

WESTERN GREBE — ONE SPECIES OR TWO?

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The summary of highest counts of individual species in 1982 Christmas Bird Counts across North America included under Western Grebe a separate entry for 31 W. (Clark's) Grebe in California and a comment on the first-time appearance in this journal for what will "likely prove to be a distinct species."⁷ Just prior to this, Harrison had called attention to the Western Grebe also, stating that it has "two subspecies ... which may prove to be good species."⁵ Most recently, the latest edition of the American Ornithologists' Union (AOU) Check-List added a special note to Western Grebe, mentioning 2 colour morphs which may represent distinct species and, if so, will be called Western Grebe (*Aechmophorus occidentalis*) [dark-phase] and "Clark's Grebe" (*Aechmophorus clarkii*) [light-phase] (See Figure 1)!

The status of the 2 color phases has been debated for well over 100 years, but in none of its previous 5 editions from 1886 to 1957 did the AOU Check-List indicate that they may represent 2 species. Nor do the 2 varieties appear to have been illustrated together in field guides prior to 1980. Peterson in 1961 mentioned 2 head patterns but showed only light-phase, without naming it.¹⁰ Three current guides show both colour phases: Peterson without comment, Scott with light- and dark-phase downy young and Farrand using the name Clark's Grebe and commenting on biological separation and possibly reclassification.^{11 14 4}

Distinct colour differences, do not always turn out to represent a species difference. Many single species have 2 or more adult, non-seasonal, non-sexual colour forms, including several

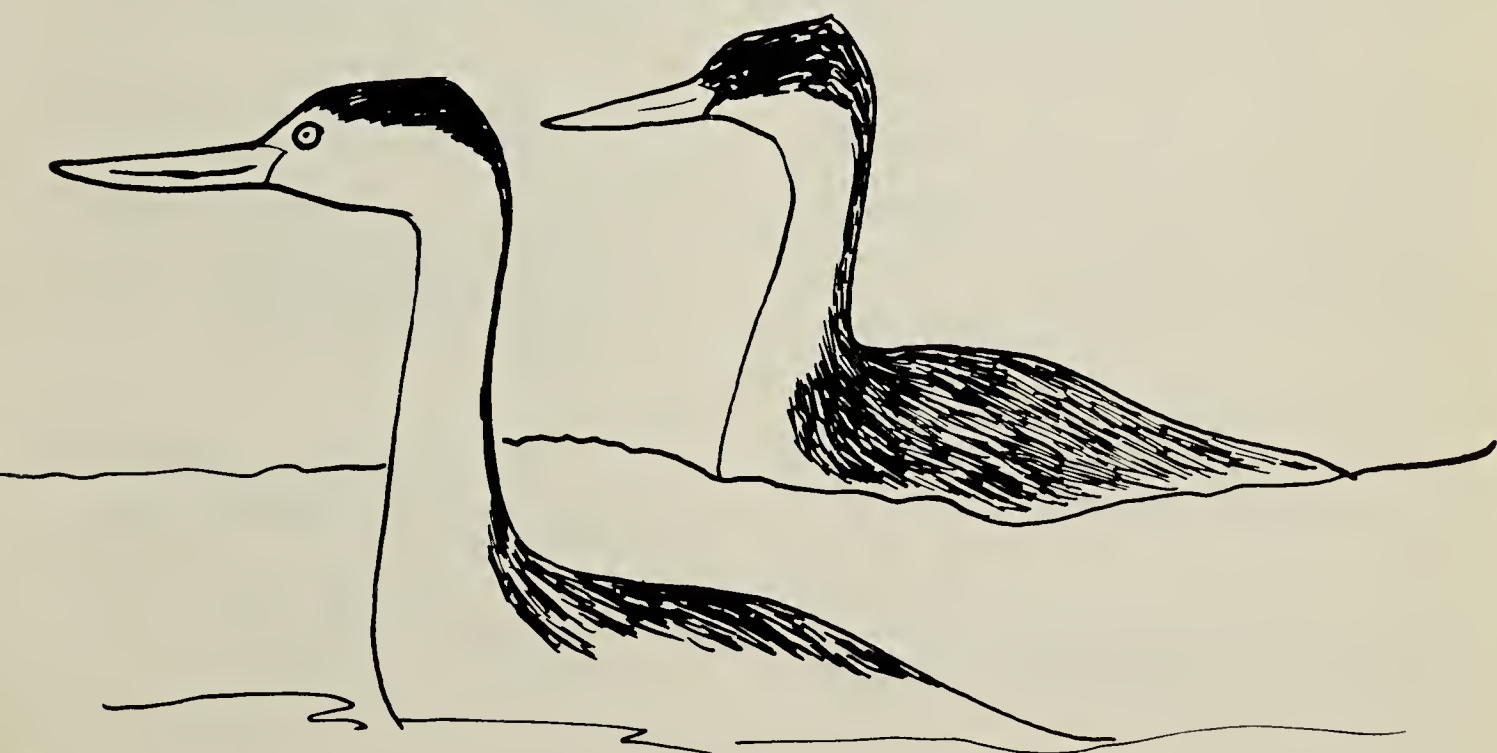


Figure 1. Western Grebe Colour Phases. Left, light-phase. Right, dark-phase. Drawing by Mary Gilliland.

buteos, falcons and sparrows, the Snow Goose and the Eastern Screech-Owl. Nor does lack of apparent colour and pattern differences always result in classification of 2 or more groups as one species. Some species resemble each other so closely physically — meadowlarks and Empidonax flycatchers, for example — that vocalizations become the main basis for more positive identification.

The critical factor in all cases is whether the groups in question do, or have the potential to, successfully interbreed on a large scale in the wild. If not, they are considered separate species. Occasional interbreeding is not by itself likely to change this assessment.

Field Characteristics

The Western Grebe is the largest North American grebe. The 2 colour phases have distinct differences in bill colour, extent of dark feathers on the head and neck, and darkness or lightness or dorsal and flank plumage. Rare

intermediate forms do occur, in which the black crown colour bisects the eye and the flanks and back are not so uniformly dark.⁴ Colour differences are itemized in Table 1.

Ratti's study found the sole significant size variant to be culmen length in females: light-phase birds averaged 3 mm shorter than dark-phase.¹² He did note a possibly significant general trend toward smaller light-phase measurements. Most current references do not differentiate between light- and dark-phase in physical measurements. Males of both phases are generally larger with thicker and longer bills.⁹

Ratti studied downy young of both forms in Utah and confirmed the early appearance of colour differences.¹² Dark-phase chicks began acquiring black crowns much sooner than light-phase young — at 10-15 days instead of 50-60 for the latter group. By 45 days dark-phase chicks had black crowns. Dorsal and flank plumage followed the

Table 1. FIELD CHARACTERISTICS OF LIGHT- AND DARK-PHASE WESTERN GREBE

<i>Light-Phase</i>	<i>Feature</i>	<i>Dark-phase</i>
Crown colour does not reach eyes, lores or mouth area. ¹⁵ Lores are white. ⁴	<i>Facial Colour</i>	Black crown colour extends below eyes, which are surrounded by black feathers. ⁴ Lores gray to black.
Orange-yellow with top of upper mandible black. ¹⁵	<i>Bill Colour</i>	Dull greenish-yellow with top of upper mandible black. ¹⁵
Paler gray flanks and back speckled with white feathers. ⁴	<i>Flank and Dorsal Plumage</i>	Uniformly dark gray to black. ⁴
Narrower ¹⁵	<i>Black Nape Stripe</i>	Wider ¹⁵
About 22 in. ¹³	<i>Body Length</i>	24-29 in. ¹³

same trend and light-phase chicks still appeared white by comparison to dark-phase until about 50 days. Lindvall and Low in the same area reported similar trends but reduced the time at which both groups resembled the respective adult phase to 25-35 days.⁶

Distribution

The Western Grebe breeds from southern British Columbia to south-central Mexico on the Pacific Coast, and inland to Manitoba, Minnesota and Iowa.⁴ It is casual to rare in the East. Wintering populations occur on the Pacific Coast through the summer range and in the Mexican interior, Utah, New Mexico, Colorado and Texas.¹

Available data on colour phase distribution clearly indicate a clinal component. Dark-phase dominates in the north and light-phase increases toward the south. Almost all eastern records are dark-phase.¹⁴ Storer reported Canadian populations to be almost completely dark-phase.¹⁵ Those of the Dakotas were similar to Saskatchewan's at approximately 1% light-phase; Utah's light-phase population of about 12% was similar to those of California and Oregon. Some Mexican populations neared 100% light-phase.² Discovery of local variations in these general proportions has not finally changed acceptance of the basic underlying geographic component of colour phase distribution.

Behaviour

Research has revealed a strong tendency toward preferential mating of like colour phases. Storer's observations of 127 pairs showed a notable disparity between the number of mixed pairs actually present and that to be expected if mating were random for colour phase: 4 present and 30 expected.¹⁵ Ratti's combined data in his

3-year Utah study indicated colour-mixed pairs occurred at only about 2% of the expected random frequency — 3 present and 140 expected.¹² His field investigations in other states produced similar results. Nero's earlier Saskatchewan study, in which 5 of 500 Western Grebes were light-phase, indicated 2 of the 5 were mated to each other.¹⁵ This could be expected less than once in 10,000 cases if mating were random. Manitoba's statistics for total light-phase and for mixed pairs resembled Saskatchewan's.⁸

Discussion

Three possibilities seem to exist for future classification of variants of Western Grebe. First, there is considerable basis for raising the light phase to full species status as Clark's Grebe. The 2 colour phases are almost totally isolated reproductively. Spatial segregation and differences observed in morphology, nest initiation dates, mean brood size and development of chicks support such a division.¹² Intermediate plumages may well be immatures and adults in non-breeding state. In breeding populations researchers found only rare intermediate forms and of these none was intermediate in either bill colour or in advertising call.⁸ This initial contact between unpaired birds of opposite sex appears to differ consistently between the two phases. Light phase birds have a single note, dark phase birds a two note call.

When interbreeding does occasionally occur it appears to be successful.⁸ Ratti gives interbreeding statistics for colour phases of Snow Goose — 50% of the frequency expected — and Parasitic Jaeger at 87%.¹² His data on mixed pairs of Western Grebe showed them to be 1.2% of nesting pairs and only 0.26% of pairs with broods. Broods of mixed colour phase were 0.5% of the total in his study group (4 of

766) and could well result from egg dumping or brood mixing. He surmises that interbreeding at such a low level may actually be strengthening reproductive isolation of the 2 phases.

A second option for which some support exists is based on studies by Dickerman and others in Mexico.^{2,3} Dickerman found sufficient combinations of colour and size variables to warrant suggesting the smaller *clarkii* as a subspecies including both colour phases. If the 2 colour phases were to be considered full species, new subspecific names would have to be added for large pale birds and small dark birds.¹⁶

The third possibility is continuation of Western Grebe as one species with 2 colour phases. Researchers unwilling to yet change this classification recommend further investigation in all regions, particularly on populations in Mexico. More research is also needed on Canadian populations.

Whether Western Grebe remains one species or becomes two, it presents a unique case. Ratti, in supporting division, says, "if dark- and light-phase grebes are morphs, they represent a unique biological phenomenon. Examinations of the literature on avian systematics indicates that no other broadly sympatric avian polymorphic species is known to exhibit such a low incidence of interbreeding."¹² Nuechterlein, believing the question of species separation still open, also sees unique aspects: "I know of no other instance in which males of two separate species regularly engage in *mutual* display to attract females."⁸

For the moment Western Grebe remains a genus of one species with 2 colour phases. Researchers in Canada, the United States and Mexico are continuing to identify and investigate gaps in data and trying to arrive at the most

accurate description of the relationship between its light and dark phases through examination of physical characteristics, vocalizations, general behaviour and habitat selection. For now the dilemma remains.

Role of the Amateur

It is certain that skilled amateurs can become involved by examining thoroughly those populations of Western Grebe which they encounter, by making careful notes on their observations and by publishing them or making them available to provincial museums. Local naturalists are clearly in a position to contribute to current research, since the Western Grebe breeds across the southern parts of the Prairie Provinces.

Blue Jay readers with observations on ratios of dark phase Western Grebe to "Clark's" Grebe in areas they visit in 1984 are invited to send their findings to the author.

¹AMERICAN ORNITHOLOGISTS' UNION. 1983. Check-List of North American birds. Sixth Ed. American Ornithologists' Union, Lawrence, Kansas.

²DICKERMAN, R.W. 1963. The grebe *Aechmophorus occidentalis clarkii* as a nesting bird of the Mexican plateau. *Condor* 65:66-67.

³DICKERMAN, R.W. 1973. Further notes on the Western Grebe in Mexico. *Condor* 75:131-132.

⁴FARRAND, JOHN, Jr. 1983. The Audubon Society master guide to birding. Vol. 1. Alfred A. Knopf, New York.

⁵HARRISON, PETER. 1983. Seabirds. An identification guide. Houghton Mifflin, Boston.

⁶LINDVALL, M.L. and JESSOP, B. LOW. 1982. Nesting ecology and production of Western Grebes at Bear River Migratory Bird Refuge, Utah. *Condor* 84:66-70.

⁷MONROE, B.L., Jr. 1983. Summary of highest counts of individuals for Canada and the U.S. *American Birds* 37:793.

⁸NUECHTERLEIN, G.L. 1981. Courtship behavior and reproductive isolation between Western Grebe color morphs. *Auk* 98:335-349.

⁹NUECHTERLEIN, G.L. 1981. Variations and multiple functions of the advertising display of Western Grebes. *Behaviour* 76:289-317.

¹⁰PETERSON, R.T. 1961. *A field guide to western birds*. Houghton Mifflin, Boston.

¹¹PETERSON, R.T. 1980. *A field guide to the birds east of the Rockies*. Houghton Mifflin, Boston.

¹²RATTI, J.T. 1979. Reproductive separation and isolating mechanisms between sympatric dark- and light-phase Western Grebes. *Auk* 96:573-586.

¹³RIDGWAY, ROBERT. 1896. *A manual of North American birds*. J.B. Lippincott, Philadelphia.

¹⁴SCOTT, S.L. 1983. *Field guide to the birds of North America*. National Geographic Society, Washington, D.C.

¹⁵STORER, R.W. 1965. The color phases of the Western Grebe. *Living Bird* 4:59-63.

¹⁶WILLIAMS, S.O., III. 1982. Notes on the breeding and occurrence of Western Grebes on the Mexican plateau. *Condor* 84:127-130.



Western Grebes (dark-phase)

Sheina Wait