International Journal of Animal Science, Husbandry and Livestock Production ISSN: 2141-5191, Vol. 8(4), pp. 456-462, October, 2022. Available online at www.advancedscholarsjournals.org © Advanced Scholars Journals

Full length Research paper

Assessment of reproductive performance of Hamary Ewes subjected to hormonal Oestrous synchronization

Faisal OA[1]*, Salah ABM[2], Fatima MI[3] and Yassin AA[4]

[1]Department of Reproduction and Obstetrics, Faculty of Veterinary Medicine, University of Khartoum
[2]Ministry of Agriculture and Animal Resources and irrigation.Dept of Animal Production, Sudan
[3]Animal Production Dept. Faculty of Agriculture and Natural Resource, Kassala University, Sudan
[4]Faculty of Animal Production Science and Technology ,Kassala University, Sudan

Accepted 22nd April, 2021

This study was designed to assess the effect of hormonal oestrous synchronization with progesterone intravaginal sponges in reproductive efficiency in Hamary ewes. Time taken to display oestrous, number of services per-conception, conception rate (CR), gestation period (GP), lambing rate and twining rate were assessed. Thirty (30) apparently healthy multiparous Hamary ewes were employed. Their age between (3 – 4 years),beside Nine sexually mature fertile apparently healthy 2 -3 years old Hamary rams were used for natural sevices. The ewes were allocated randomly into 3 equal groups (10 each). Group A and B treated with progesterone intravaginal sponges (40 mg) for 9 and 12 days respectively followed by intramuscular (i.m) injection of equine chorionic gonadotropin (eCG) 400 i.u. on the day of sponges removal. Group C employed as control injected only i.m with eCG (400 i.u.). The rams were distributed randomly among the three groups (3 males each). The collected data was analyzed by excel package of Microsoft office (2010) and SPSS version (16). The present study revealed that, there were no significant different (P>0.05) between time taken for display of oestrous, number of services per-conception, lambing rate and GP for the animal treated with progesterone intravaginal sponges for 9 and 12 days followed by injection of eCG on the day of sponges removal compared to the control. However, a significant different (P<0.05) was reported for CR and twining rate between the treated with same protocol compared to the control. In conclusion, insertion of progesterone intravaginal sponges for 9 or 12 days followed by i.m injection of eCG on the day of sponges withdrawal is the effective protocol for improvement of reproductive performance of Hamary ewes.

Keywords: Hamary Ewes, Oestrous Synchronization, intra-vaginal, Gestation period, conception rate, twining rate and equine chorionic gonadotrophin

INTRODUCTION

According to a recent official statistic, the livestock population in the Sudan is estimated to be 117 million head of cattle (31), sheep (41), goats (32), equines (8) and camels (5) (Omer, 2017 and M.A.R. 2020). The vast majority of these animals (80%) are owned by the nomadic pastoralists, semi – nomadic farmers who are scattered all over country (Medani, 1996). Livestock plays an important role in the economy of the Sudan and the welfare of its inhabitants. The contribution of this livestock in the growth domestic product (GDP) is estimated to be 20% (Omer, 2017 and C.B.S. 2020). For instance, about 70 – 80% of the Sudanese people depend in their living on domestic animals (C.B.S, 2020).

The population of sheep is significantly larger than that of cattle and goats. However, they are often neglected in most development programs in the tropics (Carles, 1983, Mohamed, S.E 2021). Sudanese sheep has been classified according to their physical features

*Corresponding author: Email:yassinpro4@yahoo.com

and ecological distributions into five major groups (Mcleroy, 1961, Elmubarak, 2010). The main group is the Desert sheep which constitutes over 60% of the total sheep population in the country (Medani,1996). This group has reputable production and marketing features in comparison to other local types. Its outstanding merits include large body, high dressing percentage and excellent mutton. On the other hand, desert sheep comprise more than 60% of the slaughtered sheep in the Northern regions and about 50% for the whole country due to their importance in social and religious ceremonies (Carles, 1983, Abdalla et al 2009.). Economically, desert sheep have a high significant contribution to the treasury through exportation of live animals mutton and skins (C.B.S, 2020).

Sudan desert sheep traditionally exported mainly to Arab countries whose preference it for mutton and lamb whose domestic supplies fall far short of their demand (Mufarrih, 1983; Evans and Maxwell, 1987, Elmubarak, 2010).

The objectives of this study were to determine the time taken for display of oestrous, number of services preconception, Conception rate (CR), gestation period (GP) lambing rate and twining rate.

MATERIALS AND METHODS

Study area:

This study was carry out in Khashm El-Girba locality, Kassala state, Sudan during February - June 2018. This locality is located in the arid desert landscape of the Eastern Sudan (Savanna belt) latitude 14°58'13.42" N longitude 35°55'54.58" E, annual rain rate determined 350 - 500 mm while temperature fluctuated between 18 – 44° C (Winter and Summer respectively). This climate enhances to grow pasture flora (Khashm El-Girba locality, 2004).

3-3 Accommodations system:

Reserved experiment animal in stockyard walled by local material with umbrella and exercise area with enough available mangers and stripes. Reserved 2.5 m per male and 2 m for female according to (El-Barbary, 2012).

3-4 Management and nutrition:

Ewes and Rams were tagged on ear and injected subcutaneously by ivermecin for treatment of internal and external parasites. The animals were fed with rations for three stages, 750 g for each level according to physiological condition (NRC, 1984); first stage (stemming up) after modification period (15 days before insemination) with energy 11.42 k.cl and 16.82 % protein (table 1); while second stage (holster up) after insemination and before 15 days of lambing containing 10.44 k.cal and 16.89 % of energy and protein respectively (table 1), and third stage (flashing up) before 15 days of lambing until lambing contain 12.08 k.cl energy and 16 % protein (table 1).

Table1: Ingredients (%) and chemical and calculated composition of the experimental diet

Ingerdians	Diets		
	stemming up	holster up	flashing up
Sorghum	32	22	36
Wheat bran	22	26	25
Ground nut cake	15	16	17
Ground nut hulls	27	32	19
Limestone	2	2	2
Cal. Salt	2	2	1
Total	100	100	100
Calculated composition: crude protein %	16.82	16.89	16
ME (kcal/kg)	11.42	10.44	12.08

3-5 Adaptation period:

Animals of experiment was leave to 21 days to adapted with inhabit condition and new nutrition.

Experimental materials:

Vaginal sponges saturated with progesterone hormone

(40 mg) (chorologist, interval, boxer, Holland), mare serum gonadotropin hormone (eCG) (syncroparttmpHs , ballast ere- 33500 labium France), sponges applicator, vaginal sponges, gauze, Vaseline, disinfectant (Dettol) and gloves was bought from IMV company (France) distributed in Sudan prosperity company.

Insert intravaginal sponges:

Intravaginal sponges were inserted by elevate ewes in chair to facilitating operation, then anointing the

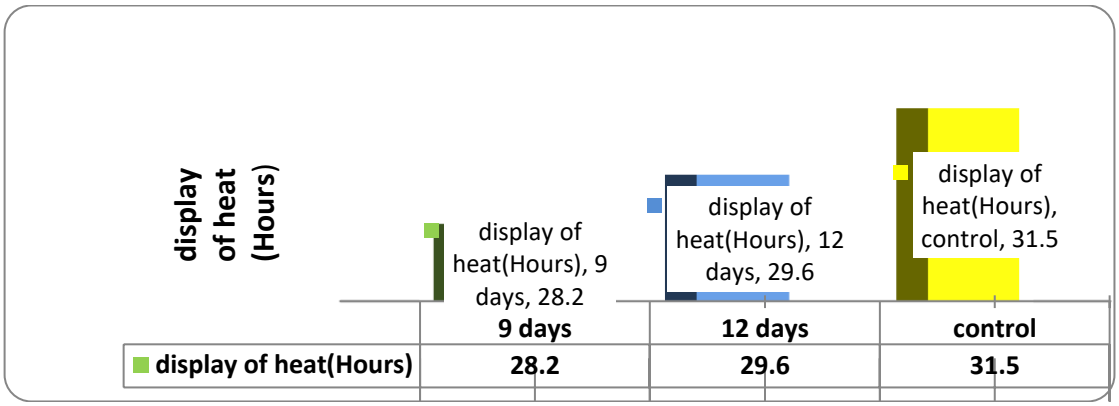

Figure1: The time taken for display of Oestours after treatment with progesterone intravaginal sponges.

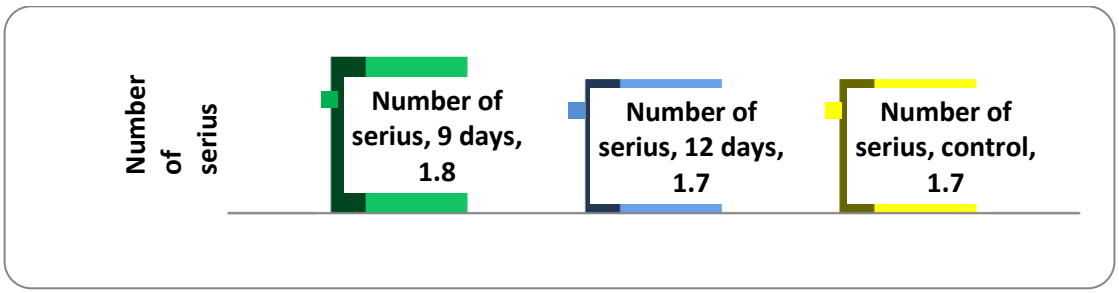

Figure 2: The number of services per-conception of ewes treated with progesterone intravaginal sponges.

applicator by medical Vaseline to facilitate induction, then detect cervix area via vagina scope then insert and impel sponge intravaginal, after the end of the period sponges were pulled via thread notable hangs out of vagina.

Heat detection and insemination:

Tail flagging, mounting others or stand to be mounted congested vagina and transparent vaginal discharge were indication of oestrous signs. Oestrous response was calculated as the number of ewes that display oestrous and subsequently mated, over the total number of ewes in each treatment group and expressed as a percentage (Arthur et al, 2009). The ewes were allowed to be mounted 48 hours after i.m injection of eCG. Natural insemination was applied with Nine sexually mature and fertile Hamary rams.

Pregnancy diagnosis:

It was performed with external abdominal ballottement 90 days from insemination and disappears of oestous signs according to Arthur et. al (2009),

Experimental plan, animals and data analysis:

The current study was designed to assess six reproduction traits (time taken to display of oestrous, number of services per-conception, conception rate, gestation period, lambing rate and twining rate). Thirty multiparous apparently healthy Hamry ewes (3 – 4 years) beside 9 sexually mature fertile Hamary Rams (2 - 3 years) were employed in this study and the animals were selected from a flock contain Nine hundred animals . The ewes were assigned randomly into 3 equal groups (10 ewes each). Animals in group A and B were treated with progesterone (40 mg) intravaginal sponges for 9 and 12 days respectively, then injected i.m with eCG (400 i.e.) on the day of sponges withdraw. However, group C was left control only injected i.m with eCG (400 i.e.) on day 10 of oestrous. Nine sexually mature and fertile rams were introduced after 48 hours of i.m injection of eCG (3 males each group) for natural mating. The parameters mentioned above were assessed. The Collected data was analyzed by excel package of Microsoft office (2010) and SPSS version (16).

RESULTS

The result of this study revealed that there was no significant difference (P>0.05) for the time taken for display of oestrous for the ewes treated with progesterone intravaginal sponges for 9 days, 12 days compared to the control. the mean values of time taken for display of oestrous for the ewes treated for 9 days, 12 days and the control were 28 hours, 30 hours and 31.50 hours respectively as shown in (figure 1).

Figure (2) indicated that the number of services per-conception was insignificantly different (P>0.05) of

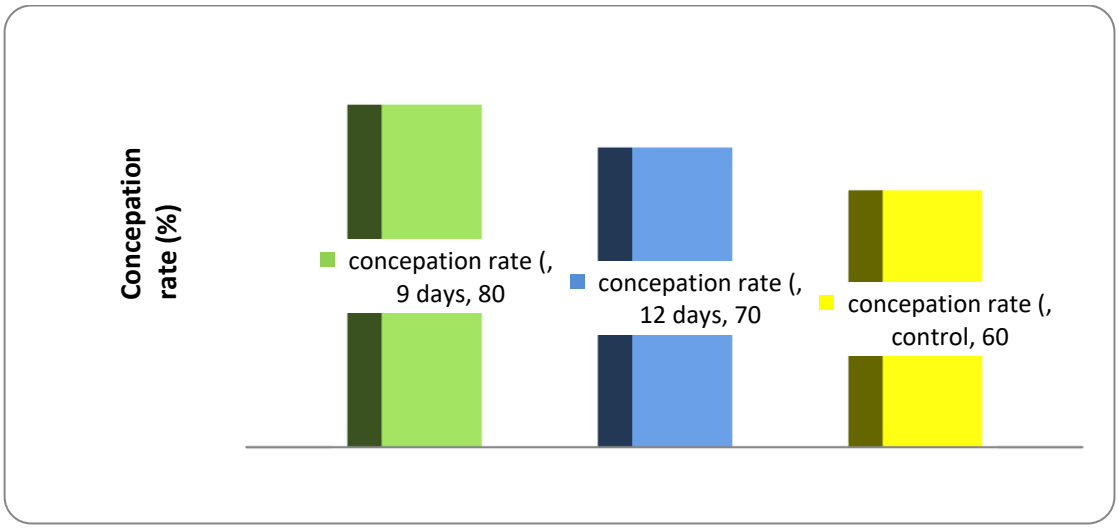

Figure 3: Conception rate of ewes treated with progesterone intravaginal sponges

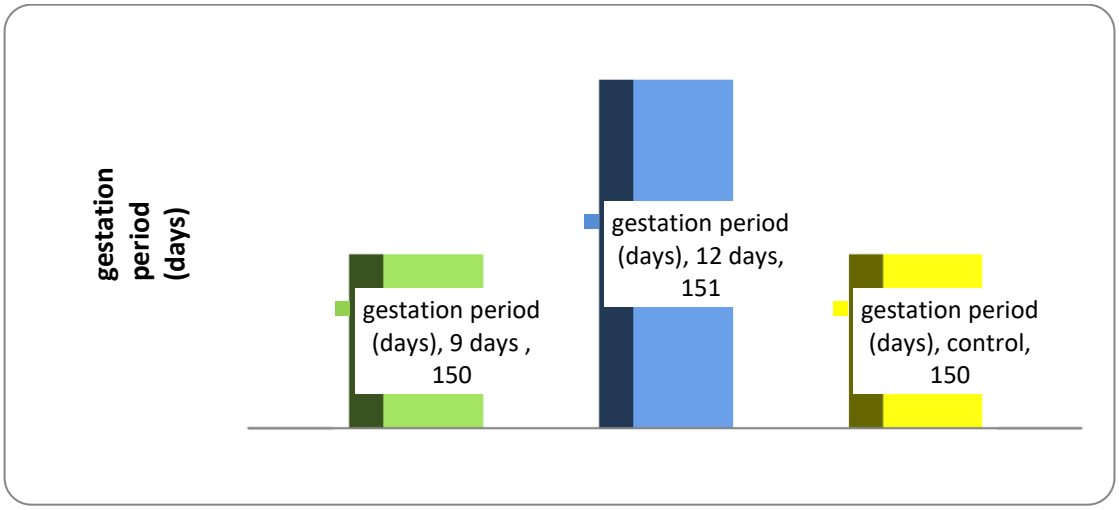

Figure 4: The gestation period of ewes treated with progesterone intravaginal sponges.

ewes treated with progesterone intravaginal sponges for 9 days, 12 days and the control. The mean values of number of services preconception were 1.8, 1.7 and 1.60 respectively. Figure (3) showed that the CR of the ewes treated with progesterone intravaginal sponges for 9 days, 12 days significantly different ($P<0.05$) compared to the control.

The mean values of CR of the treated ewes for 9 days, 12 days and the control were (80%, 70% and 60%) respectively.

The result of this study showed that the GP of the ewes treated intravaginal with progesterone sponges for 9 days and 12 days were insignificantly different ($P>0.05$) compared to the control. The mean values of GP of the treated ewes and the control were 150.0, 150.50 and 151.0 respectively as shown in figure (4).

This study indicated that, there was no significant different ($P>0.05$) of lambing rate for the ewes that treated intravaginal with progesterone sponges for 9 days, 12 days and the control. The mean values of lambing rate were 100% for the treated ewes and the control as shown in (figure 5).

As shown in figure (6) this study revealed that, there was no significant different ($P>0.05$) between the ewes that treated intravaginal with progesterone sponges for 9 days and the control however, there was a significant different ($P<0.05$) between the treated ewes with progesterone intravaginal sponges for 12 days and the control.

The mean values of twinning for the treated ewes with progesterone intravaginal for 9 days, 12 days and the control were 100%, 85% and 100% respectively.

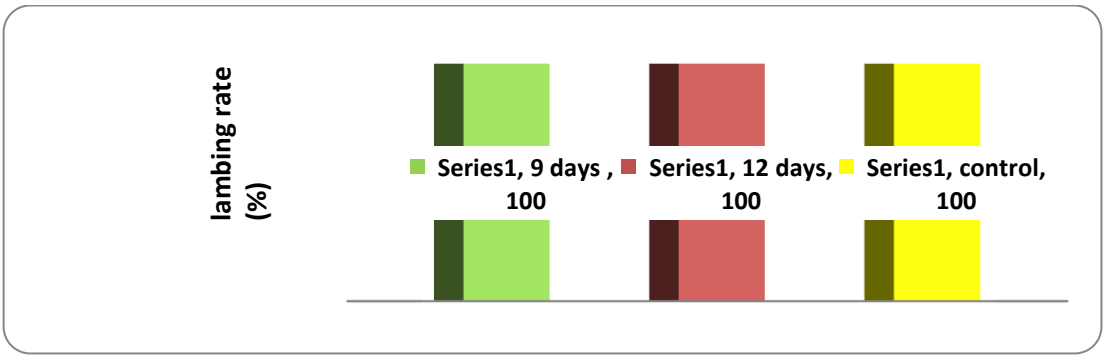

Figure 5: Lambing rate of ewes treated with progesterone intravaginal sponges.

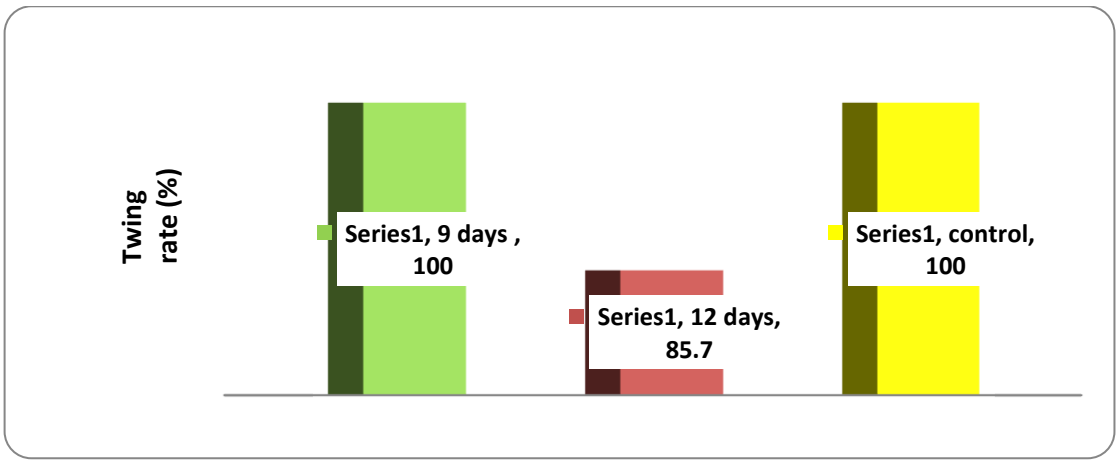

Figure 6: Show the twins rate of ewes treated with progesterone intravaginal sponges.

DISCUSSION

Factors such as management system (Omontese, 2012), intravaginal sponges texture (Alifakiotis, et. al., 1982) and techniques employed in inserting sponges (Roman, 1998, Elmubarak 2010), have been reported to influence of sponges retention in the vagina.

In this study, the time taken for display of oestrous for the ewes treated with intravaginal sponges was (29 hrs). However, Hussien (2015) mentioned the time taken for display of oestrous for ewes treated with progesterone intravaginal sponges was longer (35.50 hrs) and Simonetti et. al., (2000) who recorded (55.94_1.87 h). This different may be due the breed, nutrition or individual variation.

The results achieved in this study indicate that 100 % of ewes treated with p4 intravaginal sponges for 9 days or 12 days and followed with i.m injection of 400 i.u of eCG responded to hormonal treatment. This result support the result obtained by Timurkan and Yildiz (2005). This study reported that, the number of services per conception was improved for the ewes treated intravaginaly with progesterone intravaginal sponges for 9 days or 12 days followed with injection of eCG.

This study revealed that, the CR achieved by treatment of ewes with progesterone intravaginal sponges for 9 days was better (80%). Than CR for ewes treated with progesterone intravaginal sponges for 12 days.

The results of the present study agree with study of Foresce,et. al., (2005), Timurkan and Yildiz (2005) and Elmubarak (2010) and disagree with Simonetti, et. al., (2000) and Yadi, et. al., (2011). The difference between the two studies may be due to breed or individual variations. This study showed that, the GP is similar for all ewes treated with progesterone intravaginal sponges, this result agrees with the results of Timurkan and Yildiz (2005). This study reported that, the lambing rate is similar for the treated animals (100%) which is in constraint of the study of Elmubarak (2010), Ahmed et. al., (1998) who obtained the same result. However, disagree with Yadi, et. al., (2011), who recorded lambing rate is 16.7 %, the difference between the two studies may be due to season and breed variations.

Elmubarak (2010) achieved high twin rate for ewes treated with progesterone intravaginal sponges for 9 days. The previous study supports the finding of the current study where the twin rate was high for the ewes treated with progesterone intravaginal sponges for 9 days. While disagree with Yadi, et. al., (2011), who found 11% lambing rate, the different between the two

results may be due to seasons, nutrition and breed.

This study concluded that, insertion of progesterone intravaginal sponges for 9 or 12 days followed by injection of eCG and inseminated naturally after 48 hours of injection of eCG achieves obvious improvement in the reproductive performance of Hamary ewes.

REFERENCES

Abdalla MA, Mariam YI, Yahia YH (2009). Seasonal variation in erythrocytic and leucocytic in dices and serum proteins of female Nubian goats.Journal of Scientific and Industrial Research, 4, 168- 174.

Ahmed MMM, Makkawi SE, Jubara AS (1998). Synchronization of oestrous in Nubian goats. Small Ruminant Research, 30: 113 – 120.

Alifakiotis T, Michailidis I, Gavnhdis G (1982). Induced breeding in anoestrous milking ewes on dairy breed: Comparison of norgestometmedroxy progesterone and fluorogestone in two regimes of eCG. Theriogenology, 17(6): 603-610.

Arthur GH Noaks P, Harold P, Parkinson TJ (2009). Veterinary Reproduction and Obstetrics (8th ed), W. B. Saunders Co.Ltd.

Carles AB (1983). Sheep Production in the Tropics, Oxford Tropical Handbooks, English Language. Book Society/Oxford University Press, London, 24 – 43 pp.

CBS (2020).Central Bank of Sudan, General Directorate of Statistic and Research, Khartoum.

Chemineau P, Gauthier D, Poirer JC, Saumande J (1981). Plasma levels of LH, FSH, prolactin estradiol-lZfand progesterone during natural and induced oestrus in the dairy goat. Theriogenology, 17:313-323.

Elmubark AA (2010). The effect of improve feeding; oestrous synchronization and artificial insemination on reproductive performance of desert goats. PhD Theses, University of Khartoum.

Evans G, Maxwell WMC (1987). Salami's Artificial insemination of sheep and goats.1st edition. Butter Worth's. Sydney, 194 pp.

Fonseca JF, Bruschi JH, Santos ICC, Viana JHM, Magalhaes ACM (2005). Induction of estrus in non-lactating dairy goats with different estrous synchrony protocols. Animal Reproduction Science, 85:(1-2) 117- 124.

Hussien HM (2015). Echo determination of ovulation time and fertility in Nubian goats subjected to oestrus synchronization. M. V. Sc., thesis. Department of Surgery and Gynecology, Faculty of Veterinary Medicine, University of Al-Butana. Khashm El-Girba locality report, 2004.

MAR (2018). Ministry of Animal Resources. Information Canter, Khartoum.

Mcleroy GB (1961). The sheep of the Sudan. 2-Ecosystem and tribal breeds. The Sudan Journal Veterinary Science and Animal Husbandry, 2: 101 – 105.

MedaniMAE (1996). Livestock and Animal Production in the Sudan.Khartoum University press, Khartoum, Sudan, 63 pp. (In Arabic).

Mohamed SE (2021). Blood biochemical metabolites during late pregnancy and postpartum in cross-bred dairy cattle.Master thesis, Department of Biochemistry, Faculty of Vet.Med. University of Khartoum.

MufarrihME (1983). Sudan Desert Sheep: Their origin, ecology and production potential. Ministry of Animal Resources, Khartoum, Sudan.

NRC (1984).National Research Council. Feed stuffs Requirements of Animal Farm. National Academy press, Washington, DC, 18±35.

Omer AE (2017). Impact of Economic policy of Livestock on Reduces of Poverty in the Sudan. IST ed. PP: 43 – 80.

Omontese BO (2012). Oestrous synchronization in Red Sokoto and Sahel does using progesterone and gonadotrophin. Msc. Thesis, Department of Theriogenology and production.Faulty of Veterinary Medicine, Hamada Bello University, Zaria.

Romano JE (1998). Doesinpro estrus-estrus hastenestrusonsetin does synchronized during the breeding season. App.Anim. Behav. Sci. 77:329 - 344

Savio JD, Keenan L , Boland MP, Roche JF (1988). Pattern of the growth of dominant follicles during the estrous cycle in heifers. J- Report. Fertil;83:663-671.

Simonetti L, Blanco MR, GardoÂn JC (2000). Estrus synchronization in ewes treated with sponges impregnated with different doses of medroxyprogesterone acetate. Small Ruminant., Res., 38: 243-247.

Timurkan H, Yildiz H (2005). Synchronization of oestrus in hamdani ewes: The use of different pHs doses. Bull., Vet., Inst., Pulawy, 49, 311-314.

Yadi J, Moghaddam M F, Khalajzadeh S, Solati AA (2011). Comparison of Estrus Synchronization by PGF2α, CIDR and Sponge with PMSG in Kalkuhi Ewes on Early Anestrous Season.Inter., Conf., on Asia Agri., and Animal IPCBEE vol.13 (2011). IACSIT Press, Singapoor

Appendix table 1: Show the reproductive parameters of ewes treated with progesterone intravaginal sponges.

Parameters		**Time taken for oestrous of (hrs)**	**progesterone hormone responsiveness %**	**number of services perconception**	**) Concepation rate (%)**	**Gestion period (G P) (Days**	**Lambing rate (%)**	**Twing rate (%)**
Control	Min	24	60	1		148	100	100
	Max	36		2	60	152		
	Aver.	31.5+4.637		1.67+0.516		150.17+1.472		
9 Days	Min	25	100	1		149	100	100
	Max	34		4	80	151		
	Aver.	28.2+2.974		1.8+1.033		150.25+0.707		
12	Min	24	100	1		149	100	85.7
Days	Max	35		3	70	153		
	Aver.	29.6+3.373		1.714+0.756		151.0+1.291s		
sig		NS	**	NS	**	NS	NS	**

NS: Not significant

** The mean differnce is significant at the .05 level.