

THE COLOR PATTERN OF ALABIO DUCK (*Anas platyrhynchos Borneo*) IN SOUTH KALIMANTAN

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ABSTRACT

The study was carried to identify the phenotypic variation of Alabio duck (*Anas platyrhynchos Borneo*) being kept by smallholder. This research was conducted in Hulu Sungai Selatan (HSS), Hulu Sungai Tengah (HST) and Hulu Sungai Utara (HSU), South Kalimantan from May until November 2009. Six hundreds (75 males and 525 females) duck characterized in this study was age ranged from 5-5.5 months old. The observed parameters were plumage color, color feature, plumage shine, the color of bill, feet and shank. The results showed that the ducks from three locations (HSS, HST and HSU) performed different plumage color and color feature. The dominant plumage color of the Alabio male duck was grayish white on the neck (44-56%), grayish black on the back (40-60%) brownish grey on the chest (52-80%), while the wing was more dominated by blue-green (56%) and black (80%) in the tail. Whereas the female ducks was dominated (70-100%) brown spotted color, the rest blackish gray at tail, such as back, neck and chest. Twinkle Alabio duck plumage on males and females have the highest percentage was the glint of silver (100%) and of shiny blue-green for males (85-100%). The percentage of phenotypic color of bill, feet and shank of male and female ducks were lite yellow (40-60%), bright orange (12-44%), pale yellow (8-28%) and black (4-12%).

Keywords: Alabio duck, color pattern, South Kalimantan

INTRODUCTION

Indonesian local ducks are now known as the Indian Runner ducks (Hetzl, 1985; Samosir, 1993). Despite being one family, there are some local ducks names throughout the archipelago, based on their locations (Purba, 2004; Suparyanto, 2005). Some of well-known local ducks are Bali, Mojosari and Magelang ducks (Hetzl, 1985; Suwindra, 1998; Suparyanto, 2005), as well as Alabio duck (Rohaeni and Tarmudji, 1994; Suryana, 2007).

Alabio duck (*Anas platyrhynchos Borneo*) is one of the local duck genetic resources in South Kalimantan (Hamdan and Zuraida, 2007) as egg producers characterized by high productivity of eggs (Suparyanto, 2005; Suryana, 2007). Alabio duck have different phenotypic variations, and performances when compared to other local ducks in Indonesia (Srigandono, 1997; Suwindra, 1998;

Suparyanto, 2005).

Alabio duck in several areas in South Kalimantan has a varied phenotypic characteristics, both for qualitative traits (plumage color, color feature, color shine, feet, bill and shank color), and quantitative traits such as adult body weight, duration of egg production, age at first laying, peak production, egg weight, hatchability and hatching weight.

The differences mentioned above, allegedly due to the influence of both genetic and environmental factors. Environmental influences include maintenance management, feeding and different types of feed composition. While one of genetic factors is breeding systems regardless of structured breeding programs (Prasetyo, 2000). According Suparyanto (2003) the existence of phenotypic variation exist is due to the intensity of out crossing unstructured using one source of common ancestors.

Local ducks mostly has never been selected for economic value traits. Although among the ducks have a better and superior performances, because their capability to adapt to local environments (Hardjosworo *et al.*, 2001). Susanti and Prasetyo (2009) state that a local duck productivity can be improved by improving the genetic, feed quality and management. Improving of genetic quality is considered as ways due to its permanent impacts. Further stated that basically genetics improving can be made through selection and crossing both separately or combined.

Studies on the phenotypic characteristics of Alabio duck in the center and outside areas for development have not been done, so we need to describe the qualitative traits that can be used as an information and material for consideration to perform the selection and breeding programmes. While research on the genetics of other poultry have been reported by some researchers, by using morphometric analysis approaches (Brahmantiyo *et al.*, 2003; Muzani *et al.*, 2005), the phenotypic variability (Sartika *et al.*, 2008), and blood protein polymorphism (Fukui *et al.*, 1996; Yellita, 1998; Azmi *et al.* 2006).

This study was carried out in order to investigate the characteristics of phenotypic variation of Alabio duck including between and within variation of sub populations. The result is expected to complement the database on Alabio duck that can be used as a basis for local government policy of South Kalimantan Province, to purity, development and conserve of germplasm of Alabio duck sustainable ways.

MATERIALS AND METHODS

Research was conducted in Hulu Sungai Selatan (HSS), Hulu Sungai Tengah (HST) and Hulu Sungai Utara (HSU) districts, South Kalimantan Province from May to November 2009. The ducks used in of this research is owned by farmers Alabio ducks with total of 600 heads, consisting of 75 males and 525 females with age ranged from 5-5.5 months old or have reached sexual maturity indicated by the adult plumage appearance.

Observations of Alabio duck phenotypic characteristics was done directly to each individual bird. Data of plumage color, color feature, color shine, colored bill, feet and shank, was collected based on the method that recommended by Smyth (1993), such as by matching plumage color, and color feature and

then calculated the percentage.

Analysis of phenotypic data to calculate the frequency of qualitative traits based on the following formula (Stanfield, 1983).

RESULTS AND DISCUSSION

Observations of Alabio duck phenotypic characteristics including the dominant plumage color, color feature, shine color, colored bill, feet and shank. Percentage of dominant plumage color variability of Alabio duck from HSS, HST, and HSU districts, are presented in Table 1.

Table 1 shows that the dominant color pattern of Alabio male duck from HSU was a grayish brown plumage color in the neck (56%) and grayish brown the chest (72%), gray-black on the back (60%), bluish green the wings (56%), and black on the tails (80%). However, the male duck Alabio from HSS and HST characterized by grayish white on the back a with smaller percentage, but the color of back blackish gray reaches 60%.

While Alabio male duck from HSS has plumage color of grayish-white on the neck (48%) and chest (48%), and the remaining was brown-gray (52%). The percentage of black color plumage on the tail phenotype the ducks from three locations had relatively the same percentage, i.e. HSS (84%), HST (80%) and HSU (80%). Furthermore Alabio male duck from HST has grayish-white plumage on the neck (44%), blackish gray around the back (60%), grayish brown on the chest (80%), bluish green and black on the wings and tail of each of 56 % and 80%.

The dominant color of Alabio female duck plumage color from HSS was greyish brown color on the neck, back and chest, respectively 46.29%, 52% and 40%, while the same color around the wings and tail has greater percentage (91.43% and 92%). Alabio female duck from HST has grayish white on the neck (52%), grayish brown around the back (50.86%), and grayish brown on wings and 60.57% and 91.43% respectively.

While the Alabio female ducks from HSU has a grayish brown color around the neck, back, chest and tail ranged from 46.29 to 82.85% and the grayish black on wings of 40.57%. It is suggested that differences in dominant plumage color to occurred male and female ducks, due to different selection systems different conducted farmers. Usually farmers do selection based on plumage color phenotypic uniformity, without considering their pedigree. While as the source of

Tabel 1. The Variation Dominant Color Plumage of Alabio Duck from Different Districts at South Kalimantan

| Body parts | Characteristics of Plumage color | Districts | | | | | | Total | |
|------------|----------------------------------|---------------|-----------------|----------------|-----------------|---------------|-----------------|-------------|-------------|
| | | HSS | | HST | | HSU | | Male | Female |
| | | male n= 25 | female n=175 | male n = 25 | female n=175 | male n =25 | female n=175 | | |
| Neck | Black | 3 (12%) | - | 4 (16%) | - | 6 (24%) | - | 13 (17.33%) | - |
| | Grayish white | 12(48%) | 81(46.29%) | 11(44%) | 91(52%) | 14(56%) | 60(34.29%) | 37(49.33%) | 232(44.19%) |
| | Grayish green | - | - | - | - | - | - | - | - |
| | Grayish black | - | 4(2.29%) | - | 7 (4%) | - | 15(8.57%) | - | 26 (4.95%) |
| | Brown | - | 9(5.14%) | - | 5(2.86%) | - | 6(3.43%) | - | 20 (3.81%) |
| | Grayish brown | 10(40%) | 81(46.29%) | 10(40%) | 72(41.14%) | 5(20%) | 94(53.71%) | 25(33.33%) | 247(47.05%) |
| Back | Black | - | - | - | - | - | - | - | - |
| | Grayish white | 4(16%) | 4(2.29%) | 3(12%) | - | 7(28%) | - | 14(18.67%) | 4(0.76%) |
| | Grayish green | - | - | - | - | - | - | - | - |
| | Grayish black | 9(36%) | 32(18.29%) | 15(60%) | 46(26.29%) | 10(40%) | 50(28.57%) | 34(45.33%) | 128(24.38%) |
| | Brown | 5(20%) | 48(27.43%) | - | 40(22.86%) | 1 (4%) | 35(20%) | 6(8 %) | 123(23.43%) |
| | Grayish brown | 7(28%) | 91(52%) | 7(28%) | 89(50.86%) | 7(28%) | 90(51.43%) | 21(28%) | 270(51.43%) |
| Chest | Black | - | - | - | - | - | - | - | - |
| | Grayish white | 12(48%) | 43(24.57%) | 5 (20%) | 4(2.29%) | 7(28%) | 7(4%) | 24 (32%) | 54 (10.29%) |
| | Bluish green | - | - | - | - | - | - | - | - |
| | Grayish black | - | 21(12%) | - | 2(1.14%) | - | 8(4.57%) | - | 31(5.90%) |
| | Brown | - | 41(23.43%) | - | 103(58.86%) | - | 79(45.14%) | - | 223(42.48%) |
| | Grayish brown | 13(52%) | 70 (40%) | 20(80%) | 66 (37.71%) | 18(72%) | 81(46.29%) | 51(68%) | 217(41.33%) |
| Wings | Black | - | - | - | - | - | - | - | - |
| | Grayish white | 4 (16%) | - | 4(16%) | 69(39.43%) | 5(20%) | 40(22.86%) | 13(17.33%) | 109(20.76%) |
| | Bluish green | 13(52%) | - | 14(56%) | - | 14(56%) | - | 41(54.67%) | - |
| | Grayish black | - | - | - | - | - | 71(40.57%) | - | 71 (13.52%) |
| | Brown | - | 15(8.57%) | - | - | - | - | - | 15(2.86%) |
| | Grayish brown | 8 (32%) | 160(91.43%) | 7(28%) | 106(60.57%) | 6(24%) | 64(36.57%) | 21 (28%) | 330(62.86%) |
| Tail | Black | 21(84%) | - | 20(80%) | - | 20(80%) | - | 61(81.33%) | - |
| | Grayish white | 1 (4%) | - | 1 (4%) | - | 1(4%) | - | 3 (4%) | - |
| | Bluish green | - | - | - | - | - | - | - | - |
| | Grayish black | 2 (8%) | 4(2.29%) | 3(12%) | - | - | - | 5 (6.67%) | 4(0.76%) |
| | Brown | - | 10(5.71%) | - | 15(8.57%) | - | 30(17.14%) | - | 55(10.48%) |
| | Grayish brown | 1 (4%) | 161(92%) | 1(4%) | 160(91.43%) | 4 (16%) | 145(82.86%) | 6 (8%) | 466(88.76%) |

HSS = Hulu Sungai Selatan; HST = Hulu Sungai Tengah; HSU = Hulu Sungai Utara

eggs farmers obtained it from several villages in Hulu Sungai Utara districts.

This is in accordance to Suparyanto (2005) indicated that selection by farmers based on color pattern not based of their productivity, because most of the farmers don't have production recording system. Selection was done based on mainly body shape and visible appearance. Body shape don't only based on the condition of the body, while the appearance done more based on the proportion of body parts and certain plumage color, which only based on the experience of farmers in order to predict the production of the offsprings.

According Warwick *et al.* (1995), environmental differences such as the types of maintenance, exposed and shielded from the sun affect the plumage color, but not on the basic color pattern (Hardjosubroto, 2001). In addition, Suparyanto (2003) reported that the differences in plumage color is controlled by genes. The genes that responsible for the reduction of certain

plumage properties suspected are otosomal recessive genes, such as the white primary (w) can be produced from one gene or both like white primeries (w) and Runner (R). While diluted khaki (d) that acts to change the black to brown color, Runner pattern (R) local (spot) will abolish the pigment in the neck, wings and abdomen. grayish blue (Bl), which can reduce the production of black pigments.

Male duck from HSU, HST and HSS have a percentage of black dominant plumage color feature on the neck, back, chest and tail ranged from 60-80%, and the remain was plain plumage color and brown spotted (Table 2). Bluish blue of green plumage color feature on the wings has the highest percentage (100%). Similarly, the percentage of plumage color brown spotted around the neck, back and chest of females from HSS, HST and HSU ranged from 75.43 - 100%, the rest was black and pure white color (65-75%). Wulandari (2005) reported that which feature color of Cihateup ducks from Tasikmalaya and

Table 2. The Variation Dominant Color Plumage of Alabio Duck from Different Districts at South Kalimantan

| Body Part | Characteristics of Plumage color | Districts | | | | | | Total | |
|-----------|----------------------------------|---------------|-----------------|----------------|-----------------|---------------|-----------------|------------|-------------|
| | | HSS | | HST | | HSU | | Male | Female |
| | | male n= 25 | female n=175 | male n = 25 | female n=175 | male n =25 | female n=175 | | |
| Neck | Pure white | 6(24%) | - | 9(36%) | - | 9(36%) | - | 24(32%) | - |
| | Brown spotted | - | 132(75.43%) | - | 140(80%) | - | 149(85%) | - | 421(80.19%) |
| | Black | 19(76%) | 43(24.57%) | 16(64%) | 35(20%) | 16(64%) | 26(15%) | 51(68%) | 104(19.81%) |
| Back | Pure white | 7(25%) | - | 10(40%) | 44(25%) | 5(20%) | 35(20%) | 22(29.33%) | 79(15.05%) |
| | Brown spotted | - | 175(100%) | - | 131(75%) | - | 140(80%) | - | 446(84.95%) |
| | Black | 18(75%) | - | 15(60%) | - | 20(80%) | - | 53(70.67%) | - |
| Chest | Pure white | - | - | - | - | - | - | - | - |
| | Brown spotted | 7(25%) | 175(100%) | 8(30%) | 175(100%) | 7(25%) | 175(100%) | 22(29.33%) | 525(100%) |
| | Black | 18(75%) | - | 17(70%) | - | 18(75%) | - | 53(70.67%) | - |
| Wings | Pure white | - | - | - | - | - | - | - | - |
| | Brown spotted | - | 44(25%) | - | 44(25%) | - | - | - | 88(16.76%) |
| | Bluish green | 25(100%) | - | 25(100%) | - | 25(100%) | - | 75(100%) | - |
| | Black | - | 131(75%) | - | 131(75%) | - | 175(100%) | - | 437(83.24%) |
| Tail | Pure white | - | - | - | - | - | - | - | - |
| | Brown spotted | 7(25%) | 44(25%) | 8(30%) | 53(30%) | 5(20%) | 62(35%) | 20(26.67%) | 159(30.29%) |
| | Black | 18(75%) | 131(75%) | 17(70%) | 122(70%) | 20(80%) | 113(65%) | 55(73.33%) | 366(69.71%) |

Table 3. The Variation of the Plumage Color Shine of Alabio Duck from Different District at South Kalimantan

| Body Part | Characteristics of Plumage color shine | Districts | | | | | | Total | |
|-----------|--|---------------|-----------------|----------------|-----------------|---------------|-----------------|----------|-----------|
| | | HSS | | HST | | HSU | | Male | Female |
| | | Male n= 25 | Female n=175 | Male n = 25 | Female n=175 | Male n =25 | Female n=175 | | |
| Neck | Silver | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 75(100%) | 525(100%) |
| Back | Silver | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 75(100%) | 525(100%) |
| Chest | Silver | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 75(100%) | 525(100%) |
| Wings | Silver | - | 175(100%) | - | 175(100%) | - | 175(100%) | - | 525(100%) |
| | Shiny bluish green | 25(100%) | - | 25(100%) | - | 25(100%) | - | 75(100%) | - |
| Tail | Silver | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 25(100%) | 175(100%) | 75(100%) | 525(100%) |

Garut is pure white plumage color (11.11%) and pencilled ranged from 88.89-94.20%.

Based on the percentage of plumage shine (Table 3), male duck from HSS, HST and HSU has a glint of silver plumage (100%), especially on the neck, back, chest and tail. In the wings is the largest percentage plumage color was of spangled plumage shiny bluish green (100%). The highest percentage of shiny silver plumages (100%) was found on the neck, back, chest, wings and tail. The existing equality of plumage shine variability could be due to such as the ways farmers kept the animal is housing equipped back yard place, so that the intensity of solar

radiation are optimal.

Table 4 shows that male duck from the HSS, HST and HSU has a percentage of the bill, feet and shank color is lite yellow (40-60%), bright orange (12-44%), pale yellow (8-28%) and black ranged from 4-12%. The feet of female duck from HSS dominated by pale yellow each 42.86%, while the bill and shank dominated by lite yellow 52% and 51.43% respectively. When compared to Alabio duck from the HST and HSU the lite yellow at feet, shank part has a lower percentage.

It is suggested that the color differences of the bill, feet and shank are influenced by different raising and feeding management. Usually to under

Table 4. The Variation of Bill, Feet and Shank Color of Alabio Duck from Different Districts at South Kalimantan

| Parts of body | Districs | | | | | | Total | |
|----------------|----------|------------|---------|------------|---------|------------|------------|-------------|
| | HSS | | HST | | HSU | | Male | Female |
| | Male | Female | Male | Female | Male | Female | | |
| n= 25 | n=175 | n = 25 | n=175 | n =25 | n=175 | n=75 | n=525 | |
| Feet: | | | | | | | | |
| Bright orange | 5(20%) | 35(20%) | 7(28%) | 16(9.14%) | 7(28%) | 49(28%) | 19(25.33%) | 100(19.05%) |
| Lite yellow | 15(60%) | 60(34.29%) | 15(60%) | 87(49.71%) | 17(68%) | 70(40%) | 47(62.67%) | 217(41.33%) |
| Pale yellow | 2(8%) | 75(42.86%) | 2(8%) | 60(34.29%) | - | 43(24.57%) | 4(5.33%) | 178(33.90%) |
| Black | 3(12%) | 5(2.86%) | 1(4%) | 12(6.86%) | 1(4%) | 13(7.43%) | 5(6.67%) | 30(5.71%) |
| Bill : | | | | | | | | |
| Bright orange | 3(12%) | 50(28.57%) | 5(20%) | 10(5.71%) | 4(16%) | 16(9.14%) | 12(16%) | 76(14.48%) |
| Lite yellow | 15(60%) | 91(52%) | 14(56%) | 90(51.43%) | 14(56%) | 85(48.57%) | 43(57.33%) | 266(50.67%) |
| Pale yellow | 5(20%) | 20(11.43%) | 4(16%) | 71(40.57%) | 6(24%) | 69(39.43%) | 15(20%) | 160(30.48%) |
| Black | 2(8%) | 14(8%) | 2(8%) | 4(2.29%) | 1(4%) | 5(2.86%) | 5(6.67%) | 23(4.38%) |
| Shank : | | | | | | | | |
| Bright orange | 11(44%) | 45(25.71%) | 7(28%) | 12(6.86%) | 5(20%) | 21(12%) | 23(30.67%) | 78(14.86%) |
| Lite yellow | 10(40%) | 90(51.43%) | 10(40%) | 77(44%) | 15(60%) | 84(48%) | 35(46.67%) | 251(47.81%) |
| Pale yellow | 3(12%) | 35(20%) | 7(28%) | 77(44%) | 3(12%) | 67(38.29%) | 13(17.33%) | 179(34.09%) |
| Black | 1(4%) | 5(2.86%) | 1(4%) | 9(5.14%) | 2(8%) | 3(1.71%) | 4(5.33%) | 17(3.24%) |

intensive raising system the duck tend to have pale yellow color at bill, feet and shank. Feeding prepared by farmers twice or three times per day, with different feed formulation. Some farmers prepare ration with more percentage of small fish and swamps algae/green, as one source of carotenoids or xanthopyll that can help the formation of a yellow pigment. Suparyanto (2005) stated that one of the pairs of genes that causes the yellow color (w) in plumage, bill and shank and the color intensity affected by xanthopyll.

Wulandari (2005) stated that the color of the bill and shank of Cihateup duck from Tasikmalaya and Garut, has two colors i.e. yellow and black. Yellow color of the bill and shank is caused by fat or lipocrom pigment in the epidermal layer, while the black pigment or melanin occur in the epidermis and there is no such color on the dermis (Smyth, 1993), and is influenced by genes Id (inhibitor of dermal melanin) that is inhibit of the pigment melanin on the skin (Suparyanto, 2003). While the black color is influenced by genes charity melanin (Id⁺) which causes the color black. Warwick *et al.* (1995) and Hardjosubroto (2001) suggested that the phenotypic characteristics such as plumage, bill and shank color are fully controlled by genes that are not much influenced by environment.

CONCLUSION

The plumage color of Alabio male and female duck from three locations (HSS, HST and HSU) is dominated by grayish brown, bluish green and black color. Color feature of Alabio male duck was dominated by white-gray, grayish-black and grayish brown, and female duck is dominated by brown spotted color. Color feature of Alabio male duck was black and bluish green. While at the female duck the color feature was brown spotted, pure white and black color.

The male of Alabio ducks has a glint of silver plumage especialy on the neck, back, chest and tail. The dominant color of the of the bill, feet and shank male and female of Alabio duck were lite yellow majority, bright orange, pale yellow and black.

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