POPULATION AND HABITAT ANALYSIS OF THE JAVAN GREEN PEAFOWL (*Pavo muticus muticus* LINNEAUS 1758) IN BALURAN AND ALAS PURWO NATIONAL PARK

by

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FOREWORD

The author would like to express his gratitude to ALLAH, SWT, who has given his grace and guidance, so that this article can be realized. This article POPULATION AND HABITAT ANALYSIS OF THE JAVAN GREEN PEAFOWL (*Pavo muticus muticus* LINNEAUS 1758) IN BALURAN AND ALAS PURWO NATIONAL PARK. The Javan green peacock is a species of endangered bird, but much ecological information is not yet known.

Studying the population and habitat of the javan green peafowl is an important thing to know. The study is done in Baluran and Alas Purwo national park, where those places are one of distribution the javan green peafowl population. Conserving of javan green peafowl is impossible to achieve if knowledge about populations and habitats is not mastered. Therefore, the author felt interested in writing this article

The author hopes that this article will be useful for readers

Regards,

Jarwadi Budi Hernowo

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By

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ABSTRACT

The javan green peafowl (*Pavo muticus muticus*) have high pressure to the population and the habitat. Baluran and Alas Purwo national park is one of distribution javan green peafowl; it was chosen to study on the population and habitat analysis representative as population size and habitat types of the bird. The paper was aimed to gain the knowledge of strategic population and habitat selection of javan green peafowl on defend from the high pressure to the bird living. The individual number of the bird was counted by call count transect method and concentration count. The demographic parameter (individual number, age structure population and sex ratio) of javan green peafowl was analyzed. The result shown that, the population development has decreased approximately 47.5 % in 12 years at Baluran national park (BNP) but at Alas Purwo national park (APNP) growth up 86.05 % during 8 years. The age structure of the both population (BNP and APNP) indicated that 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 polygamous system 1 male : 4 female > 1 male : 2.5 Female. The javan green peafowl prefer habitat forest patchily with open area which are growth by grasses and shrubs. The green peafowl's are searching food more at open area as feeding site. The green peafowl as herbivorous bird and ground animal feed much on leaf, seed of grasses and leaf and fruit of shrubs. They are choice luxuriant tree or shady place for sheltering during the hot days. The birds select certain tree as tall tree or emergent tree for roosting and not for the tree there any open area. Nesting site of the bird is open area where shrubs are growing. The javan green peafowl prefer habitat such as savanna, grazing area surrounded by forest and intercropping teak forest plantation.

Keyword : Population, Habitat, Analysis, 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 randomly and the habitat condition was fragmented. Van Balen et al (1991) 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).

Alas Purwo and Baluran national park are as one of distribution site of javan green peafowl at tip of the eastern of Java Island. Baluran national park have typically savanna and monsoon forest habitat, but Alas Purwo have habitat type more diverse like; low land tropical rain forest, grazing area, and teak plantation with intercropping.

The problems in relation to javan green peafowl life are high pressure of illegal hunting to the bird (eggs, train feathers, individuals) habitat loosed due to conversion or destruction. The illegal hunting caused local population of javan green peafowl extinct on their local distribution. Meanwhile several characteristic parameter of javan green peafowl population are remaining unknown. Van Balen et al (1991) stated that in last decade the most seriously problem to javan green peafowl is poaching caused the bird became threaten. Habitat destruction and conversion disturbed to quality and quantity of habitat especially food, shelter, roosting site and cover. But reality in the field the birds still excise in their local distribution

The paper was aimed to gain of knowledge how the bird population strategy can defend from high pressure through demographic population analysis of javan green peafowl with parameter: individual number, sex ratio, age structure and survival of the population and the types habitat preferred with habitat use analyzed and principles component analysis.

METHOD

Baluran national park (BNP) is located at tip of Northeastern of Java Island (7^0 29`10" - $7^0$ 55`55" latitude South and 114^0 29`10" - $114^0$ 39`10" longitude East), 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 River.

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 1 600 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. The vegetation types have developed in BNP Park, like Savanna grassland, beach forest, mangrove, deciduous forest or monsoon forest, evergreen forest, swampy area and sub mountain forest.

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 (8^0 26`45" - $8^0$ 47`00" latitude South and 114^0 20`16" - $114^0$ 36`00" longitude East). At Eastern of the national park was bordered with Bali Strait and in the South also West direction were boundaries by India Ocean. The annual precipitation ranges from 1 079 to 1 554 mm per year with 79 - 112 rainfall days.

Five type vegetation have developed in Alas Purwo national park, 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.

Research was conducted at Baluran and Alas Purwo national park, month from June to October 2006 and August to December 2007. The study was focused at the local distribution of javan green peafowl at Baluran national park at Bekol resort (savanna, beach forest and monsoon forest) and at Alas Purwo national park at Rowobendo resort (Sadengan grazing area, intercropping area and teak plantation).

The javan green peafowl population was observed by transect and concentration method follow (Hernowo 1995) for BNP, but APNP follow (Yuniar 2006). Vegetation as important of the bird habitat was done by quadrate transect line follow Mueller and Dumbois (1977). The population analyzed done by demographic parameter and comparation approach and the habitat was analyzed by selection and preference habitat approach. Chi-square test for abundances of food resources at several types of habitat of BNP and APNP was used. F test and variance analysis of the habitat and Duncan`s multiple range test were used. The Principle component analysis was used to know determinant habitat factors.

RESULTS AND DISCCUSION

RESULTS

Analysis of Javan Green Peafowl Population Development

Comparison study was used to know the development of javan green peafowl population at BNP, the bird census was held in 1995, 2006 and 2007. The results showed that total the green peafowl population at sample area has declined 47.50 % during 12 years.

Table 1. The number of javan green peafowl population at different time observation at sample area of BNP

Transect	Habitat type	Hernowo 1995	Hernowo 2006	Hernowo 2007
Curah Udang	Savanna	22.00	27.70	24.00
Bekol Bama	Savanna	14.30	15.50	19.20
HM 113	Savanna	14.80	8.10	6.30
HM 108	Savanna –Monsoon forest	23.40	5.30	10.30
HM 93	Savanna-Evergreen Forest	25.07	6.20	8.30
Kalitopo Sumberbatu	Beach forest	18.23	6.80	3.20
Total		**117.77**	**69.60**	**70.30**

The javan green peafowl population development was analysis at APNP from years 1998, 2005 and 2006. The comparison study was used to know fluctuation of javan green peafowl population. The results showed that total the green peafowl population at sample area has raising up around 86.05 %.

Table 2. The number of javan green peafowl population at different time observation with concentration count method at sample area of APNP

Consentration Area	Habitat type	Supratman 1998	Wasono 2005	Hernowo 2006	Hernowo 2007
Sadengan	Lowland TRF & Grazing area	31	31	25	30
Rowobendo	Mixed Plantation Forest & Intercropping	12	8	6	5

Guntingan	Teak plantation Forest & Intercropping		11	44	37
Sumber Gedang	Teak plantation			2	3
Ngagelan	Teak Plantaion			3	2
Total	**Total Habitat Types**	**43**	**50**	**80**	**77**

2. Age Structure and Sex Ratio

The age structure and sex ratio of javan green peafowl representative base on observation to the birds visited water hole at BNP. 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. For sub adult male bird was 57.43 % and adult male around 42.57 %, but sub adult female was 31.27 % and adult female 68.73 %.

Table 3. Average individual number of javan green peafowl visited water hole at sample area at BNP

Water hole	**Male**		**Female**		**Total**
	Adult	**Sub Adult**	**Adult**	**Sub Adult**	
Bekol	3	5.7	26.6	12.6	47.9
Bama	0.7	0.1	0.4	0	1.2
Manting	0.6	0	0.7	0	1.3
Total	4.3	5.8	27.7	12.6	50.4

The population sex ratio was 10.1 male bird : 40.3 female bird or 1 male : 4 female. But sex ratio for adult birds was 4.3 male bird : 27.7 female bird or 1 male : 6 female. The sex ratio was quite normal for polygamous birds like peafowl.

Base on observation to the green peafowl which gathering at concentratrion area (feeding ground), age structure and sex ratio of the bird in APNP can be expressed as shown table 4. The age structure of the bird showed that population dominated by adult bird. The age structure indicated that unbalance pyramidal population. It seem perform as ”regressive population”, less on number of sub adult bird and young or pechick. Sub adult male bird was 49.69 % and adult male around 50.31 %, but adult female was 100 % .

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

Consentration Area	**Male**		**Female**		**Total**
	Adult	**Sub Adult**	**Adult**	**Sub adult**	
Sadengan	4.8	3.9	15.8	0	24.5
Rowobendo	1	0.5	3.2	0	4.7
Guntingan	1	3.4	38.6	0	43
Sumber gedang	0.8	0	1.4	0	2.2
Ngagelan	0.4	0.1	2.1	0	2.6
Total	8	7.9	61.1	0	77
	15.9		61.1		

The sex ratio of the green peafowl at APNP was 15.9 male birds: 61.1 female birds or 1 male : 4 female. But for adult bird sex ratio was 8 male : 61.1 female or 1 male : 7 female. From the bird sex ratio was indicated that the green peafowl life at polygamous system

Feeding Site

The javan green peafowl feed on open area which dominated by grasses at several habitat types in both national Alas Purwo and Baluran. At APNP, sadengan grazing area is a man made, which the former was

lowland tropical rain forest (TRF). Intercropping area at resort Rowobendo are planted mahogany and teak species, in between those two species plant growth grasses.

The javan green peafowl feed concentrated more at savanna than other habitat types at BNP. The bird feed on grasses and shrubs, that food more available during dry season.

The javan green peafowl feed twice per day at BNP and APNP, morning from 5.30 am – 9.30 am and afternoon 14.00 pm – 17.30 pm. The bird came down from roosting site, walk around and look for food, at open area Sadengan grazing area, intercropping area, gaps at teak plantation of APNP, and savanna, monsoon forest or beach forest of BNP, with mainly died grasses and shrubs. The kind of food which is eaten by peafowl was recorded both at APNP and BNP at table 5

Table 5. Vegetation life form which are eaten by the javan green peafowl at Sadengan grazing area and intercropping of teak plantation of APNP and savanna monsoon forest of BNP

No	Vegetation life form	Number of species	Part of the vegetation has been eaten	Location
1	Grasses	19	Leaf, Flower, Seed	APNP, BNP
2	Shrubs	14	Leaf, flower, Seed	APNP, BNP
3	Shrubs	1	Leaf, Seed	APNP, BNP
4	Shrubs	1	Leaf, Flower	APNP, BNP
5	Shrubs	1	Flower, Seed	APNP, BNP
6	Holticulture	6	Leaf, Fruit	APNP
7	Tree	5	Fruit	BNP
8	Palm	1	Fruit	BNP

Morning feeding was done around 4.5 hour, but for afternoon feeding activities shorter than morning. For BNP, the green peafowl feed also fruit of several trees such as *Morinda tinctoria, Zyzyphus rotundifolia, Glycomis cochichinensis, Corypha utan and Streblus asper*.

Chi-square test for abundances of food resources at several types of habitat of BNP and APNP showed that densities of species grass and shrubs which are eaten by javan green peafowl significant different, χ^2 (cal) for BNP = 1619.149, APNP = 1744.099, meanwhile χ^2 (tab) = 63.69.

Drinking Site

The green peafowl come to drinking site at Sadengan APNP is water hole a man made, or a puddle where feel by water which distributed at the grazing area or Sadengan river. Sprinkles water as tool to distributed water for grasses, but saturated water filed up the puddle.

During the dry season at BNP the condition became very harsh. The rainfall is quite low nearly 7 – 8 months are dry. The water is limited and only available in certain places. In sample area, water is available in Bekol, Bama, Kelor and Manting, but in the rainy season water is available everywhere.

Table 6. The frequency of javan green peafowl were encountered drink at Sadengan grazing area APNP and Bekol water hole BNP

Activities	Observation Time	Frequency	Document
Drinking at APNP	Morning	60	at puddle
	Afternoon	5	Man made water hole
Drinking at BNP	Morning	60	Bekol water hole
	Afternoon	60	Bekol water hole

Sheltering Site and Resting Area

Usually, the green peafowl use shelter site under trees, at trees or in shrubs and bushes. The trees are used by the peafowl at middle of Sadengan grazing area APNP, like walikukun (*Schoutenia ovata*), laban (*Vitex*

sp), and sonokeling (*Dalbergia latifolia*). The green peafowl sheltering while take rest. Besides those trees, the bird used other trees for sheltering and resting such as apak (*Ficus infectoria*), serut (*Strepblus asper*), and Bamboo (*Bambusa sp*) where they present at edge of sadengan grazing area. Meanwhile at BNP, the birds sheltered and rest under widoro bukol (*Zyzyphus rotundifolia*), mamba (*Azedirachta indica*), asem (*Tamarindus indica*), pilang (*Acacia leucophloea*), kesambi (*Schleichera oleosa*), herbs and shrubs.

Table 7. The frequency of javan green peafowl were encountered sheltering and resting at APNP and BNP

Activities	Observation Time	Frequency	Document
Shetering and Resting sadengan grazing inter cropping area at APNP	9.30 – 13.00	56	walikukun, sonokeling laban, apak, bambu, jati, mahoni, herb and shrub
Shetering and Resting at savanna, monsoon forest BNP	9.00 – 14.00	60	widorobukol, mimba, pilang, asem, kesambi, herb and shrub

The green peafowl will sheltered under luxuriant trees or climbed up and stay at middle crown of trees or at shrubs and bushes. For sheltering and resting the birds will select on certain criteria like luxuriant trees, dense shrubs and bushes also save from any disturbance during they are sheltering and resting. The peafowl will sheltered during hot days around 9.30 am – 14.00 pm.

Chi-square test for frequently the javan green peafowl used sheltering trees at several types of habitat of BNP and APNP showed that frequencies of using sheltering trees has significant different in BNP, χ^2 (cal) for BNP = 681.7967, χ^2 (tab) = 38.93, but for APNP do not significant χ^2 (cal) = 28.86, χ^2 (tab) = 42.98

Display Area

Open areas are preferred by peacocks during the mating season for dancing. Those activities for attracted the female bird. At Sadengan grazing area the peacock dance in middle of site or bellow shelter trees such as bungur (*Lagerstroemia speciosa*), walikukun (*Schoutenia ovata*) and laban (*Vitex pubescens*)

Table 8. The frequency of javan green peafowl were encountered display at APNP and BNP

Activities	Observation Time	Frequency	Document
Display at APNP	Morning	86	Open area, under shelter tree, at sadengan and intercropping area
	Afternoon	62	Open area, under shelter tree, at sadengan and intercropping area
Display at BNP	Morning	76	Open area, under shelter tree, at savanna, monsoon forest, road Batangan-Bekol Hm 70-117, Bekol-Bama Hm 2-4, Hm 12-21
	Afternoon	54	Open area, under shelter tree, road Batangan-Bekol Hm 70-117, Bekol-Bama Hm 2-4, Hm 12-21

Besides, open areas at savanna and monsoon forest are chosen by the birds for dancing, but road Batangan – Bekol mainly at Hm 70 to HM 117 and Bekol – Bama HM 2 - 4, 12 – 21 BNP, also are preferred places for dancing.

Covering Site

The green peafowl used forest or shrubs as covering site. Covering site have function as protected places from several disturbances which threat to the bird. Choosing places for covering depend on kind of

disturbance and availability of covering site. The birds get covering site can be done by walking, running or flying.

Table 9. The frequency of the javan green peafowl covering at APNP and BNP

Activities	Observation Time	Frequency	Sources of disturbance	Document
Covering at APNP	Morning	60	Peoples, bird of prey	walking, running to bush or fly to perch on trees at sadengan and intercropping area
	Afternoon	30	peoples	
Covering at BNP	Morning	60	peoples	walking, running to bush or fly to perch on trees at savanna, monsoon forest and side road Bekol - Batangan
	Afternoon	60	peoples	

Chi-square test for frequently the javan green peafowl used covering at several types of habitat of BNP and APNP showed that frequencies of covering has significant different in both BNP and APNP, χ^2 (cal) for BNP = 185.4376, χ^2 (tab) = 30.58, and APNP χ^2 (cal) = 404.3685, χ^2 (tab) = 38.93

Roosting Site

Not every tree is used by the green peafowl as roosting site, and they will select on certain trees. Several trees were used by the birds as roosting site at Sadengan APNP like Randu alas (*Bombax valetoni*), Bendo (*Artocarpus elastica*), Apak (*Ficus invectoria*), Jambu hutan (*Syzigium samarangense*), Laban (*Vitex pubescens*.) and Gempol (*Nauclea siamea*).

Table 10. The frequency of javan green peafowl roost in select trees at Sadengan, Intercropping area APNP

No	Trees For Roost	Local Name	Frequency	Document
1	*Bombax valetoni*	Randu alas	30	16-19 female, 1 male
2	*Vitex pubescens*	Laban	60	1 male
3	*Ficus elastica*	Bendo	60	2-6 female
4	*Nauclea siamea*	Gempol	8	2 female
5	*Ficus infectoria*	Apak	60	4 female
6	*Syzigium samarangense*	Jambu Hutan	15	2 Female
7	*Swietenia macrophylla*	Mahoni	30	2 – 4 female/tree
8	*Tectona grandis*	Jati	90	1 male

The trees were chosen as roosting site by the green peafowl at savanna BNP, it were recorded at table Preferred trees as roosting site at BNP are Pilang and Gebang trees.

Table 11. The frequency of javan green peafowl roost in select trees at Savanna BNP

No	Trees For Roost	Local Name	Frequency	Document
1	*Acacia leucophloea*	Pilang	120	1 male, 4 female
2	*Azedirachta indica*	Mimba	90	1 male, 3 female
3	*Tamarindus indica*	Asem	40	1 male
4	*Albizia lebekkoides*	Tekik	25	1 male
5	*Corypha utan*	Gebang	120	1 male, 4 – 6 female

The characteristic of roosting trees are (a) the trees are relatively tall (more than 7 m) or emergent trees (higher than the trees in the surrounding area (b) close to the roosting tree present open area or surrounding the roosting tree is relative open space (c) the branches of the trees a relatively upright angle to the stem (d) usually, the leaves are not so dense, rather open. Even dead trees with shaded leaves are used (e) Usually near the roosting trees occur other smaller trees.

Chi-square test for number of trees was used as roosting at several types of habitat of BNP and APNP showed that number of roosting trees has significant different in both BNP and APNP, χ^2 (cal) for BNP = 61.87033, χ^2 (tab) = 30.58, and APNP χ^2 (cal) = 78.36756, χ^2 (tab) = 46.96

Nesting Site

The green peafowl select area for the nest at open area which is growth by shrubs. The nest is simple; form oval and the eggs are putted direct on the ground. The nest built with simple materials or did not contained materials. The green peafowl laid eggs varies 2 – 6 per nest, but mostly is 3 – 4 eggs.

2. Type Habitat Selected

The relation between abundances of javan green peafowl and the habitat type at BNP was showed table 13. Base on F Test was resulted that abundances of the bird and habitat types were significant at confident limit 0.1%. The habitat type has influenced on abundances of javan green peafowl.

Table 13. F test for abundance (average) of the green peafowl in 2006 and 2007 and habitat type are used at BNP

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Habitat type	4	23607.1	11803.55	264.64	0.0001
Observation	9	922.4	48.55	1.09	0.40
Error	36	1694.9	44.60		
Total	49	26224.4			

Variance analysis of the habitat and Duncan`s Multiple Range Test showed that the birds abundance differ between habitat type as shown at table 13. The Duncan`s Multiple Range Test showed that monsoon forest and beach forest have same lavel on abundances of the green peafowl, but savanna was differ.

Table 14. Variance analysis of the habitat and Duncan`s Multiple Range Test for Variable : abundance by habitat type and observation at BNP

Duncan`s Grouping	Mean abundance	Habitat Types
A	43.45	Savanna
B	1.65	Monsoon Forest
B	1.10	Beach Forest

The bird abundance has related with the habitat type at APNP and it was showed table 15. Base on F Test was resulted that abundances of the bird and habitat types were significant at confident limit 0.1%. The habitat type has influenced on abundances of javan green peafowl

Table 15. F test for abundance (average) of the green peafowl in 2006 and 2007 and habitat type are used at APNP

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Habitat Type	4	13267.32	3316.83	82.31	0.0001
Observation	9	134.72	14.97	0.37	0.94
Error	36	1450.68	40.30		
Total	49	14852.72			

Variance analysis of the habitat and Duncan`s Multiple Range Test showed that the birds abundance differ between habitat type as shown at table 16. The Duncan`s Multiple Range Test showed that Teak plantation & intercropping at Rowobendo and teak plantation at Sumbergedang also teak plantation at

Ngagelan have same lavel on abundances of the green peafowl, but differ with lowland grazing area of Sadengan and intercropping & teak plantation of Gunting.

Table 16. Variance analysis of the habitat and Duncan`s Multiple Range Test for Variable : abundance by habitat type and observation at APNP

Duncan`s Grouping	**Mean Abundance**	**Habitat Types**
B	25.2	Grazing area with Lowland TRF, Sadengan
C	6.2	Teak Plantation & Intercropping, Rowobendo
A	44.1	Intercropping & Teak Plantation, Gunting
C	2.4	Teak Plantation, Sumber Gedang
C	2.9	Teak Plantation, Ngagelan

Determinant Factors at Several Habitat Types at Baluran National Park

Analysis to principles component habitat was done for several habitat types at Baluran National Park (BNP) showed that seven habitat component have been analyzed can be gouped became 3 principles component with represent value of 74,63% (Table 17).

Table 17. Determinant factors analysis to several habitat types of the javan green peafowl at BNP

Principles Component	**Eigen Vector**		
	Total	**% Variance**	**% Cumulative**
1	2,06	29,46	29,46
2	1,82	26,04	55,50
3	1,34	19,13	74,63
4	0,87	12,46	87,09
5	0,56	8,00	95,10
6	0,23	3,26	98,36
7	0,11	1,64	100

Number of food species (x_1), large of dancing area (x_5) and high of roost tree (x_4) were as the first principles component of determinant factor at several habitat type at BNP. The second principles component was number of roost tree (x_3) and density of food (x_2), but density of shelter site (x_6) and density of cover site (x_7) included to the third principles component (Table 6).

Table 4. Determinant factors of principles component at several habitat types of the javan green peafowl at BNP

Principles Component of Habitat	**Value of Principles Component**		
	1	**2**	**3**
Number of food species (x_1)	**0,93**	0,00	-0,04
Large of dancing area (x_5)	**0,92**	0,13	-0,03
Number of roost tree (x_3)	0,09	**0,86**	0,22
High of roost tree (x_4)	**0,17**	-0,73	-0,18
Density of food (x_2)	-0,31	**0,65**	-0,28
Density of shelter site (x_6)	0,30	0,10	**0,81**
Density of cover site (x_7)	-0,35	-0,29	**0,72**

Determinant Factors at Several Habitat Types at Alas Purwo National Park

Analysis to principles component at savanna habitat types Alas Purwo National Park (APNP) showed that seven habitat component can be grouped in three principles component and represent of 56.05 % total variance value.

Table 18. Determinant factors analysis at several habitat types of the javan green peafowl at APNP

Principles Component	Eigen Vector		
	Total	% Variance	% Cumulative
1	2,19	31,26	31,26
2	1,74	24,79	56,05
3	0,86	12,31	68,36
4	0,78	11,14	79,45
5	0,64	9,14	88,63
6	0,59	8,49	97,12
7	0,2	2,88	100

Habitat component which included as the first principles component was number of roost tree (x_3), density of cover site (x_7), high of roost tree (x_4) and density of shelter site (x_6). The second principles component was large of dancing area (x_5), Density of food (x_2), Number of food species (x_1).

Table 19. Determinant factors of principles component analysis at several habitat types of the javan green peafowl at APNP

Principles Component of Habitat	Value of Principles Component	
	1	2
Number of roost tree (x_3)	**0,78**	0,03
Density of cover site (x_7)	**0,62**	-0,15
High of roost tree (x_4)	**0,57**	-0,12
Large of dancing area (x_5)	-0,53	**0,52**
Density of food (x_2)	0,53	**0,76**
Number species of food (x_1)	0,34	**0,74**
Density of shelter site (x_6)	0,44	-0,55

DISCUSSION

The javan green peafowl population

The javan green peafowl population development at BNP is tending to decline during year 1995 – 2006. Several reason which are caused, (1) were caused by poaching and (2) *Acacia nilotica* invasion to savanna habitat. The acacia was covered approximately 6 000 ha of savanna grassland habitat. The habitat most preferred of javan green peafowl at BNP (Pattaratuma 1977, Mulyana 1988, Winarto 1993, Hernowo 1995). Meanwhile the population development of the javan green peafowl at APNP is tending to increasing during 1998 – 2006. That phenomenon is supposed better management of grazing area of Sadengan and development of intercropping teak plantation area at Gunting (Supratman 1998, Wasono 2005, Yuniar 2006 and Risnawati 2008). The green peafowl population's structures at BNP and APNP have adult more abundance (55 % – 75 %) than sub adult or young bird. The age structure indicated that opposite pyramidal population. Ponsena 1988, give same phenomenon that population age structure of green peafowl at Huai Kha Khaeng Wildlife Sanctuary Khao Ban Dai region have structure more abundance adult bird and sex ratio of the bird was 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 opposite

pyramidal population structure is not stable population in teorithycal, but in reality the bids still excist in the field. The analysis of the bird age structure should be more details on classifield the age and not only age, but also which the adult productive age bird and which one not productive bird.

Habitat types which are preferred of the javan green peafowl is open area patchyli with forest and have continous water resources (Hernowo, 1999). Not so large open areas which are growed by grasses and shrubs as importance place for the javan geen peafowl living as feeding site (Pattaratuma 1977, Mulyana 1988, Winarto 1993, Hernowo 1995, Supratman 1998, Wasono 2005, Yuniar 2006 and Risnawati 2008). The javan green peafowl feed on quite wide range species of grasses and shrubs (Rini, 2005) also they are belonging to polyphag species, its mean the birds quite wide range kind food (Septania, 2009). The bird is quite demanding on food as herbivorous bird, because they size quite big. The javan green peafowl sheltered and take rest at trees or under luxuriant tree as characteristic resting site. The selected trees do not far from feeding site. The resting trees at Baluran were widoro bukol, pilang, asem, kesambi and mimba (Risnawati 2008, Yuniar 2006, Hernowo 1995, Mulyana 1988). Meanwhile at TNAP the birds used walikukun, laban, sonokeling, apak serta jati as sheltered trees (Supratman 1998, Wasono 2005, Yuniar 2006, Risnawati 2008). The green peafowl slept on tree (Pattaratuma 1977, Mulyana 1988, Ponsena 1988, Hernowo 1995). According to Hernowo 1999, the green peafowl select certain tree for roosting site. The characteristic of roosting tree is tall tree (emergent tree), not dense leaft, branching system up right angle to the stem and present open area closing to roosting tree. Most preferred roosting trees at BNP were pilang and dead of gebang (Risnawati 2008, Yuniar 2006, Hernowo 1995, Mulyana 1988, Pattaratuma 1977), meanwhile at APNP preffered trees as roosting site was Apak (Supratman 1998, Wasono 2005, Yuniar, 2006, Risnawati 2008). Displays will hold by the male of green peafowl at open area as grazing area, intercropping area, savanna and gaps (Mulyana 1988, Winarto 1993, Hernowo 1995, Hernawan 2003, Yuniar 2007, Risnawati 2008). Those preferred places are selected because easily for the female bird found the male and for male bird can dance more easily. Nesting site of green peafowl is open area which is growth by shrubs (Mulyana 1988, Winarto 1993, Hernowo 1995, Hernawan 2003). Sometimes the nest direct get sun when do not occupied by female birds (Winarto 1993, Hernowo 1995, Hernawan 2003). The nest performace is very simple and the egg direct contact with soil. Direct contacts with soil or sun are helping on hatching of the eggs.

In relation to habitat preferences, the birds more distribute at savanna at BNP or intercropping area of teak plantation and grazing ground at APNP because the habitat contain lot of open area. The green peafowl as ground herbivorous bird, they feed in particularly much kind of grasses and shrubs where it is much grow at the open area. The abundances of the bird have relation to abundances of food habitat. At forest habitat where present open area, the green peafowl will abundance.

CONCLUSION

The javan green peafowl populations have abundances at savanna habitat at BNP and concentrated at Sadengan grazing area and intercropping teak plantation of APNP. The bird's sex ratio composition was more 1 male : 4 female, the condition indicated that the green peafowl life at polygamous system. The age structure indicated that population opposite pyramidal structure, around 67.70 % adult bids. The population health of javan green peafowl at BNP and APNP relatively good. The population development of the birds at APNP have trend growth from years 1998 untill 2006, but at BNP was declined from years 1995 to 2006.

The open area whic are growth by grasses and shrubs and surrounded by forest and closed to water resources is prefered habitat for the javan green peafowl. The open area is feeding site, dancing area and nesting site of the bird. Tall tree or emergent tree for roosting and not for the tree there any open area. Number of food species, large of dancing area and high of roost tree are determinant factors at BNP, but at APNP number of roost tree, density of cover site and high of roost tree.

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