AUDIOWINGS

JOURNAL OF THE AUSTRALIAN WILDLIFE SOUND RECORDING GROUP

Volume 22 No1 June 2020








Clockwise from top left: two fledglings just out of the nest (3 Nov); male parent removing white faecal sac (2 Nov); goanna nearby (2 Nov); nest below the verandah (30 Oct); SASS on verandah (22 Oct); ME66 gun mic pointing at nest (2 Nov); eastern brown snake approaching the nest (25 Oct). Centre image, first chick out of the nest (3 Nov).

Images by Vicki Powys

Vocalisations of the speckled warbler (*Chthonicola sagittata)* in Capertee Valley, NSW

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Summary

In October 2019 a pair of speckled warblers built a nest below the front verandah of my house. From 18 October to 5 November I made audio recordings and took photos and videos of the parents feeding nestlings, and of the young leaving the nest. Feeds per hour and food items were noted. Potential predators were identified. A repertoire of songs, scolds, rattles and contact calls are described with sonograms and audio. I compared adult song phrases with those of another pair rearing fledglings 500 metres distant, and concluded that individual males were identifiable by their unique repertoire of song phrases. Paired male and female songs were similar to one another.

General observations

Nest building

In a drought-stricken year, heavy rain (44 mm) on September 16 to 17 encouraged the speckled warblers to begin nesting in a clearing within the local dry-woodland. A domed grassy nest was built on the ground and embedded in a low clump of heath *Astroloma humifusum*. The nest was lined with wallaby fur and feathers with a short tunnel leading to the nest chamber. The nest was surrounded by sparse native grasses and increasingly bare stony ground, and situated 0.7 metres directly below the edge of my front verandah.

Gardner (2002) monitored 160 nesting attempts of speckled warblers in a three-year study in the ACT. Vocalisations were not mentioned but the measured durations of different nesting stages provided a useful guide, as follows: nest building 3 to 4 days; eggs laid within 2 days of nest completion; incubation 18 days; nestling period 17 days, with an 80% failure to produce fledglings, perhaps due to predation by larger birds and mammals. I had first noticed 'my' nest being built on 22 September, and from Gardner's numbers I estimated that hatching might occur between 15 and 19 October, and fledging around 1 to 5 November.

Predators

'My' nestlings hatched on or before 18 October and successfully fledged on 3 November, but not without some heart-stopping moments when predators approached, including a large brown snake just metres away on 25 October! For some unknown reason the snake turned away. I had wondered at the absence of the parents for 40 minutes, during a time of morning when they usually fed the young every few minutes, but they had seen the snake and kept away! On another day, a small goanna came to within half a metre of the nest, but was disturbed when I happened to step out onto the verandah. When white-winged choughs foraged too close to the nest they provoked rattling alarm calls from both the male and the female speckled warbler and a distress song from the male (see 'Vocalisations' below). The speckled warbler parents also produced a rattle alarm call when a grey butcherbird sang. The parents ceased feeding the young for 20 minutes when a pair of pied currawongs came near. On 2 November a collared sparrowhawk paid a visit. It noisily crashed through nearby ironbark foliage, causing the female parent (with food in her beak) to freeze motionless for 7 minutes. Chisholm (1967) described this freezing behaviour occurring in similar situations.

On the snake day, I noticed a lot of cheeping from the young when the parents were absent. Soon I found the answer, the young were being attacked by ants! When the snake turned away, the speckled warbler parents returned to the nest and began pecking at the ground around and inside the nest. I could see many smallish brown ants swarming. Both parents must have pecked up hundreds of ants in 20 minutes before the drama subsided. The ants did not return. Perhaps they had been attracted by a dropped food item nearby.

Food

Food items that I could identify were caterpillars, medium sized ants, but predominantly small grasshoppers for which both parents constantly foraged on the ground in a large radius around the nest. Male or female parent and food type were identified from replay of videos and photos (males have a dark eyebrow, females a reddish eyebrow). Both parents sometimes removed a faecal sac when visiting the nest, usually flying some distance before dropping it. A visual inspection after the young had fledged showed there were many dry faecal sacs remaining in the nest. Feeding the young took place at all times of day, with more feeds in the morning. The parents took a break in the middle part of the day, visited a nearby birdbath and foraged further from the nest. The

first feed of the day occurred between 05:50 and 06:00, and the last feed between 19:15 and 19:30 Australian Eastern Daylight Time (AEDT). On average, both parents equally fed the nestlings and removed faecal sacs. The cover photo shows the female speckled warbler at the nest, bringing a beakful of grasshoppers to the nestlings.

Feeding rate observations:
21 Oct 06:50 – 07:50 (m10 + f4 = 14)
13:00 – 14:00 (m3 + f1 = 4)
24 Oct 06:00 – 07:00 (m8 + f8 = 16)
07:00 – 08:00 (m5 + f4 = 9)
09:40 – 10:40 (m4 + f3 = 7)
25 Oct 06:30 – 07:00 (m2 + f3 = 5)
07:00 – 07:50 (snake present = 0)
09:00 – 10.30 (m3 + f8 = 11)

Vocalisations

Terminology

Terms used are from Catchpole and Slater (1995), where a longer bout of song can be divided into phrases (a group of syllables), syllables (a group of notes), and notes (which show as a single mark on a sonogram). Repertoire includes all the sounds that a bird species might make, including songs and calls. 'Male 1' and 'female 1' refer to the nesting pair at my house; 'male 2' and 'female 2' refer to the other pair with fledglings that were 500 metres distant from pair 1. Sonograms are read from left to right, with a 12 kHz scale on the y-axis showing pitch, and a 5.5 second scale on the x-axis showing time.

Repertoire

Tzaros (1996) observed vocalisations and behaviour of speckled warblers near Bendigo in Victoria. He noted nine different calls plus mimicry from two groups. The calls were described but not illustrated. This study was the primary source for the HANZAB (Higgins & Peter 2002) account of speckled warbler vocalisations. Tzaros noted that young only cheeped when the parents came to feed them, but my own observations show that the nestlings, when more than a week old, cheeped almost constantly, with the cheeps becoming louder when they were being fed. Tzaros noted that fledged young were fed by their parents for 6 to 8 weeks and stayed within 250 metres of the nest site. My own observations of songs and calls largely concur with those of Tzaros, but with some additions, as follows:

- melodious song phrases
- a rattling alarm call
- a short series of (typically five) harsh scolding notes
- a chippy-sweet phrase by both adults when feeding nestlings
- extended singing by adult male when young fledged
- an unusual distress song by adult male when choughs approached the nest
- a tik-tik flight call by adults (lower pitch than a similar call of young)
- tik contact calls by perched adults
- tika-tik-tik contact call of fledglings
- cheeps and louder buzz-like begging calls from nestlings
- occasional mimicry within song phrases

These songs and calls are illustrated in Figures 1 - 5, and with audio on the *AudioWings* CD.

Song phrases

Typically, male speckled warblers will sing a 5 to 8 second phrase at one perch, then fly to another perch for the next phrase, making recording difficult. But on occasions, especially if stressed and defending a nest or fledglings, they may sing a number of phrases from one perch or shrub. These longer song bouts comprised approximately 5 second phrases alternating with approximately 10 to 30 seconds of rattling.

Comparison of song repertoires

a. Comparison of two males: I recorded some longer bouts of song from the two different families 500 metres apart, and compared the results. A preliminary study of the song phrases showed that it was possible to tell individual males apart, because the phrases used were unique to each male (Figures 1 a-b and 2 a-b). Phrases measured: male 1 (n=34); male 2 (n=16). There were 10 to 15 syllables in each phrase. The first two syllables of each phrase were stable, for male 1 and male 2. Other syllables often varied.

b. Comparison of male and female in a breeding pair: I analysed six phrases from female 1 as she sang with food in her beak 20 metres from the nest. The song was somewhat weaker than male 1, with the first two syllables similar to male 1 but recognisable as her own (Figure 1 a-d).

Unusual alarm song

When white-winged choughs were foraging near the nest on 22 October, male 1 uttered a stream of continuous song and rattling lasting 4 minutes and concluding with some unusual phrases with repeated notes running up and down the scale (it was not mimicry). The song ceased when the choughs moved further away (Figure 2c).

Figure 1
a-b. Two song phrases from male 1 (range 2-8 kHz), ref: 251019-A4703.
c-d. Two song phrases from female 1 (range 2-7 kHz), ref: 251019-V577.

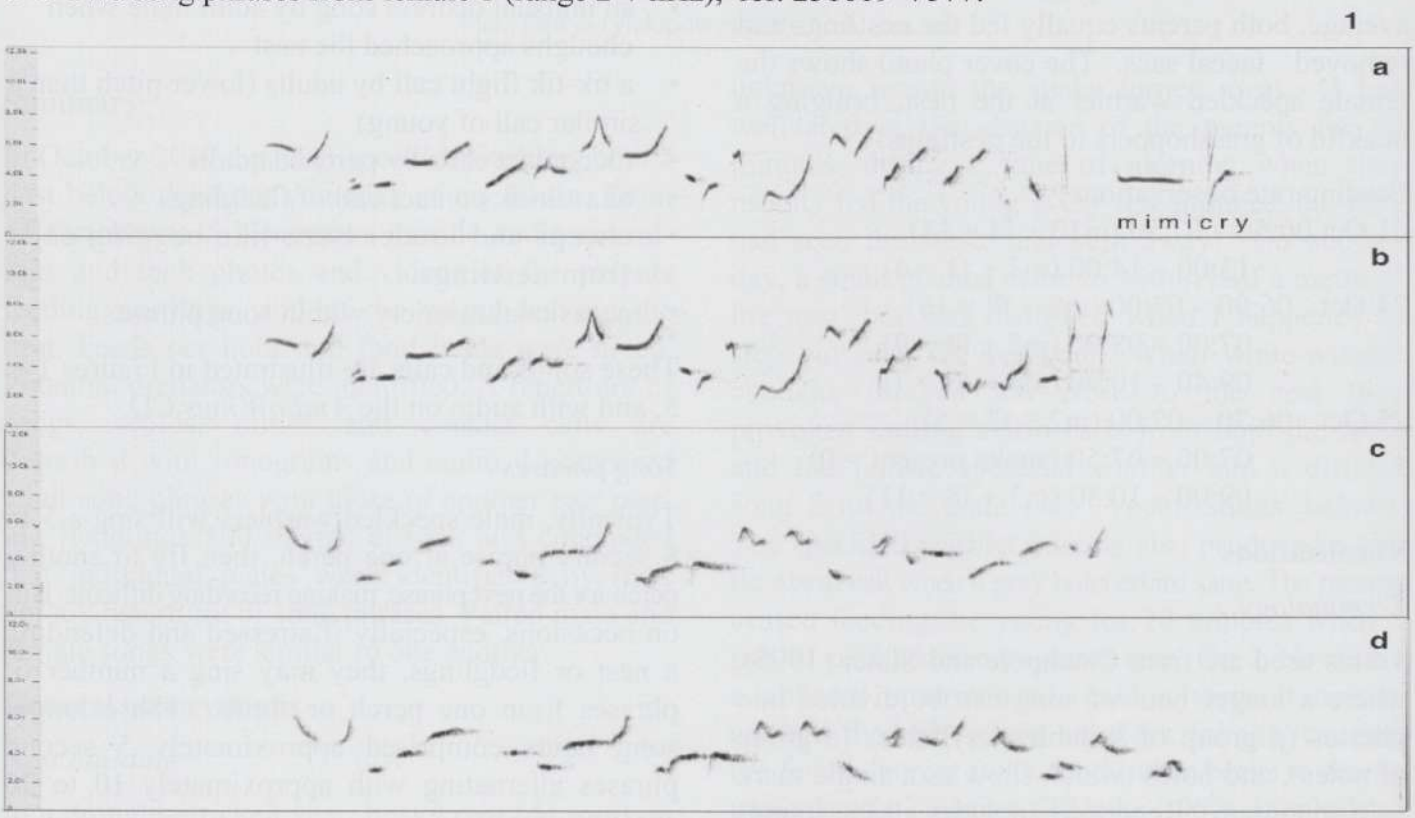


Figure 2
a-b. Two song phrases from male 2 (range 2-8 kHz), ref: 161119-V586.
c. Part of a distress song from male 1 (range 2-8 kHz), ref: 221019-A4658.
d. Part of an excitement song from male 1 (range 2-8 kHz), ref: 031119-A4748.

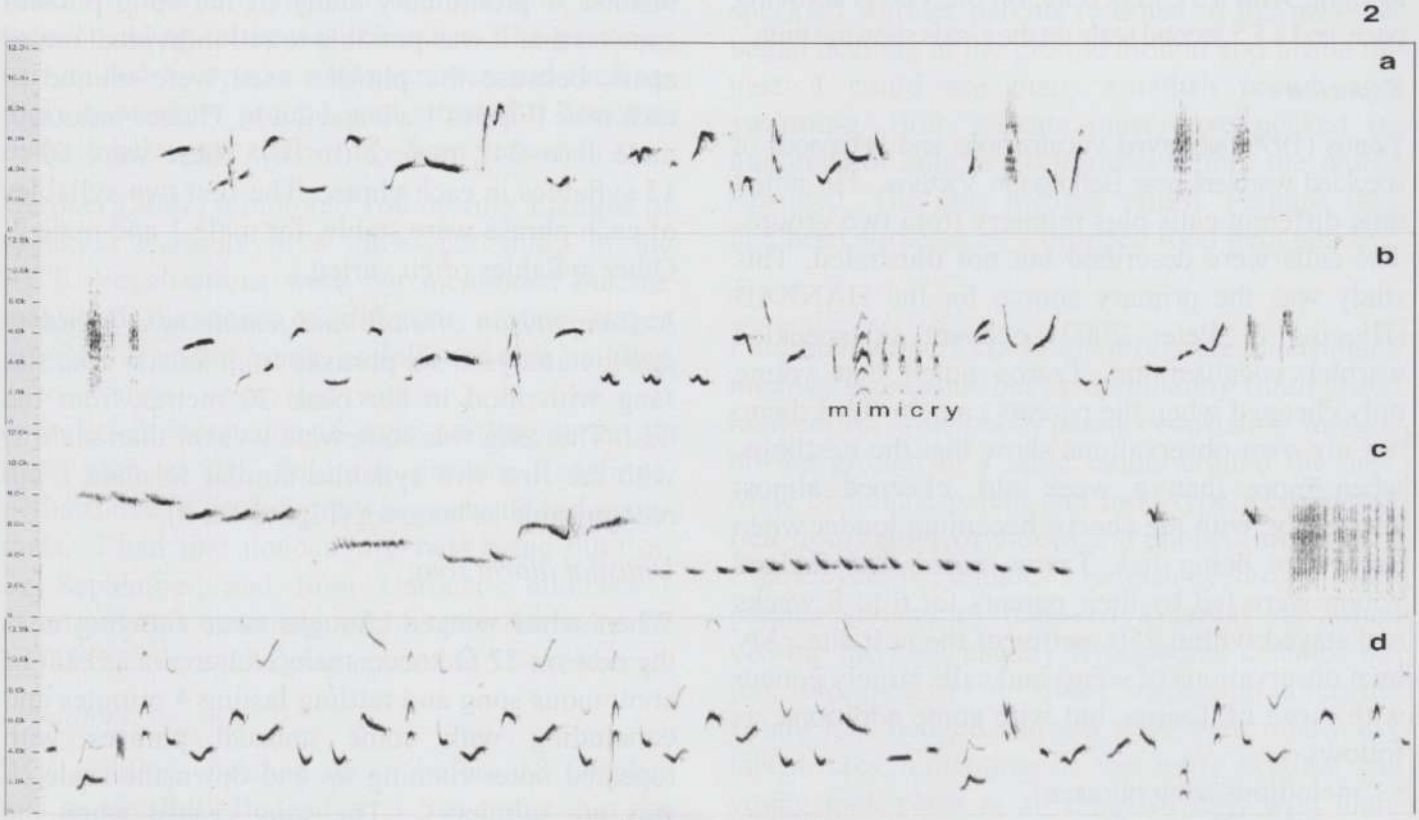


Figure 3
a. Rattle, adult 1, ref: 041119-A4656.
b. Scold, male 1, ref: 191019-V571.

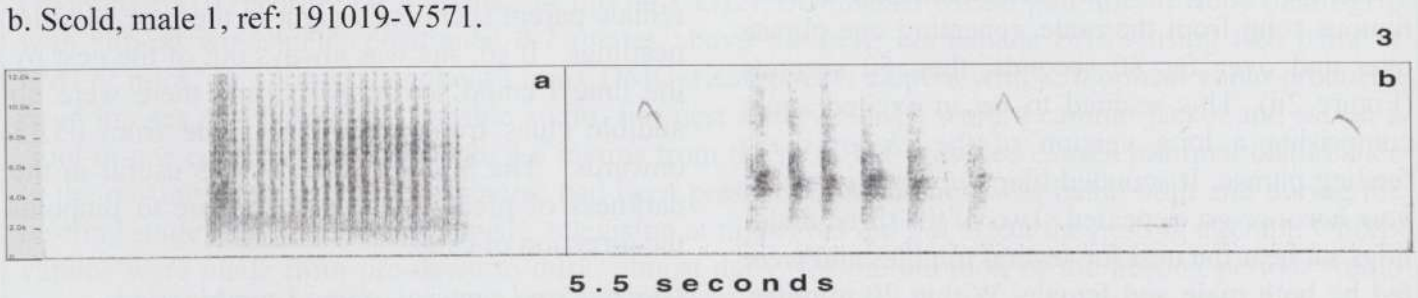


Figure 4
a. Longer *chippy-sweet* announcement call at nest, male 1, with nestling cheeps at 8 kHz, ref: 211019-A4618.
b. Two short *chippy-sweet* announcement calls at nest, female 1, with nestling cheeps at 8 kHz, ref: 211019-A4618.
c. Cheeps from nestlings, grey areas are buzzing calls as they receive food, ref: 021119-A4739.

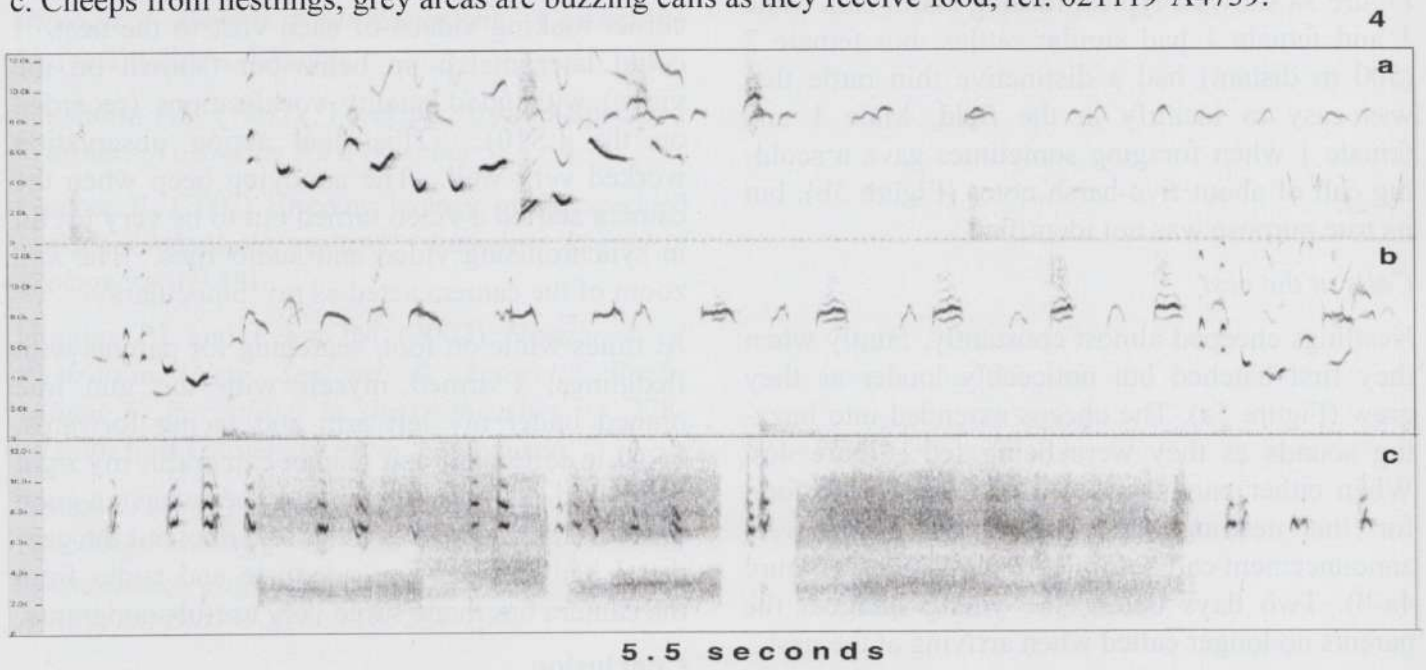
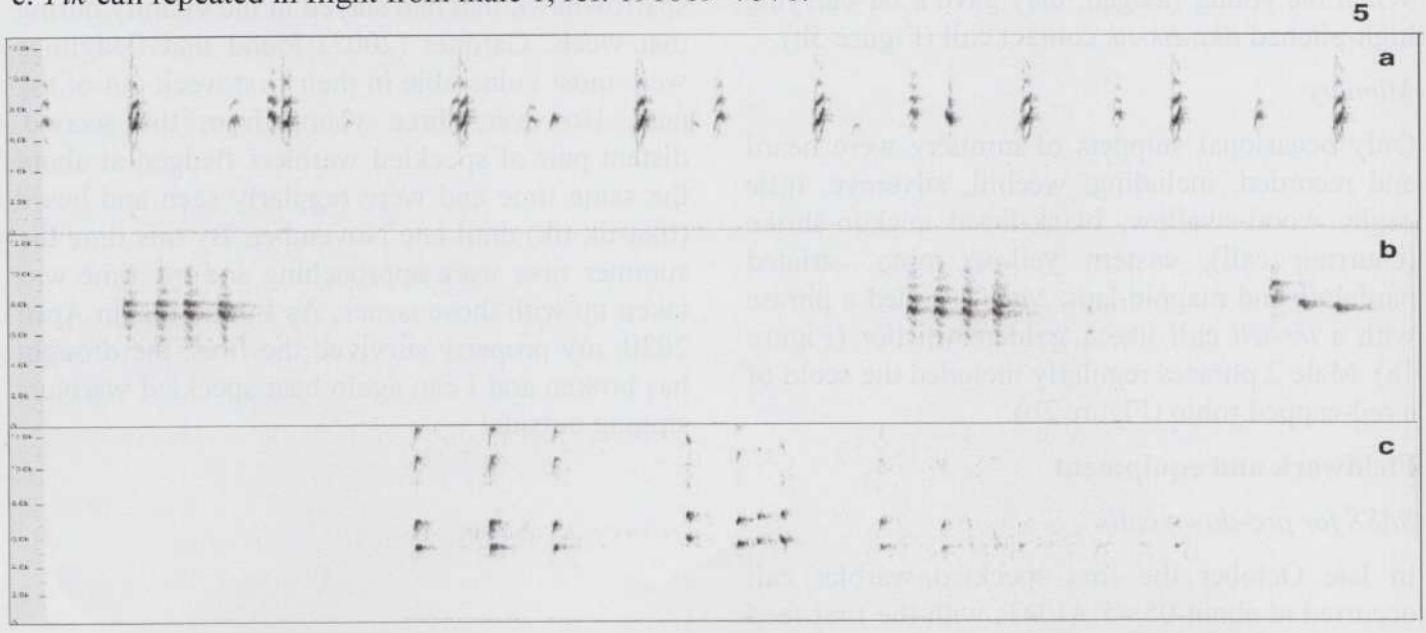


Figure 5
a. Cheeps from three nestlings (range above 6 kHz), ref: 021119-A4739.
b. *Tika-tik-tik* contact call from fledgling (range 6-8 kHz), ref: 041119-V148.
c. *Tik* call repeated in flight from male 1, ref: 191019-V571.



Song when young fledged

When the young first left the nest there was continuous song from the male, repeating one phrase over and over for 80 seconds, then 50 seconds (Figure 2d). This seemed to be an excited song, comprising a long version of the *chippy-sweet* feeding phrase. It sounded like *chippy-sweet well-now here-we-go*, repeated. Two of the three fledglings sat near the nest for several minutes and were fed by both male and female. Within 20 minutes, all three fledglings had flown to the lower branches of a nearby callitris pine where both parents tended them.

Rattles and scolds

Figure 3a shows a typical rattling alarm call. Male 1 and female 1 had similar rattles, but female 2 (500 m distant) had a distinctive thin rattle that was easy to identify in the field. Male 1 and female 1 when foraging sometimes gave a scolding call of about five harsh notes (Figure 3b), but its true purpose was not identified.

Calls at the nest

Nestlings cheeped almost constantly, faintly when they first hatched but noticeably louder as they grew (Figure 5a). The cheeps extended into buzzing sounds as they were being fed (Figure 4c). When either parent arrived at the nest with food for the nestlings, they gave a *chippy-sweet* announcement call before entering the nest (Figure 4a-b). Two days before the young fledged, the parents no longer called when arriving at the nest.

Contact calls

A *tik* contact call was given by parents when perched, also a series of *tiks* in flight (Figure 5c). When the young fledged, they gave a far-carrying high-pitched *tika-tik-tik* contact call (Figure 5b).

Mimicry

Only occasional snippets of mimicry were heard and recorded, including: weebill, silvereye, little eagle, wood-swallow, black-faced cuckoo-shrike (churring call), eastern yellow robin, striated pardalote and magpie-lark. Male 1 ended a phrase with a *ter-wit* call like a golden whistler (Figure 1a). Male 2 phrases regularly included the scold of a red-capped robin (Figure 2b).

Fieldwork and equipment

SASS for pre-dawn calls

In late October the first speckled warbler call occurred at about 05:45 AEDT, with the first feed to the nestlings a bit before 06:00. It was too dark for me to see much before 06:00 in late October (sunrise was at 06:27). I never did find out if the female parent spent each night in the nest with the nestlings. If so, she was always out of the nest by the time I could see properly, and there were no audible clues from recordings made from 05.15 onwards. The SASS stereo rig was useful in the darkness of predawn, and helped me to pinpoint the direction of calls.

Gun mic and camera - a good combination

Good quality calls were best obtained with the mono gun microphone which rested on the bottom rail of the verandah, pointing downwards and directly above the nest. Sometimes I would leave the recorder running for an hour while I sat in my corner making videos of each visit to the nest. I could later match up behaviour (shown on the video) with good quality vocalisations (recorded on the LS10). This dual action observation worked very well. The annoying beep when the camera started a video turned out to be very useful in synchronising video and audio files. The x30 zoom of the camera acted as my 'binoculars'.

At times while on foot, searching for parents with fledglings, I armed myself with the gun mic pinned under my left arm and facing forwards, LS10 in left hand, and pocket camera in my right hand. An easier solution would be to have a good quality video camera with add-on mic, but the gear that I had to hand was adequate and audio from the camera has made some very useful sonograms.

Conclusion

To end this tale I have to report that 'my' fledglings did not survive beyond the first few days out of the nest and were possibly taken by a collared sparrowhawk that had stayed in the vicinity during that week. Gardner (2002) found that fledglings were most vulnerable in their first week out of the nest. However, three young from the second, distant pair of speckled warblers fledged at about the same time and were regularly seen and heard (tika-tik-tik) until late November. By this time the summer fires were approaching and my time was taken up with those issues. As I write this in April 2020, my property survived the fires, the drought has broken and I can again hear speckled warblers singing outside!

Box 1 Recording methods

Olympus LS10 recorder (WAV files, 24 bit/ 44.1 kHz); Sennheiser ME66 gun mic in Rode pistol-grip with slip-on windshield, positioned 0.7 metres above the nest; homemade SASS using two pairs of EM172 mics, on a tripod; handheld Lumix DMC-TZ80 pocket camera with x30 optical zoom produced good images and videos and useable audio. For nest observations I wore a cammo jacket and sat on a stool in one corner of the verandah, 4.6 metres from the nest. My presence caused minimal disturbance to the nesting parents. Household noise had been present while the nest was being built and during the nestling stage (e.g. water pump, music, television at night) but did not affect the nesting attempt. Observations were made from pre-dawn to dusk, almost daily, for the duration of the nesting period. Audio was edited using Sound Studio 4 (v 4.8.14), sonograms were made using Amadeus Pro (v 2.7.5), on an iMac desktop computer (OS v 10.15.3). Adobe Photoshop Elements was used to edit the sonograms.

References

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