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Abstract. The purpose of this research is to collect and analyze the necessary information needed to develop a sustainable buffalo breeding program, which includes the potential for production performance of buffaloes in East Java Indonesia. This research was conducted on swamp buffalo smallholder farms in five Regency East Java (Ngawi, Madiun, Malang, and Banyuwangi). The research method used was survey method. Primary data was obtained from direct observation on 1089 buffalo by 816 breeders. Variables observed were population growth and productive performance of buffalo. The data obtained were tabulated in average and stand at deviation then analyzed descriptively. The results showed the availability of buffalo adult female amounted was 57.21% of the total population sample. The average height of body age 24-36 months is (112,42 ± 7,46) cm, age 36-48 months (116.88 ± 8.30) cm, age 48-60 months (119.05 ± 8.56) cm, and more than age 60 month (125.40 ± 6.19) cm. Average length of body age 24-36 months (107,25 ± 17,26 cm), age 36-48 month (115,16 ± 15,01), age 48-60 month (119,59 ± 13,74 cm), more than age 60 month (123.52 ± 11.91). The average chest girth age 24-36 month (153,17 ± 22,74) cm, age 36-48 month (169,54 ± 22,13) cm, age 48-60 month (176,20 ± 16,16), more than age 60 month (187,28 ± 13,76) cm. Estimated weight, for the average body weight age 24-36 month (311,96±76,62) kg, age 36-48 month (371,73±80,10) kg, age 48-60 month (395,41±61,75) kg, more than age 60 month (439,87±56,30). Meanwhile Natural Increase (NI) value as big as 21.56 %. In general, the productivity of buffalo in East Java is considered low. However, the vital statistic of buffalo in this province is still as the National standard need of this buffalo of Indonesia. It was concluded that vital statistical measure swamp buffalo respectable, live weight and Natural Increase swamp Buffalo in East Java is still low. Base on the low-value production of swamp Buffaloes in East Java is recommended breeding program is continuously based on reproduction control.

1. Introduction

Buffalo is one of the local livestock that has the potential to produce meat. Judging from the nutritional and physiological aspects of Buffalo is not much different compared to cattle so that it can be used to contribute to increasing national meat production. The superiority of buffalo livestock in adapting and being able to survive with low feed quality is the potential that needs to be developed to increase productivity. To increase the productivity of buffaloes, it is necessary to consider the selection of seeds, the provision of quality food, housing, disease control, reproduction, buffalo livestock [1]. One alternative to maximize livestock productivity is to increase buffalo populations, especially productive parents. Main management becomes important if the availability of seeds plays a role in increasing the population because that inhibits the development of large ruminant animals is the length of pregnancy, the appearance of lust after a long birth. Intensive handling of buffalo mothers is very important; this is because livestock productivity in an area is mostly determined by the ability and number of parents in a breeding area. To find out the productivity of the parent can be viewed regarding reproduction and production. Reproductive ability of the parent includes the first age of mating, length of pregnancy, first age of breeding, the age of parent, the status of breeding, and reproductive efficiency. Concerning production can be seen from vital statistics which include height, chest circumference, body length, and body weight estimation. Reproductive performance is critical to note in buffaloes to support increased productivity of buffaloes. Factors of buffalo parent productivity can be viewed concerning reproductive performance which includes spacing, marriage up to bunting, prolonged pregnancy, and empty time [2]. From the background described above to find out the productivity of mud buffalo in East Java Province, the primary technical coefficient data is needed for reproduction and production.

2. Materials and methods

The material used 623 adult female consists of Permanent Incisivi (PI-1) same age 24-36 months, PI-2 age (36-48) age, PI-3 age (48-60) months and PI-4 age more 60 months. The method used is a survey method. Determination of the study area using purposive sampling that is intentionally based on the number of high, medium, and low populations. Then proceed with the snowball sampling method. The primary data collection uses a questionnaire to get the population increase value every year (natural increase). Production data consist of body height (BH) and body length (BL) and chest girth (CG). Estimation of body weight is calculated through the formulation of Schoorl [3]. Reproduction and production performance data were analyzed descriptively.

3. Results and discussion

The composition of the population in an area is vital to know the development of livestock populations in an area. Also, population composition is also used to determine the composition of livestock, especially adult female cattle. This is because productive adult female cattle can be used to maximize productivity aimed at increasing population. Observations in the field found that the mud buffalo population structure in East Java in 2017 can be seen in table 1.

Table 1 shows the availability of young females amounting to 17.36% and adult female buffaloes 57.21% of the total population. This shows that the availability of adult females from the total population is quite high when compared to young, young males and adult males. However, from the data, it is quite neat, because the percentage of young females is only 17.36% so that for reserves as a replacement there is only 30% available. This is possible because the birth rate is low, and it is certain that reproductive efficiency is also low because of irregular births. Based on these data the availability of adult female cattle is very important because it will affect the birth rate in an area in the following year. [4] stated that the current and future rate of livestock population survival is strongly influenced by the presence of adult female

cattle The availability of a high percentage of fertile females shows the hope that the female buffalo produces offspring, while the presence of 11.85% male buffalo in the East Java region is only used as a male until the female buffalo produces offspring and then the male buffalo is removed from the nursery. This is following the opinion of [5] which states that farmers generally prefer to keep pregnant female buffaloes compared to adult males. Maintenance of male buffaloes generally starts from the calf that is raised later when the adult age is sold.

Table 1. Composition of Swamp buffalo population in East Java in 2017.

Composition	Male's		Female's		total	
	Heads	%	Heads	%	Heads	%
Young	129	11,85	189	17,36	277	25,44
Adult	148	13,59	623	57,21	812	74,56
Total					1089	100

The composition of the adult female buffalo population as in table 1, has not provided a clear and detailed picture of the size of adult female buffaloes that are productive and have high reproductive efficiency. To find out the reproductive achievements of productive adult female buffalo, it is necessary to present a table of population composition by age group, as in table 2.

Table 2. Composition of buffalo livestock populations (%) based on age group

Age's	Mounths					Total
	<24	24-36	36-48	48-60	>60	
Male	11.85	4.32	3.03	2.94	3.31	25.44
Female	17.36	9.18	9.73	7.81	30.49	57.56
Total	29.21	13.5	12.76	10.75	33.80	100

The details of the composition of the adult female buffalo population as shown in table 2 above, are very helpful in knowing offspring production through the calculation of Natural Increase. Also, it can be used to predict the needs of young buffaloes who are potential substitutes for a parent, old-age female buffaloes that must be rejected because of their poor reproductive performance. The two remaining components replacing young female buffalo and old female buffalo due to ages are factors that must be considered in maintaining buffalo populations in the breeding area remain constant. Therefore the need for restrictions on livestock issued each year (output). In table 2 shows the percentage of age groups of fertile females aged 2-5 years is relatively constant even though only ranges from 7.8 to 9.7%, this is advantageous to maintain population stability (from offsprings born) in breeding. Viewed for reproduction with the availability of livestock population composition based on age groups, it can be seen the magnitude of the excess or lack of young cattle in the breeding area (Net Reproduction Rate)

Natural increase (NI) is an increase in livestock population every year in an area obtained from the difference between birth and death rates. Factors that influence the height of the natural increase are influenced by the availability of adult females to produce livestock birth and death rates. Data on natural increase of mud buffalo in East Java Province can be seen in table 3.

Table 3. Components of natural increase calculation

Components	(%)
Adult Females to Population	57,21
Birth to population	23,13
Birth to an adult female	40,29
Total Death to Population	1,57
Natural Increase	21,56

Based on table 3, adult females of the population amounted to 57.21%, yielding 23.13% of births to the population, but there were deaths of 1.57% of the population. The difference in the percentage of birth with the percentage of death was obtained by the natural increase in the value of mud buffalo in East Java at 21.56%. The natural increase value is categorized as low because according to [4] statement natural increase values ranged from 0 to 50% classified as low, NI values were 50% to 80% classified as medium, and above 80% were classified as high. The low increase or the value of natural increase is because there are several reproductive problems such as a long duration of pregnancy, a long period of postpartum anestrus, a low birth rate and a high mortality rate [6]. The value of natural increase will increase if it can maintain productive females by managing the productive parent well, it can increase the birth rate and reduce mortality in Buffalo. [7] stated that the size of the natural increase is determined by several things, namely that there is a need for some data on the availability of adult females, the rate of birth and death of a population. This was also supported by the statement of [4] stated that natural increase has a close relationship with population development because if the high natural increase value means that there are some productive adult females with proper handling and management. Table 3 shows the total percentage of adult female buffalo in East Java Province at 57.21% with 26.72% being female adults aged 2 to 5 years, and 30.49% being adult females over five years old. Average chest circumference (CG), body length (BL), body height (BH), and body weight in productive female buffalo as shown in table 4:

Table 4. Average body size of adult female buffalo in several age groups.

Age (months)	N (head)	BH (cm)	BL (cm)	CG (cm)	BW (Kg)
24-36	100	112,42 ±7,46	107,25 ±17,26	153,17 ±22,74	311.96±76,62
36-48	106	116,88 ±8,30	115,16 ±15,01	169,54 ±22,13	366.26±80,10
48-60	85	119,05 ±8,56	119,59 ±13,74	176,20 ±16,16	395.41±61,75
>60	332	125,40 ±6,19	123,52 ±11,91	187,28 ±13,76	418.95±56,30

Table 4 shows that increasing age, the size of the body in adult female Swamp buffalo will increase. The highest increase occurred at the age of 24-36 months to the age of 36-48 months. This is as stated by [2] that body size (shoulder height, hip height, hip width, body length, chest circumference, chest, chest width) is influenced by livestock age and sex. There are 26.72% of female buffaloes aged 24 to 48 months in the breeding area included in the productive category, this means that the higher the livestock population at productive age, the higher the ability of livestock to keep populations in an area. This is following the opinion of [7]. Adult female management is meant to what extent the population composition at the time of observation so that the number of female cows has the high reproductive efficiency to the end of the productive age group, to produce offspring as a substitute and keep the population in the nursery area. At the same age, the increase in body size is followed by the body weight of female buffaloes; this

is an indication that with a live weight ranging from 300 - 420 kg is the body weight of female buffaloes, their reproductive organs are functioning and ready to accept males to produce offspring. So in the phase of age 24-36 months to 36-48 months, the function of the body of the animal develops maximally. At the age of 48 months to the age of more than 60 months, the growth of body length did not show a high increase of 3.93 cm. This is also supported by [8] statement which states that growth will eventually reach the inflection point which is the maximum point of the rapid growth of the body weight of cattle, and at this point there is a change of change which initially accelerates the rate of growth into a slowdown and occurs after the age of puberty to adulthood.

4. Conclusion
The productivity of female buffalo aged 24-48 months as much as 26.72 percent produces a population increase per year is still low (21.56 percent), but body size and body weight can be used as primary data on buffalo development in East Java

5. Acknowledgments

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