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ACCURACY OF PREGNANCY DIAGNOSIS AND PARAMETERS IN MARADI DOES BY MANUAL AND ELECTRONIC DEVICE METHODS

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ABSTRACT

Several techniques for pregnancy diagnosis in goats are developed. Some of them are efficient and applicable in the field, but not enough accurate. Others are outlined with a high precision, but require equipment and specialised skills. Fifty supposedly Pregnant Maradi Does (PMD) were purchased and tested for pregnancy using three methods: the abdominal palpation method (manual method), the A-mode ultrasonography and the B-mode ultrasonography (electronic methods). Stage of pregnancy and pregnancy parameters such as: foetal age, foetal number and foetal viability were determined using the ultrasound scanner (B-mode). The PMD were grouped into: First-Trimester (FT), Second-Trimester (ST), Third-Trimester (TT) and managed on-farm till eight weeks post-kidding. Pregnancy status prediction reveals that manual method used was 70.0% accurate, pregnancy detector device (A-mode) was 85.0% accurate, while accuracy of ultrasound scanner (B-mode) machine result was 100.0%. Stage of pregnancy and pregnancy parameters measured were 100% accurate at post-kidding. The result implies that B-mode ultrasonography is highly accurate in pregnancy prediction in goats.

Keywords: Maradi goats, pregnancy, ultrasound scanner, diagnosis

INTRODUCTION

Insensitivity of some methods of pregnancy diagnosis in ruminants especially goats contribute to indiscriminate slaughtering of pregnant goats (Akewusola, 2017). The pregnancy diagnosis in goats is essential for better efficacy and management of reproduction (Doize *et al*., 1997), providing information about conception rates after artificial insemination (Matsas, 2007), gestation course (Amer, 2010), time for drying-off and parturition date (Doize *et al*., 1997; Gonzalez *et al*., 2004). The separation of pregnant and non-pregnant does in different groups reduces the losses from abortions, stillbirths or giving birth to non-viable offspring and optimizes, labour, feed and medication costs (Wani *et al*., 1998). The utilization of an accurate

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and easily applicable method for pregnancy diagnosis allows the timely repeated insemination, breeding or culling of non-pregnant animals (Amer, 2010). In Nigeria, like many other African countries, ruminant farmers imbibe the use of manual or non-electronic methods of pregnancy diagnosis in predicting pregnancy status of their animals. Manual methods such as non-return to oestrus, abdominal palpation, live-weight increase, udder evaluation and milk secretion initiation among others. The application of these methods on a large scale in field practice has remained limited because of lack of practicality or the methods are insufficiently inaccurate (Singh *et al*., 2004). A method, easy to perform, reliable, not expensive and with high accuracy is preferable. The selection of a method depends on the stage of gestation, method's precision and the available equipment at the farm (Gonzalez *et al*., 2004). Ultrasonography as a method for monitoring of the reproduction status in small ruminants is becoming increasingly important and popular (Medan and Abd El- Aty, 2010; Erdogan, 2012). Now, A- mode, B-mode and Doppler ultrasound equipment is used for pregnancy diagnosis in goats. Their accuracy and usefulness under field conditions is various (Goel and Agrawal, 1992; Ishwar, 1995). B-mode (brightness) real time ultrasonography is a modern, non-invasive, rapid and accurate method for early detection of pregnancy in animals (Abdelghafar *et al*., 2007; Santos *et al*., 2007). An experienced operator could achieve an accuracy of 91–100% (Romano and Christians, 2008).

MATERIALS AND METHODS

Fifty pregnant Does of Maradi breed of age two to three years and average weight of 25.20±4.32kg were used. The does were purchased from Akinyele Kraal market, Ibadan, Nigeria.

Experimental sites: The experiment was carried out in two sites. The livestock handler method (manual method) was carried out at the market (Akinyele Kraal market) to purchase the animals used while the A-mode and B-mode ultrasonography (USS of DW-600 model, made in China, year of make: 2010) method (electronic device method) was used at the ruminant unit of Animal Science Department, University of Ibadan. The dimension of the unit was 79.56m long and 89.10m wide and is geographically placed at 70.26461N, 30.52531E at an altitude of 200-300m above sea level.

Experimental materials: Pregnancy detector device (Draminski. A-mode, 2012 model, Holland), pregnancy scanner (DW 600 model), ultrasound gel, cotton wool and wooden platform or table.

Methodology: The three methods (livestock handler method, A-mode USS, B-mode USS) were systematically used in stages. The livestock handler method was used in market and this was done by palpating the abdomen of the seeming pregnant does to check for the presence of foetus. Also milk expression from the udder was used to confirm pregnancy. The outbursts of thick

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whitish viscous secretion from the udder may confirm pregnancy while clear non-sticky secretion may indicate non-pregnant. Fifty confirmed pregnant does were bought using these processes. At the second site of the experiment, the does were settled in the unit, acclimatised for two weeks and video cameras were installed in their Kraal pen to monitor their activities. Pregnancy detector and scanner were used in turns at 10 days post acclimatisation to finally diagnose pregnancy in the does. This was done to ensure all the does were within 50-100 days post mating which was the threshold level of the scanner. Parturition was used as final standard and accuracy of the three methods was determined at the supposed post gestation (maximum of 152 days post buying).

Data analysis: Data obtained were analysed using descriptive statistics.

RESULTS AND DISCUSSION

Accuracy of manual and ultrasonography (electronic method) in predicting Pregnancy Status (PS) is shown in Table 1. Diagnosing method was compared with kidding outcomes at the end of 152 days post- arrival of the Does to the farm. The result reveals that manual methods used was 70.0% accurate (Table 1). The PS measured by pregnancy detector device (A-mode USS) was 85.0% accurate, while accuracy of ultrasound scanner (B-mode USS) machine result was 100.0%. The result also shows that the advanced technology of the B-mode ultrasonography made it had edges over the other methods as it was able to detect some pregnancy parameters such as foetal age, foetal number and foetal viability which were all 100.0% accurate at post kidding.

Table 1: Accuracy of pregnancy diagnosis and parameters in Maradi Does by manual and electronic device methods

Method	PS (%)	NOD	Parameters									Accuracy (%)
			1	2	3	4	5	6	7	8	9	
Manual	100	50	-	-	-	-	-	-	-	-	-	70
Pregnancy detector	60	50	-	-	-	-	-	-	-	-	-	85
Ultrasound Scanner	70	50	41	38	18	12	10	3	18	3	1	100

1-Total number of foetus found, 2-Total number of viable foetus found, 3-Total number of animals in 1st trimester, 4-Total number of animals in 2nd trimester, 5-Total number of animals in 3rd trimester, 6-Total number of unviable foetus, 7-Total number of single foetus found, 8-Total number of twin foetus found, 9-Total number of triplet foetus found, PS-Pregnancy status, NOD-No of animal observed

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High percentage accuracy in pregnancy diagnosis using ultrasonography method is widely reported by researchers as one of the advantages of its use as pregnancy detection method for small ruminant. The implication of this is that other pregnancy diagnosis method will be used and might transend to false positive or negative giving rise to sale of potential breeders in goats. More than 95% accuracy of diagnosing pregnancy were reported in ewe (Grace *et al.,* 1989; Logue *et al.,* 1987) and accuracy of 100% in diagnosing pregnant status was also reported by White *et al.* (1984) in ewe between 50 to 100 days of gestation by using real time ultrasonography. By using Doppler system of ultrasonography, Deas (1977) reported the sensitivity and specificity of 82% and 91%, respectively, in ewes from day 41 to 60 post breeding and Lindalhl (1971) also reported accuracy greater than 90% in mid gestation with the same system in ewe. Meredith and Madani (1980) observed an accuracy of 83% of diagnosing pregnancy with 96% sensitivity and 87.5% specificity in ewe between 61 to 151 days of gestation with A-mode ultrasonography. Similar report of Madel (1983) with 80.1% diagnostic accuracy of ultrasound with sensitivity 86.7% and the specificity of 69.1% in ewe between day 73 to 103 post breeding and 97% accuracy form day 51 onwards by Watt *et al*. (1984) with A mode ultrasonography were also observed. The accuracy for pregnancy status observed for the Maradi does was high using B-mode real time and A-mode ultrasonography with minimal variation between the two methods within 50 to 100 days of gestation and this result corroborate the findings of White *et al.* (1984) and Meredith and Madani (1980).

CONCLUSION

The pregnancy diagnosis using the B-mode ultrasonography gives the best result in Maradi goats. The 100% accuracy obtained for pregnancy status and parameters prediction confirms its sensitivity, however, the method requires expertise and might be expensive for subsistence farmers.

Recommendation: The pregnancy diagnosis in goats is a primary factor for improving the reproductive performance in herds and achieving high economic efficiency. The efficiency of the ultrasound scanner (B-mode ultrasonography) can be used to stop the incessant sale and slaughtering of pregnant does in kraal markets. This can be achieved through the purchase of the scanner by the government for ante-mortem inspection at all the control post/marketing channels where ruminants are been exchanged.

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