

Vocal Communication of Captive Male Zebra Dove (*Geopelia striata*, Linnaeus 1766)

การสื่อสารด้วยเสียงของนกเขาชาวเผดผู้ (*Geopelia striata*, Linnaeus 1766) ในกรงเลี้ยง

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ABSTRACT

Communication by displaying and singing is common in birds. The male Zebra Dove (*Geopelia striata*) always attracts females as mate using vocal communication. The aim of this study is to investigate vocal communication of captive male zebra doves kept alone and in pairs. Their vocalizations were recorded using a tape recorder and their other behaviours were also recorded by a time sampling every 30 seconds for 30 minutes in an experimental cage. The results showed that there were four call types: advertising call, settling call, courtship call and aggressive call. The comparison of call syllables between solitary and pair status was analysed using a sonagram by Avisoft SASLAB Light software. It showed that the call duration of ST and the call frequency of SI of the advertising call between the two groups were significant difference ($P < 0.05$, $z = -2.840$ and $P < 0.05$, $z = -3.408$, respectively).

บทคัดย่อ

การสื่อสารในนกมักใช้เสียงร้องและการแสดงท่าทาง โดยนกเขาชาวเผดผู้มักใช้เสียงร้องในการดึงดูดเพศเมีย การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาเปรียบเทียบเสียงร้องของนกเขาชาวเผดผู้ในช่วงก่อนจับคู่กับช่วงจับคู่ โดยบันทึกเสียงของนกเขาชาวเผดผู้จำนวน 6 ตัว ทั้งช่วงก่อนจับคู่และช่วงจับคู่ในกรงทดลอง ด้วยเทปบันทึกเสียง และบันทึกพฤติกรรมอื่นๆของนกเขาชาวเผดผู้และเพศเมียโดยใช้วิธีการ time sampling ทุกๆ 30 วินาที เป็นเวลา 30 นาที พบว่าเสียงร้องของนกเขาชาวเผดผู้มี 4 รูปแบบ คือ เสียงขันโยน (advertising call), เสียงขันโกรก (settling call), เสียงจู (courtship call) และเสียงออค (aggressive call) ผลการเปรียบเทียบโครงสร้างพยางค์ของเสียงร้อง (call) ในช่วงก่อนจับคู่กับช่วงจับคู่โดยใช้กราฟเสียง พบว่าความยาวของพยางค์ท้ายและความถี่เสียงของพยางค์ต้นของเสียงขันโยน (advertising call) มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติ ($P < 0.05$, $z = -2.840$ และ $P < 0.05$, $z = -3.408$ ตามลำดับ)

Key Words: vocalizations, communication, zebra dove

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Introduction

Communication by displaying and singing is very common behaviour in birds (Berger, 1961; Catchpole, 1979). Displays may stimulate the opposite sex (attract it or raise its sexual drive), strengthen, and maintain the pair-bond (Berger, 1961). Male birds use a variety of elaborate signals and display behaviours to attract females (Catchpole and Slater, 1995; Hennin *et al.*, 2009). The male Zebra Dove (*Geopelia striata*) always attracts females for mating using vocal communication (Amnuay, 2004). To attract a breeding partner, male may behave differently when they are single compared to when they are paired (Hennin *et al.*, 2009). Comparisons between groups of paired males versus groups of unpaired males in temperate-breeding animals have revealed such differences in signaling behaviour (Hennin *et al.*, 2009). However, few studies have explored how individual males alter their signaling behaviour in tropical birds.

The Zebra Dove (*G. striata*) classified in the Family Columbidae, is commonly found in South-East Asia (Strange, 2000)(Fig.1). Males and females are not different in morphology but they are different in vocalization and display behaviour (Lekagul and Round, 1991). Previous study found a variation in advertising call of males in this species (Tawitsri, 2000). However, many aspects regarding the singing behaviour of this species are still unknown.

The aim of this study is to examine the vocal characteristics of different call types of captive male zebra doves (*G. striata*) between during solitary and in pair period.

Materials and methods

The vocalization was recorded using a tape recorder in an experimental cage (90 × 90 × 120 cm) which was set up in an open area containing solitary and paired birds. Male and female zebra dove behaviour was also recorded using a time sampling technique every 30 seconds for periods of 30 minutes. Six groups of experiments were performed comparing birds of solitary and paired status. Calls are divided into four parts; syllable in an initial part (SI), syllables in the middle phrase (SM), syllables in the terminal phrase (ST) and pause (P). The comparison of call syllables between solitary and pair status was analysed using a sonagram by Avisoft SASLAB Light software program and data analysis by Wilcoxon matched pair signed ranks test.



Figure 1 Zebra dove (*G. striata*)

Results and discussion

The results showed that there were four call types: advertising call, settling call, courtship call and aggressive call (Fig.2-5). However, the settling call did not occur in pair status. It is possible for a paired males, this type of call doesn't play an important role for finding mate.

The comparison of call syllables of advertising call between solitary and pair status found that the call duration of ST was significant difference between solitary and pair status ($P < 0.05$, $z = -2.840$, Table 1). The call duration of ST for pair status spent longer duration than solitary status. It didn't show a clear trend because there were very diverse among species of bird. However, the result of this study differ from the result of rofous-and-white wrens (*Thryothorus rufalbus*) that the bandwidth (duration) of the terminal syllable did not change with pairing status (Hennin *et. al.*, 2009). Regarding the call frequency

of SI for advertising call, It was significant difference between two group ($P < 0.05$, $z = -3.408$, Table 2). The frequency of SI of the advertising call of solitary status was higher pitch than pair status. It is possible solitary status advertise themselves for male-male competition to produce a high pitch of SI. However, this result also is unlike the result in rofous-and-white wrens (*T. rufalbus*) that the frequency of the trill (syllables) did not change with pairing status (Hennin *et. al.*, 2009).

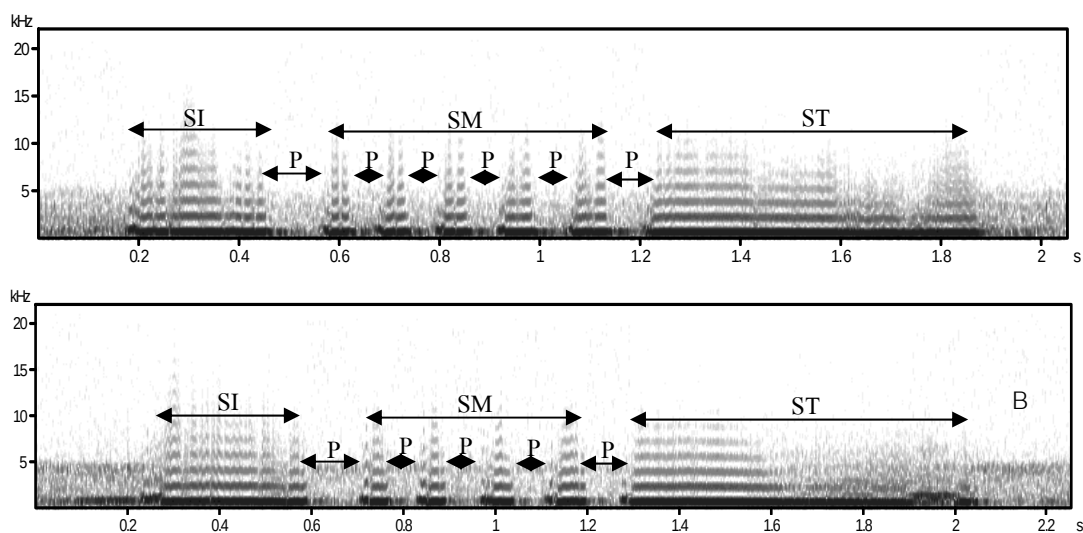


Figure 2 Sonograms of the advertising call; (A) during solitary period, (B) during paired period.

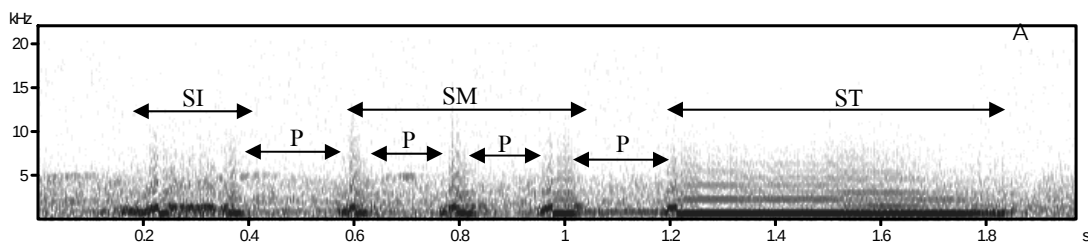


Figure 3 Sonogram of the settling call during solitary period

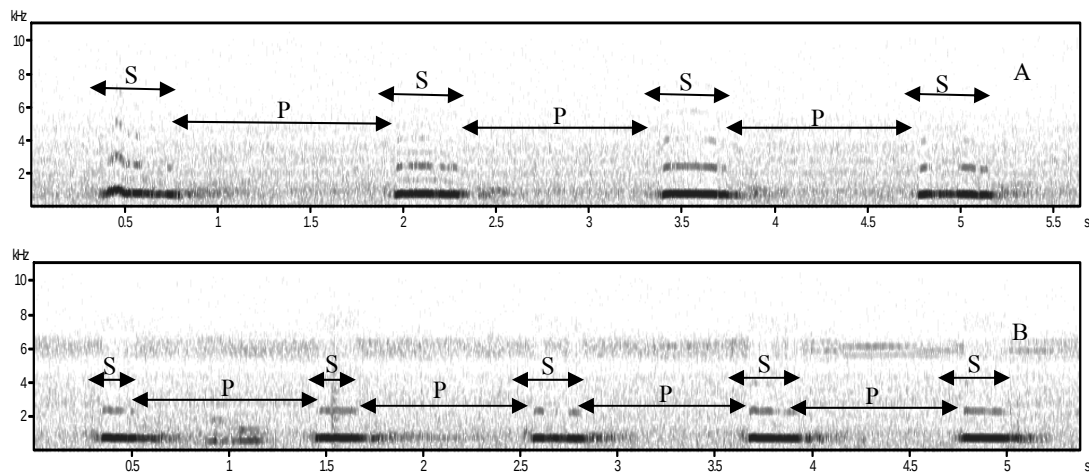


Figure 4 Sonograms of the courtship call; (A) during solitary period, (B) during paired period.

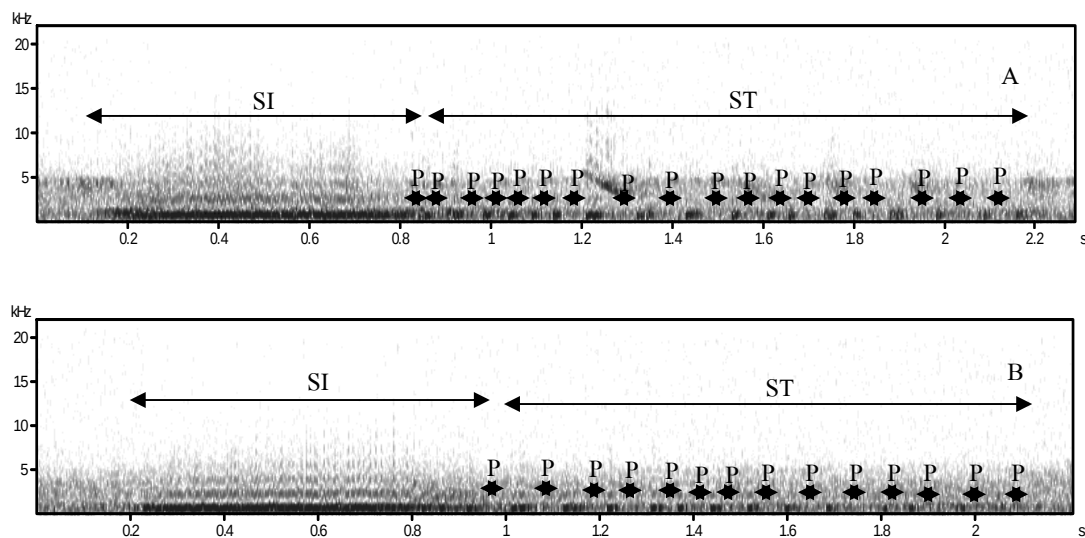


Figure 5 Sonograms of the aggressive call; (A) during solitary period, (B) during paired period.

Table 1 Mean ($\pm$ SE) time duration (s) of call type category of zebra dove (*G. striata*) between solitary and paired status

Parameters			SI	SM	ST	Pause	Total Call
Advertising call	Solitary (n = 15)	Mean $\pm$ SE	0.30 $\pm$ 0.02	0.10 $\pm$ 0.01	0.34 $\pm$ 0.02	0.62 $\pm$ 0.09	1.49 $\pm$ 0.09
	Pair (n = 52)	Mean $\pm$ SE	0.31 $\pm$ 0.01	0.10 $\pm$ 0.003	0.42 $\pm$ 0.02	0.38 $\pm$ 0.02	1.23 $\pm$ 0.03
	P		0.720	0.730	0.003	0.296	0.552
Aggressive call	Solitary (n = 3)	Mean $\pm$ SE	0.79 $\pm$ 0.16	-	0.08 $\pm$ 0.04	0.58 $\pm$ 0.11	1.46 $\pm$ 0.22
	Pair (n = 2)	Mean $\pm$ SE	0.73 $\pm$ 0.09	-	0.12 $\pm$ 0.04	0.41 $\pm$ 0.25	1.27 $\pm$ 0.21
	P		0.500	-	1.000	1.000	1.000
P	Solitary		0.206	-	0.206	0.206	1.000
	Pair		1.000	-	1.000	1.000	0.206

Table 2 Mean ($\pm$ SE) frequency characteristics (kHz) of call type category of zebra dove (*G.striata*) between solitary and paired status

Parameters			SI	SM	ST	Minimum	Maximum
Advertising call	Solitary (n =15)	Mean $\pm$ SE	10.73 $\pm$ 0.54	8.49 $\pm$ 0.45	9.62 $\pm$ 0.68	8.46 $\pm$ 0.41	11.09 $\pm$ 0.64
	Pair (n= 52)	Mean $\pm$ SE	10.20 $\pm$ 0.37	8.21 $\pm$ 0.23	8.26 $\pm$ 0.19	8.01 $\pm$ 0.19	10.20 $\pm$ 0.37
	P		0.000	0.412	0.252	0.351	0.679
Aggressive cal	Solitary (n = 3)	Mean $\pm$ SE	4.76 $\pm$ 0.59	-	4.66 $\pm$ 0.30	4.51 $\pm$ 0.45	4.91 $\pm$ 0.44
	Pair (n = 2)	Mean $\pm$ SE	8.01 $\pm$ 4.39	-	6.26 $\pm$ 2.18	6.03 $\pm$ 2.41	8.23 $\pm$ 4.16
	P		1.000	-	1.000	1.000	1.000
P	Solitary		0.206	-	0.216	0.206	0.206
	Pair		0.206	-	1.000	0.559	0.206

Conclusion

Four call types of zebra dove (*G.striata*) were recorded in solitary status. It was composed of advertising call, settling call, courtship call and aggressive call. Whereas the settling call didn't show up in pair status. Regarding call syllables of advertising call, the duration of syllable of ST and call frequency of SI were significant different between solitary and pair status.

Acknowledgements

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