THE STATUS OF DUCK DISEASES IN INDONESIA

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INTRODUCTION

The demand for a nutritional standard of animal protein originating from livestock for the Indonesian population of 160 million is at 4 gr/capita/day. At present, this nation protein requirement has not been kept up yet by the provision of 2.31 gr/capita/day, of which 62.3% have come from meat, 14.7% from milk and 23.0% from eggs. Ducks play an important role in making a contribution of eggs at 81.4 million kg/year which represents 25.8% of the total number of eggs produced by chicken and the duck itself (Livestock Statistics 1984).

The duck population in Indonesia has been up to 25.436 million in 1984. This number was the highest among those found in the Asean member countries. In 1982, Thailand had a duck population of 13.381 million, Malaysia 0.271 million, Singapore 0.448 million, the Philippines 4.400 million, while in Indonesia it has reached to 23.861 million (Livestock Statistics, 1984). Most of the Indonesian ducks are raised under the traditional farming system or extensively, restricted numbers only are kept semi-intensively or intensively (Ronohardjo, 1982; Samosir, 1983). Because of this traditional husbandry, the distribution of duck farming is largely found in the rice-growing areas, except the Alabio ducks which are kept in the marshly lands of South Kalimantan. Rice fields are important habitats for duck breeding as they are rich in carbohydrates and post harvest offals, and also in the readily availabilities of small fresh water fishes or snails as source of protein diets (Ronohardjo, 1983).

In the development of livestock production in Indonesia, the duck has a promising potentiality (Livestock Statistics, 1984), especially as a side-line efforts leading to an additional income for small holders in the rural and trans-migration settlements. However, it is not uncommon that farmers are complaining because their ducks often die or giving poor production (Prodjoharjono, 1977; Ronohardjo *et al.*, 1978 ; Partadiredja *et al.*, 1979; Sudana, 1981; Tarmuji and Yuningsih, 1985). Therefore, the Research Institute for Animal Disease (RIAD) is attempting to explore these duck disease problems in order to collect more field data (Ronohardjo *et al.*, 1978; Ronohardjo, 1983; Istiana *et al.*, 1984; Tarmudji and Yuningsih, 1985). These will involve the diseases infecting ducks, environmental influences or effects of improper application of pesticides in rice planting. In addition, various laboratory research are also being carried out at the Institute in seeking for better control methods (Syamsudin, 1981; Ronohardjo, 1983).

This paper attemps to describe various problems posed by duck diseases already existing in Indonesia among which mostly are results of research executed at RIAD and some come from other laboratories.

SEVERAL DISEASES/DISEASE AGENTS

A. BACTERIAL

(i) *Salmonellosis*

Among many duck diseases caused by bacterial agents, salmonella was the first disease agent isolated from duck eggs. This disease is of medical importance in the public health.

In 1940, Kraneveld and Eber examined 300 duck eggs and eight of them contained *S. typhimurium* Later in 1942, the same salmonella species were also isolated from 14 of 71 specimens investigated (Kraneveld

et al., 1947). Again in 1947, *S. typhimurium* var *copenhagen* was isolated from a duck suffering from diarrhoea (Kraneveld *et al.*, 1947). All the ducks and eggs were originated from the area of Bogor.
Thereafter, other salmonella species were successfully isolated in the period of 1983-1985 i.e. *S. lexington* from two eggs coming from Central Java, and *S. typhimurium* and *S. saintpaul* from 5 diseased ducks (Sri Poernomo, personal communication, 1985).

(ii) *Pasteurellosis*

According to Sjamsudin (1983) cases of pasteurellosis in Indonesia were detected in 1951. Thereafter, two similar cases were identified in Yogyakarta, Central Java in 1977 (Prodjoharjono, 1977), where respective deaths of 26.0% and 49.5% were found in 100 and 109 infected ducks.

An outbreak of pasteurellosis then occurred in 1979 in Bali where 4662 village ducks were infected and 23,3% of them died (Sudana, 1981). A similar outbreak happened in the vicinity of Bogor during 1978-1979 in a large duck farm of 3,451 birds where 23% died (Partadiredja *et al.*, 1979). Afterwards, an outbreak occurred in another farm, where 62,5% of the 1,400 affected ducks died (Sri Poernomo, 1980). All of the above researchers agreed that young ducks were more susceptible than the older birds. According to Sri Poernomo (1980) the death rate of 4 week old ducklings may reach 100% (Table 1). The causal agent of this disease is *Pasteurella multocida* which is pathogenic to rabbits, guinea-pig, mice, chickens, other than the ducks (Sri Poernomo, 1980; Witono *et al.*, 1981), and being serological different with *P. multocida* of cattle. The result of sero typing of the Bali isolate was *P. multocida* capsular A somatic type 1 (Witono *et al.*, 1981).

In both outbreaks in Bali and Bogor, the use of alum precipitated autovaccine had abated the disease incidence (Sjamsudin, 1980; Witono *et al.*, 1981). Sjamsudin (personel communication 1985) had even compared the effect of alum precipitated vaccine with that of the oil adjuvanted vaccine, where the result showed no significant differences.

(iii) *Other bacterial infections*

In addition to salmonellosis and pasteurellosis various bacteria have been isolated from the organs of sick ducks. From these organs were isolated *Paracolobactrum coliform* in a case of paracoligranuloma (Djaenudin and Utojo, 1954) as well as other bacteria such as *Streptococcus* sp., *Staphylococcus* sp, *E. coli, Pseudomonas* sp and *Proteus* (Ronohardjo et al., 1978). Meanwhile, Istiana *et al* (1984) also found, in addition to these organisms from the faecal samples, *Salmonella* sp from the egg and diet of the ducks.

B. PARASITIC

Parasitic infestations of ducks rarely cause death, though the production of these birds can be seriously affected. This is due to the fact that the dietary substances essential to the bird body cannot be profitted by the host itself. Various parasites have been found in the Indonesian ducks as shown in Table 2.

C. MYCOTIC

Up to the present, two kinds of fungal infection only, i.e. aspergillosis and candidiasis, have been identified in the duck.

This case probably is due to the fact that :

a). Duck farming in Indonesia is generally extensive in nature so that the foodstuffs naturally obtained from the environment do not contain a high degree of carbohydrate;

b) Antibiotics as feed supplements are not used in the duck ration because of the practise of extensive farming system.

The situation of mycotic disease of ducks may become different if duck breeding in Indo-

nesia has changed into an intensive system (Hastiono, personal communication, 1985).

(i) Aspergillosis of poultry has been known for a long time in Indonesia (Kraneveld and Djaenudin, 1952 ; Ronohardjo *et al.*, 1975; Hastiono, 1980 ; 1984). Nevertheless, cases in the duck in the last ten years have been identified as many as 15 times only out of 77 suspected specimens. Of these 15 cases, 11 were *A. fumigatus* (73.3%), 2 *A. flavus* and the rest *A. niger* (13.3%). Other aspergillui such as *A. terreus, A. nidulans* and *A. amstelodami* were neve1 found.

The frequent isolation of those first three Aspergillus mentioned above is due to the fact that they can grow easily and rapidly on various substrates, thus the opportunity of infecting their hosts is much greater than the three latter species (Hastiono, 1978; 1980).

(ii) *Candidiasis*

As compared with cases of aspergillosis, candidiasis is more rarely found in the duck and the incidence is much lower, 3 cases only of 16 specimens investigated.

D. VIRAL

Viral diseases known to infect ducks are not much found yet in Indonesia, except duck pox and sinusitis caused by an infection with influenza A virus. But Newcastle disease virus has also been isolated from the duck.

(i). Duck pox

Pox in ducks. was first described by Ronohardjo (1977). The disease mostly attacks ducklings three months of age, showing warts around the eyes, on the edge between the beak and corner of the mouth, but rarely found on the legs. The prevalence rate in the Alabio and Bali ducks has a range of 10-30%. Death has never been reported. The pox virus has been isolated from an infected duck (Ronohardjo, 1977; Ronohardjo *et al.*, 1978).

The second case of duck pox was reported by Soeripto *et al* (1979) who observed among the experimental Khaki Campbell ducks of the Research Institute of Animal Production Ciawi (Bogor), a morbidity as high as 17% of 228 birds.

(ii) Sinusitis or "Cengesan"

Sinusitis syndrome was first reported by Prodjohardjono (1977) in the region of Yogyakarta. Although not isolating the disease agent itself, the author related the syndrome with an avian influenza infection. Later, the disease was reported by Ronohardjo (1978) infecting several local breeds of duck (Bali, Tegal and Alabio). The infection rate ranged from 4 to 100% (Table 4) and 98.54% of the birds infected were ducklings 6 weeks of age (Ronohardjo, 1983). Identification of the causal agent showed that influenza A caused the sinusitis, and the influenza A virus (H_4N_2) and influenza virus (H_4N_6) were isolated from the sick ducks (Ronohardjo, 1983; Ronohardjo *et al.*, 1985). Further research in the laboratory denoted that infection by the virus at least influenced the growth rate of infected ducks (Ronohardjo, 1983).

(iii) Newcastle disease

Although Kingston (1977) isolated the mesogenic ND virus from an infected duck, data produced by RIAD showed that the velogenic ND virus could also be isolated from the cloacal swab of healthy ducks (unpublished data). So that the ND problem of local ducks in Indonesia probably can be consider as carrier only and do not produce disease. Data of a serological study of ND in several areas densily populated by ducks showed that in the districts of Alabio, Tegal, Bali and Bogor the antibodies against ND contained were 5.2%, 5.2%, 22.2% and 100% respectively (Ronohardjo *et al.*, 1978).

E. PATHOLOGICAL/TOXICOLOGICAL DISORDERS

The course of aflatoxicosis may lead to

a 30% mortality of affected ducks and a decrease of egg production up to 50% (Soeripto *et al.*, 1980). The author made the diagnosis of the disease by observing the pathological-anatomical pictures at *post mortem* examinations of suffering ducks. Ginting (1983) reported that among the local ducks which were reared under the traditional husbandry many suffered from aflatoxicosis (50%).

The source of aflatoxin may include duck rations consisting of tapioca and rice bran given in the semi-intensive farms (Nagler, 1981). According to Hetzel *et al* (1981) a diet containing 40 ppb afltoxin may cause pathological changes in the livers and at 200 ppb may kill the Alabio duck.

Tarmudji and Yuningsih (1985) have made speculation that duck mortalities in the regency of Karawang, West Java, which reached up to 44.3%, may be caused by pesticide poisoning. It is thought that the ducks are exposed to residues of recently-applied pesticides when they are herded in the rice fields.

DISCUSSION

The trend of increasing the duck population in Indoensia has recently been occurring at a faster rate and it will be continously developed from the former period of the 5-year National Development Plan to the next. This will be seriously considered by the government in the assumption that the duck is very potential for developing the source of animal protein originating from livestock which will also involve small farmers in the rice-growing areas quite remote from the big cities. In addition, the traditional duck farming does not need elaborate technology and facilities. Estates for rice-growing continue to expand, especially in places outside Java, so this type of farming will also take the role of increasing the farmer's income.

Various diseases, being directly as an important constraint to the health of the duck itself and also may affect public health, are being continuously investigated by RIAD. Duck diseases, such as salmonellosis (Kraneveld *et al.*, 1947, Sri Poernomo, unpublished data) and influenza A virus infection (Ronohardjo, 1982; Ronohardjo, 1983, Ronohardjo *et al.*, 1985) represent important examples to human health. Where as pasteurellosis (Prodjohardjono, 1977; Sudana, 1981; Partadiredja *et al.*, 1979; Sri Poernomo, 1980) that may cause a great death toll, especially in semiintensive farms, needs to be given serious attention by itself towards its control. The use of alum precipitated or oil adjuvanted pasteurella vaccine has shown promising results (Witono *et al.*, 1981; Sjamsudin, 1980).

The traditional system of farming where the ducks are herded in post-harvested paddy fields to consuming naturally the carbohydrate and animal protein supplies, is becoming to produce a special problem. The application of pesticides under improper manner may cause environmental contamination and the death of creatures living in the fields, and this will eventually pose bad consequences to the village farmers. The dead creatures in the rice field will alternately be consumed by the duck so that the duck itself may later die of pesticide poisoning (Tarmudji and Yuningsih, 1985).

Table 1. Pasteurellosis outbreak in an intensive duck's farm in Southern area of Jakarta *

Age (weeks)	mortality **	
4	500/500	(100)
20	354/500	(70,8)
layer	21/400	(5,3)
Total	875/1400	(62.5)

* : Sri Poernomo. Bull. LPPH. 19 (1980)
** : number of ducks died/number of ducks in the flock.
( ) : percentage.

The role of ducks herded traditionally in open fields is important for the natural spreading of influenza A virus. At day-time the ducks are herded in the rice fields and often they come into contact with wild waterbirds, and during the night when they are penned together then they may come into contact among themselves and their herdsman. It is not be as surprise, therefore, that from the local Indonesian ducks

can be isolated both the influenza A virus strain avian (H_4N_6) and the human avian hybrid (H_4N_2) (Ronohardjo *et al.*, 1985).

This traditional system of duck farming will gradually develop into semi-intensive and eventually intensive farms. However, by this

Table 2. List of Duck Parasites

	Parasite	Reference
A.	**Trematoda**	
	Amphimerus anatis	Muchlis (1960, 1971)
	Amphimerus bogoriensis	Muchlis (1971)
	Amphimerus gracilis	Muchlis (1971)
	Cotylurus sp	Darjono (1985)
	Dendrobilharzia anatinarum	Muchlis (1971)
	Echinostoma paraulum	Stevenson (1984)
	Echinostoma reyulatum	Adiwinata (1955), Muchlis (1971), RIAD (1953), Ronohardjo *et al* (1978)
	Echnoparyphium paraulum	Darjono (1985)
	Hypoderacum conoideum	Muchlis (1971)
	Notocotylus sp	Darjono (1985)
	Notocotylus imbricatus	Stevenson (1984)
	Opistorchis sp	Muchlis (1971)
	Opistorchis obsequens	Stevenson (1984)
	Philophthalmus sp	Muchlis (1971)
	Prosthogonimus sp	Muchlis (1971)
	Psilochasmus sp	Darjono (1985)
	Psilochasmus sphincteropharynx	Stevenson (1984)
	Psilorchis sp	Stevenson (1984)
	Tracheophilus sisowi	Muchlis (1971)
	Trichobilharzia brevis	Muchlis (1971)
B.	**Cestoda**	
	Diorchis sp	Stevenson (1984)
	Fibriaria sp	Stevenson (1984), Darjono (1985)
	Hymenolepis sp	Stevenson (1984)
	Hymenolepis anatina	RIAD (1954), Adiwinata (1955), Muchlis (1971), Ronohardjo *et al* (1978)
	Hymenolepis collaris	Kraneveld & Dowes (1940), Adiwinata (1955), Muchlis (1971)
	Hymenolepis coronula	Darjono (1985)
	Hymenolepis compressa	Darjono (1985)
	Hymenolepis megalops	Muchlis (1971)
	Microsomacanthus sp	Stevenson (1984)
C.	**Nematoda**	
	Ascaridia perspicillum	Adiwinata (1955), Muchlis (1971)
	Amidiostomum sp	Darjono (1985)
	Capilaria contorta	Darjono (1985)
	Capilaria anatis	Darjono (1985)
	Epimidiostomum sp	Darjono (1985)
	Gongilonema sp	Darjono (1985)
	Hystrichis sp	Darjono (1985)
	Oxyspirura sp (lava)	Darjono (1985)
D.	**Blood Parasite**	
	Leucocytozoon	Ronohardjo *et al* (1978)
E.	**Ectoparasite**	
	Esthiopterum crassicorne	Ronohardjo *et al* (1978)
	Menopon gallinae	Ronohardjo *et al* (1978)

modification the disease problem will also increase and becoming more complex, the same as happening with diseases of chicken in Indonesia (Ronohardjo, 1984). Cases of aflatoxicosis, for example, may be found increasing (Soeripto *et al.*, 1980; Ginting, 1983), because there is a tendency of giving rations rich in carbohydrates to increase (Nagler, 1981; Hetzel *et al.*, 1981; Hastiono, 1985). Besides, other infectious diseases will also be more frequent and epidemic in such intensive farming of the ducks.

Table 3. Mycotic cases in duck during ten year period

Mycotic	Case *	
Aspergillosis	15/61	(24.6)
Candidiasis	3/16	(18.8)
Total	18/77	(23.4)

* : number of diseased ducks/number of suspected ducks.
() : percentage.

Table 4. Morbidity of duck sinositis **

Breed	Case	Clinical symptoms		
		Sick	healthy	morbidity (%)
Tegal	1	15	—	100,00 *)
	2	5	12	29,41
	3	1	3	25,00
	4	1	4	20,00
	5	1	14	6,76
Bali	1	14	1	93,33
	2	5	10	33,33
	3	7	18	28,00
	4	5	17	22,73
	5	5	25	16,67
	6	1	5	16,67
	7	60	390	13,33
	8	3	22	12,00
	9	2	48	4,00
	10	2	53	3,64
Alabio	1	6	—	100,00
	2	7	—	100,00
	3	10	3	76,92
	4	18	12	60,00
	5	5	8	38,46
	6	15	55	21,44
	7	11	49	18,33
	8	10	110	9,00

*) All affected ducklings died.
** Ronohardjo, P. Penyakit Hewan 15 (25) 1983.

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