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反刍动物干物质采食量预测模型研究进展

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Research Advances in Prediction Models of Dry Matter Intake in Ruminants

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摘要 准确估测反刍动物干物质采食量(DMI)在动物营养学理论和生产实践中具有重要的意义。该领域的研究已经进入建立预测模型并不断完善时期。动物营养学家提出了多种预测反刍动物DMI的模型, 尽管所建立的模型不同, 但使用的变量、原理和评价方法是相近的。本文综述了反刍动物采食量的影响因素、调控理论以及DMI预测模型的种类和评价方法, 分析了美国(NRC, 1996和2001)、英国(AFRC, 1993)、法国(INRA, 1989)和澳大利亚(CSIRO, 2007)等国家提出的DMI预测模型特点, 最后提出了探索和完善我国反刍动物DMI预测模型的思路。

关键词: 干物质采食量 模型 采食量调控理论 模型评价方法

Abstract: Accurate estimation of dry matter intake of ruminants is of great significance in theory of animal nutrition and practice. The research in this field has been in the period of building and improving prediction models. A variety of models to predict ruminant dry matter intake were established, which were made by different methods and in different forms but used similar variables, theories and evaluation methods. The paper reviewed the factors impacting ruminant feed intake, feed intake regulation theories, kinds of establishing models and methods for evaluating the models. Ruminant dry matter intake models of United States (NRC, 1996 and 2001), UK (AFRC, 1993), France (INRA, 1989) and Australia (CSIRO, 2007) were briefly analyzed. Finally the way to establish and improve ruminant dry matter intake models in China was suggested.

Keywords: dry matter intake, model, feed intake regulation theories, model evaluation method

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[1] 龙瑞军, 董世魁, 王元素, 等. 反刍动物采食量的概念与研究方法[J]. 草业学报, 2003, 12(5): 8-17.

[2] INGVARTSEN K L, ANDERSEN H R, FOLDAGER J. Effect of sex and pregnancy on feed intake capacity of growing cattle[J]. Acta Agriculturae

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- [3] ROSELER D K, FOX D G, PELL A N, et al. Development and evaluation of equations for prediction of feed intake for lactating Holstein dairy cows[J]. Journal of Dairy Science, 1997, 80(5): 878-893.
- [4] FOX D G, SNIFFEN C J, O'CONNOR J D. Adjusting nutrient requirements of beef cattle for animal and environmental variations[J]. Journal of Animal Science, 1988, 66(6): 1475-1495.
- [5] POPPI D P. Predictions of food intake in ruminants from analyses of food composition[J]. Australian Journal of Agricultural Research, 1996, 47(4): 489-504.
- [6] ALLEN M S. Physical constraints on voluntary intake of forages by ruminants[J]. Journal of Animal Science, 1996, 74(12): 3063-3075.
- [7] ESTRADA J I C, DELAGARDE R, FAVERDIN P, et al. Dry matter intake and eating rate of grass by dairy cows is restricted by internal, but not external water[J]. Animal Feed Science and Technology, 2004, 114(1): 59-74.
- [8] HOLTER J B, WEST J W, MCGILLARD M L. Predicting *ad libitum* dry matter intake and yield of Holstein cows[J]. Journal of Dairy Science, 1997, 80(9): 2188-2199.
- [9] GIBSON J P. The effects of frequency of feeding on milk production of dairy cattle: an analysis of published results[J]. Animal Production, 1997, 65(2): 181-189.
- [10] MALCOLM K J, BRANINE M E, GALYEAN M L. Effects of ionophore management programs on performance of feedlot cattle[J]. Agri-Practice, 1992, 13(7): 7-8, 12-14, 16.
- [11] FORBES J M. Models for the prediction of food intake and energy balance in dairy cows[J]. Livestock Production Science, 1983, 10(2): 149-157.
- [12] WESTON R H. Some aspects of constraint to forage consumption by ruminants[J]. Australian Journal of Agricultural Research, 1996, 47(2): 197-207.
- [13] ILLIUS A W, JESSOP N S. Metabolic constraints on voluntary intake in ruminants[J]. Journal of Animal Science, 1996, 74(12): 3052-3062.
- [14] KETELAARS J J M H, TOLKAMP B J. Toward a new theory of feed intake regulation in ruminants 1. Causes of differences in voluntary feed intake: a critique of current views[J]. Livestock Production Science, 1992, 30(4): 269-296.
- [15] KETELAARS J J M H, TOLKAMP B J. Oxygen efficiency and the control of energy flow in animals and humans [J]. Journal of Animal Science, 1996, 74(12): 3036-3051.
- [16] MADSEN J, STENSIG T, WEISBJERG M R, et al. Estimation of the physical fill of feedstuffs in the rumen by the *in sacco* degradation characteristics[J]. Livestock Production Science, 1994, 39(1): 43-47.
- [17] STENSIG T, WEISBJERG M R, MADSEN J, et al. Estimation of voluntary feed intake from *in sacco* degradation and rate of passage of DM or N in the rumen[J]. Livestock Production Science, 1994, 39(1): 49-52.
- [18] FISHER D S, BURNS J C, POND K R. Modelling *ad libitum* dry matter intake by ruminants as regulated by distension and chemostatic feedback[J]. Journal of Theoretical Biology, 1987, 126(4): 407-418.
- [19] POPPI D P, GILL M, FRANCE J. Integration of theories of intake regulation in growing ruminants[J]. Journal of Theoretical Biology, 1994, 167(2): 129-145.
- [20] TEDESCHI L O, FOX D G, SAINZ R D, et al. Mathematical models in ruminant nutrition[J]. Scientia Agricola, 2005, 62(1): 76-91.
- [21] INGVARTSEN K L. Models of voluntary food intake in cattle[J]. Livestock Production Science, 1994, 39(1): 19-38.
- [22] FAVERDIN P, BARATTE C, DELAGARDE R, et al. Grazeln: a model of herbage intake and milk production for grazing dairy cows. 1. Prediction of capacity, voluntary intake and milk production during lactation[J]. Grass and Forage Science, 2011, 66(1): 29-44.
- [23] ZHAO J S, ZHOU Z M, REN L P, et al. Evaluation of dry matter intake and daily weight gain predictions of the Cornell Net Carbohydrate and Protein System with local breeds of beef cattle in China[J]. Animal Feed Science and Technology, 2008, 142(3): 231-246.
- [24] ZOM R L G, ANDRÉS G, VAN VUUREN A M. Development of a model for the prediction of feed intake by dairy cows: 1. Prediction of feed intake[J]. Livestock Science, 2012, 143(1): 43-57.
- [25] FUENTES-PILA J, DELORENZO M A, BEEDE D K, et al. Evaluation of equations based on animal factors to predict intake of lactating Holstein cows[J]. Journal of Dairy Science, 1996, 79(9): 1562-1571.
- [26] 赵金石. 基于CNCPS模型思路的中国肉牛、奶牛营养动态模型的建立与应用. 博士学位论文. 北京: 中国农业大学, 2008: 3-19.
- [27] DU J P, LIANG Y, XIN H S, et al. Evaluation of dry matter intake and average daily gain predicted by the cornell net carbohydrate and protein system in crossbred growing bulls kept in a traditionally confined feeding system in China[J]. Asian-Australasian Journal of Animal Science, 2010, 23(11): 1445-1454.
- [28] FOX D G, SNIFFEN C J, O'CONNOR J D, et al. A net carbohydrate and protein system for evaluating cattle diets: III. Cattle requirements and intake adequacy[J]. Journal of Animal Science, 1992, 70(11): 3578-3596.
- [29] JARRIGE R, DEMARQUILLY C, DULPHY J P, et al. The INRA "fill unit" system for predicting the voluntary intake of forage-based diets in ruminants: a review[J]. Journal of Animal Science, 1986, 63(6): 1737-1758.
- [30] JOUVEN M, AGABRIEL J, BAUMONT R. A model predicting the seasonal dynamics of intake and production for suckler cows and their calves indoors or at pasture[J]. Animal Feed Science and Technology, 2008, 143(1): 256-279.
- [31] KEADY T W J, MAYNE C S, KILPATRICK D J. An evaluation of five models commonly used to predict food intake of lactating dairy cattle[J]. Livestock Production Science, 2004, 89(2/3): 129-138.

- [32] ZOM R L G, ANDR G, VAN VUUREN A M. Development of a model for the prediction of feed intake by dairy cows 2. Evaluation of prediction accuracy[J]. *Livestock Science*, 2012, 143(1): 58-69.
- [33] DE ALMEIDA TEIXEIRA I A M, ST-PIERRE N, DE RESENDE K T, et al. Prediction of intake and average daily gain by different feeding systems goats[J]. *Small Ruminant Research*, 2011, 98(1/2/3): 93-97.
- [34] 伊涛, 熊本海. 我国肉牛饲养标准与NRC肉牛营养需要的比较分析[J]. *饲料研究*, 2010, (4): 68-71.