

Ongoing illicit trade of Sumatran Laughingthrush *Garrulax bicolor*: one-year market monitoring in Medan, North Sumatra

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Summary. Many Indonesian birds are severely threatened or already at the brink of extinction due to the flourishing illicit bird trade. One such species is the Sumatran Laughingthrush *Garrulax bicolor*, endemic to Sumatra. From March 2015 to February 2016 we assessed the extent of trade of Sumatran Laughingthrushes by recording monthly turnovers from the six most prominent bird vendors in Medan's Jalan Bintang market. In total, 2610 wild-caught individuals were traded, despite a considerable decline in market supply over the year. Total market mortality reached 16%. Mortality varied significantly during the year but was not dependent on the number of traded individuals each month. Monitoring revealed that the most frequently harvested localities were located in Aceh, North and West Sumatra and Riau province. Since the current estimate of the maximum population size of the species in the wild is 10,000 mature individuals, the level of trade is clearly unsustainable, and if not stopped, could lead to its extinction in near future.

Ringkasan. Banyak jenis burung di Indonesia terancam punah dan sudah berada pada daftar menuju kepunahan akibat merebaknya perdagangan burung ilegal. Satu dari spesies tersebut adalah burung endemik Sumatera, Poksai Sumatera *Garrulax bicolor*. Dari Maret 2015 sampai Februari 2016 kami melaksanakan penilaian terhadap tingkat perdagangan jenis ini dengan melaporkan keluar-masuknya burung ini dari enam penjual burung utama di pasar Jalan Bintang Medan secara bulanan. Tanpa terpengaruh penurunan permintaan pasar, secara total 2610 individu burung liar tertangkap dan diperdagangkan. Tingkat mortalitas di pasar mencapai 16%. Mortalitas bervariasi secara signifikan sepanjang tahun tapi tidak bergantung kepada jumlah individu yang diperdagangkan setiap bulan. Monitoring menunjukkan bahwa lokasi-lokasi yang paling banyak dipanen berada di Aceh, Sumatera Utara dan Barat serta provinsi Riau. Sampai saat ini, perkiraan ukuran populasi burung liar di alam adalah sekitar 10.000 individu dewasa sehingga jelas tingkat perdagangan yang ada tidak berkelanjutan, dan jika tidak dihentikan bisa mengarah lebih cepat kepada kepunahan.

Introduction

Bird-keeping is a popular pastime with a deeply rooted cultural background across the Indonesian archipelago (Jepson 2010; Eaton *et al.* 2015; BirdLife International 2017a). Up to the present time, songbirds (Passerines) are the most popular and sought after among all kept species (Jepson & Ladle 2009; Jepson 2010). An overwhelming majority of these birds, however, have originated from the wild and are provided by illegal bird capture and trade (Shepherd *et al.* 2004; Chng *et al.* 2015, Chng and Eaton 2016; Iqbal 2015; Rentschlar *et al.* 2018).

The White-crested Laughingthrush *Garrulax leucolophus*, widespread in continental Asia, was one such species until its importation to Indonesia was banned in 2005, due to the

risk of avian influenza (Shepherd 2006; Jepson 2010). Since then, however, the very similar Sumatran Laughingthrush *Garrulax bicolor* (hereafter SL), endemic to Sumatra Island, has been targeted and widely traded as a substitute for the White-crested Laughingthrush (Shepherd 2007, 2011, 2013; Chng *et al.* 2015).

Over-exploitation of SL has decimated its global population and it has become rare in the wild (Eaton *et al.* 2015; Harris *et al.* 2015, 2017; Shepherd *et al.* 2016; Bušina & Kouba 2017). Consequently, the IUCN threat status of SL was recently up-listed to Endangered (BirdLife International 2017b). According to Indonesian law (Act of Republic of Indonesia No. 5 of 1990 Conservation of living resources and their ecosystems) and regulation (No. 447/Kpts-11/2003 revised from No. 62/Kpts-II/1998) only non-protected native species may be collected from the wild, transported and traded by permitted persons on the basis of annually set harvest quotas. As a zero quota has been set for SL in all ten Sumatran provinces (KSDAE 2015), any trade in the species constitutes a violation of law. Nevertheless, SL are still to be found in bird markets where they are openly traded (Eaton *et al.* 2015; Harris *et al.* 2015; Chng *et al.* 2016; Shepherd *et al.* 2016, this study). As there are no commercial breeders throughout Indonesia, the wild origin of all traded SL is indisputable (Bušina *et al.*, in press). Moreover, the bird trade has expanded to online social media, where regulation is extremely difficult (Iqbal 2015). This uncontrolled trade represents a new serious threat to all Indonesian avifauna.

One of the first studies of the SL trade was carried out between years 1997 - 2001, and additionally in 2005 (Shepherd 2006). However, at that time the SL was treated as a subspecies of the White-crested Laughingthrush, and as data for these two taxa were combined, no clear conclusion about the volume of trade of SL could be drawn. Since the SL was acknowledged as a full species (Collar 2006) other studies of SL trade have been performed (Shepherd 2007, 2011; Iqbal 2015). All of these studies, however, were based only on visual survey and/or direct counting of openly displayed individuals offered for sale. Moreover, the monitoring methods and timescales used in these studies varied from the one-off inventory method (Shepherd 2007; Chng *et al.* 2016; Shepherd *et al.* 2016) and short time period monitoring (Chng *et al.* 2015; Iqbal 2015) to repeated monthly spot checks (Shepherd 2006, 2011). The results from these studies revealed the availability of SLs in the market but not absolute turnover, which more accurately reflects trapping intensity (Harris *et al.* 2015, 2017).

In this paper, we present quantitative and qualitative information regarding trade of SL in the major market of Medan city, the provincial capital of North Sumatra, where SLs are predominantly traded within the island of Sumatra. Using a full market inventory method, our data contribute to the characterization of SL trade, its extent and negative impact on wild populations.

Material and Methods

From 1 March 2015 to 29 February 2016, market monitoring was carried out in Medan, North Sumatra, at Jalan Bintang (Plate 1), the largest bird market in the city, which often supplies birds to other smaller local markets. Due to the large number of traded species that are theoretically protected by law, the vendors involved in this illegal activity are usually not willing to share information with investigators. To avoid suspicion from the vendors, and to gain access to accurate market data, we contracted a local middleman who had been directly involved in wildlife trade in the past. To uncover the complete numbers of SLs traded by vendors based at Jalan Bintang market, the total number of all wild-caught birds bought by six vendors, who were trading SL individuals on a regular basis and running permanent stores, were recorded for each store and month. In addition, we recorded the origin of the birds stated by trappers, market mortality and the price of birds sold to end-buyers according to vendors.

All prices were obtained in Indonesian rupiah, and converted to USA dollars, using a conversion rate of USD1.00 = IDR 13,300.

All pieces of information were anonymously written down by vendors after each transaction using record sheets provided by us and collected by the middleman. Verification of these data was carried out where possible by back-checking of records when the exact date and number of sold SLs was known and communicated through the network of local bird-holder friends. Variation in mortality rates across time and vendors was assessed by one-way ANOVA and Tukey's HSD post-hoc tests. Because of the probability that the health of individual birds in the typically small cages deteriorated with an increase in stocking rate, we used Spearman's rank-order correlation to examine the relationship between mortality rate and the number of purchased SL individuals by individual vendors.



Plate 1. A typical shopfront at Jalan Bintang, Medan (Photographer T. Bušina).

Results

A total of 2,610 SLs were purchased by involved stores during the 12 months of monitoring. Overall mortality during the period between acquisition from trappers or middlemen (different middlemen from our hired co-working person) to a selling event was 16% ($n = 419$ individuals; Table 1, Fig. 1). There was no significant difference in mortality rates among the vendors ($F = 1.42$, $p = 0.23$, $\alpha = 0.05$). However, mortality varied significantly among the months of sale ($F = 3.65$, $p = 0.0006$, $\alpha = 0.05$). Tukey's test revealed that there were differences between June and August, October and March, and between October and August ($MS = 33.29$, $df = 60$, $\alpha = 0.05$). There was no significant correlation between monthly mortality rate and the number of purchased birds (Spearman's correlation coefficient $\rho = 0.21$, $p = 0.08$).

Table 1. Numbers of Sumatran Laughingthrushes purchased each month between March 2015 and February 2016 by six individual vendors in Medan bird market. Variable: P, number of purchased birds; M, number of birds that died; M %, mortality percentage.

Month/Year/Variable	A	B	C	D	E	F	Total	
Mar 15	P	77	87	77	75	100	69	485
	M	5	6	8	10	12	13	54
Apr 15	P	64	77	71	75	70	68	425
	M	9	9	1	15	12	8	54
May 15	P	47	68	70	53	85	66	389
	M	9	10	11	9	14	16	69
Jun 15	P	64	65	78	60	53	56	376
	M	10	15	14	16	12	11	78
Jul 15	P	20	15	21	10	9	12	87
	M	2	2	3	1	1	2	11
Aug 15	P	11	14	16	11	20	17	89
	M	0	1	3	0	3	2	9
Sep 15	P	22	17	14	15	20	15	103
	M	7	4	2	2	3	3	21
Oct 15	P	30	26	31	27	27	30	171
	M	5	5	7	9	6	8	40
Nov 15	P	22	29	27	32	37	37	184
	M	2	4	4	8	5	10	33
Dec 15	P	20	20	23	26	22	19	130
	M	2	3	5	6	6	4	26
Jan 16	P	19	20	16	15	16	15	101
	M	2	3	2	3	1	4	15
Feb 16	P	14	16	13	9	8	10	70
	M	2	3	1	1	1	1	9
Total	P	410	454	457	408	467	414	2610
	M	55	65	61	80	76	82	419
	M %	13.4	14.3	13.3	19.6	16.3	19.8	16.1

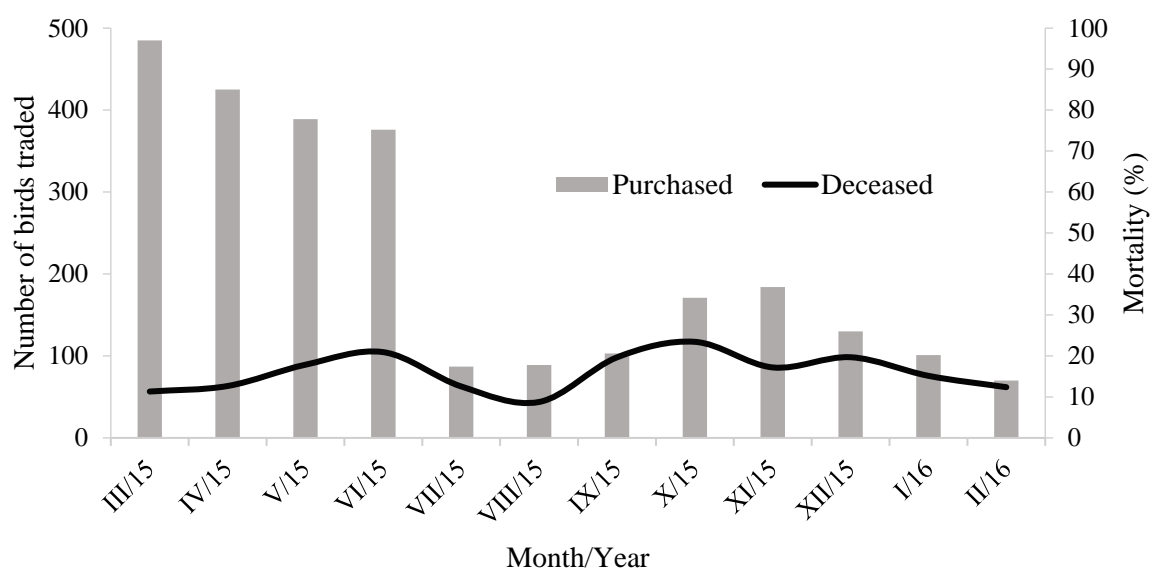


Figure 1. Number of Sumatran Laughingthrushes purchased in six bird markets (combined) by vendors at Jalan Bintang, Medan. Black line represents total monthly mortality rate of traded SL.

The vast majority of purchased SLs was said to have been intended for domestic trade, yet more than one-third was exported to Australia, Abu Dhabi, Pakistan and Turkey (personal communication, hired middleman). Regrettably, we did not succeed in collecting additional details about international trade. The price remained almost unchanged for the whole monitoring period and ranged between IDR 300,000 – 400,000 per individual.

In the first four months of monitoring the total monthly turnover of SLs reached over 350 individuals with a maximum of 485 in March 2015 (Table 1, Fig. 1). However, a significant decrease in SL supply became evident in following months. The low occurrence of SL in the bird market continued for the rest of the study period and barely exceeded the number of 150 traded individuals per month (Fig. 1).

The SLs in Medan's bird market originated from North Sumatra (outside Medan), and its three surrounding provinces, which are Aceh, West Sumatra and Riau. Almost all (95%) of all traded SLs originated from sites where trapping continued for longer than six months. At three quarters of these sites trapping was year-round (Table 2). Because of the species' sensitivity to stress potentially resulting in death, we suspect that trappers and middlemen kept the birds for no longer than two weeks before selling to vendors in Medan. Thus, we assume that the date of sale represents the month of trapping.

Table 2. List of localities used to trap Sumatran Laughingthrushes for the Medan bird market. Localities in bold were under year-long trapping pressure. x = presence of trapping activity; * = province of Sumatra; ** = regency of North Sumatra province

	Mar 15	Apr 15	May 15	Jun 15	Jul 15	Aug 15	Sep 15	Oct 15	Nov 15	Dec 15	Jan 16	Feb 16	No. of birds
Aceh*	x	x	x	x	x	x	x	x	x	x	x	x	690
Labuhanbatu**	x	x	x	x	x	x	x	x	x	x	x	x	568
West Sumatra*	x	x	x	x	x	x	x	x	x	x	x		414
Riau*	x	x	x	x	x	x	x	x	x	x	x	x	302
North Tapanuli**	x	x	x	x	x		x						197
Karo**	x	x	x	x	x	x	x	x	x	x	x	x	162
Dairi**	x	x	x	x	x	x	x	x	x	x	x	x	157
Mandailing Natal**			x			x							39
Kota Sibolga**	x								x				34
South Tapanuli**		x											18
Unknown							x	x					17
Humbang Hasundutan**		x											12

Discussion

Bird market monitoring is a fundamental conservation tool for evaluating the threat level of individual species (Nijman 2010; Rosen & Smith 2010; Regueira & Bernard 2012; Bush *et al.* 2014). Only the full market inventory method can provide real insight into the nature of bird trade and the dynamics of wild populations of affected species (García-Moreno *et al.* 2007; Weston & Memon 2009; Regueira & Bernard 2012; Alves *et al.* 2013). Our detailed monitoring study of SL trade in Medan revealed that this illegal activity has persisted at a disturbingly high level, yet underwent a dramatic reduction in July 2015 which continued for the remaining seven months of the study. Combined with subsequent observations of the short supply of SL in Medan markets (Bušina, unpublished data), this may indicate that several years of trapping have dramatically reduced the wild population to the level that SL has become difficult to find

or trap. This decline was recently confirmed by Harris *et al.* (2017), who could not find a single SL on 156 transects at several sites in North Sumatra (Karo, Deli Serdang, Langkat, and Dairi regencies) where it has previously been recorded. This situation is now similar across the whole of Sumatra, where many subpopulations have been depleted (BirdLife International 2017b).

Our monitoring revealed a higher number of traded SLs than previous studies (Shepherd 2006, 2007, 2011), probably due to the different methods used for data collection since we recorded all traded individuals over the course of one year, including those not openly displayed and stored at the back of the shops. These latter birds would have been missed in the previous short-term and/or one-off inventory monitoring studies. The accuracy of our results was also strengthened by positive back-checking of vendors' records and their correctness. Thus, we believe the method of direct counting of displayed individuals, at any given time intervals, seriously underestimates the volume of trade of individual species, and cannot recommend it for an in-depth analysis of this trade.

That all vendors had comparable mortality of SLs probably reflects similarity in the quality of bird housing and care. The question is why mortality varied so much among months, particularly March, June, August and October. These bird losses were not correlated with the total number of purchased birds in these particular months. Weather conditions in Medan also seem to be an unlikely explanation for this variation in SL mortality. In the period from March to July 2015, the temperature in Medan averaged 33 °C, and thereafter decreased by one degree to 32 °C and stayed unchanged till the end of the monitoring period (World Weather Online 2018). Since no additional information about the affected months was available from the vendors and/or middleman we can only speculate about the true reason(s) for the deaths of these birds.

Due to the availability of shipping and air transport, the market on Jalan Bintang is considered as the main hub of animal trade within Sumatra, and therefore, the majority of market monitoring studies have targeted Medan (Shepherd *et al.* 2004; Shepherd 2006, 2007, 2011, 2013; Harris *et al.* 2015, 2017). Our findings, however, indicate the regional character of this market because all traded SLs originated from North Sumatra and three adjacent provinces. We assume this is because more distant sources would increase transportation costs and reduce potential profits from sales. Based on the limited range of sources in our study, we suspect there is an equally well-developed SL trade in southern parts of Sumatra. Astounding numbers of illegally traded animals were recently reported in the markets in Palembang, South Sumatra, and Bandar Lampung, Lampung (Scorpion 2016a, b). We suggest these markets deserve serious attention from both conservation agencies and scientists.

Previous studies have already highlighted the serious threat that trade poses for SL (Shepherd 2013; Harris *et al.* 2015, 2017; Shepherd *et al.* 2016). Our in-depth market monitoring reveals the true volume of this trade, as well as an alarming decline in SLs in Medan's market over one year, which most likely relates to shrinking of the remaining wild populations (BirdLife International 2017b). Protection of this species is therefore urgent. Firstly, local government agencies for wildlife conservation need to enforce the law regarding illegal trade by targeting the vendors in bird markets. Further, campaigns promoting public awareness of the illegal bird trade and its consequences should be greatly increased.

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