

Breeding Program for Pondicherry Vultures

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Of the eight species of vulture found on the Indian Subcontinent, the Pondicherry (Indian Black) Vulture, *Sarcogyps calvus*, appears to be among the most vulnerable (Houston 1986). A solitary carrion-feeder which was never encountered in large numbers, this species' population has been further reduced in recent decades, probably in relation to widespread destruction of preferred habitat for this forest-loving vulture. While still considered common in northern portions of the Malay Peninsula and South Vietnam, reports indicate that populations throughout the majority of the range have declined in recent years. The decline in some areas, such as the nation of Bangladesh, appears to have been dramatic (Sarker 1983). The Pondicherry Vulture, as a species, is rarely represented in zoological collections in the United States. The most recent census indicates a U.S. captive population of eight individuals, five of which are offspring of the breeding pair currently exhibited at the Jacksonville Zoo. This pair has successfully produced a single offspring each year in 1983, 1984, 1986, 1987 and again in 1988. While several specimens have been located at major zoological col-

lections in Europe and Africa, no record of captive reproduction has been indicated other than with the pair at the Jacksonville Zoo. In addition to providing offspring available for future breeding programs at Jacksonville Zoo as well as other facilities, this program has allowed an opportunity for research concerning the captive reproductive behavior of this species. This information was acquired through an ethogram which was conducted on the adult pair during the 1987 breeding cycle at Jacksonville Zoo. The data obtained from this study were combined with reference material on distributions and populations of this species throughout the natural range and presented at the 1987 AAZPA National Conference in Portland, Oregon. This paper, titled "Status of the Indian King (Pondicherry) Vulture in the Wild and in Captivity," is included in the published proceedings for this conference (Penny, 1987).

Representing the only species within the genus *Sarcogyps*, the Pondicherry Vulture is quite distinctive in appearance, possessing a large wattle of skin behind and below each ear, with a pinkish red head and a neck bare of feathers. The general appearance of the head and neck provides at least a superficial resemblance to the Lappet-faced Vulture, *Torgos tracheliotus*, of Africa. Eye color within individual Pondicherry Vultures is variable, with some birds having dark brown eyes and others possessing pale yellow eyes. No evidence exists at this point to suggest that eye color is related to sexual dimorphism. With the adult pair at Jacksonville Zoo, the male has yellow eyes and the females are dark brown, as verified during observations of copulations during the spring of 1987. Plumage of adult birds is basically black tapering to dark brown on the lower back, wings, and tail. Two white patches of down on the base of the neck and lower flanks are particularly evident in flight. The bill is dark brown and relatively large.

The lower legs of the species are red, similar in color to the bare skin of the head and neck. Juveniles of the species are similar to the adults, but brown rather than black in plumage. Weight obtained on a 14-month-old bird at Jacksonville Zoo was 3.7 kg (8.1 lbs) with a head to tail length of 79.4 cm (31-1/4 inches). Wingspan measured 213.4 cm (84 inches). These measurements are estimated to be slightly less than those of the adults on exhibit.

While the Pondicherry Vulture is reported to be rather solitary in its habits (Grossman and Hamlet, 1964), it is noted to be wide-ranging as a species, occurring in southeast Asia from India eastward to Vietnam and the Malay Peninsula (Meyer de Schauensee, 1984). Several gaps appear to have developed in the original distribution within the last two decades, however, as the species is reported to have become extinct in Sri Lanka and Bangladesh (Sarker, 1983). According to Houston (1985), it is less common in Thailand than previously reported. In accordance with its solitary nature, most sightings of the species are of a single bird or a pair, even at carcass feed sites where dozens of vultures of other species are gathered (Baker, 1928; Grubh, 1983). Breeding activity throughout most of the Pondicherry Vulture's range begins as early as December, reaching a peak in February and March. Nesting is reported to almost always occur in trees or high brush and seldom, if ever, on cliff sites (Grossman and Hamlet, 1964). A substantial nest platform of sticks and branches is constructed by both male and female, a behavior which was verified in the captive pair during the 1987 behavioral study.

Concerning the captive reproductive history of Pondicherry Vultures at the Jacksonville Zoo, the pair currently breeding was acquired as adults from Southwick Wild Animals in 1965. For the next eight years, they were housed in a 3.0 x 4.0 x 3.0 meter enclosure with concrete floor. In 1973, they were introduced to a new 30 x 35 x 10 meter flight cage, sharing this enclosure with a variety of birds of prey. Current cagemates include a trio of Marabou Storks (*Leptoptilos crumeniferous*) and a single Grey Buzzard Eagle (*Geranoaetus melanoleucus*). Several species, including an Egyptian Vulture, a Bataleur Eagle pair and a Great Black Hawk, have been removed from the

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enclosure over the years, due to excessive aggression by the Pondicherry Vultures. All species within this enclosure are fed during the late afternoon, with the diet of 15 to 20 fish (spot spp fortified with vitamin B-1 tablets), distributed across the top surface of a series of tree stumps, approximately three to four feet in height, which are scattered at intervals across one side of the exhibit. This daily ration is supplemented three times weekly with four to six pounds of Nebraska brand Bird of Prey diet. Amounts of these diet items are adjusted periodically throughout the year in accordance with fluctuations of appetite observed within the exhibit specimens. While the Marabou Storks generally are the first to arrive at the food logs each evening and prefer the fish, the Pondicherry Vultures and the Buzzard Eagle will often join the feeding scene before the larger Marabous have departed and appear to eat the fish as well as the Bird of Prey diet readily. Large, domestically raised rats, which are occasionally added to the diet, are usually eaten quickly by the Marabou Storks, with the birds of prey disposing of any remaining portions. No breeding activity from the vultures was observed until 1982, when a nest was constructed approximately 7.0 meters above ground in an oak tree and an egg unsuccessfully incubated by the parents. The birds renested during the following winter and began sitting tightly on the nest on February 4, 1983. Due to dense foliage surrounding the nest site, actual observation of the nesting activity was difficult and our staff was unable to verify length of incubation and fledging period. The juvenile was first observed sitting on the edge of the nest on July 14, 1983 and had fledged by August 1, 1983. Excessive interest by the trio of Marabou Storks required removal of the fledgling vulture that same day where it quickly adjusted to self-sufficiency on a diet of Bird of Prey.

Successful breeding occurred again with this species in 1984, 1986, 1987 and 1988. Nest construction, incubation, and an apparent hatching occurred in 1985, but the chick was lost during repair work on the aviary waterfall system. Death was assumed due to subsequent neglect by the parents and exposure. While precise dates on egg laying could not be determined in any year until 1987, successful fledgling dates were as fol-

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The adult breeding pair of Pondicherry Vultures rests atop the waterfall structure in the bird of prey flight cage. While our female (left) has dark brown eyes and our male (right) has yellow eyes, no evidence exists in literature references to suggest that eye color is sexually dimorphic.

lows: July 30, 1984; August 11, 1986; August 17, 1987; and August 19, 1988. The offspring produced by the 1983 and 1984 seasons are currently being held by the Detroit Zoo, with the 1986, 1987 and 1988 juveniles retained in holding at the Jacksonville Zoo. Considering the lack of available information describing the reproductive behavior of this species in the wild, a decision was made prior to the 1987 season to obtain more detailed documentation of this subject via the ethogram. In particular, the role of each sex in nest building, incuba-



This is the juvenile Pondicherry Vulture which hatched on April 10, 1988 at the Jacksonville Zoo. Age at the time of this picture was approximately 7-1/2 months.

tion, brooding the chick and feeding it were of particular concern. A total of 227 hours of observation was conducted, beginning on January 26, 1987 and continuing through July 12, 1987. Among items of interest which were revealed by the ethogram was an incubation period of 50 days, somewhat longer than the 45 days reported in the wild by Grossman and Hamlet (1964). The fledgling period for this particular chick was determined to be 122 days. Additional information obtained through this study is described in the paper mentioned earlier in the article (Penny, 1987).

In summary, the Pondicherry Vulture appears to be one of a number of the Accipitrid (Old World) vultures which is poorly represented in western zoological collections. Information provided by the 1987 AAZPA ISIS SDR Abstracts indicates a United States population of 2.2.3 listed by reporting zoos at the time, with 1.1.3 of these being offspring of the breeding pair at Jacksonville. Obviously, considerable work is needed to broaden the gene pool if a viable captive breeding program is to develop in the United States. The Detroit Zoo has made some progress in this area, with the recent importation of a female Pondicherry Vulture from the Paris Zoo in France. Data provided by the 1987 ISIS Abstracts indicates that the Paris Zoo continues to maintain 1.1 Pondicherry Vultures within their collection. Additionally, one captive specimen has been located in Johannesburg, South Africa and another in Tel Aviv, Israel. Infor-

mation provided by Jack Clinton-Eitniew, director of the Center for the Study of Tropical Birds (San Antonio, Texas) indicates that both of these facilities currently wish to keep these specimens in their collections. The possibility exists that a number of these attractive vultures are currently being displayed in zoos within their natural range, as suggested by Grubb (1983), who notes that the Pondicherry more than any other species of vulture in India, is sought after as an attractive exhibit in zoos. Grubb notes concern over the fact that the species occurs nowhere in large numbers and could easily be eliminated in a given area by organized collecting. However, with few opportunities available for transfer of specimens from European or African zoos, the best option for diversification of the gene pool appears to be from either wild populations or captive collections within the natural range, particularly India. Considering pressures on wild populations throughout southeast Asia, careful consideration is mandatory before any specimens are taken directly from the wild. Final reference should be made at this point to Houston's (1986) statement that the American King Vulture, *Sarcoramphus papa*, as well as the Pondicherry Vulture may be headed for trouble within the current decade and that the Pondicherry may already be a threatened species. Such reports emphasize the need to further develop the captive breeding program which has a strong beginning at Jacksonville Zoo.

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