Recent surveys of the bird trade in local markets in central Laos

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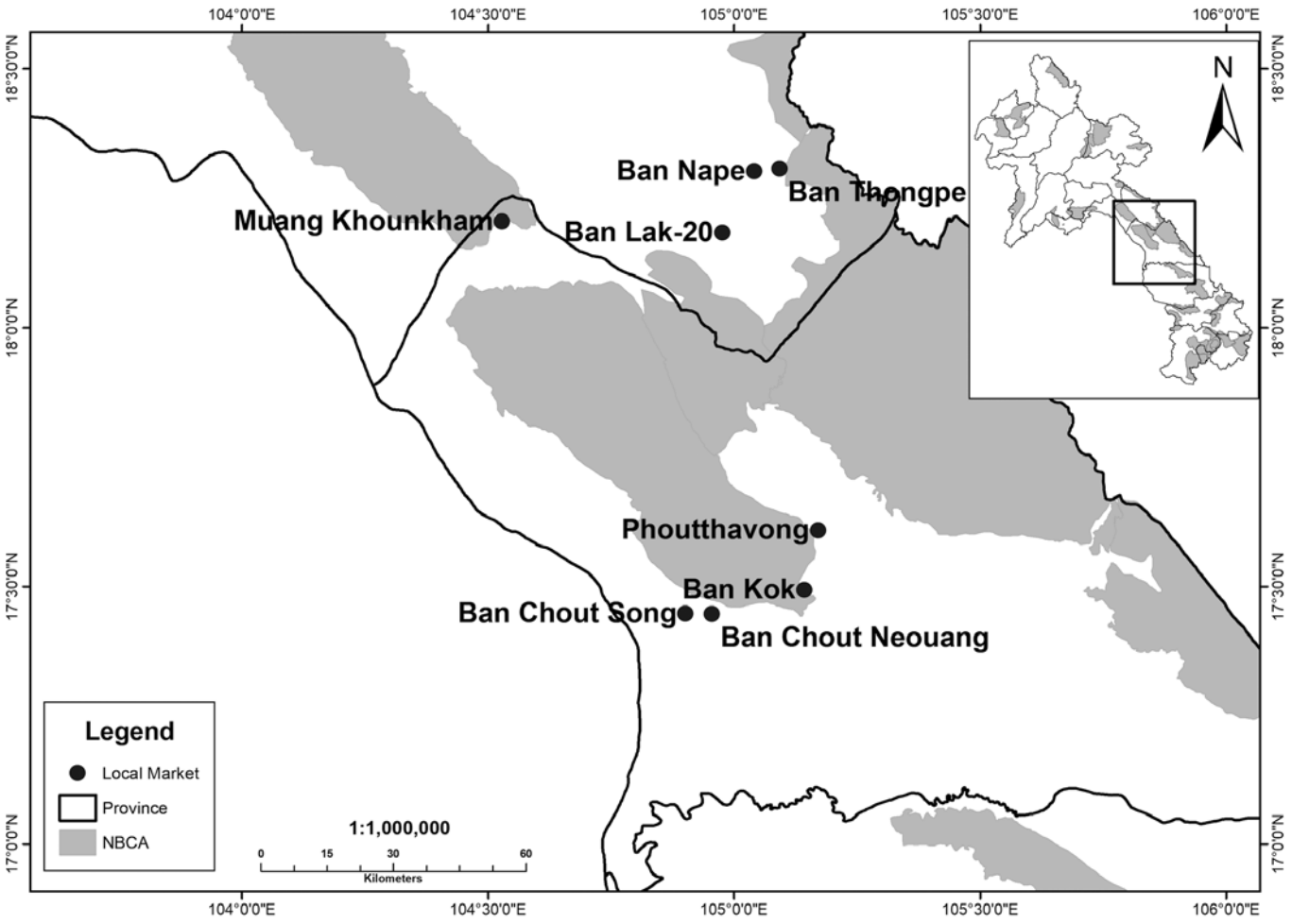
Hunting of wildlife for subsistence and both local and domestic trade is widespread across Laos. Market surveys with a focus on wild birds were conducted from February 2015 to February 2016. A total of 1,020 individual birds were detected in the trade in local markets. 718 individuals were identified to 13 orders, 30 families and 84 species, while 302 individuals could not be identified to the species-level. Black-crested Bulbul *Pycnonotus melanicterus* **(183 individuals), Red Junglefowl** *Gallus gallus* **(85 individuals) and Eastern Spotted Dove** *Spilopelia chinensis* **(81 individuals) were found to be the most abundant species sold in markets. The highest species richness and abundances were found at Ban Kok and Ban Chout Song markets. Species richness and abundance of birds traded were highest during the dry season. The most expensive and the cheapest species per individual were Common Hill Myna** *Gracula religiosa* **(US$61.30) and Black-headed Bulbul** *Pycnonotus atriceps* **(US$0.25–1.23) respectively. Observations of bird populations in surrounding areas are needed to relate their population trends with hunting effort for further conservation actions.**

INTRODUCTION

Laos falls within a globally important hotspot for biodiversity, Indo-Burma, and hosts a large number of rare and endemic species (Tordoff *et al.* 2012). To date, more than 700 species of birds have been recorded in the country (Duckworth *et al.* 1999). Many more species have been documented in the country this century (e.g. Duckworth *et al.* 2001, 2002, Evans 2001, Duckworth & Tizard 2003, Duckworth 2006, 2009, Eve 2007, Duckworth & Evans 2007, Woxvold *et al.* 2009, Alström *et al.* 2010, Coudrat & Nanthavong 2016).

Laos's high rate of deforestation poses a major threat to its birds (Thewlis *et al.* 1998, Duckworth *et al.* 1999). Deforestation, which results in a direct loss of habitat for wildlife, is driven by activities such as logging and agricultural expansion. In Laos, there is accelerating forest loss and fragmentation on a large scale to create agricultural land. Additionally, poorly regulated hunting and illegal trade are causing the serious decline of wild populations of many species, and driving species such as the Green Peafowl *Pavo muticus*, White-winged Duck *Asarcornis scutulata* and Crested Argus *Rheinardia ocellata* towards local extinction (Evans & Timmins 1995, Fuchs *et al.* 2007, Chauhan 2014). Traditionally, birds are

Figure 1. Map of study sites.



hunted by villagers for local consumption and some localised trade to nearby towns (Hansel 2004). However, the hunting of wildlife that is causing major population declines in some species is driven mainly by commercial trade affecting relatively few bird species (Coudrat *et al*. 2014).

The bird trade in Laos not only strives to meet the demands of the local market but, for a relatively few species, also that of international markets for food, pets, traditional medicines and decorations (Nash 1993, 1997, Srikosamatara & Suteethorn 1994, Nooren & Claridge 2001, Singh 2008). For instance, 33 species of birds were found being traded at That Luang fresh local food market in Vientiane, with four species on the list of globally threatened species (Srikosamatara *et al*. 1992). Additionally, 74 pieces of Helmeted Hornbill *Rhinoplax vigil* parts (casques, beads and pendants), a species which does not occur in Laos, have also been observed on sale in the Golden Triangle Economic Zone, Louangphabang and Vientiane (Krishnasamy *et al*. 2016).

Presently, there are very limited updated data on the situation of the wild bird trade in Laos, particularly in the central provinces of the country. This study aims to survey bird trading in local markets in central Laos, and to establish a baseline for the species of birds traded, the abundance of each species and their average price, particularly in two provinces (Bolikhamxay and Khammouane) in the central region of Laos. These two provinces are known to hold important areas for rare and threatened species in South-East Asia, as well as being among the known hotspots for bird diversity in Laos (Tobias *et al*. 1998, Ounekham & Inthapatha 2003, Strange 2013). Wildlife in these areas was reported to be in decline, especially species that are important for food, which were hunted more frequently (Hallam *et al*. 2007). The areas also suffer from high levels of illegal, commercial hunting typical of much of Laos and Vietnam (Coudrat *et al*. 2014).

METHODS

Bird trading activities were surveyed in eight local markets in Bolikhamxay and Khammouane provinces in central Laos from February 2015 to February 2016, comprising three local markets in Bolikhamxay—Ban (= village) Lak-20, Ban Nape and Ban Thongpe—and five local markets in Khammouane: Ban Chout Neuang, Ban Chout Song, Ban Kok, Phoutthavong and Muang Khounkham (Figure 1).

These markets are near five National Biodiversity Conservation Areas (NBCAs) (also known as National Protected Areas, NPAs), namely Nam Kading, Phou Hin Poun (also known as the Khammouane Limestone), Nakai–Nam Theun, Hin Namno and Phou Xang He, which are recognised by the Lao Government to be nationally important for biodiversity conservation, and which overlap with the Nam Kading, Khammouane Limestone, Nakai–Nam Theun and Hin Namno Important Bird and Biodiversity Areas (IBAs) respectively (Ounekham & Inthapatha 2003).

Six cycles of market surveys were conducted from February 2015 to February 2016, over the months of February, April, June, August and October 2015 and February 2016. The observation routine consisted of observations in the morning (08h30–11h30) and afternoon (13h30–17h00), and over two days for each market. In each survey, the number and value of each bird species found in each local market were counted and recorded using data collection forms. The price of each bird recorded was that given by the traders. Species of birds were identified following various guide books including Robson (2008) and Naphitapat *et al*. (2012). Taxonomy and nomenclature in this study follow BirdLife International (2020).

Species richness of birds found in the local markets was also generated as a sample-based rarefaction curve using EstimateS (Colwell 2013) to predict the actual number of species found in the local markets given that we are unlikely to detect all species sold. Species diversity was calculated using the reciprocal from the Simpson's Index. Descriptive statistics for each species detected in the market surveys, including the (1) minimum price, (2) maximum price, (3) mean price and (4) standard deviation, were evaluated using software SPSS version 17.0 for Windows (SPSS Inc. 2007). The value was converted from Laotian Kip to US Dollar, considering US$1 = 8,156.55 LAK on 10 November 2015. A series of one-way analysis of variance (ANOVA) was used to test the differences in value of each species in each local market. In each local market, if the number of a species sample found was fewer than three individuals, it was excluded from statistical comparisons.

RESULTS

A total of 1,020 birds were found during 48 observation days. Of these, 718 birds were identified to 84 species, representing 13 orders and 30 families; 302 birds were unidentifiable to species because their feathers had been removed (Appendix 1). The pattern in species richness was mirrored in the indices of species diversity (D = 9.86). The sample-based rarefaction curve showed that the number of bird species continued to increase with additional surveys (Figure 2), with an average number of 21 birds seen for sale each day. The highest number of birds were seen for sale in Kok and Chout Song markets, with an estimated 14,873 birds and 9,398 birds per year, respectively.

Order Passeriformes was the richest in bird species observed, with 41 species found during the surveys, which represented (48.81%) of

Figure 2. Species rarefaction curve of birds in eight local markets.

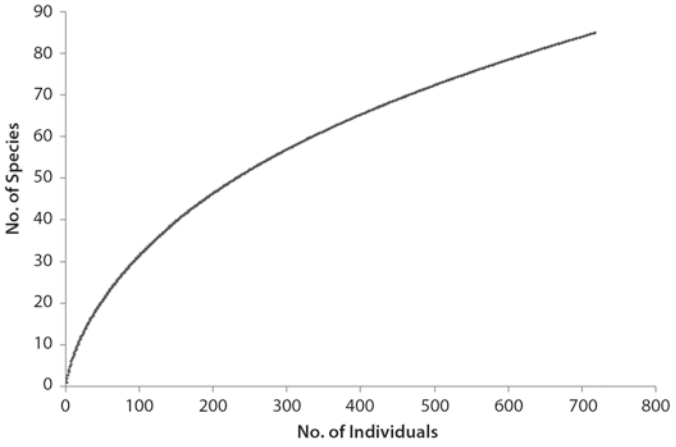


Figure 3. Number of species and individuals of birds traded in each local market.

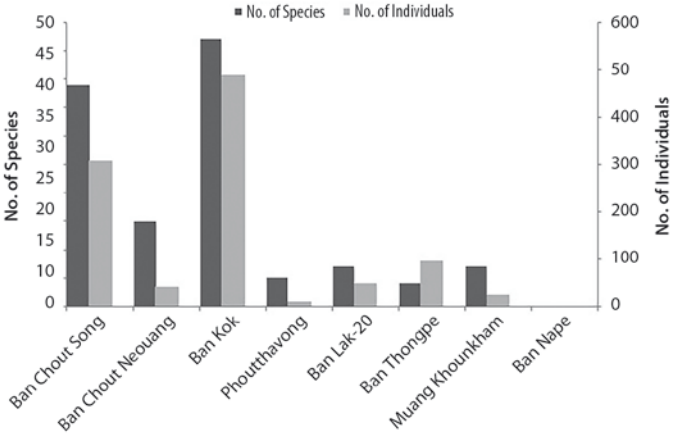


Table 1. Number of species and individuals in each bird order and family.

Order	Family	No. of species	Percentage of total species found (%)	No. of individuals	Percentage of total individuals (%)
Galliformes		4	4.76	103	14.35
	Phasianidae	4	4.76	103	14.35
Columbiformes		6	7.14	136	18.94
	Columbidae	6	7.14	136	18.94
Piciformes		7	8.33	37	5.15
	Megalaimidae	3	3.57	32	4.46
	Picidae	4	4.47	5	0.70
Strigiformes		6	7.14	14	1.95
	Strigidae	5	5.59	13	1.81
	Tytonidae	1	1.19	1	0.14
Coraciiformes		2	2.38	5	0.70
	Alcedinidae	1	1.19	4	0.56
	Coraciidae	1	1.19	1	0.14
Cuculiformes		3	3.57	5	0.70
	Cuculidae	3	3.57	5	0.70
Pelecaniformes		6	7.14	10	1.39
	Ardeidae	6	7.14	10	1.39
Accipitriformes		3	3.57	3	0.42
	Accipitridae	3	3.57	3	0.42
Gruiformes		2	2.38	4	0.56
	Rallidae	2	2.38	4	0.56
Anseriformes		2	2.38	1	0.14
	Anatidae	1	1.19	1	0.14
Psittaciformes		1	1.19	2	0.28
	Psittacidae	1	1.19	2	0.28
Charadriiformes		2	2.38	6	0.84
	Turnicidae	2	2.38	6	0.84
Passeriformes		41	48.81	392	54.60
	Muscicapidae	9	10.71	23	3.20
	Pycnonotidae	7	8.33	301	41.92
	Timaliidae	6	7.14	12	1.67
	Dicruridae	4	4.76	17	2.37
	Stenostiridae	1	1.19	4	0.56
	Oriolidae	1	1.19	1	0.14
	Pittidae	1	1.19	1	0.14
	Sturnidae	2	2.38	13	1.81
	Monarchidae	1	1.19	1	0.14
	Eurylaimidae	1	1.19	1	0.14
	Chloropseidae	2	2.38	7	0.97
	Nectariniidae	1	1.19	1	0.14
	Irenidae	1	1.19	2	0.28
	Estrildidae	1	1.19	10	1.39
	Turdidae	3	3.57	5	0.70

the total species sampled (Table 1). Order Piciformes was the second group with seven species (8.33%), followed by Columbiformes, Pelecaniformes and Strigiformes, each with six species (7.14%). Among passerines, Muscicapidae was the richest in species with nine species found, which represented (10.71%) of total species detected (Table 1). Family Pycnonotidae was the second richest with seven species (8.33%), followed by the families Columbidae, Ardeidae and Timaliidae, each with six species (7.14%) found.

Species with the highest abundances recorded were Black-crested Bulbul *Pycnonotus flaviventris*, Red Junglefowl *Gallus gallus* and Eastern Spotted Dove *Spilopelia chinensis* with 183, 85 and 81 individuals, respectively (Appendix 1). Between 10 and 50 individuals were found for each of 12 species, and fewer than 10 individuals were found for each of the remaining 72 species.

The highest levels of species richness and abundance of bird trading were found at Ban Kok market (47 species, 489 individuals) and Ban Chout Song (39 species, 309 individuals). Lower numbers of individual birds and species were found in Ban Chout Neouang (15 species, 42 individuals), Muang Khounkham (7 species, 25 individuals), Ban Lak-20 (7 species, 48 individuals), Phoutthavong (5 species, 11 individuals) and Ban Thongpe (4 species, 96 individuals) (Figures 3 & 4). However, no birds were found on sale in Ban Nape market.

We found higher species richness and abundance from surveys in February (25 species, 317 individuals in 2015; 39 species, 328 individuals in 2016) and April (43 species, 141 individuals). In contrast, we found comparatively lower species richness and abundance in June (14 species, 23 individuals), August (5 species, 8 individuals) and November (18 species, 83 individuals) (Figure 5).

Table 2: Price ranges and price differences between male and female individuals and dead and live individuals, for a selection of species with adequate sample sizes.

Common name	Male			Female			Dead			Alive		
	n	Mean	Range	n	Mean	Range	n	Mean	Range	n	Mean	Range
Red Junglefowl	47	8.04	6.13–9.81	38	5.99	3.68–7.36			3.69–9.20			9.81
Siamese Fireback	3	10.63	9.81–12.26	3	7.36	6.13–9.81						
Silver Pheasant	7	15.24	8.58–18.39	3	11.44	9.81–12.26						
Oriental Turtle Dove							4		2.45	3		3.07
Eastern Spotted Dove							6		1.84–3.68	54		1.84–6.13
Thick-billed Green-pigeon							5		1.84–3.68	9		2.45–3.68
Common Moorhen							2		1.23–2.45	1		1.84
Chinese Pond-heron							4		9.81	1		1.84
Collared Owlet							2		1.23	1		2.45
Oriental Scops-owl							1		1.84	1		1.23
Banded Kingfisher							1		1.23	3		1.23–6.13
Greater Coucal							2		1.23–1.84	1		3.07
Stripe-throated Bulbul							27		0.28–1.23	4		1.23–2.45
Black-crested Bulbul							147		0.61–6.13	36		0.61–2.45
Black-headed Bulbul							9		0.25–0.61	14		1.23
Grey-eyed Bulbul							43		0.61	2		1.23
Greater Racquet-tailed Drongo							4		1.23–1.84	5		1.23–2.45
Black Drongo							3		0.61	2		1.23
White-rumped Shama							3		0.61	2		1.23
Blue Whistling-thrush							2		1.23	1		2.45
Scaly-breasted Munia							2		0.28	8		0.61

Table 3. Price ranges and price differences between local markets for selected bird species, compared using one-way ANOVA. LM1: Ban Chout Song Local Market; LM2: Ban Chout Neouang Local Market; LM3: Ban Kok Local Market; LM4: Phoutthavong Local Market; LM5: Ban Lak-20 Local Market; LM6: Ban Thongpei Local Market; LM7: Muang Khounkham Local market. Numbers in parenthesis refer to the number of individuals. ns = not significant.

Common name	LM1	LM2	LM3	LM4	LM5	LM6	LM7	P-value
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Red Junglefowl	7.65±1.05 (44)		6.24±1.18 (34)		8.58±1.50 (5)			<0.01
Silver Pheasant			17.16±2.74 (5)			11.44 ±1.41 (3)		0.03
Grey-capped Emerald Dove	3.39 ±0.60 (21)		2.45 ±1.06 (3)					0.03
Eastern Spotted Dove	3.45±0.47 (72)		4.22± 2.13 (8)					0.01
Yellow-vented Green-pigeon			3.07±0.39 (6)				3.07±0.00 (3)	ns
Stripe-throated Bulbul	1.59±1.06 (9)	1.14±0.23 (13)	0.75±0.27 (9)	0.61±0.00 (4)				0.01
Black-crested Bulbul	1.44±0.47 (23)	1.18±0.18 (12)	0.65±0.14 (141)	0.61±0.00 (3)			0.61±0.00 (4)	<0.01
Black-headed Bulbul	1.16±0.25 (15)		0.61±0.00 (8)					<0.01

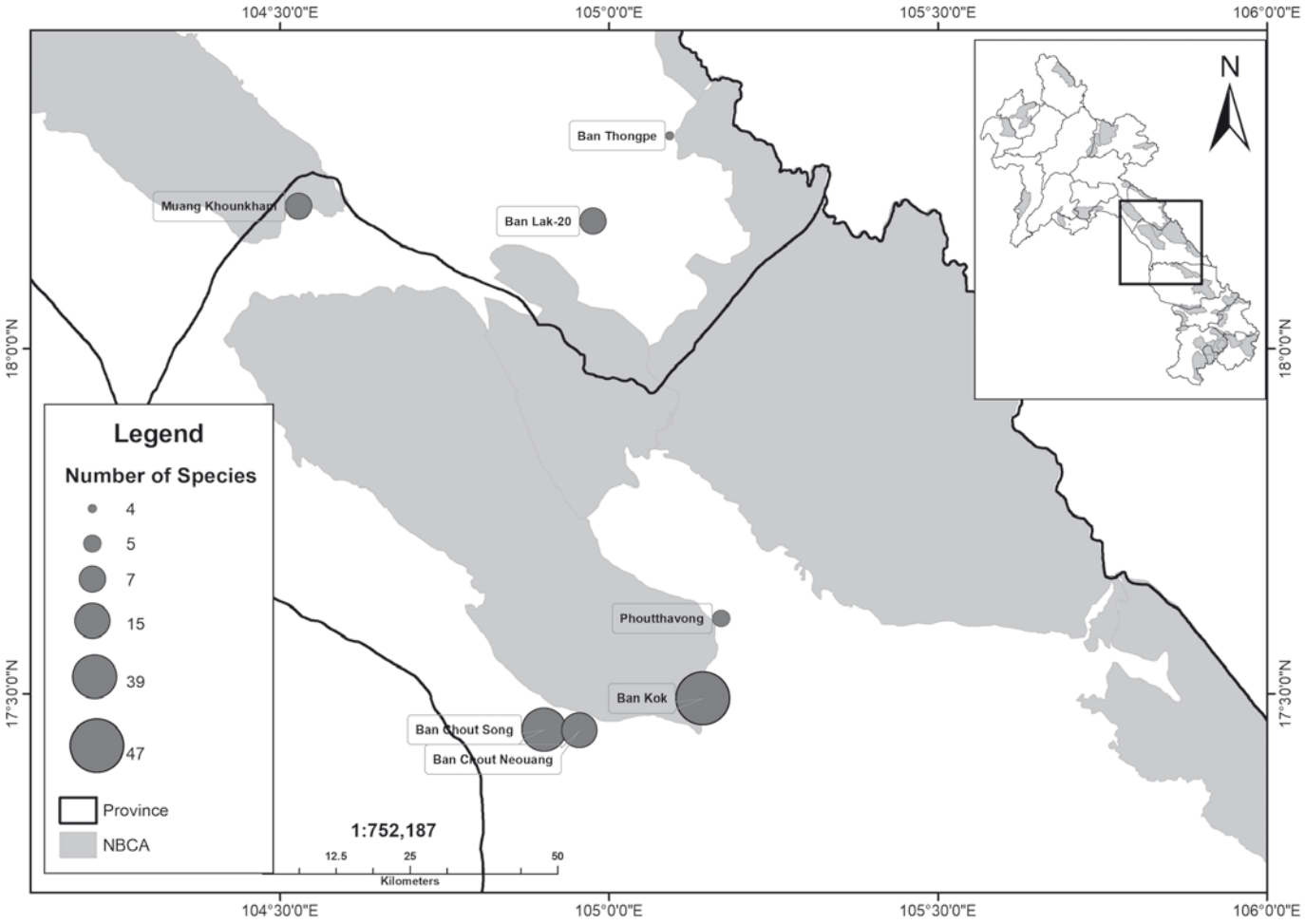
The price of the birds traded appeared to be based on the size, whether alive or dead, perceived beauty and quality of song. The most expensive species was the Common Hill Myna *Gracula religiosa* at US$61.30 (n=5 individuals) per individual, and the species with the lowest value was Black-headed Bulbul *Pycnonotus atriceps* with an average price of US$0.97 (0.25–1.23; n=23 individuals). Male and female individuals of three strongly dimorphic species were priced differently, namely Red Junglefowl, Siamese Fireback *Lophura diardi* and Silver Pheasant *Lophura nycthemera*. Nineteen species were priced differently between dead and live individuals (Table 2). In addition, the value of seven of eight species available for comparison differed significantly between each local market (P<0.05) (Table 3).

All species found were classified as Least Concern in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (IUCN 2020). However, seven species, the Common Hill Myna and six owl species, are listed in Appendix II of the Convention on International Trade in Endangered of Wild Fauna and Flora (CITES) (CITES 2019). In addition, 28 species were classified under the Lao Wildlife and Aquatic Animal Law (The Forestry Division 2009). Three species are classified under the Wildlife Prohibition Category (Category I) which protects species that are near-extinct, high-value or of special importance in the development of socio-economic, environmental, educational and scientific research. Twenty-three species are classified under the Wildlife Management Category (Category II) and are considered as beneficial in terms of national economic, social and environmental interests, and in addition are important for the livelihoods of ethnic people and educational scientific research.

DISCUSSION

The results of the present study demonstrate high species richness and abundance of birds traded in local markets in Laos, and perhaps far higher than previous studies indicate (e.g. Srikosamatara *et al*. 1992, Schweikhard *et al*. 2019). This study also indicates that the actual number of species traded in local markets is far higher than what was detected during the surveys because the cumulative number of species observed continued to increase well beyond the last observation cycle (Figure 2). From a review of the literature (Xayyasith 2018), the number of bird species found in the surrounding areas (especially in the five adjacent NBCAs)

Figure 4. Map of hotspot markets for bird trading in central Laos.

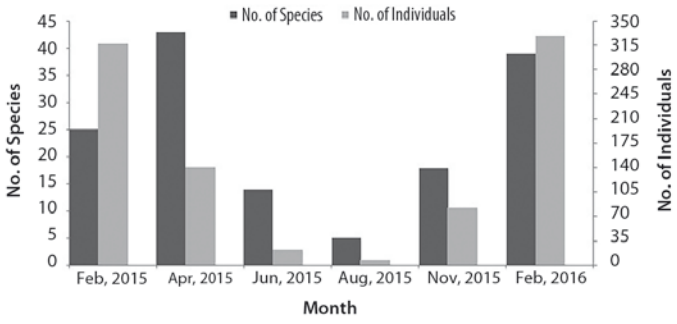


was nearly six times higher than what was observed in markets in the current study, and all species detected in the markets have been reported in the surrounding areas, suggesting that they are hunted locally. Additionally, some species (e.g. Crested Argus and Red-collared Woodpecker *Picus rabieri*) previously found in local markets such as Ban Lak-20, Ban Thongpe and Ban Nape (Tizard 1996, Timmins & Evans 1996, Thewlis *et al.* 1998, Evans & Timmins 1998), were not found in this study.

The present study is consistent with Jenkins *et al.* (2005), who suggested that the routine surveillance of local markets in Laos can provide insights and useful information not just on the exploitation of wildlife occurring in surrounding landscapes, but also document significant and interesting records of species in poorly-surveyed areas. For example, a number of species of interest or conservation concern in Laos, such as the Annamite Striped Rabbit *Nesolagus timminsi* (Surridge *et al.* 1999), Purple Cochoa *Cochoa purpurea* and Ashy Woodpigeon *Columba pulchricollis* (Duckworth *et al.* 2002), Kha-nyou *Laonastes aenigmamus* (Jenkins *et al.* 2005), Blanford's Fruit Bat *Sphaerias blanfordi* (Douangboubpha *et al.* 2012), Laotian Giant Flying Squirrel *Biswamoyopterus laoensis* (Sanamxay *et al.* 2013) and Red Giant Flying Squirrel *Petaurista petaurista* (Sanamxay *et al.* 2015) were all first discovered and recorded for the country based on data collected from local markets.

The study showed that the Black-crested Bulbul and Eastern Spotted Dove were the most traded species in local markets in Laos. These are primarily species of scrub and forest edge, i.e. much of the habitat that is close to villages. For instance, the bulbul is a conspicuous species that can be easily hunted in large numbers at fruiting trees, while the dove is common and relatively large-bodied, perhaps giving it an appeal to hunters over other readily visible species in such habitats. The Red Junglefowl was found to be the next most traded species compared to the previous two aforementioned, and confirms that junglefowl is clearly a highly sought-after species by local people visiting rural markets, and consistent with previous studies (Duckworth *et al.* 1999, Srikosamatara *et al.* 1992, Hansel 2004). Interestingly, the species is relatively low priced for a fairly large-bodied species, in comparison to smaller birds such as the Common Hill Myna which sells for a higher price. Species such as the Common Hill Myna were also found to be available in lower numbers than the Red Junglefowl or Eastern Spotted Dove. This may be due to various factors, including potential localised scarcity in degraded, near-village habitats, naturally lower densities, or simply the lack of species-specific demand. In addition, several species found to be traded are winter visitors which are seasonally

Figure 5. Number of species and individual birds traded over each survey period.



absent (e.g. Robson 2008). Therefore, a thorough, across-the-year study may find that the abundances of such species are in total lower, relative to species that are available through the year.

In terms of abundance and species richness, Ban Kok and Ban Chout Song markets were the highest compared to other markets in this study. Both markets are located near to extensive areas of forest. Based on our knowledge of the behaviour of local hunters, commonly traded species are usually hunted in areas adjacent to the markets, and not surprisingly, all species found in this study are also known to occur in the surrounding areas (Xayyasith 2018). The low numbers of forest interior species (e.g. Pygmy Blue Flycatcher *Muscicapella hodgsoni*, Common Hill Myna) detected in markets, as well as species known to have been seriously reduced by hunting (and so which tend to survive in highest numbers far from villages), suggests that the majority of the offtake for local markets actually occurs close to villages, and not deep in the forest. In addition, these two markets are also located beside major roads and thus serve as street markets for peddling various forest products. Although many of the small, commoner birds were sold openly, large-bodied (and perceivably rarer) species tend to be hidden in bags and were taken out only when prospective customers visited. Such trading behaviour is also documented in previous studies on the sale of wild birds and other wildlife in Madagascar and elsewhere (Robinson *et al*. 2018).

Both the numbers of species and individual birds traded were found to peak in February and April, but are relatively low in June, August and November. This may be because during the rainy season, it is often difficult for local people to hunt, given that the rice-farming period exerted high labour demands. In contrast, it is easier to hunt wildlife in the dry season because most villagers are relatively free from farming activities, and many choose to supplement their incomes by collecting non-timber forest products. Moreover, it is easier to hunt animals in small streams and pools near and within the forest during the dry season because many species congregate at such limited water resources during this period. Last, many species of migratory birds were found for sale in this season simply because the Laos dry season coincides with the northern winter when many migratory species are present.

This study found that the price of birds traded is influenced by (1) body size, (2) whether a bird is alive or dead, and (3) a species's song and perceived beauty. Large-sized birds such as pheasants were sold at higher prices as these were specifically bought for food. However, some relatively small-sized species such as the Common Hill Myna were sold at relatively high prices (US$61.30 per individual) because these birds are valued as pets and songbirds. Live and dead birds were priced differently as most live birds were traded with the option of being sold for their beauty and song. The price variations observed across the markets appeared to be largely driven by the different prices between male and female birds (different body size between males and females) for strongly dimorphic species such as the Red Junglefowl and Silver Pheasant, as well as between dead or live birds. Some local markets appear to sell more males than females, and more live birds than dead birds.

None of the species found in the surveys were globally threatened (IUCN 2020). Seven species were classified in Appendix II in CITES (CITES 2019) (and these are species which are now locally rare in Laos, and yet in high demand). Twenty-eight species in the surveys were listed under the Lao Wildlife and Aquatic Law (The Forestry Division 2009), of which three were in high demand (i.e. Red Junglefowl, Siamese Fireback and Silver Pheasant).

Based on the current conservation situation in Laos, there seems to be little justification at present for trying to prevent or regulate subsistence and localised hunting for most species found in these markets except for species where notable declines have been witnessed, including Common Hill Myna, green pigeons *Treron* spp., Barred Cuckoo Dove *Macropygia unchall*, herons and bitterns, buttonquails and raptors. Most of the species detected in the surveys remain widespread and at least locally common in Laos despite decades of hunting pressure. Imposing unnecessary restrictions on hunting these species may alienate local people from conservation efforts. In fact, the conservation prospects of the birds traded in these markets overwhelmingly depends on what happens to the habitat rather than on offtake levels.

In conclusion, this study marks the first systematic surveys of the bird trade in the local markets of Bolikhamxay and Khammouane provinces in central Laos. We suggest that the results of this study can offer useful baseline information for future surveys to monitor the hunting and trading of wildlife, especially bird species. This may help guide efforts to conserve and better manage wildlife in Laos.

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Appendix 1. Bird species traded in local markets in central Laos. LM1: Ban Chout Song market, LM2: Ban Chout Neouang market, LM3: Ban Kok market, LM4: Phoutthavong market, LM5: Ban Lak-20 market, LM6: Ban Thongpe market, LM7: Muang Khounkham market.

Species	Local markets							Total individuals	Price
	LM1	LM2	LM3	LM4	LM5	LM6	LM7		Min – Max
Lesser Whistling-duck *Dendrocygna javanica*			1					1	2.45 – 2.45
Red Junglefowl *Gallus gallus* ***	44	2	34		5			85	3.68 – 9.81
Scaly-breasted Partridge *Arborophila chloropus*					2			2	7.36 – 7.36
Siamese Fireback *Lophura diardi* *	1		5					6	6.13 – 12.26
Silver Pheasant *Lophura nycthemera* *	1		5			3	1	10	8.58 – 18.39
Grey-capped Emerald Dove *Chalcophaps indica*	21		3					24	1.84 – 3.68
Eastern Spotted Dove *Spilopelia chinensis* **	72	1	8					81	1.84 – 6.13
Barred Cuckoo-dove *Macropygia unchall*							1	1	2.45 – 2.45
Oriental Turtle Dove *Streptopelia orientalis*	5		2					7	2.45 – 3.07
Thick-billed Green-pigeon *Treron curvirostra* **	12		2					14	1.84 – 3.68
Yellow-vented Green-pigeon *Treron seimundi* **			6				3	9	2.45 – 3.68
Greater Coucal *Centropus sinensis* *	1	1	1					3	1.23 – 3.07
Green-billed Malkoha *Phaenicophaeus tristis*			1					1	1.23 – 1.23
Chestnut-winged Cuckoo *Clamator coromandus*	1							1	0.61 – 0.61
Common Moorhen *Gallinula chloropus*			3					3	1.23 – 2.45
White-breasted Waterhen *Amaurornis phoenicurus* ***					1			1	1.23 – 1.23
Little Egret *Egretta garzetta* **		1						1	3.68 – 3.68
Green-backed Heron *Butorides striata*			1					1	2.45 – 2.45
Purple Heron *Ardea purpurea* **			1					1	7.97 – 7.97
Chinese Pond-heron *Ardeola bacchus*	1		4					5	1.84 – 2.45
Cinnamon Bittern *Ixobrychus cinnamomeus*			1					1	2.45 – 2.45
Black Bittern *Ixobrychus flavicollis*			1					1	1.84 – 1.84
Crested Goshawk *Accipiter trivirgatus*	1							1	2.45 – 2.45
Japanese Sparrowhawk *Accipiter gularis*						1		1	1.84 – 1.84
Rufous-winged Buzzard *Butastur liventer*	1							1	2.45 – 2.45
Collared Owlet *Glaucidium brodiei* **		1	2					3	1.23 – 2.45
Asian Barred Owlet *Glaucidium cuculoides* **					1			1	1.84 – 1.84
Collared Scops-owl *Otus lettia* **			4				1	5	1.23 – 1.84
Oriental Scops-owl *Otus sunia* **					1		1	2	1.23 – 1.84
Spotted Owlet *Athene brama* **			2					2	1.84 – 1.84
Oriental Bay-owl *Phodilus badius* **			1					1	1.84 – 1.84
Banded Kingfisher *Lacedo pulchella*	3	1						4	1.23 – 6.13
Indian Roller *Coracias benghalensis*	1							1	1.84 – 1.84
Green-eared Barbet *Psilopogon faiostrictus*		2	13			1		16	1.84 – 2.45
Moustached Barbet *Psilopogon incognitus*			15					15	1.23 – 2.45
Lineated Barbet *Psilopogon lineatus*		1						1	1.84 – 1.84
Laced Woodpecker *Picus vittatus* **			1					1	1.23 – 1.23
Bay Woodpecker *Blythipicus pyrrhotis* **			1					1	1.23 – 1.23
Rufous Woodpecker *Micropternus brachyurus* **		1						1	1.23 – 1.23
Greater Yellownape *Chrysophlegma flavinucha* **			2					2	3.68 – 3.68
Vernal Hanging Parrot *Loriculus vernalis*			2					2	0.61 – 0.61
Yellow-legged Buttonquail *Turnix tanki*					2			2	1.23 – 1.23
Barred Buttonquail *Turnix suscitator* **					4			4	1.23 – 1.23
Long-tailed Broadbill *Psarisomus dalhousiae*	1							1	6.13 – 6.13
Blue Pitta *Pitta cyanea* **	1							1	0.61 – 0.61
Black-naped Oriole *Oriolus chinensis*		1						1	1.23 – 1.23
Greater Racquet-tailed Drongo *Dicrurus paradiseus* **	1		7			1		9	1.23 – 2.45

Species	Local markets							Total individuals	Price
	LM1	LM2	LM3	LM4	LM5	LM6	LM7		Min – Max
Black Drongo *Dicrurus macrocerus* **	2		3					5	0.61 – 1.23
Ashy Drongo *Dicrurus leucophaeus* **	1							1	1.23 – 1.23
Hair-crested Drongo *Dicrurus hottentottus* **			2					2	1.23 – 1.23
Black-naped Monarch *Hypothymis azurea*	1							1	1.23 – 1.23
Stripe-throated Bulbul *Pycnonotus finlaysoni*	9	13	9	4				35	0.28 – 2.45
Black-crested Bulbul *Pycnonotus flaviventris*	23	12	141	3			4	183	0.61 – 6.13
Streak-eared Bulbul *Pycnonotus blanfordi*			3					3	0.61 – 0.61
Black-headed Bulbul *Pycnonotus atriceps*	15		8					23	0.25 – 1.23
Puff-throated Bulbul *Alophoixus pallidus*		1	5					6	0.61 – 1.23
Black Bulbul *Hypsipetes leucocephalus*	0		8					8	0.61 – 1.23
Grey-eyed Bulbul *Iole propinqua*	1		42					43	0.61 – 1.23
White-browed Scimitar-babbler *Pomatorhinus schisticeps*	2							2	0.28 – 0.28
Large Scimitar-babbler *Pomatorhinus hypoleucos*	1							1	1.23 – 1.23
Rufous-fronted Babbler *Stachyris ruffifrons*	1		4					5	0.28 – 0.61
Pin-striped Tit Babbler *Macronous gularis*	2							2	0.28 – 0.28
Puff-throated Babbler *Pellorneum ruficeps*	1							1	0.28 – 0.28
White-crested Laughingthrush *Garrulax leucolophus*			1					1	1.23 – 1.23
Common Myna *Acridotheres tristis* **	1							1	6.13 – 6.13
Common Hill Myna *Gracula religiosa* **			5					5	61.30 – 61.30
Blue Whistling-thrush *Myophonus caeruleus*	3							3	1.23 – 2.45
Blue Rock-thrush *Monticola solitarius*	1							1	1.23 – 1.23
Japanese Thrush *Turdus cardis*			1					1	0.61 – 0.61
White-throated Rock-thrush *Monticola gularis*				1				1	0.61 – 0.61
Siberian Rubythroat *Luscinia calliope*	1							1	0.28 – 0.28
Siberian Blue Robin *Luscinia cyane*	1							1	0.28 – 0.28
White-rumped Shama *Copsychus malabaricus*	1		4					5	0.61 – 1.23
Yellow-rumped Flycatcher *Ficedula zanthopygia*			1					1	0.61 – 0.61
Verditer Flycatcher *Eumyias thalassinus*				1				1	0.61 – 0.61
Pygmy Blue Flycatcher *Muscicapella hodgsoni*				2				2	0.61 – 0.61
Hainan Blue Flycatcher *Cyornis hainanus*	3		2					5	0.28 – 0.61
Hill Blue Flycatcher *Cyornis banyumas*	6							6	0.28 – 0.28
Grey-headed Canary-flycatcher *Culicicapa ceylonensis*	4							4	0.28 – 0.28
Little Spiderhunter *Arachnothera longirostra*		1						1	0.61 – 0.61
Asian Fairy Bluebird *Irena puella*			2					2	1.23 – 1.23
Blue-winged Leafbird *Chloropsis moluccensis*		3	2					5	0.61 – 1.23
Orange-bellied Leafbird *Chloropsis hardwickii*			2					2	0.61 – 0.61
Scaly-breasted Munia *Lonchura punctulata*	2						8	10	0.28 – 0.61
Number of individuals	250	42	374	11	16	6	19	718	
Number of species	39	15	47	5	7	4	7	84	

Remarks: * Category I, **Category II and *** Category III of the Lao Wildlife and Aquatic Animal Law.