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Ethnoveterinary medicine and health management of Pelung Chicken in West Java, Indonesia

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Abstract. *Asmara IY, Garnida D, Sulisytati M, Tejaningsih S, Partasasmita R. 2018. Ethnoveterinary medicine and health management of Pelung Chicken in West Java, Indonesia. Biodiversitas 19: 1502-1508.* Pelung chicken is a race group of chickens. The spread of Pelung chicken is in the district of Cianjur, and now become widespread to several districts in West Java. The spread of Pelung chicken does occur because as a poultry, it is attractive to people who like to keep the chicken. The chickens are mainly raised as singing chickens. Some studies showed that health-management practices and disease control measures present challenges in maintaining the existence of the chickens. A survey was carried out to determine health management and the use of ethnoveterinary in raising Pelung chickens. Structured questionnaires were used to collect data involving 131 Pelung keepers in four districts in West Java Province including Cianjur, Sukabumi, Bandung and Garut Districts. The data was analyzed using descriptive analysis. The result showed that respiratory diseases such as *Snot* (Infectious Coryza) and *Tetelo* (Newcastle Disease) were main diseases for Pelung chickens. Vaccination combined with ethnoveterinary medicines was a common practice for Pelung keepers to prevent and cure chicken diseases. More than five major medicinal plants were found to be used to cure various chicken diseases in which leaves of papaya and turmeric were the most mentioned by respondents. Documentation and investigations regarding plant properties and their applications for Pelung chickens disease cure should be carried in the future. A combination of vaccination, ethnoveterinary medicine and good hygiene are required to control deadly diseases such as Newcastle Disease. Government intervention would be required to improve keepers' skills and awareness in chicken health management.

Keywords: Pelung, health, ethnoveterinary

INTRODUCTION

Indonesia is considered as one of the major chicken domestication centers in the world due to distinctive characteristics of chickens in this country compared to those in Asia and other countries in the world (Partasasmita et al. 2016, 2017; Sulandari et al. 2007a, 2008). It is reported that Indonesia has at least 31 distinct groups of chickens (Nataamijaya 2000). In general, the chicken groups are classified into descript and non-descript chickens (Directorate General of Livestock Services 2003). Descript chickens are chickens which usually have specific characteristics (primarily specific plumage color), while non-descript chickens are chickens with no specific phenotypical characteristics (Partasasmita et al. 2017; Diwyanto and Iskandar 1999). Non-descript chicken such as Kampung chicken is believed to be the most common and represent the highest population among local chickens (Diwyanto and Iskandar 1999; Muladno 2008). In contrary, descript chicken such as Pelung chicken is considered local to certain area and their population is low (Muladno 2008).

Pelung chicken is a variation of typical chicken of Warung Kondang Sub-district, Cianjur District, West Java (Partasasmita et al. 2016). This type of chicken began to be nurtured and developed in 1850 by nobles and clerics. Based on scientific search, Pelung chicken allegedly is a derivative of red forest chicken found in Java (Jatmiko 2001). Pelung chickens are firstly developed by people in Cianjur, West Java Province as a singing rooster in 1850 (Hippapi Kabupaten Cianjur 2005; Sulandari et al. 2007b). Currently, the distribution of Pelung chicken spreads across West Java and other provinces in Indonesia. Crowing duration of Pelung chickens can reach 15 seconds, whereas other local chickens only 2-3 seconds (Hippapi Kabupaten Cianjur 2005). Pelung chickens are bigger and growing faster than other local chickens. The body weight of male adult chickens can reach 5.400 g, while female adults 4.500 g and the hens produce 39-68 eggs per year (Sulandari et al. 2007b). The plumage color of Pelung chickens is generally dominated by red, black and green for male chickens and black for females (Sulandari et al. 2007b). Figure 1 shows images of Pelung chickens.

Health-management practices and disease control are still challenges in maintaining the existence of Pelung chickens. In Cianjur, respiratory diseases still occurred for the chickens and vaccination was not a common practice in health management of Pelung chickens (Asmara 2014). However, the use of traditional medicines such as papaya leaves (*Carica papaya* Linn) was a common practice in health management for Pelung chickens in Cianjur area. Unlike the modern chicken farming, the village chicken of Naga, Tasikmalaya that has been affected by the Newcastle

Disease has been traditionally treated by the medicinal plants, such as onion, garlic, and papaya instead of applying modern medicines (Partasasmita et al. 2017). The application of traditional medicine was also a common practice for other local chickens in Indonesia and the medicines were forms of preventive care for chicken diseases (Muladno 2008). Natural products, particularly which are derived from plant origin and are generally used as means of curative and/or, in some cases, preventive measures of disease, are classified into ethnoveterinary medicines (Guèye 1999). Documentation of ethnoveterinary medicine is important since properties, complexity, and intensity of the ethnoveterinary medicine among individuals, societies, and regions are varied (Selvaraju et al. 2011). The present study was conducted to determine health management and the use of ethnoveterinary medicines in Cianjur and other areas outside Cianjur. The findings would be significant as inputs for maintaining the existence of Pelung chickens.

MATERIALS AND METHODS

Description of research area

The research was carried out in areas where Pelung chickens were majority kept. The areas were Garut, Bandung, Cianjur and Sukabumi Districts, West Java Province (Figure 2). Garut District is situated 64.2 km from Bandung City, the capital of West Java Province. The district is adjacent with Bandung District, and it is located at an altitude of 100-1500 m asl with mean annual rainfall of 2,589 mm and annual temperature 24-27ºC (Dinas Komunikasi dan Informatika Kabupaten Garut 2017). Bandung District is a highland area with annual rainfall of 1,500-4,000 mm and annual temperature between 12-24ºC. The district is adjacent with the capital of West Java Province (Pemerintah Kabupaten Bandung 2017). Two other areas, Cianjur and Sukabumi Districts, are located in southwestern of Java Island. Both districts are adjacent. Cianjur District is situated at an altitude of 7-2,962 m asl with mean annual rainfall of 2,610 mm and mean annual temperature 24.4°C (Dinas Komunikasi Informatika Persandian Dan Statistik Kabupaten Cianjur 2017), while Sukabumi District is situated at an altitude of 0-2.960 m asl with annual rainfall of 2,000-4,000 mm and annual temperature 18-30°C (BPS Kabupaten Sukabumi 2016). Figure 2 depicts the research area.

Figure 1. Pelung chickens

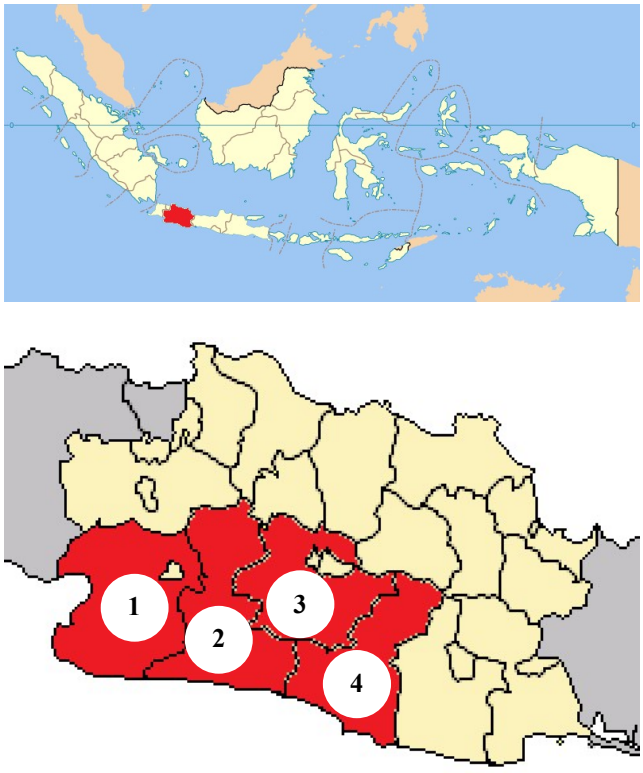

Figure 2. Research areas in four district of West Java, Indonesia. 1. Sukabumi, 2. Cianjur, 3. Bandung, 4. Garut.

Research methodology

A purposive sampling technique was applied in the survey due to no precise information about the number of Pelung keepers. A total of 131 Pelung keepers participated in the study. Respondents consisted of 29, 20, 47, and 35 keepers from Garut, Bandung, Cianjur, and Sukabumi, respectively. The respondents were the person who owned Pelung chickens. Face-to-face interviews with structured questionnaires were used to gather data about health management practices and ethnoveterinary medicines in preventing and curing chicken diseases. Data collected from the questionnaire was coded and analyzed using descriptive analysis. The Statistical Package for the Social Sciences (SPSS) IBM SPSS statistics 19 was used to perform the analysis.

RESULTS AND DISCUSSION

Results

Table 1 shows prevalent diseases of Pelung chickens in four research areas. More than 60% of respondents stated that *Snot* (Infectious Coryza) was the most frequent disease, while 44% of respondents named *Tetelo* (Newcastle Disease). *Ngorok* (Chronic Respiratory Disease) and *Flu Burung* (Avian Influenza) were mentioned by 13% of respondents, respectively. A same number of respondents (5%) reported intestinal diseases such as *Berak Hijau* (Fowl Cholera) and *Berak Kapur*

(Pullorum) were the most common disease suffered by their chickens. *Lumpuh* (Marek's Disease) and *Gumboro* (Infectious Bursal Disease) were confirmed by 6% and 3% of respondent, respectively. A small number of respondents (2%) identified *Cacingan* (Parasitic Worms) as the most common disease of Pelung chickens.

In all areas, vaccination was not a common practice for Pelung keepers to prevent diseases (Table 2). More than 40% of respondents in all areas, prevented and treated their sick chickens with ethnoveterinary medicine while 47% of respondents applied both vaccination and ethnoveterinary medicine.

Table 3 displays the vaccine which was most applied by respondents to protect diseases. Among respondents who practiced vaccination, Newcastle Disease Vaccine was the most frequent vaccine to prevent disease (86%) followed by Infectious Choriza (19%). A small number of respondents applied Chronic Respiratory Disease Vaccine (4%), Avian Influenza Vaccine (4%) and Infectious Bursal Disease Vaccine (3%).

Table 4 shows traditional medicines most commonly used by respondents. More than 40% of respondents used Papaya (*Carica papaya* Linn) and Turmeric (*Curcuma sp*) to prevent and cure diseases while 33% and 30% respondent used Onion (*Allium cepa*) and garlic (*Allium sativum*), respectively. More than 10% of respondents used Ginger (*Zingiber officinale*) and Aromatic Ginger (*Kaempferia galanga* L.) correspondently, whereas 8% of respondents used Areca Nut (*Areca catechu* L.) to avoid and treat the diseases.

Respondents stated that traditional medicines play an important role in increasing palatability and immunity of chickens (Table 5). They also mentioned that traditional plants are essential in preventing and curing parasitic worms and respiratory diseases such as *Snot* and *Ngorok*. Some traditional plants acted as antibiotic, anti-inflammatory and antipyretic. In general, traditional medicines were administered to chickens through feed or drink or, in some instances, orally. For example, mashed garlic was given orally to improve the immunity of Pelung chickens suffered from respiratory diseases.

Table 1. The most frequent disease of pelung chickens

Traditional/Local name	Common name	District				All districts
		Garut	Bandung	Cianjur	Sukabumi	
		(%)				
Snot	Infectious coryza	59	70	64	66	64
Tetelo	Newcastle disease	52	20	49	40	44
Ngorok	Chronic respiratory disease	31	15	0	14	13
Flu Burung	Avian influenza	0	20	21	9	13
Lumpuh	Marek's disease	10	10	2	6	6
Berak Hijau	Fowl cholera	7	10	2	3	5
Berak Kapur	Pullorum	10	0	2	6	5
Gumboro	Infectious bursal disease	0	5	4	3	3
Cacingan	Parasitic worms	3	0	0	6	2

Table 2. Prevention and Medication of Pelung Chicken Diseases

Prevention and medication	District				All districts
	Garut	Bandung	Cianjur	Sukabumi	
	(%)				
Vaccination	3	5	13	0	6
Ethno-veterinary	38	55	36	66	47
Vaccination and ethnoveterinary	59	40	51	34	47

Table 3. List of vaccine of pelung chickens

Vaccine	District				All districts
	Garut	Bandung	Cianjur	Sukabumi	
	(%)				
Newcastle disease	89	89	90	67	86
Infectious choriza	28	11	13	25	19
Chronic respiratory disease	6	22	0	0	4
Avian influenza	6	0	7	0	4
Infectious bursal disease	0	11	0	8	3

Table 4. Plant medicines used to treat pelung chickens

Plant	District				All districts
	Garut	Bandung	Cianjur	Sukabumi	
	(%)				
Papaya (*Carica papaya* Linn)	39	32	61	49	48
Turmeric (*Curcuma sp*)	54	84	27	29	42
Onion (*Allium cepa*)	54	58	10	29	33
Garlic (*Allium sativum*)	50	63	5	26	30
Ginger (*Zingiber officinale*)	14	26	12	14	15
Aromatic Ginger (*Kaempferia galanga* L.)	14	32	2	17	14
Areca Nut (*Areca catechu* L.)	4	5	12	9	8

Table 5. Medicinal plant benefit and general administration

Plant	Part used	Benefit	General administration
Papaya	Leave	Prevention/medication of parasitic worms	Oral
(*Carica papaya* L)		Prevention/medication of respiratory disease	Dissolved in water
		Anti-inflammatory	Mixed with feed
		Increasing palatability	
		Increasing immunity	
Turmeric	Rhizome	Prevention/medication of respiratory disease	Oral
(*Curcuma* sp.)		Prevention/medication of parasitic worms	Dissolved in water
		Medication of wounds	Mixed with feed
		Increasing immunity	
		Increasing palatability	
		Antibiotic	
		Anti-inflammatory	
Onion	Bulb	Prevention/medication of respiratory disease	Oral
(*Allium cepa* L)		Increasing immunity	Mixed with aromatic ginger, garlic and brown sugar
		Antibiotic	Mixed with vegetable oil
		Increasing palatability	Mixed with feed
		Antipyretic	
Garlic	Bulb	Prevention/medication of respiratory disease	Oral
(*Allium sativum* L)		Increasing immunity	Mixed with aromatic ginger, onion and brown sugar
		Antibiotic	Mixed with feed
		Increasing palatability	
Ginger	Rhizome	Prevention/medication of respiratory disease	Oral
(*Zingiber officinale*)		Increasing immunity	Dissolved in water
			Mixed with feed
Aromatic ginger	Rhizome	Prevention/medication of respiratory disease	Oral
(*Kaempferia galanga* L.)		Prevention/medication of parasitic worms	Dissolved in water
		Increasing immunity	Mixed with feed
		Increasing palatability	
		Antibiotic	
Areca nut	Seed	Prevention/medication of parasitic worms	Oral
(*Areca catechu* L.)		Increasing immunity	Mixed with feed
		Increasing palatability	

Discussion

The current study revealed that respiratory diseases are common diseases suffered by Pelung chickens. Similar results for local chickens have been reported by Abdelqader et al. (2007), Henning et al. (2007), Das et.al (2008) and Kumaresan et al. (2008) in Asian Countries, as well as Mtileni et al. (2009) and Okeno et al. (2011) in African countries. These studies stated that Newcastle Disease (ND) is the major disease causing of chicken deaths. Therefore, it is required to design management intervention strategies to reduce losses associated with the disease.

In all areas of current study, *Snot* (Infectious Coryza) and *Tetelo* (Newcastle Disease) are the main disease infects the chickens. Outbreaks of Infectious coryza may have an economic effect through increasing culling rate and reduction of egg production in commercial poultry (Blackall 1999). This disease infects upper respiratory tract of chickens caused by the bacterium *Haemophilus paragallinarum* (Blackall 1995). Infected birds show some clinical signs including nasal discharge and facial swelling (Blackal 1999; Glisson 1998). The disease may affect birds of all age groups; however, older birds may be more suffered (Glisson 1998). Even though the diseases do not

necessarily kill infected birds, it has the capability of reducing feed and water intake and losing the weight of birds (Ahlers et al. 2009). Antibiotics are commonly used to cure infectious coryza (Ahlers et al. 2009), and vaccinations are practiced as preventive actions (Ahlers et al. 2009; Blackall 1999; Glisson 1998; Blackall 1995).

Tetelo (Newcastle Disease) is the second most frequent disease for Pelung chickens in all study areas. This disease is also suffered by other local chickens in Indonesia (Muladno 2008) and other developing countries (Alexander 2000; Cumming 1992). Newcastle Disease has an economic effect due to its contagious viruses that lead to high mortality of chickens in South-east Asia (Aini 1990). Like infectious coryza, Newcastle Disease infects respiratory tract of chickens caused by paramyxovirus infection (Alexander 2000). The disease is contagious which lead to the death of 50-100% of infected chickens (Ahlers et al. 2009). Birds infected by Newcastle Disease displays various clinical signs depended on factors such as the virus, host species, age and immune status of the host as well as environmental conditions (Ahlers et al. 2009; Alexander 2000). The infection of a virulent virus may lead to the death of chickens without any signs of illness (Ahlers et al. 2009). However, symptoms of illness may include diarrhea, edema of the head and wattles, respiratory distress and gasping and in an advanced stage, may shows nervous signs, such as paralysis and torticollis (Ahlers et al. 2009; Alexander 2000). Vaccination should be carried out to control Newcastle Disease, and there is no known medication to cure the infection (Ahlers et al. 2009).

The current study revealed that most of Pelung keepers relied on ethnoveterinary medicine to control diseases. Vaccination is not generally practiced by Pelung keepers in study areas. Asmara (2014) reported that vaccination is carried out by keepers with a high chicken population (more than 10 Pelung chickens). Keepers of other indigenous chickens, such as Sentul and Kedu chickens, who are members of breeder organizations vaccinated their chickens regularly. Muladno (2008) stated that in Indonesia, vaccinations are frequently undertaken only if the local government conducts a mass vaccination program and low awareness of vaccination are remained issue. Newcastle disease vaccine is the most common vaccines injected into Pelung chickens. This finding indicated that even though infectious coryza is stated as the primary disease, Newcastle disease is the major constraint to the production of Pelung chickens. Newcastle disease is a lethal disease with unpredictable outbreaks (Alders et al. 2012). Outbreaks are frequently related to change of seasons (Awan et al. 1994); hence, knowledge of seasonal disease outbreaks is essential to support vaccination schedule (Okeno et al. 2012). Asmara (2014) suggested that vaccination should be carried out during the dry seasons to develop chicken immunity during the transition seasons. Alders et al. (2002) argued that establish vaccination calendars, for example, the vaccination every four months, is recommended to protect the flocks throughout the year. The use of ethnoveterinary to support vaccination program is also suggested (Okeno et al. 2012).

The utilization of ethnoveterinary medicine is reported in some studies of chickens in developing countries such as Abdelqader et al. (2007), Mtileni et al. (2009) and Okeno et al. (2011). Globally, livestock keepers with limited access to modern medicines, mainly in the areas with insufficient health coverage services, depend on traditional knowledge for the management of animal health and to improve animal productivity (Selvaraju et al. 2011). The use of ethnoveterinary medicine was reported to be effective (Zainuddin 2006; Guèye 1999) with low cost and almost no side effects (Selvaraju et al. 2011). Furthermore, the use of ethnoveterinary medicine is sustainable and ecologically sound since it is locally available, accessible and suitable for use on poor and or traditional farms (Guèye 1999). However, Moreki (2012) argued that ethnoveterinary medicines have drawbacks including unidentified dosages in the use of such medicines. Ethno-veterinary knowledge has been passed verbally from older people to the younger generations (Moreki 2012; Selvaraju et al. 2011; Guèye 1999); hence, it would be gradually lost due to rapid socioeconomic and cultural changes (Selvaraju et al. 2011; Guèye 1999). Ethno-veterinary documentation is an urgent need for future generations and further research (Selvaraju et al. 2011; Guèye 1999).

Leaves of papaya (*Carica papaya L*) and turmeric (*Curcuma* sp.) are the most mentioned ethnoveterinary medicine used in controlling diseases. Papaya leaves were used as ethnoveterinary plants for backyard pigs and chickens in Trinidad and Tobago (Lans et al. 2007) and used for controlling coccidiosis of chickens in Cameroon (Nghonjuyi et al. 2015). In the current study, Pelung keepers claimed that Papaya leaves are beneficial for some disease treatments mostly for controlling parasitic worms. Papaya leaves contain papain, a proteolytic enzyme, which is capable of digesting worms or other parasitic cells (Nghonjuyi et al. 2015; Al-Fifi 2007). The anti-inflammatory property of papaya leaves with high concentrations of vitamin A may protect caeca epithelium cell of chickens and build body resistance to coccidian (Al-Fifi 2007; Nghonjuyi et al. 2015).

Turmeric (*Curcuma sp*) is abundant in tropical and sub-tropical regions (Teow et al. 2016). Pelung keepers believed that this herb is effective both as curative and preventive means of controlling respiratory diseases such as *Snot*. Turmeric performed as an antibacterial effect in chickens (Samarasinghe et al. 2003; Lawhavinit et al. 2010; Akbarian et al. 2011; Ürüşan and Bölükbaş 2017). Curcumin is the main bioactive in turmeric (Teow et al. 2016), and it is capable of damaging the bacterial membrane integrity (Tyagi et al. 2015).

Although Pelung keepers have knowledge about the diseases and the treatment methods to control it, the occurrence of respiratory diseases may indicate low implementation of biosecurity. Ngaya (2007) defines biosecurity as the application of procedures and practices to avoid introduction and spread of disease. The main principles of biosecurity are poultry isolation, traffic controlling, and sanitation. A combination of vaccination and good hygiene through following sanitary rules are required to control deadly diseases such as Newcastle

Disease (Ahlers et al. 2009). Sanitary measures at traditional farms may include cleaning the chicken house and its equipment as well as regularly cleaning out and dispose of manure. This is because transmission of Newcastle Diseases may occur through the inhalation of respiratory droplets or excretions, contaminated house, and its equipment, or direct contact between infected birds (Ahlers et al. 2009).

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