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Research Article

Study of Milk Yield and Factors Contributing to the Yield in Jersey and Holstein Breeds of Cattle in Rupandehi District

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Abstract

Survey was conducted in Mainahiya Village Development Committee, HarnaiyaVillage Development Committee, TilottamaMunicipality and Devdaha Municipality of Rupandehi district in the year April 2015 in order to study the milk yield and milk parameters in Jersey and Holstein cattle. Total sampling household were 13 and sampling size was 158. The primary data were collected through structure questionnaire and collected information were tabulated in Microsoft excel and SPSS version 16. Different statistical analyses were performed by SPSS version 16 and Mini Tab. Result showed that average milk yield of Holstein10.504±0.620ltr, fat 3.995±0.308%, protein 3.241±0.087% and SNF 8.830±0.208%. The average milk yield of Jersey 8.594±0.631, fat 4.476±0.314, protein 3.400±0.088 and SNF 9.016±0.212 were found. Milk yield was significantly($p<0.01$) higher in Holstein breed than jersey and milk yield was significantly ($p<0.01$) higher in 4thlactation.Experiment showed the insignificant ($p>0.01$)negative correlation between milk yield and fat($r=-0.120$),milk yield and protein ($r=-0.49$)and milk yield and SNF ($r=-0.53$)but significant($p<0.01$)and positive correlation between fat and protein($r=0.485$),fat and SNF($r=0.501$) and protein and SNF($r=0.778$).

Keywords: Average milk yield; Fat; Protein; SNF

Introduction

Milk may be defined as the whole, fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy milking animals, excluding that obtained within 15days before or 5 days after calving or such periods as may be necessary to render the milk practically colostrum-free and containing prescribed percentages of milk fat and milk-solid-not—fat. Milk is an emulsion or colloid of butterfat globules within a water-based fluid that contains dissolved carbohydrates and protein aggregates with minerals [1]. Milk consists of water, fat, protein, lactose, ash or mineral matter in the form of major constituents and phospholipids, sterols, vitamins enzymes, pigments in the form of minor constituents. The true constituents of milk are fat, casein and lactose. In cattle water is the major constituent of milk and contributes 86.6% followed by lactose (4.9%), fat (4.6%), protein (3.4%) and ash (0.7%). Composition of milk may be altered by genetic and environmental factors. Milk composition varies considerably among breeds of dairy cattle. Jersey and Holstein breeds give milk of higher fat and protein content than Shorthorn and Friesian breeds.The fat, lactose and protein content of milk vary according to stage of lactation. Solid Not Fat (SNF)content is usually highest during the first 2 to 3 weeks, after which it decreases slightly. The highest percentages are usually found in colostrum, followed by a decline during the first 2 months of lactation, then a slow increase as lactation progresses [2].The main objective of this research is to gain the knowledge for selecting the high yielding cattle at farmer level.

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Materials and Methods

The survey was conducted purposively in Mainahiya Village Development Committee, Harnaiya Village Development Committee, Tilottama Municipality and Devdaha Municipality of Rupandehi district in the year April 2015. Householdswere selected purposively which were under the supervision of Dairy Cattle Improvement Project (DCIP). Primary datafor this research were collected through survey questionnaire and secondary datawere obtained from official documents such as District Agriculture Development Office (DADO), District Livestock Service office (DLSO), Nepal Agriculture Research Council (NARC); literature search from publications in journals and other reports. Total households were 13 and sample size of this research was158. The statistical packages for social science (SPSS), Mini Tab and Microsoft excel were used to analyze the quantitative data.

Results and Discussion

Tables 1and 2 present the mean milk yields in litres in relation to respective constituent components being fat, protein and solid-not-fat (SNF) expressed in percent (%).

The result showed significant difference in milk yield. Highest milk yield was observed in Holstein breed (10.504 ltr) followed by Jersey breed. Highest fat % (4.476), protein % (3.400) & SNF

Table 1: Meancattle milk yieldand mean milk contents (fat, protein and SNF) in different breeds of cattle from Rupandehi district.

Cattle breed	Mean ±SD milk yield in litres	Mean ±SD milk content in percent (%)		
		Fat	Protein	SNF*
Holstein	10.504±0.620[a]	3.995±0.308[a]	3.241±0.087[b]	8.830±0.208[a]
Jersey	8.594±0.631[b]	4.476±0.314[a]	3.400±0.088[a]	9.016±0.212[a]

Means in columns followed by the same letter(s) are not significantly different at P=0.05

Table 2: Meancattle milk yields and mean milk constituents (fat, protein and SNF) in five lactations of cattle from Rupandehi district.

Lactation	Mean ±SD milk yield in litres	Mean ±SD milk constituents in percent (%)		
		Fat	Protein	SNF*
1	8.494±0.660[b]	4.381±0.328[a]	3.397±0.093[a]	9.016±0.212[a]
2	8.432±0.494[b]	4.227±0.245[a]	3.215±0.069[b]	8.855±0.165[a]
3	10.273±0.444[ab]	4.292±0.221[a]	3.394±0.062[a]	8.973±0.149[a]
4	11.048±0.905[a]	4.263±0.450[a]	3.331±0.127[ab]	8.928±0.304[a]
5	9.5±2.467[b]	4.015±1.228[a]	3..265±0.347[ab]	8.930±0.829[a]

Means in columns followed by the same letter(s) are not significantly different at P=0.05

% (9.016)were observed in Jersey breed and protein % was found to be significant different (Table 1). Fat and milk protein of Jersey and Holstein were found to be 4.2, 4.78 and 3.3, 3.59 % respectively [3].

*Solids-not-fat

Highest milk yield was found in 4th lactation(11.048 ltr) followed by 3rd lactation.2nd lactation(8.432 ltr) had the lowest milk yield which was statistically at par with 1st and 5th lactation. Similarly, highest protein % was found in 1stlactation(3.397) which was statistically at par with 3rd lactation followed by 4th, 5th lactation. 2ndlactation(3.215) showed the lowest protein % of milk (Table 2).

*Solids-not-fat (SNF)

Result showed the genetic correlation betweenmilk yield and yield of its constituent componentsare positive but insignificant(p>0.01); negative correlations were observed between milk yield and fat%(r= -0.120), milk yield and protein%(r=-0.49)and milk yield and SNF% (r=-0.53).

Table 3: Correlation between milk, Fat, protein and SNF.

	Milk	Fat	Protein	SNF
Milk	1	-0.120	-0.49	-0.53
Fat		1	0.485''	0.501''
Protein			1	0.778''
SNF				1

Correlation is significant at the 0.01 level (2-tailed).

Significant(p<0.01)and positive correlations were found between fat and protein%(r=0.485),fat and SNF%(r=0.501)and protein and SNF%(r=0.778) (Table 3).Milk yield and composition percentages are negatively correlated, -0.3 for milk yield and fat percentage [4].

Conclusion

Holstein breed was higher milk yielding cattle among the entirebreed.Highest milk yield was found in 4th lactation.Selection of Holstein breed having 4th lactation is profitable in terms of quantity of milk.

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