

Hybridization Among *Aechmophorus* Grebes and Implications for Identification



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All photographs by Steven G. Mlodinow

The *Aechmophorus*¹ grebes, Western (*A. occidentalis*) and Clark's (*A. clarkii*), are among the most distinctive breeding-bird species of Colorado, with their relatively large size and striking plumage. Western Grebe is a widespread breeder on larger water bodies in the state (Ortega, 2016a), while Clark's Grebe is rare in Colorado in the breeding season away from the eastern plains (Righter et al., 2004; Ortega, 2016b).

Western and Clark's Grebes were considered color morphs of a single species until they were given separate species status (AOU 1985) based on evidence that these taxa had a high degree of assortative mating (Ratti, 1979; Nuechterlein, 1981) and a strongly bimodal distribution of visual characters (Storer and Nuechterlein, 1985). Reproductive isolation appears to be based on differences in vocalizations (Nuechterlein, 1981; Nuechterlein and Storer, 1982) rather than other aspects of the complex courtship displays, which seem identical in the two species (Nuechterlein and Storer, 1982). Supporting this conclusion is that hybrids with vocalizations of one species or the other were far more likely to find a mate (73%) than those giving an intermediate call (20%) (Nuechterlein and Buitron, 1998). Playback experiments suggest that mate choice becomes less selective late in the breeding season (Nuechterlein and Buitron, 1998), reducing reproductive isolation as a whole. Because of the near-identical structure and very similar plumage patterns of the two species, particularly in basic plumage, hybridization between the two species can result in an identification quandary for birders.

Rates of hybridization among Aechmophorus grebes

The rate of hybridization can be indirectly measured by the percent of mixed pairs in a population. This rate was found to be 1.2% in Utah (Ratti, 1979) and 1.1% at Tule Lake, California (Nuechterlein, 1981). A more-direct, but more-

¹ From the ancient Greek meaning "spear-bearer"

difficult, assessment of that rate can be obtained by determining the number of hybrids at individual locations. The percentage of *Aechmophorus* grebes appearing to be hybrids at breeding locations include 1.5% in Manitoba (Eichhorst and Parkin, 1991), \approx 3% in Manitoba/Minnesota (Nuechterlein and Buitron, 1998), 3.2% in the Klamath Basin (Kontner, 2011), and 6.5% in northern Utah (Kontner, 2012).

There are, apparently, few or no data on rates of mixed pairs or percentage of hybrids from Colorado in the ornithological literature. On 2 July 2009, Mlodinow was able to closely observe 149 nesting *Aechmophorus* grebes at Potholes Reservoir, Grant County, Washington and found 2.5 % of pairs were mixed and 1.9% of individuals appeared to be hybrids (Mlodinow, unpubl. data).

Identification of *Aechmophorus* grebes

Storer and Nuechterlein (1985) provided what has become the standard for differentiating Clark's Grebes from Western Grebes, albeit only in alternate plumage (roughly from April into October). Western Grebe has its red eyes completely surrounded in black and a yellow-green to yellow bill with a diffusely dusky culmen. Clark's Grebe has its red eyes completely surrounded in white and a bright yellow-orange to orange bill with a sharply defined black stripe along the culmen. Ratti (1981) added the whiter sides of Clark's Grebe and, to a lesser extent, that species' paler back as useful, though not diagnostic, criteria for differentiating the two taxa. Importantly, diagnostic criteria for these species in non-breeding plumage (mostly from October into April) are murkier, with a number of field guides and other sources (e.g., Storer and Nuechterlein, 1985) vaguely stating that bill color is duller then and loreal pattern less reliable (more likely to be dusky in Clark's or show whitish in Western). Additionally, regarding individuals of both species in their first plumage cycle (which runs into/through September of their second calendar year) have less-distinct plumage patterns (Pyle, 2008): The lores can have a dusky wash, the black upperparts plumage can be mixed with worn brownish feathers, and with the back feathers having pale fringes. These birds also lack the elongated lateral crown feathers that create the flaring crown of adults. Such immature birds also sport brownish eyes as late as their first December and with some not developing the typical bright red eyes until their second September.

The criteria for identifying *Aechmophorus* grebes have been refined somewhat since the publication of Storer and Nuechterlein (1985). Below are criteria that we have worked out based on experience in California, Washington, and Colorado, and based upon discussions with our birding colleagues. The following should be read with reference to Figures 1-4.

Head Pattern

Alternate plumage: Differences in the black-and-white head pattern have long



Figure 1. This Western Grebe is in alternate plumage and shows all of the classic features of the species. The yellow-green bill has dark top and bottom edges, the red eyes are entirely enclosed in black, the hind-neck stripe is wide, the back is quite dark, and the sides and flanks are almost entirely dark. Arapaho National Wildlife Refuge, Jackson County, Colorado; 4 July 2014.



Figure 2. Also in alternate plumage, this Clark's Grebe exhibits the typical features of a bill that is strongly orange with a distinct dark culmen stripe, the eyes surrounded by white, red loreal stripes, thin hind-neck stripe, back noticeably paler than the hind-neck stripe, and the sides and flanks having substantial white plumage. Windsor Lake, Weld County, Colorado; 22 April 2013.

been a primary character for separating Clark's from Western Grebe. These differences are most obvious when birds are in alternate (breeding) plumage, mostly from April into October. Alternate-plumage Clark's Grebes have a black crown that does not extend onto the face, so that the eyes are totally encompassed by white. In alternate-plumage Western Grebes, the black of the crown extends onto the face, fully encompassing and "hiding" the eyes. Of note, in a small minority of alternate-plumage Westerns, the lores look diffusely gray rather than black. Additionally, during courtship displays both species lift their crown feathers, which in Western Grebes leads to white or pale gray appearing above the eye.

Basic plumage: When not in alternate plumage, the border between the dark and light is often less crisp in Western Grebes, with most having some gray or mottling in the face, lores, and/or forehead, all areas that are black during the summer. The eyes are somewhat visible in some Westerns, and a few may show white between the eye and maxilla ("upper mandible") in basic plumage. Conversely, Clark's Grebes usually maintain a sharp demarcation between black and white areas, but the black of the cap often reaches the very top or the upper rear portion of the eyes. However, a "pure" winter Clark's should not have dark in the loreal region or below the eye.

The loreal stripe (a strip of bare skin extending from the eye to the bill) is an oft-useful character that is rarely noted in the identification literature. In Clark's Grebe, the loreal stripe is nearly always brightly colored in breeding condition, varying from bright yellow to nearly red, though seeing the loreal stripe can be difficult, depending on angle, distance, and lighting. During winter, the loreal stripe can be bright, but is often dull, rarely black. In Western Grebe, the loreal stripe is never brightly colored (usually black, sometimes gray). During summer, the stripe is engulfed by the black of the face and is typically invisible. During winter, when the face is often mottled or grayish, the loreal stripe is sometimes apparent.

Bill Color and Pattern

Another standard mark for telling Western and Clark's Grebes apart is bill color. Western Grebes have dull yellow to yellow-green bills. Clark's Grebes have bright yellow-orange to orange bills, often with intense orange-red at the base of the mandible, especially during breeding season. Western Grebes never show this orange-red color. Clark's Grebes have duller-colored bills during the winter, whereas there seems little seasonal difference in this character among Western Grebes. Observers should be wary, however, of the effects of lighting, which can cause a the dull yellow of a Western Grebe's bill to gleam yellow-orange or obscure the bright coloration of a Clark's Grebe's bill. Beyond color, Western Grebes have a diffusely dusky culmen and dusky along the bottom edge of the bill; in both cases, the dark is more prominent and extensive proximally. In

Clark's Grebes, the culmen has a narrow black stripe with sharply defined edges and no dusky along the lower edge of the bill.

Body Color

Western Grebes tend to be darker overall than Clark's. When looking over a mixed flock of *Aechmophorus* grebes, the darker birds usually are Westerns and the paler ones Clark's. This distinction is mostly due to a disparity in darkness on the birds' sides, though the differences in back shading contributes. The sides of alternate-plumage Clark's Grebes often look nearly white, whereas Western Grebes are typically medium to dark gray. When in basic plumage, many Clark's are darker, decreasing the usefulness of this character. More importantly, the angle and brightness of light can wreak havoc upon the observer, causing white-sided Clark's to sometimes look wholly dusky and dark-sided Westerns to gleam as if white. To properly assess the darkness of a grebe's side, the bird should be sitting in neutral position (not preening, swimming quickly, diving, or courting) on relatively flat water in good lighting.

Hind-neck Stripe

The hind-neck stripe is narrower in Clark's Grebe than in Western. At its narrowest point, the hind-neck stripe of basic-plumage Western Grebes is 15-20 mm wide while in Clark's Grebes it is 10-15 mm wide (Pyle, 2008). Furthermore, the apparent width changes with position in both species, the stripe appearing narrower when the neck is extended. This field mark is truly adjunctive and should not be considered definitive when making an identification.

The Hybrid Issue

This portion of this essay should be read with reference to Figures 3-5 here in the text and Figures 6-7 on the back cover.

We know that Western and Clark's Grebes hybridize with each other (Kontner, 2011) and that "pure" birds will breed with hybrids. Three percent would seem a reasonable estimate of hybrids among the United States/Canada breeding populations of *Aechmophorus* grebes, given the data presented above. So, when should we consider an *Aechmophorus* grebe a hybrid as opposed to an "odd" Western Grebe or Clark's Grebe? Or simply as unidentifiable?

Kontner (2012) labeled birds (in July) as hybrids using identification criteria set forth by Storer and Nuechterlein (1985), differentiating species by 1) bill color and the presence of black or white 2) in the lores, 3) above the eye, 4) below the eye, and 5) behind the eye. If an individual displayed more than one mark at odds with identification to either species, it was considered a hybrid; individuals with only one incorrect character were left as indeterminate. Side color, loreal stripe, and width of hind-neck stripe were not considered.

Most *Aechmophorus* grebes seen in Colorado are in alternate plumage. For such birds, we mostly adopt Kontner's approach, except that we factor in side color



Figure 3. The left bird has a typical Clark's Grebe bill but has black reaching the top and rear of the eye. Additionally, the loral stripe is black and the upperparts and sides appear darker than those of its mate (right); it is obviously intermediate, thus a hybrid [in eBird parlance, "Western x Clark's Grebe (hybrid)"]. That mate looks typical of Clark's Grebe in most respects, excepting the black loral stripe, which breeding-condition Clark's should not show. The right-hand bird could (possibly correctly) be considered a Clark's Grebe, but a safer identification may be, in eBird parlance, a "Western/Clark's Grebe." This photo also nicely illustrates the typical size difference notable between males and females of the two *Aechmophorus* grebes. Most mensural characters in these species show only a small amount of overlap in ranges between the two sexes; the left bird is almost certainly the female of the pair. Upper Queens Reservoir, Kiowa County, Colorado; 10 June 2017.

and, to a lesser degree, hind-neck stripe. Therefore, an indeterminate bird by Kontner's (2011) standards that favors Western Grebe but has distinctly pale sides, we would consider as a hybrid. Likewise, a grebe with dark sides, that Kontner (2011) would have labeled indeterminate, we consider to be a hybrid. The neck stripe is added into the equation only in birds at either end of the spectrum: very wide or very narrow. Additionally, in our opinion, a brightly colored loral stripe or bright orange-red at the base of the mandible indicate the presence of Clark's Grebe genes so that a bird otherwise resembling a Western Grebe with either of these features would be considered a hybrid. Conversely, a bird resembling a Clark's Grebe with dusky along the lower edge of the mandible would be considered a hybrid. Unfortunately, genetic studies on *Aechmophorus* grebes have proved inconsistent (Kontner, 2012), and field-identification help from that realm will not be soon forthcoming.

As of 16 July 2018, there were some 188 Colorado records of Western x Clark's Grebe hybrids housed in eBird (eBird 2018). These records are scattered across 27 counties with the vast majority from the eastern plains (particularly Weld County). However, there are also records from relatively lightly-birded parts of western Colorado, such as Archuleta, Eagle, Moffat, and Montezuma counties. While the preponderance of the eBird records are from warmer seasons, the period in which the genus is most abundant in the state, there are also many.



Figure 4. This hybrid has white lores and the areas below and behind the eye is mostly white, much like a basic-plumage Clark's Grebe. However, the black along lower edge of bill and the darkness of the sides and flanks favor Western Grebe. The bill color seems intermediate. Frederick, Weld County, Colorado; 28 October 2012.



Figure 5. With dark sides, dark along the lower edge of the bill, and shading encompassing the eye, this grebe could be easily passed over as a Western Grebe. However, this bird is in alternate plumage. Thus, with the bird's eye being encompassed by dusky (rather than black) and with the spur of white just touching the eye below and in front, the possibility of the bird being a hybrid should be considered. The bill is more orange than that of a Western Grebe, and there was a hint of red (not visible in this photo) at the very base of the mandible. Windsor Lake, Weld County, Colorado; 30 April 2013.

from winter, including the bird during the 2017-2018 winter on Brush Hollow Reservoir, Fremont County, that was so widely reported as a Clark's Grebe.

Conclusion

Though considered separate species, Western and Clark's Grebes do hybridize, and hybrids likely compromise 1% to 5% of the overall *Aechmophorus* grebe population in the United States and Canada (the status in the Mexican breeding populations is unknown). The presence of hybrids turns an otherwise straightforward identification into a challenge. Identification of these grebes should be based on a suite of characters that includes facial pattern, bill color and pattern, loreal stripe and its color, and shading of sides. Even using this array of features, distinguishing between hybrids and parental species is not always possible. Therefore, any out-of-season or stray *Aechmophorus* grebe should be carefully evaluated before an identification is made.

ACKNOWLEDGEMENTS

We thank Marshall Iliff for his review, on short notice, of a previous draft of the manuscript. We also thank the host of eBirders that continue to enlarge and refine our understanding of geographic and temporal distribution of birds.

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Figure 6. This alternate-plumage hybrid could be easily passed over as a Clark's Grebe, but for the black of the cap touching (or very nearly so) the eye both from above and behind. Additionally, the loreal stripe is black. Windsor Lake, Weld County, Colorado; 30 April 2013. Photograph by Steven G. Mlodinow.

Figure 7. The left bird bears a strong resemblance to Western Grebe, with darker sides and a duller bill than its Clark's Grebe mate (right). However, the bill color is rather bright and orange for Western Grebe plus there is orange-red at the base of the mandible. Once those anomalies are noticed, the white immediately below and behind the eye, dusky in front of the eye, and black above the eye lead to its identification as a hybrid. It also has an anomalous small dark ring encircling the eye and, unlike Clark's Grebe, has loreal stripe of dark feathering. Potholes Reservoir, Grant County, Washington; 2 July 2009. Photograph by Steven G. Mlodinow.



Figure 6



Figure 7

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