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MANAGEMENT STRATEGY OF ANIMAL HEALTH AND PRODUCTION CONTROL ON ANTICIPATION GLOBAL WARMING FOR ACHIEVEMENT OF MILLENNIUM DEVELOPMENT GOALS

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LIST OF CONTENTS

POSTER

EFFECTS OF HEAT STRESS AND ATTEMPTS TO MAINTENANCE OPTIMAL REPRODUCTIVE PERFORMANCE OF DAIRY COWS DURING HOT CONDITION IN THE TROPICAL CLIMATE

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ABSTRACT

East Java province is characterized by high seasonal temperature, humidity and rainfall. The range of ambient temperature is depend on the altitude.. In the highlands the temperature is lower than in the lowland areas. The effects of hot temperature are mediated through an effect on body temperature of cow. Some effects of heat stress on fertility of dairy cows have been studied in the four UPT – HMTs at East Java. Fertility of cows decreased during dry season in both Branggahan (Kediri) and Karangwaru (Tuban) UPT – HMTs. The incidence of anestrus and repeat breeders increased especially in both Branggahan and Karangwaru UPT – HMTs. Anestrus was probably due to reduction of the length and intensity sign of estrus, so that the number of undetected estrous period of cows increased. Heat stress can reduce fertility and embryonic survival, this incidence was observed by the high incidence of repeat breeding cows during dry season in the four UPT HMTs. Many attempts have been carried out in order to minimise these problems such as improving detection of estrus, cooling for lactating and dry dairy cows, estrous synchronisation, and hormonal treatment. Finally, attempts for maintaining optimal reproductive performance of dairy cows during hot condition require more intensive studies since many factors influencing the reduction of fertility in dairy cows.

Keywords: heat stress, dairy cows, reproduction, seasons

INTRODUCTION .

East Java is classified as tropical zone. It characterized by high though seasonal temperature, humidity and rainfall. The ambient temperature is dependent on elevation and proximity to mountains, hot in lowland areas and cool in higland areas. The temperature in the highland areas such as Batu and Singosari between about 18 and 25°C, and that in lowland or areas such as Karangwaru (Tuban) and Branggahan (Kediri) ranging from 27 to 34°C. Both in high and lowland areas in the dry season the ambient temperature is quite hot during the day and little bit cool during the night, and in some instance this dry season is so called as "hot season".

Heat stress can be defined as the sum of forces external to a homeothermic animal that acts to displace body temperature from the resting state (Yousef, 1984). Such a stress can disrupt the performance of reproduction in dairy cows for example heat stress reduces the length (Monty and Wolf, 1974; Abilay *et al.*, 1975) and intensity (Gangwar *et al.*, 1965) of estrus and leading to anestrus. Others negative effect of heat stress such as damage ovum, sperm and embryo (Ealy *et al.*, 1995, Edwards and Hansen, 1996 and 1977, Monty and Racowsky, 1987). These kind of abnormalities may lead to repeat breeding.

This research was a clinical investigation aimed to find out reproductive abnormalities in dairy cows during wet monsoon and dry seasons, and trying to solve the problems due to heat stress.

MATERIALS AND METHODS

The research was carried out in four Dairy Cows Breeding Centers and Forages (BPT & HMTs) Batu, Branggahan, Karangwaru and Singosari in 2007 during wet and dry seasons. The size of herd ranging between 60 and 90 dairy cows for each BPT & HMT.

Clinical examinations for reproductive abnormalities were performed by veterinerians of the Department of Animal Reproduction Faculty of Veterinary Medicine Airlangga University and East Java Livestock

Service. Rectal palpation and real time ultrasound was used for examination when it was necessary (Table 1). Data resulting from clinical examination were

The number of reproductive abnormalities of dairy cows during wet monsoon and dry seasons in the four dairy herd were serve descriptively.

RESULTS

Effects of Heat Stress on Reproduction

There are many effects of heat stress on dairy cows, which is in general such stress can disrupt their reproductive. Four herds of The Dairy Cows Breeding Centers and Forages (BPT & HMT) have been observed for the influence heat stress on reproductive failure of dairy cows.

Reproductive Abnormalities

Types and number of reproductive abnormalities of the dairy cows in BPT & HMTs Batu, Branggahan, Karangwaru and Singosari are depicted in Table 1.

Table 1. Some Reproductive Abnormalities of the Dairy Cows During Wet Monsoon and Dry Season in the four BPT & HMTs at 2007

Location	Reproductive Abnormalities			Treatment
	Type of Abnormalities	Number of Abnormalities Wet Monsoon	Dry Season	
BPT & HMT Batu	Anestrus:			
	Corpus luteum persistent (CLP), luteal cyst, no visible estrus (NVE)	0	7	Prostaglandin – F2α (PGF2α), Terramycine intra uterine (IU)
	Repeat breeding:			
	Fertilization failure or Early embryonic death (EED)	1	14	Terramycine IU
BPT & HMT Branggahan	Anestrus:			
	CLP, luteal cyst, NVE	11	15	PGF2α Terramycine IU
	Ovarian hypo – plasia, ovarian hypofunction	1	1	Ovalumon
	Repeat breeding:			
	Fertilization failure or EED	3	6	Terramycine IU
BPT & HMT Karangwaru	Anestrus:			
	CLP, luteal cyst, NVE	21	27	PGF2α
	Ovarian hypo – function	1	0	Ovalumon
	Repeat breeding:			
	Fertilization failure or EED	2	14	Terramycine IU
BPT & HMT Singosari	Anestrus:			
	CLP, luteal cyst, NVE	1	8	PGF2α

As can be seen from Table 1, the incidents of anesrus and repeat breeders were high in the four BPT & HMTs during dry season. Anestrus was probably more caused by no visible estrus rather than corpus luteum persistent since observation of dairy cow for estrus sign was not adequate.

DISCUSSION

Higher incidence of silent heat and anestrus is therefore one of the most often reported findings in cows exposed to high ambient temperatures.as reported elsewhere. The higher incidence of anestrus during dry season than in wet monsoon season in the four herd of dairy cows was probably caused by no visible estrus (NVE) since the detection of heat stressed cows was more difficult because the cows became much less active and the period of estrus is shorter than in cows under cool conditions. In addition the diagnosis of corpus luteum persistent in these BPT & HMTs was not supported by hormonal (blood progesterone level) observation.

Under the influence of heat stress the duration and intensity of estrus reduced. There is a clear decrease in motor activity and other manifestations of estrus such as mounting (Wolfenson *et al.* 1988). Commonly, the detection of estrus for dairy cows in Indonesia is not based on the mounting activity, but it is based on the clinical sign of estrus such as swelling, softening and reddening of the vulva, clear stringy mucus from vagina often adhering to tail and legs, restlessness, bawling and dribbling of urine. The cow was observed individually for the sign of estrus twice daily in the morning and afternoon milkings.. This visual detection of estrus, generally regarded as the most accurate and reliable method, but it is labor intensive and require careful and well trained observer (Frost *et al.*, 1981).

The majority of anestrus in dairy cows at the four BPT & HMTs occurred after calving (postpartum anestrus) and after service.(post service anestrus), therefore this incident of anestrus could related with post service or postpartum uterine infection, nutritional deficiency or inadequate of estrus detection.

The incidence of repeat breeders in the three BPT & HMTs was reasonably high for cows inseminated during dry season. These cows were not pregnant following three successive breedings. Heat stress may damage the ovum, sperm or embryo (Ulberg and Burfening 1967). There may also be an indirect effect on the uterus environtment caused by changing levels of hormones. Early embryonic mortality is a major problem associated with heat stress. It appears that the majority of this embryonic mortality occurs within the first 7 – 10 days after conception (Ryan *et al.* 1993). Other factors such as timing of insemination, expertise of inseminators, quality of semen, uterine infection, lactational stress and failure to conceive must be considered (Radostits and Blood 1981).

Ovarian hypoplasia, in dairy cows the condition is usually a left – sided unilateral defect. At post – mortem the condition is easily diagnosed by the very small size of the ovary and tha characteristic grooves running longitudinally on the surface. Hypoplastic ovaries have to be distinguished from ovaries in anestric cow (ovarian hypofunction) which larger and rounder and lack these characteristic longitudinal grooves (Frost, *et al.*, 1981). .

Administration of terramycine and prostaglandin F2α intra uterine was aimed to clean and eliminating microrganism from uterus and destroying corpus luteum. Usually 2 – 3 days after treatment the cow became estrus.

Attemps to Reduce Heat Sress for Dairy Cows

The general methods to reduce the negative effect of heat stress on reproduction in dairy cattle can be grouped as follow :
Management adjusment, reduce the exposure of cows to heat stress

The most practical methods to reduce heat stress can be grouped into shade, ventilation and cooling (Armstrong *et al.*1975). Shading aimed to protect the cows from direct solar radiation is one of the more easily implemented and economical method to minimize heat stress. Numerus types of shading are available, from trees to housing

or stall barn including free or tie stall barn. The degree to which housing should be modified to reduce heat stress will depend upon geographical location and extent of heat stress. Other method such as wetting or taking a bath during mid – day for dairy cow is a routin procedure at diry farm in Indonesia

Biotechnical approaches, aimed directly at fertility improvement such as estrus synchronisation for timed insemination and embryo transfer.(Monterroso *et al.* 1995; Pursley *et al.* 1995; Hafez, 2000).

Pharmaceutical approaches, aimed directly at fertility improvement i.e hormonal treatment such as GnRH administration at estrus, GnRH or hCG administration post – insemination. Administration of GnRH at estrus to induce ovulation not only decreases the incidence of delayed ovulation but also provide additional luteotrophic support for early pregnancy. GnRH or hCG administration post insemination support the luteal function through a creation of additional corpora lutea and prevents precocious luteolysis through elimination of growing luteal phase follicles. (Frost *et al.* 1981; Gilad *et al.* 1993; Hafez, 2000).

CONCLUSIONS

During dry season the incidence of reproductive abnormalities was increase in the four dairy herds. This increase was probably due to the elevation ambient temperature. It is suggested for carrying out estrous synchronisation and insemination during wet monsoon season. The most practical method reduce heat stress in Indonesia is shading and wetting or taking a bath for cow during mid – day.

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