

## Vocalisations and taxonomic status of the Purplish-backed Quail-dove *Geotrygon lawrenceii*

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*Geotrygon lawrenceii* habita selvas húmedas siempreverdes entre los 400 y 1.050 m en el sur de América Central. En base al Concepto Filogenético de Especie, se ha discutido el estatus específico de la forma *carrikeri*, de la Sierra de los Tuxtlas, Veracruz, México<sup>11</sup>. De hecho, un análisis de los cantos de *G. lawrenceii* de México, Costa Rica y Panamá demuestra que estos cantos de Centroamérica, si bien variables, son diferentes de los de *carrikeri*, lo que provee apoyo científico a su reconocimiento como un taxón de nivel específico. Es la única especie endémica de Tuxtlas y dada la tasa extremadamente alta de deforestación en el área, se la considera En Peligro<sup>14</sup>.

Purplish-backed Quail-dove *Geotrygon lawrenceii* inhabits humid evergreen forest at 400–1,050 m in southern Central America<sup>12,15</sup>. It is considered “fairly common but local” in Costa Rica<sup>16</sup> or “rare to uncommon and apparently local” in Panama<sup>12</sup>. The nominate form occurs throughout this range except north-western Costa Rica whence the race *lentipes* has been described on the basis of its slightly larger size and paler coloration nominate than *lawrenceii*<sup>10,18</sup>.

In 1941, Wetmore<sup>18</sup> described a highly disjunct new race of Purplish-backed Quail-dove *G. l. carrikeri* from the Sierra de los Tuxtlas (hereafter the Tuxtlas), an isolated volcanic massif in southern Veracruz, Mexico. This form differs from Central American birds in its strikingly larger size and paler coloration<sup>18</sup>, and occurs in humid evergreen forest from 350–1,500 m<sup>8</sup>.

Peterson<sup>11</sup> argued that *carrikeri* should be accorded specific status, noting simply that “recent decisions ... have tended toward recognition of disjunct differentiated forms as full [phylogenetic] species.” The AOU<sup>1</sup> followed Peterson’s<sup>11</sup> view and

recognized Tuxtla Quail-dove *Geotrygon carrikeri* as a full species, although Peterson provided no new data and failed to address biological concerns. While there are doubtless many unrecognized species taxa in the Neotropics, cogent analyses of germane data might be permitted to support philosophical tendencies, e.g., in cases where vocalisations can be of taxonomic significance. Here I provide an analysis of the songs of Purplish-backed Quail-doves (*sensu lato*) from Mexico, Costa Rica and Panama, and discuss potential taxonomic implications. Songs were analysed using a Kay Elemetrics DSP Sonagraph, Model 5500. Dominant frequency was determined from a power spectrum (amplitude [db] plotted against frequency [Hz]).

### Songs of Purplish-backed Quail-doves

In general, the advertising songs of all Purplish-backed Quail-doves (in the broad sense) are superficially similar and quite distinct from the relatively simpler songs of other quail-doves<sup>6,15</sup>. Published descriptions of the songs have varied somewhat, however, making it hard to draw any

**Table 1.** Mean values for certain parameters of the songs of Tuxtla Quail-dove *Geotrygon carrikeri* from Mexico (cf. Fig. 1) and Purplish-backed Quail-doves *Geotrygon lawrenceii* from Central America (cf. Figs. 2–3).

	Mexico	Costa Rica	Panama
Duration of whole song phrase	0.90 s	0.83 s	1.02 s
Duration of first note	0.42 s	0.25 s	0.45 s
Duration of inter-note pause	0.06 s	0.10 s	0.12 s
Duration of second note	0.42 s	0.48 s	0.45 s
Inter-song interval	1.6–2.6 s	1.5–2.4 s	1.4–1.6 s
Upper frequency second note	1,190 Hz	970 Hz	1,010 Hz
Lower frequency second note	670 Hz	530 Hz	500 Hz
Dominant frequency second note	970 Hz	710 Hz	780 Hz
Frequency range	520 Hz	440 Hz	460 Hz

conclusions from the phonetic renditions of multiple fieldworkers. In Panama, the voice has been described as “a loud *coo-ah*, repeated at short intervals”<sup>19</sup> or “a fairly loud, nasal and somewhat hollow *cowh*, repeated steadily for lengthy periods”<sup>12</sup>. In Costa Rica, the song is described as “*coo-ka-krrrw* or *pum-whaa-koow*, the third note downslurred, longer and louder than the others (the only note audible at a distance)”<sup>15</sup>. In Mexico, the song has been described as “a fairly soft, low-pitched *who wh'o-oo*, the first part of the second note more emphatic, and the last syllable slurred downward”<sup>20</sup>, or “a 3-syllable, slightly burry or twangy *hu'w-wohw* or *h'w-wohw*, ... at a distance only the last *wohw* audible”<sup>8</sup>. Thus, given the apparent similarity between the songs of Mexican and Costa Rican birds, in contrast to Panamanian birds, Howell & Webb<sup>8</sup> noted that the taxonomy of the complex remained moot.

Fig. 1 illustrates advertising songs of birds from Mexico, Costa Rica, and Panama, which allow some conclusions to be drawn about the relationships of birds from these three areas. The songs from all areas essentially comprise two notes, the second much stronger and louder. The combination of a brief pause between notes and a slight inflection at the end of the first and start of the second note often creates the distinct effect of a three-syllable song. As noted above by some authors, at a distance

only the loud last note may be audible, which presumably has resulted in voice transcriptions that suggest a single-note song.

Table 1 provides data from the three birds whose songs are shown in Fig. 1. The sample size is small but the songs of doves are innate<sup>3,4</sup>, although some dialectal variation can exist between populations<sup>3</sup>, as with other species in which vocalisations are considered innate, e.g. Tamaulipas Pygmy-owl *Glaucidium sanchezi*<sup>7</sup>. In addition, the numerous *carrikeri* I have heard sounded essentially identical to the individual in Figure 1A, while a second *lawrenceii* heard in Panama sounded the same as the bird in Figure 1C (R. A. Behrstock pers. comm.). Inter-song interval appears to be individually variable, as in certain other quail-dove species<sup>8</sup>, and seems unlikely to be of taxonomic value. The main characters considered to be of taxonomic importance in Columbidae advertising songs are pitch (or frequency), pitch modulation, temporal parameters that create different rhythms, and tonal quality<sup>3,4</sup>; in all of these regards the song of *carrikeri* can be distinguished readily from that of *lawrenceii*.

The Central American birds share similar duration, tone, and lower pitch and pitch modulation of the second note, which downslurs after the longer and abrupt inter-note interval; however, *carrikeri* appears intermediate between Central American birds in duration of the first note and, consequently, in overall song length. The main difference between Figure 1B (Costa Rica) and 1C (Panama) is the shorter, hurried-sounding first note of the former, which contrasts with the prolonged legato first note of the latter; possibly a dialectal variation.

By contrast, in *carrikeri* (Figure 1A) the first note almost slurs into the second, which is more frequency-modulated than that of *lawrenceii* and which rises abruptly before it downslurs. Of interest is the distinctly higher pitch of *carrikeri*, which is rather surprising given this taxon's larger size, the general rule being that larger (heavier) species produce lower-pitched songs<sup>3,4,16</sup>.

Based on these recordings, a phonetic rendering of the songs is as follows: **Mexico**: a relatively high-pitched, fast-sounding, slightly twangy *hoooh wh'wooh*, or *hu wh'wohw*. **Costa Rica**: a relatively low-pitched, hollow, resonant *hoo wh'hoooh*, with a relatively fast-paced, or hurried, first note. **Panama**: a relatively low-pitched, hollow, resonant *whoooh hoooh* or *hoooh w'hoooh*, with a relatively even pace. In all cases, at a distance only the stronger second note may be audible.

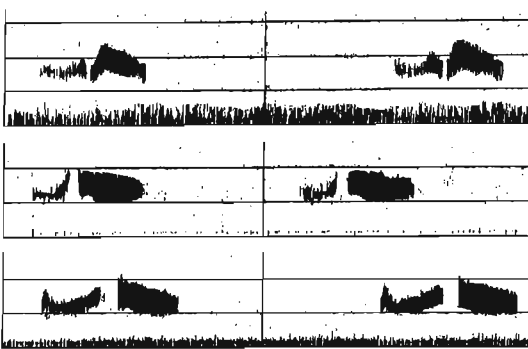


Figure 1. Sonograms of songs of (A): Tuxtla Quail-dove *Geotrygon carrikeri* recorded by S. N. G. Howell at 900 m on Volcan Santa Marta, Veracruz, 2 May 1990. Note the higher frequency (cf. B and C) and the abruptly rising start to the main (second) note. (B): Purplish-backed Quail-dove *Geotrygon l. lawrenceii* recorded by D. L. Ross, Jr., at 700 m at Rara Avis, Costa Rica, 12 June 1993<sup>13</sup>. Note for this and C the lower frequency (cf. A) and distinct interval before the evenly downslurred main (second) note. (C): Purplish-backed Quail-dove *Geotrygon l. lawrenceii* recorded by R. A. Behrstock at Cerro Jefe, Panama province, Panama.

## Conclusions

An analysis of the songs of Purplish-backed Quail-doves from Mexico, Costa Rica and Panama indicates that songs from Central America, while slightly variable, are distinct from that of the distinct taxon *carrikeri*, of southern Mexico. This provides support for recognising *carrikeri* as a distinct species, Tuxtla Quail-dove, endemic to the Sierra de Los Tuxtlas.

As such, it is the only species endemic to the Tuxtlas, *contra* Peterson<sup>11</sup> who suggested that the Long-tailed Sabrewing *Campylopterus [curvipennis] excellens* is endemic to the Tuxtlas; this hummingbird also occurs in the Atlantic-slope lowlands of the Isthmus of Tehuantepec<sup>8,9</sup>, a centre of endemism that supports the highly localized Nava's Wren *Hylorchilus navai* and numerous endemic plant taxa<sup>5,14,17</sup>.

Of conservation importance, and as noted rightly by Peterson<sup>11</sup>, Tuxtla Quail-dove inhabits a region characterised by an extremely rapid rate of deforestation, and the higher slopes inhabited by this dove remain effectively unprotected. Stattersfield *et al.*<sup>14</sup> considered Tuxtla Quail-dove as Endangered, i.e. facing a very high risk of extinction in the wild in the near future, and provided a conservation overview for the Los Tuxtlas and Uxpanapa region, which together comprise an Endemic Bird Area (EBA). One hopes that effective conservation action can be directed toward these rich areas before it is too late.

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