

# REPRODUCTIVE PERFORMANCE OF KACANG AND PERANAKAN ETAWAH GOAT IN INDONESIA

(Performans Reproduksi Kambing Kacang dan Peranakan Etawah di Indonesia)

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## ABSTRAK

Evaluasi performans reproduksi kambing kacang dan Peranakan Etawah (PE) yang telah beradaptasi dapat memberikan informasi penting untuk mengetahui potensi produksi sebagai sumberdaya lokal. Data reproduksi dikoleksi dari 280 induk PE dan 200 kambing kacang melalui penelitian di lapangan dan monitoring lebih dari 1,5 tahun pada peternak di Jawa Tengah, Indonesia. Kejadian reproduksi, tanggal beranak dan jumlah anak yang diamati dicatat. Data dianalisis dengan menggunakan statistik deskriptif. Hasil penelitian menunjukkan bahwa rata-rata litter size antara 1 – 3 anak per kelahiran untuk seluruh induk dengan rata-rata untuk kambing kacang dan PE masing-masing adalah 2,06 dan 1,56 anak. Bobot lahir pada kambing kacang dan PE masing-masing adalah 3,8 dan 5,4 kg. Daya hidup sampai penyapihan untuk kambing kacang dan PE masing-masing adalah 97% dan 92%. Selang beranak pada induk kambing minimum 205 hari pada kambing kacang dan maksimum 450 hari pada kambing PE. Indeks reproduksi induk kambing kacang dan PE masing-masing adalah 3,07 dan 1,65 anak/induk/tahun.

**Kata kunci:** Kambing Kacang, Kambing Peranakan Etawah, Reproduksi, Indonesia

## INTRODUCTION

Indonesia situated roughly between 6° to 11° north latitudes and 95° and 141° east longitudes. The temperature in Indonesia, being a tropical country, stays within constant range, differing only a few degrees between hot and cool months: 23-31°C daily in the low plains and 18-27°C in the inferior plateau.

Small ruminant production systems in South and Southeast Asia have endured in relation to the overall pattern of crop production and farming system (Pashaa and Saithanoob, 2000). Goats are important for a larger part of the Indonesian rural population (Sabrani and Knipcheer, 1992). Particularly smallholders keep animals as an important

component of farming activities. Nearly ninety nine percent of small ruminants in Indonesia are found in the hand of smallholders. This fact indicates an important role for smallholders (Soedjana, 1993). Goats in Indonesia play a complex function in Indonesian's farming systems. Their biological and economic functions have long been recognized. Besides producing animal product, they also provide manure to maintain soil fertility (Suradisastira, 1993). The contribution of goat within the total farming income for small goat keepers is substantial (Sabrani and Siregar, 1981).

Goats in Indonesia are kept primarily for meat production, so production traits of interest are number of young weaned per breeding female per year and their growth rate (Bradford.

1993). The number of goat raised per farm is relatively small (Soedjana, 1993) about two till ten head (Sodiq *et al.*, 2001). The two common productive system for small ruminants in Indonesia are (1) cut and carry, where forage and other feeds are brought to continuously housed animals (Sodiq *et al.*, 1998; 2000); and (2) grazing under tree crops, along roadsides, in temporarily idle croplands, etc. (Bradford, 1993). Housing of animals has traditionally been part of goat production system in the humid tropics. Most animal houses have open sides for better ventilation to remove both sensible heat and humidity (Chaniago, 1993).

The majority of goats in Indonesia are concentrated in the Island of Java (DGLS, 1999). The major breeds of goats in Indonesia are the Kacang and Peranakan Etawah goat (Edey, 1983). Kacang is a local (indigenous) breed of goat found in Indonesia. It is called locally 'Kambing Kacang'. Kacang goat are relatively small with a compact body frame, have erect ears and short horn in both sexes. Peranakan Etawah goats are descended originally from crossings between the Kacang with Etawah (Jamnapari) goats. Generally known simply as PE goat, animals of this population are distinctly different from the Kacang goats. They have a larger body frame, long hanging ears, a convex face and larger horn.

Reproductive performance is one of the main determinants of productivity of goat. This applies to breeding of animal for meat production (O'Shea, 1983). High reproduction rates are

essential for profit in meat goat production (Ezekwe and Lovin, 1996). The level of reproductive performance is dependant on the interaction of genetic and environmental factors (Greyling, 2000) and has to be given priority (Barding *et al.*, 2000).

Reproductive efficiency as such can be measured and expressed as the kidding rate, weaning rate, kidding interval, live weight of kids born or weaned and the length of the reproductive cycle (Greyling, 1999). By far the most important factors affecting off take rates is number of young weaned per female per year (Bradford, 1993). Because Indonesia is close to the equator, Indonesian breeds appear to be completely non seasonal (Bradford, 1993), there is strong evidence from recent studies that indigenous Indonesian breed do not display any breeding season but breed with equal efficiency at all months of the year (Lindsay *et al.*, 1982). The low latitudes between the tropics are characterized by small annual day length variation, high but regular annual rainfall, high humidity and high temperatures. These factors may be expected to contribute to annual variation in reproductive activity.

High mortality of young stock and poor reproductive efficiency of does are major causes of low productivity in many production systems. This paper provides a basic statistics information on breeding time and the age at first time breeding, type of birth, litter weight at birth, survival rates, kidding interval, and also doe reproduction index of Kacang and

Peranakan Etawah goats under Village Production System in Indonesia.

## RESEARCH METHODS

The data collection on 280 Peranakan Etawah goat doe and 200 Kacang goat doe were used for the study. The study commenced with primary visits to identify individual female goats involved in the study, with their names (number) or tags. Herd detail were then recorded: number of females, kids and bucks maintained in the herd, the breeds kept, the reason for raising goats, and management practice. All experiments dealing with reproduction and management were coded in the database. At every reproductive event, date and number of the animal concerned were recorded. Age at first kidding and kidding intervals (KI) were then calculated. Litter size (LS) was defined as the number of total born per kidding doe. Mortality rate (MR) were calculated at birth and from birth to weaning. Kids were weighed at birth and at weaning. Doe reproduction index (DRI) was defined as the number of total kids alive till weaning divided by kidding interval. Descriptive statistics was used to analyze data reproductive performance (Systat, 1992).

## RESULTS AND DISCUSSION

### The Reproductive Timing (Breeding)

Both Kacang and Peranakan Etawah doe in Indonesia capable of breeding all the year round (January till December). There is no breeding season for both Kacang and Peranakan Etawah goats. Lindsay *et al.* (1982) state that this

may be because there is little variation in day length in the tropical region and changes in day length are believed to be the signal that control seasonal rhythms in temperate region. It may also be because Indonesian breeds are incapable of responding to change in day length. Restall (1991) reported that goats in the tropics are seasonal. Riera (1982) classifying goat breeds into continuous and seasonal types. The former include breeds from India, Africa, Malaysia, Indonesia and several countries in South America. Some of these show seasonal pattern that Riera concludes are determined by rainfall and nutrition.

### Age at First Breeding in Females

Puberty is generally considered to be related more to growth than age in tropical goats (Devendra and Burns, 1983), with first estrous occurring with the attainment of 60-70% of adult live weight. In this research on both Kacang and Peranakan Etawah does show wide variation in age at first breeding. Age at first joining of female goats range between a minimum of 7 months in Kacang goat to a maximum of 2 years in Peranakan Etawah goat. The survey of village goats (Saithanoo *et al.*, 1991) showed that 60% of does conceived before 7 months, with an average age at first kidding of 12.4 months.

The age at which animals first begin to breed is important for two reasons: early breeding can improve the rate of turnover of generations of animals and so speed up genetic progress (Lindsay *et al.*, 1982). Lifetime reproductive efficiency is greatly

increased by early breeding (Edey, 1983). This is a sound strategy and one that occurs as a natural consequence of village management system where males are continually present and fertility control is not practiced. However, an understanding of the factors affecting development of puberty in tropical goats is lacking, particularly the effect of association with the opposite sex.

### **Type of Birth**

Number of kids born per doe indicated multiple births (Amoah, 1990). Litter size was defined as the number of total born kids per kidding per doe (Alexandre *et al.*, 1999). Litter size ranged between 1 and 3 in all herds and breeds. Average litter size at birth of Kacang and Peranakan Etawah were 2.06 and 1.56 kids, respectively. Birth type percentage of Kacang goat showed that the single, double and triplet type were 15.3%, 63.4%, 21.3%, respectively. Birth type percentage of Peranakan Etawah goat showed that the single, double and triplet type were 40.8%, 55.7%, 3.5%, respectively. Average litter sizes at birth of Kacang goat were higher than litter size at birth of Peranakan Etawah goat. Litter size was related to doe age and parity (Amoah and Gelaye, 1990). Parity, season and year significantly influenced litter size at birth (Awemu *et al.*, 1999).

### **Kidding Difficulties**

Mechanical difficulties at parturition sometimes develop from inter-breed crosses (Lindsay *et al.*, 1982). Various *malpresentation* may occur or the fetus may be relatively large

compared with the mother (Edey, 1983). Abnormal positions are sometimes seen and occur more frequently with twins (Bearden and Fuquay, 2000). Some typical of problems of *presentation* at birth are: one leg back, head only, forelegs only, breech birth - hind legs and tail, and twin or triplets mixed up (Steele, 1996).

During this research does not show any kidding difficulties in all herds and breeds. Lindsay *et al.* (1982) found in some circumstance breeding of females is deliberately delayed to prevent them being too small at parturition, with the possibility of distocia. Extreme care must be taken, however, when mating small indigenous breeds with imported animals because the larger conceptus may well is too large and lead to distocia.

### **Survival Rate**

The survival rates calculated for two different ages such as 1 day (at birth) and 4 months (at weaning) of ages is presented in Table 1.

The successful end of the reproductive process depends on the born animal surviving (Lindsay *et al.*, 1982). There was a significance influence of birth weight on mortality rate. Mortality generally decreased as the birth weight of kids increased (Awemu *et al.*, 1999). It was evident that survivability of kids increase with the increase of birth weight of kids and milk yield of dams. The higher survival rates were noticed for male kids, this is mainly due to significantly higher birth weight of male kids (Husein *et al.*, 1996). It is common experience that multiple births in goats

are associated with a high mortality rate (Devendra and Burn, 1983). The environmental factors exerted significant influences on preweaning mortality (Awemu *et al.*, 1999).

Main factors closely related to higher kids mortality are birth weights, milk production by dam, predators, diseases and accidents. Among the factor affecting kid survivability during the pre weaning period, birth weight is most consistently identified as a primary

contributing factors in early kid mortality (Singh *et al.*, 1990). Mortality rate generally decreased with the increasing parity. This may attributes to physiological maturity of older does and their ability to provide enough milk for the kids (Awemu *et al.*, 1999). Overall survival rates till weaning of in this research (97 and 92% for the Kacang and Peranakan Etawah goats, respectively) seemed to be similar than those reported by Anggraeni *et al.* (1995) and Sodiq (2000, 2001).

Table 1. Survival Rate of Kacang and Peranakan Etawah Goats

Survival Rate	Kacang kid	Peranakan Etawah kid
At birth (%)	100	100
At weaning (%)	97	92

### Kidding Interval

The interval between kidding is an important predictor of lifetime productivity (Awemu *et al.*, 1999). There was no significant difference in the post partum anoestrus interval for does giving birth to different number offspring (Greyling, 2000).

Interval between kidding ranged from a minimum of 205 days in Kacang goats to a maximum of 450 days in Peranakan Etawah goat. Kidding interval varied among herds and breeds. Average kidding intervals of Peranakan Etawah goat (240 days) were longer than those of Kacang goat (320 days). This depends on service period (which is the period between kidding and conception) and gestation period. There were limited results for service periods in this study, which is also influenced by fertility of

doe and management or breeding policy of the hers owner. Das (1993) demonstrated that old does (3-4 year) tended to have lower kidding intervals than the younger (1-2 years) and older does (>5 years). This is probably due to reproductive physiology function being more active in 3-4 years old does compare to lower activity in younger and older does.

### Doe Reproduction Index

The productivity of any breeding females is determined by the number of progeny delivered in a given period of time (Greyling, 2000). Average doe reproduction index of Kacang and Peranakan Etawah goats were 3.07 and 1.65 kids/doe/year. Showing that on a doe reproduction index, crossbred genotype (Peranakan Etawah goat) was

inferior to the native does (Kacang goat). This finding is higher than reported by Anggraeni *et al.* (1995) and Sodiq (2000; 2001) on doe reproduction index of Peranakan Etawah goat under out of Village Breeding Center.

Awemu *et al.* (1999) demonstrated that the environmental factors exerted significant influenced on reproductive performance. The results call for management efforts to curb mortality, increase litter size at birth and at weaning, and to reduce intervals between kidding, in order to improve the productivity of goats. The effect of type of birth was highly substantial in goats, with multiple births producing more than single births (Awemu *et al.*, 2000). The interval between parturition and the first post partum estrus is an important trait, which contributes to the productive efficiency (Greyling, 1999). Prolonged kidding intervals were responsible for a decrease in productivity of goats (Awemu *et al.*, 1999).

## CONCLUSIONS

Reproductive performances of goats revealed that breed a seasonally with average litter size and litter weight at birth were 2.06 kids and 3.8 kg (Kacang) and 1.56 kids and 5.4 kg (Peranakan Etawah), respectively. Survival rate till weaning were 97% (Kacang) and 92% (Peranakan Etawah). A minimum kidding interval of 205 in Kacang goat and a maximum of 450 days in Peranakan Etawah. Doe reproduction index of Kacang and Peranakan Etawah goats were 3.07 and 1.65 kids/doe/year,

respectively. Further studies are required to identify and analyze some factors affecting reproductive performance of Kacang and Peranakan Etawah goats especially under smallholder condition.

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