work are presented.

Index

183