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STUDIES ON IMPROVING LOCAL SHEEP BREEDS FERTILITY IN EGYPT

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Abstract

Egyptian local sheep breeds are subtropical fat-tailed ,sheep characterized by satisfactory fertility and ability to breed all year around, but have low prolificacy and growth rate. The breeding objectives were to increase the prolificacy of Ossimi and Rahmani breeds usually in the small holders and in small farm conditions. There was no formal study to set the breeding objectives. The three main breeds of sheep in Egypt are Rahmani, Ossimi and Barki. It was recommended for farmers to exchange rams and increase crossing among the three local breeds. Crossing with outside breeds such as Awassi, Cyprus and finn. The first cross was back-crossed to the local to produce1/2 Finn ¾ local from each breed group. The cross animals were mated for some generation, and involved in a selection programmed to establish a new breed type with better lamb production. The first cross ewes had a slightly better fertility conception rate than the local ewes. Crossed ram lambs performed better in pubertal age than purebred parents. Semen quality at first ejaculation had poor quality, while it was good at 80% semen motility score. Different research experiments were conducted and many additives were used to improve preserved semen quality such as dyes, Caffeine, Sugars, aromatic compounds chelating agents, antioxidants, selenium, seminal plasma, Soybean and injecting different types of Hormone. Licorice contains many photochemical which have ameliorating effects on semen quality and considered as a versatile additive. Fish oil was also used as supplementation and could improve semen quality and the conception rate and enhanced ram fertility.

Effect of different dietary energy levels were also investigated on some blood and seminal constituents and semen quality of Rahmani rams. High and low dietary energy were 2615, 3138 and 2092 Kcal. ME/Kg on DM basis. Most semen physical characteristics were high LE fed rams but did not differ significantly. Effect of (50 ug IM of) GnRH injection/week on semen ejaculate characteristics in rams collected in breeding and non-breeding seasons. GnRH treatment improved libido, semen volume, sperm numbers, but not viability. More over the administration of 80 mg (Recombination Bovine somatotropin rbST), at 14 day interval starting at 2 month of age, improved growth performance puberty characteristics and semen physical characteristics of male rams.

In another trail, in the hot season of the year, animals were treated with selenium (0.1 mg/DM as sodium salient) orally ,injection with melatonin 25 ug/Kg body weight daily at sunrise, and prostaglandin F2 (PG F2,3 mg/head one hour before collection of semen. Ram injected with prostaglandin F2 surpassed ($p< 0.05$) the control in sperm motility, Rams treated with selenium had lower significantly ($P< 0.05$) semen PH. Blood components in ram, were insignificant affected by selenium ,melatonin or PGF2 treatments. Research plans, programs and factors influencing the Egyptian local sheep breeds fertility of stored semen and methods used for improvements are discussed.

Key words: *local breeds , semen additives, Diluents.*

INTRODUCTION

Sheep with its multi facet utility (for meet, wool, skin, manure and to some extent milk) play an important role in Egyptian animal meet production.

They are better adapted to arid and semi-arid tropics with marginal and sub-marginal lands, otherwise unfit for crop production (Mousa, 1991; Osman, 1985) and (FAO, 2000).

The three main breeds of sheep in Egypt are Rahmani, Osseimi and Barki. Rahmani is the largest breed, easily identifiable by its red wool and small ears.

The Osseimi is slightly smaller, with white wool. Barki is the smallest breed, with white wool and a brown neck. Purebred Barki is the breed of choice for Bedouins in the desert.

All are fat-tailed sheep. What distinguishes fat-tailed sheep from other sheep is their long tails, filled with fat and having a function similar to the camel's hump.

Figure 1. Rahmani Sheep

Fat-tailed sheep are hardy and adaptable, able to withstand the tough challenges of desert life. When feed is ample and parasites not burdensome, fat-tailed sheep can be impressive in size, growth, and conformation. Carcass quality is good, with most of the fat concentrated in the tail region. The carcass and meat are preferred by Moslems.

The wool from fat-tailed breeds is coarse and frequently has colored fibers. It would be of limited value in world markets. It is used primarily for rug making and other cottage-type industries. Some shepherds sell their wool clip, while others give it away to the shearer. The Bedouin women make beautiful rugs and blankets from the wool.

Some of their handiwork can be purchased in the villages (Shoenlan, 1996).

Shearing is done once or twice a year with hand clippers. There is a reluctance to use electric shears because of wool quality and the difficulty in getting replacement combs and cutters. With the tropical climate, sheep and goats breed year-round, typically producing three crops in two years. Twinning is common in goats, but quite variable in sheep, with considerable room for improvement (Marai et al., 2008; Marai et al., 2003; Mousa, 1991).

Some shepherds have only a few sets of twins, while others claim to have a majority of twin births. Limited selection is practiced for reproductive rate. Given the difficult environmental conditions, not all farmers are convinced they want multiple births. Nonetheless, we encourage selection for twins, as reproductive rate is one of the most important factors affecting profitability (Osman, 1985).

Rams typically run with ewes all year round, making it difficult for farmers to plan breedings, flush ewes and feed according to stage of production. Some of the better farmers have started to separate rams and have defined breeding seasons. Sheep are inbred, which depresses performance and fixes negative traits in the flock (FAO, 2000; Ferial et al., 2000).

It was recommended for farmers to exchange rams and increase crossing among the three local, fat-tailed breeds. Crossing with outside breeds such as the Awassi, but only if the breed is adapted to the desert. Other breeds have been tried and failed in this environment (Aboul Naga, 1995).

The Mediterranean subtropical Chios (C) sheep are known for their high prolificacy, early sexual maturity and good milk production. Their usefulness for improving sheep production in the subtropics where prolific temperate breeds performed poorly as purebreds has been reported (Aboul Naga, 1995; Aboul Naga et al., 1997; FAO, 2000). A crossbreeding program was carried out by the Ministry of Agriculture in Egypt between the imported C sheep from Cyprus and both Ossimi (O) and Awassi (A) sheep. Production performance of these breeds and their crosses has been described by (Aboul-Naga and Abdoul-Ela, 1985; Ferial et al., 2000).

Animal breeding and reproduction have a great contribution to make to a future sustainable animal agriculture.

Figure 2. Crossbred Barki Lambs

Many opportunities are open to the animal breeding and reproduction sector for improving the biological and economic efficiency of food production and increasing food supply. These

opportunities are dietary energy is the most important factor which affects semen quality in farm animals (Lysandrides, 1981). The deficiency of dietary energy causes delay of animal puberty, suppresses libido and sperm production (Yassien, 2009). Also, the amount of the mutton depends mainly on the reproductive performance of the rams.

Alleviation of heat stress may be achieved by ameliorating the environment, reducing the animal′s heat production and/or helping the animals to dissipate the heat load. The latter includes physical, physiological and nutritional techniques (Marai et al., 2003). In that respect, melatonin hormone and prostanglandins can be used as physiological techiniques and selenium can be used as nutritional technique. This is attributed to that selenium acts as a component of the enzyme catalyzes the degradation of organic hydroperoxdase. Regarding the melatonin hormone, it can be used ton increase fecundity. The prostaglandins have a role in increase of testicular contraction with consequentpro motion in the release and progression on spermatozoa towards the epididyms (Marai et al., 2003).

Figure 3. Barki sheep

Many additives were used to improve preserved semen quality such as: dyes, caffeine, sugars, and aromatic compounds chelating agents, antioxidants, selenium, seminal plasma and soybean (Leeuw et al., 2000; Mohamed El - Sharawy et al., 2003).

Licorice contains many photochemical which may have ameliorating effects on semen quality , so this study was designed to investigate the possible effects of licorice extract addition to the diluter on sperm motility of chilled stored ram Licorice is the name applied to the roots and rhizomes of *Glycyrrhiza* sp ecies and has been used for medicinal purposes for at least 4000 years (Ibrahim, 2010).

Glycyrrhiza glabra L. is one of the very important nutraceuticals, contains some 400 bioactive phytochemicals and has manydocumented bioactivities such as: steroid like activity , powerful antioxidants activity, antibacterial activity and antiviral activity (Ibrahim, 2010).

The biggest obstacle in the exploitation of frozen ram semen is that freezing and thawing reduces motility and membrane integrity, which leads to poor fertility following cervical AI. Extensive research has been conducted in the last few decades on ram semen diluents, semen processing, freezing and thawing methods for improving the post-thaw viability and membrane integrity of motile sperm cells (Mohamed El − Sharawy et al., 2012). Techniques such as administration of recombinant bovine somatotropin (rbST) could lower the cost of production in farms. Bovine somatotropin (bST) is a growth hormone (GH) produced by cow pituitary gland and of importance to growth, metabolism, lactation and reproduction of all animals (El-Gohary et al., 2011). The effects of using bST have been studied in sheep (Shahin et al., 2004), dairy goats and and dairy cattle (Yassien, 2009).

Many experiments have been performed to study the effects of somatotropin (GH) on the reproductive functions of cattle, but few were carried out to study its effects on sheep and goat. Somatotropin (ST) plays an important role in the reproductive process (spermatogenesis and steroidgenesis), where its receptors were found in leyding and sertoli cells, vas deference, prostate gland, epididymis and seminal vesicles (Marai et al., 2003). The effects of rbST on reproduction was related to rbST dose, time of starting treatment, breed and other factors such as nutritional status and milk production (Shahin et al., 2004). GnRH has been used in rams, bulls, boars and stallions to increase sperm numbers in the ejaculate (Azawi et al., 2012).

In addition to increased sperm numbers in the ejaculate following GnRH administration, some researchers noted that treated animals had a greater libido at the time of semen collection (Azawi et al., 2012). Libido was assessed using

quantifiable observations, such as time to initial false mount and time to ejaculation in buffalo, and time for collection in rams (Leeuw et al., 2000).

Initially, the effects on reaction time and collection time were attributed to hypothalamic-pituitary-testicular effect following GnRH administration. A great deal of attention also has recently been given to the essential roles of polyunsaturated fatty acids of sperm membrane.

Semen from all domestic species contains high levels of polyunsaturated fatty acids, in particular, docosahexaenoic acid (DHA) and docosapentaenoic acid (Awad and Graham, 2004). It was claimed that DHA is an essential component of healthy sperm cells, enhancing membrane integrity and tail flexibility, as well as increasing output.

Moreover, Awad and Graham, 2004, reported that ram spermatozoa are especially rich in DHA, which competes with arachidonic acid for the sn-2 position in membrane phospholipids. There is also evidence that the lipid and fatty acid compositions of chicken sperm play important roles in maintaining semen quality (Shahin et al., 2004).

The studies of specific requirement for DHA by sperm cells has focused attention on the required physical structure that promotes fertility and their potential association with tissue DHA content e.g. a positive correlation between the state of polyunsaturation and membrane fluidity and function (Azawi et al., 2012). DHA is the predominant fatty acid in the sperm and was highly correlated with sperm motility (Chinoy, 1972) and other semen characteristics and freezability (El-Darawany, 1999).

As Fish oil is rich in polyunsaturated fatty acids mainly DHA (Abd El-Razek, 2009), this study was to investigate the effect of oral fish oil supplementation on the fresh and frozen semen. A number of commercially available extenders containing a substitute for egg yolk have been used for the preservation of bovine, ovine, ram and caprine semen by a number of workers. Ram spermatozo diluted in soya lecithin based extender Bioxcell maintained the sperm quality and produced acceptable fertility rates (Abd El-Razek, 2009).

MATERIALS AND METHODS

Experiment I

Plan was to cross the local ewes with the imported Finn rams. The first cross was back-crossed to the local to produce 1/4 Finn 3/4 local (1/4 F 3/4 L) from each breed group. The 1/4 F 3/4 L cross was either inter se mated, for some generations, and involved in a selection programme to establish a new breed type with better lamb production, or utilized as a dam breed to be mated to terminal size (Suffolk cross) to produce fat lambs. The 1/4 F 3/4 L was thought to be more suitable as a crossbred group for the prevailing conditions based on the following criteria:

- Their prolificacy would not be too high and ewes could be managed easily by the farmers.
- Ewes could stand the prevailing environmental conditions better than the crosses with higher Finn blood.
- The ewes' ability to breed at different times of the year was expected to be closer to the local sheep.
- Sheep have a reasonable size fat tail which is a determinant factor in consumer preference and price in the market.
- The genotype could be easily produced by using the 1/2 Finn rams, produced on state farms, on the breeders flock.

Experiment II.

Two types of diluters were used; egg yolk- tris (EYT) (Shahin et al., 2004) and yolk- glucose-citrate (Shoenlan, 1996). Licorice extract powder (levels of 1, 5, 10, 50 and 100 µg per ml. of diluter. Diluter containing no licorice extracts served as control (0). Diluters were prepared the day prior to use, allowing large participle to settle overnight at 5˚C, so that the supernatant could be used. Before use, each diluter was warmed to 37 ˚C.

Experiment III.

Four experimental extenders, i.e., tris-egg yolk (TEY) and 3.0 gr.tris; 80 ml distilled water; fructose 0.2% wt/vol; egg yolk 20%), egg yolk-citrate (EYC) (2.9 g sodium citrate 80 ml distilled water; fructose 0.2% wt/vol; egg yolk 20% v/v), milk extender (MILK) (10 % skim milk and Bioxcell were used in this study.

Antibiotics including gentamycin sulphate (500 µg/mltylosin tartrate (100 µg/ml; lincomycin

hydrochloride (300 µg/ml; and spectinomycin hydrochloride (600 µg/ml; were added to TEY, EYC and MILK extenders.

Using artificial vagina (42°C) semen was collected (two consecutive ejaculates/raml/ week) for a period of 3 weeks. The semen was transferred to laboratory within minutes of collection. Visual motility was assessed microscopically (at 200x) with and sperm concentration was determined by Neubauer haemocytometer. sperm/ml of the ejaculate were selected for further processing., the qualifying ejaculates were pooled and held for 15 min at 37°C in a water bath before dilution. Pooled semen was split into four equal aliquots for dilution in four different experimental extenders.

Semen aliquots were diluted at 37°C with one of the four experimental extenders. Sperm quality assays including sperm progressive motility, sperm viability (Live/dead percentage), sperm plasma membrane integrity, sperm acrosomal integrity and sperm abnormalities were unstained as live. Sperm plasma membrane integrity (PMI) was assessed by hypo-osmotic swelling (HOS), assay abnormalities semen samples (100µl) was fixed in 500µl of 1% formal citrate (2.9 g tri-sodium citrate dehydrate, 1 ml of 37% solution of formaldehyde, dissolved in 100 ml of distilled water) and one hundred spermatozoa were examined with a phase contrast microscope (X 1000) under oil immersion. Normal acrosome was characterized.

Experiment IV

Six rams aged 2 years were used. The experiments were performed in October and November in the breeding season. Semen was collected, samples showing less than 70% motility were discarded. After the spermatological characteristics of each ram were determined, the ejaculates were pooled and diluted at a 1:4 ratio (semen:diluent) at +37 oC with Tris extender. The diluent contained tris (hydroxymethyl) aminomethane (3.63 g), glucose (0.50 g), citric acid (1.99 g) and egg yolk (15%).

Diluted semen was cooled gradually to +4^{o}C within 2 h. Cooled semen was split into 6 parts and different amounts of ascorbic acid (0 (control), 0.5,1, 2, 5 and 10 mg/ml) were added to each group. Motility and pH were evaluated 0, 2, 4, 8, 16 and 24 h after dilution.

Diluted and cooled semen was split into 20 parts. Each part was diluted at a 1:1 ratio with one of the extender groups containing different proportions of glycerol (0%, 1%, 3%, 5% and 7%) and ascorbic acid (0, 0.5, 1, 2 mg/ml). Extended semen was packaged in 0.25 ml French straws. The semen was allowed to equilibrate for 4 h before freezing. The semen in straws was frozen in liquid nitrogen vapor. They were thawed in a water bath at +38^{o}C for 25 s.

Motility, dead spermatozoa rates, damaged acrosome rates and total abnormal spermatozoa rates were determined following cooling to +4 oC, glycerolizatione equilibration and freezing-thawing.

Experiment V.

Six rams of local breed (Rahmani and Ossimi) 2–4 years old were used for semen collection by artificial vaginaOn each day, ejaculates, from three different rams, containing greater than 70% progressive motility were pooled together and considered to be one sperm sample. For this experiment 10 sperm samples were extended, frozen, thawed and analyzed. Sample was split into three aliquots for freezing: 0.25 ml straws(control or in pellets on the cold surface of paraffin wax or on the cold surface of cattle fat. Pellet blocks were cooled by immersing the aluminum boxes in liquid nitrogen for 30 s and placing the block horizontally in liquid nitrogen vapor 3 cm above the surface of liquid nitrogen. Volumes of 0.1 ml, of equilibrated spermatozoa, were dropped into the depressions on the surface of each pellet block. After 10 min in the liquid nitrogen vapor, the pellet blocks were immersed in liquid nitrogen and the pellets packaged in small goblets for storage at -196^{o}C.

The surface temperature of the pellet blocks was determined by making a 1mm deep hole in the wax or fat using a blunt 22 gauge needle. A thermocouple was inserted into the hole and sealed in place with 10 _l of melted wax or fat, respectively. The pellet blocks were then immersed into liquid nitrogen for 30 s, and then placed in the freezing apparatus, 3 cm above the liquid nitrogen surface and the temperature of the blocks measured at 1 min intervals for 15

min. For these experiments, no spermatozoa were placed onto blocks, and block temperatures were monitored 5 min longer than blocks containing spermatozoa would have been plunged into the liquid nitrogen. In a second experiment, paraffin wax and cattle fat blocks were immersed in liquid nitrogen for 5 min prior to being placed in the freezing apparatus, and the temperature of the blocks measured for 15 min at 1 min intervals.

Experiment VI

A total number of 20 rams of Egyptian Suffolk sheep were used, during May-July months. The rams were 1.5-2.5 years of age and 60-70 kg body weight. The animals were divided into four groups of nearly equal average weights. Each group was of 5 rams. The first group was kept without treatment as control. The first second group was treated with selenium (0.1 mg/ kg DM as sodium selenite) orally. The third group was injected with melatonin (25 µg/ kg body weight. Daily at sunrise; melatonin was dissolved in a minimum of absolute ethanol and diluted in 0.9 NaCl 1:9) and the fourth was injected with Prostaglandin F2α (PGF2α; 3mg/head, one hour before collection of semen).

RESULTS AND DISCUSSIONS

I-Reproductive performance of the Finn ewes

The first results on the reproductive performance of the Finn crosses with either 0 or R local ewes were reported by[4] Prolificacy, expressed as number of lambs born/ewe lambed, increased by 0.68 and 0.70 in the Finn-Rahmani (FR) and Finn-Osimi (FO) first cross, respectively, and by 0.17 and 0.27 lambs in 1/4 F 3/4 R and 1/4 F 3/4 0, respectively, over the local ewes It should be noted that the latter group were 2-3 years old and 2-5 years in the first cross and 2-9 years for the local ewes. Although age of ewe was included in the model adopted for analyzing the data there could however be a confounding effect between age and breed groups.

The most interesting result is that the Finn crossbred ewes showed better fertility than the local ewes at different seasons of mating which resulted in a higher figure for number of lambings/ewe/year. Such performance resulted in a detectable improvement in annual number of lambs produced/ewe in the Finn crosses over the local ewes; 1.25 and 0.80 lamb for FR and FO and 0.19-0.44 and 0.34-0.55 lamb for 1/4 F 3/4 R and 1/4 F 3/4 0, respectively rebreed each 8 months and that 1/4 Finn ewes are expected to show better performance when they have attained maturity.

- Cross-breeding programs involving crosses with specific breed combination are difficult to sustain at the farmer level. A range of combinations should be envisaged, e.g. in the present program a 12-37 percent range would be allowed and probably investigated rather than the 25 percent F genetic;
- A structure must be established to guarantee the flow of the desired genotypes. In the present case, non-sustainability evolved as it depends mainly on state institutions to provide the exotic genotype;
- Enhancement of improved cross-breeding genetic material should be accompanied by access of breeders to inputs, e.g. regular availability of feed stuff;
- Phenotypic characters of local breeds involved in the consumer preference and consequently in market price, should be taken into consideration in the cross-breeding programs with exotic breeds;
- A lower portion of the exotic temperate blood seems more suitable for crosses in subtropical conditions.

II.

Progressive sperm motility, sperm viability, sperm plasma membrane integrity and NAR were significantly ($P < 0.05$) higher for BIOX, MILK, and TEY extenders at 1st, 3rd and 5th day of storage compared to EYC extender. Moreover, progressive sperm motility, sperm viability and sperm plasma membrane integrity were not affected up to third day of storage in BIOX extender and at 5th day of storage the values for these parameters remained significantly ($P < 0.05$) higher in BIOX compared to other extenders. Sperm abnormalities (head, mid piece and tail) did not differ among the different extenders

III.

Motility increased significantly ($p < 0.01$) in levels of licorice extract 1, 5, 10,50 and 100 µg / ml in both diluters, during all storage periods. The means of progressive motility were 72.5 ±

1.02 %, 72.08 ± 1.05, 70.90 ± 2.05 % and 66.25 ± 3.15 % respectively, compared to the control (0) 61.45 ± 16.2 %. (fig1). Levels 1, 5 and 10 µg /ml were superior ($p< 0.01$) to levels 50 and 100 µg /ml (fig1). Diluter type had a significant effect ($p < 0.01$) on sperm motility. Overall the percentage of motile sperm in EYT diluter (66.48 ± 1.21 %) was higher than that in yolk-glucose citrate diluter (64.37± 1.44 %).

Sperm motility tended to decline significantly ($p < 0.01$) as the length of storage period increased. The means of progressive motility were 80.00 ± 2.04 % after dilution (0h), 68.75±3.15 % 61.25 ± 4.27% and 50.62 ±4.61 %, at 24, 48 and 72 h after cooling, respectively. The study findings may contribute to the recent attempts to design defined semen diluter and move away from animal-based cryoprotectants, which may pose hygienic risks and are difficult to standardize..Finally there are several factors affecting the phytochemistry of the licorice root such as geographical location, soil condition, time of harvesting and the environmental factors and this should be considered when applying such treatment widely.

In conclusion, the addition of licorice extract to the diluter improved ram sperm progressive motility during cooled storage at 5˚C.

IV.

In the preliminary study, ascorbic acid at concentrations of 0.5, 1 and 2 mg/ml in diluent during the storage of semen at +4^{o}C did not affect the motility of spermatozoa or pH ($P > 0.05$) compared to the control group. However, ascorbic acid at concentrations of 5 and 10 mg/ml in the diluted semen significantly decreased ($P < 0.05$) motility and pH. In the main experiment there was no significant difference in motility, acrosomal integrity, total abnormal spermatozoa rate or dead spermatozoa rate depending on the increase in the proportions of ascorbic acid in the diluted semen groups containing the same glycerol levels after equilibration.

The percentage of progressively motile spermatozoa in the A1 control group (without glycerol and ascorbic acid) was 79.0 ± 0.77% after equilibration, and the increase in the glycerol level significantly decreased motility in the C4, D4 and E4 groups compared to the A1 control group.

V.

Fish oil supplementation with the different doses affected the semen physical parameters (The ejaculate volume, sperm cell concentration, sperm motility and live sperm percentages of rams in all fish oil groups were significantly ($P<0.05$) increased during treatment period than that of the control rams. However, the percentage of sperm abnormalities was significantly reduced in fish oil treated groups compared to that for control one. Treatment with fish oil led to increase seminal plasma proteins which adsorbed into the cold-shocked ram sperm surface and that this adsorption is able to reverse the membrane alterations induced by cold-shock and maintain high percentage of frozen thawed ram sperm motility.

VI.

Semen physical characteristics:

Semen physical characteristics of ram lambs in control and treated groups during different stages of puberty are presented in Table 1. Ejaculate volume, percentages of initial gross motility, sperm livability and abnormality percentage improved ($P<0.05$) by injection of 80 mg rbST.

On the other hand, sperm cell concentration was not affected by rbST treatment. Results agree with Fukui, 2008, who reported an increase ($P<0.05$) of semen ejaculate volume, percentage of live sperm and total sperm output and decrease ($P<0.05$) in abnormal spermatozoa in mature rams injected with 100 mg rbST five times with 14 days gap. El-Gohary et al., 2011, reported a decrease ($P<0.05$) in sperm abnormalities percentage and an increase of sperm output from Simmental sires injected with 640 mg rbST seven times every 14 days gap. Moreover, injection with rbST (5 injections, 100 mg/ male at 14 day-intervals) improved semen quality and ejaculate volume of rams (Azawi et al., 2012) and goats (El-Darawany, 1999) reported that all physical characteristics of Friesian bull semen improved ($P<0.05$) by rbST treatment (Table 1).

Table 1. Semen characteristics of first ejaculate containing spermatozoa of ram lambs in rbST and control groups

Characteristics	G1	G2	Sign.
Ejaculate volume (ml)	0.26±0.12	0.32±0.11	*
Initial gross motility (%)	43.6±0.13	50.6±0.10	*
Live sperm (%)	41.3±0.12	50.2±0.12	*
Abnormal sperm (%)	17.2±0.12	10.6±0.10	*
Sperm concentration (x109/ml)	1.23±0.12	1.42±0.12	NS

Significant at P<0.05. NS: non-significant.

The use of GnRH treatment in conjunction with semen collection has been shown to optimize the number of spermatozoa/ejaculate in the ejaculate of the Awassi ram semen. This result is in agreement with the findings of Shahin et al., 2004, who found to optimize the number of spermatozoa in the ejaculate of the bull.

CONCLUSIONS

Reproduction is directly affected by various management related factors. Manipulation of these factors can cause changes in reproductive performance. The control and manipulation of the sheep reproduction has been the objective of scientists around the world for many years.

The crossbred ram lambs reached puberty at younger ages and heavier weights than local ram lambs. Lambs seem to be adversely affected by the environment in Upper Egypt, resulting in slower growth rates than those reported in their home country. The evidence does not show crossbreeds having better semen properties at puberty. However, by the time the sperm had reached 80% motility, ejaculation volumes in the two crossbreeds and C ram lambs were significantly higher (P<0.05) than in both O and A ram lambs. These differences may be due to the variation in testicular size. This study shows that crossbreeding with the highly fertile Chios subtropical breed can considerably improve the early breeding performances

Artificial insemination (A.I.) is a reproductive method of great influence in the improvement of productivity. The advantage of A.I. has to be coupled, however, with an appropriate reproductive rate. That means that the A.I. must not have a detrimental effect on conception and lambing rates. The effort of the research centers has been focused on increasing the viability of the semen doses, especially testing different diluents.

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