The effect of treatment with a slow-releasing oxytocin preparation at the onset of oestrus on the ovulation rate of Merino ewes

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ABSTRACT

The effect of a slow-releasing oxytocin preparation on the ovulation rate of Merino ewes was investigated. Synchronised Merino ewes were subcutaneously injected with a slow-releasing preparation containing 10 IU oxytocin, 48 hours after sponge withdrawal. Laparoscopic examination of the ovaries of all ewes was performed 10 d after the oxytocin treatment in order to determine the number of corpora lutea per ewe. The ovulation rate of the adult ewes of the treated and control groups was 179.1 % and 159.1 % respectively ($p < 0.05$) while that of the 2-tooth ewes was 108.3 % and 112.8 % respectively ($p > 0.05$). It would appear that a higher ovulation rate can be obtained by a single injection of a slow-releasing oxytocin preparation at the onset of oestrus. The lack of response in the 2-tooth ewes was probably due to their relatively low body weight.

Key words: Merino ewes, ovulation rate, oxytocin.

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INTRODUCTION

From a previous study it would appear that the intravenous injection of ewes with 0.1 IU oxytocin every 30 min for a 24 h period starting at the onset of oestrus results in a increased ovulation rate (number of ovulations/ewes ovulated)[3]. This result supports the hypothesis that the 'Ronderib Afrikaner ram effect' on ovulation rate described by King[2] was brought about by increased oxytocin secretion in the ewe during oestrus.

In practice it would not be possible to treat ewes at such short intervals to obtain a higher ovulation rate. It would, however, be practicable to administer a slow-releasing oxytocin preparation at the onset of oestrus. A slow-releasing preparation would inevitably lead to a higher basal oxytocin level instead of a higher pulse frequency as obtained by half-hourly treatments. The purpose of the present study was therefore to determine whether a slow-releasing oxytocin preparation would also lead to an increased ovulation rate.

MATERIALS AND METHODS

Ninety adult and 48 2-tooth Merino ewes were divided into 2 groups on a stratified weight and age basis and were managed as a single flock on natural pastures. Both groups (each consisting of 45 adult and 24 2-tooth ewes) were synchronised for 14 days with flugestone acetate intravaginal sponges (Ovakron, Milborrow Animal Health) during the natural breeding season (May). At sponge withdrawal the ewes were weighed and 12 Merino rams were placed with the ewes. Forty-eight hours after sponge withdrawal the treatment group was injected subcutaneously with a slow-releasing oxytocin preparation containing 10 IU oxytocin which was prepared as follows: a liquid oxytocin preparation containing 150 IU oxytocin (Oxytocin Synth., Phenix) was freeze-dried after the pH had been adjusted to 7.7. The freeze-dried product was dissolved in 20 mℓ butanol (Merck) to which a further 130 mℓ liquid petroleum (Merck) was added. A gel was formed by adding 3 g aluminium monostearate (Merck).

Laparoscopic examination of the ovaries of all ewes was performed 10 d after the oxytocin treatment. In each ewe the number of corpora lutea was counted. In this study the ovulation rate was calculated as the number of ovulations per ewes ovulated. Data were analysed using the LSMLMW and MIXMDL-PC-2 programme which is suitable for the analysis of unbalanced data sets[1].

RESULTS AND DISCUSSION

Ninety-seven percent of the ewes in the treatment group ovulated compared to 98.6 % in the control group ($p > 0.05$). The ovulation rate of the adult ewes of the treatment and control groups was 179.1 % and 159.1 % respectively ($p < 0.05$). The number of adult ewes displaying single and multiple ovulations in the treatment group (10 single : 33 multiple ovulations) differed significantly ($p < 0.01$) from that recorded for the control group (19 single : 25 multiple ovulations). The ovulation rate of the 2-tooth ewes of the treatment group (108.3 %) did not differ significantly from that of the control group (112.8 %), while the number of ewes displaying single and multiple ovulations was the same (22 single : 2 multiple).

The mean body weight of the adult ewes that ovulated was 53.8 ± 0.94 kg for the treatment group and 53.8 ± 0.87 kg for the control group ($p > 0.05$). In the treatment group a significant difference ($p < 0.05$) in mating mass was found between adult ewes displaying multiple ovulations (53.8 ± 0.77 kg) and those with a single ovulation (49.1 ± 1.03 kg). The body weight of the adult ewes of the control group displaying a single ovulation was 52.9 ± 0.94 kg and did not differ significantly from the 54.4 ± 0.83 kg recorded for the multiple ovulators.

In the treatment group the mean body weight of the 2-tooth ewes that ovulated was 44.3 ± 0.99 kg compared to 44.0 ± 0.89 kg for the control group ($p > 0.05$). The mass of the 2-tooth ewes displaying multiple ovulations did not differ significantly from that of the ewes with a single ovulation in the treatment group (43.5 ± 0.73 *vs.* 44.3 ± 0.92 kg) or the control group (44.5 ± 0.75 *vs.* 43.5 ± 0.82 kg).

The relatively low ovulation rate recorded for the 2-tooth ewes could be

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ascribed to the low body mass of these ewes. King[2] reported that the Ronderib Afrikaner ram apparently only influences the number of follicles that ovulate and not the number of follicles that reach maturity. The inability of the oxytocin treatment to increase the ovulation rate of the 2-tooth ewes was probably due to the lower body weight, which probably led to fewer mature follicles being present.

The positive response of the adult ewes indicates that a single slow-releasing oxytocin treatment may enhance ovulation rate. The mechanism of oxytocin release as well as the optimum plasma oxytocin levels required for increased ovulation warrants further investigation.

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Book review — Boekresensie

Ostrich chick rearing, a stockman's guide

D C Deeming, A C K Dick and L L Ayres

1996. Ratite Conference, c/o Hangland Farm Ostriches Ltd, United Kingdom, 122 pp., paperback. Price £ 25.00. ISBN 0 9527584 1 5.

In the preface the authors note that ostrich farming worldwide is in transition from being an art to becoming a science. Consequently this book is not a mere stockman's guide. This is demonstrated by the detailed table of contents, in which the wide spectrum of fields covered is indicated.

The book includes an introduction, followed by chapters on the following subjects:

Incubation and hatching: the ostrich egg; considerations for successful incubation of ostrich eggs; the incubation process; incubators and hatchers; temperature; humidity and water loss; ventilation and respiratory gases; egg turning; embryonic development; the hatching process; chick quality.

Anatomy and growth: basic anatomy; digestive system; respiratory system; excretory system; circulatory system; reproductive system; nervous system; muscular and skeletal system; skin and feathers; sexing ostrich chicks; growth rate and dimensions.

Rearing environment: enclosure design; rearing systems; enclosure dimensions; brooding; walls; flooring; environmental conditions; temperature heating systems; humidity; ventilation; lighting; noise; staff.

The daily routine: before the chicks arrive; removing chicks from the hatcher; weighing; handling; moving chicks to different locations; transporting birds; provision of food and water; cleaning and biosecurity; forms of identification; leg bands; permanent identification; record-keeping; a suggested daily routine.

Nutrition and feeding: digestion; feed items; concentrate feeds; pelleted vegetation; cereals; probiotics; stones; feed management regimen; provision of feed; feed consumption; alterations in the diet; feed storage; water; feed and water troughs.

Behaviour: the importance of behaviour; what ostriches do all day; feeding; food-item preference; location and presentation of feed; colour preferences; stones; social interactions; abnormal behaviour; pecking at other birds; pecking at non-edible objects; coprophagy.

Veterinary problems, diseases and chick mortality: introduction; recognising a sick chick; non-contagious causes of mortality; oedema and dehydration; 'stargazing'; yolk-sac infection; splay legs; tibiotarsal rotation; rolled toes; slipped tendon; impaction and gastric stasis; starvation; wounds; the dangers of water troughs; contagious causes of health problems and mortality; viral problems; bacterial problems; fungal problems; protozoan problems; care of sick birds; tube-feeding; a veterinary first-aid kit; culling; *post mortem* examinations.

A final chapter sums up conclusions, and contains recommendations for further reading, a glossary and an index.

While the quality of reproduction of some of the black-and-white photographs could be better, most serve a useful purpose. There are a number of excellent line-drawings, particularly of the hatching process and of anatomical features. There are also numerous instructive graphs and tables.

The book is based on experience gained in the UK and may be biased towards small-scale operations. However, much of the information is applicable to South African conditions, and most of its contents have never before been set out in comparable detail. Chick-rearing is the most difficult part of ostrich farming, with the highest mortality rates. South African veterinarians have only recently been confronted with the need to advise ostrich farmers and to treat their stock. This book is recommended to anyone involved in this challenging industry.

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