Productivity of Flemish Giant Cross (Fz-3) as Broiler Rabbit

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ABSTRACT

Flemish Giant cross (FZ-3) rabbit has been developed to contain blood ratio of 37.5% of Flemish Giant and 62.5% of Reza (crossbred of Rex and Satin rabbit) and is expected to become a superior broiler rabbit. A total of 280 heads of FZ-3 rabbits were produced and evaluated for their does and kits productivity. FZ-3 Doe has good productivity in litter size at birth (6.85+1.27 kits). The weaning weight of kit was 752.93+171.42 g /head, and body weight at age of 10 weeks was 1325.21+317.31 g/head, while its adult weight was 3333.82+427.19 g/head. Carcass percentage of FZ-3 rabbit slaughtered at 10 weeks was 43.85%, while the proportion of commercial cuts of loin and hindquarter was 60.69%.

Key Words: Rabbit, Carcass, Commercial Cut

INTRODUCTION

Indonesian population grows rapidly. As the consequences of this century, the increasing need of food including meat, provision of employment and income levels should be fulfilled for the population especially in rural areas. Fulfillment of meat by ruminants may be difficult to be achieved due to the time of reproduction is quite long. Therefore, we need to look for other alternatives such as poultry and rabbits which can multiply rapidly in a short time.

Four things that are very attractive for raising rabbits are (Cheeke 1986; Cheeke at al. 1987):

1. Rabbit has biological ability to grow and multiply rapidly in the marginal conditions and intensive care (per year of a rabbit doe can produce >120 kg live weight intensive conditions or 40 kg in marginal conditions),
2. Rabbit is a profitable agribusiness for pet, meat and qualified breeding stock (ratio B/C = 1 : 46 to 3 : 15), with the conditions of higher demand than supply,
3. Efforts to develop rabbit agribusiness in most of the Indonesian Province are conducted in micro, small and medium enterprises, both as individually and as a group (from Aceh through Papua province, the scale of ownership of 8-800 does),
4. A source of new income for farmers in rural and urban growth nodes and support businesses (food, cages, pet accessories).

Increasing rabbit meat consumption has been a challenge in the last few years. High prices associated with lack of interest in whole carcasses have contributed to this situation. The development of processed products such as retail cuts is an attempt to meet the changing demand. Knowledge about carcass traits such as weight and percentage of prime retail cuts are essential for this new market. According to Blasco & Ouhayoun (1996), the first retail cuts are hind legs, loin and fore legs.

In 2008, Indonesian Research Institute for Animal Production imported giant rabbit named Flemish Giant from Belgium. The Flemish Giant (FG) has potential advantages as a terminal-sire breed for improving live market and carcass weights (Carregal 1980; Ouhayoun 1980; Lukefahr et al. 1982, 1983a,b, 1984). Rex and Satin rabbits are well known for their beautiful and attractive furs, apart from their tender, low cholesterol and low fat meat. Furs from the Rex is soft and uniform in height, while from the Satin is dense and shiny. For these particular traits a piece of prime quality raw Rex pelt is expectedly worth of USD 8-14.00 in the global market; while dense and shine of Satin fur is similar to mink fur, one of the most valuable commodity in the fur industry.

The efforts to produce dense, soft and shiny fur with uniform length, hence increases its fur quality and economic value (expectedly more than USD 10-18.00 per piece), have been carried out since 1996. Results showed that such expected breed, we name the breed as Reza appeared in the F2 offspring (Prasetyo 1999) at about 23 out of 925 offsprings and low survivability (<30%). Hybrid vigour of the F1, in term of growth rate/bodyweight, however increased >10%, hence producing more meat and wider pelt/skin. Breeding within Rezas, apparently caused very high mortality of the offspring (Raharjo & Gultom 2002).

Other shortage faced in the rabbit production is the breed quality, which is small in size, low productivity and high mortality. Attempt to improve the breed and its productivity will be carried out by crossing of Flemish Giant, which is big (may reach 12 kg at mature age, but having poor quality fur) with Reza (medium weight). To produce medium (in weight) Reza, a crossing will be carried out through FG × Reza and its F1 (FZ-1 with proportion ½ FG and ½ Reza) is crossed rotational with Reza and FZ-1 to produce FZ-2 (proportion ¼ FG and ¾ FG) and rotational crossed between FZ-1 × FZ-2 to produce FZ-3 (proportion 3/8 FG and 5/8 Reza). This FZ-3 is expectedly having Reza-type fur. Having this done, we produce the medium (bigger) size Reza. Hybridization (crossbreeding) is very encouraged to produce a broiler rabbit (fryer) and Flemish Giant rabbits are very suitable for use as a superior male will be mated with the females of other breeds as a terminal sire breed (Sartika 2005).

The aim of this study was to evaluate Flemish Giant cross (FZ-3) rabbit performance consisted of the growth rate, doe productivity and carcass traits on 10 weeks of slaughter age.

MATERIAL AND METHODS

The study was conducted at the Research Institute for Animal Production (RIAP), Ciawi, West Java in January to June 2011. RIAP is located at 300 m above sea level with ambient temperature ranged between 22-28°C with an average annual rainfall reaches 3500-4000 mm.

The study used 50 females and 10 males of Flemish Giant cross (FZ-3 Rabbits with blood proportion were 37.5% of Flemish Giant and 62.5% of Reza). The interse mating of FZ-3 rabbits for four parities (parity 2 to 5) produced 281 heads of progeny. Galvanised wire cages 0.75×0.60×0.40 m (length×width×height) were used for the growing-fattening period. The cages had a hopper feeder and an automatic cup drinker and were located in an open-air shelter with asphalted cardboard roofing. Rabbits were fed *ad libitum* (the diet contained 2700 kkal ME/kg; crude protein: 16.0%; crude fibre: 14.0%), drinking water was also available *ad libitum*.

Productivity of FZ-3 rabbit was observed by measurements on reproductive performance (litter size at birth, litter size at weaning, total litter weight at birth and total litter weight at weaning) and body weight of doe (pregnant and lactating does) on a weekly basis, as well as mortality of kitten during lactation and performance of growth (weekly body weight from weaning to 20 weeks of age), Carcasses were prepared as recommended by the World Rabbit Science Association (Blasco & Ouhayoun 1996) by removing the skin, the distal parts of the tail, fore and hindleg, urogenital organs, and the digestive tract and carcass yield (Fennel et al. 1990) of 10 weeks of age were randomly selected in the initial population. Data were analyzed by descriptive analysis.

RESULTS AND DISCUSSION

Evaluation of doe productivity is shown in Table 1. FZ-3 rabbit shows the litter size at birth (6.85+1.27 kits) is equal with the Flemish Giant rabbit (6.86+1.18 kits) and higher than Reza rabbit (6.16±1.14 kits) (Brahmantiyo et al. 2010).

FZ-3 rabbit seems to have mothering ability is good with the number of LS at birth and LS at weaning reached 6.85+1.27 kits and 4.97+1.46 kits, respectively. The results agrees with Afifi & Khalil (1992) which stated that crosses were done to improve productivity of doe through increased litter size at birth and also litter weight at birth and litter weight at weaning.

Table 1. Performance of FZ-3 doe rabbits

Traits	FZ-3
Litter size (LS) at birth (head)	6.85±1.27
LS at weaning (head)	4.97±1.46
Mortality (%)	0.26±0.20
Total litter weight at birth (g)	354.90±86.99
Total litter weight at weaning (g)	3611.15±1080.96
Doe body weight at give birth (g)	3333.82±427.19
Doe body weight at weaning (g)	3369.40±414.17

Growth performance of FZ-3 rabbits is shown in Table 2. Birth, weaning and the weight of 10 weeks of age reached 52.99+10.66 g/kit, 752.93+171.47 g/kit and 1325.21+317.31 g/head, respectively. Birth weight of FZ-3 rabbit is the same as Rex (52.11 g/kit), Satin (55.22 g/kit) and Reza (52.97 g/kit) rabbits, but weaning weight of FZ-3 is higher than Rex (635.18 g/kit), Satin (625.50 g/kit) and Reza (575.43 g/kit) (Brahmantiyo et al. 2010). Body weight of FZ-3 rabbits on 10 weeks of age reached 1325.21 g/head higher than the body weight at 12 weeks of age of Rex (1318.86 g/head), Satin (1313.87 g/head) and Reza (1261.57 g/head). Reza crosses with Flemish Giant rabbits increased the weaning and mature weight, so the rabbit FZ-3 is expected to produce sufficient meat production.

Evaluation of productivity of FZ-3 rabbits was done on slaughter age of 10 weeks. Carcass production is shown in Table 3. Lukefahr et al. (1983a) reported that the effect of genetic group × gender interaction on several carcass characters was not significant, so in this result it was not separated between sex. The percentage of carcass, meat and bone of FZ - rabbits were 43.85, 69.10 and 30.90%, respectively. Carcass percentage was still lower compared with the results of Ozimba & Lukefahr (1991) on New Zealand White (NZW), Californian and their crossbreds with an average 55%. This difference was influenced by the slaughtered age (10 weeks vs 4 months) and breed. Diwyanto et al. (1985) reported that the carcass productions of NZW, local, NZW × local and Chinchilla × local rabbits were 45.8, 42.6, 48.9 and 46.7%, respectively.

Table 2. Performance of growth of FZ-3 rabbits with CV: coefficient of variance

Traits	Average (g/head)	CV (%)
Body weight at birth	52.99±10.66	20.12
Body weight at 3 weeks	292.01±75.59	25.89
Body weight at 6 weeks	752.93±171.47	22.77
Body weight at 10 weeks	1,325.21±317.31	23.94
Body weight at 16 weeks	2,082.26±427.62	20.54
Body weight at 20 weeks	2,562.27±369.35	14.41

Table 3. Carcass characteristics of FZ-3 rabbit

Traits	Average
Slaughter weight (g)	1436.83±24.25
Carcass weight (g)	630.17±46.94
Offal weight (g)	367.83±11.17
Pelt weight (g)	147.50±7.34
Lean meat weight (g)	436.50±28.45
Bone weight (g)	194.83±15.46
Carcass percentage (%)	43.85
Percentage of offal (%)	25.60
Percentage of pelt (%)	10.26
Percentage of lean meat (%)	69.10
Percentage of bone (%)	30.90

Table 4. Commercial cuts of FZ-3 rabbit

Commercial cuts	weight (g)	Std	Proportion from carcass weight (%)
Foreleg	207.33	23.59	32.90
Rack	45.83	10.19	7.27
Loin	131.17	15.38	20.81
Hindquarter	251.33	20.09	39.88

Carcass traits are influenced by the adult weight and the maturity of rabbits at the age of slaughter (Pla et al. 1996; Piles et al. 2000; Dalle Zotte 2002). In this study, carcass was produced from 10 weeks of age. Carcasses were cut into commercial cut and then the proportion of these pieces was shown in Table 4. Commercial cut is important for evaluating of economic value of rabbit meat. Commercial cut such as loin and hindleg have higher economic value than the foreleg and rack pieces. Therefore, the carcass evaluation was based on the proportion of commercial cuts to give a final result economically. FZ-3 rabbit produced commercial pieces for foreleg, rack, loin and hindquarter 32.90, 27.07, 20.81 and 39.88%, respectively. Total piece of high economic value (loin and hindquarter) was as much as 60.69% of the total carcass produced.

Commercial rabbit meat is usually produced by a three-way cross involving crossbred females mated to males from a sire line. The crossbred females are obtained by mating males and females from two female lines selected for litter size, while the sire lines are generally selected for growth rate, carcass yield, and meat quality (Baselga 2004; Pascual & Pla 2007). FZ-3 as broiler rabbit were developed by crossing Flemish Giant and Reza rabbits, that designed to have bigger on bodyweight and wider fur than Reza, also have good on reproduction. A crossbreeding scheme involving crossbred does would be justifed by the performance of the lines that produce the crossbred does and their heterosis effect on litter size (Ouyed et al. 2007; Ouyed 2009).

FZ-3 rabbits were reared in the same premises after weaning and reaching bodyweight at slaughter were due to their potential in the growth rate. Bodyweight at slaughter on 10 weeks of age was 1436.83 + 24.25 g/head. Metzer et al. (2006) reported bodyweight at slaughter on 9 weeks of Pannon White and Zika (crossbred of Pannon White and Hycole) were 2644 ± 15.9 g/head and 2758 ± 22.2 g/head, respectively. FZ-3 showed lower bodyweight at slaughter than Pannon White and Zika rabbits because of difference on breed and environment, also interaction between breed and environment. Pannon White and Zika were selected rabbit for high growth rate, which improves the body weight at a fixed age (Piles et al. 2000).

Carcass traits are basically influenced by the adult body weight and maturity at slaughter (Dalle Zotte 2002). Slaughtering the rabbits at the same bodyweight, later matured larger sized breeds or lines have poorer dressing out percentage than that of the smaller sized ones (Lukefahr et al. 1982; Maertens 1992; Pla 1996; Pla et al. 1996; Gómez et al. 1998; Dalle & Ouhayoun 1998). This is partly due to the different growth rate of tissues and organs (Cantier et al. 1969; Deltoro & López 1985). The skeleton and digestive tract mature earlier, the intensive growth of muscle starts later and fat is the latest.

CONCLUSION

Flemish Giant cross (FZ-3) has potency as meat producer with litter size at birth, weaning weight and the weight of 10 weeks of age and adult weights reached 6.85 + 1.27 kits, 752.93 g/head, 1325.21 + 317.31 g/head and 3333.82 + 427.19 g/head. Carcass of FZ-3 rabbit that were slaughtered on 10 weeks of age was 43.85 and 60.69% proportion of commercial pieces of loin and Hindquarter.

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