Selection for 10 Weeks Old Body-Weight on Sentul Chicken

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ABSTRACT: Sentul chicken is native chicken breed originally from Ciamis district, West Jawa. It has been a dual purpose breed which had legally claimed (decreed by Minister of Agriculture of the Republic of Indonesia, No. 698/Kpts/PD.140/2/2013, 13th of February 2013) as one of the native breeds identified in Indonesian. Selection on to this breed has been done for three generations with selection criteria of male 10 weeks old body weight. Selection intensity was 25% of the highest body weight. About 500 chicks were hatched per generation per line. The birds were raised intensively under optimum ration. Results showed that there were Grey- and White-lines. The average predicted response of selection based on differential and intensity selection of the grey-line male chicken were 25.55 and 37.41 g/generation, respectively. While actual and realized responses were 43.50 and 55.33 g/generation, respectively. The average predicted response of selection based on differential and intensity selection of the white-line male were of 30.23 and 40.94 g/generation, respectively, whilst predicted responses with the actual and realized responses were 38.50 and 55.33 g/generation. This exercise showed some potential benefits of local chicken, which could be further valuable explored.

Keywords: Sentul-chicken, selection, body-weight

INTRODUCTION

Along with the increasing effort of chicken farmers as a response to increasing national native-chicken meat demand (Febroni *et al.,* 2015), Sentul chicken was chosen to be one of indigenous breeds to be selected as meat type chicken. Sentul chicken was obtained from Ciamis district, West Java province. This indigenous breed was claimed legally as a breed of Indonesian chicken, decreed by Ministry of Agriculture of The Republic of Indonesia No. No. 698/Kpts/PD.140/2/2013, 13th of February 2013.

Selection of Sentul chicken for 10 week body weight has been begun in 2010. The selection has been carried out in the Indonesian Research Institute for Animal Production (IRIAP). The aim of selection was to improve the growth of selected Sentul chicken to meet market weight of the average of 800 – 1000 gram/bird by the age of 10 weeks. The selected Sentul chicken was named as SenSi (Sentul selekSi). The paper presented information on the selection responses of SenSi chicken up to third generations.

MATERIALS AND METHODS

There were about of bird population up to average of 200 hens and 50 cocks per line (Grey and White lines, Iskandar *et al.,* 2012) in every generation, mated artificially and selected for three generations. Along with selected lines for two generations, there was a group of control population. In the third generation, the raising of the control population was terminated due to the insufficient available cages. Sex identification was carried out when the young chicken reached six weeks of age. Every individual chick was marked with numbered wing-band accordingly to

the lines it belonged.

The one day old chicken (doc) were vaccinated with Marek's right away and followed with other health program similar to the health program applied to commercial egg type of modern chicken. The individual doc was then weighed. About 500 docs of each line for three generations were raised up to 10 weeks of age under intensive management. The birds were confined in space-sufficient wire-cages, placed in a concrete building provided with sufficient ventilation, room temperature and light.

The chicken were fed diets of 17% crude protein with 2800 kcal ME/kg containing sufficient nutrients required for growing egg type of modern chicken. Feed and drinking water were served ad libitum.

At the age of 10 weeks, selection for body weight was applied to male chicken only. Selection intensity was 25% of the highest live body weight following the selection for plumage. The different plumage other then grey or white were discard and cockerels with single comb, were also discards. The selected chicks were then moved to litter type of confinement up to the age of 16 weeks and they were moved again to individual cages. Artificial insemination was applied to within the same line with mating ratio of one male to four females. The eggs were then incubated weekly in the automatic hatching machine. This breeding procedure was applied to every generation.

Response to selection was calculated following equations: i) Predicted response (R) which was calculated base on selection differential, R= h2S; where h2 = heredity value; S = the different value between average population and selected population; ii) Predicted response calculated base on selection intensity, R= ih2σp, i = selection intensity (25%), where h2 = heredity value, σp = table value of truncated normal distribution (1.271); iii) Actual response to selection, R = different between selected and control population; iv) Realized response to selection, R= different between one generation to another. The average heritability was calculated by following formula suggested by Becker (1992).

RESULTS AND DISCUSSION

Body weight response to selection for 10 weeks-old male's body weight in Table 1, showed that predicted responses were lower than actual or realized responses. The average predicted response of selection based on differential and intensity selection of male chicken were 25.55 and 37.41 g/generation for Grey-SenSi. The average predicted response of selection based on differential and intensity selection of White-SenSi, were 30.23 and 40.94 g/generation, respectively.

Actual and realized response to selection of both lines showed higher value than the predicted responses (Table 2). The grey-line showed the actual and realized response to 10 weeks old body weight selection of 43.50 and 55.33 g/generation, respectively. The White-SenSi showed almost similar to the values of Grey-SenSi. The actual and realized response to 10 weeks old body weight selection of White-SenSi was 38.50 and 55.33 g/generation.

The body weight achievement in this experiment was actually very much lower than that of reported by Larivière et al. (2009) in Ardennaise-Belgium traditional chicken selected for 11 weeks old body weight. The predicted responses, which were lower than actual responses was due to fluctuation in responses from one generation to another as it was influenced by the instable environment condition. Newcastle disease outbreak in third generation killed about 60% of population, which could removed some chicken those had more weight. Climate changing within year was also affecting chicken performance from one generation to the next. However, as the aim of the selection program to produce improved native chicken, the last generation of the lines would be expected to have the best performance.

Table 1. Predicted selection response of 10 week body-weight of male Grey-and White-SenSi chicken calculated based on selection differential and intensity (25%)

Lines	Generation	Average population 10-weeks body-weight	Selected population 10-weeks body-weight	Selection differential	Standard deviation	h^2 value	Selection Response	
							Calculated by Selection differential	Calculate by Selection intensity
		(g/bird)	(g/bird)	(g/bird)	(g/bird)	(g/bird)	(g/bird)	(g/bird)
Grey	Base	801	957	156	68	0.24	37.13	20.57
	First	724	886	162	132	0.24	38.56	39.93
	Second	940	1067	127	158	0.24	30.23	47.79
	Third	967	1000	33	81	0.24	7.85	24.50
	Average						25.55	37.41
White	Base	801	708	93				
	First	707	874	167	134	0.24	39.75	40.53
	Second	947	1110	163	149	0.24	38.79	45.07
	Third	944	995	11	123	0.24	12.14	37.21
	Average						30.23	40.94

The average of body weight of male SenSi chicken reached the market weight (Febroni *et al.*, 2015) with slight high in standard of deviation, showing slight instability between generations.

Table 2. Actual and realized selection response of 10 week body-weight of male Grey-and White-SenSi chicken

Lines	Generation	Selected population 10-weeks body-weight	Control population 10-weeks body-weight	Actual selection response	Realized selection response
		(g/bird)	(g/bird)	(g/bird)	(g/bird)
Grey	Base	801	708		
	First	724	765	-41	-77
	Second	940	812	128	216
	Third	967		27	
	Average			43.50	55.33
White	Base	801	708		
	First	707	765	-58	-94
	Second	947	812	135	240
	Third	944			20
	Average			38.50	55.33

The similar analysis was also used to evaluate response to selection on population of male White-SenSi and the result showed the similar pattern with slight lower body weight response

(Table 3 and Table 4). Heritability value as calculated from actual data of the second generation of 0,24±0.13 was actually lower than heritability estimates of native large Beladi chicken (0.41±0.20 of Khalid *et al*., 2012) but similar to Iranian native fowl (0.24±0.01 of Shalehinasab *et al.*, 2013) and Ardennaise-Belgium traditional chicken (0.29±0.13 of Larivière *et al.* 2009).

CONCLUSIONS

There were two lines of Sentul chicken breed, selected for 10 weeks old body weight, prepared for further selection to produce improved native SenSi (as a name for the lines) chicken for meat type. The lines were Grey-SenSi and White-SenSi. The selection criterion was 25% of the highest male's 10 week body weight in the population in each generation.

The average predicted response of selection based on differential and intensity selection of the male Grey-SenSi chicken were 25.55 and 37.41 g/generation, respectively. While actual and realized responses were 43.50 and 55.33 g/generation, respectively. In the male White-SenSi showed the values of 30.23 and 40.94 g/generation, respectively for predicted responses calculated based on differential and selection intensity. Actual and realized responses of the male White-SenSi, were 38.50 and 55.33 g/generation, respectively.

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