

PERFORMANCE OF PEKIN DUCKS IN SMALLHOLDINGS UNDER DIFFERENT REARING SYSTEMS

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RINGKASAN

Prestasi itik Pekin telah dikaji di bawah dua sistem pengurusan yang berbeza di kawasan pekebun kecil. Sistem-sistem yang dikaji ialah sistem separa intensif and sistem intensif. Ciri-ciri tumbesaran dan nilai-nilai karkas telah ditentukan dalam tempoh kajian selama lapan minggu. Itik-itik yang dipelihara di bawah sistem intensif dalam reban berlantai atas telah menunjukkan prestasi tumbesaran yang setanding dengan itik-itik di bawah perlakuan separa intensif yang disediakan tempat berenang. Perbezaan-perbezaan pada nilai purata untuk semua ciri karkas yang dikaji adalah tidak nyata di antara kedua-dua perlakuan. Keputusan telah dibincangkan dan rumusannya, sistem pemeliharaan secara intensif, seperti yang digunakan untuk ayam, boleh diamalkan untuk memelihara itik di kawasan pekebun kecil tanpa menjejaskan prestasi pengeluaran. Walau bagaimanapun, penggunaan sistem sedemikian memerlukan pengubahsuaian kepada bekas-bekas minuman dan makanan supaya dapat membekalkan lebih banyak air dan mengurangkan pembuangan makanan.

INTRODUCTION

The White Pekin duck is universally acknowledged as a meat or table bird because of its rapid growth rate. A body weight gain of around three kg over a rearing period of seven to eight weeks has been regularly reported for this strain (WILSON, 1973; SUMMERS and LEESON, 1976; HESTER, PIERSON, WILSON, ADAMS and STADELMAN, 1981; LEESON, SUMMERS, and PROULX, 1982; YEONG, 1982 and ADAMS, HESTER and STADELMAN, 1983). This figure is much higher than the average weight normally obtained with broiler chickens over the same period of growth. The introduction of this strain of duck was quite recent, but its popularity was such that it now forms the majority among the meat duck strains in Malaysia, replacing the local ducks (Itik Jawa).

In Malaysia, the duck rearing industry is relatively new and as such its management system has not reached the level of sophistication achieved for chickens. However, the progress of development of the duck rearing system follows a trend similar to that for chickens although at a slower pace. The first

system practised by local farmers was the backyard of free-range system where ducks were not confined but allowed to roam around in the villages, scavenging on any available food in the surroundings. Occasionally they were fed with leftover food from the kitchen or surplus grains. From this simple system the management of ducks progressed a step further to the semi-intensive system where ducks are confined in an enclosure which has a shed for shelter, a run and a pool of water or a free-flowing stream for swimming. This system still persists in a great majority of duck farms in the country. It is generally believed that ducks, being water fowls, need a swimming place for proper growth and development.

A fully intensive confinement rearing system for ducks, similar to that used for chickens, is scarcely practised in the country, if at all although in the USA and many European countries such a system is common. Probably the local farmers are still apprehensive about the capability of such a system in providing suitable conditions for duck growth. It was therefore the objective of this study to determine whether or not ducks housed in pens and provided with

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drinking water but with no swimming space could perform as efficiently as those reared semi-intensively with the provision of water for swimming.

MATERIALS AND METHODS

This study was conducted in a small-holder environment where water for swimming was available. Three separate enclosures were set up, each comprising a shed, a run and a pool of water for swimming. The area of the runs and pools measured some 9 sq m and 15 sq m respectively. This set-up was similar to those available in many duck farms in the country and represented the semi-intensive system. A conventional open-type raised floor poultry house was erected near each semi-intensive enclosure. The floor was of bamboo slats. These houses formed the intensive system, and together with the three enclosures they represented the respective replicates for the intensive and semi-intensive systems.

One hundred and fifty-six mixed sex day old ducklings of Pekin strain were used in the study. One hundred birds were assigned to the semi-intensive system while the balance was allotted to the intensive system. Distribution of the birds to each system and replicate was made at random. The three replicates in the semi-intensive system contained 33, 33 and 34 birds respectively while the distribution to the replicates in the intensive system was 18, 19 and 19 birds respectively. The floor space provided for each bird in the intensive system was 0.26 sq m while in the semi-intensive system 0.21 sq m of shed space was provided to each duck. Both these densities provided ample space for feeding and drinking.

In both systems feed and water was provided *ad libitum* in feed and water troughs. A starter mash diet was provided for three weeks followed by a finisher mash ration until the end of the trial (eight weeks). These diets were formulated and prepared at MARDI farm (Table 1).

Birds were brooded for two weeks, during which time heat and light was supplied by 'hurricane' lamps 24 hours per day. During brooding, birds under the semi-intensive system were not allowed out of the shed.

Body weights were recorded by replicate for both treatments at day-old and 56 days. The consumptions of feed were also determined on a per replicate basis. Mortality was recorded daily and the weights of the dead birds taken. Feed efficiency for each replicate was then calculated after correction was made for the dead birds. A general observation on the birds was also made particularly with respect to feeding, growth and behavioural activities.

At the end of the trial eight birds from each treatment were randomly sampled for carcass analyses. These samples comprised equal numbers of males and females. Carcass traits investigated were eviscerated weight; cooked weights of meat, skin and bone; and ratios of meat-to-bone and meat plus skin-to-bone.

RESULTS

Growth and Production Performance

Means of body weight, feed intake, feed conversion efficiency and mortality rate over eight weeks are presented in Table 2. Ducks under the intensive rearing system recorded a mean body weight of 8.3% lower than those under the semi-intensive system. The difference however, was not statistically significant. Visual observation showed that the weekly body size of ducks under the two systems was comparable at any stage of growth over the trial period.

Birds under the semi-intensive system indulged in more activities than those in confinement. The usual behaviour was for them to proceed to the pool of water for swimming after the morning feeding. At other times between feeding they spent their time either in the shed, on the grass run or in the pond.

Table 1. Experimental rations

Composition	Starter % 0-3 weeks	Finisher % 4-8 weeks
Corn	52.90	54.25
Wheat pollard	10.00	15.50
Soyabean meal	28.00	21.00
Fish meal	6.50	1.50
Palm oil	1.00	6.00
Trimix	0.10	0.10
Tricalcium phosphate	0.75	1.00
Salt	0.25	0.25
DL-methionine	0.20	0.05
TM 50	0.05	0.05
Choline chloride (50%)	0.20	0.20
Calculated protein and energy		
Crude protein (%)	22.1	19.7
Metabolisable energy (Kcal/kg)	2 939	2 983

Table 2. Growth performance of Pekin ducks at eight weeks

	Treatment	
	Intensive	Semi-intensive
Body weight (kg/bird)	2.59	2.83
Feed intake (kg/bird)	10.76	11.05
Feed efficiency (feed/gain)	4.22	3.96
Mortality (%)	5.2	4.3

In contrast birds in the intensive confinement system were relatively idle except when they are eating or drinking.

The recorded consumptions of feed for both treatment groups were high, the mean intakes per bird for the intensive and semi-intensive systems being 10.8 kg and 11.1 kg respectively. The difference however, was not statistically significant. It was observed that a considerable portion of the feed mash was wasted during feeding. This wastage was either due to spill-over of feed onto the ground or to losses in the drinking troughs.

Similar to the results of live weight and feed consumption, there was also no treatment effect on feed conversion efficiency (feed/gain ratio). Birds in both systems registered efficiency figures in the vicinity of four with the difference between treatments not being significant.

Carcass Yield

All the carcass parameters measured did not reveal any significant differences between the two management systems (Table 3). These yields represented data

Table 3. Carcass yield of Pekin ducks at eight weeks

	Treatment	
	Intensive	Semi-intensive
Percent dressing* (%)	65.3	65.8
Meat** (%)	50.1	48.8
Skin** (%)	21.9	23.8
Bone** (%)	28.0	27.4
Meat:bone***	1.78	1.78
Meat + skin:bone***	2.57	2.64

*hot eviscerated weight as percentage of preslaughter live weight

**as percentage of cooked eviscerated carcass

***based on cooked eviscerated carcass.

from equal numbers of male and female birds from each treatment. Treatment differences for the investigated variables for the combined sex were small (range 0–80%). Some 65%–66% of the live weight was recovered as eviscerated carcass. The proportion of meat in the cooked carcass was around 50% while that of bone was about 28 percent. The contribution from skin was quite considerable (21.9% and 23.8% of the cooked carcass for the intensive and semi-intensive systems respectively) due to the thick layer of subcutaneous adipose tissue.

DISCUSSION

The results of this study show that rearing Pekin ducks in smallholdings on intensive raised floor houses did not adversely affect growth rate, feed consumption, efficiency of feed utilisation or carcass yield in comparison with the more commonly-used semi-intensive rearing system. This situation was confirmed by workers overseas (WILSON, 1975; LEESON *et al.*, 1982) and locally (YEONG and FAIZAH, 1981; YEONG, 1982).

The mean body weight of 2.6–2.8 kg/bird recorded in this study was slightly lower than the values normally reported for Pekin ducks. Values in the vicinity of 3.0 kg are

normally quoted for 8-week old Pekin ducks (WILSON, 1973; YI JUNG and YU-PING ZHOU, 1980; YEONG, 1982). This slight discrepancy could be due to a number of factors such as purity of the strain used, plane of nutrition, environment and management among other factors. For instance the effect of strain purity was clearly demonstrated by YEONG and FAIZAH (1981) who obtained a mean body weight of only 2 kg for 8-week old cross-bred Pekin ducks of Cherry Valley and Taiwan origins, while the importance of protein and energy levels in affecting body weight was shown by OLUYEMI and FETUGA (1978) and WILSON (1975) respectively. In so far as this study is concerned all experimental factors were kept as constant as possible to both treatment systems.

The mean feed intakes, which did not show any significant effect between the two management systems, were also slightly higher than the values reported by WILSON (1975) and YEONG (1982). The possible inferior quality of feed and feed wastage might have contributed to such high consumptions. The feed in mash form instead of pellets and the use of shallow bamboo feed troughs might cause a considerable amount of feed wastage through spillage in both systems. Therefore the feed consumption reported in this study might not present the true consumption of the birds.

Ducks reared under the semi-intensive system would be expected to consume more feed than those reared intensively. This was because they expended more energy during swimming activities in the pond and were therefore expected to make up for the loss of energy through increased feed consumption. The absence of such an expected difference could probably be due to the ability of these birds to obtain some nutrients either from the grass run or from the pool. This additional unrecorded 'food' could probably offset the need to consume extra formulated feed from the troughs provided.

The absence of a significant effect of rearing system on feed conversion efficiency indicated that one system did not present an environment more stressful or more conducive than the other in influencing feed utilisation. Nevertheless it would not be true to assume that both systems under the conditions of this study presented an ideal environment for growth. The feed conversion efficiency data obtained were slightly higher than the figures usually quoted for Pekin ducks. Values ranging from 3.0 to 3.8 were regularly reported (WILSON, 1975; CLAYTON and POWELL, 1979; YI JUNG and YU-PING ZHOU, 1980; YEONG, 1982). Although feed quality may be an important factor in determining conversion efficiency other factors which could have contributed to poorer conversion efficiency in this study were the form of the feed (mash), unsuitable feed trough and the probable insufficient supply of brooding heat.

The comparable influence of both systems on growth and production of Pekin ducks was further shown by the similarity in mortality rates recorded. It would be expected that ducks, being hardier than chickens, would incur lower rates of mortality. Rates of around five percent would be considered to be on the higher level of normal mortality rates for chickens. This could be due to the inadequacy of the brooding heat supply, among other factors since the majority of deaths occurred during the period of brooding for both systems.

Under the conditions of this study carcass yields of ducks at eight weeks of age were not significantly affected by rearing system. This indicated that the two systems exerted similar influence in the overall carcass development of ducks.

In general, carcass yields of Pekin ducks have not varied very much over the years although inconsistencies in results have been reported. The eviscerated dressing percentage of between 65.3% and 65.8% observed in this study agreed with the results of YEONG and FAIZAH (1981) but was slightly higher than the values reported by WILSON (1975). These slight variations were probably due to variations in the technique of carcass preparation. The amounts of cooked meat, skin and bone as percentages of cooked carcasses were around 50%, 22% and 28% respectively. The figures reported for cooked meat by YEONG and FAIZAH (1981) and YEONG (1982) were 70% and 76% respectively. It was highly probable that these workers included the skin as part of meat. The combined meat and skin value obtained in this study (about 72%) corresponded to the values of 'meat' reported by the above workers. The percentage amount of bone was in close agreement to the results of YEONG and FAIZAH (1981) but was higher than the reported figure of YEONG (1982). This discrepancy could also be due to strain difference as well as procedural differences in carcass preparation. As percentages of eviscerated weight the amounts of cooked meat, skin and bone were in close agreement to the results of STADELMAN and MEINERT (1977). The meat plus skin-to-bone ratio corresponded to the values of STADELMAN and MEINERT (1977) and YEONG and FAIZAH (1981) but was lower than the figure reported by YEONG (1982).

In conclusion the results of this study show that Pekin ducks reared under the intensive management system in small-holdings performed as well as those under the commonly-used semi-intensive system, in growth and production performance. Although ducks are water fowls, the absence

of a pool of water for swimming was not a hindrance to growth and development of ducks as long as sufficient water was available at all times for drinking as well as for washing down the feed consumed. The use of the intensive system would allow rearing of ducks in areas where land is scarce and no stream of running water or pond is available. In the adoption of the intensive system it would be necessary to provide a large drinking trough or cup for drinking and washing of the duck's bill. Likewise bigger feed troughs are needed to increase the feed

holding capacity and to minimise feed spillage.

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SUMMARY

The performance of mixed sex Pekin ducks under two different rearing systems was investigated in a smallholder environment. The systems were the semi-intensive and the intensive. Growth parameters and carcass traits were determined over an 8-week trial period. Ducks raised under the intensive system of raised floor housing showed growth responses comparable to those of birds reared semi-intensively with the provision of a pool of water for swimming. Differences in the mean values of all the carcass traits examined were not significant between the two treatments. Results were discussed and it was concluded that the intensive full-confinement rearing system, similar to that used for chickens, could be adopted for growing Pekin ducks in smallholdings without bringing any adverse effect to the birds. The use of such a system however, would necessitate the modification of drinkers to provide a bigger water capacity, and a redesigning of feeders to minimise feed spillage.

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