Journal Of Agriculture and Social Research (JASR) Vol. 6, No.1, 2006

IMPROVING DOMINANT D300 PULLET EGG LAYING CAPACITY

ONWURAH, F. B. AND M. B. NODU

ABSTRACT

A trial was conducted to investigate the possible improvement of Dominant D300 cock (D300CX) with Anak broiler pullet (BxPx). Egg laying capacity, egg weight, mortality rate, broodiness, feed intake and liveweight were determined and data analyzed using one way analysis of variance with means separated using Duncan's Multiple Range Test. Results indicated that the laying capacity of dominant D300 pullet improved significantly ($p<0.01$) in the hybrid (BxD300Px) resulting from crossing Anak broiler (BxPx) with dominant D300 cock (BxD300Px) were similar ($p>0.01$) but significantly ($p<0.01$) different from D300Px (16.5 ± 4.47). Egg weight, mortality rate and broodiness were also not significantly ($p<0.01$) different among crosses. Feed intake and liveweight at point of lay were significantly ($p<0.01$) different. Economics of production was highest in BxPx and least in D300Px. The results suggest that D300px and BxPx cross-improved egg production in the hybrid (BxD300Px).

Key words: Broodiness, chicken breeds, cross breeding, egg production, indigenous production system.

INTRODUCTION

Village poultry production describes all indigenous poultry production systems in the rural communities that are essentially characterised by scavenging and low input / output production. Such systems are often small flock sized (X to Y birds), and without a clear ownership pattern that varies from country to country (CTA, 1990). Where ownership exists, it is usually a product of social and cultural aspects of the society while, labour and marketing operations are essentially women and children affairs. Thus, making large-scale production hardly possible. As a result, commerce and research have greatly favoured the exotic breeds while the indigenous breeds were mostly neglected.

The poor meat and egg outputs of the indigenous chicken have necessitated the introduction of exotic breeds. The exotic breeds have fast growth rates and better egg production potentials but are susceptible to a number of tropical poultry diseases that plague the industry today. There is the need to incorporate our indigenous breeds of poultry in research, if we are to sustain the sector. This incorporation will produce strains of chicken that are adaptable to our local environment and as well achieve the much objectives of making Nigeria attain self sufficiency in the sourcing of poultry breeding stocks and boosting of her poultry industry (Taiwo et al., 2005). This is because indigenous breeds are hardier, tougher and more acceptable to indigenous consumers due to their tough meat texture. Their broodiness tends to eliminate the attendant cost of incubation and brooding requirements common to the exotic breeds, which is an added advantage.

This study was conducted to investigate the possibility of improving D300 cock (D300cx) and Anak Broiler pullet (BxPx) hybrid (BxD300Px; hybrid pullet) egg production.

MATERIALS AND METHODS

Ten female Anak broiler pullets (BxPx) were allowed to run together with two male dominant D300 (D300cx). Seventy eggs were collected within 1 week (six weeks after the first egg was dropped), and were artificially incubated. Fifty chicks each of BxPx, D300Px and BxD300Px were brooded together for 6 weeks using the conventional deep litter system. The chicks were fed *ad lib* with broiler starter and fresh clean drinking water during the brooding stage. At the end of the 6th week, they were transferred to growers' pen and offered clean drinking water and fresh growers mash *ad libitum* for 16 weeks. Birds were routinely vaccinated with the recommended breeder vaccines before the end of the 16th week of age, then separated into 3 groups (BxPx, D300Px and BxD300Px) with each group consisting of 21Px, and replicated 3 times. The birds were feed layers mash and clean drinking water to the end of trial period. Parameters evaluated included egg laying capacity (number), egg weight, broodiness, mortality rate, feed intake and liveweight and economics of production.

All data collected were subjected to one way analysis of variance (Steel and Torrie, 1980) and means separated using Duncan's Multiple Range Test (Duncan, 1955). Economic parameter data were analyzed according to Akpodiete and Inoni (2000).

RESULTS AND DISCUSSION

Table 1: Effect of D300Cx and BxPx cross on feed intake and liveweight at point of lay.

Parameter	BxPx	D300Px	BxD300Px	Mean	SEM±	CV
Feed intake (g)	69.03^a	50.57^c	55.34^b	58.34	.776	10.16
Live weight (kg)	3.47^a	1.08^c	1.32^b	1.96	.013	0.23
Feed conversion ration	0.02	0.05	0.04	0.04	.001	4.88

^{abc} means on the same row with different letters are significantly ($p<0.01$) different.

From table 1, feed intake was significantly ($p<0.01$) different. This could be attributed to breed differences in feed intake and feed conversion rates. This agrees with the result of Azharul et al. (2005), which reported reduced feed intake in Bangladesh traditional indigenous hens. Feed conversion ratio was non-significantly ($p>0.01$) different (Table1). This implies that the birds were converting more for feed to egg production than to weight gain.

Table 2: Effect of D300Cx and BxPx cross on egg laying capacity, egg weight, broodiness and mortality rate.

Parameter	BxPx	D300Px	BxD300Px	Mean	SEM±	CV
Egg laying capacity	23.00^a	6.00^b	21.00^a	16.5	4.472	0.74
Egg weight (g)	8.19	4.76	8.00	6.98	2.227	0.90
Broodiness	0.00	0.86	0.05	0.30	0.1139	1.79
Mortality	0.33	0.05	0.10	0.16	0.746	12.92

^{abc} means on the same row with different letters are significantly ($p<0.01$) different.

From table 2, the number of eggs laid by the BxPx, D300Px and BxD300Px pullets were significantly (p<0.01) different. The number of eggs laid by D300Px was significantly lower (6.0) than those laid by BxPx (23.0) and BxD300Px (21.0). There were non-significant (p>0.01) differences between the number of eggs laid by the BxPx (23.0) and the BxD300Px (21.0) breeds. This implies that the laying capacity of D300Px can be similar to BxPx in the BxPx / D300Cx hybrid (BxD300Px). This could be attributed to heterosis. This agrees with Essien (2003) who stated that crosses between local and exotic breeds result in heterosis. Egg weights were not significantly (p>0.01) different, (Table 2). Egg weight, as reported by DEGEM (n.d), is controlled by three dominant gene (A, B, C) factors.

Gene A is responsible for low weights while genes B and C are responsible for large weights. Gene A is epistatic with respect to the other two and where the three occur as dominant genes, the egg weight is intermediate. It, therefore, seems that eggs from the D300Px parents were intermediate while those from BxPx may have been dominated by B or C or both gene factors. This resulted in the egg weights of BxD300Px being intermediate and not significantly different from the BxPx egg weights. Small egg weight, is genetic, can be improved by masking the dominant A factor through cross breeding with breeds that have B, C or A, B, C, genes. Different breeds when crossed interplay to produce hybrid vigour in the progeny due to genetic differences. Thus, agrees with Oguzor and Nwankwo (1996) and Ibe (1998), who stated that hybrid vigour is expressed in hybrids whose parents have genetic differences. Mortality was non-significantly (p>0.01) different among the three breeds (BxPx, D300Px and BxD300Px) as shown in Table 2. This may be due to the effect of vaccination and medication. This agrees with the findings of Kitalyi (n. d) who reported that laboratory and on station research results on control of diseases are promising. For the results recorded for broodiness in BxPx (0.00), D300Px (0.86) and BxD300Px (0.05) were not significantly (p>0.01) different (Table 2). However, the broodiness did not affect their laying capacities significantly. The result implies that crossing breeds with negligible broodiness traits coupled with regular removal of eggs could gradually eliminate the broodiness observed in D300Px, especially because D300Px is a light breed. Light breeds are less broody (Portsmouth, 1978) and excellent layers (Ayivor and Hellins, 1982). It, therefore, appears that the laying potentials recorded for D300Px (Table 2) might have resulted from broodiness, occasioned by environmental conditions and thus could be eliminated.

Table 3: Economics of D300Cx and BxPx Cross on egg production.

Parameter	BxPx	D300Px	BxD300Px	Mean
Av. Feed consumed (kg)	25.70	18.80	20.60	21.70
Feed cost/kg (₦)	60.00	60.00	60.00	60.00
Total feed consumed cost (₦)	1,542.00	1,128.00	1,236.00	1,302.00
Price of Egg (₦)	20.00	40.00	20.00	27.00
Total egg number	472.00	124.00	446.00	347.00
Total egg value (₦)	9,440.00	4,960.00	8,920.00	7,773.00
Gross-margin (₦)	7,898.00	3,832.00	7,684.00	6,471.00

From table 3, feed economy was highest in D300Px total egg value was highest in BxPx (₦9,440) followed by BxD300Px (₦8,920) and least in D300Px (₦4,960) even when price/egg for D300Px was ₦40 against ₦20 for BxPx and BxD300Px, which resulted in a gross margin of ₦7,684 for BxD300Px and ₦3,832 for D300Px. This implies that BxD300Px and BxPx are similar in gross margin but different from D300Px.

CONCLUSION

It is apparent from the study that the reproductive performance of D300Px could be genetically improved by crossing D300Cx (cock) with BxPx (pullet) and the genetic gains sustained through better environmental conditions. The study indicated that egg production capacity of the local dominant D300Px breed improved by a factor of 3.6 (72%) by crossing male dominant D300 (D300Cx) with female Anak broiler pullet (BxPx). Therefore, it is recommended that intensified research efforts into improvements in egg and meat production, and resistance to diseases by the local breeds of chickens be made because the impact of such researches would better the lot of women and children who are primarily involved in local chicken production.

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