ФОРУМ

Рынок кормов: инвестиции и инновации для развития бизнеса

МОСКВА | КРОКУС ЭКСПО 25 ОКТЯБРЯ 2023

ЭФКО ГРУППА КОМПАНИЙ

Корма и добавки для КРС: новые и проверенные временем технологии

Герасимова Марина

Генеральный директор ООО «Бирюч»

ГК ЭФКО

АГРО ИНВЕСТОР

FEEDLOT

КормВет экспо

Два основных вызова и оба вверх: население и температура

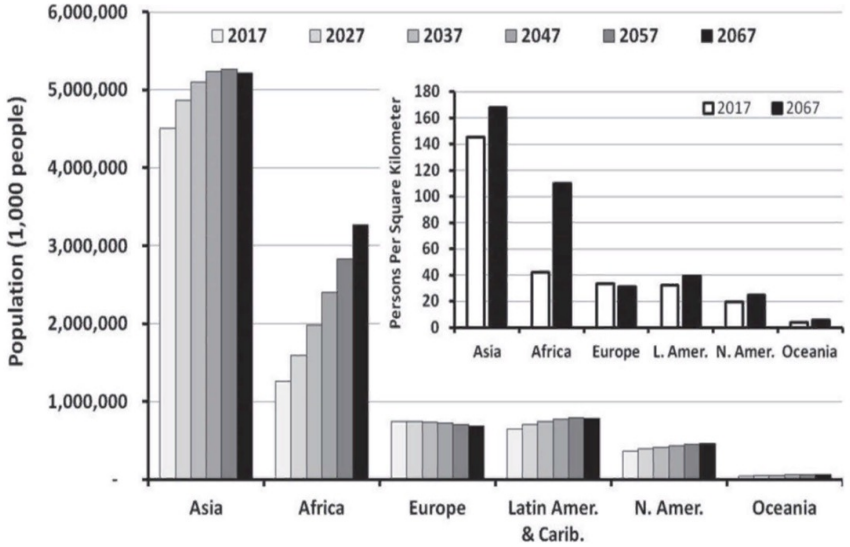

Figure 2 Estimated population of world's regions from 2017 to 2067 and estimated population density for 2017 and 2067. Raw population data downloaded from United Nations, 2017. Inset shows population density (persons per km^2) for each region. L. Amer. = Latin America; N. Amer. = North America; Carib. = Caribbean.

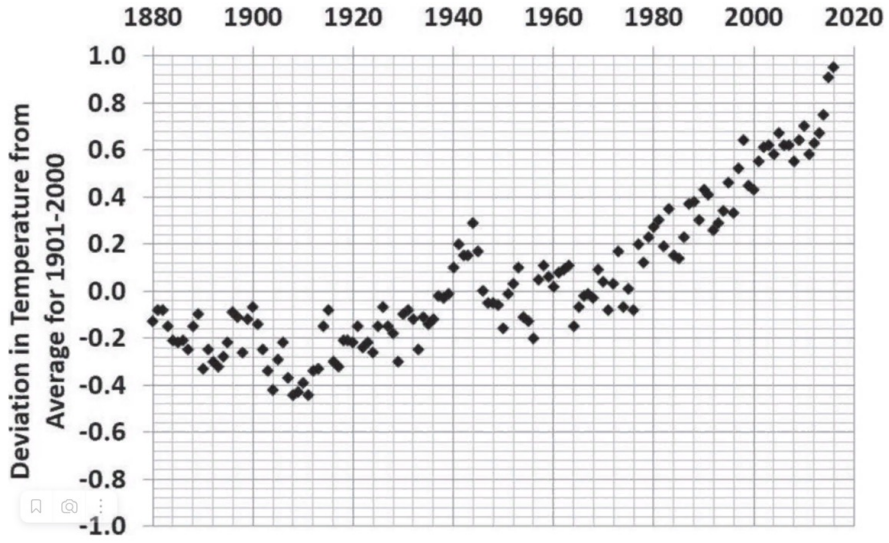

Figure 3 Deviations in average global temperature from average global temperature for 1901 to 2000. Source of data: NOAA National Centers for Environmental Information, Climate at a Glance: Global Time Series (published July 2017, retrieved Jul. 27, 2017, from http://www.ncdc.noaa.gov/cag/).

Рост населения – рост потребления

Интенсификация в всех отраслях промышленности, в том числе сельском хозяйстве

Мировой тренд продуктивности понятен и логичен

Вопросы:

- Что можно сделать?
- Где искать ответы?
- Кто поможет?

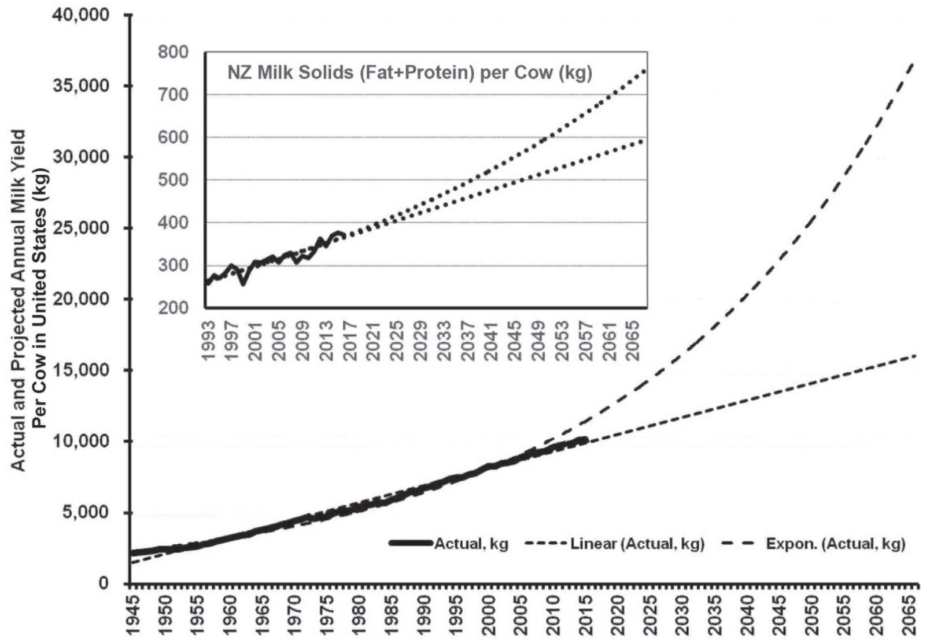

Figure 9 Forecasted change in milk yield of US dairy cows and milk solids of New Zealand (NZ) dairy cows (inset) during the next 50 years. Actual data from multiple USDA sources and NZ Dairy Statistics 2015–2016 (Dairy NZ, 2016) (heavy black lines) were extended through linear and exponential (Expon.) trend lines using Excel (Microsoft Corp., Redmond, WA). We discussed these trend lines and agreed on likely levels of production.

Эффекты кормления ЖК молочных коров и краткая схема обмена

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Journal of Animal Science and Biotechnology

REVIEW Open Access

Advances in fatty acids nutrition in dairy cows: from gut to cells and effects on performance

Massimo Bionaz*, Einar Vargas-Bello-Pérez and Sebastiano Busato

Abstract

High producing dairy cows generally receive in the diet up to 5–6% of fat. This is a relatively low amount of fat in the diet compared to diets in monogastrics; however, dietary fat is important for dairy cows as demonstrated by the benefits of supplementing cows with various fatty acids (FA). Several FA are highly bioactive, especially by affecting the transcriptome; thus, they have nutrigenomic effects. In the present review, we provide an up-to-date understanding of the utilization of FA by dairy cows including the main processes affecting FA in the rumen, molecular aspects of the absorption of FA by the gut, synthesis, secretion, and utilization of chylomicrons; uptake and metabolism of FA by peripheral tissues, with a main emphasis on the liver, and main transcription factors regulated by FA. Most of the advances in FA utilization by rumen microorganisms and intestinal absorption of FA in dairy cows were made before the end of the last century with little information generated afterwards. However, large advances on the molecular aspects of intestinal absorption and cellular uptake of FA were made on monogastric species in the last 20 years. We provide a model of FA utilization in dairy cows by using information generated in monogastrics and enriching it with data produced in dairy cows. We also reviewed the latest studies on the effects of dietary FA on milk yield, milk fatty acid composition, reproduction, and health in dairy cows. The reviewed data revealed a complex picture with the FA being active in each step of the way, starting from influencing rumen microbiota, regulating intestinal absorption, and affecting cellular uptake and utilization by peripheral tissues, making prediction on *in vivo* nutrigenomic effects of FA challenging.

Keywords: Absorption, Dairy cow, Dietary fatty acids, Intestine, Liver, Metabolism, Performance, Transcription factors, Transport

Introduction

Important advances in the understanding of overall lipid digestion, absorption, and metabolism in dairy cows has been made between 1950 to 1990; afterwards, due to technological advances, a larger emphasis was placed on determining the molecular aspects of those processed. Furthermore, before the 1990's, the effect fatty acids (FA) on transcription of genes was virtually unknown.

Discovery of transcription factors (TF) that sense the presence of lipids, especially FA, and the advances in the understanding of biological effects of FA in many pathways and functions in cells, have provided a great window into the biological roles of FA. Borrowing methods and knowledge obtained from monogastric species, especially model organisms, advances were made on our knowledge on the molecular processes related to the metabolism and biological functions of lipid molecules in dairy cows.

Different from monogastric species, ruminants generally receive a low amount of lipids into the diet. It is

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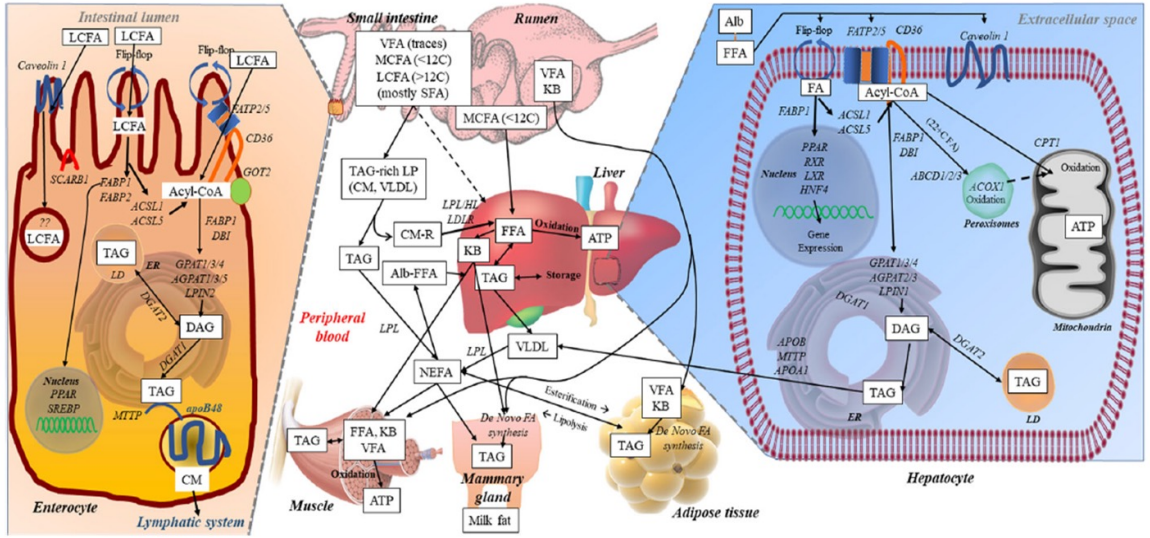

Fig. 2 Model summarizing in dairy cows the absorption of fatty acids by enterocytes and their utilization by peripheral tissues (especially liver) with indicated enzymes and other proteins/complexes involved. As discussed in detail in the review, the model is mostly based on data obtain from monogastric species together with available data in ruminants, including the transcription abundance of the various genes presented in Fig. 1. Abbreviations: Alb, albumin; CM, chylomicron; CM-R, chylomicron remnants; DAG, diacylglycerol; ER, endoplasmic reticulum; FA, fatty acids; FFA, free fatty acids; KB, ketone bodies; LCFA, long chain fatty acids; LD, lipid droplets; LP, lipoprotein(s); LPL, lipoprotein lipase; MCFA, medium chain fatty acids; NEFA, non-esterified fatty acids; TAG, triacylglycerol; TAG-rich LP, TAG-rich lipoproteins; VFA, volatile fatty acids; VLDL, very low density lipoproteins

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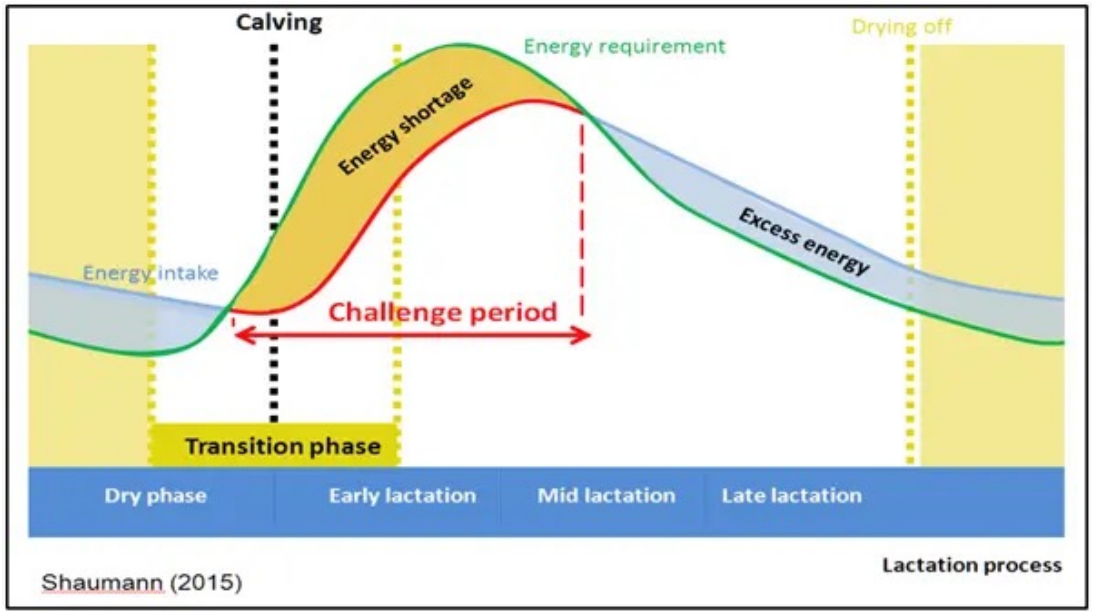
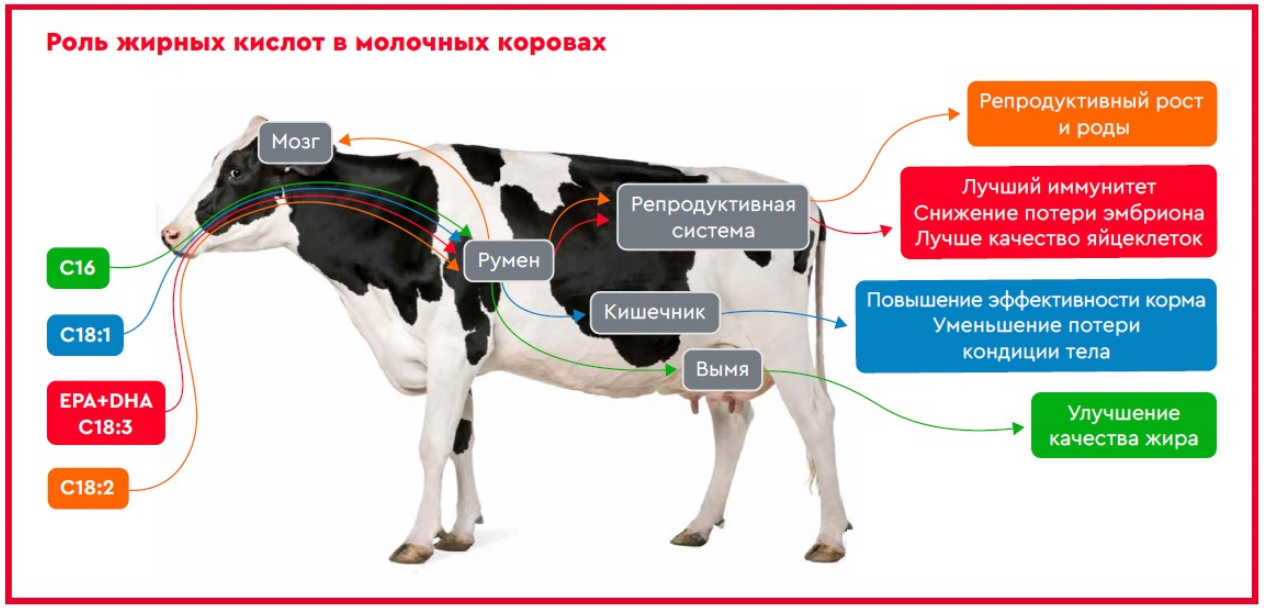
Роль жирных кислот для продуктивных коров





https://en.engormix.com/feed-machinery/feed-formulation/balancing-fat-nutrition-optimise_a45613/

100-летний обзор по кормлению жирами молочных коров

- Высокопродуктивные коровы в общем получают рационы с 5–6% жира
- Меньше по количеству, сравнительно с рационами моногастричных
- Жиры в рационе крупного рогатого скота важны и значительно повышают эффективность
- Множеств научных исследований и практики применения жиров
- Некоторые жирные кислоты (ЖК) крайне биоактивны и влияют на организмы на всех уровнях биохимии, от предоставления незаменимых нутриентов, вплоть до гормональных и нутригеномичных эффектов

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A 100-Year Review: Fat feeding of dairy cows[1]

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ABSTRACT

Over 100 years, the *Journal of Dairy Science* has recorded incredible changes in the utilization of fat for dairy cattle. Fat has progressed from nothing more than a contaminant in some protein supplements to a valuable high-energy substitute for cereal grains, a valuable energy source in its own right, and a modifier of cellular metabolism that is under active investigation in the 21st century. Milestones in the use of fats for dairy cattle from 1917 to 2017 result from the combined efforts of noted scientists and industry personnel worldwide, with much of the research published in *Journal of Dairy Science*. We are humbled to have been asked to contribute to this historical collection of significant developments in fat research over the past 100 years. Our goal is not to detail all the work published as each development moved forward; rather, it is to point out when publication marked a significant change in thinking regarding use of fat supplements. This approach forced omission of critically important names and publications in many journals as ideas moved forward. However, we hope that a description of the major changes in fat feeding during the past 100 years will stimulate reflection on progress in fat research and encourage further perusal of details of significant events.

Key words: fat, conjugated linoleic acid, energy, 100-year review

HUMBLE BEGINNINGS—FATS ARE AN AFTERTHOUGHT

Concepts of feeding fat to dairy cows precede the limits of the past century. Research on feeding oilseeds commenced early; Wood (1894) reported effects of feeding oils from cottonseed, palm, and coconut, as well as oleo oil, corn gluten meal and stearin, concluding that the first effect of feeding oils was to increase milk fat percent. Reports on feeding oils and seeds are found throughout the literature from that time (Henry and Morrison, 1916, "Feeds and Feeding").

Reid (1956) succinctly summarized previous knowledge in his *Journal of Dairy Science* review of the first 50 years of the American Dairy Science Association as follows:

> "After publication of Jordan's reports in 1897 and 1901 that milk fat can be produced from carbohydrates, the viewpoint developed that fat is merely a source of energy exchangeable on an isodynamic basis with other nutrients. As a consequence, for some years thereafter very little attention was given to the fat content of the rations of cows. However, in Germany, Fingerling and his associates between 1904 and 1907 published data which, though showing that sheep and goats can make milk fat from carbohydrates, suggested that fat itself is more efficiently used than is carbohydrate. They also indicated that within certain limits the percentage of fat in milk is influenced by the amount of fat in the ration. These results provoked extensive studies with cows at ten experiment stations in Germany, which were reported by Kellner in 1907. However, since the low-fat rations used provided almost as much fat as was produced in the milk, these experiments provided very inconclusive information."

In the first decade of papers published in *Journal of Dairy Science*, very few addressed the topic of feeding fat (Appendix Table A1). Discussion of oils began inadvertently in early issues in studies that focused on how protein meals altered milk fat content, eventually raising questions about the possible role of their contaminating oils on observed responses. Palmer and Crockett (1917) reported that feeding cottonseed meal to cows increased melting point and long-chain fatty acids of milk fat, and caused an oily flavor of the milk that could be reversed by feeding corn silage but not hay. McCandlish (1921) continued work on cottonseed meal and milk fat percentage, but rejected reports that

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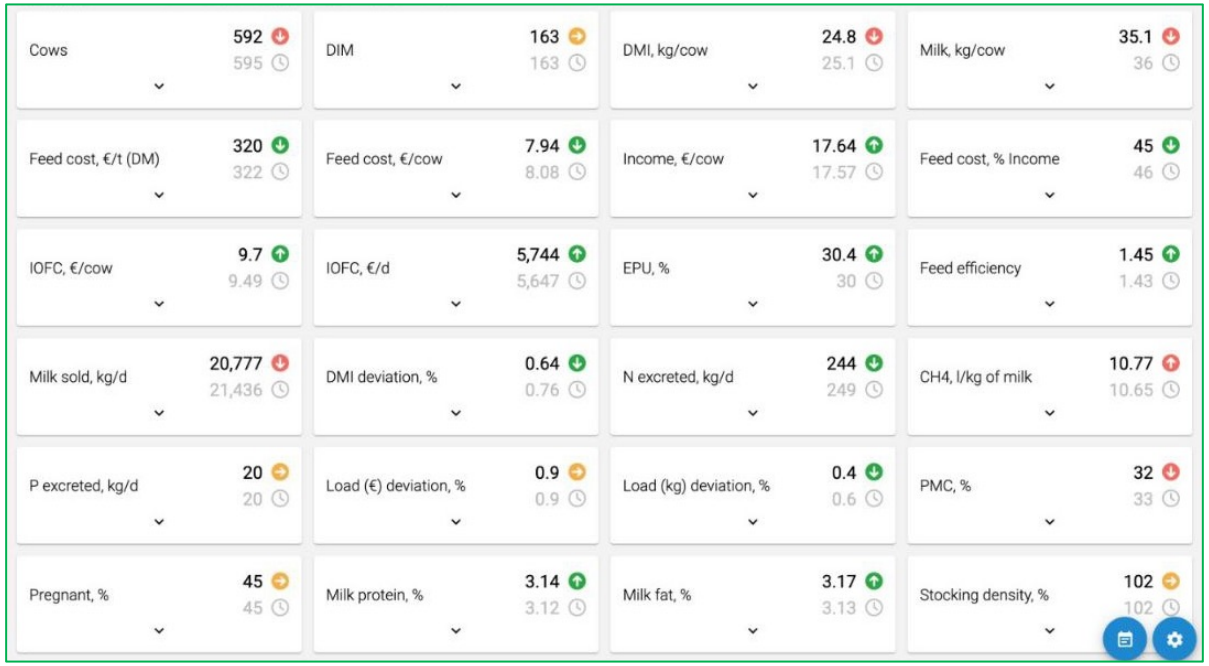
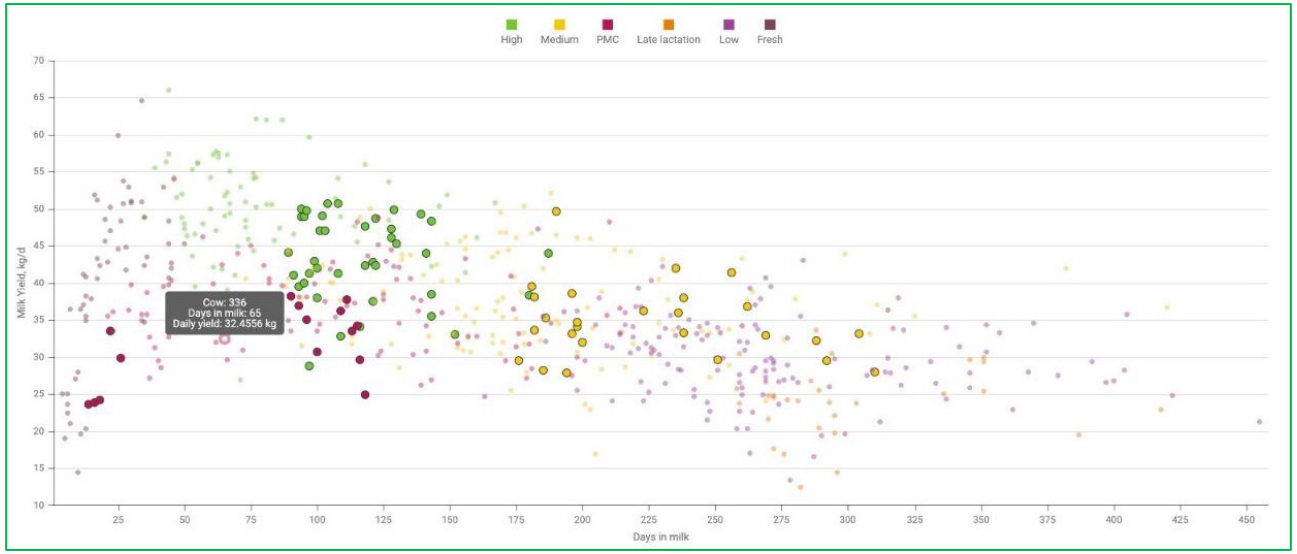
https://www.sciencedirect.com/science/article/pii/S0022030217310482

Программы для управления эффективностью молочного животноводства





Программы оценивают сотни показателей, сотни и даже тысячи коров на ферме

Будущее начинается там где кончается «сейчас»

Искусственный интеллект, который хочет кормить защищенным жиром

Кормление не по анализам, рекламе и статьям, а по эффекту на молоко и экономику

ФОРУМ

Рынок кормов: инвестиции и инновации для развития бизнеса

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ЭФКО ГРУППА КОМПАНИЙ

Кому интересно и кто хочет больше информации?

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