



FOOD & FERTILIZER TECHNOLOGY CENTER

A FAVORABLE OUTLOOK FOR DUCK PRODUCTION IN THE FAR EAST AND SOUTH PACIFIC

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EXTENSION BULLETIN NO. 310

September 1990

FOREWORD

This Bulletin reviews the present situation of duck production in the Asian and Pacific region. It notes that not only is the demand for animal protein increasing each year, but the number of ducks has increased by 50% in a single decade, and is showing an annual growth rate of 10-15% in some Asian countries. The outlook for increased duck production is thus extremely promising. The main varieties used as meat ducks in Asia are reviewed, and the author describes the breeding of the mule duck, the main meat duck of Taiwan where more than 36 million meat ducks are raised each year. Ducks are also important egg producers in Asia, and the brown Tsaiya ducks of Taiwan have shown great increases in productivity in recent years as a result of improved feeding and management. Disease prevention has also shown rapid development in Taiwan, based on good hygiene and vaccination. These developments in Taiwan will be very useful to other Asian and Pacific countries where ducks are also being raised under tropical and subtropical conditions.

The author is Director of the Ilan Duck Research Center in ROC on Taiwan, where most of the work in developing the mule duck was carried out. The author has played a leading role in developing the mule duck, a three-way cross of the Muskovy, Peking and the native Tsaiya which has brought prosperity to thousands of Taiwan's duck producers. He has also been active in assisting in the development of duck production elsewhere in Asia, and at the time that this Bulletin goes to press (September 1990) is about to conduct a training course co-sponsored by FFTC on mule duck production which will be attended by 11 trainees from 3 countries. He first presented the paper on which this Bulletin is based at the 5th Animal Science Congress of the Asian-Australian Association of Animal Production Societies, held in Taipei, ROC on Taiwan, on May 27-June 1, 1990.

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(Chinese Abstract)

摘 要

鴨隻飼養的數目在 1971 到 1981 的十年間，增加了 50%，而且有繼續增加的趨勢。台灣的養鴨事業，以肉鴨和蛋鴨為主，除了提供消費者蛋白質來源外，鴨羽毛的外銷，每年也賺取大量外匯，而胚胎蛋的外銷香港，馬來西亞和新加坡，提供當地肉鴨戶的飼養。台灣的肉鴨主要是三品種白色土番鴨，由公番鴨×母改鴨（公北京鴨×母白菜鴨）所生產，而褐色菜鴨則是蛋鴨的主要品種。

台灣養鴨事業的迅速發展仍歸功於育種，營養和管理工作的研究成果。由於地理環境和氣候條件，遠東及南太平洋地區，具有發展養鴨事業的潛力，台灣成功的經驗足以幫助此一地區養鴨事業的發展。

(Japanese Abstract)

摘 要

台湾のアヒルの頭数は1971年から1981年の間に50%以上増え、今後もその傾向は続くと思われる。ホンコン、シンガポール、マレーシアで飼育されている肉用アヒルの大部分は台湾の育種場から半孵化卵の形で輸出されている。アヒルは台湾でも採卵あるいは肉用に飼育されているが、羽毛も重要な副産物である。肉用アヒルの主な品種はPekin, 土着Tsaiya, Muscovyの3者交配で育成された white mule duck である。採卵用としては brown Tsaiya が主流である。台湾での生産性が大幅に上昇したのは栄養条件の改善と育種によるところが大きい。

(Korean Abstract)

초 록

1981년도의 오리 사육수는 1971년 보다 50%가 증가되었으며 앞으로도 계속하여 증가될 전망이다. 대만에 있는 육종농장에서는 홍콩, 싱가포르, 말레이시아에 육용오리의 대부분을 부화중기난의 형태로 공급하고 있다. 대만에서는 알과 고기를 얻기 위하여 오리를 사육할 뿐 아니라 또한 주요한 부산물인 오리털을 얻기 위하여 오리 사육이 성행되고 있다. 주요 육용 오리로는 북강오리, 재래종 Tsaiya와 Muscovy에 의한 3원백색교잡 오리이다. 갈색 Tsaiya종은 대만에서 널리 사육되는 오리이다. 좀더 많은 생산성 향상은 영양과 육종의 개선에 귀착되고 있다.

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ABSTRACT

The number of ducks has increased by more than 50% between 1971 and 1981, and increases in production are likely to continue. Breeding farms in Taiwan provide most of the meat ducks to farms in Hongkong, Singapore and Malaysia, in the form of half-hatched eggs. Ducks are also raised for eggs and meat in Taiwan, with down an important by-product. The main meat duck is the white mule duck, a three-way cross between the Pekin, the native white Tsaiya and the Muscovy. The brown Tsaiya is also the main laying duck of Taiwan. Large increases in productivity have resulted from improvements in nutrition, breeding and management.

INTRODUCTION

With the increasing demand for animal protein all over the world, it is felt that duck production is likely to be a valuable asset in meeting this demand. The total world population of ducks increased by more than 50% in the 10 years between 1971 and 1981 (Bird 1985). According to one estimate, the number of ducks has grown even more than 50% during the last decade; certainly the duck population is growing at the rate of 10-15% each year in some Asian countries (Table 1).

The importance and popularity of the duck industry has much to do with the ability of ducks to adapt to a wide range of the environmental conditions found in the Asian and Pacific region. The numerous rivers and streams provide an ideal environment for ducks, although temperatures are sometimes rather too high for optimum performance. Hetzel (1985) stated that 75% of the domesticated ducks of the world are found in south and east Asia. The human population in the Asian region is over 2.2 billion, but the annual consumption of ducks is only about 800

Table 1. Duck production in some Asian countries

Countries	1980		1989	
	Meat ducks (thousand birds)	Duck eggs (million eggs)	Meat ducks (thousand birds)	Duck eggs (million eggs)
Japan	112	-	124	-
Korea	404	19	563	25
Malaysia	7,000	18	10,000	150
Philippines	4,725	-	16,400	416
Thailand	2,000	1,000	6,500	1,300
Taiwan, ROC	25,805	476	36,213	404

million birds. Therefore, duck production in this region still has plenty of scope for development.

Most of the countries in Asia, including Southern China, Thailand, Indonesia, India and the Philippines, are rice producers. Traditionally, egg laying ducks are raised in harvested rice fields where they scavenge for fallen grain, insects and other materials, at little or no expense to the farmer. Although production is seasonal and unstable, the consumer still benefits from cheap eggs. Traditional meat duck production, on the other hand, takes place mainly near rivers and streams, using very simple facilities. A combination of duck and fish farming is also widespread, and is found in China, Indonesia, Malaysia, Thailand and other countries of this region.

The duck industry of Taiwan has grown rapidly over the last two decades. In 1988, 36.2 million meat ducks were raised, 3.6 times the number produced in 1968. This development was the result of remarkable achievements in breeding, as well as great improvements in artificial insemination and electric incubation, combined with a better understanding of the nutrient requirements of ducks. This paper evaluates the potential for duck production in the Far East and South Pacific, in the light of Taiwan's experience.

MEAT DUCKS

Pekin ducks, mule ducks and Muscovy ducks are the major breeds used for meat production in Asian countries. There are few breeding farms for meat ducks in Southeast Asia outside Taiwan. Duck farms in Hongkong, Malaysia and Singapore prefer to import their meat ducks as half-hatched eggs, mostly from Taiwan but some also from Thailand. Half-hatched eggs are eggs which have been incubated for 24 days. They are then packed in polystyrene boxes and covered with fresh bean sprouts to maintain the right temperature and moisture content during shipment. The method used by the distributor to hatch the eggs is necessarily in an incubator but depends on the climate, and the eggs are then delivered to commercial growers. The Pekin duck is the major meat duck breed in Thai-

land, Malaysia, the Philippines, Korea and Mainland China. Other popular commercial breeds in this area are Cherry Valley, Tegel, Huggard, Legard and Maple-Leaf. The growth performance of meat ducks in Southeast Asia is poorer than that of ducks in the United Kingdom and the United States. High environmental temperatures and outdoor semi-intensive management are the main reasons why Asian ducks require a longer growing period to reach market weight. A lack of information about optimal nutrient requirements in tropical and subtropical climates is also responsible for poor feed conversion efficiency, which results in much higher costs. Over 70% of duck farmers in the Far East and South Pacific are still using feed prepared on the farm for their ducks. However, in Taiwan about 95% of ducks are fed a complete pelleted diet.

Mule ducks are the major meat duck of Taiwan. A three-way cross system is used for white mule duck production. First, the Pekin drake is crossed with white Tsaiya ducks to produce a crossbred female line, called the Kaiya duck. This is then crossed (usually by artificial insemination) with large white Muscovy drakes. The resultant progeny is the mule duck, which is sterile, but grows rapidly and has a good carcass composition with more meat and less fat than the carcass of the Pekin ducks. These three-way crosses used in white mule duck production take the character for high egg production from the Tsaiya, their high growth rate from the Pekin, and their good carcass quality and meat texture from the Muscovy. The white feathers give the carcass a much better appearance than that of dark-plumaged ducks. The details of mule duck production have been published by Huang* (1985). The average body weight at 10 weeks of age was about 1.4 kg in 1966, but had increased to 3.0 kg by 1989 (Table 2).

A combination of duck and fish farming is widespread in Asia. Tilapia is the most common fish used in this production system. The feces of 4,000 ducks raised on one hectare of fishpond can support the growth of 30,000 tilapia, when an additional 50-60 kg feed is supplemented daily – only 25% of the

* See also FFTC Extension Bulletin 291: *Utilization and Performance of Waterfowl in the Republic of China on Taiwan*.
Chien Tai

Table 2. Improvement in the performance of mule ducks in Taiwan, 1966-1989

Year	Body weight (kg)	Feed/gain
1966	1.41 (10 wks)	4.95
1972	2.00 (13 wks)	7
1986	2.90 (10 wks)	3.09
1989	3.00 (10 wks)	2.95

feed needed for the same quantity of fish raised without ducks. Since both the ducks and the fish are commercial operations, duck/fish integrations may save much of the cost of the feed for fish production. Rice and freshwater shellfish both grow well in the water from the duck/fish system.

Muscovy ducks continue to grow in

popularity, because they can adapt to a wide range of environments and have low-fat meat. In France, the Muscovy's share of total duck production rose from 20% to 85% over the last decade, and the Muscovy is also becoming widely accepted in other countries around the world. The consumption of Muscovy duck meat has increased five times in the last couple of years in Taiwan. The body weight of Muscovy ducks at 11 weeks of age is on average 3.8 kg for males, while at 10 weeks of age females weigh an average of 2.4 kg.

Muscovy ducks have been raised in the Philippines for years, while the consumption of Muscovy ducks in Japan grew rapidly last year (1989). The Muscovy seems to be a good meat duck breed for Asia. Moreover, the fast growing Muscovy is also important for the growth performance of mule ducks. The performance of Tsaiya and Kaiya ducks in Taiwan is shown in Table 3.

Table 3. The performance of Brown Tsaiya, White Tsaiya and White Kaiya ducks

	Brown Tsaiya	White Tsaiya	White Kaiya ducks
40 wks body weight (kg)			
Male	1.36	1.50	
Female	1.48	1.58	2.06
Age at 1st egg (day)	116	125	141
Egg no. at 360 days	218	181	195
Egg no. at 500 days	337		
Egg weight at 40 wks (g)	67.8	69.1	81.7

LAYING DUCKS

Four breeds are recognized as the major egg producers: the brown Tsaiya of Taiwan, the Patero Grade of the Philippines, the Indian Runner of Malaysia, and the Khaki Campbell, which is now distributed over much of the world where duck egg production is important. All these laying ducks originate from the green-headed Mallard, *Anas platyrhynchos platyrhynchos*.

The brown Tsaiya duck is a native

Chinese breed, and is the only breed of laying duck raised in Taiwan. It has a small body size, high egg production and good eggshell quality (Table 3). Over 95% of duck eggs are consumed as processed eggs, i.e. salted eggs and "thousand-year eggs". Most duck eggs eaten in the Philippines are eaten in the form of "balut", the partially (13-16 days) incubated duck eggs. Egg production of the Patero Grade is only 70% (female duck-day), while in Malaysia, local ducks and Khaki Campbell ducks have only 50-60% egg

production. However, Hutt (1952) has reported that the egg production of Khaki Campbell ducks can be extremely high. Records show that 50,000 ducks had an average of 92% egg production, with 73.4 g average egg weight. These significant differences in egg production performance are due to variation in feeds and feeding between the different countries. The improvement in egg production of Brown Tsaiya in Taiwan between 1970 and 1989 is definitely the result of greater knowledge of the nutrient requirements of these ducks, since the selection program for Tsaiya did not begin until 1986 (Table 4). The nomadic method is the common way of raising growing Tsaiya ducks. The young ducks scavenge for fallen grain from 4-16 weeks of age, and are then kept in a house and given good quality feed during the laying period. Tsaiya ducks raised in this way are able to achieve a reasonable performance in egg production. If however the laying duck remains heavily dependent on scavenging, egg production performance is poor. In Taiwan, the first laying period for Tsaiya ducks is at 10-12 months, with an egg production rate of about 90% (female duck-day). After forced moulting, egg production can reach 80-85% for another 6-8 months. During the laying period, farmers check the performance of each individual duck and remove the nonlaying ones, in order to reduce their costs of production.

Table 4. The improvement in the performance of laying Tsaiya ducks

Year	Egg-production (female duck-day, %)	Feed/egg
1976	70	4.40
1987	85	3.02
1989	88	2.80

* Data of 1976 was from 180 days after laying of first egg
 Data of 1987 was from 350 days after laying of first egg
 Data of 1989 was from 384 days after laying of first egg

NUTRITION RESEARCH

Research on the nutrient requirements of duck was begun in Taiwan about 15 years

ago by Dr. T. F. Shen. At that time, duck farmers relied solely on empirical methods for preparing diets, and consequently some feed-stuffs were wasted because so little was known about the nutrient requirements of ducks under local conditions. After years of research, most of the nutrient requirements of mule ducks and laying Tsaiya have now been established, and were published in *"The Nutrient Requirements of Ducks"* in 1988. Farmers are now better able to formulate duck rations efficiently, as are the feedmills where the production of complete pelleted feed for ducks increased from 10,000 mt in 1974 to 60,000 mt in 1988. Since Taiwan has similar geographical and climatic to those found in many other countries of the Asian and Pacific region, hopefully *"The Nutrient Requirements of Ducks"* can be used to improve the performance of ducks in other parts of the region. However, minor modifications may be needed to make more efficient use of local ingredients in each country. Interestingly enough, our experience in handling duck feed for Chinese breeds in Taiwan also helped some duck breeds imported from overseas to reach a reasonable level of performance here.

DISEASE PREVENTION

Duck Virus Hepatitis, Duck Virus Enteritis and Pasteurellosis (Fowl Cholera) are the three main duck diseases in Southeast Asia. All three diseases are endemic. The implementation of sound hygiene will reduce the risk of infection, and a vaccination program is also strongly recommended. Pasteurellosis is the most difficult disease to control of the three. Veterinary research in Taiwan has shown that vaccines now available on the market are less than 40% effective, probably due to the frequent mutation of the bacteria.

The cost of hygiene practices and vaccination programs for ducks is less than 1/3 of those for chickens. In the field of disease prevention and control, given the lack of effective control for many poultry diseases, we may find that there is a considerable advantage in duck production.

CONCLUSION

Two issues of magazines with a worldwide distribution, *Poultry International*

(February 1989), and *Feed Management* (January 1989), both used ducks as their cover stories recently. This indicates that duck production is important in world poultry production. Professor M. L. Scott at Cornell University has written:

“Duck production may have more advantages in developing countries compared to chicken production”.

The geographic conditions of the Far East and South Pacific are an ideal environment for duck production. Experience in Taiwan of duck production has produced a significant improvement in the performance of ducks on this island, and these results could be shared with other countries. Duck products such as meat and eggs provide a good protein source for human beings, while the duck feathers (down) are a valuable byproduct

which may earn a good income when exported. It appears that the potential for duck production in the Asian and Pacific region is very promising.

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