

Population analysis of the javan green peafowl (*Pavo muticus muticus* Linnaeus 1758) in Baluran and Alas Purwo National Parks, East Java

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ABSTRACT

Hernowo JB, Alikodra HS, Mardiasuti A, Kusmana C (2011) Population analysis of the javan green peafowl (*Pavo muticus muticus* Linnaeus 1758) in Baluran and Alas Purwo National Parks, East Java. *Biodiversitas* 12: 99-106. The javan green peafowl (*Pavo muticus muticus*) have high pressure to the population and the habitat. The distribution of the bird at Java Island is clumped randomly at several types in condition of fragmented and isolated habitat and it has small individual number every unit population. Baluran and Alas Purwo National Parks are one of distribution javan green peafowl; it was chosen for study on the population analysis. The research was aimed to gain data and information on demographic population of javan green peafowl. The individual number of the bird was counted by call count transect method and concentration count. The population demographic parameter (individual number, age structure and sex ratio) of javan green peafowl was analyzed. The result shown that individual number of the javan green peafowl at Baluran National Park (BNP) was 69.1 birds (in 2006) and 70.5 birds (in 2007) not much differ, but it compared with the observation in 1995 approximately was 117.7 birds had significant different. The green peafowl population at BNP declined around 47.50% during 12 years. Meanwhile the population at Alas Purwo National Park (APNP) was 80.7 birds (in 2006) and 73.5 birds (in 2007), if compared to observation in 1998 only 43 birds and in 2006 was 80.0 birds, the population grow up 86.05% during 8 years. The age structure of population indicated that both population (BNP and APNP) tend to unbalance pyramidal, where adult birds more abundance than sub adult or juvenile. The birds sex ratio at both (APNP and BNP) indicated that the peafowl life in polygyny system 1 male: 4 female > 1 male: 2.5 female.

Key words: population, javan green peafowl, Baluran, Alas Purwo.

INTRODUCTION

The population of javan green peafowl (*Pavo muticus muticus*) have small size (around 30-50 individuals) on every site of their local distribution. The distributions of the birds are clumped and the habitat condition was fragmented (patchly). Van Balen et al. (1995) reported that distribution of javan green peafowl randomly fragmented and isolated at several types of habitat. The population is small and fragmented also isolated; it is called metapopulation (Gilpin and Hanski 1991).

Baluran National Park (BNP) and Alas Purwo National Park (APNP) are as one of distribution site of javan green peafowl at tip of the eastern of Java Island. BNP have typically savanna and monsoon forest habitat, but APNP have habitat type more diverse like; low land tropical rain forest, grazing area, and teak plantation with intercropping. Hernowo (1997) mentioned that the javan green peafowl population abundancies at BNP has related with habitat types. The javan green peafowl population was more abundance at savanna habitat.

The problems in relation to the peafowl population are poaching (eggs, chicks, peacock, peahen and their feathers), disturbed habitat, and habitat conversion. Impact

from poaching activities influenced directly on decreased and local extinct of the population. Meanwhile knowledge in relation to the green peafowl population is limited, because most studies did not themed population dynamics. Still few studies on javan peafowl demographic population, because sufficient data. In many cases population data of green peafowl were not available. Population data is main parameter for conservation effort of this bird as basic information like population demographic data.

The paper was aimed to analyzed demographic population of javan green peafowl such as: individual number, sex ratio and age structure. Beside that aspect, the bird abundances and the population growth in relation to the habitat types are important to know population health and strategy for conserving the birds.

MATERIALS AND METHODS

Study sites

Baluran National Park (BNP)

Baluran National Park (BNP) is located at tip of northeastern of Java Island (7°29'10"-7°55'55" S and 114°29'10"-114°39'10" E), cover an area of about 25,000

ha. The national park is bordered by Madura Strait to the north and by the Bali Strait to east. At southern west of park was bordered with Bajulmati and Klokoran Rivers (BNP 2007).

The geological situation of BNP is described as part of small volcano with Plio-Pleistocene deposits. Baluran Mountain is 1247 m high, and near the centre of the national park. Most of area in the national park is flat (0-10 m), except near Gunung Baluran, Gunung Priok, Gunung Montor and Gunung Glengseran are wavy and hilly. The two major soil types in BNP are of volcanic and marine origin. Most important are volcanic soils, rich in minerals but poor in organic materials. They have a high chemical but a low physical fertility because of them are very porous and do not keep water well. Black soil covers about half of the lowland including most of the monsoon forest and savanna grassland (BNP 2007).

Baluran has a typical monsoon climate with a long dry season. This climate is heavily influenced by the southeast wind during the period of April to October, with less precipitation. The average dry period covers about 7-8 month of the year. The annual precipitation ranges from 900 to 1600 mm per year. Due to the dry period being quite longer, water is most limiting factor in BNP. The local distribution of wild animal is influenced by availability of water. During the dry season, animals can easily be

observed near the water hole, but in rainy season they spread everywhere (Hernowo 1995).

The vegetation types have developed in BNP, like savanna grassland, beach forest, mangrove, deciduous forest or monsoon forest, evergreen forest, swampy area and sub mountain forest. Mangroves occur at Bilik, Lempuyangan, Mesigit, Tanjung Sedano and Kelor. Typical vegetation at mangrove is *Avicennia alba*, *Sonneratia caseolaris*, *Ceriops tagal*, *Rhizophora apiculata*, *Bruguiera gymnorizha*, and *Lumnitzera racemosa*. Beach forest present between Pandean and Tanjung Candibang and some places such as Labuan Merak, also east of Gatal. These types of forest are dominated by *Barringtonia racemosa*, *Terminalia cattapa*, *Pandanus tectorius* and *Hibiscus tilliaceous*. The savanna grassland with fire-climax is strongly influenced by man. Tree species dominant in that area are *Acacia nilotica* (an introduced African exotic species) a few *Acacia leucophloea*, *Schleichera oleosa*, *Zizyphus rotundifolia* and *Corypha utan*. Dominant grass species are *Dichantium coricosum*, *Brachiaria mutica* and *Sorgum nitidus*. Monsoon forest is characterized by dominant tree species of *Tamarindus indica*, *Schoutenia ovata*, *Grewia eriocarpa*, *Flacortia indica*, *Cordia abligua* *Azadirachta indica* and *Sterculia foetida*. Mountain forest and evergreen forest are signed leave do not fall in the dry season. Typically trees growth in that forest is *Mallotus*

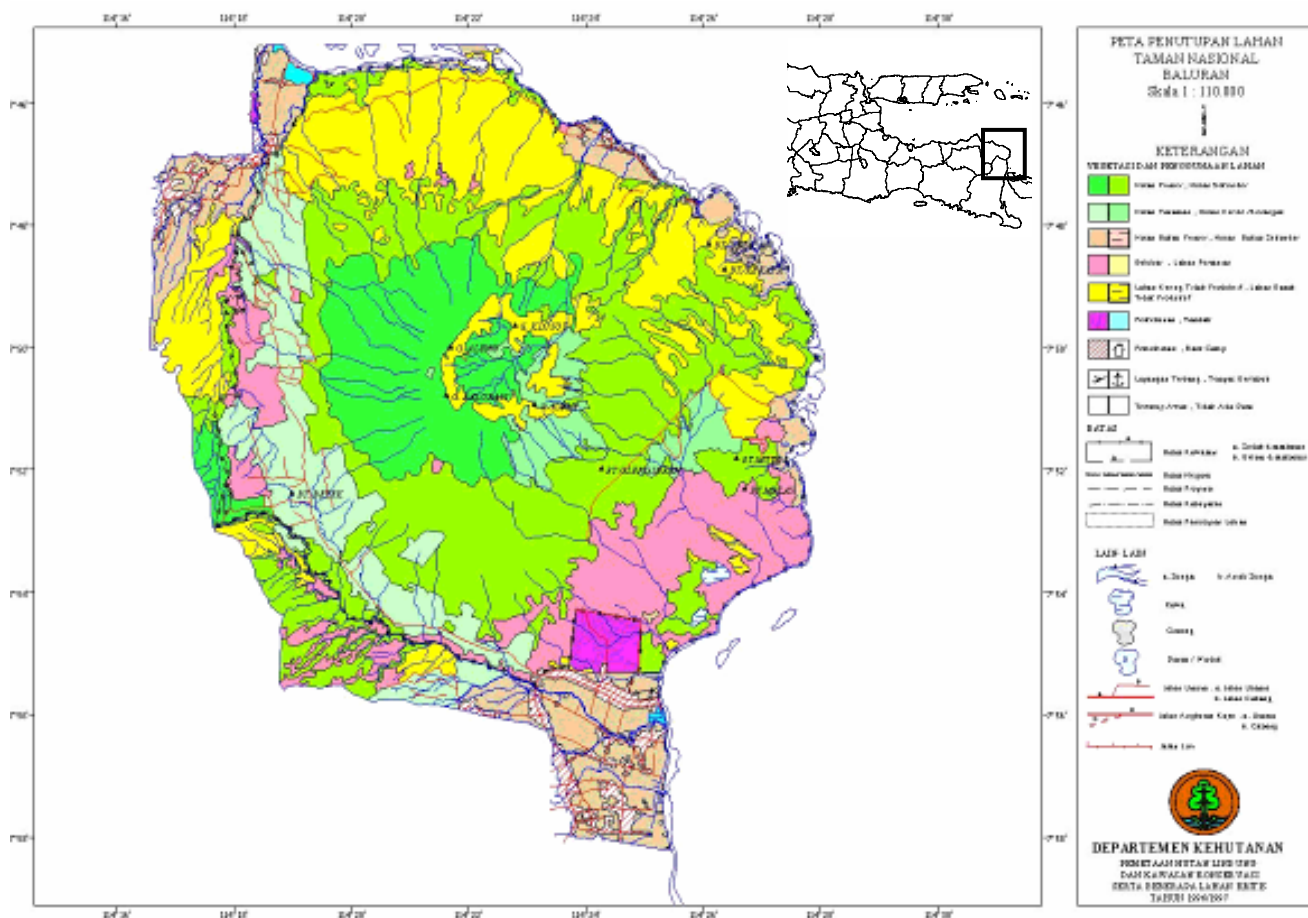


Figure 1. Map of Baluran National Park, East Java

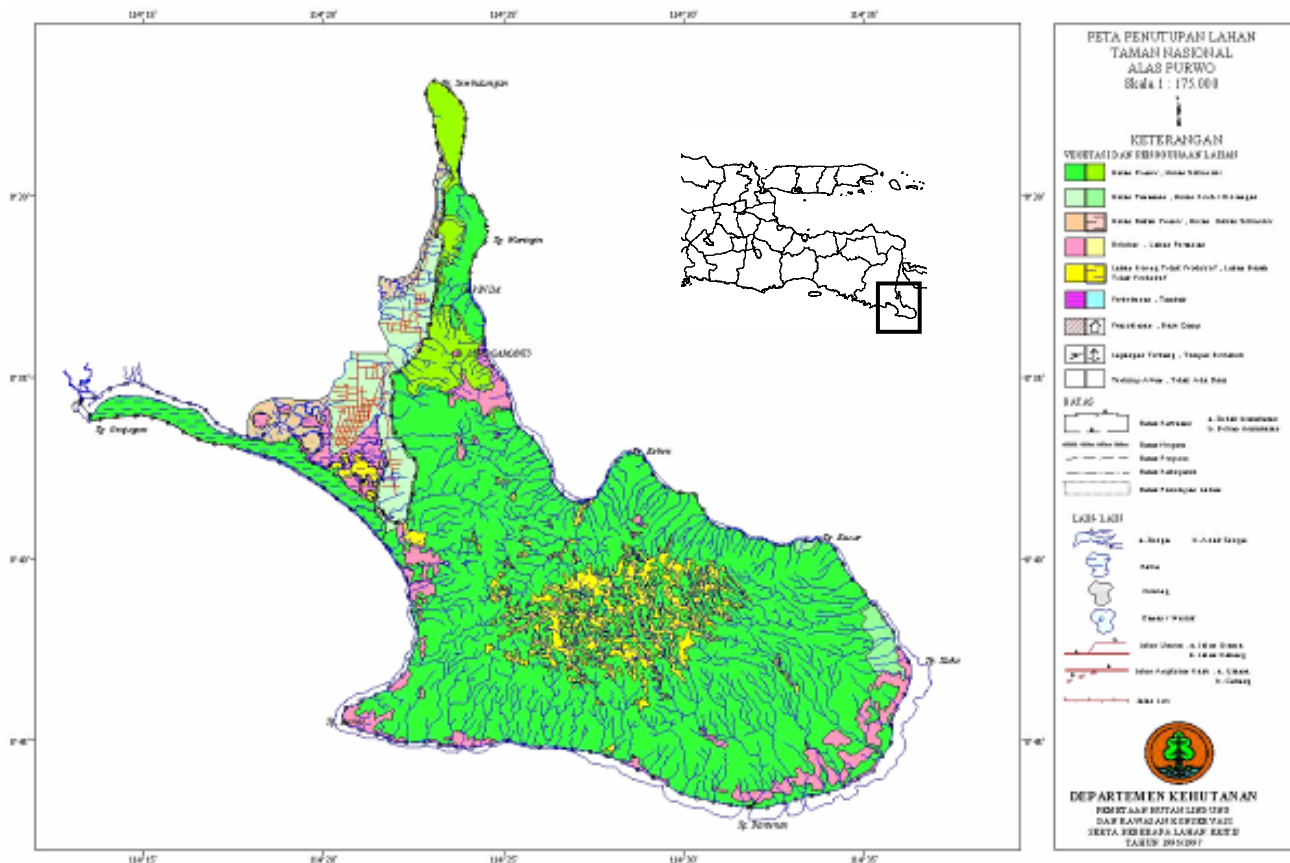


Figure 2. Map of Alas Purwo National Park, East Java

philippensis, *Homalium foetidum*, *Emblica officinale* and *Aleurites moluccana* (Partomihardja 1989).

Wild animal which present at BNP have relation with green peafowl such as leopard (*Panthera pardus*), civet (*Viverra malacensis*, *Paradoxurus hermaphroditus*), mongoose (*Herpestes javanica*), red dog (*Cuon alpinus*), piton (*Phyton reticulatus*), monitor (*Varanus salvator*) and crested serpent eagle (*Spilornis cheela*) (Hernowo 1995).

Alas Purwo National Park (APNP)

Alas Purwo National Park (APNP) is cover an area of about 43,420 ha. The national park is located at tip of southeastern of Java Island (8°26'45"-8°47'00" S and 114°20'16"-114°36'00" E). At eastern of the national park was bordered with Bali Strait and in the south also west direction were boundaries by India Ocean. Intensive study was focused at Sadengan grazing area, low land tropical forest and teak forest plantation Rowobendo. Topography at the national park is consist of flat area with slope (0-8%) of about 10,554 ha, undulating area at the slope (8-15%) of about 19,474 ha, meanwhile rolling part (15-25% slope) at around 11,901 ha and small portion with hilly area about 2 301 ha. Four type soil groups at study area e.g mediterranean red litosol complex about 2,106 ha, grey regosol 6,238 ha, grey grumusol 379 ha and alluvial hydromorf at around 34,697 ha. Numerous small streams flow at APNP, with radial pattern. All of the rivers flow to Indian Ocean.

Several underground rivers occur at karsts complex such as Pancur River (APNP 2007). According to Smith and Ferguson the rainfall type at the study area has classified as B, with annual precipitation ranges from 1079-1554 mm per year with 79-112 rainfall days. The annual average temperature is around 27.1°C and relatively humidity is about 85%.

Five type vegetation have developed in APNP, e.g. beach forest, mangrove, low land tropical forest, bamboo forest and teak plantation. Besides those vegetation types, man made grazing area occur at Sadengan. Hernowo (1999), mentioned that abundance of green peafowl was connected to availability of habitat to fulfill feeding sites, roosting site, sheltering site and nesting site.

Beach forest occurs at the southern park from Grajagan to Plengkung about 30 km and Plengkung to Tanjung Slakah around 50 km. It is present about 40 km at northern park. The dominant species at the beach forest were ketapang (*Terminalia catapa*), waru (*Hibiscus tiliaceus*), keben (*Barringtonia asiatica*) and nyamplung (*Calophyllum inophyllum*). Mangrove is present at Grajagan with species vegetation such as bakau (*Rhizophora* spp.), tanjang (*Bruguiera* spp.), api-api (*Avicenia* sp.), pedada (*Sonneratia caseolaris*) and nyirih (*Xylocarpus granatum*). Tropical low land forest was big portion at the park. The vegetation occur at those forest such as *Ficus* spp., bendo (*Artocarpus elastica*), rao (*Dracontomelon mangiferum*),

pule (*Alstonia* spp.), santen (*Lannea grandis*), gintungan (*Bischofia javanica*), and pohpohan (*Buchanania arborescens*). But at more dry condition at the forest is present kepuh (*Sterculia foetida*), asam (*Tamarindus indica*), and randu alas (*Bombax valetoni*). Besides these forest, bamboo formation also consociation of sawo kecil (*Manilkara kauki*) occurs at the park (APNP 2007).

Several wild animal which occur at APNP might be have relation to green peafowl such as leopard (*Panthera pardus*), wild boar (*Sus scrofa*), palm civet (*Paradoxurus hermaphroditus*), mongoose (*Herpestes javanica*), red dog (*Cuon alpinus*), phyton (*Phyton reticulatus*), monitor (*Varanus salvator*), crested serpent eagle (*Spilornis cheela*) and white bellied sea eagle (*Haliaeetus leucogaster*) (APNP 2007).

The observation

Research was conducted in Baluran and Alas Purwo National Parks, at least ten month from June to October 2006 and August to December 2007. The study was focused at the local distribution of javan green peafowl in BNP at Bekol resort (savanna, beach forest and monsoon forest) and APNP at Rowobendo resort (Sadengan grazing area, low land forest, mixed plantation forest with intercropping area and teak plantation forest with intercropping area and teak plantation forest).

Counting on individual number of javan green peafowl at BNP, was done by transect call count method follow Hernowo (1997). The sample area cover an area around 4 km x 3 km (1200 ha). Four transect was observed at sample area approximately 3 km length of each transect. Census was carried out in ten days every observation time and it was done simultaneously every year (in 2006 and 2007). The census started every morning at 5:00 am and lasted until 8:00 am. Four observers went through the transect route. The walking speed was about one hour per km in each transect. The individual number was counted based on the number of javan green peafowl in fixed area (1200 ha) and direct visual contact with the birds during the census. Each calling of a javan green peafowl was recorded the type and number of call, the time and direction from observers to the bird. After the census, the observers came together to make correction to avoid double counting. Besides that census, additional observation was done at water holes, roosting site and feeding site to know age structure, and sex ratio of javan green peafowl.

In APNP, census for javan green peafowl was done by concentration count method follow Yuniar (2007). The sample area for concentration of the birds was focused at five places such as Sadengan grazing area, Rowobendo intercropping area, Guntungan intercropping area, Sumber Gedang teak plantation forest, and Ngagelan teak plantation forest. Five observers recorded on number of green peafowl at concentration area in each observation time. Census was carried out in ten days every observation time and it was done simultaneously every year (in 2006 and 2007). The census started every morning at 5:00 am and lasted until 8.00 am.

Data analysis was done for counting the green peafowl population with statistical average and their confident limit

in each habitat types in both transect and concentration methods. Demographic population was analyzed on parameter of individual number, sex ratio age structure and health of the population during year 2006 and 2007. Proportional approach on sex ratio parameter was used with percentage. Age structure was analyzed by pyramidal structure approach. Population health analysis used abundances, sex ratio, age structure parameter.

Compared population study was done at the same area with other researcher in different time observation was aimed to get information of trend of green peafowl population development.

RESULTS AND DISCUSSION

Population abundance at BNP and APNP

The individual number of javan green peafowl was counted at every habitat type in Baluran National Park (BNP) showed that the total average number of individual at sample area in year 2006 and 2007 was 69.8 birds (Table 1). The Chi-square test showed that the peafowl abundances significant differ by habitat type ($\chi^2 = 29.05$, $P < 0.01$). The highest abundance of the birds was found at Bekol savanna which, representative savanna habitat type approximately 61.6-73.5% of javan green peafowl population at sample area.

Table 1. The individual number of javan green peafowl found at habitat types in year 2006 and 2007 in BNP with observation (n = 20)

Habitat type	Cover-age (ha)	Average individual number (bird)			
		2006	SD	2007	SD
Bekol Savanna	323.99	50.8	±8.05	43.4	±1.65
Bama-Manting beach forest	167.46	6.8	±3.58	8.5	±1.08
Bekol monsoon forest	645.41	5.3	±1.42	0.3	±1.16
Bekol evergreen forest	30.00	6.2	±1.93	8.3	±0.95
Total	1166.86	69.1	±22.52	70.5	±17.38
Total average				69.8 ± 19.77	

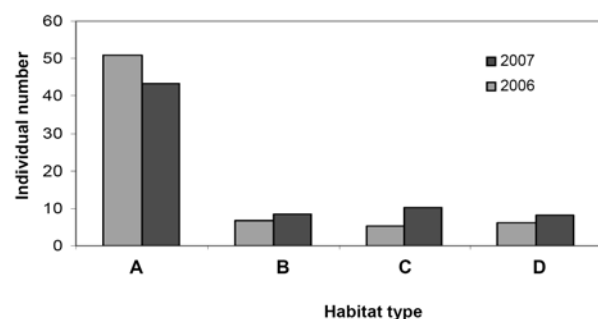


Figure 3. Individual number of javan green peafowl in-relation to habitat type of BNP. A. Savanna Bekol, B. Beach forest Bama-Manting, C. Monsoon forest Bekol, D. Evergreen forest Bekol.

Base on Figure 3, the javan green peafowl has abundance more at savanna habitat, although at other habitat type the

bird were present such as at monsoon forest, beach forest and evergreen forest, but the size is small (5.3-10.3 bird). Savanna habitat type was coverage area approximately 27.80% from total habitat type, but the abundances of the javan green peafowl more than 60%. There is indication that the birds have preference to habitat type at BNP.

Meanwhile in Alas Purwo National Park (APNP) the individual number of javan green peafowl was counted at every habitat type, showed that the total average number of individual at sample area in year 2006 and 2007 was 78.6 birds (Table 2). The Chi-square test showed that the peafowl abundances significant differ by habitat type ($\chi^2 = 38.92$, $P < 0.01$). The highest abundance of the birds was found at Gunting intercropping area of teak plantation habitat type which representative approximately 57.4% the bird population in year 2006, but in year 2007 the bird abundance was shifted to grazing area of Sadengan which representative 39.8% of the population.

Figure 4, showed that the javan green peafowl abundances more concentrated at habitat type of teak plantation with intercropping area and grazing area approximately 78.6-85.7% of javan green peafowl population in APNP. The bird abundances at other habitat type was relatively small (2.4-11.9 bird). The grazing area and teak plantation and intercropping area were coverage representative 30.3% of total habitat tipe the javan green peafowl at sample area of APNP, but representative 78% population. These is fact indicated that the bird prefer on certain habitat type at APNP.

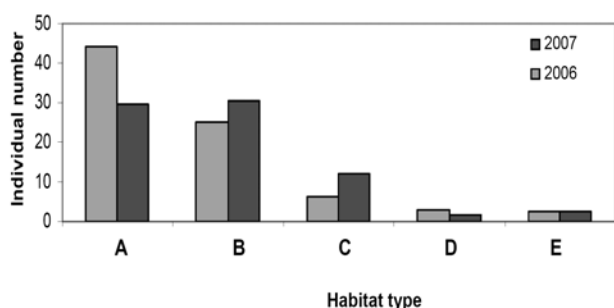


Figure 4. Individual number of javan green peafowl in-relation to habitat type at APNP. A. Teak plantation forest and intercropping area (Gunting), B. Grazing area and lowland forest (Sadengan), C. Mix plantation forest and intercropping area (Rowobendo), D. Beach forest and teak plantation forest (Ngagelan), E. Teak plantation forest-back mangrove (Sumber Gedang).

Age structure and sex ratio

The age structure and sex ratio of javan green peafowl at BNP representative base on observation to the birds visited the water hole. The average individual number of peafowl can be found at water hole was recorded at Table 3. Base on age classification, population structure of the birds showed that population dominated by adult bird. The age structure indicated that unbalance pyramidal population. Sub adult male bird was 59.43% and adult male approximately 40.57%, but sub adult female was 31.12% and adult female 68.88%. The age structure of the javan green peafowl at BNP will influenced to the future population.

Table 3. Average individual number of javan green peafowl visited water hole Bekol resort in BNP

Water hole	Male		Female		Total
	Adult	Sub adult	Adult	Sub adult	
Bekol	3.0±0.64	5.7±0.47	26.6±1.00	12.6±0.81	47.9
Bama	0.7±0.53	0.6±0.50	0.6±0.56	0	1.9
Manting	0.6±0.50	0	0.7±0.65	0	1.3
	4.3	6.3	27.9	12.6	
Total	10.6		40.5		51.1

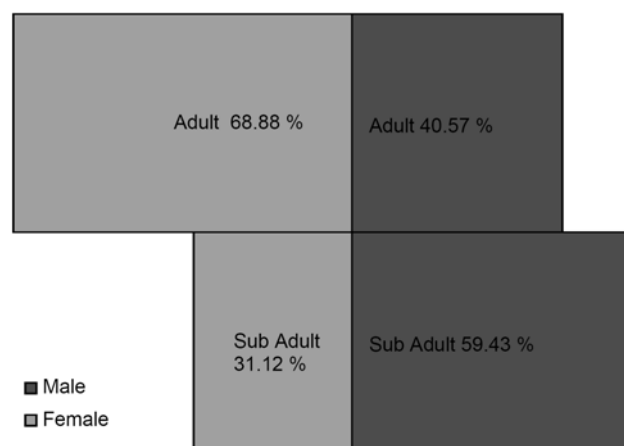


Figure 3. The pyramidal age structure of javan green peafowl in BNP

Table 2. The individual number of javan green peafowl found at habitat types in year 2006 and 2007 in APNP with observation (n = 20)

Consentration area	Habitat type	Coverage area (ha)	Average individual number (bird)			
			2006	SD	2007	SD
Gunting	Teak plantation forest and intercropping area	220.41	44.1	±11.97	29.7	±5.48
Sadengan	Grazing area and lowland forest	147.00	25.1	± 1.66	30.5	±5.58
Rowobendo	Mix plantation forest and intercropping area	252.54	6.2	±3.58	11.9	±3.48
Ngagelan	Beach forest and teak plantation forest	296.94	2.9	±1.10	1.8	±0.79
Sumber Gedang	Teak plantation forest-back mangrove	294.25	2.4	±1.17	2.6	±1.07
	Total	1211.16	80.7	±18.44	76.5	±14.24
	Total average		78.6±15.75			

The population sex ratio was 10.6 male bird: 40.5 female bird or 1 male: 3.8 female. But sex ratio for adult birds was 4.3 male bird: 27.9 female bird or 1 male: 6.5 female. The sex ratio was quite normal for polygyny mating system birds like peafowl. Polygyny system at javan green peafowl population is the population strategy in order to ensure the best gen flow at the population.

Base on observation to the javan green peafowl which gathering at concentration area (feeding ground) in APNP, age structure and sex ratio of the bird can be expressed as shown Table 4. The age structure of the bird showed that population dominated by adult bird. The age structure of the bird indicated that unbalance pyramidal population. Sub adult male bird was 45.33% and adult male approximately 54.67%, and adult female was 85.06% and 14.94% sub adult female.

Table 4. Average individual number of javan green peafowl gathering at feeding area in APNP

Concentration area	Male		Female		Total
	Adult	Sub adult	Adult	Sub adult	
Sadengan	4.8±0.41	2.3±0.47	16.5±0.97	4.0±0.87	27.6
Rowobendo	1.0±0.18	1.0±0.18	7.0±0.83	0	9.0
Gunting	1.0±0.18	3.5±0.51	27.0±0.74	5.5±0.51	37.0
Sumber Gedang	0.8±0.41	0.0	1.5±0.68	0	2.3
Ngagelan	0.6±0.50	0.0	2.1±0.55	0	2.7
Total	8.2	6.8	54.1	9.5	78.6
	15.0		63.6		

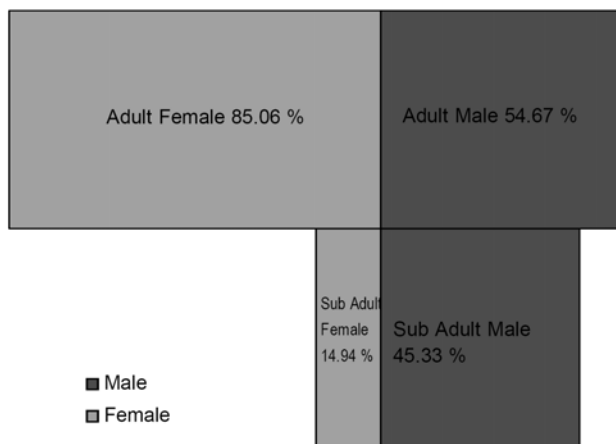


Figure 4. The pyramidal age structure of javan green peafowl at APNP

The sex ratio of the green peafowl in APNP was 15.0 male birds: 63.6 female birds or 1 male: 4.2 female. But for adult bird sex ratio was 8.2 male: 54.1 female or 1 male: 6.6 female. The bird sex ratio was indicated that the green peafowl life at polygyny system. Choising polygyny system on the javan green peafowl mating system is the population strategy to make assure the best gen flow at the population.

Table 6. The individual number of javan green peafowl at different time observation with concentration count method at sample area of APNP.

Natality and mortality

Data of natality and mortality the green peafowl very difficult were found direct from the field observation in APNP and BNP, but the bird census data in 2006 and 2007 showed that the population fluctuation data has indicated on expression direct of natality and mortality. The population data in BNP from census in year 2006 was 69.1 birds, but in year 2007 became 70.5 birds, so it was growth 1.4 birds or approximately 2.07% of the natality and mortality (increased). Meanwhile the population of the javan green peafowl census year 2006 in APNP was 80.7 bird but year of 2007 only 76.5 bird, so the population was declined 4.2 bird or 5.49% of the natality and mortality (increased).

Comparison analysis of javan green peafowl population development

Comparison study was used to know the development of javan green peafowl population in BNP, in 1995, 2006 and 2007 (Table 5). The individual number of javan green peafowl at different time observation with transect call count method at sample area of BNP was used on comparison.

Base on chi-square test, showed that population abundances of the javan green peafowl in BNP with difference of observation time (year 1995, 2006 and 2007) has significantly differ ($\chi^2 = 17.89, P < 0.01$). Result of the analysis showed that the javan green peafowl population was declined approximately 66.95% during 12 years. But in year 2006 to years 2007 the population was growth from 69.1 birds to 70.5 bird approximately 2.03%.

Table 5. The individual number of javan green peafowl at different time observation with transect call count method at sample area of BNP.

Habitat type	Hernowo 1995	Curren study in 2006	Curren study in 2007
Savanna	51.10	50.80	43.40
Monsoon forest	23.40	5.30	10.30
Evergreen Forest	25.07	6.20	8.30
Beach Forest	18.23	6.80	8.50
Total	117.80	69.10	70.50

The javan green peafowl study was held in APNP in year 1998, 2005, 2006 and 2007 (Table 6). To know the development of javan green peafowl population, comparation population analysis was used. The individual number of javan green peafowl at different time observation with concentration count method at sample area of APNP was compared. Base on chi-square test, showed that population abundances of the javan green peafowl in APNP with difference of observation time (year 1998, 2006 and 2007) has significantly differ ($\chi^2 = 19.71, P < 0.01$) The results showed that total the green peafowl population at sample area has raising up around 87.67%.

Concentration area	Habitat type	Supratman 1998	Wasono 2005	Curren Study 2006	Curren Study 2007
Sadengan	Grazing area and lowland forest	31	31	25.1	30.5
Rowobendo	Mix plantation forest and intercropping area	12	8	6.2	11.9
Guntingan	Teak plantation forest and intercropping ar		11	44.1	29.7
Sumber Gedang	Teak plantation forest-back mangrove			2.4	2.6
Ngagelan	Beach forest and teak plantation forest			2.9	1.8
Total		43	50	80.7	76.5

The javan green peafowl population abundances do not significant different (69.10-70.50 individuals) between year 2006 and 2007 in BNP, but if it compared to Hernowo (1995), the population abundances have significant different (117.70 individuals). The population development declined approximately 66.95%, but in year 2006 to years 2007 the population was growth from 69.1 birds to 70.5 birds, approximately 2.03%. Several reasons the declined green peafowl population in BNP during 1995-2006 were caused by poaching and *Acacia nilotica* invasion to savanna habitat. The notorious problem which caused declined of the javan green peafowl population was poached activities (van Balen et al. 1995).

Discussion

Meanwhile the green peafowl populations in APNP have grown up around 87.67% from year 1998 to year 2006 (Supratman 1998; Wasono 2005; Yuniar 2007; Risnawati 2008). The javan green peafowl population grow up has fantastically in APNP. The reasons were relatively do not occur poaching activities in the park and developing area of intercropping at teak plantation forest as new habitat the peafowl. Developing of the new habitat at intercropping teak plantation forest has created new places for the javan green peafowl living. It means that the new habitat can support more individually or sub population at that place.

The green peafowl population more abundant at savanna habitat types in Bekol BNP. The savannas have availability of food resources, water supply, roosting site and nesting site at whole years (Pattaratuma 1977; Mulyana 1988; Winarto 1993; Hernowo 1995, 1999). In APNP, the birds were more distributed at Sadengan grazing area and intercropping teak plantation forest of Gunting. The abundance of the javan green peafowl have relation with availability of resources mainly food resources (Hernowo 1995).

In general sex ratio of green peafowl population in BNP and APNP shown that 1 male: 4 female. These conditions indicated that the bird life in polygyny system (Perrins and Birkhead 1983). If unsuitable the sex ratio will influence to the birds reproduction process. The javan green peafowl population's structures in BNP and APNP have adult more abundance (55-75%) than sub adult or young bird. The age structure indicated that formed opposite pyramidal population. Ponsena (1988), give same phenomenon that population age structure and sex ratio of green peafowl in Huai Kha Khaeng Wildlife Sanctuary, Thailand have age structure 1 adult male: 2.82 adult female: 1.47 immature

and at others area of sanctuary have age structure 1 adult male: 4.47 adult female: 0.22 immature.

The age structure of the javan green peafowl population in BNP and APPNP was opposite pyramidal condition. Those condition was same phenomenon at several places of the javan green peafowl local distribution shown such as the observation in BNP by Hernowo (1995), in APNP by Hernowo and Wasono (2006), in Buah Dua Sumedang teak plantation by Hernowo and Hernawan (2003). The age structure of javan green peafowl population as "opposite pyramidal" is still discussable because many factors may influence to the population such mortality, natality factors and detail of classified on age structure take account which the adult productive and not productive should know or may be the age structure remain as naturally.

The javan green population's development in BNP decreased during year 1995 to 2006 but in year 2007 has little grown. That condition supposed that poaching activities decreased in BNP. The javan green peafowl populations in APNP year 1998 to 2006 fantastically grow approximately 87.67%. But in 2007 the population decreased approximately 5.49%. That phenomenon was caused by new habitat for the javan green peafowl at intercropping teak plantation forest has been created.

In over all of population health of green peafowl in BNP and APNP are good, it has vigourity and quite well sex ratio.

CONCLUSION

The javan green peafowl population in BNP declenated during year 1995-2006. The population has abundances at savanna habitat in BNP. The population in APNP increased fantastically during in year 1998 to 2006. Those populations were more concentrated at sadengan grazing area and intercropping teak plantation of APNP. The birds sex ratio composition in BNP and APNP were 1 male: 4 female, the condition indicated that the green peafowl life at polygyny system. The age structure indicated that population opposite pyramidal structure, around 67.70% adult bids. The population health of javan green peafowl in BNP and APNP relatively good.

REFERENCES

APNP [Alas Purwo National Park] (2007) Alas Purwo National Park. [http:// www.dephut.go.id](http://www.dephut.go.id) [Indonesia]

- BNP [Baluran National Park] (2007) Baluran National Park. <http://www.dephut.go.id> [Indonesia]
- Gilpin ME, Hanski I (1991) Metapopulation dynamics: empirical and theoretical investigations. *Biol J Linn Soc* 42: 73-78.
- Hernowo JB (1995) Ecology and behaviour of the green peafowl (*Pavo muticus* Linnaeus 1766) in the Baluran National Park. East Java, Indonesia. [M.Sc. Thesis]. Faculty of Forestry Science, Goerg August University Gottingen. Germany.
- Hernowo JB (1997) Population study of javan green peafowl (*Pavo muticus muticus* Linnaeus 1758) with three different methods in Baluran National Park, East Java Indonesia. *Media Konservasi* 5 (2): 61- 66. [Indonesia]
- Hernowo JB (1999) Habitat and local distribution of javan green peafowl (*Pavo muticus muticus* Linnaeus 1758) in Baluran National Park, East Java. *Media Konservasi* 6 (1): 15-22. [Indonesia]
- Hernowo JB, Hernawan E (2003) Population and habitat study of javan green peafowl (*Pavo muticus muticus* Linnaeus 1958) at Ciawitali teak forest plantation of BKPH Buahdua and BKPH Songgom, KPH Sumedang. *Media Konservasi* 8 (3): 117-126. [Indonesia]
- Hernowo JB, Wasono WT (2006) Population and habitat of javan green peafowl (*Pavo muticus muticus* Linnaeus 1958) in Alas Purwo National Park. *Media Konservasi* 9 (3): 83-88. [Indonesia]
- Mulyana (1988) Habitat study of green peafowl (*Pavo muticus* Linnaeus 1766) at Bekol Resort, Baluran National Park, East Java. [Honor Thesis]. Department of Forest Resources Conservation, Faculty of Forestry, Bogor Agricultural University. Bogor [Indonesia]
- Partomihardja T (1989) Check-list of plant species in the Baluran national park, East Java. RCB LIPI. Bogor.
- Pattaratuma A (1977) An ecological study on the green peafowl, "Burung Merak" (*Pavo muticus* Linn.) in the Game Reserve Baluran Banyuwangi, East Java, Indonesia. Technical Paper No 2. Department of Forest Biology. Faculty of Forestry, Kasetsart University Bangkok.
- Perrins CM, Birkhead TR (1983) Avian ecology. Chapman & Hall. New York.
- Ponsena P (1988) Biological characteristic and breeding behaviours green peafowl (*Pavo muticus* Linnaeus) in Huai Kha Khaeng Wildlife Sanctuary. *Thai J For* 7: 303-313.
- Risnawati R (2008) Population and habitat analysis of green peafowl (*Pavo muticus* Linnaeus, 1766) in Alas Purwo and Baluran National Park, East Java. [Honor Thesis]. Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry, Bogor Agricultural University. Bogor [Indonesia].
- Supratman A (1998) Distribution and habitat characteristic study of green peafowl (*Pavo muticus* Linnaeus 1766) at non breeding season in Rowobendo Resort Alas Purwo National Park, East Java. [Honor Thesis]. Department of Forest Resources Conservation, Faculty of Forestry, Bogor Agricultural University. Bogor [Indonesia].
- van Balen S, Prawiradilaga DM, Indrawan M (1995) The distribution and status of green peafowl In Java. *Biol Conserv* 71: 289-297.
- Warsono WT (2005) The population and habitat of green peafowl (*Pavo muticus* Linnaeus 1766) in Alas Purwo National Park, East Java. [Honor Thesis]. Department of Forest Resources Conservation, Faculty of Forestry, Bogor Agricultural University. Bogor [Indonesia].
- Winarto R (1993) Some ecological aspect of green peafowl (*Pavo muticus* Linnaeus 1766) at breeding season in Baluran national park, East Java. [Honor Thesis]. Department of Forest Resources Conservation, Faculty of Forestry. Bogor Agricultural University. Bogor [Indonesia].
- Yuniar A (2006) Population and habitat study of green peafowl (*Pavo muticus* Linnaeus 1766), in Alas Purwo National Park and Baluran National Park, East Java. [Honor Thesis]. Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry, Bogor Agricultural University. Bogor [Indonesia]