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Influence of Hybridization of Azeri Native Zebu (*Bos primigenius Indicus* or *Bos indicus*) on Subsequent Milk Production and Reproductive Performance

Orang Estegamat

Department of Animal Science,
Islamic Azad University, Astara Branch, Astara, Iran

Abstract: In this study, for investigation of phenotypic and genotypic traits of hybrids arise from *Azeri Zebu* hybridization, 160 heads *Holstein*, *Qafqaz*, *Latvia* breeds in 4 groups with 4 replicates were divided, randomly. After breeding, high records of milk production, reproduction, milk quality, calf viability, weight gain at three lactations were occurred for hybrids in comparison with parents (control). At third lactation, milk production record of Azeri Zebu × Holstein hybrids with 2185kg was more than all of experimental groups. Also, milk fat and protein in this group were higher than others. In overall, milk yield and milk fat of *Zebu* hybrids were significantly more than parent's records. It was concluded that *Azeri Zebu* hybridization with external breeds, especially *Holstein* may cause high productivity or reproductively in subsequent hybrid cattle.

Key words: Hybridization · Breeding · Reproductive performance · Zebu

INTRODUCTION

With attention to high demands for animal product and its economic importance, rearing and selection for creation of food animals with higher diseases resistance, reproductive ability and higher potential for milk production is necessary, nowadays. *Zebu* (*Bos primigenius indicus*), is a kind of livestock with specific genotype, biology and requirements, different from other kinds of livestock. *Zebu* has humps on the shoulders, large dewlaps and droopy ears [1].

In recent decades, new hybrids of *zebu* have been created, such as *Braman*, *Santa-hertruda*, *Braford charbrey*, *Bifmaster* and *Branqus* in United States, *Bonsmara* and *Afrikander* in Africa, *zebu frizi*, *Taurindikus* and *Draftmaster* in Australia, *Pitanqeura* in brazil and *Karanshvis* in india, etc.

In many hybrids of *zebu*, high records of meat or milk production have been reported. For example body weight of 535kg for 12month age *Mondolong zebu* and 12 kg daily milk production was reported from brazilian hybrids [1-6].

In this study, we tried hybridization of *zebu* (Azeri native cattle × Azeri *Zebu*) and investigate of their offspring for milk production and reproductive ability.

MATERIALS AND METHODS

In this study,. 160 head cattle in Astara region (Azerbaijan Republic) have been used. This experiment was conducted with completely randomized design (CRD) with four treatments and four replicate. Azeri *Zebu* cattle were selected based on their body weight in to replicates for minimum body weight variance in replicates (as control group). Other three groups were include; 1) Control: *Azeri Zebu*, 2) *Holstein* × *Azari zebu*, 3) *Qafqaz* × *Azari zebu,* 4) *Latvia* × Cuban *zebu*'s.

Experimental conditions such as feeding or housing were similar for all of groups.

After breeding and during experiment, the milk production, milk quality index, body weight, reproduction, calving interval, calves health, retained placenta disorder and grow characterizes of hybrid calves (offspring) were investigated in three lactation period.

Experimental analysis was conducted with SAS 9.1 Software and comparison of means has been done via Duncan multiple test ($P<0.05$).

RESULTS AND DISCUSSION

In this evaluation, it was clear that phonotypic traits (such as color, hump High...) were transferred to hybrid

Corresponding Athor: Orang Estegamat, Department of Animal Science, Islamic Azad University, Astara Branch, Astara, Iran. Tel: +989111818267, E-mail: arlotfi@gmail.com.

offspring's, dominantly. Because of high reproduction ability of *Zebu* (more than these local breeds), their calving were done easier than other foreign breeds without any calving hardness or remained placenta. Also, recovery of ovaries after calving occurred, after short time period. The ovarian follicles in Hybrids at estrous time were mature and the number of mature follicles in *Zebu*s was more than that of other breeds, because of the occurrence of twin-calving in hybrids was more [7, 8].

In this examination, climatic or temperature variations had no any significant effect on reproduction of *Zebu* or hybrid cattle and the reproductive performance was better than other experimental breeds. Increase in temperature to 30 centigrade or temperature declining hadn't significant effect on *zebu* and hybrids reproductive physiology in compared with other groups.

During the first lactation; milk record of Azeri *Zebu* (1050kg milk) was raised to 1905kg in hybrids. In this investigation, it has been show that best productive indexes were for group3; Holstein × Azeri *Zebu*, as compared with the other three groups. Also, milk fat, milk protein and milk yield in hybrids were higher than parents.

During the second and third lactations; record of Azeri *Zebu* increased from 1050kg in parent to 1180kg in hybrids. In other words, 130kg increase in milk yield resulted by this hybridization. But, in group2 at the second lactation,350kg and in group3, 390kg milk yield increase was recorded for hybrids as compared with their first lactation. Comparisons between second and third lactations demonstrated that there is positive correlation between milk yield and body weight for hybrids.

At Table 2, milk yield/ body weight ratio at first lactation were 396kg, in third lactation were 432kg. Therefore, milk production and body weight not only in group1, also in all of hybrids had positive correlation. This ratio in hybrids in compare with parents was higher, too [1, 6]. In Table 3, the reproductive ability and milk production is presented.

Biometric analysis showed Azeri *Zebu*s had lower milk production level, but hybrids had milk production increase from 400 to 600kg. Milk production, milk fat or milk protein in hydrides was higher, especially in group 2 (Holstein × Azari *Zebu*), that this group had 159.91, 190.6 and 260 kg milk production in first,

Table 1: Milk yield, fat and protein in experimental groups at first lactation

Groups	Milk yield (Kg)	Milk Fat (%)	Milk Fat (kg)	Protein milk (%)	Protein milk (kg)	Milk fat and protein (kg)
Azeri *Zebu*	1050±5/23	8/5	60/9±5/4	4/5	47/25±3/6	108/2
Latvia × cuban *Zebu*	1905±22/8	4/30	84/3±8/3	3/8	72/39±4/1	156/7
In compared with Azeri Zebu	185/7	74/1	138/4	84/4	153/2	144/8
Holstein × Azeri *Zebu*	2050±48	4/2	86/1±6/5	3/6	73/80±5/8	159/9
In compared with Azeri Zebu	195/2	72/4	141/3	80	156/2	147/8
Qafqaz × Azeri *Zebu*	1697±53/7	4/32	73/4±5/5	3/5	59/4±4/3	132/8
In compared with Azeri Zebu	161/6	74	120/5	77/7	125/8	122/2

Table 2: Milk yield and body weight of hybrids in three lactation period

Groups	*First lactation* Body weight	*second lactation* Body weight	*Third lactation* Body weight	*First lactation* milk production/body weight	*Second lactation* milk production/body weight	*First lactation* milk production/body weight
Azeri *Zebu*	265	279	287	396	423	432
Latvia × cuban *Zebu*	315	330	348	605	677	798
In compared with Azeri Zebu	9/118	3/118	5/120	8/152	160	7/1840
Holstein × Azeri *Zebu*	332	348	360	617	683	783
In compared with Azeri Zebu	3/125	7/124	4/125	8/155	5/161	3/181
Qafqaz × Azeri *Zebu*	302	310	327	562	622	863
In compared with Azeri Zebu	139	9/112	9/113	9/141	147	8/199
Mean of Holstein, Qafqaz and Lanoia *In compared with Azeri Zebu*	332	347	361	795	820	890
Mean of hybrids in three groups	316	331	345	595	660	815
In compared with Azeri Zebu	2/119	6/118	2/120	3/150	2/155	7/188

Table 3: Reproductive and productive traits of experimental groups at first lactation

Traits	Azeri *Zebu*	Latvia× Azari *Zebu*	Holstein × Azeri *Zebu*	Qafqaz × Azeri *Zebu*
First month of gestation	35.5±0/5	34.5±0/45	32.8±0/4	330±0/4
During gestation	288±0/5	285±0/5	284±0/6	284/2±0/5
Re-gestation day	135±4/4	130±413	121.5±4/6	121/5±415
Pre-calving	440±9/5	4/5±9/2	406±7/8	405±7/9
abortion	1.2	4.2	5.1	2/57
Milk fat and protein	82	89	9.89	90.4

second and third lactation, respectively. Lower abortion rates was recorded in hybrids, also milk production/body weight ratio were 41.5-52.5%.

It was concluded the hybridization of Azeri *Zebu* with external breeds have positive productive or reproductive results in hybrids.

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