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The Analysis of Cement, Livestock, Inseminator, Animal Husbandry and Feed's Factors in the Artificial Insemination's Success of Bali's Cattle in the Region of Cattle's Center in Jambi Province

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Abstract
The success of artificial insemination (IB) in Jambi Province based on the technical indicator was still not satisfactory. To increase the success of the artificial insemination is needed to analyze the determinant factors of the artificial insemination success. This study aimed to analyze the influence of cement, cattle, breeder, inseminator and feed's factors toward the success of artificial insemination on Bali's cattle in the region of livestock's center in the Jambi province.The research method of this study is a survey method, by the sampling pulling technique of *Stratief Random Sampling* that were the highland, medium and lowland areas. The sample size of this study was determined by using the iteration method. The Measurement of the qualitative variable used a questionnaire in Likert questions, forms, with *Scala's Summated Rating's*. The analysis mode that used is *path analysis.*Partially, the factor of cement, cattle, inseminator and feed as a critical success of artificial insemination of the cattle in the Region of Cattle's Center of Jambi Province. The feed factor is the decisive factor that most domains (32.38%) in the success of artificial insemination of the cattle, then followed by the cement factor (14.02%), and the inseminator factor (9,13%), as well as livestock factor (6.07%). For the breeders factor, it was not the determining factor in the success of its artificial insemination of the cattle in the region of Cattle's center of Jambi province.
Keywords: Cement, Livestock, Inseminator, Animal Husbandry, Feed's Factors, Insemination's

1. Introduction

The success of artificial insemination implementation on the cattle in the Jambi province, according to the report from the Department of Animal Husbandry and Animal Health of Jambi Province in 2013 was different (target and realization) in three regional of cattle' centers in Jambi province. In the upland area, namely the region of cattle's center in Kerinci district was targeting 1,850 of acceptors with the realization of 662 acceptors (35.78%), and it was targeting about 1,150 births with birth realization about 524 or (45.57%). For the plain area, namely the region of cattle's center in Tebo Regency was targeting about 2,037 acceptors with the realization of acceptors 1,304 or (45.70%), and it was targeting about 1,640 births with the birth realization about 983 or (59.94%). Furthermore, low-lying area was the region of cattle's center in the Tanjabbar District was targeting 2,609 acceptors with the realization about 967 acceptors or (37.06%), and it was targeted about 1,245 births, with the birth realization about 838 or (67.31%). The success of its artificial insemination in Jambi Province based on the technical indicators that were still not satisfactory.

In the implementation, the success of its artificial insemination is determined by many factors, namely: semen, cattle, ranchers, and inseminator and fodder factor. The cement factor such as the quality of the cement (it almost entirely were congealed cement these are packed in the straw) was depending on the production process, distribution, storage, and treatment. The Livestock's factor that most decisive was the female fertility, which is determined by many things, including the nation and the nutritional status. The factor of breeders such as breeder's knowledge was determining the success of its artificial insemination especially the estrus detection. The estrus detection and insemination at the most appropriate time is a critical point to obtain the higher reproductive fertility on the cattle. The estrus determination that was not inaccurate would be increasing the number of the inseminations per pregnancy, birth spacing with the subsequent insemination and birth interval. The Inseminator factor such as knowledge and technical ability of the inseminate was affecting the pregnancy scoring on the cattle population in its working area. Inseminates expertise and skill in recognition of lust accuracy, appliance sanitary, handling of congealed cemen, the correct thawing, as well as the ability to do an artificial insemination would determine the success. The Factor of livestock management that was including the feeding in it was the other important thing in determining the success of its artificial insemination (Herawati, et al, 2012). To increase the success of the artificial insemination is needed to analyze the determinants of the artificial insemination success. The research results were important to formulate the optimal policies of artificial insemination's program to support the betterment of the region of cattle's center in Jambi province.

2. Materials and Methods

2.1. Research method

The method used is a survey method, namely a study by taking a sample from a population that is aimed to obtain the generalization as far as from which the sample population was taken. The research location in the Region of Cattle's Center in Jambi Province consists of: 1) plateau area (The Region of Cattle's Centre in Kerinci district); 2) The middle area (The Region of Cattle's Centre in Tebo); and 3) The low-lying area (The Region of Cattle's Center in Tanjabbar District). The Region of Cattle's Centra Determination is based on the Regulation of the Agriculture Minister Number: 50 / Permentan / OT.140 / 8/2012 about the Guideline for Agricultural Regions Development.

2.2. Sampling Technique

This study used a sampling technique of *Stratief Random Sampling* (Harun Al Rasyid, 1994), which are consisted of 3 (three) stratums namely: First statum (The Region of Plateau Cattle's Centre), Second Stratum (The Region of Middle Area Cattle's Centre), and Third Statum (The Region of Lowland Cattle's Centre). The sample size in this study is determined by using the iterative method (Harun Al Rasyid, 1994). The first step to obtain a sample, firstly it has to calculate the total of sample size that would be taken through: In the first iteration used the formula:

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{(U'_p)^2} + 3$$

Description:

$Z_{1-\alpha}$ = The Constants that is obtained from the normal distribution table

$Z_{1-\beta}$ = The Constants that is obtained from the normal distribution table

α = The Error type I, is to accept the hypothesis that should be rejected

β = The Error type II, i.e. to reject the hypothesis that should be accepted

ρ = The Estimated price of correlation coefficient

2.3. Validity and Instrument's Reliability Test

The Measurement of qualitative variation uses a questionnaire of questions form with Likert Summated Rating Scale 'which is conducting its validity and reliability test. The Test instrument's validity is conducted to determine whether the measuring instrument that have been developed can be truly measured which one is needed to be measured. The test of instrument's validity is conducted by correlating the score of each question with score total of the questions for each variable. The decision if a tcount= table at the significance level of 0.05 or 0.01, it means that the data were valid and feasible to use in testing the research hypothesis. When Titan <table at the 0.05 or 0.01 significance level, it means that the data was not valid and will not be included in the research hypothesis testing (Sutawidjaya, 2000)..

The Instrument reliability test is intended to determine whether the data collection tool basically showed the level of sensitivity, accuracy, stability or consistency of that tool in revealing a certain symptoms of a group of individual, even it is carried out at the different times. The Instrument reliability test in its realization was using the split half method. The decision was If tcount (ttable at the significance level of 0.05 or 0.01, so that these questions were reliable and if count < table at the significance level of 0.05 or 0.01, so that these questions were not reliable (Sutawidjaya, 2000).

2.4. Analysis Model

The measurement scale of the data obtained are varied, namely ordinal scale and ratio scale. For the ordinal scale, the research data is conducted the transformation into an interval scale by using a Successive Interval Method (Sutawidjaya, 2000). To analyze the factors that influence the success rate of artificial insemination of the cattle is used a *path analysis* with a structural model, namely:

$$Y_i = \rho_{YiX1} X_1 + \rho_{YiX2} X_2 + \rho_{YiX3} X_3 + \rho_{YiX4} X_4 + \rho_{YiX5} X_5 + \rho_{Yi\varepsilon i} \varepsilon_i$$

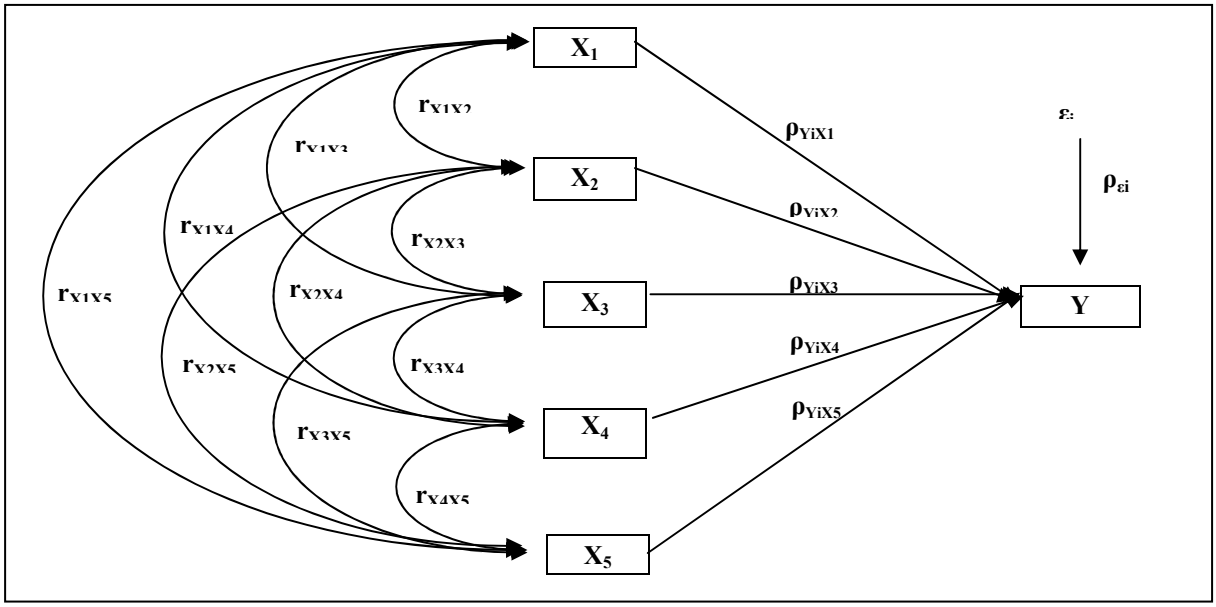

Figure 1. The Connection Structure of X1-5 with Y

Description:
Y = Successful of artificial insemination
X1 = Cement Factor
X2 = Breeder Factor
X3 = Livestock Factor
X4 = Inseminator Factor
X5 = Feed Factor
ρ_{YiX1-5} = Coefficient Line
ε = residue Variable
The decisions, such as:
- If tcount < ttable so H0 is accepted, its meaning that the factors of cement, cattle, breeder, inseminator and feed simultaneously were not affecting the success of artificial insemination on the cattle in the region of Jambi Province cattle's center.
- If tcount ≥ ttabel so H0 is rejected, its meaning that the factors of cement, cattle, breeder, inseminator and feed simultaneously were affecting the success of artificial insemination on the cattle in the region of Jambi Province cattle's central.
If the results of steps above were significant, it would be followed by the coefficient significance testing of the line parted. To examine the line coefficient partially, the pair of hypothesis and its alternate are formulated as follows:

$$H_0 : P_{Y_i X_j} = 0$$

$$H_1 : P_{Y_i X_j} \neq 0$$

The Decisions, such as:
- If tcount < ttable so H0 is accepted, its meaning that the factors of cement, cattle, breeder, inseminator and feed partially were not affecting the success of artificial insemination on the cattle in the region of Jambi Province cattle's center.
- If tcount ≥ ttabel so H0 is rejected, its meaning that the factors of cement, cattle, breeder, inseminator and feed partially were not affecting the success of artificial insemination on the cattle in the region of Jambi Province cattle's central.

3. Result

3.1. Determinant Factor of The Artificial Insemination's Success

Before the step of conclusion, making about the line coefficient, firstly it must be examine about the significance of its line coefficient, either simultaneously (F-test) and partial (t-test). To examine the significance of its line coefficient simultaneously, so that the hypotheses pair is formulated by: H0: PYX1 = PYX2 = PYX3 = PYX4 = PYX5 = 0 and H1 at least have a PYxi 0. The F test analysis result obtained the count value = 53.545 by the significant = 0.000 which meant that H0 is rejected and H1 is accepted, it meant that at least there was one

significant line coefficient value. These results indicate that the cement factory (X1), breeder factor (X2), livestock factor (X3), inseminator factor (X4) and feed factors (X5) simultaneously affect the IB success. Based on the t test, it obtains the results for the five existing lines (X1, X2, X3, X4 and X5), apparently insignificant one line was the line coefficient for farmers factor (X2), while for four other lines that were lined coefficient of a cement factory (X1), livestock factor (X3), inseminator factor (X4) and feed factors (X5) are significant. The existence of insignificant line coefficient means that the line coefficient has no meaning. Thus the insignificant line coefficient should be eliminated, so that its happening a line structure change that was from the initial line structure (its involving at least five independent variables = X1, X2, X3, X4 and X5) became a structural form of a new line that was only involving about four independent significant variables (X1, X3, X4 and X5).

For that new line structure, it's needed to re-calculate the line coefficients by the testing of its line simultaneously by F test. The pair hypothesis are formulated by: H0: PYX1 = PYX3 = PYX4 = PYX5 = 0 and H1 at least have a PY1Xi 0. The F test analysis result obtained the Fcount value = 65.008 by the significant = 0.000 which means that H0 is rejected and H1 is accepted, meaning that there is at least one path coefficient means (significant). It's meant that at least there was one significant line coefficient value. These results indicate that the cement factory (X1), breeder factor (X2), livestock factor (X3), inseminator factor (X4) and feed factors (X5) simultaneously affect the IB success. The t test result for Y obtained about PYX1, PYX3, PYX4 and PYX5 are significant. This meant that the factors of cement, cattle, inseminator and feet were influenced by the AI success on the cattle in the Region of Jambi Province Cattle's Center.

These conditions correspond to the opinion of Correa et al., (1996), the success of artificial insemination is influenced by several things, such as: a female itself, Inseminator skills in repositioning the cement, the timeliness of AI, a lust detection, cement handling and cement quality, especially the post-thaw motility (PTM). These Five determinants of AI success, namely (i) the quality of congealed cement in the farmer level; (ii) the knowledge and awareness of farmers in lust detection; (iii) body condition score (BCS) of the cattle; (iv) the health of livestock, particularly that is related to the reproductive organ; as well as (v) the skills and attitudes of the inseminator, and the timeliness of AI (BIB 2011; Diwyanto, 2012; Caraviella et al., 2006). The success of AI program is influenced by several things, such as: a female itself, Inseminator skills in depositing of cement, timeliness of AI, lust detection, cement *handling* and the cement quality, especially the post-thaw motility or PTM (Correa, Rodriquez, Petterson and Zavos. 1996)

Path analysis Mode for the success of AI can be described in a *path diagram*, below:

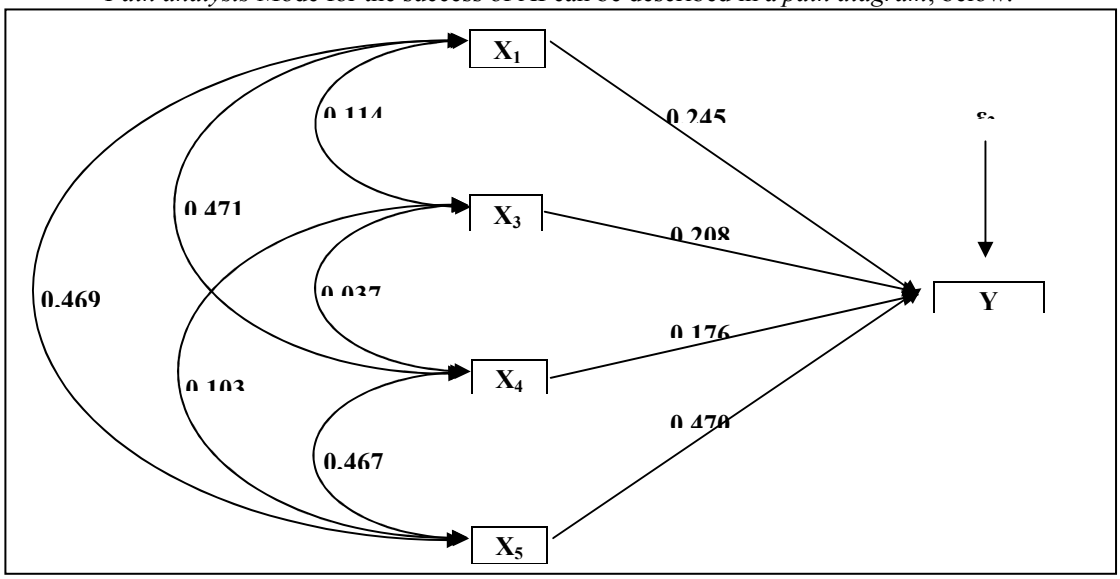

Figure 2. Line Variable Diagram of X1, X3, X4 and X5 Against Y

Description:
Y = Successful of artificial insemination
X1 = Cement Factor
X2 = Breeder Factor
X3 = Livestock Factor
X4 = Inseminator Factor
X5 = Feed Factor
ρ_{YiX1-5} = Coefficient Line
ε = residue Variable

Table 1. The Direct and Indirect Effect of AI success On Cattle in The Region of Jambi Province Cettle's Center

Variable Endogen	*Direct Causal Effects*	*Indirect Causal Effects* Melalui Variabel				*Total Causal Effects*
		X_1	X_3	X_4	X_5	
X_1	6,003	0,000	0,581	2,031	5,401	14,015
X_3	4,326	0,581	0,000	0,135	1,026	6,069
X_4	3,098	2,031	0,135	0,000	3,863	9,127
X_5	22,090	5,401	1,026	3,863	0,000	32,380
The Total Causal Effects of AI Success						61,591

Description:
X1 = Cement Factor (spermatozoa motility)
X3 = Livestock Factor (body condition score)
X4 = Inseminator Factor (experience, knowledge, technical skills)
X5 = Feed Factor (The Sufficiency fodder)

3.2. Cement factory

The calculation results of the path analysis model are obtained the value of the cement factors influence against the AI success as amount as 14.01%. It's meant that the success of AI on the cattle in a region of Jambi province Cattle's Centre is determined about 14.01% from the cement factor, especially the spermatozoa motility or sperm live and move forward/progression. Line coefficient for the cement factor was positive, it's meant as well as the cattle cement quality or as greater as the percentage of live spermatozoa and move forward forward/progression, so that the higher of the AI success. Conversely, as shoddy as the cattle cement quality or live spermatozoa and move forward/progression or as small as the percentage of live spermatozoa and move forward/progression, so that as lower as the AI success of the cattle in the Region of Jambi Province Cattle's Center.

This study was in line with the idea of Rosita et al (2013) that stated if the factors that can affect the AI success, the one was the motility of spermatozoa.According to Susilawati (2011), on the field implementation, because of several reasons such as long distance, poor handling, lack of N2 liquid during the trip to the farmers, so that the quality of the frozen cement (PTM) which was actually having been appropriated to the ISO standard can only go down, it is feared as the one cause of the AI failure. The Frozen cement factor is affected by the success of AI program, such as if that *straw* is not saved in the *container* or flask containing the liquid nitrogen for a long time, so that the cement or inflexible spermatozoa, or when the *thawing* (melting back) from cement is not in accordance with the applicable requirements (Adikarta and Listianawati, 2001. According to Rosita et al (2013), the factor that can affect the AI success, the one was the spermatozoa motility. Indonesian National Standard (INS) mentioned that the sperm concentration as much as 25 million with the 40% motility and abnormality about <20%. While the sperm cells in the volumed mini straw about 0.25 ml are 30 million per straw (Susilawati, 2013). According to Bearden et al. (2004) the cattle sperm motility value ranges between 70-80%.

3.3. Livestock factor

The calculation result of the path analysis model is obtained the value to influence the factors such as livestock's body condition score on the AI success as amount as 6.07%. It means that the AI success of the cattle in the region of Jambi province Cattle's Centre as amount as 6.07% from livestock factor such as kettles body condition score. Line coefficient for the livestock factor was positive, it means that as good as the cattle body condition score, so as higher as the success of AI. Conversely, as bad as the cattle's body condition score, as lower as the success of AI on the cattle in the Region of Jambi Province Cattle's Center.

The findings of this study supported by the research (Lalman et al., 1997) which is concluded that the cattle's body condition score at the *calving* time has the greatest effect on the pregnancy rate. According to Spitzer, et al., (1995), some studies showed that the body condition score (BCS) at the time of calving/birth and at the beginning of the breeding season was the most important indicator of the reproductive performance.

3.4. Inseminator Factors

Path analysis models have provided the value for inseminator factors against the success of AI was amount 9.13%. The values were informed that the success of AI on the cattle in the region of Jambi province Cattle's Centre was amount 9.13% of the inseminator factors such as experience, knowledge, technical skills and straw inseminator management. Actually for the inseminator factor, the coefficient of its line was positive, it means as good as the experience, knowledge, technical skills and straw inseminator management, so as higher as the success of AI. Conversely, as bad as the experience, knowledge, technical skills and management inseminator straw, so as low as the success of AI on the cattle in the Region of Jambi Province Cattle's Center.

The results of this study supported by the Herath et al., (2012) research which is concluded that the inseminate expertise in implementing of this AI was one of the five critical success factors of AI. According to

Ismanto (2003) that the expertise and inseminator skills in the recognition accuracy of lust, sanitary appliance, handling of the frozen cement, the right thawing, and the ability to implement the AI would determine its AI's success. Its Added by Anzar et al (2003), the inseminator skill in implementing the AI on the cattle was very determine the pregnancy rate, which was the estrus detection period, until its getting the AI services was very critical to get a high pregnancy rate. Similarly, the Rivera et al, (2005) statement that stated if an increasing of the conception rate can be achieved with the right determination of the lust period by the inseminator and ranchers. Human Research factory has also affected the success of the AI program. When implementing its insemination, So that the officer in this case the Inseminator it was very determining the success of the program. Its beginning with the ability to detect the estrus from the female to be inseminated, when the implementation or frozen cement deposition in the female reproductive organ, as well as the handling of post-AI (Jalius, 2011; Affandhy et al, 2006).).

3.5. Feed Factor

The calculation result of the *path analysis* model obtained the value of the feed factor influence such as the adequacy of feed to the success of AI was about 32.38%. The value has a meaning in the form of AI's success in a cattle in the region of Jambi province Cattle's Centre was about 32.38% from the feed factor in the form of the feed adequacy. The line coefficient value of the feed factor was positive, it means as enough as the feed given, so as higher as the success of AI. Or, conversely as lack as the feed given, so that as lower as the success of AI in a kettle in the Region of Jambi Province Cattle's Center.

The study's finding is reinforced by the Jaenudin and Hafez (2000) opinion, which is stated that the conception rates can be influenced by the quality of the feed given to livestock. The cattle that were fed by the less qualified between the postnatal period until the implementation of AI can be causing the low fertility and the increasing of early embryonic death. According to Udin (2012), the condition of the cattle's mother that is inseminated, has an important role in the success rate of AI, where the high pregnancy rate is obtained on the cattle that given by the extra food with a good quality. Meanwhile, according to Umiyasih and Anggraeny (2007), the development of reproductive organs during the growth period and physiological status of livestock must be considered, as the result of malnutrition can be caused the ovaries malfunction, the failure of pregnancy and the occurrence of infertility.

The season factor became one of the determining factors of the feed availability, especially the verdant forage that can be caused the fluctuation in the availability of the verdant forage, and periodically is always happening a shortage during the dry season. The quantity, quality, and continuity of verdant forage are not guaranteed throughout the year, so that it causes the cattle cannot be produced optimized (Widiati, 2003). Winugroho et al., (1998) who stated that the availability of verdant forage was influenced by the climate and patterns of food crops, which in the dry season the verdant forage production has been decreasing.

3.6. Breeders factor

In this study, the breeders was the level of knowledge about the livestock reproduction and the ranchers' ability to detect the estrus. The knowledge and skills Improvement of the farmers were regarding the farm management in improving the livestock population, the one was the management of reproduction about estrus detection and proper mating period (Parera, 2011). The breeder's role in determining the proper mating period, would determine the success of a pregnancy time in a complete, otherwise the determining of the inappropriate mating period, then the complete can be occur in two to three times per copulate.

The t test analysis result on the breeder is gained the significant results about 0.060 which meant that insignificant because its significance was larger from of $\alpha = 0.05$. This result has a meaning that the level of animal husbandry knowledge about livestock reproductive and the ranchers' ability to detect the estrus is unreal effected on the AI success on the Cattle, in the Region of Jambi province Cattle's Center, it means that the breeder factor is not included in the path analysis model. This fact is informed that the highest or lowest of the knowledge level about the livestock reproductive and the ranchers' ability to detect the estrus is not affected by the AI success on the cattle in a Region of Jambi Province Cattle's Center.

This result was in contrast to some opinions, that is the accuracy of lust detection and the timely reporting from breeders to the inseminator, as well as inseminate work from the attitude, facilities and field conditions would largely determine the success of its Artificial Insemination. The Inseminator and ranchers were the spearheading of the AI implementation as well as the responsible party for the success or failure of its program in the field (Hastuti et al., 2008). AI's success is not only determined by the appropriateness of the lowest detection by the inseminator, but also by the livestock owners in detecting the lust (Caraviello et al., 2006). Other factors that were including to affect the AI success by the breeders namely the interval when reporting the cattle that has a lust to the inseminator, which sometimes farmers did not directly report the lust cattle to the inseminator for implementing the AI, whereas the interval of lust and ovulation time on the cattle is limited (Toelihere, 1993).

The Human factor or breeder was a crucial factor in the success of an Artificial Insemination program, because it has a central role in the activity of its AI service. Breeder as the management of livestock, someone's motivation to join the program or new activities are influenced by the social and economic aspects, in which the socioeconomic factors such as, education, experience, and the amount of the cattle ownership were the factors would be affected to its maintenance management and finally they would affected to the income (Goddess and Nurtini, 2008)

4. Conclusion

1. Simultaneously, the factors of cement, ranchers, cattle, inseminator and feet were a critical success factor of an Artificial Insemination on the cattle in a Region of Jambi province Cattle's Center, but partially the factors of cattle, inseminator and feed as a determining factor of an Artificial Insemination's success of the cattle in a region of Jambi province cattle's center.
2. The factor of Feed was the most dominant decisive factor (32.38%) in the success of Artificial Insemination on the cattle in a region of Jambi province Cattle's Center, then it followed by the cement factor (14.02%), and inseminator factor (9,13%), as well as livestock factor (6.07%). For breeders factor, actually it was not the determining factor of the Artificial Insemination's success of the cattle in a region of Jambi province Cattle's Centre.

Bibliography

Adikarta, E. W. dan A. Listianawati. 2001. Pengaruh Suhu dan Waktu Penyimpanan Semen Beku Sapi FH Post Thawing Terhadap Kualitas Sperma Post Kapasitasi. Journal Tropical Animal. Special Edition. (April) 2001. Hal : 85 – 90.

Affandhy L., D. Pamungkas., D. B. Wijono., P. W. Prihandini., P. Situmorang, dan W. C. Pratiwi. 2006. Peningkatan Produktivitas Sapi Potong melalui Efisiensi Reproduksi. Laporan Akhir. Loka Penelitian Sapi Potong.

Anzar, M. U., Faroq., M. A., Mirza., M. Shahab and N. Ahmad. 2003. Factors Affecting The Efficiency of Artificial Insemination in Cattle and Buffalo in Punjab. Pakistan. Animals Sciences Institute. National Agricultural Research Center, Islamabad Sciences 45500 Pakistan. Departement of Biological Sciences, Quaid - i - Azam University Islamabad 45500 Pakistan. Journal Pakistan Vet. J., 23 (3) : 106 – 113.

Balai IB (BIB). 2011. Buku Pintar IB. Balai IB, Lembang. Direktorat Jenderal Peternakan dan Kesehatan Hewan Kementerian Pertanian.

Bearden J. H., J. W. Fuquay and S. T. Willard. 2004. Artificial insemination. In: Applied Animal Reproduction. 6th ed. Pearson Education, New Jersey.

Caraviella, D. Z., K. A. Weigel., P. M. Fricke., M. C. Wiltbank., M. J. Florent., N. B. Cook., K. V. Nordhund., N. R. Zwald and C. L. Rawson. 2006 . Survey of Management Practices on Reproductive Performance of Dairy Cattle on Large us Commercial Farmas. Departement of Dairy Science, University of Wisconsin. Madison 53706. School of Veterinary Medicine, University of Wisconsin, Madison 537. Journal of Dairy Science. 89 (12) : 4723 – 4735.

Carvacho,P.R. 2009. Mineral Imbalances in The Complex Interactions Soil – Plant – Animal in The Grasslands of Center West Region of The Sao Paulo State, Brazil. Pakistan J.of Nutrition 8: 1603 – 1612.

Correa, J. R., Rodriquez, Petterson and Zavos. 1996. Thawing And Processing Spermatozoa at Various Temperatures and Their Effects on Sperm Viability, Osmotic Shock and Sperm Membrane Functional Integrity. Theriogenology. Volume 46.

Dewi H. dan Nurtini, S. 2008. Kajian Sosial Ekonomi Pelaksanaan IB Sapi Potong di Kabupaten Kebumen. Jurnal Ilmu-Ilmu Peternakan.

Diwyanto K. 2012. Optimalisasi Teknologi IB Untuk Mendukung Usaha Agribisnis Sapi Perah dan Sapi Potong. Bunga Rampai. Puslitbangnak. (unpublished).

Hastuti, D., Nurtini, S., Widiati, R. 2008. Kajian Sosial Ekonomi Pelaksanaan IB Sapi Potong di Kab. Kebumen. Jurnal Ilmu-ilmu Pertanian. Vol 4. No 2. 2008: Hal 1 -12

Harun Al Rasyid. 1994. Teknik Penarikan Sampel dan Penyusunan Skala. disunting oleh Teguh Krismantoroadji dkk., Program Pascasarjana Universitas Padjadjaran, Bandung.

Herawati, T., Anggraeni, A., Praharani, L. Utami, D. dan Argiris, A. 2012. Peran Inseminator Dalam Keberhasilan IB Sapi Perah. Laporan Pengembangan IB. Penelitian Kerjasama Balai Penelitian Ternak, Ciawi Bogor dan Balai IB, Lembang.

Iswanto, A. H. 2003. Partisipasi Peternak dan Tingkat Keterampilan Inseminator Dalam Program IB pada Sapi Potong di Kabupaten Bojonegoro, Jawa Timur. Thesis. IPB.

Jainudeen, M. R. and Hafez, E. S. E. 2000. Cattle and Buffalo dalam Reproduction jn Farm Animals. 7th Edition. Edited by Hafez E. S. E. Lippincott Williams & Wilkins. Maryland. USA.

Jalius. 2011. Hubungan Motilitas Progresif dan Keutuhan Membran Sperma dalam Semen Beku Sapi Bali dengan Keberhasilan Inseminasi. Agrinak Vol. 01 No.1.

Lalman, D. L., D.H. Keisler, J. E. Williams, E. J. Scholljegerdes and D. M. Mallet. 1997. Influence of Postpartum Weight dnd Body Condition Score Change on Duration of Anestrus by Undernourished Suckled Beef Heifers. Journal Animal Sci., 75 (8): 2003–2008.

Parera, H., Souhoka, D. F., Serpara, J. E. M. 2011. Kemampuan Peternak Sapi Bali di Kecamatan Teon Nila Serua dalam Mendeteksi Estrus dan Menentukan Waktu Kawin. Agrinimal, Vol. 1, No. 2, Oktober 2011, Hal. 84-87.

Rivera, H., H. Lopez and P. M. Fricke. 2005. Use of Intra Vaginal Progesterone – Releasing Inserts in a Synchronization Protocol Before Timed Aland For Synchronization Retun Science, University of Wisconsin, Madison 53706. Journal of Dairy Science. 88 (#): 957 – 968.

Rosita, E. A., Susilawati, T. dan Wahyuningsih, S. 2013. Keberhasilan IB Menggunakan Semen Beku Hasil Sexing dengan Metode Sedimentasi Putih Telur pada Sapi PO *Cross*. Jurnal Ilmu-Ilmu Peternakan Vol. 24 (1) Hal : 72 - 76

Spitzer, J. C., D. G. Morrison, R. P. Wettemann and L. C. Faulkner. 1995. Reproductive Responses, Calf Birth and Weaning Weight as Affected by Body Condition at Parturition and Postpertum Weight Gain in Primiparous Beef Cows. Journal Animal.sci., 73: 1251-1257.

Susilawati, T. 2011. Tingkat Keberhasilan IB dengan Kualitas dan Deposisi Semen yang Berbeda pada Sapi Peranakan Ongole. Jurnal Ternak Tropika Vol. 12, No. 2 Hal: 15-24.

----------, 2013. Pedoman IB pada Ternak. Universitas Brawijaya Press. Malang.

Sutawidjaya. M.S., 2000. Statistik Sosial. Bandung: Fakultas Pertanian Universitas Padjadjaran

Toelihere, M. R. 1993. Inseminasi Buatan pada Ternak. Angkasa, Bandung.

Udin, Z. 2012. Teknologi IB dan Transfer Embrio pada Sapi. Penerbit Sukabina Press, Padang.

Umiyasih, V dan Anggraeny. Y. N. 2007. Petunjuk Teknis Ransum Seimbang, Strategi Pakan Pada Sapi Potong. Laporan Penelitian, Pusat Penelitian dan Pengembangan Peternakan. Badan Penelitian dan Pengembangan Pertanian. Departemen Pertanian. Jakarta.

Widiati, R. 2003. Analisis Linier Programming Usaha Ternak Sapi Potong dalam Sistem Rumah Tangga Tani Berdasarkan Tipologi Wilayah di Daerah Istimewa Yogyakarta. Disertasi S3. Program Pasca Sarjana UGM. Yogyakarta.

Winugroho, M., B. Hariyanto, dan K. Ma'sum. 1998. Konsep Pelestarian Pasokan Hijauan Pakan Dalam Usaha Optimalisasi Produktivitas Ternak Ruminansia. Dalam : Prosiding. Seminar Nasional Peternakan Dan Veteriner. Jilid I. Puslitbang Peternakan. Bogor.

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