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THE NESTING OF THE NEW MEXICAN DUCK

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Plates 12 and 13

THAT no nesting record of the New Mexican Duck (*Anas diazi novimexicana* Huber) exists in the literature is rather surprising, considering that the duck has been recognized as distinct since 1920. This gap is probably due to the bird's limited range and wariness, and the resulting lack of familiarity with the species on the part of both the ornithologist and the duck hunter. The local names "Black Duck" and "Black Mallard," applied to it by most of the few sportsmen who distinguish it at all, express generic recognition but specific confusion. The only other subspecies of the species is *Anas diazi diazi* Ridgway, of the high plateau country of central México.

The writer's purpose is to summarize here information relating solely to the nesting of the New Mexican Duck, gleaned by visits to museums and especially by field studies in New Mexico. This paper is preliminary to publication of a full life-history study which has been carried on for two years and remains to be completed.

I am indebted especially to Mr. Adrey Borell of the Soil Conservation Service Regional Office in Albuquerque for facilitating the work in various ways. Thanks for permission to examine specimens and for other courtesies are extended to Mr. H. B. Conover, Dr. Herbert Friedman, Dr. J. W. Aldrich, Mr. Allen Duvall, Major Allan Brooks, Dr. J. T. Zimmer, and Dr. K. P. Schmidt. Locally, for necessary authorization I wish to thank Mr. Cyril Luker and Mr. Ezra Warner; for help, Mrs. Elizabeth Lindsey, Mr. William Williams, and Mr. Tom Kerr. Verifications of plant identifications were made by staff members of the U. S. National Museum. Organized Research, University of New Mexico, materially assisted the writer by a grant covering half the expenses of the field work.

The known nesting range of the New Mexican Duck is confined to a small area of the southwestern United States, but the presumptive range extends southward into Chihuahua, México, where its relation to the northern breeding limits of the Mexican Duck (*A. diazi diazi*) is undetermined. Without doubt the great majority of our subspecies breeds within the boundaries of New Mexico, chiefly in the Rio Grande Valley where this traverses the southern half of the state. The northernmost point of this duck's nesting range is in Rio Arriba County, N. M.

In June, 1883, Dr. E. A. Mearns collected a peculiar male (U. S. National Mus. 134,686) which he considered an immature Mallard. The locality noted was Belen, El Paso County, Texas. Mearns wrote on the label: "mated and probably breeding." The specimen is clearly the result of interspecific crossing between the New Mexican and Mallard Ducks, with the characters of the former greatly predominating. The extreme southern part of the Mallard's breeding range covers most of the known nesting range of the New Mexican Duck; frequent hybridization produces individuals showing widely varying proportions of the traits of the parent species. Almost any day in winter and early spring, interesting wild hybrids may be seen at close range, mingling with wild Mallards which also winter in the duck ponds at Rio Grande Park, Albuquerque. Hybrids usually outnumber the pure New Mexicans here; few of the latter winter this far north.

Mearns's specimen, in view of his notation on the label, furnishes the closest approach to a breeding record for Texas. The locality is near the Rio Grande and not many miles from New Mexico.

There is as yet only one set of eggs in a museum, and the accompanying hen does not seem to be pure-blood New Mexican. Mr. J. Stokely Ligon collected this bird at the nest, and with it its five eggs, at Lake Burford (Stinking Lake), Rio Arriba County, N. M., July 17, 1913. Since this antedated the description of the New Mexican Duck, the specimen was naturally identified at the time as a Mallard. The skin (U. S. Nat. Mus. 240,231) and eggs (U. S. Nat. Mus. 40,128) now bear the name *A. diazi novimexicana*, since H. C. Oberholser in the early 1920's determined the bird as *A. novimexicana*. The latter name was given by Huber (1920) in the original description, before the relationship to *A. diazi diazi* was pointed out by Conover (1922).

Because this hen and her eggs furnish the first data on the New Mexican Duck's nesting, the validity of the identification merits some

discussion. Whereas the male New Mexican, although similar to the Mallard female, is not difficult to distinguish from it, in the case of certain hens it is impossible to decide with certainty to which species they belong. This is probably due in part to convergence of the extremes of individual variation within both species; dark Mallard hens closely resemble the light variants among the New Mexican hens. In addition, hybridization greatly confuses the picture. Most male hybrids are easily recognized as such, which is far from true for females of mixed blood, since the phenotypic characters of the normal hens of the two species furnish only slight, largely relative differences.

Duck 240,231, then, has belly plumage with both the streaks and ground color lighter than in the average New Mexican hen, but still within the range of variation in this species. The dark tone of the belly scarcely lightens from front to vent, a New Mexican trait which is the best distinction between hens of the two species. Its tail feathers and lower tail-coverts resemble those of the Mallard more than the New Mexican, since some of the light streaks are practically white. Possibly this specimen is an exceptionally light New Mexican, but those characters mentioned, and others, point to the conclusion that it is of mixed blood with the New Mexican traits more apparent than those of the Mallard.

A Mallard hen (U. S. Nat. Mus. 269,078) taken at Lake Burford, N. M., by Wetmore, closely approaches the New Mexican condition in certain characters. This lake, in the extreme northern part of the state, is well within the breeding range of the Mallard.

The five eggs taken from the 1913 nest average 56.9 mm. long and 44.4 mm. wide. In color they are very light, with a mere tinge of slightly bluish green. Ridgway (1912) shows no color nearly light enough; the closest approach is "pale glaucous green," plate 33, row 39 B G, f. On direct comparison they are indistinguishable in color from many Mallard eggs. Of forty-five eggs of *A. diazi diazi*, comprising nine sets, in the U. S. National Museum, none show as strong a green tint as the set of *A. diazi novimexicana* eggs, and many of the former show no color beyond an ivory tone. When a greenish tint shows up in the *A. diazi diazi* eggs, it is not a bluish green but a very pale olive green, rather dull in appearance.

After searching in the Rio Grande Valley for nests, Huber (1923) wrote: "The nest and eggs of the New Mexican Duck, so far as I know, still remain to be described. Although I hunted almost daily during the last half of May and the first half of June, I was not successful in locating a single nest of this species." However, his ob-

servations of young accompanied by old females showed that the species breeds near the river at Las Cruces, N. M. He stressed the extreme wariness of the birds of every age.

In the early 1930's, Major Allan Brooks visited the Cienaga of San Simon in extreme southwestern New Mexico, where he found a number of New Mexican Ducks evidently breeding, but did not see a nest.

Mr. Adrey E. Borell found three duck nests at this cienaga (marsh) in 1941, and has kindly made his unpublished notes available. He lacked facilities for photographing the nests. Two of the nests were determined as those of the New Mexican Duck by his seeing the hens. Borell's notes are as follows: "May 21, 1941—One nest in clump of willows surrounded by water contained 8 eggs. Female flushed from nest at 5:00 P. M. One nest in clump of cattails surrounded by shallow water contained 8 eggs. Female on nest at 8:30 A. M. One nest in grass 12 inches tall, on dry ground, at base of small ash tree about 20 feet from edge of slough. This nest had been molested by C.C.C. boys a week before and was deserted when I saw it. Remains of broken egg shells indicated several eggs." He also observed four different hens with their broods, of which he saw seven, six, four, and three young, respectively.

The present writer searched for New Mexican Duck nests almost every week end during the spring and summer of 1944. Most of this time was spent in, and in the vicinity of, the Bosque del Apache Federal Wildfowl Refuge south of San Antonio, N. M. The species was well represented and evidently breeding here, but not until late in the season was an occupied nest discovered. However, on May 20, a female New Mexican Duck, which I was watching through binoculars at close range, walked from the water's edge in a flooded field to the top of a low dike beside a shallow, dry ditch. After ten minutes there she returned to the water. At the spot where she had been I found a single egg, in a saucer-like, natural depression in the dry earth, bare except for a few leaves of xerophytic plants drifted there by the wind. This was the first egg of the species that I had seen. The following day the egg was still in the same position. It is not uncommon for ducks to drop an egg away from any nest. The egg was still there a week later.

Finally, on June 25, 1944, my first nest was seen. A New Mexican hen flushed from the nest when I approached within 30 yards, leaving the two eggs uncovered. The nest was photographed in monochrome and in color; the eggs were measured and replaced. Two weeks later the hen was attending the nest, but there were still only two eggs. Perhaps this bird was nesting for the first time.

This nest was located in the Bosque del Apache Refuge, where officials had seen many broods of young but had not found the nest of this species. It was in a moist, level meadow, forty-five yards from a sluggish stream 20 feet wide by 18 inches deep. The vegetation at the nest site was common three-square (*Scirpus americanus* Pers.) and saltgrass (*Distichlis* sp.). These arched over the nest somewhat, giving fair concealment. Dark gray down feathers were abundant in the rim of the nest from the day when it was first seen, but the great bulk of the total nesting material, which weighed 215 grams air dry, consisted of short fragments of three-square and grasses. This nest, because of its abnormal egg number, was not followed through, and the fate of the eggs is unknown. When the nest was visited in the autumn to examine the nesting material, no egg-shell fragments were found.

The following season, 1945, three nests were found, all on an area administered by the Soil Conservation Service in Hidalgo County, N. M., where an overgrazed valley has been taken over for restoration. This is in the watershed of the Gila River, and is the only known nesting station outside of the Rio Grande drainage (Plate 12, top figure). Ground water, supplied from 638 square miles of drainage area in Arizona and New Mexico, funnels northward through the valley to form a marsh two miles in length and averaging 0.15 mile wide. Obviously, such a marsh is a highly unusual feature of this arid country, and the New Mexican Duck nests in greater concentration here than at any other known breeding locality. The altitude is 3880 feet. Channels of open water as much as eight feet deep are sluggish and discontinuous; there is a fall of 34 feet in the two miles of heavily vegetated marsh. The channels are marked by long, sinuous lines of large willow (*Salix Wrightii* And.) trees, and isolated clumps of the same trees, growing from the centers of isolated, circular water-holes, are typical of the drier northern portion of the marsh. Cottonwoods form scattered clumps. A large part of the two-mile stretch of marsh is dominated by cattail (*Typha latifolia* L.) and Olney's three-square (*Scirpus olneyi* A. Gray). Adjacent to the marsh farther north, the water table is too far down to support willows or marsh hydrophytes due to severe gullying brought on by overgrazing. Grazing is now permitted under the jurisdiction of the Soil Conservation Service.

The bottomland bordering the marsh supports a zone of mesquite scrub and thorn-trees extending as far out as the ground water remains sufficiently close to the surface to support such trees of ten to

fifteen feet in height. Beyond this mesquite zone occurs the vegetation type which characterizes the surrounding country generally, except the high mountains—namely, the desert grassland dominated by grama (*Bouteloua*) and mesquite grasses (*Hilaria*) of various species; the most conspicuous and easily recognized plant is the palmilla (*Yucca elata* Engelm.).

At this marsh I camped from April 10 through June 20, 1945, devoting full time to study of the New Mexican Duck. I judge that six pairs nested there that season. A New Mexican Mallard hybrid drake mated with a New Mexican hen, but their nest was not found. Although Mallards and Cinnamon Teals were common during April, neither was seen during May or June, and it is safe to say that no ducks other than the New Mexican bred there in 1945.

My second New Mexican nest (Plate 12, middle, and Plate 13, lower left) was found April 30, when I was watching at a great distance a pair flying over a moist meadow. One of them sloped down to the nest site; the other continued in flight back to the water. There were nine eggs which, judging from one which was collected, had been incubated approximately two weeks. The nest was situated among saltgrass (*Distichlis stricta* Rydb.) and scattered cocklebur (*Xanthium saccharatum* Wallr.), 77 yards west of the open water of a deep channel bordered by reed (*Phragmites communis* Trin.) and cattails. Several feet of distinct runway, arched over by grasses, approached the nest from the northeast. The nest was very well concealed in a dense clump of mostly dead saltgrass which drooped over it, 14 inches above. Down was abundant in the nest. The surrounding soil was saturated just below the surface.

A blind made of green artificial grass (cemetery) matting over a portable framework of pipe was set up, and daily moved nearer the nest until May 2, when the duck tolerated it within a few feet, which proximity I considered necessary because of the lack of a long-focus lens. The blind seemed to increase her apprehensiveness; that afternoon when I approached within thirty yards, very cautiously and mostly keeping hidden by the blind, she suddenly flew up *with an egg*, her bill gripping the embryo and the yolk dripping from the dangling shell. She circled over the cattails some fifty yards in the air, and there the egg dropped, whether by accident or design. To my surprise, the birds did not desert the nest after this episode. They did, however, on May 4 when a steer stepped upon the edge of the nest, crushing three eggs. It is noteworthy that the drake was still keeping company with the hen at this advanced stage of the incubation period. No evidence of hybrid traits appeared in either individual.

On further examination of the nest's make-up, the inside of the downy cup measured 8 inches in length by 5.5 inches across, while the nest was 15 inches by 10.5 inches outside the down rim. Beneath the down layer, a shallow lining of compacted grass fragments was 2 inches lower at its center than at its rim. The outside dimensions of this grass foundation were 12 inches by 9 inches, with an inch thickness of grass at the nest's center. Beneath the grass foundation, among the bases of the grass stems of the clump sheltering the nest, was a shallow scoop in the ground which did not extend down below the general level of the surrounding earth between grass clumps. Therefore, the nest remained dry.

While the adults were not collected because of the scarcity of nesting pairs, the identity of the nest was validated by incubating an egg artificially and raising the young female New Mexican Duck to the age of more than five months, then preserving it as a scientific skin (A. A. L., N. M. 15). The accompanying photograph (Plate 13, top figure) shows this bird at exactly five months of age. The details of its development are not germane to the topic of this paper.

Nests 3 and 4 (Plate 12, bottom, and Plate 13, lower right) were found May 15 by flushing the hens from the nests. Each nest then contained five eggs. One which I took from nest 3 showed approximately ten days of incubation. As has always been my experience when hens have been scared up from the nest, the eggs were left uncovered. However, when I visited nest 3 the following day at 5:00 P. M., the hen was absent and the nest had been covered with a level, continuous blanket of down, beneath which only *two* eggs remained. These were stone cold. No trace whatever of the other two could be found in the nest or its environs, including the bottom of a pool ten inches deep which lay only 16 inches from the edge of the nest. Marking the eggs inconspicuously, I replaced them in such a way that I could tell if they were changed in position even slightly, and put back the down covering.

May 17 at 7:00 P. M. I revisited nest 3, finding everything quite unchanged. Since the same was true the following morning, I took the two eggs and kept them all day on cotton in a metal pan kept in the sun with the lid open enough so that a thermometer with its bulb touching the eggs was held at approximately 39° C. That evening I put the two eggs under a Pekin duck at a near-by ranch, and on May 21 substituted an electric incubator. There on May 28, the still surviving duckling pipped the shell three-fifths around but died in its attempt to hatch. Its viability seems noteworthy because

incubation, when nearly half through, had been interrupted for at least 42 hours, very probably for 71 hours. All three nights were cool.

Nest 3, poorly concealed from above but fairly so otherwise, was among tufts of the rush, *Juncus balticus* var. *montanus* Engelm., which dominated the meadow. *Carex simulata* Mack. and grasses also grew near the nest. The wet earth beneath the nest was nine inches above the water level of a very stagnant pool, 70 feet by 4 feet, formed by the erosion of a rut of an old wagon road. The bird's access to the nest was by two short runways, the end of each dropping seven inches straight down to the water. The original runway, three feet long or twice the other's length, approached the pool's edge at a 45° angle; the newer one led off, not from the edge of the nest facing the pool, but from one side, so that rushes screened the nest from the pool. This short runway was in regular use. The other, although quite distinct as though from long use, had been abandoned and young rushes were thriving in it. Also, the nest itself showed that the exact site had been used before, apparently for some years. Its well-packed foundation, 1.5 inches thick in the middle and varying from 2 to 3.5 at its rim, consisted of very worn, moldy, short sections of grasses and rushes.

Nest 4 had been selected for thorough observation; on the day it was found a barbed-wire fence was put up around it in the form of a circle forty yards in diameter, to protect it from cattle. The nest lay in a tall clump of *Carex prae-gracilis* W. Boott, with the grass, *Hordeum jubatum* var. *caespitosum* (Scribn.) Hitchc., in scattered growth close by. The general area for a radius of 30 feet from the nest was dominated by a dense growth of the spike rush, *Eleocharis rostellata* Torr. The nearest open water was 0.1 mile away.

The five eggs present when found May 15 increased to six the next day. The hen started incubation the same day she laid this last egg. I spent May 17 watching the nest vicinity from a distance. The hen had spent the previous night on the nest, leaving it at 8:13 A. M. (Standard Time) to join her mate in a slough 0.3 mile away. She had carefully covered the six eggs, making a flat-topped dark pad of the down. After feeding for fifty minutes, the pair flew over to the nest, dipping down to 15 feet above it but not alighting or pausing in flight, then circled back to the slough for casual feeding, loafing, and preening. Again, at 10:05, the pair flew together directly to the nest. The drake did not alight, but left the hen there, where she stayed until 2:09 P. M. when she took fright at my stealthy approach. I left at once, and eight minutes later the pair circled low over the



NEW MEXICAN DUCK: (*Upper*) NESTING AREA, HIDALGO COUNTY, NEW MEXICO. (*Middle*) SITE OF NEST No. 2. (*Bottom*) SITE OF NEST No. 3.



NEW MEXICAN DUCK: (*Top*) YOUNG FEMALE RAISED FROM NEST NO. 2.
(*Lower left*) NEST 2. (*Lower right*) NEST 4.

nest without alighting, as though to check its safety. Later in the afternoon they left the slough and flew over the nest in the same way, returning to the slough to feed until after sunset. At 7:09, both flew to the nest, where only the hen alighted. She remained there, and I left the area at 7:33 when it had become too dark to see. The following morning before sunrise, at 5:02, the hen was found on the nest.

I did not visit the nest May 19, judging the presence of several fishermen at the slough to be disturbance enough. At 9:00 A. M. on May 20, the female was away and the six eggs were well covered with down, and warm. In the afternoon I saw from a distance that the pair was still attending the nest. That evening a Sunday party of target-shooters at the slough, which is privately owned, made considerable noise a quarter mile from the nest. I am sure these people did not approach the nest. At 7:00 o'clock next morning the nest was down-covered, but only *three* cold eggs remained, with no trace of the other three. I believe the duck had not spent the night at the nest, having deserted it the previous evening after spiriting away half the eggs and pulling the down neatly over the others.

With all three 1945 nests, there is either direct observation or strong evidence of ducks transporting eggs away when deserting or very nervous. It would seem that this is a peculiar trait of behavior in the New Mexican Duck. The only reference I have seen to ducks carrying eggs is this quotation from Hochbaum (1944, p. 92): "On two occasions local guides have told me that they have seen Mallard hens carrying eggs in their bills. I took such reports with a grain of salt until one morning in May, 1941, an approaching duck in flight immediately caught my eye because of the peculiar shape of the head. As it came closer I saw that it was carrying something in the bill. It was a female Shoveller, and as she passed within thirty yards of me it became clear that she was carrying an egg between the upper and lower mandibles, the egg being held near the tip of the bill. I have no evidence which might explain such behavior."

The remaining eggs from nest 4 were incubated artificially. Candling showed that two of them still contained living embryos on June 3, nineteen days after incubation commenced, but they failed to hatch.

Twenty-three eggs of the New Mexican Duck have been measured. They range in length from 53.3 (the above-mentioned dropped egg of 1944) to 59.6 mm. In breadth the range is from 40.0 to 43.2 mm. The maximum length and breadth measurements were both taken from the same egg, one of the nine from nest 2. The mean length of the 23 eggs is 56.8 mm.; the mean breadth, 41.2 mm.

For comparison, the 71 eggs of the Mexican Duck (*A. diazi diazi*) in the U. S. National Museum were measured. Their mean length is 55.2 mm.; the mean breadth, 41.0 mm.

In color, the typical New Mexican Duck egg, unblown, matches that of Plate 19, 1, C of Maerz and Paul's 'Dictionary of Color' (1930). There is no name for this exact color sensation; the named colors closest to it are "water green" in which the green has markedly greater value or brightness than that of the egg, and "eucalyptus green" which is the same as the egg color in value and hue, but is less pure, having considerably more gray. This book has several distinct advantages over Ridgway for accurate color recording of eggs, eyes, and soft parts, which make it superior for these; unfortunately, it is inferior for plumages, due largely to the hard, glossy, unfeatherlike texture of the color plates.

SUMMARY

The known breeding range of *Anas diazi novimexicana* is restricted to the Rio Grande watershed in New Mexico and Texas, and the Gila watershed in southwestern New Mexico. Frequent hybridization with the Mallard confuses the determination of range.

The only set of eggs collected previously was in 1913, seven years before the bird was recognized by science.

The first photographs and descriptions of the nest and eggs are presented, based on four nests studied in 1944 and 1945. None of the nests came through to hatching, in two cases because the hens deserted after they had carried away half of the eggs. Another hen, flushed from the nest, flew off with an egg in her bill. One artificially incubated egg produced a female duckling which was hand-raised for five months.

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