

## VOCALISATIONS AND DISPLAYS OF THE HOODED PITTA, *PITTA SORDIDA*

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### A B S T R A C T

Data are presented on two calls and three displays of the Hooded Pitta *Pitta sordida* from southern peninsular Thailand. Sonograms and power spectra of calls of the Blue-winged Pitta *P. moluccensis* are presented for comparison. These calls are then discussed in relation to taxonomic grouping of the family Pittidae. Although any grouping based upon calls alone is necessarily artificial, comparison of calls may aid in establishment of taxonomic groups.

### I N T R O D U C T I O N

In 1988 a study was carried out under the auspices of the International Council for Bird Preservation, into the habitat requirements of Gurney's Pitta (*Pitta gurneyi*). The study concentrated upon 500 ha of lowland evergreen rainforest in southern peninsular Thailand. During fieldwork, behavioural data were collected on all contacts with pittas (Pittidae). In this report, we revise previous onomatopoeic representation of calls of the Hooded Pitta (*Pitta sordida*) in order to clarify distinctions from the calls of other pitta species, describe some displays of this species and consider the vocalisations of this and other pittas in relation to taxonomic sub-grouping.

### M E T H O D S

The information presented here covers the results of casual observations of the behaviour of *P. sordida* collected during the study. Behavioural notes were generally made following location and subsequent observation of calling birds, although some contact occurred with non-calling individuals. Often, in order to elicit responses from these birds, observers gave vocal imitations of the calls of this and other species.

Selected calls from various recordings were analysed using a Bruel and Kjaer (type 2031) Narrow Band Spectrum Analyser (NBSA) with a frequency range set at 0 to 10 kHz and with Hanning weighting. Sonograms were made using a Kay 6061B Sonagraph.

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## RESULTS AND DISCUSSION

Information on the pittas has often been given in the literature, (e.g. MEDWAY & WELLS, 1976; SMYTHIES, 1968 and 1981), but most publications deal with details of distribution, migration and plumage. To date very little published information is available describing their behaviour.

Two calls of *P. sordida* have been described in the literature. One, from Bornean populations, is rendered "fih, fih" (SMYTHIES 1968), but certainly with reference to birds in Thailand and Malaysia, is better written "whew...whew" (Fig. 1). It is somewhat reminiscent of the rather tonal barking of a small dog. This call will henceforth be referred to as the Double-whistle. Two sonagrams were analysed.

The Double-whistle consists of two similar units, with a pause of ca. 380 milliseconds (msec) between them. The sonagram trace for each unit is shaped like an inverted U.

Both units start at ca. 600 to 800 Hz with an ascending portamento which has a crescendo. The frequency peaks at ca. 1.8 kHz (measured from sonagrams) or 2.05 kHz (measured with the Bruel and Kjaer NBSA). Following the frequency peak is a descending portamento, with the call ending at 0.90 to 1.1 kHz. Unit duration is about 130 to 140 msec (in both examples, the second unit is 10 msec longer than the first).

The power spectrum (Fig. 2) for a representative part of one of these units reveals a fundamental with readily identifiable third and fifth harmonics. An ill-defined peak is present at approximately the position of a second harmonic; however, this is of lesser amplitude than the third harmonic.

The call is regular and monotonous and is often produced continuously for long periods throughout daylight and occasionally during the night. Territory-holding birds will respond to the calls of one individual with the same call. There is no evidence, however, to suggest that this call is necessarily produced purely in response to any particular external stimulus.

For comparative purposes, two examples of that call of Blue-winged Pitta *P. moluccensis* which appears to fill the same niche as the Double-whistle of *P. sordida*, were analysed. Like *P. sordida*, the equivalent vocalisation of *P. moluccensis* (Fig. 3) usually consists of two similar units (although sometimes just a single unit is given). Units start with a crescendo. Unlike *P. sordida*, *P. moluccensis* units have two frequency peaks, the second of which reaches a higher frequency. There is a brief diminuendo between the frequency peaks (frequency trough).

Two sonagrams indicate some variation in structure between the first and second units (the resolution of third sonagram was too poor to enable any definite conclusions to be drawn). In both cases the frequency range covered from the top of the first frequency peak to the bottom of the frequency trough is greater in the first unit. It is unsure whether this is a function of differences between individuals or whether it occurs throughout the species.

This difference between units appears to be exaggerated in the Mangrove Pitta *P. megarhyncha* (not shown) and may facilitate identification.

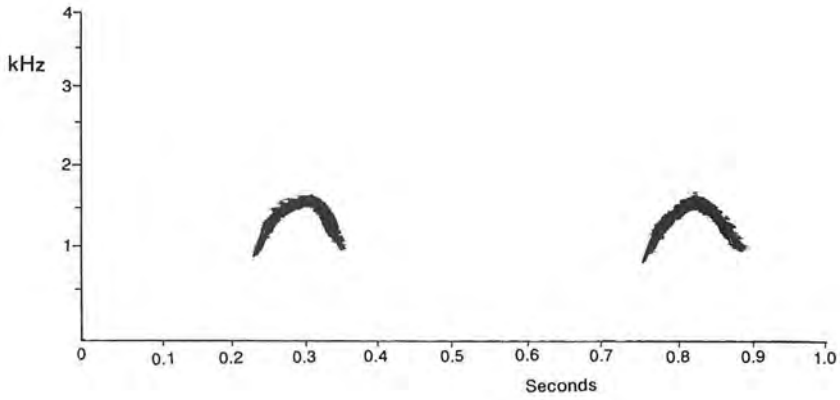


Figure 1. Sonogram showing the Double-whistle of *P. sordida*.

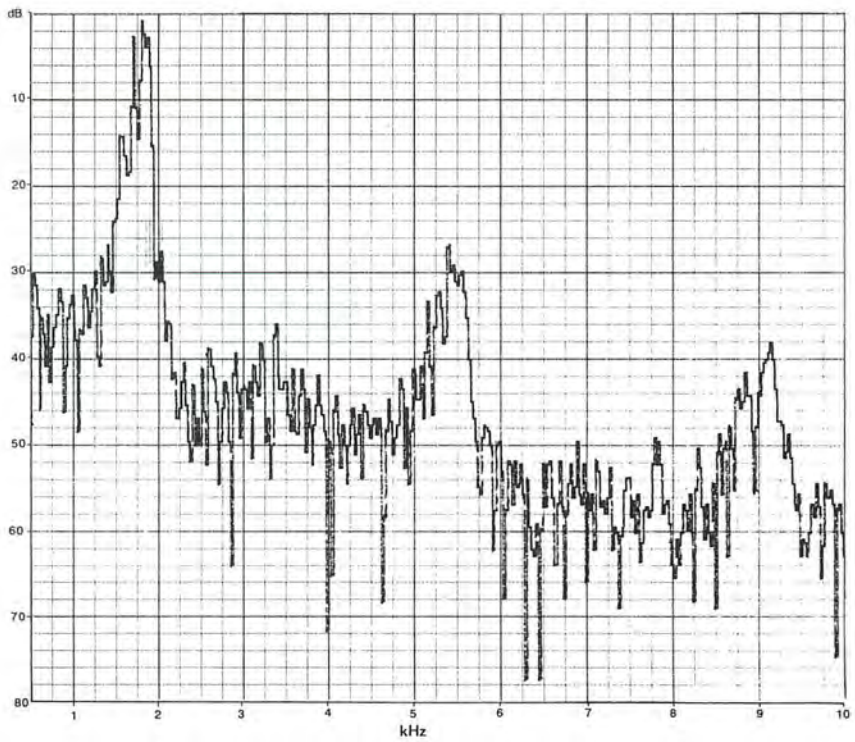


Figure 2. Power spectrum for a representative part of one unit of the Double-whistle of *P. sordida*.

Table 1. Comparison of some parameters of the Double-whistle of *P. sordida* and *P. moluccensis*.

	Double-whistle		Alarm call of <i>P. sordida</i>
	<i>P. sordida</i>	<i>P. moluccensis</i>	
Unit duration (msec)	130–140	230–280	205
Pause between units (msec)	380	460–480	–
Starting frequency (kHz)	0.6–0.8	1.2–1.3	2.0
End frequency (kHz)	0.9–1.1	1.3–1.4	1.3
Peak frequency (kHz)	1.8	1.9–2.0	2.8
	2.5 <sup>1</sup>	2.33–2.35 <sup>1</sup>	5.6 <sup>2</sup>
Lower peak (1st Unit) (kHz)	1.7–1.8		
Lower peak (2nd Unit) (kHz)	1.7		
Trough (1st Unit) (kHz)	1.2–1.3		
Trough (2nd Unit) (kHz)	1.3–1.4		

<sup>1</sup>Frequency measured using Bruel and Kjaer NBSA

<sup>2</sup>Frequency value for second harmonic and alarm of *P. sordida*.

Table 1 presents a comparison of some parameters of Double-whistles of *P. sordida* (n=2) and *P. moluccensis* (n=2) (all values refer to the fundamental, and are taken from sonagrams, except where stated).

The second call of *P. sordida* (Fig. 5), rendered ‘skyew’ by ROUND & TREE-SUCON (1986) resembling the alarm call of *P. gurneyi* (rendered ‘skyeew’ by COLLAR et al., 1986), was also frequently noted. This call is somewhat brief, harsh and striking in quality. With practice is easily distinguished from the alarm call of Gurney’s Pitta and should be rendered ‘skew’. This call appears to be produced only in situations of alarm of anxiety and will henceforth be referred to as the alarm call.

The sonagram traces (Fig. 5) show this call to consist of one unit, starting with an ascending portamento which is followed by a rather irregularly descending portamento. Both the fundamental and second harmonic are present at a considerable amplitude as shown on both the sonagram and the power spectrum (Fig. 6) (taken from a representative part of this unit). There is evidence on the power spectrum of rather poorly defined third and fourth harmonics, but at a considerably lower level.

Four distinct displays were observed during the study, all of which were performed on exposed, elevated perches, 1–20 m above the ground:

‘Bowling’—Involves the bird drawing its body very rapidly up to a 65° angle, with neck extended, then lowering the front half of its body to the horizontal, and hunching its neck. This action may be repeated two or three times in as many seconds. Bowling was recorded both in response to territorial calling of other birds and to vocal imitation by a human observer. It appears to be associated with the Double-whistle and alarm calls but not with Wing-flicking or Bobbing (described below).

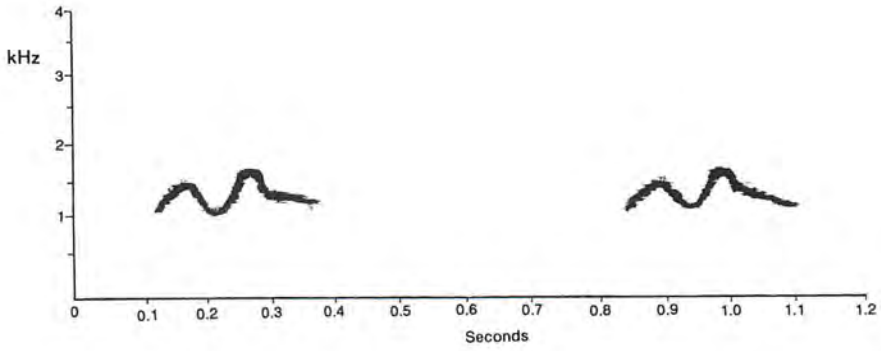


Figure 3. Sonogram showing the Double-whistle of *P. moluccensis*.

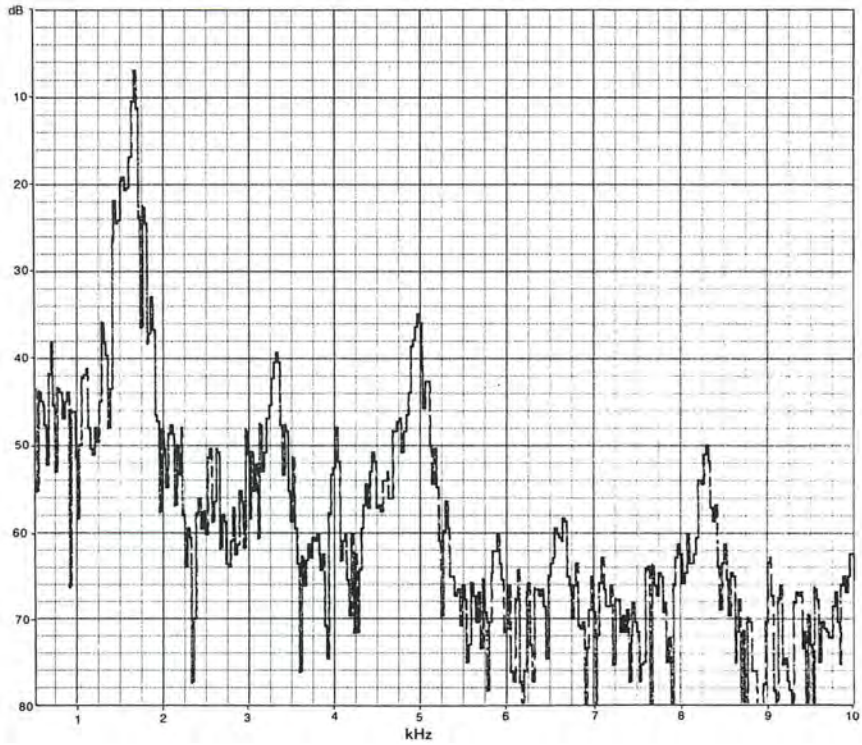


Figure 4. Power spectrum for a representative part of one unit of the Double-whistle of *P. moluccensis*.

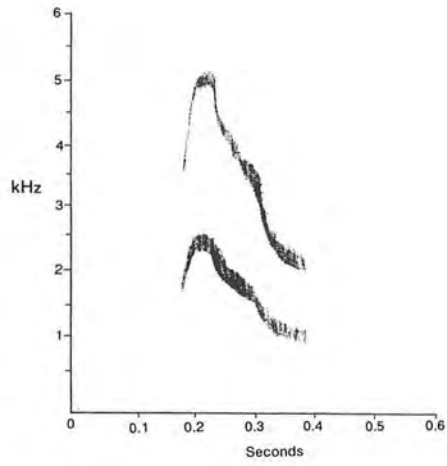


Figure 5. Sonogram showing wide band (300 Hz) analysis of the alarm call of *P. sordida*.

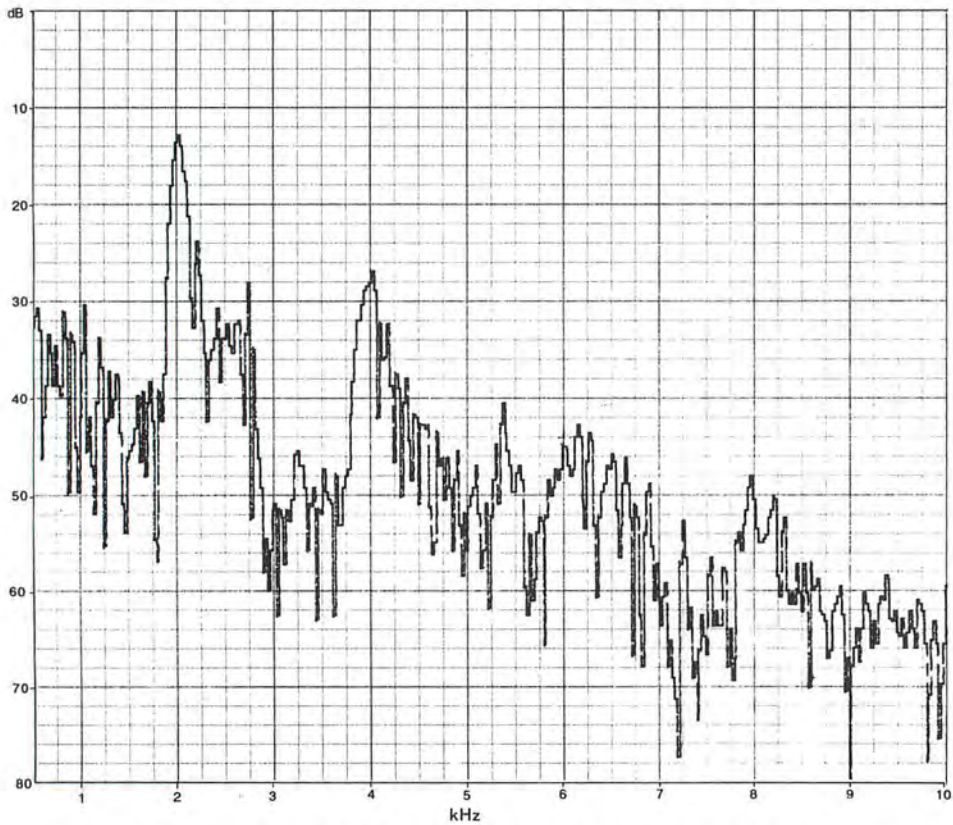


Figure 6. Power spectrum for a representative part of one unit of the alarm call of *P. sordida*.

Table 2. Comparison of published descriptions of the vocalisations of some species of pitta.

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Australasian species:		
<i>P. arquata</i>	– low whistle	SMYTHIES (1981)
<i>P. brachyura</i>	– “pu-wi-u...pu-wi-u”	P. JEPSON (pers. comm.)
<i>P. caerulea</i>	– low whistle	MACLOUGHLIN (1989)
<i>P. cyanea</i>	– “pleeooow-whit”; “skyeew”	ROUND & TREESUCON (1983)
<i>P. ellioti</i>	– “chawee-wu”; “jeeow/jow”	ROBSON et al. (1989)
<i>P. granatina</i>	– low whistle/song	SMYTHIES (1981)
<i>P. guajana</i>	– “kirr (pau)”;	MEDWAY & WELLS (1976)
<i>P. gurneyi</i>	– “Lilip”; “skyeew/skeow”	ROUND & TREESUCON (1986)
<i>P. megarhyncha</i>	– “pu-wi-u...p’wi-u”; “skyeew”	MEDWAY & WELLS (1976)
<i>P. moluccensis</i>	– “pu-wi-u...pu-wi-u”; “skyeew”	MEDWAY & WELLS (1976)
<i>P. nipalensis</i>	– double-whistle	SMYTHIES (1986)
<i>P. oatesi</i>	– “teow-whit”	KING, WOODCOCK & DICKINSON (1976)
<i>P. phayrei</i>	– “teow-whit”	KING, WOODCOCK & DICKINSON (1976)
<i>P. schneideri</i>	– low double-whistle	HURRELL (1981)
<i>P. sordida</i>	– “whew...whew/skew”; song	SMYTHIES (1981)
African species:		
<i>P. angola angola</i>	– “ffrueep/hgg”; “skeow”	MASTERTON (1987)
<i>P. angola longipennis</i>	– low trill; grunt; whinny; “skeow”	MACKWORTH-PRAED & GRANT (1970)
<i>P. reichenowi</i>	– croak	MACKWORTH-PRAED & GRANT (1970)

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On many occasions two birds were noted feeding together (5–30 m apart), and responded to a vocal imitation of the Double-whistle by simultaneously approaching the observer, separated by 10–15 m. Upon landing, they reacted to repeated imitation by producing both Skew and Double-whistle calls and Bowing. Although no confirmation of this was possible, it appears likely that such observations relate to mated pairs.

'Bobbing'—Involves the bird standing with its body at a 45° angle whilst bobbing its head up and down, in the manner of raptors gauging distance and/or position of an object. Bobbing was noted on only a few occasions, apparently in anxiety, either following disturbance whilst feeding, or in reaction to the alarm calls of other birds.

'Wing-flicking'—Noted during most contacts with the species except when feeding. It was performed by adults carrying food (thus with occupied nests or recently fledged young), and in response to calling by both conspecifics and other pitta species. The display varied in intensity, from very mild, with the wings only slightly extended and no call produced, to full extension of the wings on each flick, accompanied by the alarm call and Bowing display. On all occasions when Wing-flicking was observed, the action exposed the white patches on the primaries.

On one occasion, Wing-flicking was carried out by a pair of birds with recently fledged young apparently as a distraction display. Both adult birds moved in front of the observer, perching on low branches every few metres and whilst perched, Bobbing, Wing-flicking and producing the alarm call.

Another display was performed by a bird producing the Double-whistle, which upon being flushed by the observer, flew to an elevated perch and puffed up the feathers on its crown and rump and fanned its wings and tail. This action was repeated for 30–45 seconds until the bird moved off. The effect of this action was to expose the turquoise feathers of the wing and rump. No call was produced during the display.

Calls and displays were often combined, such combinations apparently depending upon the intensity of the bird's reaction to external stimuli. All the described displays are apparently indicative of anxiety or alarm, and are produced in conjunction with the alarm call. The extent of spread of wing during Wing-flicking appears to present an indication of the degree of motivation. Bowing, however, is often performed in conjunction with the Double-whistle, which otherwise appears to function as an advertisement call.

Bird song can be defined as a 'complex pattern of sound' (ALLABY, 1985), as opposed to calls which include all other simple vocalisations. Of the described vocalisations of the pittas, a working song has been described from *P. granatina* (SMYTHIES, 1981) and *P. sordida* (SMYTHIES, 1981). In addition to the two call types described above, this provides three distinct types of vocalisation produced by the pittas. Some published descriptions of pitta calls are reproduced below. Due to a lack of published data, none of these accounts can be regarded as complete descriptions of the species' repertoire (Table 2).

These three types of vocalisation can be distinguished as follows:

- (1) Song, as defined above.
- (2) Repetitive, monotonous vocalisations with far-carrying qualities, produced with no apparent external stimulus, except that of inter- or intra-specific vocal competition (e.g. the Double-whistles of *P. sordida* (Fig. 1) and *P. moluccensis* (Fig. 3).



- (3) Vocalisations showing wide variation in structure and being produced in response to obvious external stimuli. These show the short sharp structure of alarm calls (as opposed to distress calls (CATCHPOLE, 1979) (e.g. the alarm call of *P. sordida* (Fig. 5).

It can be seen from the list that the groupings given above apply to all the species covered. All species have at least one call Type 2. A descending note ("skew", "skyew" or "skeow") often referred to as an alarm call e.g. for *P. ellioti* in ROBSON *et al.* (1989) is a feature of many species, in *P. gurneyi* there is a distinct difference between the Type 3 calls of males and females. At least two species perform song.

An interesting point is that the call (Type 2) of *P. guajana* bears a closer resemblance to the calls of the African species than to the majority of those occurring in Australasia. The main call of *P. baudii* apparently resembles that *P. guajana* but is more drawn out (S. HARRAP, pers. comm.).

A number of taxonomic groupings within the Pittidae have been suggested (see ROZENDAAL, 1988) based on a variety of features such as size, altitudinal distribution and habitat associations, plumage and size etc. The vocalisations listed above suggest groupings based on call type:

- (1) *P. arquata*, *P. caerulea* and *P. granatina* produce a single whistle, whereas of the Australasian species all except *P. guajana* produce a double-whistle.
- (2) Within those species producing a di- or trisyllabic double-whistle, a super-species based on plumage characteristics includes *P. brachyura*, *P. megarhynchus*, *P. moluccensis*. The vocalisations of these species show striking similarity. One example of this call is shown in Fig. 4; as suggested above, variation in the production of separate units of these calls may provide a method of specific separation.
- (3) Another group of species including *P. cayanaea*, *P. oatesi* and *P. phayrei* which have a double-whistle involving a long descending note, followed by a sharply rising, higher pitched note resembling the cracking of a whip.
- (4) *P. guajana* and *P. gurneyi* fall outside these groups, having a Type 2 call, and an anxiety call which is shared by the species included in groups b and c (above).

It is obvious that taxonomic reorganisation of the family based solely upon vocalisations must be considered artificial. ROZENDAAL (1988) suggests taxonomic grouping of the pitta species occurring in Indochina at a subgeneric level, based upon their ecological requirements, vocalisations and structure, but notes that currently the data available are insufficient for this to be viable. Such a system would provide a more valid grouping, but in order to be comprehensive it would need to be combined with genetic and morphological data.

The only published accounts of pitta displays are of rapid wing flapping by *P. gurneyi* (GRETTON, 1988). *P. angolensis* and *P. reichenowi* (MACKWORTH - PRAED & GRANT, 1970) have a rapid wingflap display, although in both cases this appears to be associated with Type 1 calls. *P. gurneyi*, *P. megarhyncha* and *P. moluccensis* perform a wing-flicking display apparently in response to anxiety (pers. obs.). Not enough information is available to produce any viable comparison of these displays.

The information presented here is intended to provide a basis for further work, and to facilitate fieldwork on the ecology of the pittas. Many of these species are vulnerable or endangered.

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