

# CALIFORNIA BIRDS



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## ON THE FIELD IDENTIFICATION OF CALIFORNIA HUMMINGBIRDS

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Adult males of the seven species of California hummingbirds can be quite easily distinguished on the basis of information given in current field guides. However, females and immatures of several species have long presented great difficulties in field identification. Most current field guides, including those of Peterson (1961), do not attempt to distinguish between females of certain species, and immatures are scarcely mentioned. Moreover, one recently-published guide (Robbins, et al., 1966) contains an extraordinary number of inaccurate or misleading statements and illustrations.

The objective of this paper is to call attention to certain morphological and behavioral characters, particularly vocalizations, that can be helpful in identifying female and immature hummingbirds in the field. I emphasize at the outset that the methods here proposed are not infallible — there will always be some birds that defy identification. Immatures, especially, are often quite impossible to identify by sight alone, and they are often silent. Female and immature Rufous and Allen's hummingbirds are truly impossible to distinguish in the field, and methods for identification of these species in the hand are presented elsewhere (Stiles, MS).

The techniques of field identification discussed here were developed during a four-year field study of hummingbird ecology carried out at the University of California at Los Angeles. Most of the field work was done in the Los Angeles area, but I also made numerous

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field trips to chaparral, desert and mountain localities north to San Francisco Bay and Yosemite, east to southeastern Arizona, and south into Baja California. I have had extensive field experience with all species of California hummingbirds except the Broad-tailed *Selasphorus platycercus*, and have studied all except this species and the Rufous Hummingbird *S. rufus* both on and away from the breeding grounds. My information is most extensive for Anna's *Calypte anna*, Costa's *C. costae* and Black-chinned *Archilochus alexandri* hummingbirds, but I have also studied Allen's *Selasphorus sasin sasin* and *S. s. sedentarius* and Calliope "*Stellula*" *calliope* hummingbirds in some detail.

## DISTRIBUTION AND IDENTIFICATION

A knowledge of the geographic range and seasonal occurrence of hummingbirds is often a considerable aid in identification. Distribution and dates of occurrence are covered in great detail by Grinnell and Miller (1944) and Bent (1940). Only those instances where distribution may help to solve identification problems are discussed here.

Anna's is the only species regularly present year-round except for the resident race of Allen's Hummingbird *S. sasin sedentarius*, which is restricted to the Channel Islands and the Palos Verdes Peninsula. Anna's is the only hummingbird present in most of California between mid-October and mid-January, although an occasional *Selasphorus* may remain through December as far north as Berkeley (Ortiz, 1967), and small numbers of *costae* often winter in the southern part of the state (Bent, 1940; Grinnell and Miller, 1944; Stiles, 1970).

The migratory Allen's Hummingbird, *S. s. sasin*, is the only *Selasphorus* breeding on the coastal slope of California (south to western Ventura County), and the only hummingbird breeding along the coast north of Marin County. In southern California it is an earlier spring migrant than *rufus*, passing through between about mid-January and mid-March. The Rufous Hummingbird comes through between early March and late April in the south, and between late March and early May in the San Francisco Bay region (Ortiz, 1967); it breeds almost entirely north of California (Grinnell and Miller, 1944). Between early May and about early July, *sasin* is the only *Selasphorus* in most of California. Following breeding, both *rufus* and *sasin* move gradually southward in the mountains and along

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the coast. Specimen records and mist-netted birds indicate that, at least in Southern California, *rufus* is rare before mid-July, while *sasin* is rare later than early August.

The Calliope Hummingbird is the only species breeding in the high mountains of most of California. The Broad-tailed breeds in California only in the White Mountains, and perhaps other nearby ranges on the east side of the Owens Valley. However, after the breeding season this species may occur in other mountains of the state. On 1 September 1967, I captured and examined an immature male Broad-tailed that was visiting feeders at Pine Cove, in the San Jacinto Mountains.

Costa's Hummingbird is the only breeding species of the Colorado and Mojave Deserts and the Owens Valley. In the south, it may arrive and breed as early as mid-February, and it may occur in the southern California chaparral from mid-March on. The Black-chinned Hummingbird is the only breeding species in most of the Great Central Valley of California. In the chaparral of southern California, the species arrives in mid- to late April; both it and *costae* reach peak numbers there in May. Many *alexandri* leave the lowlands for the high mountains by mid- to late July.

## VOCALIZATIONS AND IDENTIFICATION

Each species of California hummingbird has two kinds of vocalizations that are useful in identification: the chip-note and the aggressive chatter and/or squeal. The most frequently heard notes of females and immatures are chip-notes, which serve as general contact and spacing notes, and are given in situations of general excitement and low-intensity aggression. In situations of high-intensity aggression, chatters and/or squeals are given. Immature and adult male *Calypte* spp. sing and adult males of the other species have characteristic trilling or rattling sounds made by the wings in flight.

Sound spectrograms of chip-notes of several species of California hummingbirds are given in Figure 1. The chip of *anna* is a very hard, sharp, explosive "tzip" or "kip". When excited, *anna* may run several or many chips together into an excited chittering.

Although very similar in appearance, Costa's and Black-chinned females sound very different. The chip of *costae* is a very high, light and sharp "tik" or "tip"; many chips may be run together into a rapid twitter if the bird is excited. The *alexandri* chip is just the opposite - low-pitched, softer, slurred "tew" or "tchew". Black-chin-

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ned Hummingbirds almost never run together a string of chips when excited, and are much less vocal than *Calypte* spp. in virtually every situation.

Chips of Allen's and Rufous hummingbirds are indistinguishable, and resemble that of *anna* in pitch but not in quality, being a less sharp and dry, more sibilant "chip" or "tchup". The Broad-tailed's chip is very similar but slightly higher in pitch. The chip of *calliope* is very high-pitched, like that of *costae*, but is softer and slurred like that of *alexandri*, with a sibilant quality not unlike the chips of *Selasphorus* spp. Like *alexandri* and unlike *costae*, the Calliope is a relatively silent bird under most circumstances.

Aggressive chatters of *anna* and *costae* are louder and harsher than their respective chips, but fairly similar in quality; *costae* may give an excited, buzzy squeal - apparently several chatter-notes run together;

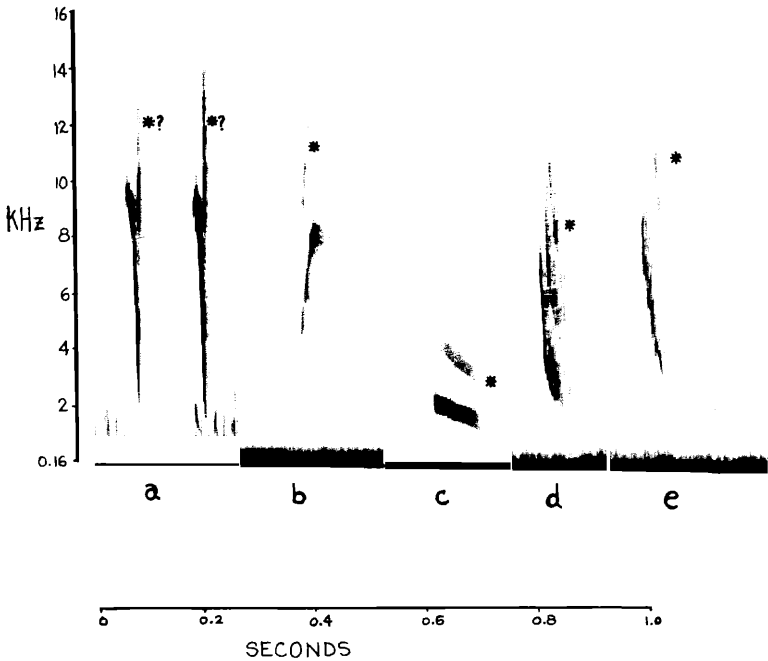


FIGURE 1. Sound spectrograms of chip-notes of some California hummingbirds. a=*Calypte anna*; b=*C. costae*; c=*Archilochus alexandri*; d=*Selasphorus rufus*; e=*Stellula calliope*. Frequency scale is 160 - 16,000 cycles/second. The harmonic frequencies in the chips of all but *Calypte* spp. (marked with asterisks) are probably artifacts of the recording system rather than true properties of the vocalizations themselves.

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*Selasphorus* spp. and *alexandri* often precede or accompany a bout of chattering with a shrill squeal, and the chattering itself is more structured, consisting of notes in groups of 2 or 3 rather than a single note repeated.

The song of the adult male *anna* is very scratchy and buzzy in quality; that of the male *costae* is a very high, thin whistle. The immature male *anna* gives a gurgling, unstructured song that gradually develops over a period of months. Young male *costae* give a song resembling that of the adult male but shorter, slightly lower in pitch, and slightly scratchy or sibilant in quality.

The beating wings of adult male *sasin* and *rufus* produce a high, thin trilling whistle; that of *sasin* (including *sedentarius*) being very slightly higher in pitch. The wing-trill of *platycercus* is higher in pitch and much more loud and shrill, while that of *alexandri* is relatively low in pitch, softer and less shrill. The wings of *calliope* produce a sharp rattle or buzz when the bird starts into flight or changes direction suddenly, but are silent during most normal flight. Wings of females and immatures of all species, and adult males of *Calypte* spp., produce only the normal humming sound. Adult males of all species have characteristic displays with associated sounds, which will be discussed in detail elsewhere.

## PLUMAGE AND IDENTIFICATION

Plumage and other visual characters are subtle and much less clear-cut than the vocal differences. Proper use of plumage differences requires great caution and considerable practice, plus a realization that in some species, certain individuals (especially immatures) cannot be safely identified by these characters alone. Many of the characters I will cite can be observed only at close range, under favorable conditions. Differences in size, bill length, and certain color characters will only be appreciated after considerable experience with all the forms involved. One should not attempt to distinguish female Costa's and Black-chinned, for instance, without extensive previous experience with both of these species plus juvenile *anna*. Moreover, certain color differences present between two species in one area may not hold good in other areas (see below). Nevertheless, under favorable circumstances many female and immature individuals of most species of California hummingbirds can be identified visually.

Juvenile hummingbirds of all species can usually be recognized as such by the broad, paler edgings of the dorsal feathers. The ventral

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body feathers also often have very broad, pale, soft edges. As the bird gets older, these edgings wear off, and are often narrow and inconspicuous by the time of the postjuvinal body molt. Very fresh body feathers of adult hummingbirds may also have narrow, pale edgings (much less conspicuous than in juveniles) that soon wear off. Most migratory species molt on the wintering ground, and these feather-edgings are largely worn off by the time the birds come north in the spring. However, they are noticeable on fresh-plumaged adult Anna's and Allen's (*sedentarius*) hummingbirds in late summer and fall.

Adult females and older juveniles of *anna* are distinctly larger than any other California hummingbird except the Broadtailed, which does not occur in the same areas. Adult female *anna* are further distinguished by having a number of red feathers on the throat and by having the sides extensively bronze-green. Female *anna* also average grayer below and have less conspicuous black on the tail than do most other species. Juvenile *anna* often have little or no red on the throat or green on the sides and may be paler than adults below, thus appearing confusingly similar to females of other species. Younger birds usually have broad, pale buffy-gray edgings on the dorsal feathers. Although size is usually diagnostic, some immature *anna* can be identified with certainty only by voice.

Costa's Hummingbird is the palest species in general coloration, and the purest white below. The throat of female *costae* is usually immaculate white, sometimes with a few purple feathers, but is only rarely marked with dusky, and then very faintly (Figure 2). Juvenile *costae* are very white below, and have broad whitish feather-edgings above. Young males often have some purple on the throat, generally near the corners of the future gorget.

Female Black-chinned are very similar to female Costa's Hummingbirds, but usually appear distinctly longer-billed. They average grayer below than *costae*, and the throat is highly variable; it may be virtually immaculate, or marked with dusky or even bronze-green to varying degrees. These markings are evenly distributed over the entire throat, and may be faint to very heavy. The dark markings may occupy only the shafts of the feathers, or (rarely) may occupy virtually the entire feather, with only a narrow pale whitish edging (Figure 2). Young male Black-chinned average more heavily marked with bronzy or dusky on the throat than adult females; young females are often less heavily marked than adults. Young males sometimes have a few black or purple feathers on the throat, but the

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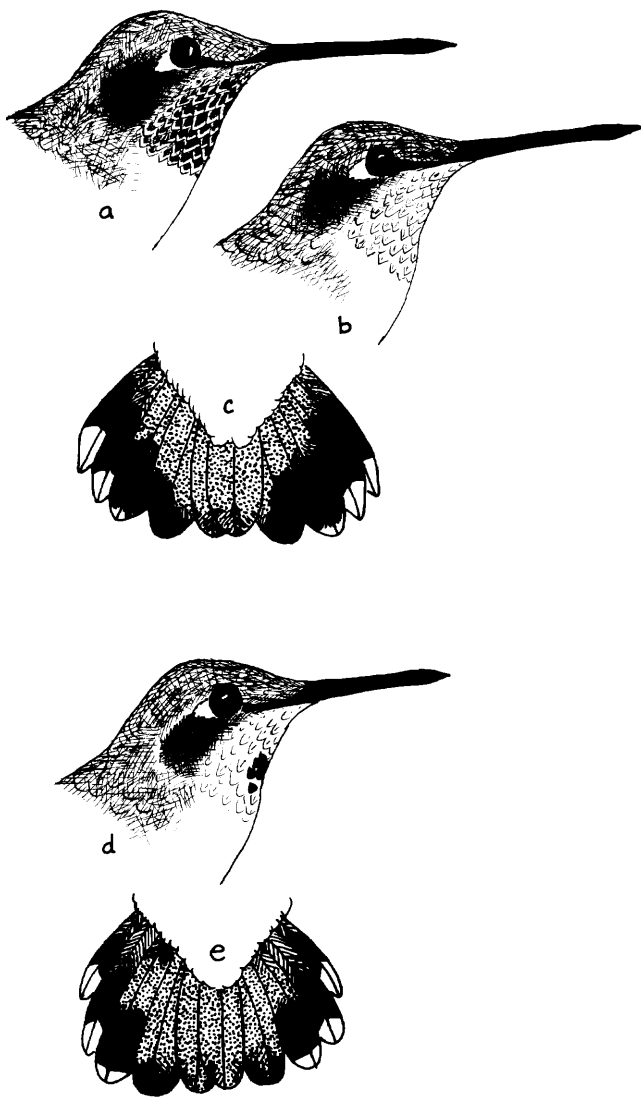


FIGURE 2. Plumage differences between adult female Costa's and Black-chinned Hummingbirds. a,b=head-patterns of adult female Black-chins, showing variation in throat markings and lack of pale postocular stripe; c=tail-pattern of female Black-chin. Note blunt-pointed outer rectrices, extent of black on rectrices 2-5. d=head-pattern of female *costa*; note shorter bill, pale postocular stripe; not all individuals have purple on throat, e=tail-pattern of female *costae*; note slender, shorter, round-tipped outer rectrices.

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purple is generally darker and less extensive than in young male *costae*. Immature *alexandri* are usually grayer below than adults, and some birds may be very dusky; the pale feather-edgings above are usually buffier than in *costae*. However, some young *alexandri* are quite pale below, and can be safely told from *costae* only by voice.

Another character of some value for distinguishing adult female *costae* and *alexandri* is the pattern of the side of the head (Figure 2). In Costa's, there is a pale line extending back from the postocular white spot, more or less distinctly separating the greenish crown and dusky auriculars. In the Black-chinned, this line is often absent; the dusky of the auriculars meets the crown directly, and also extends further ventrally, smudging more gradually into the pale grey-white of the neck and throat. This difference holds for California birds but not for southeastern Arizona ones. Black-chinneds there are paler below than in California and may have fairly distinct pale postocular stripes. In southern Arizona, bill length and voice are the best characters.

When seen well, the pattern and shape of the rectrices is also helpful in distinguishing Costa's and Black-chinned hummingbirds (Figure 2). Outer rectrices of *alexandri* are bluntly *pointed* (this may not hold for juveniles, however), and are broader and have more black than do those of *costae*. Outer rectrices of *costae* are narrower with more grey and less black, and rounded at the tip.

The remaining four species all have at least some rufous in the tail (Figure 3). The Broad-tailed can be fairly easily told from the others by its larger size, by the lack of rufous tinge below, and by the throat pattern of faint, dusky streaking or speckling. Immature males may have a few magenta feathers on the throat.

The Calliope is distinctive because of its small size, and especially the short bill and short, broad-appearing tail (Figure 3). Most birds are whitish below with a pale rusty wash on the sides, and most individuals have rather little rufous in the tail. I have yet to find consistent differences in plumage between adult females and immatures.

Female and immature Rufous and Allen's hummingbirds cannot be safely distinguished in the field. Adult females of both species have the throat basically white, speckled with red centrally and bronze-green laterally. Immature males may have the throat irregularly speckled with red. Both immature males and females have the entire throat more or less uniformly marked with dusky-bronze or bronze-green to varying degrees, and usually strongly tinged with buffy.



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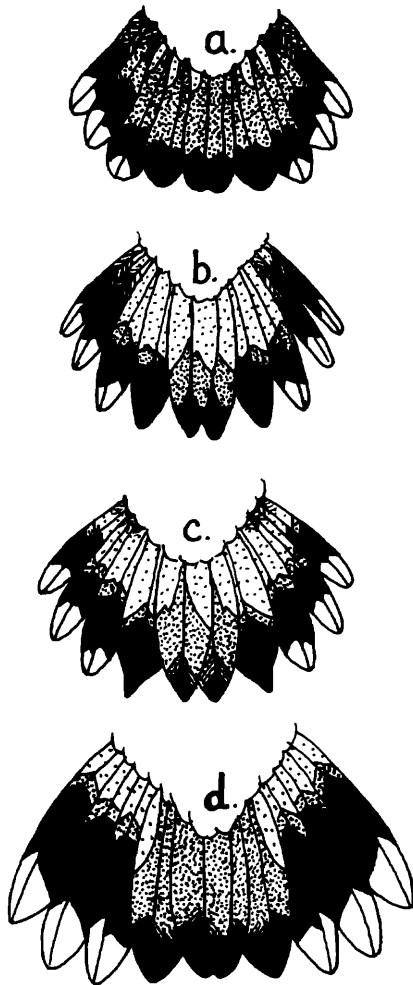


FIGURE 3. Tail patterns of adult female *Selasphorus*-type hummingbirds, drawn to scale. Heavy stipple=green; light stipple=rufous; hatching=dusky; solid=black; blank=white. a=*Stellula calliope*, b=*Selasphorus s. sasin*; c=*S. rufus*; d=*S. platycercus*.

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Juveniles have the pale dorsal feather-edgings cinnamon-buff. Further details on identification and age and sex determination in these two species will be presented elsewhere. Compared to other species, both *rufus* and *sasin* are more strongly marked with rufous below and on the tail (Figure 3). The dorsal green coloration is also more golden in hue.

### BEHAVIOR, HABITAT AND IDENTIFICATION

Where two or more species breed sympatrically there often exist microhabitat differences that help to separate them. In the chaparral of southern California, Anna's, Black-chinned, and Costa's hummingbirds breed. Anna's breeds earlier than the others, and occupies most of the available habitat. Costa's chooses the driest, most open part of the chaparral, e.g. hill tops and south- and west-facing slopes. Black-chinned choose the dampest situations, canyon-bottom woodlands and north- and east-facing slopes with tall, broken vegetation. Female *alexandri* nest along canyon-bottom streams, and may nest only if there is water; female *costae* often nest in the chaparral itself (see Stiles, 1970; Grinnell and Miller, 1944). In wet, shady gardens *alexandri* may be very common; *costae* is usually rare or absent. Following breeding, *alexandri* is common in high mountains; *costae* is very uncommon.

In addition to vocalizations, several hummingbirds have behavioral mannerisms that are often of some value in identification. Several species differ in the position at which the tail is held, and the amount of tail movement during hovering flight (e.g. while feeding). Anna's holds its tail down, in nearly the same plane as the body, and with rather little motion, pumping, spreading, flicking, etc. Rufous and Allen's hummingbirds also move the tail very little, but often hold it high, at a marked angle to the plane of the body. The Calliope commonly holds the tail very still, and nearly perpendicular to the plane of the body. Costa's and Black-chinned hummingbirds nervously flick the tail open and shut and pump it up and down while hovering (see Figure 4).

### IDENTIFICATION IN THE HAND

A brief discussion of this topic is included here because of the amount of mist-netting of hummingbirds currently being carried out in California. The plumage characters mentioned above are, of course,

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even more easily discerned in the hand. Other characters not visible in the field can also be appreciated, such as the unusual shape of the inner primaries of the Black-chinned (cf. Ridgway, 1911; Short and Phillips, 1966), or the curiously stiffened and flattened barbs of the Calliope's rectrices. Table 1 gives measurements of adults in fresh plumage of all species of California hummingbirds. Identification of female Costa's and Black-chinned hummingbirds is facilitated by measurements (see Short and Phillips, 1966); female and immature Rufous and Allen's hummingbirds can safely be distinguished only by mensural characters (Stiles, MS).

Ideally, having the bird in the hand should enable one to determine age and sex as well as species. Unfortunately plumage sequences have been worked out in detail only for *Calypte anna* (Williamson, 1956) and *Selasphorus sasin* and *rufus* (Stiles, MS). The only descriptions of immature plumages of most of these taxa are those of Ridgway (1911), which all too often are incomplete or, apparently, based on mis-sexed specimens.

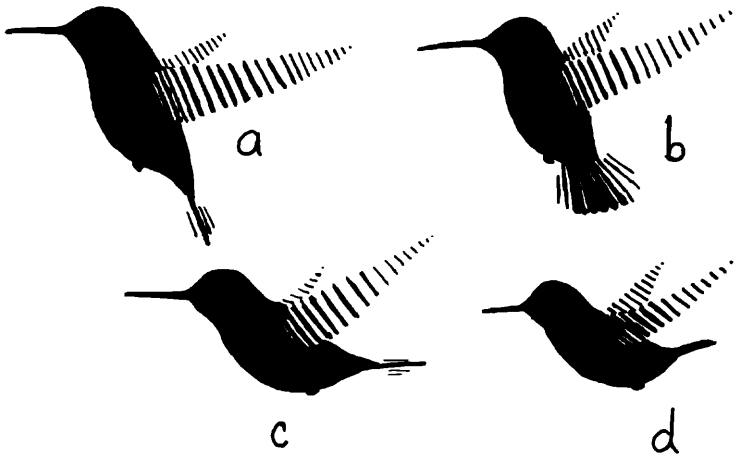


FIGURE 4. Positions frequently adopted during hovering flight by certain California hummingbirds, a=*Calypte anna*; b=*C. costae*, *Archilochus alexandri*; c=*Selasphorus rufus* and *sasin*; d=*Stellula calliope*.

52 TABLE 1. Measurements of adult California hummingbirds in fresh plumage.<sup>1</sup>

Species	Measurements in millimeters											
	exposed culmen		wing length (chord)		tail length		weight					
	M	F	M	F	M	F	N	M	N	F	N	
<i>Calypte anna</i>	17.78 ±0.81	18.66 ±0.96	49.76 ±0.95	49.26 ±1.01	30.26 ±1.08	25.42 ±0.94	36	4.40 ±0.34	31	4.08 ±0.38	31	
<i>Calypte costae</i>	17.17 ±0.70	17.56 ±0.62	44.06 ±0.76	44.72 ±0.88	22.69 ±0.89	23.30 ±1.00	25	2.98 ±0.25	19	3.25 ±0.26	19	
<i>Archilochus alexandri</i>	18.39 ±1.03	20.75 ±1.07	42.19 ±1.13	46.06 ±1.26	25.48 ±1.40	26.53 ±0.87	18	3.09 ±0.21	17	3.36 ±0.22	17	
<i>Selasphorus sasin</i>	15.96 ±0.52	17.32 ±0.74	38.03 ±0.85	41.40 ±0.90	24.45 ±0.87	23.90 ±1.03	11	2.85 ±0.21	12	3.25 ±0.21	12	
<i>Selasphorus sasin</i> <i>sedentarius</i>	18.25 ±0.77	19.92 ±1.02	38.38 ±0.99	43.20 ±1.12	24.56 ±0.93	25.16 ±1.13	19	3.39 ±0.25	26	3.73 ±0.37	26	
<i>Selasphorus rufus</i>	16.06 ±0.80	17.58 ±0.66	40.35 ±0.86	44.39 ±0.83	27.39 ±0.95	25.98 ±1.11	14	3.07 ±0.16	14	3.41 ±0.25	14	
<i>Selasphorus</i> <i>platycercus</i>	17.33 ±0.69	18.67 ±0.80	48.59 ±1.17	49.95 ±1.07	31.94 ±1.72	29.52 ±1.56	16	3.41 ±0.38	16	3.79 ±0.42	16	
<i>Stellula calliope</i>	14.27 ±0.78	15.57 ±0.50	38.55 ±0.70	41.57 ±0.91	19.67 ±0.88	20.93 ±0.77	22	2.53 ±0.30	16	2.94 ±0.28	16	

<sup>1</sup>: Mean and standard deviation are given; N = 25 for all measurements.

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As a general rule, wing and tail measurements of immatures resemble those of adults (especially the adult females, in those species where wings and tails of adult males are modified for sound production). Bills of very young juveniles are often much shorter than those of adults. By the time they are a few months old, young hummingbirds generally have bills as long as do adults of the same sex.

### SUMMARY

Techniques for field identification of female and immature California hummingbirds are discussed. The most reliable character for distinguishing most species, notably Costa's and Black-chinned hummingbirds, is voice. A number of plumage and behavioral characters are also discussed, and it is emphasized that these should be used with great caution and only after considerable experience with all potentially confusing taxa. Female and immature Rufous and Allen's hummingbirds cannot be safely distinguished in the field. As an aid to identification of birds in the hand, measurements of adult specimens of all California hummingbird species are provided.

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