Estimation of breeding values of total milk yield of Egyptian buffalo under different production systems

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INTRODUCTION

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- The contribution of buffalo to total milk production in Egypt is around 70 per cent .
- FAO noted that Egyptian buffaloes contribute to about 5 and 14% of the world buffalo's milk and meat, respectively.

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- There are different types of production systems to raising buffaloes in Egypt:
  1. The traditional crop/livestock system (small holders).
  2. The intensive production system (Commercial farm)
  3. Flying system
  4. Experimental farms

INTRODUCTION

1. **The traditional crop/livestock system (small holders)**
   - Small holdings and herds (1-5 heads/farm).
   - Contains about 96% of the total cattle and buffalo population.
   - Low producing native animals.
   - Family labor.
   - No recording for milk or for any other activities.

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INTRODUCTION

- Low values of inputs and outputs.
- Surplus milk is sold at farm gate to middlemen at low price.
- Live animals are sold alive in village markets.
- Most services provided to the farmer by the MALR.

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2. The intensive production system

- Contains large commercial farms of more than 50 heads each.
- Contains about 4% of the total cattle and buffalo population.
- Milk recording is practiced mainly for farm management purposes.
- Some dairy enterprises have dairy processing plants and feed mills.
- Many large dairy farmers are members of breeders associations or cooperatives.

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3. Flying system

- Located at the outskirts of large cities.
- Buffaloes are put under very intensive feeding regiemes to produce high-fat milk.
- Buffaloes are bought in milk and are sold for slaughter immediately after drying off.
- Through this system, much of the best animals are lost.

4. Experimental farms

- The fourth production system is experimental farms which keep the buffalo for educational training and research purposes.

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The aim of the study

- This study was focused on calculating estimates of heritability, breeding values and the least squares means of total milk yield of Egyptian buffaloes under different production systems.

MATERIALS AND METHODS

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MATERIALS AND METHODS

- This study was carried out using milk production records of buffalo herds recorded by the Cattle Information System/Egypt (CISE) of Cairo University, Faculty of Agriculture during the period from 1990 to 2006, which were used to estimate genetic and non-genetic parameters of total milk yield of recorded Egyptian buffaloes.

MATERIALS AND METHODS

- The data comprised 3526 lactation records of 2179 buffaloes in 51 herds at 8 governorates under four production systems were used.
- The 8 governorates were Elbehera, Baniswif, Fayoum, Giza, Ismalia, Kaliobia, Elminia and Sharkia.
- The four production systems were commercial, experimental, flying and small holder herds. Parities included the first six lactations.

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MATERIALS AND METHODS

Statistical Analysis

1- The following fixed model was used to estimate the least squares means of total milk yield of buffaloes in different governorates, production systems and parities; using the General Linear Model (GLM) procedure (SAS, 2001).

$Y_{ijklm} = \mu + G_i + S_j + P_k + YS_l + e_{ijklm}$

Where:

Y_{ijklm} = observation of total milk yield;

μ = overall mean;

G_i = fixed effect of governorate i, (i=8);

S_j= fixed effect of production system j, (j=4);

P_k = fixed effect of parity k, (k=6 parities);

YS_l= fixed effect of year-season of calving l, (l=32) and

e_{ijklm}= random residual effect.

MATERIALS AND METHODS

2- The following repeatability animal model was used to estimate heritability, repeatability and breeding values using the Derivative-Free Restricted Maximum Likelihood (DF-REML) procedure (Meyer 2000).

$Y_{ijklm} = \mu + A_i + P_j + YS_k + H_l + e_{ijklm}$

Where:

Y_{ijklm} = observation of total milk yield;

μ = overall mean;

A_i = additive genetic random effect of the individual i;

P_j = fixed effect of parity j, (j=6 parities);

YS_k= fixed effect of year-season of calving k, (k=32);

H_l= fixed effect of herd l, (l=51) and

e_{ijklm}= random residual effect.

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RESULTS AND DISCUSSION

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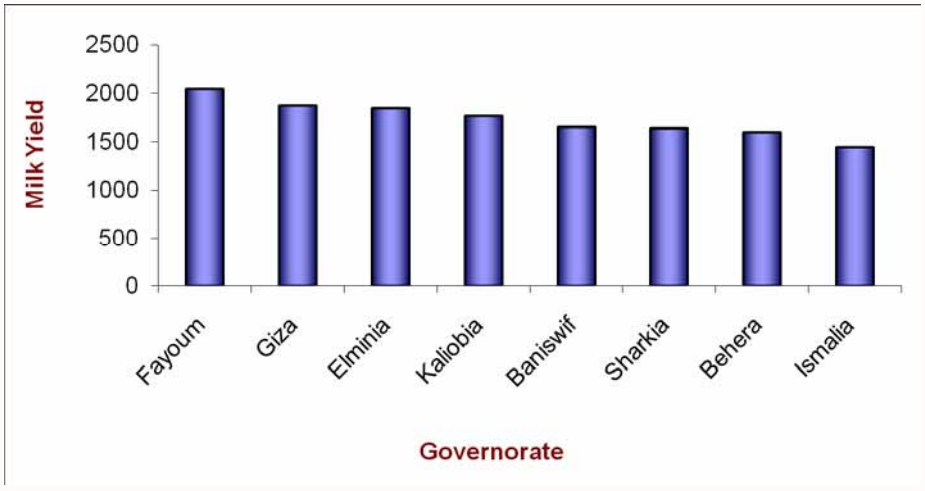

Least squares means of total milk yield (kg) of buffaloes in eight governorates.

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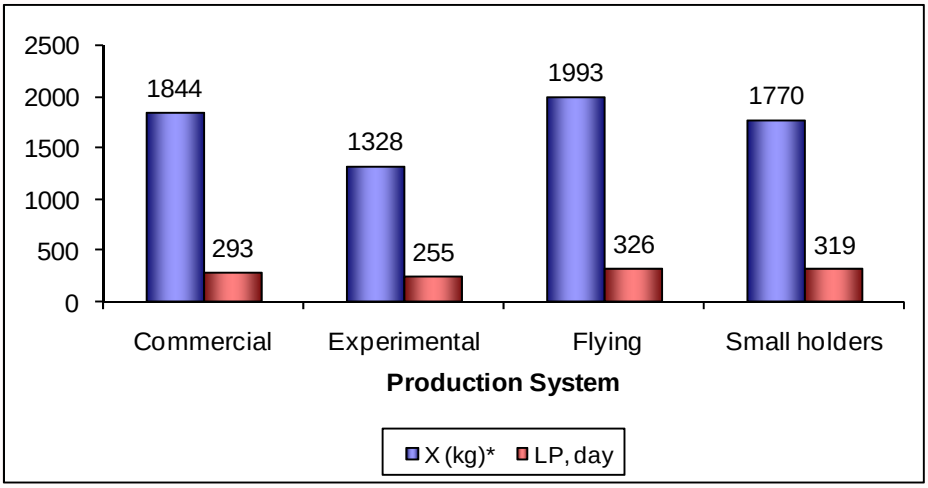

Least squares means (X) of total milk yield (kg) and average Lactation period (LP) in days of buffaloes under different production systems.

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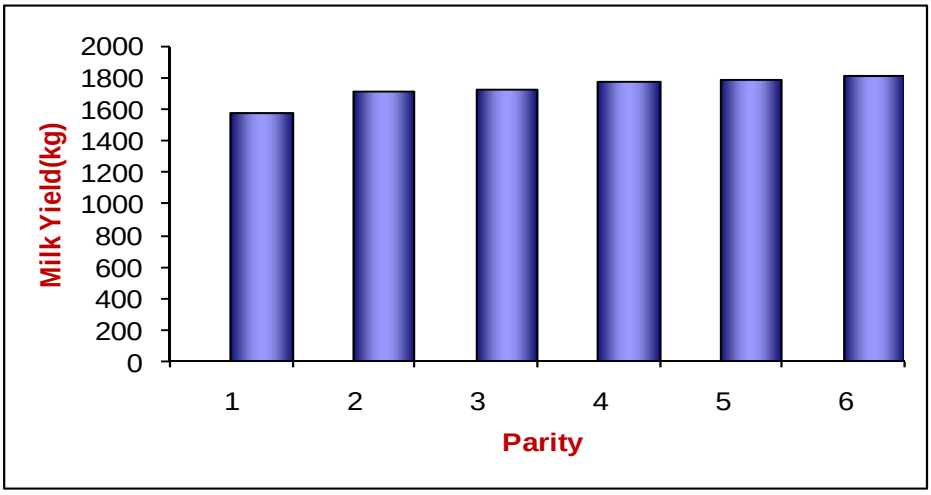

Least squares means of total milk yield (kg) of buffaloes for different parities.

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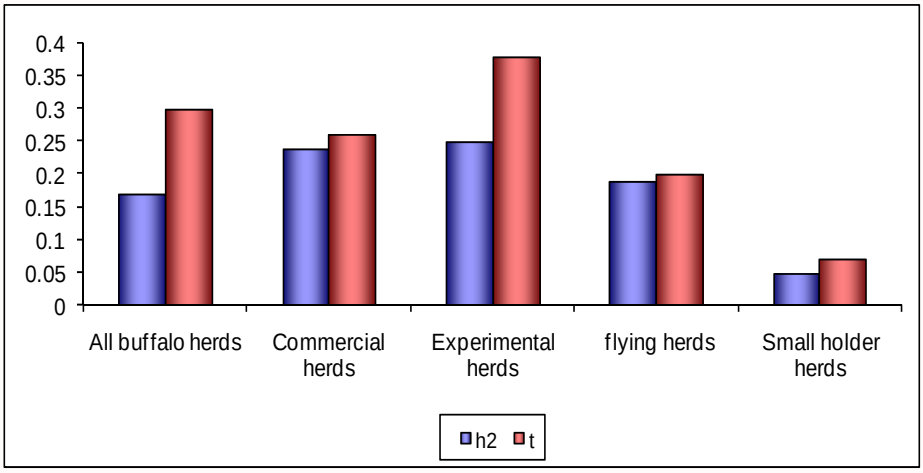

Estimates of heritability (h2) and repeatability (r) of total milk yield for all buffalo herds and under different production systems.

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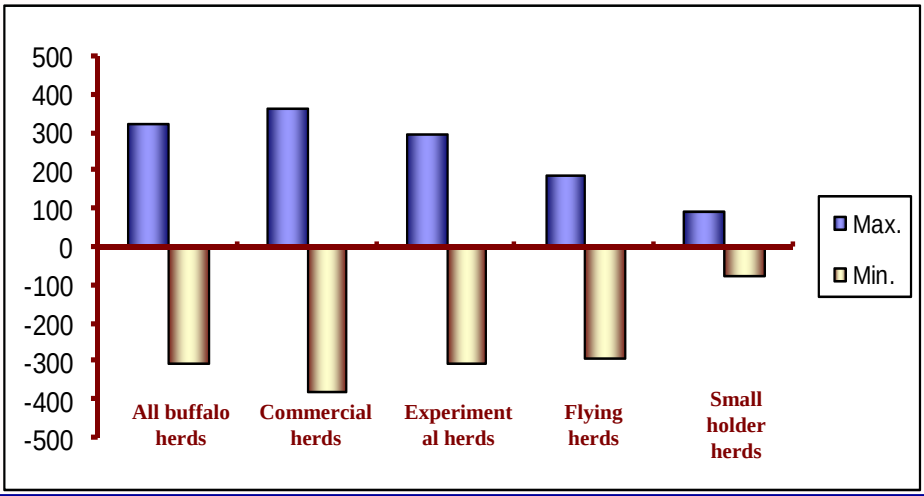

Maximum and minimum estimates of breeding values of total milk yield (kg) for all buffalo herds and different production systems.