

## Conference Paper

# Conception Rate of the Madura Cattle in the Special Artificial Insemination Program (SIWAB) in Waru Sub-district, Pamekasan Regency

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**Abstract.**

Pregnancy rate is one of important indicator for assessing the success of the artificial insemination (AI) program. Since 2017, the Indonesian Government released the Special Artificial Insemination Program (local: SIWAB) in an effort to accelerate the cattle population. This study was conducted to evaluate the pregnancy rate following AI of the Madura Cattle in Waru Sub-district, Pamekasan Regency, an important breeding area for the Madura cattle. The study concerned the effect of bull and season on the insemination of the cows and the pregnancy rate. The season was grouped into 2 categories based on the rainfall intensity: dry and wet season were less than 150 mm/month and more than 150 mm/month, respectively. The secondary data was obtained from 2017 to 2018 involving 6 bulls. The results showed that during 2017 the bull number 2 showed the highest pregnancy rate (53.7%, n = 1,056 vs. 46.3%, n=1.121). According to Chi-square analysis on the number of bulls and pregnancy rate from 2017 to 2018, the result showed that there was no significant effect ( $P>0.05$ ). The season time of insemination had no effect on pregnancy rate in 2017, but had a significant effect in 2018. Average of service per conception (S/C) and conception rate (CR) on 6 bulls were  $1,55 \pm 0,08$  and  $66.0 \pm 3.6$  %. It was concluded that the bull number 2 had a higher pregnancy rate and season did not have a consistent effect on the pregnancy rate of Maduran cattle in the SIWAB Program.

**Keywords:** kwd

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## 1. Introduction

Madura island is a region contributing the big population of cattle (app. 21%) in East Java [1]. The population of Madura cattle supports the national population of beef cattle in Indonesia. Madura cattle have big potential genetic to elevate the productivity. Madura cattle is one of Indonesian local breeds domesticated from *Bos taurus* and have good adaptation to heat stress and rural environment genetically. Kutsiyah et al. [2] stated the characteristics of Madura cattles were adaptable to heat stress, mytes, good meat quality, and good skin. Madura cattle was officially classified as a breed based on

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Keputusan Menteri Pertanian Nomor : 3735/Kpts/Hk.040/11/2010. This decree stated that Madura cattle is widely spread in Madura island and have physic and genetic uniformity among them. As animal genetic resources, Madura cattle should be preserved therefore it could give benefits to enhance the Indonesian wealth [3]. Nurgartiningasih [4] described that Madura cattle have good adaptation to tropical climate, cowpox, low feed quality, and less needed of feed than imported cattles.

Waru is a breeding center in Pamekasan regency to support the genetic purity. To increase population of Madura cattles, the government implements the Special Artificial Insemination Program (local: SIWAB) using artificial insemination in 2017-2019. This program was successful to increase pregnancy rate and birth rate. The pregnancy and birth rate are affected by reproduction of dam. The pregnancy failure represents low reproductivity and unseccess artificial insemination (AI). The reproductivity of dam is affected by reproductive physiology and nutrition of dam. Susilawati [5] stated the success of AI is affected by dam condition, inseminator skill, correct time to AI, estrous detection, semen handling, and semen quality. Artificial insemination is an applied technology that can increase productivity and genetic quality of beef cattle through using potential bulls for fertilizing more dams [6]. The reproductive efficiency is affected by nutrition, farming management, health, environment and genetic [7,8].

Climate including temperature, humidity, rainfall intensity, and season (dry and wet) could affect the animal productivity. Indonesia, a tropical country, has two seasons including wet and dry season. Koivisto [9] stated season can affect the semen quality more than 2%. The studies were mostly reported about identification of reproductive performance including sperm quality as factors of AI succession [10,11,12]. Unfortunately, the effect of bulls and seasons on pregnancy status of dams in AI program were rarely reported. The objective in this study was to identify the success of pregnancy on Madura cattle through AI based on bulls and seasons in Waru, Pamekasan regency.

## 2. Materials and Methods

### 2.1. Data Collection

In this study, secondary data were collected from recording of artificial insemination program in Waru, Pamekasan. Data were obtained from National Integrated Information System of Veterinary (SIKHNAS) in 2017-2018 including AI acceptor, bulls appliction, and pregnancy [13]. Data were collected and analyzed for 4 months started from April to July 2020.

The method in this research was case study on 6 Madura bulls during 2017-2018. The seasons were divided into two groups (dry and rainy season) based on rainfall intensity in Waru, Pamekasan. The rainfall intensity of dry and wet season were less than 150 mm/month and more than 150 mm/month, respectively. Data of rainfall intensity in Waru, Pamekasan were collected from Meteorological, Climatological, and Geophysical Agency in climatological station Class II Malang during 2017-2018 [14].

## 2.2. Data Analysis

Data of were analyzed using Chi-square test. Correlation of bulls, seasons and pregnancy status in 2017-2018 was tested

## 3. Result and Discussion

### 3.1. Correlation of bulls and pregnancy status in 2017

Artificial insemination success rate is affected by bull quality. Artificial insemination programme was conducted in Waru, Pamekasan, a village breeding center of Madura cattle. A total of 6 bulls were used in this study.

According to Table 2, a total of 371 dams were not pregnant. The highest to smallest number of pregnant dams were successfully inseminated by bull no 2, 3, 4, 1, and 6 respectively. In this study, there was no correlation between bulls and pregnancy status ( $P>0.05$ ). The highest percentage of pregnancy in 2017 was 53.3% and shown by bull no 2 (Figure 1). Dwiyanto et al [15] stated factors affecting the success of AI were frozen semen quality, knowledge and awareness of farmer for detecting estrous, body condition score (BCS), animal health, inseminator's skills, and proper AI time.

According to Table 3, a total of 685 from 1,056 Madura cattles were pregnant through AI and the rest of them were not pregnant. From 685 pregnant dams, a total of 508 and 177 dams were pregnant in dry and wet season, respectively.

There was no correlation between season and pregnancy status ( $P>0.05$ ). According to Picture 2, the percentage of pregnant dams in wet and dry season were 25.8% and 74.2% respectively. The pregnancy rate in wet season is commonly higher because of feed availability and less heat stress. In this study, Madura cattles have high pregnancy rate in dry season. Karnaen and Arifin [16] stated the average of pregnancy length, pregnancy rate, and estrous length in dry season were higher than wet season.

TABLE 1: Correlation analysis between bulls and pregnancy status in 2017.

Bulls Number	Pregnancy status					
	Not pregnant		Pregnant		Total	
	F	%	F	%	F	%
1	10	0.9%	38	3.6%	48	4.5%
2	202	19.1%	365	34.6%	567	53.7%
3	86	8.1%	162	15.3%	248	23.5%
4	71	6.7%	116	11.0%	187	17.7%
5	1	0.1%	0	0.0%	1	0.1%
6	1	0.1%	4	0.4%	5	0.5%
Total	371	35.1%	685	64.9%	1056	100.0%

p-value = 0.193,  $\alpha = 0.050$ , p-value >  $\alpha$ , r = 0.083

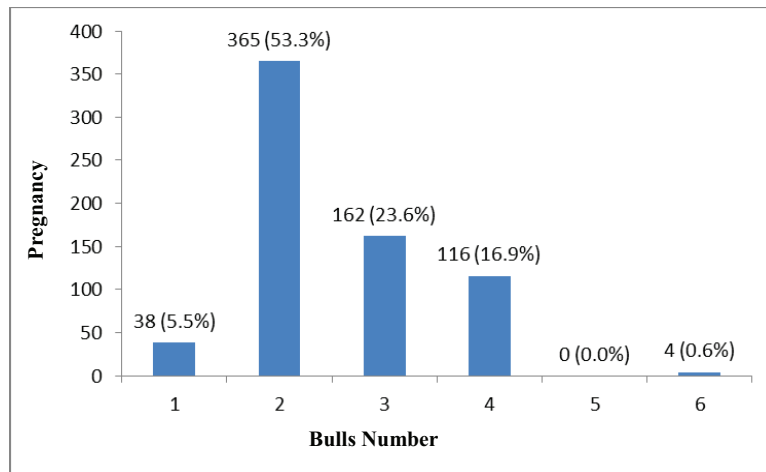


Figure 1: Graph of number of pregnancy affected by bulls in 2017. **Correlation of season and pregnancy status in 2017.**

TABLE 2: Correlation analysis between season and pregnancy status in 2017.

Season	Pregnancy Status					
	Not Pregnant		Pregnant		Total	
	F	%	f	%	F	%
Wet	96	9.1%	177	16.8%	273	25.9%
Dry	275	26.0%	508	48.1%	783	74.1%
Total	371	35.1%	685	64.9%	1056	100.0%

p-value = 0.990,  $\alpha = 0.050$ , p-value >  $\alpha$ , r = 0.000

### 3.2. Correlation of bulls and pregnancy status in 2018

According to Table 4, a total of 820 from 1,211 Madura cattles were pregnant through AI and the rest of them were not pregnant. The highest to smallest number of pregnant dams were successfully inseminated by bull no 2, 1, 3, 6, and 4 respectively. In this study, there was no correlation between bulls and pregnancy status in 2018 ( $P > 0.05$ ).

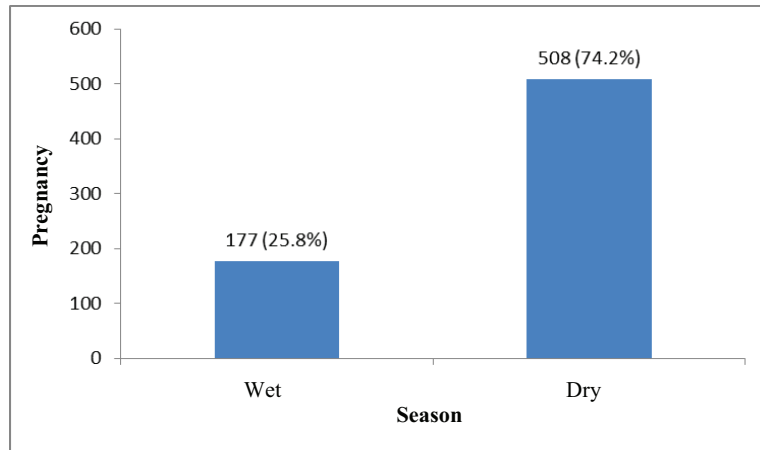


Figure 2: Graph of number of pregnancy in wet and dry season in 2017.

The highest percentage of pregnancy in 2018 was 47.0% and shown by bull no 2 (Figure 3). The result of pregnancy rate in 2018 was similar with 2017.

TABLE 3: Correlation analysis between bulls and pregnancy status in 2018.

Bulls Number	Pregnancy status					
	Not Pregnant		Pregnant		Total	
	f	%	F	%	f	%
1	138	11.4%	275	22.7%	413	34.1%
2	176	14.5%	385	31.8%	561	46.3%
3	75	6.2%	150	12.4%	225	18.6%
4	0	0.0%	2	0.2%	2	0.2%
5	1	0.1%	0	0.0%	1	0.1%
6	1	0.1%	8	0.7%	9	0.7%
Total	391	32.3%	820	67.7%	1211	100.0%

p-value = 0.362,  $\alpha = 0.050$ , p-value >  $\alpha$ , r = 0.067

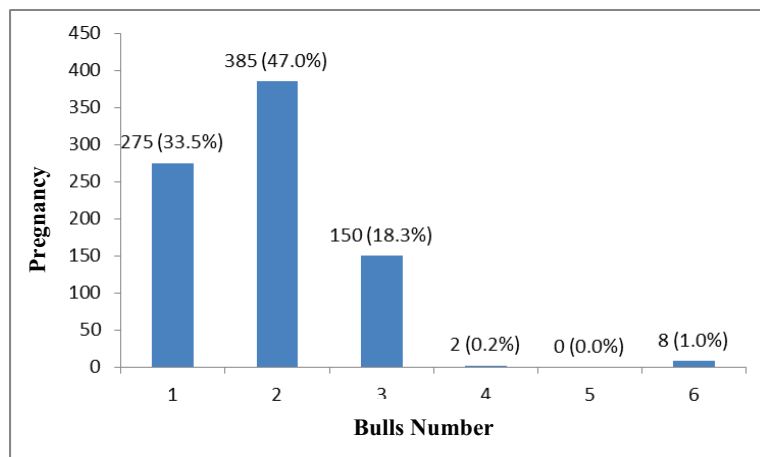


Figure 3: Graph of number of pregnancy affected by bulls in 2018.

### 3.3. Correlation of season and pregnancy status in 2018

According to Table 5, a total of 820 from 1,211 Madura cattles were pregnant through AI and the rest of them were not pregnant. From 820 pregnant dams, a total of 654 and 166 dams were pregnant in dry and wet season, respectively.

TABLE 4: Correlation analysis between season and pregnancy status in 2018.

Season	Pregnancy Status					
	Not Pregnant		Pregnant		Total	
	F	%	F	%	f	%
Wet	104	8.6%	166	13.7%	270	22.3%
Dry	287	23.7%	654	54.0%	941	77.7%
Total	391	32.3%	820	67.7%	1211	100.0%

p-value = 0.013,  $\alpha = 0.050$ , p-value <  $\alpha$ , r = 0.071

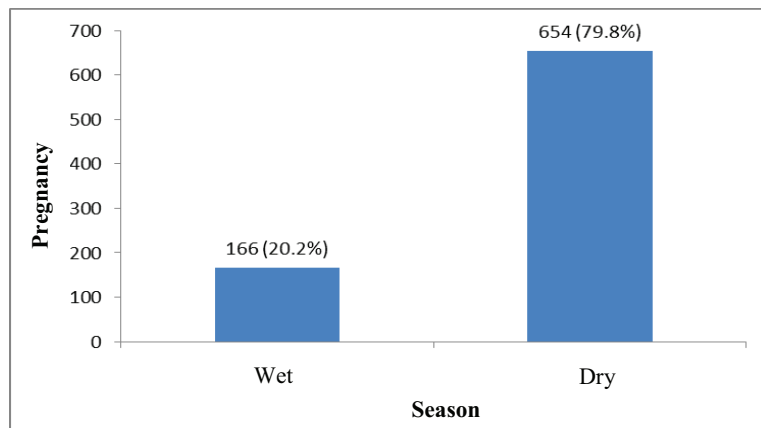


Figure 4: Graph of number of pregnancy in wet and dry season in 2018.

In this study, the significant correlation between season and pregnancy status was found ( $P < 0.05$ ). According to Figure 4, the percentage of pregnant dams in wet and dry season were 20.2% and 79.8% respectively. It was caused by higher length of dry season in 2018 (9 months) than 2017 (6 months). Estrous cycle in dry season was longer than wet season. In dry season, feed have low quality that can decrease cholesterol level in blood. In addition, heat stress in wet season can inhibit hormonal synthesis of FSH and LH. This will delay the ovulation and cause long estrous. This case could be an advantage for inseminator because they have longer time to provide better service of AI.

### 3.4. Service per conception (S/C)

Service per conception is number of insemination for having pregnancy [17]. The score of s/c is affected by inseminator skills, farmer skill on estrous detection, and semen quality. In 2017, s/c in wet and dry season were 1.57 and 1.54 respectively. In 2018, s/c in wet and dry season were 1.64 and 1.45 respectively. The s/c score in wet and dry season were better than previous study. Jainudeen and Hafez [18] described that s/c was normally around 1.6-2.0 where lower s/c dams have higher fertility and vice versa.

TABLE 5: Service per conception in wet and dry season.

	2017		2018	
	wet	dry	wet	dry
Σ used straw	279	783	273	948
Σ pregnant dam	177	508	166	654
S/C	1.57	1.54	1.64	1.45
Average	1.559±0.025		1.547±0.138	
	1.553±0.081			

### 3.5. Coception rate (CR)

Conception rate is number of pregnant acceptor in first AI divided total acceptor and multiply 100% [19]. Conception rate can be identified using rectal palpation for 40-60 days after AI was conducted. The average score of CR in natural mating and AI are 70% and 65% respectively and depend on inseminator skill [20]. The result showed that CR in wet and dry season in 2017 was 62.8% and 65.0% respectively. In 2018, CR in wet and dry season were 64.9% and 71.2% respectively. In this study, the CR score was good. Fanani et al. [21] stated the good CR is 60-70%. According to natural condition, management, and animal distribution, the good CR in Indonesia is 45-50%. Afiati et al. [22] described that 80% fertility is affected by bull fertility, dam fertility, and AI technique that have 64-74 of CR.

TABLE 6: Conception rate in wet and dry season.

	2017		2018	
	wet	dry	wet	dry
Σ used straw	159	497	159	646
Σ pregnant dam	253	765	245	907
CR	62.8%	65.0%	64.9%	71.2%
Average	63.9±1.5 %		68.1±4.5 %	
	66.0±3.6 %			

## 4. Conclusion

The success of pregnancy of Madura cattle including pregnancy status, S/C and CR is better in dry season. Bull no 2 have highest pregnancy rate. The effect of season on pregnancy rate was fluctuative.

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