

## **CHARACTERIZATION OF ZARAIBI GOAT PRODUCTION SYSTEMS IN DELTA REGION OF EGYPT**

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### **ABSTRACT**

Personal interviews with 40 goat owners were conducted in three representative areas (Damietta, Port Said and Dakahlia) located in north delta, where Zaraibi goats are prevailing. The survey was carried out using structured questionnaires, during the period from February to August 2010, containing a total of 90 items grouped into goat owner production resources, management practices, goat production performance and their production constraints. The majority of households (75%) kept only goat herds and 25% owned both sheep and goats. The mean flock size was 12.6 heads, of which 53.74% consisted of does, 22.82% male kids, 19% female kids and 4.3% bucks. About 60% of the goat keepers keep goats mainly for saving purpose, the second main reason for income generation (30%), however, keeping goats for meat and milk purposes were ranked as third (5.9%) and fourth (4.5%) order, respectively. Usually the rate of majority of farmers supplementing females at suckling and late pregnancy stages 82.5 and 70%, respectively. In studied areas, 74.4% of breeders have their Zaraibi bucks. Average weaning age and marketing age were 4 and 7.5 months, respectively. Average weaning weight under household conditions was estimated as 14.8 kg. Average litter size has been recorded as 2.16 kids. Pre-weaning and post-weaning mortality were estimated as 11.47 and 2.76%, respectively. Kidding interval of goat farmer's is estimated as 250 days. Female post-weaning sales (14.19%) was found to be lower than selling adult does. Female kids growth rate and physical characteristics had higher reasons for disposal of 67.5 and 50%, respectively. On the other hand, cash need, disease, slaughter for home consumption and injury had lower reasons for disposal of 12.5, 5.0, 2.5 and 2.5%, respectively. The poor fertility performance and cash need had higher reason for disposal for adult Zaraibi females. Goat milk is used mainly for suckling kids (58%), home consumption (39%) and supplementary income to the smallholder (3%).

**Keywords:** Production system, goat, production resources, management practices, performance and constraints.

### **INTRODUCTION**

Small ruminants (i.e., sheep and goats) contribute largely to the subsistence, economic and social livelihoods of low-and medium input farmers in developing countries (Kosgey, 2004 and Olivier *et al.*, 2005). Due to their high fertility, short generation intervals, adaptation in harsh environment and their producing ability from limited feed resource; the sheep and goats could be consider good for investment and insurance (Tsedeke, 2007). However, as a matter of fact goats productivity is low in the developing countries. Various factors contributed to the low productivity: such as health

constrains and management as well as, feed quality and quantity shortage (Tsedeke, 2007 and Getahun, 2008). Thus, strategic planning for sustainable development of goats may be put into consideration for each of production systems, production constraints and type of ownership (Kosgey *et al.*, 2006). Generally, the goats are distributed in Egypt across the country. The Barki goat represent described desert breed, it lives in north-western coastal region, while both Egyptian Baladi and Zaraibi goats are mostly found in Nile valley and delta (Galal *et al.*, 2005). It is well known that Zaraibi is related to the Egyptian Nubian breed, in the same time it consider as the most important native goat breed evaluated on the basis of milk and meat production (Marai *et al.*, 2002 and Galal *et al.*, 2005) This study was carried to characterize the Zaraibi goat production systems and identify their production constraints in (Damietta, Port Said and Dakahlia) areas where Zaraibi goats are prevailing in Egypt.

## **MATERIALS AND METHODS**

Personal interviews with 40 goat owners were conducted in three representative areas (Damietta, Port Said and Dakahlia governorates) located in north delta where Zaraibi goats are prevailing. The survey was carried out using structure questionnaires contain a total of 90 items grouped into goat owners production resources, management practices, goat production performance and their production constraints during the period from February to August 2010.

## **RESULTS AND DISCUSSION**

### **Production resources**

The major features of the Zaraibi goat production systems prevailing in Egypt are presented in Table (1).

**Table (1): The major features of the Zaraibi goat production systems.**

<b>Parameter</b>	<b>Estimate</b>
Landless, %	95
<b>household heads education level:</b>	
Illiterate, %	60
Literate, %	40
<b>Age of household heads</b>	
≤40 years, %	22.5
41-60 years, %	57.5
> 60 years, %	20
<b>Family size, person</b>	5.6
<b>Flock size, head</b>	12.6
<b>Flock composition (%):</b>	
Goat herds	75
Mixed flocks	25
Zaraibi in goat herd	65.5
Goat in mixed flock	73

In the surveyed areas, the average family size of goat owners are 5.6 persons. Most of goat owners (60%) were illiterate. On the other hand, 40% of them were literate which suggested that communication of technical knowledge on goat farming would be easy. A large proportion of households (57.5%) were between 41-60 years. About 23% of household heads within the age group of 40 years and below. At this age, household built up goats flocks and using them for sustaining family needs. Older household (20%) heads seemed to use their goat flocks as an informal pension facility or maintained the flocks for younger family members. The majority of households (75%) kept only goat herds and 25% owned both sheep and goats.

**Table (2): Frequency distribution (%) of age structure of the Zaraibi goat flocks at breeders.**

Age structure	Female %	Male %
< 12 month	19	22.82
>12 month	53.74	4.29

The overall mean flock size was 12.6 heads, distributed as 53.74% does, 22.82% male kids, 19% female kids and 4.3% bucks. Kosgey *et al.* (2008) found in Kenya 48 and 22% of the smallholders and pastoral/extensive farmers, respectively owned only 18% sheep and 18% owned only goats and mixed 34 and 60% owned both sheep and goats. They found that the smallholders owned an average of 2.6±3.5 kids, 2.8±4.8 weaners and 5.7±7.9 adults. Belete *et al.* (2010) found that breeding females represent larger proportion while suckling age are the second largest age group in the flock for goats in Goma district of Jimma Zone of Ethiopia.

The higher proportion of females may be attributed to the prevalent practice of retaining females for breeding while males are sold when they reach market age. Ogola *et al.* (2010) found that male kids (14.6%), female kids (14.2%), bucks (15.9%) and does (55.4%) for dairy goat production in Kenya. Ahmed *et al.* (2002) studied age distribution within the flock of desert black goat under extensive production systems in North Sinai in Egypt. They recorded 60% of the females are over 3 years to be used as breeding does and about 40% are less than 2 years for replacement.

**Table (3): Percent of most important reasons given for keeping goats among farmers.**

Purpose	Percentage
Income	29.8
Saving	59.7
Milk	4.5
Meat consumption	5.9

Goats are kept for different purposes; (Table 3) shows the percent of most important reasons given for keeping goats among farmers. It could be noticed about 60% of the goats keep for saving purpose, 30% for income generation. However, from production side of view keeping goats for meat

and milk purposes were ranked as third (5.9%) and fourth (4.5%), respectively. Casey and Van Niekerk (1988) in South Africa found that goats play an important role in both commercial and subsistent farming systems. They recorded in the commercial farmers that goats are mainly kept for meat production, while to subsistent farmers, goats are of greater importance as source of meat and cash for other activities in the family, as well as source of milk for poor families, which cannot afford to keep cattle.

**Management practices**

Generally, goat management was based on primary experiences, and sometimes the modern technology were not applied, therefore, the low productivity and low efficiency will be a normal results of keeping goats. This could be attributed to the following:-

**Feeds and feeding systems**

**Table (4): Feeding systems and supplement feeding practice at different production stages in the surveyed areas.**

Feeding systems	Summer and autumn	Winter and spring
Green fodder, %	52.5	92.5
Crop Residual, %	47.5	7.5
Supplemented with concentrates, %	82.5	47.5
Supplement feeding practice at different production stages		
Stage of production	Frequency	
At suckling	82.5	
At late pregnancy	70	
At meeting	15	

Table (4) shows the major feeds available and their utilization. It could be noticed that Berseem (*Trifolium alexandrinum*) was the principal feed resources in winter and spring. During summer and autumn months, flocks used mainly green fodder (sorghum) and grazed crop residues. In addition to the green fodder supplemented feed was given. About 48% of the households supplemented their animals in summer and autumn months, and 83% during summer month only. Table (4) also shows the supplement feeding practice at different production stages. It could be noticed that the majority of farmers (82.5 and 70%) usually supplemented females at suckling and late pregnancy stages, respectively. Mousa (1996) working on 90 Zaraibi does, mentioned 65% of the does flushed during the last two months of pregnancy and during lactation period to be result in 500 kg more milk yield. In the same trend, almost all kids targeted for fattening by the same supplement. Sires also are given extra feed during the breeding season, at which the concentrate (corn, barley and grains) is available.

**Mating system**

The breeding season usually start at June-July. Bucks used for mating for the first time at one year old. In studied areas, about 74.4% of breeders owned their Zaraibi bucks. However, in the case of owners do not have their own sires, they borrow one of the same breed (Zaraibi goat) favorite or other favorite breed (Damascus goat) for 20-30 days. In other survey of small-scale goat study, farmers conducted in two villages of the

Eastern Cape; Masika and Mafu (2004) found that only 20% of goat owners kept their own bucks.

Kidding occurs once per year, from December to January and weaning occurs at 4-5 months of old. Then after, the weaning age in this study was at 4 months of age which was earlier; 5.9 months for kids of Kochere district (Adugna, 1998); 4.8 months for kids in Wolaita area (Adugna, 1990) and 4.5 months for desert black goat under extensive production systems in North Sinai in Egypt (Ahmed *et al.*, 2002). In the other side the average marketing age was recorded as 7.5 months. Ahmed *et al.* (2002) obtained 8.3 months of desert black goat under extensive production systems in North Sinai in Egypt. The difference in marketing time attributed to the available better feed to reach the market weight by the owner herd of Zaraibi goats.

**Production performances**

Production and reproduction performances of Zaraibi goat under field condition has been depicted in Table (5). From the present study, 22.1% of the total goats gave only one kid, whereas multiple births were recorded in 77.9% of total goats (45.65% twin, 26.09% triple and 6.16% quadruplets). Under experimental station, Hamed *et al.* (2009) obtained 82.9% multiple births of total Zaraibi goats (twins: 55.7%, triple: 30% and quadruplets: 4.2%). Abdel-Raheem (1998) using the same breed found that the birth type ratios were 17, 56, 23 and 4% for single, twins, triplets and quadruplets, respectively.

**Table (5): Production and reproduction performance of Zaraibi goat under field condition.**

Parameters	Performance
<b>Birth type</b>	
Single, %	22.1
Twin, %	45.65
Triplicate, %	26.09
Quadruplets, %	6.16
<b>litter size, kids</b>	2.16
<b>Pre-weaning mortality, %</b>	11.47
<b>Post-weaning mortality, %</b>	2.76
<b>Kidding interval, days</b>	250
<b>Weaning weight, kg</b>	14.8

Regarding the Zaraibi goats litter size, it has been estimated as 2.16 kids, this is near to the top (from 1.7 to 2.9 kids) obtained by several studies under research stations condition by (Marai *et al.*, 2002 and Hamed *et al.*, 2009). However, Song *et al.* (2006) concluded that the management system affected the reproductive performance of does, especially litter size at weaning which were higher under intensive conditions, compared to those under the range environment. In addition the management system permit to cull does with low litters, which resulted partially in significant increase in litter size Wilson *et al.* (1989).

Losses of kids from birth to weaning constitute a major source of kids wastage. Pre-weaning mortality for Zaraibi goats in the present study was 11.47%. Survivability of Zaraibi kids under experimental station conditions ranged between 60% to 100% (Mourad, 1993). Marai *et al.* (2002) found that the overall mean of mortality rate was (26.8%) for Zaraibi goats under experimental station. On the other hand post-weaning mortality for Zaraibi goats in the present study was 2.76%. Generally, the management system especially the level of hygiene in the farm lead to the pre and post weaning mortality rate level. Therefore, it was found that high kid mortality can occur even with animals kept under extensive management systems (Ndloyu and Sibanda 1991). Mortality of kids may be reduced by control of internal and external parasites, feeding of the dam, vaccination and improved housing (Boomker *et al.*, 1997 and Payne and Wilson, 1999). Webb and Mamabolo (2004) reported that the mortality rates in of South African indigenous goats in communal farming systems were extremely high (40.6%) compared to systems with better management.

Kidding intervals of examined Zaraibi goat is estimated as 250 days. Marai *et al.* (2002) reported that the kidding intervals of Zaraibi goats in Egypt under experimental station was 349.5 days. However, kidding intervals depends on the herd management policy; it may vary from 250 to 355 days (Alphonsus *et al.*, 2010).

Average weaning weight of Zaraibi goat under present household conditions was estimated as 14.8 kg. The corresponding figure under experimental station ranged from (6.3 to 11.2 kg) for Zaraibi goat in Egypt (Taha, 2003 and Shaat *et al.*, 2007). This difference may be a related to better management practices applied in goat owner herds. Rai and Singh (2005) reported that the average body weight at 3 months were (12.49 and 11.26 kg. under semi-intensive system and extensive system, respectively for Jakhrana goats.

**Table (6): Frequency (%) of disposal reasons for Zaraibi kids and adult females goats.**

Parameters	Estimate
Post-weaning sales, %	14.19
Disposal reasons for kids	Frequency (%)
Disease	5
Slaughter for home consumption	2.5
Injury	2.5
Growth rate	67.5
Physical characteristics	50
Cash needs	12.5
Sales unspecific	12.5
Adult sold, %	30
Disposal reasons for adult females	Frequency (%)
Old age (large in age)	27.5
Poor performance:-	
Milk production	37.5
Fertility	85
Growth rate	32.5
Cash needs	70

Female post-weaning sales (14.19%) was found to be lower than selling adult does (30%) for the goat owners (Table 6). Female kids growth rate and physical characteristics are higher reasons for disposal of 67.5 and 50%, respectively. On the other hand, cash needs, disease, slaughter for home consumption and injury had lower reasons for disposal of 12.5, 5, 2.5 and 2.5%, respectively.

Verbeek *et al.* (2007) found that the main reasons for culling for each of goats and sheep, and for both smallholders and pastoral/ extensive farmers were: age of the animals (28%) followed by fertility (21%), small size (19%), health (13%), performance (3%) and temperament (3%). Other reasons included feed scarcity, overpopulation, drought, and prevention of inbreeding, and conformation, colour and condition of the animal could be added.

The poor fertility performance and cash needs are higher reasons for disposal for adult Zaraibi female (85 and 70%, respectively). Also, sold for poor performance of milk production and growth rate and old age were 37.5, 32.5 and 27.5%, respectively.

#### **Production constraints**

Table (7) shows that the goat disease (38%); low body weights (25%) and feed shortage (14.5%) are the major production constraints in the studied areas.

**Table (7): Production constraints in the examined areas.**

<b>Production constraints</b>	<b>Percentage</b>
Quantity and quality of feed	14.5
Diseases/parasites	38.1
Low body weight	25
Others (land, money, animal genetic and theft)	22.4

In addition, Odeyinka and Okunade (2005) found that accidents on the roads, seasonality of feed supply, diseases, theft, lack of capital and land could be add to the previous as identified in West African Dwarf goat production constraints in Oyo State area.

## **CONCLUSIONS**

The view of goat farms' owners is mainly as an investment project to keep the exist income of money. Then, organizing the environment of keeping money of the goats come after. However, goat diseases, low body weights and feed shortage are found to be the limiting factors for increasing reproduction and productivity of Zaraibi goats. Therefore, it could be concluded; to enhance the profitability and sustainability of system in the long-run, flock-owners need to be educate the importance of time of vaccination and feed supplement to the animals, during stages of production. In the same time the identification of alternative feed resources and strategic feeding management might be options for development of the Zaraibi goat sector of animal production in this area of Egypt.

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خصائص نظم إنتاج الماعز الزرايبي في دلتا مصر  
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أجري هذا البحث للتعرف على نظم إنتاج الماعز الزرايبي ومشاكل إنتاجها والتي تحد من انتشارها بما يساعد على نشر هذه السلالة لذي أكبر عدد من المربين. تم اختيار ٤٠ مربي ماعز زرايبي عشوائيا من أماكن انتشار الماعز بمحافظة دمياط وبورسعيد والدقهلية والوفاة في شمال دلتا مصر وذلك خلال الفترة من فبراير حتى أغسطس سنة ٢٠١٠. وذلك لعمل استبيان. واشتمل الاستبيان على إجمالي ٩٠ عنصرا وكان يضم الليانات التالية: الصفات الشكلية المحددة لمواصفات الزرايبي عند شرائه وحجم القطيع وتكوينه ونظم الرعاية والإيواء والصفات الإنتاجية والتناسلية والحيازة الزراعية (ملك أو مشاركة) ونوع العمالة وحجم الأسرة ومستوي التعليم والغرض من تربية الماعز الزرايبي (لبن - لحم - جديان) وعدد الحيوانات المباعة والعمر عند التسويق وأسس الاستبعاد وتسمين الجديان والمعوقات التي تواجه مربي الماعز الزرايبي. وكانت أهم النتائج المتحصل عليها ما يلي: تحتفظ أغلبية المزارع الصغيرة بنسبة ٧٥% ماعز فقط وبنسبة ٢٥% قطعان مختلطة من الماعز والأغنام. وكان متوسط حجم القطيع ١٢.٦ رأس منهم ٥٣.٧٤% أمهات، ٢٢.٨٢% من الننتاج ذكور، ١٩% من الننتاج إناث و٤.٢% تيووس. يحتفظ المربي بحوالي ٦٠% من قطيعه بصفة رئيسية لغرض الحفظ و٣٠% لتكوين سلالة و ٥.٩ و٤.٥% لإنتاج اللحم واللبن على التوالي. ووجد أن غالبية المربين ٧٠ و ٨٢.٥% يقومون بإعطاء الأمهات عليه إضافة في مراحل الحمل المتأخر والرضاعة على الترتيب. ووجد أيضا أن ٧٤.٤% من المربين في المناطق التي اشتملت عليها الدراسة يحتفظون بذكور (تيس زرايبي) للتلقيح. كان متوسط عمر الفطام وعمر التسويق ٤ و ٧.٥ شهر على التوالي و متوسط وزن الفطام تحت ظروف المزارع الصغيرة ١٤.٨ كجم ومتوسط عدد الجداء عند الميلاد ٢.١٦ جدي. كان معدل النفوق أثناء فترة الرضاعة ١١.٤٧% بينما كان ٢.٧٦% بعد الفطام وكانت الفترة ما بين ولادتين ٢٥٠ يوم. وكان معدل بيع الإناث بعد الفطام ١٤.١٩% أقل من معدل بيع الأمهات ٣٠%. وكان من أكبر أسباب استبعاد الربيعات انخفاض معدل النمو والصفات لمظهرية ٦٧.٥ و ٥٠% على التوالي. على العكس من ذلك كان الاحتياج المالي والأمراض والنحى للإستهلاك المنزلي والنطح للأمهات العشار فتسقطها أقل أسباب الاستبعاد ١٢.٥، ٥، ٢.٥ و ٢.٥% على الترتيب بينما كان انخفاض الخصوبة والاحتياج المالي من أكبر أسباب استبعاد الأمهات. وجد أن

لين الماعز يستخدم بصفة رئيسية (٥٨%) لرضاعة النجاج ويستهلك بنسبة ٣٩% للاستخدام الأدمي بينما يمثل ٣% كدخول إضافي للمربي. أيضا وجد أن أمراض الماعز وانخفاض معدلات نموها من القيود الأساسية في المناطق التي اشتملت عليها الدراسة. تعتبر مزارع تربية الماعز في مناطق إجراء الدراسة (محافظة نياط وبورسعيد والدقهلية) بصفة رئيسة مشروع استثماري لحفظ المال والدخل والمحافظة على البيئة. وقد وجد أن من العوامل التي تعوق زيادة هذه المشروعات لزيادة الإنتاج والتناسل في الماعز الزرايبي الأمراض وبطيء معدلات النمو ونقص الغذاء. ومع ذلك يمكن استنتاج أنه لتحسين ومعظمة الربح وزيادة كفاءة نظام الإنتاج لفترة طويلة، يجب إرشاد مربي الماعز للحصول على قدر كاف من المعلومات الخاصة بأهمية تحصين حيواناتهم في الوقت المناسب ضد الأمراض ومعرفة أهميه التغذية الإضافية خلال مراحل الإنتاج المختلفة. والإستفاده من بدائل الغذاء وأساليب الرعاية التي يمكن اختيارها لتحسين الماعز الزرايبي في مصر.

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