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Paul A. Johnsgard

University of Nebraska-Lincoln, pajohnsgard@gmail.com

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The Elusive Musk Ducks*

*Unusual behavior makes species both conspicuous
and difficult to observe*

By PAUL A. JOHNSGARD

IF one were to try to choose the most remarkable duck in the world, serious consideration would have to be given the Australian Musk Duck (*Biziura lobata*) of the family Anatidae. Among its unusual features are the great dimorphism of the sexes (males weigh eight pounds or more and are about three feet from bill to tail; females weigh two to three pounds and measure about two feet), the leathery pendent lobe that is located on the lower mandible, the strong odor of musk that is prominent in males during the breeding season, and the remarkably large eggs (averaging one-half pound). To these facts it might also be added that comparatively few people have ever seen Musk Ducks fly, that males have a most unusual whistling call, and that the males' displays are so loud and conspicuous that they can be seen and heard for at least a half mile under favorable conditions. In spite of all these unusual characteristics, no comprehensive studies on the biology of this species exist. This is the more remarkable considering the abundance of the bird over the southern half of Australia. The Musk Duck is of relative unimportance as a game species, since both sexes are of a dull gray color and, as they rarely fly, make poor targets. Also, the birds have a tendency to inhabit

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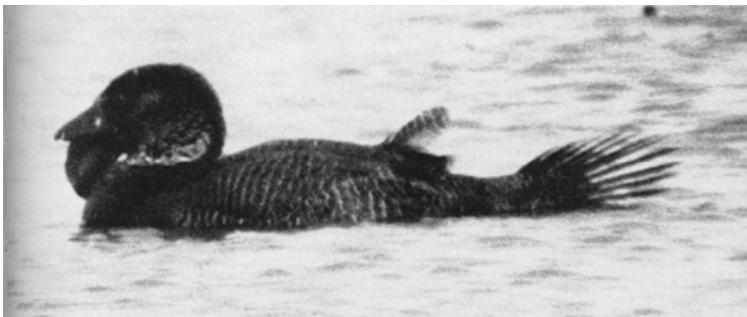
weedy, overgrown marshes and to dive from sight at the first sign of danger. This behavior probably is the reason that relatively little has been written about them.



Female, above, is about a foot shorter than male. Note large feet, posterior placement of the legs.

On reading the available literature on the Musk Duck, the paucity of definite information about it becomes apparent. For example, the origin of the musky odor has not been determined, although presumably it originates in the uropygial gland. Second, although the normal clutch of eggs is believed to number only two or three, some clutches of up to five or six have been reported, perhaps the result of several females' activities. Some writers suggest that the large males are essentially flightless, yet adult birds will suddenly appear on a lake in considerable numbers and disappear just as rapidly. Like

wise, large numbers will arrive at coastal areas during the winter, foraging in the shallows on invertebrate life. No definite function can be readily attributed to the lobe, which is largest in old males and rudimentary in females, but as it is not hollow it cannot serve for food storage as does a pelican's pouch.



Profile of swimming adult male, above, reveals unusually large lobe that hangs loosely when duck is not displaying.

If the lobe, the sexual dimorphism, and the musky odor are ignored, the remaining features of the species agree well with those of the typical stiff-tailed ducks such as the Ruddy Duck (*Oxyura jamaicensis*) of North America. For example, the tail feathers are elongated and stiffened for diving and maneuvering under water, the legs are placed so far to the rear that locomotion on land must be very difficult, the nest is built over water, and the eggs are large, white, and chalky. Thus it appears that the Musk Duck is an aberrant member of this specialized group of waterfowl, which includes seven other smaller species. Most of these have elaborate male sexual displays, including the inflation of the neck through the use of special tracheal air sacs or by the inflation of the esophagus. The Musk Duck lacks these structural features, but does have a subgular pouch connected with the mouth that allows for the

enlargement of the throat. Although the lobe usually hangs quite loosely and resembles a piece of soft, black leather, it can be made thicker and turgid, presumably through muscular action or the expansion of the subgular pouch.

Indications of a remarkable behavior associated with these curious anatomical features have been evident for some time. Australia's pioneer ornithologist John Gould mentioned the strange sounds made by Musk Ducks, including the "plonk call," which he likened to the noise produced by dropping a stone into a deep well. The origin of this sound has baffled many people, some of whom have attributed it to vocal origin, while others have contended that it is caused by the wings, feet, or tail striking the water's surface. More recently, various ornithologists have described a sharp whistle associated with the elaborate kicking displays of the male. The female is thought to have only a few vocalizations, which is unusual among ducks. Partly to try to answer some of the many questions concerning this and several other species of Australian waterfowl, I went to southern Australia, aided by a research grant from the National Science Foundation. I hoped that a study of the behavior of these species would produce new evidence as to their taxonomic relationships and a better understanding of the evolution of behavioral differences in the family Anatidae. Although the more technical details of these studies have been published elsewhere, the Musk Duck provides such a perfect example of the effects of sexual selection on behavior and structure that its interest as a biological case study in evolution equals the curiosity value associated with any strange and exotic species.

While the Musk Duck has been reported to lack gregarious tendencies, it frequently does occur in flocks during the non-breeding season. At such times these gather on larger lakes and along the coast, relatively undisturbed by hunters and other predators. The birds are too large to be attacked by fish, and dive from sight when a hawk or an eagle appears. Like the

smaller Ruddy Duck and the similar Australian Blue-billed Duck (*Oxyura australis*), with which it sometimes associates, the Musk Duck is a hardy bird. It is edible, and for a period of time there was a commercial attempt to can and market its meat.



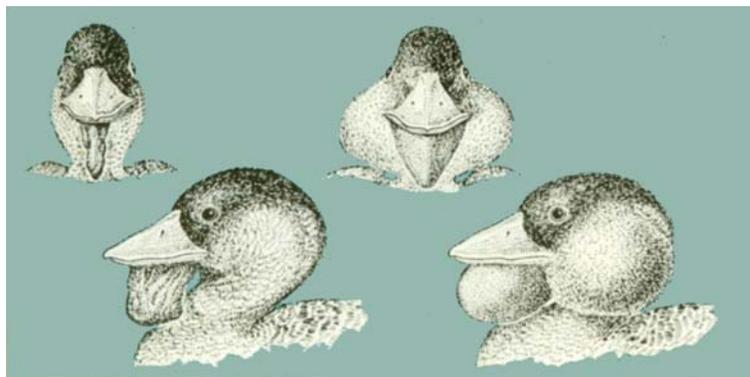
Splashing, above, is part of male's "plonk kick" display during which both feet strike the water with a loud smack.

As the spring breeding season approaches, Musk Ducks move into places where permanent water areas exist, and which have substantial cover of emergent vegetation such as rushes and cattails. In such areas the males begin to attract the females by a combination of vocal and mechanical sounds and visual posturing.

Unlike the other stiff-tails, or ducks in general, there does not appear to be a true "courtship" that facilitates the formation of a pair bond lasting through the breeding season. Rather, the males indiscriminately display to all females, and probably associate with them only until fertilization is achieved, after which the female lays the eggs and tends them and young by herself. In this way the male is potentially capable of fertilizing a large number of females; the limit simply depends upon the availability of females and the distance from which they can be attracted. Thus the conspicuous nature of the displays is ex-

plained through sexual selection as determined by the differential abilities of males to attract females on the basis of their varying appearance and their behavior. (The younger males have smaller pouches and possibly display with less vigor.) In this way the presence of the pendent lobe and inflatable throat pouch, which enhance the visual aspects of display, seems explainable, and the loud splashing and calling provide important auditory stimuli. However, there is no evidence that the females are sensitive to the musky odor of the males. The surprisingly large size of the mature males may also be related to sexual selection, but certainly must also be partly a result of their aggressive tendencies. When a male is displaying to one or more females—frequently several will be attracted simultaneously — other males sometimes also approach the group. Should such an "onlooker" male move too close to a female, the displaying bird will suddenly rush toward him across the water surface or, more commonly, dive submarine-fashion and attempt to attack him from below. Usually the intended victim frantically retreats at the first indication of an attack, but occasionally a vicious battle ensues, with biting, wing beating, and scratching all combined amid a frenzied splashing of water. Smaller and weaker males are probably lucky to emerge from such a battle without broken bones, and thus a distinct advantage accrues to the larger and stronger. This, then, could well account for the evolution of the extreme sexual dimorphism that exists today.

In the displays of the male Musk Duck, we can see an interesting hierarchy of forms that appear to represent increasing degrees of modification and exaggeration of normal behavior and reflect probable stages in the evolution of these displays. Not only do the postures become progressively more unlike normal swimming postures, but also the time intervals between them become more constant and predictable.



Drawings at left show how lobe and neck look normally. At right, lobe is turgid during courtship display, as throat and subgular pouch are inflated.

The simplest of these displays consists of a vigorous backward thrust of the feet that produces a “paddling kick,” in which a sheet of water is thrown upward and backward six feet or more. Clearly this display derives from a stronger than usual paddling movement, thus resulting in both visual and auditory stimuli, but lacks marked posturing or associated calling. Paddling kicks are repeated at irregular intervals of several seconds.

The second display, or “plonk kick,” is made up of variable tail cocking, lobe and throat enlargement, and a simultaneous kick by both feet. Unlike the paddling kick, which is primarily directed backward, the plonk kick tends to throw water out laterally, and both legs are momentarily lifted from the water as they are pulled back ward. As the feet enter the water their outstretched webs strike the surface, thus producing the distinctive plonk sound associated with the display. These kicks are indefinitely repeated at intervals of approximately three seconds, with only slight variation.

As females are attracted by the noise and water movement, the male replaces the plonk kick by the most complex display,

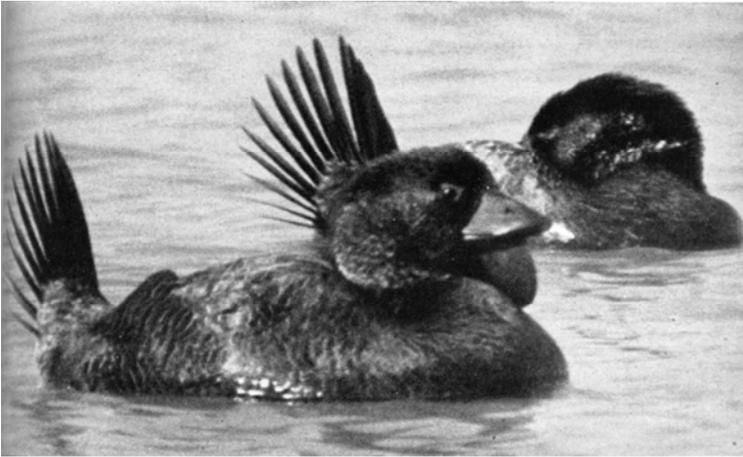
the “whistle kick.” Extreme tail cocking, lobe enlargement and throat inflation are associated with this display, which consists of a relatively weak lateral kick of both feet and a simultaneous, sharp whistle. Between kicks the body is often flexed upward to an extreme degree, as the bill is raised and the tail is bent forward until it touches the back. The interval between successive whistle kicks averages over three seconds and rarely varies by more than a quarter-second.

This species is perhaps unique in that no special preliminary displays are apparently associated with actual mating. Rather, the male quite suddenly mounts and copulates with one of the females he has attracted. This “primitive” method of mating probably simply reflects the fact that pairing in the species is non-existent and, as a result, there is no need for synchronization of sexual stimulation or pair-bond maintenance mechanism.

After copulation, the females move into dense growths of rushes or similar emergent plants and construct their nests. Sometimes the nest is built on the branch of a tree that has been partially submerged, as often happens during the flooding of lowlands in rainy years. The incubation period of Musk Ducks is another of the many points of its life history that still remains unknown, but it is probably as long as, or longer than, the three-week period of the smaller stiff-tails. The downy young are extremely precocial, swimming and diving shortly after hatching. Occasionally the young have been reported to ride on the mother’s back as she swims about partially submerged. According to one authority, the downies grasp the feathers of the mother’s neck, and during times of danger she may even dive with the young clinging to her.

Although few people have observed adult males in flight, I have witnessed flights by females or immature males on several occasions. In each case there was a strong offshore wind, the birds were in rough water near the middle of a lake, and they flew toward the calmer water near shore. Actual flight

was not attained until the birds had “run” for about forty yards or more over the water, and even then an altitude of only a few feet above the surface was reached before they “crash-landed” into the water again. In general, it appears that most flights are undertaken at night, and several instances of nocturnal accidents are on record, such as when birds have flown into the sides of buildings.



Elongated, stiffened tail feathers, above, help the ducks in diving and maneuvering under water. Bird in rear is asleep.

There are a few cases of Musk Ducks having been kept in captivity for various periods, and one male even survived for six years in the Berlin Zoo during the early 1900's. This bird terrorized almost all the other waterfowl on its pond by attacking them under water; its appearance would consistently cause a fast, general retreat to the shore by all other ducks.