The Identification of Chickadees in New Jersey: A Tool for the Breeding Bird Atlas

by DAVID SIBLEY

Two species of Chickadees are found in New Jersey: Black-capped in the north and Carolina in the south. Their ranges barely overlap and neither species wanders far into the range of the other, so most observers will have only one species to deal with. Within the area of overlap, however, identification can be a tremendous challenge, and an observer claiming a record of either species out of range will have a difficult job proving the claim.

Due to the difficulty in separating the two species, the range of both species in New Jersey has never been precisely defined. Documenting the actual area of overlap, and possible changes in distribution, is one of the most challenging problems in New Jersey field ornithology. Coincidentally, one of the goals of the Breeding Bird Atlas is to accurately document the breeding range of all species that breed in New Jersey, including these sister species. The Atlas project also hopes to locate the area of hybridization, if one exists.

Distribution and Movements

In general these two species are separated by range. Black-cappeds occur to the north and at higher elevations, Carolinas to the south and at lower elevations. A glance at the map (figure 1) will identify most individuals, but there is a narrow band across the state where both species are found. This **contact zone** seems stable, although it is possible that the entire contact zone is slowly shifting north (Frank Gill, pers. comm.). Further evidence of this shift comes from observations near Hopewell, New Jersey, where Carolina Chickadees arrived about 10 years ago and now coexist with Black-cappeds (Hannah Suthers, pers. comm.); and from Princeton's Institute Woods, where both species nested as recently as 1980, but only Carolina has been recorded in the past few years (Laurie Larson, pers. comm.). Black-capped Chickadees stage periodic irruptive flights in fall, when hundreds or even thousands can be seen in a day flying past coastal points in New England. These birds seem to evaporate before they reach New Jersey, but Black-capped Chickadees can occasionally be found in winter a few miles south of the line drawn on the map. Carolina Chickadees seem to be essentially sedentary, and have not been recorded north of the mapped range.

Figure 1.

Map of central New Jersey showing the approximate area inhabited by both species of chickadees. While the reviewers of this map agreed on the **general** area of overlap, there was limited agreement on the details. Within this area many local features could cause local variation in chickadee distribution, and the actual boundaries of the contact zone are probably irregular; they may even vary from year to year. Note that Sandy Hook supports an isolated population of Black-capped Chickadees, while the adjacent mainland holds only Carolinas.

Geographic Variation

Both species are comprised of several subspecies (of dubious validity) which exhibit a clinal change in size and plumage. In general both species become slightly larger and paler to the north, so that relatively large pale Carolina Chickadees occur in New Jersey together with relatively small, gray Black-capped Chickadees. Think of these species forming a continuous cline from small and gray in Florida to large and pale in Alaska, with a distinct step —a small but abrupt change—in New Jersey.

The Black-capped Chickadees that arrive with the periodic fall invasions, and most or all of those found south of the contact zone, probably originate far to the north. Although not a different subspecies, these may appear slightly more distinctive—paler and fluffier—than the resident New Jersey Black-cappeds.

Identification by Plumage: Tertial Talk

The differences between these species are most easily assimilated by looking at the drawing of the species as you read this description of plumage. Subtle but distinct differences exist in the plumage of these two species, but when looking for these differences it is important to remember the season. Both species molt into fresh plumage in late summer, and appear clean and silvery from then until early spring. Summer adults (after thousands of trips in and out of a small nest hole) become very worn, and look darker and scruffier than in winter. Juveniles appear as early as April, and the contrast of a fresh-plumaged juvenile next to a worn adult could lead to misidentification of the adult as Carolina (drabber) and the juvenile as Black-capped (brighter).

The differences I describe are for birds in fresh plumage, and may be less useful in summer. There may be additional differences that become apparent when birds are worn, but I have little experience with summer chickadees. In the contact zone hybrids do occur. Remember that some chickadees in that area are simply not identifiable. A final word of caution: confident identification requires a very detailed view. Chickadees seen briefly as they flit through the treetops are usually unidentifiable, and distant views can be misleading. Let those birds go and concentrate on identifying the ones you see at arms length. No single character is entirely diagnostic by itself. Look for a number of characters and consider the whole package. In order of importance the things to look (and listen) for are: color of the wing covert edges, color of the neck sides, speed of call, contrast between back, tertials, and secondary edges, bib shape, overall color, and size and shape. Using several of these

marks together should lead to reliable identifications.

Brightness

Black-capped Chickadees appear brighter overall and more contrasting than Carolina. The back is greener, the flanks are cleaner and brighter buff, the breast is whiter, the black bib is broader and less clean-cut, the white cheek patch is cleaner and longer, the tertials are darker gray, and the edgings on wing and tail feathers are bright white. Black-cappeds also appear larger-headed, fluffier, shaggy-naped, and longer-tailed. Carolina Chickadees appear overall more grayish; all contrast between the back, tertials, wing coverts, flanks, and breast is reduced. Most of these characters are subtle and variable, but together they create a different appearance that should alert an experienced observer.

Wing Patterns

Wing pattern features are well-known (Kaufman 1990). Black-capped has white edges on the greater coverts and secondaries, where Carolina has silvery-gray edges. In addition, the base color of these feathers is slightly darker on Black-capped, and the contrast is sharper between white edges and dark centers. The greater covert edges are a more reliable mark than the secondary edges, but beware of brief or distant views. In practice these differences can be hard to interpret. The silvery quality of the pale edges is strongly affected by light, and a Carolina seen in sunlight can appear just as white-edged as a Black-capped. Furthermore, a very close view of a Black-capped sometimes reveals a grayish tinge on the covert edges. Pale edges wear quickly, and both species will be darker in spring and summer than in fall, but Black-capped should always show more white than Carolina.

Cheek Patterns

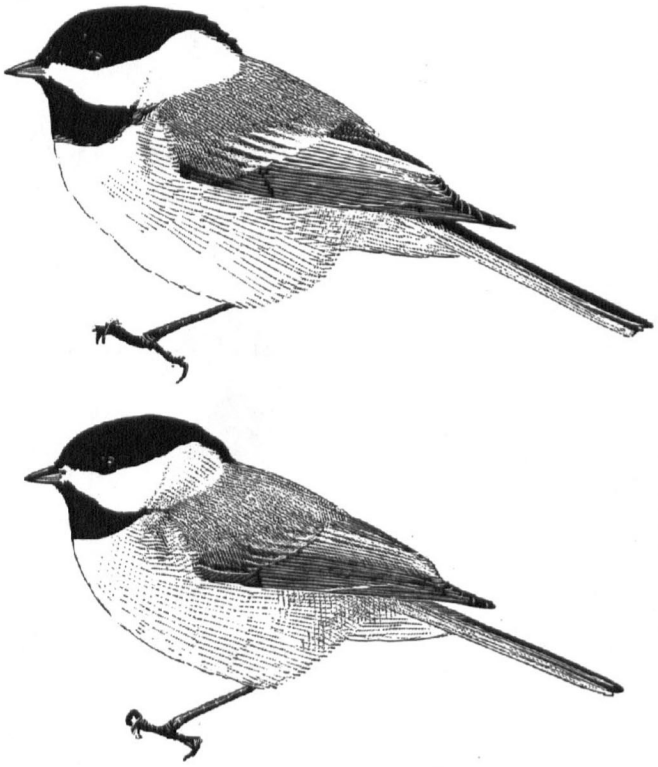
The white cheek patch is prominent on both species, but the rearward extension of the white cheek patch, technically the sides of the neck, is whiter and more extensive on Black-capped. This is often obvious in a close view, as Black-cappeds have a long sweep of clean white on the nape contrasting directly with the greenish back, while Carolinas have a shorter extension of distinctly grayish-white feathers, and less contrast with the back. To use this field mark more objectively, look for a faint shadow line at the rear edge of the auriculars (ear coverts), and study the light-colored feathers behind this line. On Black-capped Chickadee these feathers are all white, and the long fluffy nape feathers create a larger area of white behind the auriculars than on them. Carolina Chickadee has these feathers behind the auriculars faintly washed with gray, and the area of grayish-white space behind the auriculars is equivalent to the area of white on the auriculars. Obviously this can only be seen at close range, and takes some practice, but it should provide a useful identification clue all year.

Backs & Bibs

Going back to the wing pattern: remember that the wing feathers are darker with more contrasting white edges on Black-capped. This fact combined with the greener back of Black-capped creates a more contrasting upperside. Fall and winter Black-cappeds show a crisp green-black-white pattern on the back and tertials, while Carolinas show a less contrasting pattern in shades of gray. This feature seems quite reliable in fresh plumage, but is probably less so in summer, when the back has faded to grayish-green and much of the white tertial edging has worn off.

Another feature worth studying is the shape of the black bib.

Figure 2.



Black-capped Chickadee (upper) and Carolina Chickadee (lower) in fresh plumage; see text for discussion of field marks.

Carolinas generally show a neater, more triangular bib, while Black-cappeds are more uneven or "ragged". Typically, Black-cappeds show a slight downward bulge of black on each side of the bib (a projection of the white breast up into the center of the lower edge of the bib) creating a "double-rounded" lower edge. Less reliably, on Black-capped the black bib extends slightly farther towards the shoulder, and this extension often takes the form of a ragged smudge. Bib shape changes constantly as the birds move, however, so this feature is of limited use. Bib pattern is at least partly determined by white feather tips that conceal black; as these wear, more black is exposed, and overall bib shape changes. Summer birds show more black than winter.

Other characters are subjective and variable: the overall brighter colors and cleaner appearance of Black-capped, and subtle differences in shape and size.

Song and calls

Both species have a song comprised of simple clear whistles. Black-capped's song is lower-pitched and virtually always two-noted, with the second note lower and usually in two pulses "fee bee-eee". Carolina's song is higher-pitched and more variable from two- to six-noted, often a three-noted "fee bee bee" very similar to Black-capped. The so-called classic Carolina Chickadee song "fee bee fee bay" is, year-round, no more frequent than other variations, although Frank Gill (pers. comm.) reports that it is the most frequent song in spring, and Ward (1966) reports that the song is less variable in and near the contact zone than farther away from it.

Laboratory experiments by Donald Kroodsma (Smith 1991)

have shown that the song is learned, not innate, and field observations show that chickadees in the contact zone respond to playback of recorded songs of both species (Merritt 1978). Some individuals in and near the contact zone sing typical songs of both species, or sing the wrong song (Merritt 1978; Wade Wander pers. comm., Frank Gill pers. comm.). Thus, contrary to many published reports, within the contact zone song is of little value for identification, since a young chickadee in the contact zone has the opportunity to learn both songs, or to incorporate elements of both songs into a "hybrid" song.

Calls are complex and varied, but the entire repertoire is shared by both species. Both species give almost constant high "tsik" notes while foraging calmly. When disturbed they give some variation of the characteristic loud "tsi-tsi-dee dee" or "chika-chika-dee dee dee dee". Interacting with other members of their flock they give a complex "gargle" call, a descending jumble of harsh and liquid notes. The differences between the two species are in the details of these shared calls. In general the voice of Black-capped Chickadee is lower and fuller than Carolina, while Carolina sounds a little softer and more nasal, but variation between individuals of the same species obscures this subtle difference between species.

The easiest call to listen for and compare is the series of harsh "dee" notes. Black-capped gives this series more slowly than the same call of Carolina. If you have a digital watch it is possible to measure the rate of "dee" notes. When you hear a chickadee call, repeat the "dee-dee-dee..." series to yourself, count at the same rhythm, and count the notes while watching the seconds digit on the watch. I find that Black-cappeds call at about 4 dees/second, while Carolinas call at 6-7 dees/second. There is variation depending on the "mood" of the bird and other factors. Listen for several calls, and use this character in conjunction with others.

Hybrids and the Species Question

The great similarity between these two species has always raised the question "are they in fact two species?" Numerous field studies have been carried out in the contact zone, and hybrids have been reported in Illinois and Virginia, and suspected in Kansas, Pennsylvania, and New Jersey (Merritt 1978, Wade Wander pers. comm.). Hybrids are almost impossible to confirm by field observations, but recent DNA studies show that gene flow, as a result of hybridization, is occurring between these two species (Gill *et al.* 1993). Other research suggests that, while hybridization occurs regularly, the hybrids are less fit than pure birds, raise fewer young, and therefore the hybrid population remains small and stable (Frank Gill, pers. comm.). Among banded birds in Indiana, Merritt (1978) found no more than 15% intermediate, and at Hopewell, New Jersey, Hannah Suthers (pers. comm.) has banded only "a couple" of possible hybrids in 15 years. Biochemical studies now suggest that these two species are not closely related - contrary to all appearances (Gill *et al.* 1993).

The actual isolating mechanism that prevents hybrids from overrunning the state could be as simple as the reduced fitness of hybrids, but other factors might also come into play. This is an aspect of chickadee research that breeding bird atlassers could make a contribution to. Brewer (1963) suggested that reproductive isolation was achieved through different habitat tolerances and timing of nesting, rather than visual or vocal characters. One possible isolating mechanism is the brief pre-copulatory display (Smith 1991). In Black-capped Chickadee the pre-copulatory sequence is initiated by either the male or the female giving high, thin, variable "see" notes. The male may give a gargle call. In Carolina Chickadee it is reported that the male initiates the sequence by giving typical whistled song, and the female responds with soft nasal "dee" notes similar to those given during courtship feeding (similar to the begging calls of fledglings). If these differences are true and consistent, they could inhibit interbreeding.

A Note To Atlassers

Separating the Chickadees is only a problem in the narrow zone of contact. If you are one of the lucky ones with an atlas block that is in the contact zone, you may want to take a field trip into pure Black-capped country, and follow this up with a trip to pure Carolina country. If you use this mini-guide while you identify the known species birds, and familiarize yourself with the variation within each species, you will be well armed to tackle the job of separating the Chickadees in the zone of contact.

If you are in the zone of contact, please try to keep notes on the number of Black-capped and Carolinas you see breeding. If this contact zone is moving north, it is the data generated by the atlas that will help to document the extent of the range change.

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