

Enhanced Global Nutrition to Reduce Acute and Chronic Disease in Animal

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Received date: February 11, 2023, Manuscript No. IPJARN-23-16277; **Editor assigned date:** February 13, 2023, PreQC No. IPJARN-23-16277 (PQ); **Reviewed date:** February 24, 2023, QC No. IPJARN-23-16277; **Revised date:** March 04, 2023, Manuscript No. IPJARN-23-16277 (R); **Published date:** March 11, 2023, DOI: 10.36648/2572-5459.8.2.075

Citation: Hoffman C (2023) Enhanced Global Nutrition to Reduce Acute and Chronic Disease in Animal. J Anim Res Nutr Vol. 8 No2: 075

Description

This study analysed the effect of level of nutrition and date of birth (age) on the onset of puberty in Payoya she-kids born in autumn (November) or in winter (February). Two experiments were conducted to examine pubertal events at the onset of puberty. For each date of birth (age), two experimental groups were used, differing on the level of nutrition. Groups were balanced for Live Weight (LW) and Body Condition Score (BCS).

Body Condition Score

High-yielding cereals and other staples have produced adequate calories to ward off starvation for much of the world over several decades. However, deficiencies in certain amino acids, minerals, vitamins and fatty acids in staple crops, and animal diets derived from them, have aggravated the problem of malnutrition and the increasing incidence of certain chronic diseases in nominally well-nourished people (the so-called diseases of civilization).

Enhanced global nutrition has great potential to reduce acute and chronic disease, the need for health care, the cost of health care, and to increase educational attainment, economic productivity and the quality of life. However, nutrition is currently not an important driver of most plant breeding efforts, and there are only a few well-known efforts to breed crops that are adapted to the needs of optimal human nutrition. Technological tools are available to greatly enhance the nutritional value of our staple crops.

However, enhanced nutrition in major crops might only be achieved if nutritional traits are introduced in tandem with important agronomic yield drivers, such as resistance to emerging pests or diseases, to drought and salinity, to herbicides, parasitic plants, frost or heat. In this way we might circumvent a natural tendency for high yield and low production cost to effectively select against the best human nutrition. Here we discuss the need and means for agriculture, food processing, food transport, sociology, nutrition and medicine to be integrated into new approaches to food production with optimal human nutrition as a principle goal.

For the first experiment (goat kids born in autumn), Payoya she-kids were used: High-nutrition group and control group. For the second experiment (goat kids born in winter), Payoya she-kids were used: high-nutrition group and control group. In both

experiments, the level of feeding was adjusted weekly according to LW so that the animals would gain about 50 and 100 g per day for C and H groups, respectively. Oestrus was tested daily using young aproned bucks. Ovulation rate was assessed by laparoscopy 7 days after identification of oestrus. Plasma samples were obtained weekly for progesterone assay. LW and BCS were recorded weekly. No effect of nutrition level or birth date on the date of the first ovarian activity or the first detected oestrus was observed. No effect of nutrition on LW or BCS at the first detected oestrus was observed. Birth date influenced significantly the LW of the animals at the onset of ovarian activity or first oestrus ($P < 0.001$). Irregular sexual activity was frequently observed before the first oestrus (74.7% and 48.0% of the first reproductive activity was irregular for experiments 1 and 2, respectively). No effect of nutrition level or birth date on ovulation rate was observed. Ovulation rate at first oestrus was influenced by LW in November-born goat kids. These results demonstrate that the age at puberty was very dependent upon the season of birth in payoya goat kids, and that there could be some benefit in breeding November-born goat kids at a higher LW to obtain a higher prolificacy at the first kidding as a consequence of a higher ovulation rate at puberty.

Nutrition and feeding influence growth, reproduction, and health of fish and their response to physiologic and environmental stressors and pathogens. The basics of fish metabolism are similar to those of warm-blooded animals in that they involve food intake, digestion, absorption, and transport of nutrients to the various tissues. Fish, however, being the most primitive form of vertebrates, possess some distinguishing features which will be discussed. Unlike warm-blooded animals, which are homeothermic, fish are poikilothermic, so their body temperature and metabolic rate depends on the water temperature and this has practical implications for the nutrition, feeding and health of fish. Several behavioral responses have been linked to methods of feeding, feeding habits, frequency of feeding, mechanisms of food detection, and food preferences. Fish are also unique among vertebrates in their ability to absorb minerals not only from their diets but also from water through their gills and skin.

Attention to nutritional and behavioral factors is important for appropriate care of lemurs in captivity. Although only a few species are commonly held in captivity, differences between them are important. Knowledge of feeding ecology and natural diet guide nutrition guidelines, as well as management and

prevention of common nutrition-related disorders, including obesity, diabetes, and iron-storage disease. Behavioral characteristics that influence captive management are related to social organization, reproductive behavior, territoriality, and

infant care. Housing animals in appropriate social groupings in adequately complex environments reduces abnormal behaviors, and addition of enrichment activities and operant conditioning encourages normal behaviors.