

1976

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Recommended Citation

Hanebrink, Earl L. (1976) "Characteristics and Behavior of Guineafowl and Domesticated Chicken Hybrids," *Journal of the Arkansas Academy of Science*: Vol. 30 , Article 17.

Available at: <https://scholarworks.uark.edu/jaas/vol30/iss1/17>

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Characteristics and Behavior of Guineafowl and Domesticated Chicken Hybrids

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ABSTRACT

The description, behavior, and morphologic measurements are presented for two hybrid crosses of domesticated chicken and guineafowl. The ease at which gallinaceous birds hybridize might warrant a closer look at the classification system. Possibly the number of families in the superfamily Phasianoidea should be reduced as some other researchers suggest.

INTRODUCTION

Hybridization occurs at the species, genus, and family levels among domesticated birds. In gallinaceous birds it has occurred among species of different families (Hanebrink 1973a, b). Isolating mechanisms, however, normally keep these crosses to a minimum.

The purpose of this report is to describe the characteristics of crosses between guineafowl and domesticated chickens. Ghigi (1900), Heinroth and Heinroth (1955), and others reported such crosses. The Heinroth's (1955) stated that both peacocks and domestic cocks are known to mate successfully with guineafowl hens, but the offspring show no sexual behavior because their sex glands hardly develop at all. Such hybrids are sometimes mentally abnormal and are always undistinguished in color; instead of being the sum of their two parents they are an unseemly mosaic of both. The breeding dress of the peacock and the elegant spotting of the guineafowl are the results of factors inherited from two birds of the same species: because the hybrids get only one dose of inheritance for either species, the characteristics of each parental type tend to be diluted. Recently Hanebrink (1973a, b) published reports on a cross between guineafowl and peafowl. Reports have been written on various hybrids of gallinaceous species. Some of these crosses have been induced artificially by artificial insemination. Domesticated chicken-quail hybrids (*Gallus gallus* x *Coturnix coturnix japonica*) were produced successfully by Mitsumoto and Nishida (1958) and by Wilcox and Clark (1961). Several crosses have been attempted between domesticated turkeys (*Meleagris gallapavo*) and domesticated chickens (Warren and Scott 1935). Published reports of turkey-chicken crosses indicate that only a limited number of fertile eggs were obtained and few advanced embryos (Ogorodii 1935, Quinn et al. 1937, Asmundson and Lorenz 1957). Olson (1960) reported successful hatching of chicken-turkey hybrids; he found a total of 302 embryos (14.2%) among 2,132 eggs incubated. One-hundred twenty of these embryos had attained an age at which down color established hybridization. Twenty-three hybrids hatched. It is evident from Olson's study that under certain conditions, spermatozoa from Dark Cornish and Rhode Island males are capable of fertilizing turkey eggs. An early account by Edwards (1761) reported a cross between a turkey and pheasant.

Crosses between peafowl and guineafowl have been reported by Serebrovsky (1929), Ghigi (1900), Taibel (1955), Heinroth and Heinroth (1955), Mayball (1961), and Hanebrink (1973a, b).

From crosses of turkeys and domesticated chickens, Olson (1960) reported all males. Wilcox and Clark (1961) gave no sex ratios among their artificial-insemination crosses of the *Coturnix* quail and domesticated chicken. Haldane (1922) concluded that in the F_1 offspring of a cross between two animals' species, one sex is absent, rare, or sterile. That sex is always the heterogametic sex. In birds the heterogametic sex is the female whereas in mammals it is the male. An increased percentage of males has been found in the F_1 generation in interhybrid crosses among gallinaceous birds. Ghigi (1936) reported only males in crosses between domestic fowl and guineafowl and guineafowl and peafowl. From color markings the hybrid guineafowl x peafowl cross reported by Hanebrink (1973a, b) was thought to be a female, although no eggs were laid and no autopsy was performed. This hybrid is living and associates itself with other

peafowl. According to Cole and Hollander (1950), a cross of a male pigeon with a female dove produces offspring which are all males, and these are sterile when mated to pigeons. When this hybrid is mated to a dove of the parental species, however, it occasionally produces a three-fourths dove. Such offspring are all males and sterile. A male dove mated with a female pigeon produces both male and female offspring of which all the females are barren.

DESCRIPTION OF DOMESTICATED CHICKEN—GUINEAFOWL HYBRIDS

Chicken-guineafowl hybrids (Figs. 1, 2) were hatched from guinea



Figure 1. Hybrid of White Leghorn and White Guinea fowl.



Figure 2. Hybrid of Buff Cochon and White Guinea fowl.

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eggs under natural barnyard conditions. In this situation two female white guineas were enclosed in a pen with several breeds of domesticated chickens. No male guineafowl were included in the enclosure. From a total of 30 guineafowl eggs, only one hatched; it produced the white hybrid (Fig. 1). The eggs were incubated by a domesticated duck and one of the female white guineafowl. All the other eggs from these two settings either were infertile or at least no development of embryos occurred to the hatching point.

The buff hybrid (Fig. 2) hatched from a total of 12 eggs. Four of these eggs were fertile to the point of the eggs being pipped. Two actually hatched from this setting but one chick died the first day. Both the buff and white hybrids (Figs. 1, 2) were reared with baby chicks and are now more than two years old. During the spring of 1974 copulation between the female white guineafowl and the two domesticated roosters was observed several times by David Remagen (pers. commun.) who is the owner of the hybrids. Morphologic measurements for the two female white guineafowl were practically identical. It was not known whether the hybrids came from one female guineafowl or both, but the father of the pure white hybrid had to be the White Leghorn rooster as there was no feathering on the tarsus and the color was pure white. The father of the buff hybrid had feathering on the tarsus which is characteristic of the Buff Cochinchin rooster. The hybrid was also buff, even though the female guineafowl was white. Neither hybrid shows any visible sex characteristics in its behavior, and they fare equally well with chickens and guineas but usually associate with each other. They feed and roost with both chickens and guineafowl but are seldom included in a flock of either chickens or guineas in their normal routine.

The hybrid from the female white guineafowl and male White Leghorn is solid white and is generally intermediate (Table I) between the parents in morphologic measurements but actually is smaller in stature than either parent. This hybrid has bright orange legs which are guinea-like but weak. The bird is wobbly as it walks. This cross has typical guineafowl stance with the tail elevated somewhat like that of the chicken. Waddles are vestigial and the face has sparse feathering, a characteristic of the guineafowl. There is no helmet like that of the guineafowl nor is there a comb like that of the domesticated chicken. There is a small round tubercle near the base of the upper bill which is characteristic of neither the chicken nor the guineafowl.

The cross between the male Buff Cochinchin and female white guineafowl is mainly larger (Table I) in morphologic measurements than the parent birds but is intermediate in stature. The color is a general buff with some feathering on the tarsus which is characteristic of the male Buff Cochinchin. The feathering on the tarsus, however, does not compare with that of the parent. This hybrid also has a guineafowl stance with its tail elevated like that of the domesticated chicken. It also has vestigial waddles and does not have the helmet characteristic of guineafowl. There is no comb but there is a slight protuberance at the base of the upper bill which both parents lack. The tips of the tail feathers are vermiculated and similar in coloring to those of the typical pearl guineafowl. The genetic origin of this characteristic is not known. The white guineafowl is a mutation from the wild pearl

African guineafowl and possibly they still carry some hidden genes for this characteristic. A common coloring fault among Buff Cochinchins is black feathers in the tail. However, the parent Buff Cochinchin male did not have this fault, and the hybrid's tail feathers were pearl-guineafowl-like rather than black.

SOCIAL BEHAVIOR OF THE HYBRIDS

Even though the guineafowl-domesticated chicken hybrids were reared with baby chickens they prefer to remain to themselves. They both show no visible sex characteristics and are calm under normal conditions. However, they are extremely nervous when caught and are easily frightened when cornered in contrast to either parent. Their voice is somewhat guineafowl-like although different. They never use their voice unless frightened. Peafowl-guineafowl hybrids associate more with other peafowl than they do with guineafowl. The guineafowl-domesticated chicken hybrids seem to have no preference but associate with each other. These hybrids are similar to guineafowl in their agonistic behavior as they are very hostile toward domesticated chickens while feeding which is a characteristic of guineafowl.

CONCLUSIONS

Crosses between domesticated chickens and guineafowl have been reported as well as a large number of crosses among other members of the superfamily Phasianidae. The cross reported here represents species in different families of the superfamily Phasianidae. The domesticated chicken had been placed in the family Phasianidae and the guineafowl in the family Numididae. Most published accounts mention the hybrids but give little description of the behavior or morphologic measurements. This report includes descriptions of the behavior and morphologic characters of such a cross. Though game breeders do not advocate interhybrid crosses, these crosses do occur both naturally and under artificial conditions. Sarvella (1969) mentions that these crosses can be valuable research tools. Cytological and biochemical (serum protein) studies of intergeneric and interfamilial crosses help to advance the understanding of evolutionary trends which lead to classification systems. Also, they can make it possible to devise techniques for transferring genes from wild birds to domestic ones. The ease with which gallinaceous birds seem to hybridize suggests a closer look at the classification system. Possibly the number of families in the superfamily Phasianidae should be reduced as suggested by Yamashina (1952) and Mainardi (1959).

ACKNOWLEDGEMENTS

The writer is most grateful for the cooperation of David Remagen in permitting the hybrids to be studied. Photographic work was done by Dr. Harvey Barton, Associate Professor of Zoology, and Dr. James Hutchison, Professor of Botany, Arkansas State University.

Table I. Comparison of Morphological Characters of Guineafowl-Domesticated Chicken Cross with Those of Parent Birds

Characters in cm	White Guinea	Hybrid White	White Leghorn	Hybrid Buff	Buff Cochinchin
	♀		♂		♂
Culmen	3.5	3.0	3.0	3.0	3.0
Tarsus	8.0	8.0	10.0	9.5	12.0
Middle Toe	4.3	5.0	5.5	6.2	5.3
Middle Toe with Nail	5.0	6.0	6.5	7.5	6.0
Bend of Wing (length outward from bend.)	12.70	10.16	12.70	15.24	14.00
Total Wing Length	33.02	30.48	35.60	33.02	40.60

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