

Vireo
*huttoni*FRENCH:
*Viréo de Hutton*SPANISH:
Vireo reyezuelo común,
*Vireo oliváceo***Hutton's
Vireo**

Aptly described as “the spirit of the live oak tree” (Van Fleet 1919), Hutton’s Vireo is a year-round resident in mixed evergreen forests and woodlands of western North America, and can be particularly common in areas where live (evergreen) oaks predominate. This species occurs throughout most of its breeding range during every month of the year, and often is described as the only non-migratory vireo in the United States. Yet the southwestern population is partly migratory and others exhibit conspicuous, though largely local, seasonal movements.

Unobtrusive, easily overlooked, and little-studied, this vireo is noticed most often by its persistent but insipid two-parted song. Individuals begin singing in late winter and begin nesting in early spring. Hence, they are sometimes under-represented

on breeding bird surveys and atlas projects, which usually begin after the peak singing period for this species. The sexes are alike in plumage, are at least seasonally monogamous, and both participate in nest-building, incubation, and caring for the young.

In winter, they often join

mixed-species flocks which also typically contain Ruby-crowned Kinglets (*Regulus calendula*). Hutton’s Vireos are similar enough in plumage and behavior to the more common and widespread Ruby-crowned Kinglet that their identification can be a challenge, especially for those unfamiliar with western birds.



The Birds of North America

Life Histories for
the 21st Century



Figure 1.

Distribution of the Hutton's Vireo. In winter, spring, and fall, some individuals move outside the range shown here. See Distribution: winter range, and Migration.

At the persistent request of colleague Spencer F. Baird, John Cassin reluctantly named this species after William Hutton, a young naturalist whom he did not know but who collected the type specimens in 1847 in Monterey, CA (Mearns and Mearns 1992).

Up to twelve subspecies have been described based on variation in size and plumage (Phillips 1991). Coastal and interior forms exist in disjunct allopatry where populations are separated by wide desert. Preliminary biochemical work suggests that these forms are so different genetically that they may warrant full species status (Cicero and Johnson 1992).

DISTINGUISHING CHARACTERISTICS

Small vireo, 10–12 cm total length; 9–15 g mass. Upperparts greenish olive to olive gray; underparts dull yellowish white washed with pale buff to buffy or grayish olive. Outer vanes of remiges and rectrices edged greenish yellow to yellowish white. Two whitish to yellowish wing bars; broad pale whitish to yellowish eye-rings, broken at top; pale lores. Bill blackish above, paler below (especially at the base); legs and toes blue-gray to dark gray; toe pads whitish. Sexually monomorphic in plumage color and pattern. Sexes usually separable during breeding season by presence of brood patch (female) and cloacal protuberance (male), although males can develop a slight brood patch (Pyle et al. 1987, JND).

Distinguishable from the superficially similar Ruby-crowned Kinglet by thicker vireo-type bill, usually broader eye-ring, and 2 distinct wing bars with darkest part of wing between the 2 bars; also by its chunky, large-headed, neckless appearance, and its noticeably thicker, usually blue-gray legs. Ruby-crowned Kinglet generally appears to have only 1 wing bar (across tips of greater coverts), with darkest part of wing behind this bar; legs thin and black; toe pads yellowish not whitish. Field identification of these 2 species discussed by Kaufman (1979, 1993) and Stallcup (1984).

Compared to Hutton's Vireo, western coastal race of Solitary Vireo (*Vireo solitarius cassinii*) has a whiter throat, sharply contrasting plumage patterns, and a complete, bold white eye-ring and adjoining white lore, creating a distinctly spectacled appearance. Bell's Vireo (*Vireo bellii*) has fainter and narrower wing bars, a lighter throat and breast, and a peculiar narrow eye-ring/partial supercilium face pattern (see description in Brown 1993). Hutton's Vireo is sometimes confused with *Empidonax* flycatchers,

but the flycatchers have bills that are flat and wide, and most have unbroken eye-rings.

DISTRIBUTION

THE AMERICAS

Breeding range. Figure 1. From sw. British Columbia (including Vancouver I.) south through w. Washington, w. Oregon, and California (west of the Sierra Nevada divide), to nw. Baja California, and disjunctly in the mountains of s. Baja California; and from the mountains of central and se. Arizona, sw. New Mexico, and extreme w. Texas, south through the highlands of Mexico to w. Guatemala (Am. Ornithol. Union 1983).

Breeding range, by subspecies (Fig. 2):

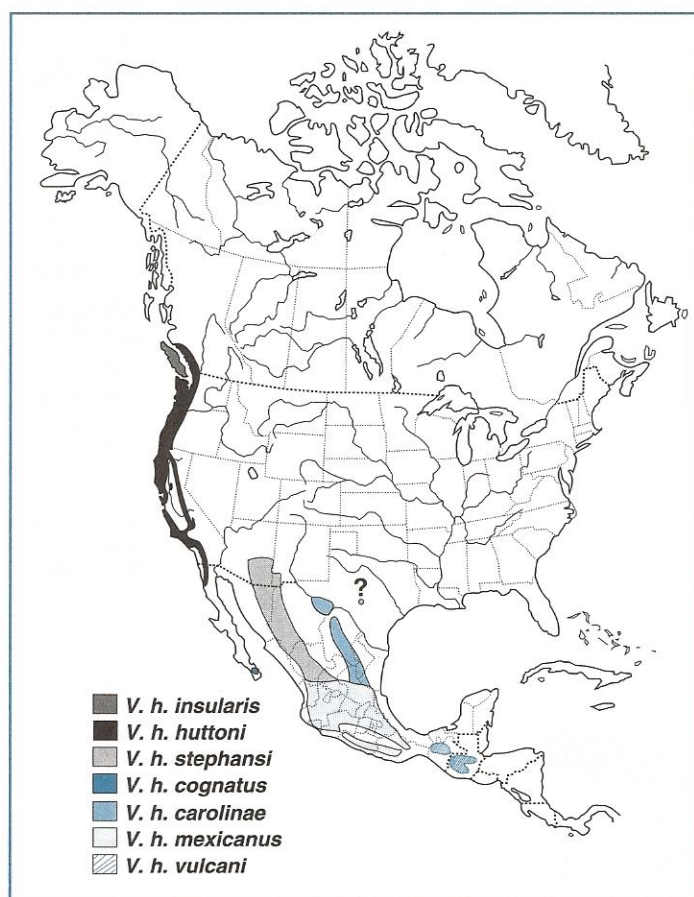
V. huttoni insularis. From sw. British Columbia on Vancouver I. north to Cape Scott (R. W. Campbell pers. comm.).

V. h. huttoni. Along the mainland coast of sw. British Columbia north at least to Kingcome Inlet, east to Hope (R. W. Campbell pers. comm.), and south through w. Washington (including Whidbey I.) and w. Oregon, generally west of Cascade divide; California west of Cascade and Sierra Nevada divides from the Oregon border south through the Klamath Mtns., Coast Ranges, and w. Sierra Nevada below 2,000 m (and locally on the Sacramento Valley floor along the upper Sacramento River and probably in the Sutter Buttes, Colusa Co.) south to the Transverse Ranges (including Santa Rosa, Santa Cruz, Anacapa, and Santa Catalina Is.) and Tehachapi Mtns., and south through the coastal slope of the Peninsular Ranges (rare and local on the desert side; Garrett and Dunn 1981) to nw. Baja California (Grinnell and Miller 1944, Small 1994, Am. Birds, unpubl. records).

V. h. cognatus. In the high mountains of s. Baja California, mostly above 900 m (Miller et al. 1957).

V. h. stephensi. From central and se. Arizona north to the Mazatzal Mtns. and the Whiteriver-Fort Apache area, west to the Santa Catalina and Pajaritos Mtns. (Phillips et al. 1964), sw. New Mexico from Hidalgo Co. (especially Animas Mtns. and Cloverdale) and Grant Co. (especially near Silver City; Ligon 1961), south through Mexico along Sierra Madre Occidental through e. Sonora and w. Chihuahua to n. Sinaloa, and through w. Durango to w.-central Zacatecas (Miller et al. 1957).

V. h. carolinae. From w. Texas in Presidio (Rappole and Blacklock 1994), and Brewster Co., especially the Chisos Mtns. (Oberholser 1974), and locally east of the Pecos River in n. Real Co.



(Lasley and Gee 1991) and possibly in Val Verde Co. along Devils River (Western Foundation of Vertebrate Zoology [WVZ] nest record, G. Lasley pers. comm.), south through central Coahuila, e. Zacatecas, and e. Nuevo León, to ne. San Luis Potosi and sw. Tamaulipas (Miller et al. 1957).

V. h. mexicanus. In mountains of s. Mexico from Nayarit, s. Zacatecas, and s. San Luis Potosi in the north, to w. Veracruz (2,100–3,600 m elevation) in the east, e. Colima in the west, and to central Oaxaca in the south (Miller et al. 1957).

V. h. vulcani. In mountains of central Chiapas and sw. Guatemala (Miller et al. 1957).

Winter range. Virtually the same as breeding range but winter visitors present just outside breeding range occur in California (*V. h. huttoni*) along the immediate coast (Garrett and Dunn 1981, Unitt 1984, JND), in the Central Valley (Grenfell and Laudenslayer 1983, Small 1994, JND), and in the Sierra Nevada upslope from breeding localities (Beedy and Granholm 1985, Gaines 1988); *V. h. stephensi* reported in Arizona from various localities in central and southeastern part of state (Phillips et al. 1964), and in New Mexico in the Rio Grande Valley (Williams and

Figure 2.
Distribution of
the seven
subspecies of
Hutton's Vireo
(see Systematics).

Hubbard 1991); *V. h. carolinae* in Texas from the Davis Mtns., Jeff Davis Co. (Arnold and Kutac 1974, Oberholser 1974); and *V. h. stephensi* in nw. Mexico locally along the coast (Howell and Webb 1995).

OUTSIDE THE AMERICAS

No records.

HISTORICAL CHANGES

Little known. In California, Johnson and Cicero (1985) discovered a small breeding population in the isolated San Benito Mtn. area of San Benito and Fresno Co., and suggested the area had been colonized within the last 40–50 yr. Roberson (Roberson and Tenney 1993) suggested a similar recent range expansion eastward in neighboring Monterey Co. He also noted that because of habitat changes, populations have been lost in the Salinas Valley. Suspected breeding birds first were reported for the Sutter Buttes, Sutter Co., CA in 1980; perhaps a recently colonized site (Am. Birds, unpubl. records). Similarly, suspected breeding birds first were reported on Anacapa I. off the coast of Santa Barbara in s. California in 1973 (Jones and Diamond 1976). Although these records may represent actual changes in distribution, it is always difficult to separate reality from artifacts of coverage. No information outside California.

FOSSIL HISTORY

Unknown.

SYSTEMATICS

GEOGRAPHIC VARIATION

Body dimensions and plumage coloration vary geographically (see Appendix and plumage descriptions below). Smallest and yellowest birds occur in most humid region of the species' range (sw. British Columbia); largest and grayest in most arid region (nw. Mexico); intermediates occur to the north, east, and south of nw. Mexico (Hamilton 1958). Subtle differences in vocalizations (see Sounds: vocal array and Fig. 4).

SUBSPECIES; RELATED SPECIES

See also Figure 2, Appendix. Several distinguishable subspecies, probably attributable to little mixing among populations and little migration. Based on a biochemical method, Cicero and Johnson (1992) estimated that one migrant is exchanged between coastal (*V. h. huttoni*) and interior (*V. h. stephensi*) populations every 11 to 36 generations.

Five subspecies recognized by the American Ornithologists' Union (AOU) within its checklist region (Am. Ornithol. Union 1957).

V. h. insularis. Similar to *V. h. huttoni* (see Appearance: molts and plumages), but plumage coloration richer; upperparts uniformly dark greenish olive, underparts (except sides and flanks) washed dull buff yellow with olive tinge, sides and flanks washed olive buff. Eye-rings, wing-bars, and edgings of rectrices yellowish to yellowish olive.

V. h. huttoni. For plumage description see Appearance: molts and plumages.

V. h. stephensi. Paler than *V. h. huttoni*; upperparts mostly dull olive gray, greener toward rump; underparts mostly dull olive buff, but sides and flanks sometimes washed yellowish olive. Eye-rings, wing-bars, and edgings of rectrices yellowish white. Mean wing length longer than for other subspecies (see Appendix); probably associated with its migratory tendencies (see Migration).

V. h. cognatus. Similar to *V. h. stephensi*, with upperparts grayish olive, but underparts nearly uniformly buffy yellow (appearing paler and cleaner ventrally than any other subspecies).

V. h. carolinae. Similar to *V. h. stephensi*, but upperparts averaging slightly darker.

Two others are known from Mexico and Guatemala (Miller et al. 1957):

V. h. mexicanus. Averaging darker than *V. h. huttoni*; upperparts dark olive gray to olive brown; underparts appearing two-toned with the breast, sides, and flanks darker than belly.

V. h. vulcani. Nearest *V. h. huttoni*, but averaging slightly grayer above and below.

Data on subspecies reported herein follow these classification schemes.

More recently, however, Phillips (1991) recognized 12 subspecies, including: all those above except *V. h. insularis* and *V. h. vulcani*, with modified ranges; three not recognized by the AOU in 1957; one described from Mexico in 1966; and three newly described in 1991.

An electrophoretic study of coastal (*V. h. huttoni*) and interior (*V. h. stephensi*) forms found an exceptionally wide allozymic divergence between these disjunct subspecies (Cicero and Johnson 1992). Though sample sizes were small, the findings suggest these forms are isolated reproductively and warrant species status.

Within the Vireonidae, allozymic variability is lower for Hutton's Vireo than for other members of the family (Johnson et al. 1988). More data needed.

Closest related species, as determined by protein electrophoresis, may be the Yellow-winged Vireo (*Vireo carmioli*), a resident of Costa Rica and Panama (Johnson et al. 1988). Further study needed.

MIGRATION

NATURE OF MIGRATION IN THE SPECIES

Migratory pattern unclear. At least in the U.S., most populations are resident but exhibit erratic local dispersal (JND). Thus, individuals may occur locally in fall, winter, and spring where absent in summer. Populations in Mexico, except those in the Sierra Madre Occidental north of Durango, may be entirely sedentary (J. Nosedal pers. comm.).

V. h. stephensi in Arizona and New Mexico is partly migratory (Phillips et al. 1964). Although it occurs year-round in such places as Santa Catalina Mtns. in se. Arizona (Phillips et al. 1964), at least some individuals migrate regularly through portions of Arizona, New Mexico, Texas, and nw. Mexico (see Timing and Routes of Migration).

Post-breeding elevational movements reported in Oregon (Gilligan et al. 1994), California (Beedy and Granholm 1985, Gaines 1988), and Arizona (Phillips et al. 1964).

Extralimital records (mostly spring, fall, and/or winter) from British Columbia from various localities, perhaps most notably from Mayne I. (R. W. Campbell pers. comm.); from Oregon, east of the Cascade divide at Malheur National Wildlife Refuge (Littlefield 1990); from Nevada from several localities (Alcorn 1988); from California in the Mojave Desert (Garrett and Dunn 1981); from New Mexico north to Magdalena Mtns. (Socorro Co.; Williams 1994), and east to s. Guadalupe Mtns. (Eddy Co.; Williams 1992). Museum specimens and available photographs and sightings suggest records from s. Nevada and e. Mojave Desert, CA are probably of *V. h. stephensi*, and those from Oregon, n. Nevada, and w. Mojave Desert, CA of *V. h. huttoni* (JND).

The species' largely non-migratory tendency is presumably associated with its preferred evergreen habitat, where oaks, madrones, and other evergreen trees furnish insect forage year-round (see Grinnell and Miller 1944). Of 1,159 birds banded in North America, none were recovered away from their original capture sites (National Biological Service, Bird Banding Laboratory, unpubl. data).

TIMING AND ROUTES OF MIGRATION

See Figure 5. On the central California coast near the Big Sur River mouth, post-breeding dispersants are captured in mist nets just outside their breeding range as early as 10 Jun (hatching-year birds) and 7 Jul (adults). Captures (all ages) peak in early Aug at this wintering site (JND, Big Sur Ornithology Laboratory [BSOL] data). On



South Farallon I. about 180 km north, rare visitors occur from 18 Jul to 8 Nov, with a slight peak in late Sep and early Oct, and from 30 Apr to 17 May when they are rarer visitors (Am. Birds, unpubl. records). In Arizona, migrants reported from Tucson Valley, e.g., 7 Aug and 23 Apr (Phillips et al. 1964). In Texas, migration of *V. h. stephensi* reported from mid-Sep to late Oct, and from mid-Apr to mid-May, with early dates 7 Sep and 9 Apr and late dates 9 Nov and late May (Oberholser 1974).

V. h. stephensi is a regular but uncommon to rare migrant through the Lower Colorado River Valley in w. Arizona (Rosenberg et al. 1991), in the Organ Mtns. of sw. New Mexico (Williams and Hubbard 1992), in extreme w. Texas from El Paso to Culberson Co. (Arnold and Kutac 1974), and probably in nw. Mexico from e. Sonora to the coastal strand (see Howell and Webb 1995).

MIGRATORY BEHAVIOR

No information.

CONTROL AND PHYSIOLOGY

No information.

HABITAT

BREEDING RANGE

Principally evergreen forests and woodlands with moderate to dense crown closure and understory.

Figure 3.

Live oak woodland habitat of Hutton's Vireo in coastal Monterey Co., California. Photo by the author.

In British Columbia, inhabits mid-to-late successional Douglas-fir (*Pseudotsuga menziesii*) forests and mixed woodlands below 250 m elevation (R. W. Campbell pers. comm.). In Washington and Oregon, inhabits mixed, usually second-growth, forests of spruce (*Picea* spp.), western redcedar (*Thuja plicata*), hemlock (*Tsuga* spp.), Douglas-fir, and live oaks (*Quercus* spp.). In California, inhabits live oak woodlands (Fig. 3) and mixed forests containing non-deciduous oaks, Douglas-fir, ponderosa pine (*Pinus ponderosa*), madrone (*Arbutus menziesii*), tanoak (*Lithocarpus densiflorus*), California bay-laurel (*Umbellularia californica*), incense cedar (*Calocedrus decurrens*), white fir (*Abies concolor*), and/or coast redwood (*Sequoia sempervirens*), mostly below 1,800 m elevation (JND). In Arizona, New Mexico, and Texas, inhabits pine, pine-oak, and pine-oak-juniper woodlands (Hutto 1985, Rappole and Blacklock 1994). In Mexico, inhabits highland forests and woodlands (mostly 1,200–3,500 m elevation) of pine, oak, and/or fir (Edwards 1989, Howell and Webb 1995).

Breeds to a lesser extent also in mixed evergreen/deciduous forests throughout, mostly riparian-associated; in California, in arborescent chaparral, Monterey pine (*Pinus radiata*), bishop pine (*Pinus muricata*), foothill pine (*Pinus sabiniana*), and cypress (*Cupressus* spp.) plant associations (Grinnell and Miller 1944, Shuford 1993, JND). Appears to reach peak abundance in

habitat predominated by evergreen oaks; prefers this habitat more strongly than any of its congeners (Grinnell and Miller 1944, Root 1988, JND).

Breeding elevation ranges from near sea level along the Pacific coast to above 3,600 m in the highlands of Mexico.

Where this species occurs sympatrically with four other vireo species (Warbling [*Vireo gilvus*], Solitary, Gray [*V. vicinior*], and Bell's) in the San Jacinto Mtns. of s. California, all use spatially separated habitats (Grinnell and Swarth 1913). In w. Mexico where Hutton's Vireo is broadly sympatric with Warbling Vireo, the two forage together in tree canopies; no evidence of vertical separation (R. Hutto pers. comm.). See also Breeding: nest site and nest.

SPRING AND FALL MIGRATION

Reported from riparian woodland and suburban parks, yards, and gardens where broadleaf trees are present (Phillips et al. 1964, JND).

WINTER RANGE

Essentially the same as breeding habitat but birds present to a larger extent in riparian woodland (Phillips et al. 1964, Kaufman 1979, Gilligan et al. 1994, JND).

FOOD HABITS

FEEDING

Main foods taken. Insects and some spiders (Chapin 1925).

Microhabitat for foraging. Arboreal, usually under the cover of foliage, mostly in middle to upper levels, often in the outer portion (Edwards 1989, JND). In central California oak woodland, forages largely in foliage zone (65%), secondarily in subcanopy (33.3%), and occasionally in herb layer (1.7%; $n = 60$ observations; Root 1967). Foraging niche broader on Santa Cruz I., CA than on the mainland (Yeaton 1974). On the mainland, major foraging zone >4.5 m in oaks; on the island, 0.15–2.4 m in chaparral. In se. Arizona during winter, *V. h. stephensi* forages mostly (90.7%) 1.0–3.9 m in oaks ($n = 43$ observations; Austin and Smith 1972). In w. Mexico during winter, *V. h. mexicanus* forages exclusively in the canopy of madrones and oaks (Hutto 1988).

Food capture and consumption. No quantitative information. From JND except where noted. Generally gleans, mostly from leaf surfaces, but also from flowers, fruits, lichens, and bark of twigs and branches. Typically searches for prey by slow, methodical, and assiduous gleaning. Also hovers while gleaning and hawking in aerial

pursuit. Often directs attacks at prey from a meter or more away, and usually strikes prey while passing in rapid flight. Sometimes hangs upside down, chickadee-like, from terminal leaf or twig while gleaning (Root 1967). Sometimes removes wings and legs of large insects with bill before consumption (Van Fleet 1919). Often wipes bill on perch after eating large insects. In winter, joins mixed species flocks that often contain kinglets, bushtits, chickadees, titmice, nuthatches, warblers, and small woodpeckers. In California oak woodland, differs in foraging techniques from its foliage-gleaning associates (see discussion in Root 1967).

DIET

Major food items. Insects: hemipterans, particularly pentatomids (stink-bugs), reduviids (assassin-bugs), and piesmatids (leaf-bugs); homopterans, including cicadellids (leaf-hoppers), plant-hoppers (Fulgoroidea), and scale insects (Coccoidea; Beal 1907); lepidopterans, including various caterpillars, moths, and butterflies; coleopterans, particularly coccinellids (ladybird beetles) and weevils (Curculionioidea; Chapin 1925). Also some spiders and plant materials. Known plant materials include insect galls and fruits of elderberry (*Sambucus* sp.), poison oak (*Toxicodendron diversilobum*), and California coffeeberry (*Rhamnus californica*; Beal 1907, B. Williams pers. comm., JND). At Hastings Reservation (Carmel Valley, CA), a Hutton's Vireo ate sap that flowed from a hole that had just been pecked by a Red-breasted Sapsucker (*Sphyrapicus ruber*); the vireo hovered in the air for 5–10 s while consuming the sap, and then perched on a nearby branch (P. Hurd, Jan 1942, unpubl. field notes).

Quantitative analysis. Chapin (1925) reported from stomachs 98% animal matter, chiefly insects and a few spiders ($n = 70$ stomachs) with about 46% hemipterans, 25% lepidopterans, 13% coleopterans, smaller quantities of other insect taxa, and about 2% arachnids. In Monterey Co., CA, in a comparative study of the Blue-gray Gnatcatcher (*Polioptila caerulea*) and its foliage-gleaning associates, Root (1967) performed an analysis of Hutton's Vireo stomach contents that revealed 12% hemipterans, 30% coleopterans, 25% lepidopterans, 22% hymenopterans, and 11% other. (Data expressed as percent of total prey individuals [$n = 134$] that were identifiable.) In the same study, mean prey length reported as 10.6 mm ($n = 52$).

FOOD SELECTION AND STORAGE

No information on selection; no evidence of food storage.

NUTRITION AND ENERGETICS

No information.

METABOLISM AND TEMPERATURE REGULATION

No information.

DRINKING, PELLET-CASTING, AND DEFECTION

No detailed information.

SOUNDS

VOCALIZATIONS

Development. No information on age-related changes in maturation of vocalizations; no evidence for or against vocal learning.

Vocal array. Figure 4. **SONGS.** Much individual and geographic variation. Typical song pattern is a monotonous and unmusical series of nasal and wheezy two-syllable, ascending phrases: *zu-wee.....zu-wee.....zu-wee.....zu-wee.....* (Fig. 4a) repeated approximately 1/s for a period sometimes spanning ≥ 10 min, usually followed by an even longer period of silence (Kaufman 1979, JND). A common variation is composed of descending phrases: *zee-ooo.....zee-ooo.....zee-ooo.....zee-ooo.....*. A bird may sing either form, may alternate between the 2, and occasionally may mix ascending and descending phrases in the same series: *zu-wee.....zee-ooo.....zu-wee.....zee-ooo.....*, producing a pattern reminiscent of the song of the western forms of Solitary Vireo (Kaufman 1979, JND). Occasionally, song is composed of only single-syllable, flat phrases, that otherwise follow the same pattern: *cheew.....cheew.....cheew.....cheew.....*. Bent (1950) reported a bird singing the typical song 781 times within 11.5 min. Female not known to sing.

CALLS. Several calls with numerous variations, but all with the typical, hoarse, scolding vireo quality. At least in California and Arizona, most common call is a drawn-out, whining, somewhat raspy, ascending, single-syllable *rheeee* (Fig. 4c), similar in quality to the call of a western Rufous-sided Towhee (*Pipilo erythrophthalmus*; Kaufman 1979, JND). This call is given once or twice in succession, and is sometimes followed by a rapid series of shorter notes (2–9) with a similar whining quality, producing a whinnying or laughter-like chatter, e.g., *rheeee-he-he-he-he-he* (Kaufman 1979, B. Williams pers. comm., JND). Other calls given in California include a low, inquiring *tshuk...tshuk*; a low *whit...whit*; a rough *zchrip*; and a high-pitched *zeet* (Hoffman 1923, B. Williams pers. comm., JND).

GEOGRAPHIC VARIATION. Not well documented. In general, *V. h. huttoni* and *V. h. insularis* give

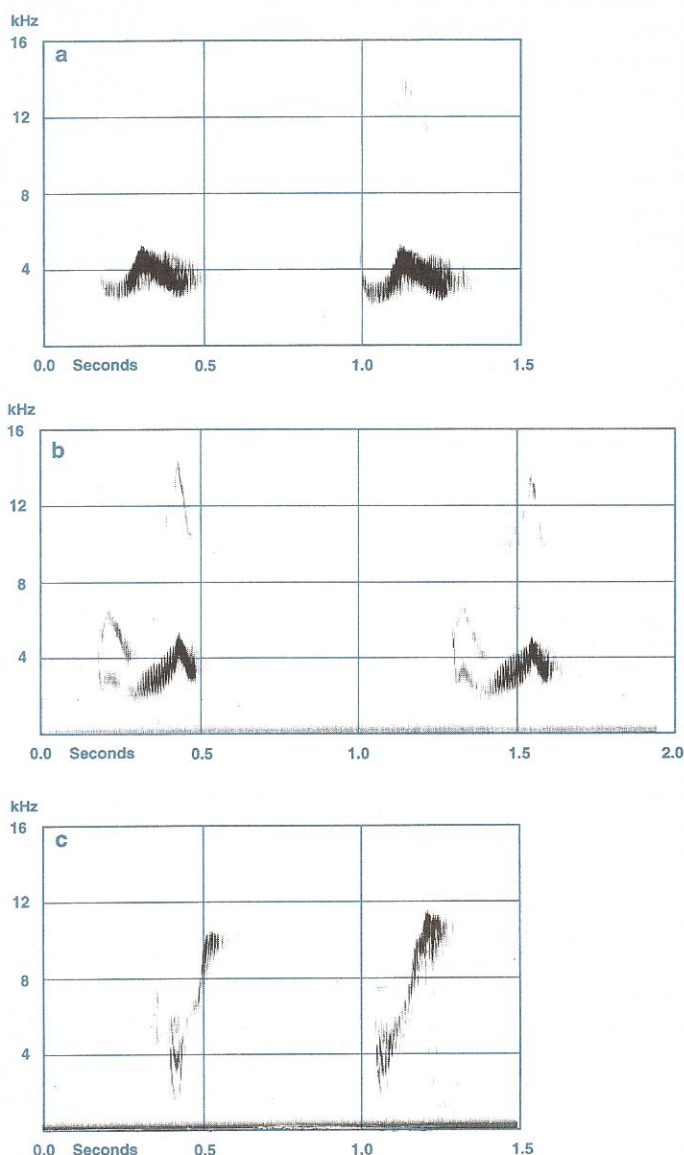


Figure 4. Vocalizations of Hutton's Vireo. a: *zu-wee* song of *V. h. huttoni* (BLB # 16822, Monterey Co., CA, 20 Mar 1988). b: *tchur-ree* song of *V. h. stephensi* (from recordings in the collection of J. C. Barlow taken from ARA cassette #7, Bioacoustics Laboratory and Archive, Florida Museum of Natural History; Chiricahua Mtns., Cochise Co., AZ, 9 May 1969). c: *rheeee* call of *V. h. huttoni* (BLB #16822, Monterey Co., CA, 20 Mar 1988). Prepared by the staff of the Borror Laboratory of Bioacoustics (BLB).

songs most similar to those described above (Fig. 4a). Other subspecies give songs of a slightly harsher quality, more aptly represented as *tchur-ree.....tchur-ree.....tchur-ree.....tchur-ree.....* (Fig. 4b). Calls known from California, the *tshuk...tshuk* and *whit...whit*, are not known from Arizona or nw. Mexico (Kaufman 1979).

Phenology. Sings occasionally at any time of year. In California, songs given often from late Jan through Aug, with a peak from early Feb through mid-Apr. Fairly silent from Nov to early Jan (B. Williams pers. comm., JND). In Texas, males sing often from late Mar to Aug (Oberholser 1974). Calls given year-round, but most frequently 1–2 wk before the onset of regular singing (B. Williams pers. comm.).

Daily pattern of vocalizing. Sings throughout the day. In coastal fog belt of California, may not begin until late morning (JND).

Places of vocalizing. Generally sings from unexposed perches within tree canopy or subcanopy, mostly 2–10 m above ground (JND). Often moves between perches in mid-song; sometimes also while foraging (Willard 1908, JND). Like other congeners, male sometimes sings from nest while sitting on eggs (Van Fleet 1919, Cornell Nest Record Program [NRP] data). Also sings from neighboring tree while female on eggs (NRP data).

Repertoire and delivery of songs. No systematic data on variation in number of song types per individual. Occasionally a bird sings several song types during one singing bout, seemingly going through its entire repertoire (B. Williams pers. comm., JND).

Social context and presumed functions of vocalizations. From JND (California). Songs presumably function in territory establishment and maintenance, as well as mate attraction, although no published evidence of this. Countersinging occurs routinely early in breeding season. The *tschuk...tschuk* call may function as interspecific communication and is uttered commonly while foraging in mixed-species flocks. The harsh *zchrip* likely functions as an intraspecific contact call and is uttered quietly by both male and female when near the nest or while foraging together alone, or with fledglings. The *rheeee* call followed by the whinny is often given in threatening contexts (e.g., when an accipiter flies by) and in these cases likely serves as an alarm or distress call. Both sexes give a version of the *whit...whit* and *rheeee* calls conveying distress when an intruder approaches the nest.

NONVOCAL SOUNDS

Bill-snaps occasionally when attempting to capture an insect in midair, and sometimes in the hand during banding (JND).

BEHAVIOR

LOCOMOTION

Walking, hopping, climbing, etc. Hops among branches and twigs within foliage, sometimes

while flicking wings, and fanning and fluttering tail (JND).

Flight. With rapid wingbeats, mostly within or between trees. Longer flights are slightly undulating (JND).

SELF-MAINTENANCE

Preening, head-scratching, stretching, bathing, anting, etc. Known to preen between foraging and singing bouts; nestlings near fledging-stage preen frequently; details of head-scratching unknown; anting not reported (JND). Bathing in artificial bird baths observed occasionally. A family of 5 Hutton's Vireos was seen bathing in a stream in central California (F. Durham, Aug 1942, unpubl. field notes). One bird bathed by dropping from a willow branch 1.5 m above the water, into the middle of the stream (10 cm deep).

Sleeping, roosting, sunbathing. Not documented.

Daily time budget. No data.

AGONISTIC BEHAVIOR

One case of female attacking male repeatedly during nest building, female fleeing then being pursued by male, and both fluttering to ground during physical combat (Bent 1950). Pair in Sierra Nevada foothills observed chasing intruding conspecific pair from vicinity of nest site (D. Drynan pers. comm.). In Arizona's Bradshaw Mtns. during the breeding season, a Hutton's Vireo responded immediately after hearing a *V. huttoni* tape recording. When a dummy was placed before him, the bird flew from perch to perch, singing vigorously as close as 1 m away (J. Barlow, May 1970, unpubl. field notes). At Big Bend National Park, TX, a Hutton's Vireo attacked a Gray Vireo and then gave a *rheeee* call (J. Barlow, Jul 1977, unpubl. field notes).

SPACING

Territoriality. Territorial during breeding season. Presence of adults away from some breeding areas (e.g., at Big Sur River, CA) suggests at least some territories are not maintained in fall and early winter (JND). Territory size varies with habitat: on California Channel Is., 0.7 ha in chaparral, 0.9 ha in bishop pine forest; on mainland California, 2.9 ha in chaparral, 1.1 ha in Monterey pine forest (Yeaton 1974). No other quantitative data, but size likely smaller in favored live oak woodland (JND). Males presumably establish and maintain territories by singing and continual presence. No direct evidence for interspecific breeding territoriality, though might be expected where sympatric with ecologically similar Chestnut-backed Chickadee (*Parus rufescens*; see discussion in Wagner 1981).

Individual distance. No quantitative information. Small numbers (2–4) of conspecifics regularly occur together in winter, especially in mixed-species flocks (JND). One observed bathing in artificial bird bath with a Rufous-crowned Sparrow (*Aimophila ruficeps*) during fall in California (B. Williams pers. comm.).

SEXUAL BEHAVIOR

Mating system and sex ratio. Monogamous; no reports of polygyny or polyandry. No information on sex ratio.

Pair bond. Pairs can be found at any time of year, indicating at least some year-round bonds. Song probably important in pair formation. One description of copulation at Hastings Reserv., Carmel Valley, CA (T. Riney, Apr 1946, unpubl. field notes). Male sang *zu-wee* song 1 min before and 3 min after copulation at the rate of 7 songs/5 s. Female quivered her wings and male flew to her side, facing same direction on same branch, then hopped on her back. Copulation lasted 2 s. Male then flew up in the tree and foraged; female remained in the same position, quivering her wings, for about 4 s, before foraging. One report in s. California of pair copulating in nest tree during nest-building period (NRP data).

Extra-pair copulations. No reports.

SOCIAL AND INTERSPECIFIC BEHAVIOR

Degree of sociality. During breeding season, paired birds forage together and exchange *zchrip* calls prior to egg-laying (JND). During incubation and brooding periods, mates call to each other during nest exchanges (JND). Extremely social during winter; a regular participant in mixed-species flocks. In w. Mexico, for example, found with mixed-species flocks 97% of the time; a regular member of flocks (82% of flocks encountered); mean of 1.2 individual Hutton's Vireos/flock ($n = 33$ observations; Hutto 1987). In pine-oak woodland in w. Mexico, forages in some of the most species-rich flocks in the world (mean = 18.6 species; $n = 11$ observations; Hutto 1987).

Play. No reports.

Nonpredatory interspecific interactions. For flocking behavior, see Degree of Sociality, above. Occasionally chased from exposed song perches by territorial male Anna's Hummingbirds (*Calypte anna*) in California (JND).

PREDATION

Kinds of predators. Specific data lacking, but adults and fledglings undoubtedly taken by common predators of small birds, namely Sharp-shinned Hawks (*Accipiter striatus*), Cooper's Hawks (*Accipiter cooperii*), and Northern Pygmy-

Owls (*Glaucidium gnoma*). Likewise, eggs and nestlings probably taken by Scrub Jays (*Aphelocoma coerulescens*), Steller's Jays (*Cyanocitta stelleri*), American Crows (*Corvus brachyrhynchos*), and perhaps northern flying squirrels (*Glaucomys sabrinus*). Nests are typically well-concealed, however, and their discovery by these common predators may be unusual (Van Fleet 1919).

Response to predators. From JND (California). Responds to humans near the nest by giving nervous sounding and rapidly repeated *whit... whit* calls. Chases Scrub Jays from vicinity of nest while emitting peevish *rheeee* calls. The *rheeee* call followed by the whinny is commonly given at the approach of a potential predator such as an accipiter at any time of year. Mobbing is common when in mixed-species flocks during winter.

BREEDING

PHENOLOGY

Pair formation. In California, occurs shortly after onset of regular singing, although some pairs seem established before this period; most probably form in early to mid-Feb (JND).

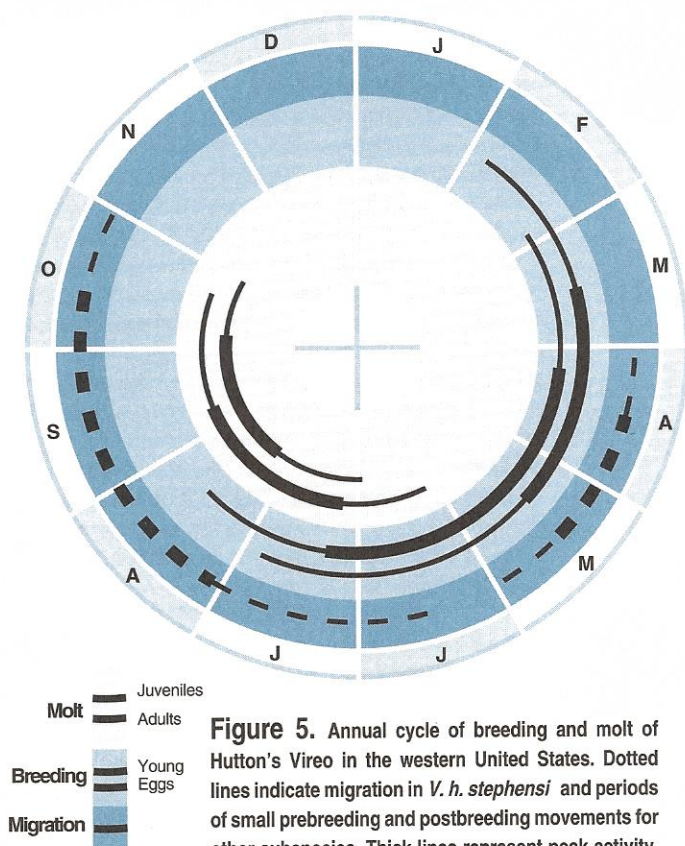
Nest-building. In California (San Diego Co.), earliest report is first week Feb, latest first week Aug (Cornell Nest Record Program [NRP] data). For *V. h. huttoni*, nest-building appears to occur earliest in California, and progressively later with increasing latitude.

First/only brood per season. See Figure 5. Dates for full clutches based on nest records from Western Foundation of Vertebrate Zoology (WVZ) and NRP, largely from California but also from throughout range north of Mexico: mean = 23 Apr (SD = 33 d, range = 10 Feb–1 Jul, $n = 83$). In British Columbia, dates for 8 clutches ranged from 25 Apr–26 Jun (R. W. Campbell pers. comm.). In California, first nestlings found in late Feb; first fledglings in early Mar. In British Columbia, dates for 18 broods ranged from 3 Apr–24 Jul (R. W. Campbell pers. comm.).

Second/late brood(s) per season. Late nesting activities (Jul–Aug) across range undoubtedly attributable, in part, to replacement clutches after earlier losses. Frequency of these records, however, suggests the species may have >1 brood, as proposed by many (e.g., Getty 1912, Dawson 1923, Roberson and Tenney 1993, R. W. Campbell pers. comm.); specific documentation lacking, however.

NEST SITE

Selection process. No details; descriptions from nest records indicate female probably selects site (NRP).



Microhabitat and site characteristics. Nest typically situated near ends of horizontal branches, suspended from forks of twigs; occasionally from foliage, rarely from mistletoe (*Phoradendron* spp.; NRP data). Usually well concealed under cover of foliage, fruticose lichen, and/or staminate flowers of oak.

Of reported nests in California, 67% in coast live oaks; Douglas-fir the most commonly used substrate in British Columbia, Washington, and Oregon; Arizona sycamore (*Platanus wrightii*) and silverleaf oak (*Quercus hypoleucoides*) are usual substrates in Arizona (NRP, WFVZ, R. W. Campbell pers. comm., Harrison 1979). Other recorded substrates include western redcedar, madrone, red alder (*Alnus rubra*), vine maple (*Alnus circinatum*), hazelnut (*Corylus cornuta*), and ocean spray (*Holodiscus discolor*) in British Columbia (R. W. Campbell pers. comm.); spiraea (*Spiraea* sp.) in British Columbia and Washington (NRP); red alder and scouler willow (*Salix scouleriana*) in Oregon (L. B. McQueen pers. comm., NRP); silk tassel (*Garrya* sp.), willow (*Salix* spp.), western sycamore (*Platanus racemosa*), California-lilac (*Ceanothus* spp.), manzanita (*Arctostaphylos* sp.), chinquapin (*Chrysolepis chrysophylla*), bay-laurel,

white alder (*Alnus rhombifolia*), madrone, box elder (*Acer negundo*), elderberry (*Sambucus* sp.), cottonwood (*Populus* spp.), interior live oak (*Quercus wislizenii*), canyon live oak (*Quercus chrysolepis*), black oak (*Quercus kelloggii*), valley oak (*Quercus lobata*), Monterey pine, foothill pine (*Pinus sabiniana*), incense cedar, common olive, and Chinese elm (*Ulmus parvifolia*) in California (NRP, Van Fleet 1919, JND); emory oak (*Quercus emoryi*), netleaf oak (*Quercus rugosa*), Arizona white oak (*Quercus arizonica*), ash (*Fraxinus* sp.), and canyon grape vine (*Vitis arizonica*) in Arizona (Bent 1950, NRP); and gambel oak (*Quercus gambelii*) in New Mexico (NRP).

Mean nest height from ground based on nest records (NRP and WFVZ) = 4.9 m (SD = 2.5 m, range = 0.9–13.7 m, $n = 102$).

Nest sites often 2 to 3 rows of trees back from a clearing (Van Fleet 1919); nests sometimes in branches overhanging streams or canyons (NRP, WFVZ). In British Columbia, nests in old-growth and second-growth forests, or in forest edge habitats, sometimes associated with roadsides or farm clearings (R. W. Campbell pers. comm.).

NEST

Construction process. From Van Fleet (1919) except where noted. Built by both sexes. Nest material is collected largely within a 35–50 m radius of nest tree, rarely nearer and probably never from the tree itself. When delivering nest material, a vireo generally makes 2 or 3 stops in other trees before the final flight to the nest; flight away from the nest is direct. Loose strands of nest material are woven on either side of the chosen fork. The loose and hanging strands then are woven together at the bottom, creating the general shape of the nest. Next, finer strands are woven in, and when the structure can support the weight, each bird independently sits in the nest and arranges the bottom and sides with its feet and body. Method varies somewhat with individuals and materials used. With one well-watched nest in central coastal California, building was done mostly in early afternoon (Allen 1930), but birds have been observed building at various times throughout daylight hours (B. Williams pers. comm., JND). Based on nest records, 3–10 d are needed to complete a nest (NRP); frequent rain may protract this period to 2 wk or more (Van Fleet 1919).

Structure and composition matter. Figure 6. Globular hanging cup, usually suspended from forks of horizontal twigs; externally of various combinations of lichens (especially of the genera *Usnea* and *Ramalina*), mosses, plant down (particularly from oaks, sycamores, willows, and

cottonwoods), fine grasses, moth and spider cocoons, feathers, pieces of paper and string, small green leaves, and shreds of bark, all held together with spider silk; lined with fine grasses and occasionally hair, feathers, or fine shreds of bark (Bent 1950, NRP, R. W. Campbell pers. comm.). In British Columbia, moss was principal component in 85% of observed nests ($n = 13$; R. W. Campbell pers. comm.). From interpretable nest records in California, lichen was the principal component in 71% of nests ($n = 21$; WFFVZ). This figure is probably much higher for nests in California's coastal mountains, where the lace lichen (*Ramalina menziesii*) conspicuously clothes oaks and conifers for the length of the state in prime Hutton's Vireo breeding habitat (JND). In fact, lace lichen itself may be a factor in making this region such prime habitat (JND). In deciduous forest associated habitats, nests typically are composed largely of plant downs (NRP). Plant down is also the major component away from coastal populations, in the drier interior (NRP).

Dimensions. Mean values for 6 Arizona nests in cm: outside diameter 7.6, height 7.1, inside diameter 6.0, depth 4.5 (Harrison 1979); one California nest: outside diameter 7.6, height 7.0, inside diameter 4.8, depth 4.1; one Oregon nest: outside diameter 8.3, height 7.0, inside diameter 5.1, depth 4.4 (WFFVZ).

Microclimate. Nests are generally well hidden among foliage and lichen; microclimatic variables have not been measured quantitatively.

Maintenance or reuse of nests, alternate nests. New nest built for each nesting season; material sometimes added during incubation period (Van Fleet 1919). Disturbance during nest-building often causes birds to abandon nest, in which case they tend to use material from first nest to construct a new nest (Van Fleet 1919, JND). One case of a pair removing material from a Bushtit (*Psaltirparus minimus*) nest, then using it to line their own nest (NRP). Conversely, one record of Lesser Goldfinch (*Carduelis psaltria*) removing material from a recently-fledged-from Hutton's Vireo nest (Hall 1938).

Nonbreeding nests. Not reported.

EGGS

Shape. Usually ovate, sometimes acute ovate or elongate ovate (Bent 1950), sometimes nearly round (Van Fleet 1919).

Size. From WFFVZ, mean length (range) \times mean breadth (range) in mm for *V. h. huttoni*: 17.94 (16.96–19.08) \times 13.41 (12.80–13.92) ($n = 20$ clutches; 79 eggs); *V. h. stephensi*: 17.51 (17.23–17.66) \times 13.10 (12.45–13.69) ($n = 5$ clutches; 14 eggs); *V. h. carolinae*: 18.85 (18.68–19.18) \times 13.60 (13.12–14.05)



Figure 6. Adult Hutton's Vireo on typical nest constructed largely of fruticose lichen, hung from forking twigs of a live oak tree. Drawing by M. Fylling adapted from a photo by L. B. McQueen.

($n = 1$ clutch; 4 eggs). From Bent (1950), *V. h. cognatus*: 19.1 (18.3–19.7) \times 14.0 (13.7–14.3) ($n = 1$ clutch; 3 eggs).

Mass. Of fresh, whole egg for *V. h. huttoni*: ($n = 10$ eggs), mean 1.74 g, range 1.51–2.16 g (Hanna 1938), about 16% of adult female weight; mean of empty shell and (range) in grams from WFFVZ for *V. h. huttoni*: 0.082 (0.068–0.092) ($n = 20$ clutches; 79 eggs), *V. h. stephensi*: 0.083 (0.074–0.099) ($n = 5$ clutches; 14 eggs), *V. h. carolinae*: 0.086 (0.085–0.087) ($n = 1$ clutch; 4 eggs).

Color. White; marked sparingly with a few small spots or fine dots, chiefly near larger end, of light to dark, or reddish browns; occasionally unmarked; no apparent geographical variation (Bent 1950).

Surface texture. Smooth without gloss.

Eggshell thickness. No data.

Clutch size. One to 5 eggs, modal size 4 ($n = 55$ clutches; WFFVZ).

Egg laying. Usually begins immediately after nest completion, but sometimes not until a few days later; 1 egg/d until set complete (Van Fleet 1919). No specifics on time of day or parental behavior; no reports of intraspecific egg dumping.

INCUBATION

Onset of broodiness and incubation in relation to laying. Brooding begins immediately after laying of first egg (Van Fleet 1919), but continuous incubation routine may not begin until clutch is at least half complete (Miller 1953).

Incubation patch. Single medial abdominal patch forms fully in females and partially in at least some males (Pyle et al. 1987).

Incubation period. 14–16 d (Harrison 1978); 16 d for one nest in central coastal California (Miller 1953); 15 d recorded for one nest in British Columbia (R. W. Campbell pers. comm.).

Parental behavior. Both sexes sit on eggs. No quantitative data on attentiveness; eggs presumably covered all day in a regular incubation routine (Miller 1953). Generally cautious, marked by rapid change-over at nest (Van Fleet 1919, JND), although male may sing from nest while on eggs, or from neighboring tree while female on eggs (NRP data). Posture of bird during incubation is low in nest, sometimes crouched, with its large eye being the most conspicuous feature appearing just above rim of nest (Bent 1950, JND; Fig. 6). Resolute attachment to nest while incubating; numerous accounts of collectors having to remove birds from nests by hand to access eggs (e.g., Bent 1950, WFBVZ).

Hardiness of eggs against temperature stress; effect of egg neglect. No details; no reports of egg mortality from these causes.

HATCHING

Preliminary events and vocalizations. Not documented.

Shell breaking and emergence. One report; entire brood emerged in 2 d, 3 of 4 on 1 d; eggs hatched at various times throughout the day (Miller 1953).

Parental assistance and disposal of eggshells. Not documented.

YOUNG BIRDS

Condition at hatching. Altricial; eyes closed, naked, flesh colored. No detailed information.

Growth and development. Body size appears to double 1 d after hatching (Wheelock 1905). From F. Durham, May 1939, unpubl. field notes, Hastings Reserv., Carmel Valley, CA, except where noted. On fourth day after hatching, furrow of eye-lid appears. On fifth day after hatching, apterylae are still pink, yet the pterylae are blacker than the optic areas. On sixth day, the primaries are about 2 cm long, the head and neck feathers are at the pin stage, the ventral tract is dark, and wing bars are beginning to appear. On eighth day, 2 of the 4 young's eyes are open and tail feathers are beginning to develop. On ninth day, all of the young's eyes are open and their natal down is giving way to juvenal plumage. On eleventh day, young extend and beat their wings in the air. On thirteenth day, young perch on nest's rim; at this point, brooding over night has ceased and juvenal plumage is complete. On

fifteenth day, young leave the nest. Known to give begging calls (1–2 wk posthatching), in presence of adults; same wheezy quality of adult vocalizations (B. Williams pers. comm.).

PARENTAL CARE

Brooding. Brooding by both parents begins with emergence of first chick (Van Fleet 1919), and continues until about 13–14 d after hatching, when young are fully feathered and are perching on rim of nest; rhythm unknown (F. Durham, May 1939, unpubl. field notes). At Hastings Reserv., Carmel Valley, CA, female parent seen to stand and sit on nestlings (described as "push-ups"), presumably allowing air to circulate on the young (F. Durham, May 1939, unpubl. field notes).

Feeding. From Wheelock (1905). By both adults, may begin immediately. Fed perhaps exclusively by regurgitation during first 2 d after hatching. Regurgitation thin, pasty, unrecognizable; delivery rate to nest of 4 young in central California 16/2 h first day after hatching, 19/2 h second day. First fresh food (spiders and small worms) delivered on third day, though feeding by regurgitation continued until fifth day. Water apparently also given by regurgitation on third day. Food matter given by regurgitation successively less digested with days following hatching. On fourth day, 61% of feeding observed was by regurgitation; analysis of crop contents revealed beetles, caterpillars, other small insects, and spiders, both fresh and partially digested. Following one feeding by regurgitation on fifth day, all food items were delivered fresh.

From F. Durham, May 1939, unpubl. field notes, Hastings Reserv., Carmel Valley, CA. Male generally brings largest food items. On and following fifth day after hatching, parent may awaken sleeping young in early morning by producing a "clucking" sound before feeding them. As a stimulus for feeding, parents may peck around young's head at base of upper and lower mandibles, or along the commissure. Young respond to feeding by extending their heads, and vibrating them. On some occasions, female tries to take food away from the male in order to feed the young. For the observed pair of Hutton's Vireos, the average intermission between feeding young was about 9 min. Feeding rate to nest of 4 partially feathered nestlings in n. California 20/h (Van Fleet 1919). No information on apportionment of food to young.

Nest sanitation. From F. Durham, May 1939, unpubl. field notes, Hastings Reserv., Carmel Valley, CA. Parents eat all feces produced by their young during the first few days after

hatching. Young are fed and then defecate directly into parent's mouth. Following fourth day posthatching, parents stimulate defecation by pecking young's rump. Soon after, this behavior becomes specialized such that the bare uropygium of young is wagged laterally when the fecal sac is produced. After about 5 d posthatching, parents carry feces away (≥ 5 m) from nest, usually depositing them on branches of nearby trees. After about 12 d posthatching, young position their rear over the rim for defecation, thus relieving the parents' task of carrying feces from the nest.

COOPERATIVE BREEDING

Not known to occur.

BROOD PARASITISM

Uncommon host of Brown-headed Cowbird (*Molothrus ater*); over 20 cases of parasitism reported (from Oregon, California, Arizona, New Mexico, Texas, and Durango-Mexico) (Friedmann et al. 1977, Friedmann and Kiff 1985, R. W. Campbell pers. comm., J. Nocedal pers. comm.). Of 18 nests found with eggs or young in British Columbia, none were parasitized, although there were 2 separate cases of adults feeding young cowbirds (R. W. Campbell pers. comm.). Of about 25 cowbird hosts documented during the Monterey Co., CA, breeding bird atlas work (Roberson and Tenney 1993), none involved Hutton's Vireo, possibly because the nests are concealed so well (D. Roberson pers. comm.). In Santa Barbara Co., CA, however, many discovered nests were parasitized, and Hutton's Vireo numbers are thought to have declined since the mid-1980s as a result (Lehman 1994).

Timing of laying in relation to host's laying. Not generally known; one report of eggs laid prior to nest completion, resulting in nest abandonment (NRP data). In much of California, first clutches may be exempt from parasitism because Brown-headed Cowbirds do not generally arrive on breeding grounds until after Hutton's Vireos have begun nesting (B. Williams pers. comm.).

Response to parasitic mother, eggs, or nestlings. See above, otherwise not known.

Effects of parasitism on host. No details, see above.

Success of parasite with this host. No quantitative data; several cases of adult Hutton's Vireos feeding fledgling cowbirds (e.g., in British Columbia; see above).

FLEDGLING STAGE

Age at departure about 14 d (Van Fleet 1919). In British Columbia, the nestling period for one

nest was exactly 14 d (R. W. Campbell pers. comm.), but was about 17 d for one in central coastal California (Grinnell and Linsdale 1936). Parents observed feeding young up to 21 d after nest departure (NRP data). Parents and young travel together, generally close to nest, and call to each other frequently (JND). One reported observation of a fledgling in California being fed leaf-roller moth larvae (*Epinotia emarginana*; B. Williams pers. comm.). This is one of the most common small moths in California oak woodlands, and is probably an important food for fledglings, as well as nestlings and adults (JND).

IMMATURE STAGE

Shortly after independence, young probably disperse from natal territory into wintering areas where they typically join mixed-species foraging flocks. At a non-breeding site just outside breeding habitat in central coastal California, 83% of known-age birds newly captured in mist nets from Jun–Oct are immature ($n = 80$; JND, Big Sur Ornithology Laboratory [BSOL] data).

DEMOGRAPHY AND POPULATIONS

MEASURES OF BREEDING ACTIVITY

Age at first breeding; intervals between breeding. No information.

Clutch. Typically 4 eggs, ranging from 1–5 (Bent 1950, WFVZ data, R. W. Campbell pers. comm.). Suspected of having >1 clutch per breeding season, but not verified (see Breeding: second/late brood(s) per season).

Annual and lifetime reproductive success. Based on nest records, an average of 2.9 young/nest survive to fledgling stage ($n = 8$ nests; NRP data). Habitat quality is probably a key determinant of nesting success. In the central Sierra Nevada Mtns. of California, nesting is attempted in presumably suboptimal habitat (grazed pine-oak woodland with little to no understory); of 4 attempted nests recorded during a period of 6 yr there, only 1 fledged young (K. Purcell pers. comm.). No data on lifetime success.

LIFE SPAN AND SURVIVORSHIP

Oldest known wild bird: 6 yr 6 mo, banded as a hatch-year female Jun 1977, last recaptured Dec 1983 (Marin Co., CA; D. Hardesty pers. comm.).

DISEASE AND BODY PARASITES

One of 4 individuals tested from coastal Marin Co., CA, was infected with the blood parasite *Haemoproteus vireonis* (P. Super pers. comm.). Otherwise, no information.

CAUSES OF MORTALITY

No specific information available.

RANGE

Initial dispersal from natal site. See Breeding: immature stage. No systematic data on dispersal distances, although young *V. h. huttoni* have occurred in the Mojave Desert, CA, as far as 120 km from nearest possible natal site (McCaskie 1994, M. Heindel pers. comm.).

Fidelity to breeding site and winter home range. Little known; at a central coastal California wintering site, 23% of individuals captured in mist nets one winter were recaptured the next ($n = 13$ captures; JND, BSOL data).

Home range. No information.

POPULATION STATUS

Numbers: estimates or counts of density. Estimates vary with habitat, region, and season. Estimates of densities ($n/40$ ha) by season in young-growth, medium sawtimber Douglas-fir forest in nw. California are: 8.1 (spring), 8.9 (summer), 13.8 (fall), and 3.7 (winter; Marcot 1984); in cottonwood-willow riparian forest, south fork Kern River, CA: 14 (spring) (Fleshman and Kaufman 1983). Breeding bird densities (pairs/40 ha) are: 2.4 in chaparral in Santa Monica Mtns., CA; 8.8 in chaparral on Santa Cruz I., CA; 6 in Monterey pine forest at Pt. Lobos, CA; 6.8 in bishop pine forest on Santa Cruz I., CA (Yeaton 1974). Densities in live oak woodland presumably much higher; anecdotal estimate for Sonoma Co., CA = 15.6 pair/40 ha (Van Fleet 1919). Based on atlas work, 2,000–4,000 breeding pairs estimated for Monterey Co., CA (Roberson and Tenney 1993).

Trends. On Breeding Bird Surveys from 1968–1979, numbers increased in far western states, significantly only in California (Robbins et al. 1986). Numbers fairly stable to slightly increasing across range thereafter through 1991 (Natl. Biol. Service, unpubl. data). Numbers thought to be declining since the mid-1980s in Santa Barbara Co., CA, where many nests found were parasitized by Brown-headed Cowbirds (Lehman 1994). No data from Mexico or Guatemala.

POPULATION REGULATION

In winter, severe cold may result in dramatic decline in numbers (Linsdale 1947). No quantitative data.

CONSERVATION AND MANAGEMENT

EFFECTS OF HUMAN ACTIVITY

Shooting and trapping. No information.

Pesticides and other contaminants/toxins. No quantitative information. Pesticides are used to control leaf-roller moth larvae in some suburban and semirural residences in n. Sierra Nevada foothills of California (B. Williams pers. comm.). Although the pesticides are probably non-toxic to Hutton's Vireos, their use in these breeding areas undoubtedly results in a significant decline of a potentially important food source for the birds (see Breeding: fledgling stage).

Collisions with stationary/moving structure or objects. Not reported.

Degradation of habitat: breeding and wintering. Degradation of habitat along the Salinas River in central California presumably resulted in extirpation of populations in Salinas Valley (Roberson and Tenney 1993). In w. Mexico, understory agriculture in cloud forests and cutting and grazing effects in pine-oak woodlands do not appear to harm Hutton's Vireos (as determined by probability of occurrence) (R. Hutto pers. comm.). In fact, at least in winter, species seems to prefer disturbed conditions where there are still trees intact, and is more likely to be detected in disturbed cloud forests followed by cut and grazed pine-oak woodlands than in any other habitat types (R. Hutto pers. comm.).

Disturbance at nest and roost sites. Disturbance during nest-building period often results in nest abandonment (Van Fleet 1919).

MANAGEMENT

Presumably not presently in need of management.

APPEARANCE

MOLTS AND PLUMAGES

Descriptions below are of nominate *V. h. huttoni*.

Hatchlings. Little information; young psilopaedic (little or no down), skin flesh-colored, down first forms on dorsal surface (Wheelock 1905).

Juvenal plumage. Starts to appear within a few days after hatching and is fully developed about 2 wk later (D. Drynan pers. comm.). Juvenal plumage worn Apr to Aug.

Upperparts grayish olive, sometimes with brownish wash; wings and tail dusky with pale yellowish olive edgings; median and greater wing-coverts broadly edged pale buffy olive to brownish; underparts, auricular and suborbital regions pale olive-grayish (Ridgway 1904, Pyle et al. 1987).

Basic I plumage. Prebasic I molt (Aug–Sep) is partial, involving all contour feathers except primary wing-coverts; Juvenal remiges and

rectrices retained (Pyle et al. 1987). Of hatching-year birds captured in mist nets in Big Sur, CA, molting dates range from 30 Jun to 23 Oct, with a median date of 25 Aug ($n = 48$; BSOL data; Fig. 5).

Upperparts plain olive, greener toward rump; remiges and rectrices dusky brownish to blackish with pale yellowish olive edgings; median and greater wing-coverts broadly tipped with pale yellowish olive or pale olive buff, producing 2 distinct wing bars, tertials similarly edged; primary wing-coverts buffy olive to brownish, lack green edgings, and contrast with slightly glossier and green-edged greater coverts; ear coverts and sides of neck slightly paler olive than crown and nape, becoming pale buffy olive to dull olive-buff in suborbital and malar regions; distinct eye-ring pale dull olive-yellowish, broader posteriorly, and broken on middle portion of upper eye-lid; chin, throat, and upper breast pale buffy olive, becoming deeper buffy olive on sides and flanks; lower breast, abdomen, and undertail-coverts pale olive-buff (sometimes whitish on lower abdomen and undertail-coverts); axillars and underwing-coverts yellowish white, sometimes tinged with olive; inner webs of remiges and rectrices edged yellowish white; rectrices tapered (Ridgway 1904, Pyle et al. 1987).

Definitive Basic plumage. Definitive Prebasic molt (Jul-Sep) is a complete molt of all body and flight feathers (JND, BSOL data; Fig. 5). Acquired in summer-fall of second calendar year of life.

Similar to Basic I except primary wing-coverts, like median and greater wing-coverts, are broadly tipped with pale yellowish olive or pale olive buff, green edged, and slightly glossy; rectrices truncate, not tapered (Pyle et al. 1987).

No Prealternate molt. Feather wear causes plumage to change slightly by breeding season. Generally appears less olive and yellowish, more drab and grayish (Pyle et al. 1987).

BARE PARTS

Bill and gape. Bill blackish above, paler below (particularly at base); gape of nestlings orange, tomlia yellow.

Iris. Brown.

Legs and feet. Sky blue to pale gray legs and toes, apparently changing from blue to gray with age (Stallcup 1984). Toe pads whitish.

MEASUREMENTS

LINEAR

See Appendix. No consistent differences in measured characters between the sexes at the

specific and subspecific levels (in all cases $P > 0.05$). New measurements of study skins from University of California, Berkeley Museum of Vertebrate Zoology (MVZ), California Academy of Sciences (CAS), Los Angeles County Museum of Natural History (LACM), University of Arizona (U of A), and of live birds from BSOL (wing chord only); all ages, all sexes, all subspecies; lengths reported in mm. Data shown as mean \pm SD (range, n). These data summarize those in Appendix.

Culmen: 6.69 ± 0.40 (5.25–8.08, 381); exposed culmen: 9.15 ± 0.56 (7.90–10.6, 452); wing chord: 62.0 ± 3.0 (53.0–71.0, 552); tail: 49.1 ± 2.5 (42.0–56.0, 458); tarsus: 19.34 ± 0.83 (17.00–21.43, 460).

MASS

See Appendix. Although females tend to be heavier than males, the difference is not statistically significant ($P > 0.05$). Data from MVZ, BSOL, and U of A (*V. h. insularis* from J. Barlow unpubl. data); all ages, all sexes, all subspecies. Data here summarize those in Appendix. Mean = 11.30 g (SD = 0.82, range = 9.00–15.10, $n = 257$).

OTHER

Skull ossification occurs in the median line pattern and completes in hatching year from 15 Aug through Dec. Some individuals retain unossified windows through spring of their second calendar year of life (Pyle et al. 1987, JND).

PRIORITIES FOR FUTURE RESEARCH

Relatively little is known about this fairly common songbird, perhaps in part because of its inconspicuous and retiring habits. Virtually nothing is known about establishment, maintenance, fidelity, and longevity of territories, nor about variability in reproductive success and survivorship in different habitats. Long-term studies of color-marked populations would greatly further our knowledge of these topics and others, including the occurrence of natal philopatry and double-brooding.

The extent of dispersal and migration in all populations of Hutton's Vireo is vague. More detailed information on movements, perhaps with the aid of color banding or radio tracking, would be helpful.

Aside from casual observations of losses due to particularly cold winters, nothing is known about the mechanisms responsible for population regulation, nor the causes of death (including predation).

The few genetic studies of this species have brought some interesting findings, but more detailed studies are needed to confirm them. In particular, due mainly to small sample sizes, allozymic differences reported by Cicero and Johnson (1992) between *V. h. huttoni* and *V. h. stephensi* are alone inadequate to demonstrate that birds from the two populations represent distinct biologic species. In addition to further biochemical work, systematic study of differences in vocalizations, behavior, plumage, and morphology of these two forms would be helpful.

More can be learned about distribution, particularly in Texas, where huge tracts of inaccessible private land make even presence-absence information unavailable.

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Appendix. Linear measurements (mm) and mass (g) of Hutton's Vireos by subspecies from museum specimens. Data shown as mean \pm SD (range, *n*). Sources: Museum of Vertebrate Zoology, University of California, Berkeley; California Academy of Sciences; Los Angeles County Museum of Natural History; Department of Ecology and Evolutionary Biology, University of Arizona.

	<i>V. h. insularis</i>	<i>V. h. huttoni</i>	<i>V. h. stephensi</i>	<i>V. h. cognatus</i>	<i>V. h. carolinae</i>	<i>V. h. mexicanus</i>	<i>V. h. vulcani</i>
CULMEN							
Male	6.4 \pm 0.2 (6.1–6.7, 8)	6.7 \pm 0.3 (5.8–7.5, 102)	6.8 \pm 0.4 (5.7–8.1, 68)	7.2 \pm 0.4 (6.5–8.0, 15)	6.7 \pm 0.4 (6.2–7.4, 11)	6.4 \pm 0.5 (5.3–7.2, 16)	6.9 \pm 0.5 (6.3–7.4, 5)
Female	6.2 \pm 0.3 (5.8–6.5, 6)	6.6 \pm 0.3 (6.0–7.6, 89)	6.7 \pm 0.4 (6.0–7.5, 30)	7.0 \pm 0.4 (6.3–7.5, 9)	6.7 \pm 0.3 (6.2–7.1, 7)	6.2 \pm 0.2 (5.9–6.7, 12)	7.1 \pm 0.3 (6.8–7.4, 3)
EXPOSED CULMEN							
Male	8.6 \pm 0.2 (8.3–8.9, 8)	9.1 \pm 0.5 (7.9–10.5, 135)	9.3 \pm 0.6 (8.0–10.6, 70)	9.6 \pm 0.3 (9.3–10.4, 16)	9.0 \pm 0.6 (8.0–9.8, 12)	9.1 \pm 0.6 (8.4–10.1, 17)	9.0 \pm 0.5 (8.4–9.7, 7)
Female	8.7 \pm 0.4 (8.2–9.3, 6)	9.1 \pm 0.5 (8.1–10.5, 114)	9.1 \pm 0.6 (8.0–10.0, 32)	9.3 \pm 0.4 (8.7–9.8, 10)	9.3 \pm 0.5 (8.7–10.2, 7)	9.0 \pm 0.5 (8.2–9.9, 13)	9.1 \pm 0.8 (8.1–10.3, 5)
WING CHORD							
Male	62.3 \pm 1.2 (60.0–64.0, 8)	60.5 \pm 2.0 (53.0–65.0, 138)	65.8 \pm 2.1 (61.0–71.0, 71)	63.1 \pm 2.1 (58.0–67.0, 16)	64.0 \pm 2.4 (59.0–68.0, 12)	65.3 \pm 2.6 (62.0–69.0, 18)	64.7 \pm 1.4 (62.0–67.0, 7)
Female	62.7 \pm 3.4 (56.0–66.0, 6)	60.2 \pm 1.9 (56.0–64.0, 118)	66.0 \pm 2.1 (62.0–70.0, 33)	63.3 \pm 1.7 (60.0–65.0, 10)	64.1 \pm 1.9 (62.0–67.0, 7)	64.8 \pm 2.3 (62.0–70.0, 13)	64.2 \pm 1.9 (62.0–67.0, 5)
TAIL							
Male	46.6 \pm 2.4 (44.0–52.0, 8)	48.0 \pm 2.0 (42.0–53.0, 137)	50.8 \pm 2.1 (46.0–56.0, 70)	49.7 \pm 1.5 (47.0–52.0, 16)	51.4 \pm 1.7 (49.0–54.0, 11)	51.2 \pm 2.6 (46.0–56.0, 18)	50.4 \pm 1.4 (49.0–53.0, 7)
Female	45.0 \pm 3.2 (43.0–51.0, 6)	48.0 \pm 2.1 (42.0–54.0, 117)	51.0 \pm 1.9 (48.0–55.0, 33)	51.0 \pm 1.8 (49.0–55.0, 10)	51.6 \pm 2.0 (48.0–53.0, 7)	50.2 \pm 2.3 (46.0–54.0, 13)	50.8 \pm 2.4 (48.0–54.0, 5)
TARSUS							
Male	19.3 \pm 0.9 (18.3–20.7, 8)	19.5 \pm 0.9 (17.9–21.4, 137)	19.0 \pm 0.7 (17.3–20.4, 70)	19.8 \pm 0.5 (19.0–20.8, 15)	19.1 \pm 0.8 (17.1–20.2, 12)	19.4 \pm 0.8 (17.5–20.4, 18)	18.8 \pm 0.7 (17.8–19.4, 7)
Female	19.0 \pm 0.7 (17.5–19.5, 6)	19.5 \pm 0.8 (17.4–21.3, 118)	19.1 \pm 0.8 (17.0–20.6, 33)	19.9 \pm 0.7 (18.8–21.0, 10)	19.5 \pm 0.6 (18.8–20.2, 7)	19.0 \pm 0.9 (17.9–20.5, 13)	19.2 \pm 1.1 (18.0–20.3, 5)
MASS							
Male	11.5 \pm 0.0 (11.5, 2)	10.8 \pm 0.6 (9.7–12.0, 42)	11.3 \pm 0.8 (10.0–13.0, 24)	11.6 \pm 0.6 (10.7–12.7, 15)	11.4 \pm 0.2 (11.1–11.7, 8)	12.4 \pm 0.5 (12.0–13.2, 5)	12.8 \pm 0.4 (12.6–13.5, 5)
Female	11.6 \pm 0.8 (10.1–12.5, 8)	11.0 \pm 1.0 (9.0–15.1, 34)	11.6 \pm 1.6 (9.5–14.2, 7)	12.0 \pm 0.7 (10.9–13.1, 8)	11.4 \pm 0.4 (11.0–12.0, 5)	13.2 (<i>n</i> = 1)	13.0 \pm 0.9 (12.2–14.0, 3)

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