BUFFALO HEIFERS:
body measurements and hormonal values at the onset of puberty

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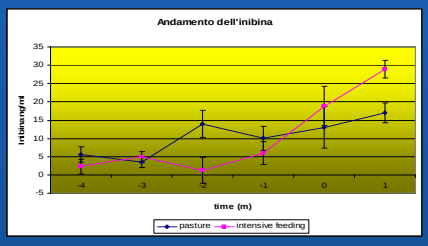
INTRODUCTION

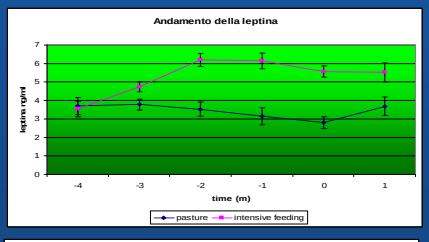
Sexual maturation involves activation of the hypothalamic-pituitary-gonadal axis, a process that results in ovulation of a viable oocyte in females and spermatogenesis in males. This transition typically occurs at a genetically predetermined age, but nongenetic variables such as photoperiod, body weight and adiposity can modify the onset of puberty. Although the precise chemical or hormonal signals of puberty have not been clearly defined. It has been suggested that sufficient body growth is a consequence of metabolic changes occurring before and around the onset of puberty. Therefore, it is plausible to think that these changes serve as peripheral signals to initiate puberty. A study was designed to determine whether inhibin A, Leptin and Insulin like Growth factor (IGF-1) could be related to gonadal maturaty in prepuberal buffalo heifers.

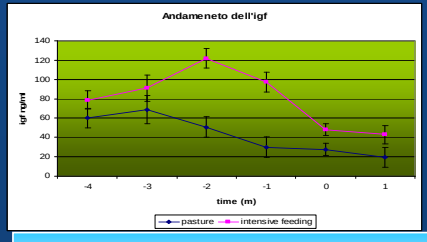
MATERIAL AND METHODS

The study was carried out to determine some body measurements and hormonal values around the pubertal period in buffalo heifers. Twenty six prepubertal 8-mo-hold buffalo heifers weighing a mean of 134 kg were used. Thirteen heifers were bred in intensive feeding (IF), 13 heifers were bred on pasture (PS). Starting from the 13th month of age, blood samples were collected: every 10 days to assay the concentration of plasma progesterone (P4); monthly to assay the plasma concentrations of leptin and insulin –like growth factor-I (IGF-1); every 20 days to assay the plasma concentrations of inhibin-A. At puberty, physical parameters (body weight, withers height and body length) were measured. Body mass index (BMI) was evaluated using the following formula:((body weight(kg)/withers height(cm)/body length(cm)x103). Data analysis was performed by SAS/STAT in SAS 9.2 release using general linear model (GLM) (SAS, 2006).

Livestock System	PS		IF		Overall	
	means	ds	means	ds	means	ds
Age at the beginning of the trial (d)	226,42	11,18	221,92	10,74	224,08	7,59
Weight at the beginning of the trial (kg)	136,67	11,62	132,23	11,17	134,36	7,89
Age at Puberty (d)	611,5	9,87	599,54	9,48	605,28	6,81
Weight at Puberty (kg)	375,17b	11,4	462,16a	10,95	420,4	11,77
Daily Gain (g)	620,53b	14,82	873,23b	14,24	751,93	2,77
BMI at the beginning trial	13,59	1,21	12,3	1,17	12,92	0,83
BMI at Puberty	23,64b	0,58	29,15a	0,55	26,5	0,68







RESULTS AND DISCUSSION

Heifers achieved puberty when plasma P4 levels exceeded 1 ng/ml. The onset of puberty occurred at the same mean age in both groups (599 vs 610 days, for IF and PS, respectively) but rearing systems significantly affected puberty weight (P<0.05) and average daily gain (P<0.001), with about 250 g/d more in IF. When the buffalo heifers reached puberty, the average values of body weight and BMI were 462 kg - 29,15 in IF and 375 kg -23.64 in PS (P<0.05), respectively. Plasma leptin concentrations were manteined at lower levels until the onset of puberty in PS than in IF (2,80 vs 5,56 ng/ml, P<0.0001, respectively at puberty). Plasma IGF-1 concentrations exhibited a curvilinear profile relative to the onset of puberty and the values at puberty were 47,9 and 27,6 ng/ml in IF and PS, (P<0.03), respectively. Plasma Inhibin-A concentrations began to gradually increase four weeks before the onset of puberty in IF and PS (18,83 and 13,07 ng/ml, respectively at puberty) and this increase continued throughout the peripuberal period (Terzano G.M.,2010). These results imply that, in spite of the differences in all the studied parameters in IF and PS, Inhibin-A can be used as a novel marker of the onset of puberty in buffalo heifers.

References: Terzano G.M.,2010. Inhibin A: experience and role in buffalo reproductive physiology.Rev. Vet. 21, Sup 1: 172-178.SAS, **2006. The SAS System for Windows, Release 9.2. SAS Institute Inc., Cary, NC, USA**

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