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International wildlife trade, avian influenza, organised crime and the effectiveness of CITES: The Chinese hwamei as a case study

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ABSTRACT

The Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) is the most important global initiative to monitor and regulate the international trade of plants and animals, but there is a lack of (retrospective) assessments of the effectiveness of its actions. We here focus on the international trade in Chinese hwamei *Garrulax canorus*, a songbird native to south-eastern China and northern Lao PDR and Vietnam. Prior to the year 2000, the species was heavily traded as an ornamental cage bird, both in countries within and outside its natural range. In an effort to prevent international overexploitation, at the request of China, the Chinese hwamei was listed in Appendix II of CITES, regulating all international trade. Here we compare data from three non-range countries (Thailand, Singapore and Indonesia) for which we have bird market survey data prior to and following the CITES listing. In addition, we assess whether or not CITES import and export figures agree with observations in the bird markets, and explore the contemporary (online) trade and trafficking in Chinese hwamei. We find a clear effect of the CITES listing and Chinese export restrictions in Indonesia (before ~50 birds/survey vs ~15 birds/survey after), but not in Thailand (~10 vs ~13) and Singapore (~4 vs ~16). Singapore is the only country that reports the import of Chinese hwamei, 1650 birds in 2002–2004 only, possibly accounting for a proportion of the birds observed in trade. In contrast, neither Thailand nor Indonesia report the import of a single Chinese hwamei since its CITES listing, despite some 2000 birds having been recorded openly for sale, suggesting large-scale illegal international trade in the species. Five seizures in Singapore and Indonesia were mostly because of concern about avian influenza. Price data, corrected for inflation, suggests that prices for Chinese hwamei have increased substantially, albeit following a delay, from ~US$50 prior to the listing to ~ US$200 after. We conclude that the CITES Appendix II listing of Chinese hwamei has had some positive effect on reducing the volumes of these birds in international trade, mainly through implementation of domestic legislation in China, but that substantial illegal or undocumented trade persists in Southeast Asia, involving organised criminal networks. We recommend actions from range countries, such as China, to cease the illegal export of Chinese hwamei, from importing countries such as Indonesia, to ensure no illegal shipments of birds enter their country, and for consumer countries where the species cannot legally be traded to curb the illegal domestic trade as the demand for songbirds in these markets drives the trafficking.

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1. Introduction

Wildlife trade, including fisheries and the timber trade, is one of the leading threats to global biodiversity conservation (Nijman, 2010; Smith et al., 2009; Sutherland et al., 2017). In recent years, attention in academic and conservation circles has focused very much on the illegal aspects of this trade (Biggs et al., 2017; Farine, 2020; Ngoc and Wyatt, 2013; Patel et al., 2015; Phelps et al., 2016; Rosen and Smith, 2010; Siriwat and Nijman, 2018; Wyatt, 2009), with, following the definition of the UN Convention against Transnational Organized Crime, wildlife trafficking now being recognized as a serious crime (UNOTC, 2020).

The Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) is the most important global initiative to monitor and regulate the international trade of plants and animals (Barrett et al., 2010; Phelps et al., 2010; Smith et al., 2011; Harfoot et al., 2018; Stahl and De Meulenaer, 2017). With 183 member countries ('Parties'), this UN-chartered convention aims to regulate trade and to protect endangered species from overexploitation in international markets. It does so by listing specific species or species groups in any of three appendices and subjecting them to regulatory measures. As of 2020, ~1000 species are listed in CITES Appendix I, generally prohibiting all commercial international trade and ~35,000 species are listed in Appendix II, regulating all commercial international trade.

It is widely recognized that CITES lacks enforcement capabilities, adequate funding and robust science (Phelps et al., 2010) and there are numerous examples where conservationists, governments and scientists have criticized the workings of CITES, often by highlighting its deficiencies (Blundell and Mascia, 2005; Janssen and Krishnasamy, 2018; McFadden, 1987; Nijman and Shepherd, 2010; Reeve, 2002; Smith et al., 2001; Vincent et al., 2014; Weber et al., 2015). CITES lacks conclusive data regarding the effectiveness of many listings and is hindered by a lack of accountability amongst some CITES Parties and poor capacity and coordination. As a result, CITES often struggles to catalyze consensus among its member countries, which have diverse (often competing) interests (Berec et al., 2018; Morell, 2010; Nijman and Shepherd, 2010). Here, we attempt to respond to the need for improved assessments of the effectiveness of CITES listings, and of the effectiveness of CITES implementation among its members, by analyzing the trade of a popular songbird; the Chinese hwamei *Garrulax canorus*, a species that has been listed in Appendix II since 2000.

The Chinese hwamei, also known as huà-méi ('painted eyebrow' in Chinese) or melodious laughingthrush, is native to China, Lao People's Democratic Republic (PDR) and Vietnam (BirdLife International, 2016a). Chinese hwameis are highly sought after for their melodious song and are often used in songbird competitions, in part outside their natural range (Chng et al., 2015; Eaton et al., 2017a, 2017b). The species is currently listed as Least Concern on the IUCN Red List of Threatened Species, with a declining population trend (BirdLife International, 2016a). In China, Chinese hwamei occurs in the south-eastern and central parts of the country, where it reportedly remains common despite high poaching levels (BirdLife International, 2016a). The country has not listed the species as a first- or second level-protected animal, but hunting and sale of wild Chinese hwamei is nevertheless prohibited as all wild birds are protected under the China Wild Animal Protection Law (Xu Ling, TRAFFIC East Asia office *in litt.* 2018). In Lao PDR, Chinese Hwamei populations appear to be confined to the north, although there are historical records from the south (Duckworth et al., 1999). The status of these populations is unknown, but it is likely to be threatened by trapping for the international trade (Duckworth et al., 1999). In Vietnam, Chinese hwamei are now very scarce as a direct result of the cage bird trade (Duckworth et al., 1999; BirdLife International, 2016a; Eaton et al., 2017b). In the past 20 years, the species was observed in the Vietnamese wild only three times during field surveys and regular birdwatching tours (Eaton et al., 2017b). The Chinese hwamei is not legally protected in Vietnam.

In the 1980s and 1990s, China was the major source of Chinese hwamei in international trade, but the country stopped issuing export permits in August 1998 and boosted its anti-smuggling efforts to counter the illegal wildlife trade (CITES, 2000b). Following a Chinese proposal, the species was listed in Appendix II of CITES in April 2000. Now, two decades after its inclusion in CITES, we aim to assess the effectiveness of this listing and measure its success in regulating (and hence, lowering) international trade. We will do so by comparing trade data from before and after the listing. Additionally, we will assess how well countries have adhered to the rules and intentions of CITES which have governed the regulation of the international trade in Chinese hwamei in recent years, and we present data on how other external factors such as the outbreak of avian influenza throughout Asia and a potential increase in captive breeding outside range countries may affect the trade in this species. We test four specific hypotheses:

1. Given that China, the species' main exporter prior to its CITES listing, implemented an export ban in 1998, we expect that the number of Chinese hwamei openly offered for sale will have declined substantially in all non-range countries.
2. We expect a good agreement between the number of Chinese hwamei that were legally imported into non-range countries and the numbers we observed in trade in these countries. The latter cannot be substantially larger than the former.
3. In countries where no or few Chinese hwamei have been imported, we expect that any trade we observe should be hidden from view, or at least be substantially less visible and open than prior to the CITES listing. We expect no seasonality in the trade in Chinese hwamei.

4. Rarity has a premium in wildlife trade (Courchamp et al., 2006). If the CITES listing, and regulation in general, has led to a decrease in the number of Chinese hwamei available for sale we expect asking prices (after correction for inflation) to have increased. Prices should be higher in regions where fewer hwamei are offered for sale compared to regions where availability is higher.

2. Methods

2.1. Data acquisition

We evaluated published and unpublished market survey data from countries that are (a) non-range countries, (b) for which we had data from before *and* after the 2000 CITES Appendix II listing and (c) for which at least one survey had been conducted post 2014, in order to have a representation of the current situation. As such, we excluded surveys conducted in Vietnam (e.g. Edmuds et al., 2011; Eaton et al., 2017b), China (e.g. Dai and Zhang, 2017; Haibin and Kunming, 1999) and Myanmar (e.g. Shepherd and Nijman, 2007), but we did use these reports to evaluate the larger overall trade in Chinese hwamei.

To find relevant studies and reports, searches were conducted on Google Scholar in January 2020 using the words 'bird', 'hwamei' or 'Garrulax' in combination with the word 'trade'. These searches were conducted in English, Indonesian, Malay and Thai. In Thailand, Singapore and Indonesia, Chinese hwamei is also known as นกฮวยบ๊ี๋, *kekicau-raya halia bercelak*, 画眉, *huà-méi*, *wamei* or *wambi* (in Indonesia a *wambi mini* refers to the spot-throated babbler *Pellorneum albiventre*, another popular songbird from the mainland Asia; we ensured no data pertaining to this bird was included in the analysis).

Price data were obtained from the gathered studies and (online) reports. Most prices were reported in the local currency, sometimes with US$ prices added. Additionally, prices for all three focus countries were obtained from several online platforms (olx.com, topopedia.com, jualo.com, Facebook) on which Chinese hwamei are sold. These prices normally refer to asking prices or first quotes and may be lowered after bartering or when more than one bird is purchased.

To assess levels of international trade to non-range countries prior to the CITES listing, we relied on export figures reported by Hong Kong and China (Nash, 1993; CITES, 2000a), excluding exports from China to Hong Kong and vice versa. During the period from 1991 to 1993, export figures from Hong Kong were based on permits, health certificates and inspection reports, while from 1994 to 1997, they were solely based on health certificates. All other export figures used in our assessment were based on actual reported exports.

To assess international trade after the CITES listing, we consulted the CITES trade database to determine reported import and export numbers for Chinese (and Taiwanese) hwamei for the period from 2000 to 2018 (data from 2019 were not yet available and data prior to the CITES listing are not included). Only those records concerning trade in live birds or live (fertilized) eggs (trade terms 'EGL' and 'LIV') were included in our analysis.

2.2. Network analysis of the trade, criminal networks and trafficking

Two of us, CSR and VN, have observed the trade in Chinese hwamei in the bird markets in Indonesia recurrently from the early 1990s to 2019 and in Thailand and Singapore, intermittently, from the mid-1990s to 2019, i.e. prior to and after the CITES Appendix II listing. During this period we have worked in a professional capacity for and with international and local conservation NGOs, universities and local and national government agencies. In a professional capacity PS has researched the wildlife trade in Thailand, including the trade in the animal markets, since 2013, and she and BTCL have conducted comparative studies of bird markets in Indonesia and other Southeast Asian countries.

Jepson (2016), in the context of presenting an overview of the conservation of another songbird threatened by the cage bird trade; the Bali myna *Leucopsar rothschildi*, argued convincingly that network analysis and network perspectives offer a means to investigate the interactions that govern various aspects of species' conservation (including, importantly, its trade). Jepson (2016) relied on personal experience, review of the literature, a study he conducted on the culture of bird keeping (by means of a household survey, interviews and workshops) and in-depth interviews with key informants. We adopted this approach to present a discourse of the contemporary trade in Chinese hwamei and to present an overview of the trade networks and their illegality. Like Jepson (2016), this was partially guided by personal experience (visiting bird markets throughout Southeast Asia, observing the trade in songbirds and hanging out in places where songbird enthusiasts congregate) and a review of the literature (including government documentation and legislation), but rather than conducting in-depth interviews, we relied on documentation and discussions provided by those involved in the trade themselves.

The songbird community in Southeast Asia is very active online: dedicated forums allow discussion of all aspects of songbird keeping; blogs and vlogs give personalised accounts and visit key players; sellers advertise their products, thereby presenting factual information about availability, prices and origin. By merely observing rather than interacting, we were able to collect high-quality factual data that, by definition, is not biased by our presence or motives. Just like any interview in person, with care, the information presented online can be used as a reliable source of information. For instance, when a vlogger visits and interviews "the largest importer of Chinese hwamei in the province of Central Java", we see 36 quarantine cages and Chinese hwamei in cages. The importer recounts how he started trading Chinese hwamei in the 1990s when most

of the Chinese hwamei he sold originated from China and he obtained them from an importer at Jakarta's Pramuka bird market. In 2014 he switched to importing Chinese hwamei from Vietnam, a country he now regularly visits (his next visit was planned in the next month) and where he typically purchases 50 birds at a time. From there he imports them directly into Central Java and informs the viewer that there are no problems at the airport to get the birds into the country. This probably gives an accurate account of the modus operandi of this trader, and the vlog is as reliable as an in-person interview. Indonesia's most famous Chinese hwamei, a champion singer with the unfortunate name of 'Hitler' is widely reported as having a value of US$27,500, and indeed there is a video of the bird's owner where he states that once another songbird enthusiast offered him this amount but he rejected the offer. While values of more than US$10,000 are indeed paid for champion songbirds (Jepson, 2008), in this case there is no evidence that this offer was made and the owner has an incentive to exaggerate the value of his champion to mythical proportions. Importantly, for the purpose of our study, all that is of relevance is that (very) high monetary values are placed on certain exceptional Chinese hwamei, as this may be an important factor that drives the trade. Through triangulation, the information from various online sources, our own discussions and observations in the bird markets, research conducted by others, and official (government) documentation, allows us to indeed present an overview of the international trade in Chinese hwamei and how the criminal networks operate.

2.3. Analysis

In the past, hwameis were considered one species, ranging from Taiwan, Province of China (PoC), Hainan, southeast China to Lao PDR and northern Vietnam. Li et al. (2006) showed considerable genetic divergence between the populations from Taiwan PoC and the other areas, and suggested that these were best considered two species (*G. conorus* and *G. taewanus*) and this has been accepted by, amongst others, BirdLife and the IUCN Red List (BirdLife International, 2016b). The original CITES Appendix II proposal from China listed three taxa (*coronus*, *teawanus* and *owstoni*), thus including *G. taewanus* in the listing. CITES now does recognise the two species of hwamei and both are listed on Appendix II. In trade in Southeast Asia we almost exclusively see Chinese hwamei (the Taiwan hwamei lacks the pale eye patch, the 'painted eyebrow', has a less varied and less complex song (Tu and Severinghaus, 2004) and is perceived as less attractive); while retrospectively reassigning birds to either of the two species is not possible, we assume that in the past, as now, most, if not all hwamei in trade are indeed Chinese hwamei.

Export data prior to 2000 were available for some but not all years. For the period 1994–1997 for Hong Kong, CITES (2000a) gives aggregate numbers; we distributed these numbers equally over these years. Years with no export data were left missing in the analysis rather than assuming zero export.

We retrieved reports from three countries that fulfilled the criteria outlined above in terms of non-range countries with data from before and after the CITES listing, i.e. Thailand, Singapore and Indonesia. Chinese hwamei's inclusion in Appendix II was approved in April 2000 and the listing came into effect in July 2000. CITES permits handed out in this period may have had a validity that stretched beyond this date, and birds may not have been sold immediately. For these reasons, we included the period up until April 2001 as pre-CITES listing and the period hereafter as post-CITES listing. We treated each survey as an independent data point, apart from one; a five-year study by Shepherd (2006) that we split into a pre- and a post-CITES listing dataset.

Webster (1975) reported an increase in Chinese hwameis in trade in Hong Kong in winter, suggesting bird may be more commonly traded in certain periods of the year. For Beijing (using data from CITES, 2000a) and Indonesia's two largest cities; Jakarta and Surabaya (using data from our own market surveys for the period 2017 to 2019), we assessed seasonality in the trade. We had no turnover data from Chinese hwamei but we had it for two other laughingthrushes, viz. chestnut-capped laughingthrush *G. mitratus* and black-throated laughingthrush *G. chinensis* from weekly market surveys in the town of Garut in West Java, Indonesia (V. Nijman, unpubl. data.). For the former, nine times a single bird was sold within a week and a tenth individual was sold within two weeks after arrival in the market. For the latter, on average, 50% was sold within 15 days. Based on these data we assumed that 75% of Chinese hwamei are sold within the first two weeks after arrival in the bird markets.

Prices in local currency were corrected to 2020 prices using an online inflation corrector and these were then converted into 2020 US$ prices. When a range was reported, we included both the upper and lower values.

For Indonesia, we tested whether or not the mean price for a Chinese hwamei was related to the government-recommended monthly minimum wage (*upah minimum*). These minimum wages are published annually by the Indonesian government for each regency and the major cities, and for 2019 they varied from US$171 (Yogyakarta regency) to US$452 (Bekasi regency). We then pooled cities into provinces (eight in total) and tested whether or not the mean price for a Chinese hwamei was related to the number of ads we recorded for each province.

We compared export volumes and numbers recorded at surveys in Thailand, Singapore and Indonesia prior to and following the CITES listing with t-tests, we tested seasonality with a one-way ANOVA, followed by t-tests to compare three 4-months periods. We assessed the change in asking prices in the bird markets of Indonesia by fitting an ordinary least-squares regression to the data, and we calculated the linear correlation coefficient (Pearson's r) to test for a relationship between exports of Chinese hwameis and asking prices. Where needed, data were log-transformed prior to analysis to approach a normal distribution more closely. We report mean ± 1 s.e.m. All tests were run on SPSS22, and we accept significance when $P < 0.05$ in a two-tailed test.

3. Results

3.1. Trade during the pre-CITES listing period

Trade between China and Hong Kong prior to the transfer of Hong Kong to China in 1997 was extensive, as for instance Webster (1975) noted for Hong Kong that "Hwamei [ ] are imported [from China] in quantities exceeding 100,000 a year [ ] for the hwamei [ ], anyone who has visited the shops will confirm that over 10,000 can be seen on any one day, especially in winter." Export to non-range countries was also extensive as for Indonesia, Nash (1993) recorded the import of over 13,000 Chinese hwamei (6940 from China, 4914 from Hong Kong and 1475 re-exported through Malaysia) through Jakarta's international airport in October 1991 to January 1992.

Annual exports reported from China and Hong Kong to non-range countries averaged at 50,853 ± 9942 birds, with peaks of 94,413 and 100,715 birds (1979 and 1991) (Fig. 1). The last two full years when China still issued export permits, numbers for Chinese hwamei had gone down to 750 birds (1996) and 60 birds (1997).

We found three reports for Thailand prior to the CITES listing and all were from the capital Bangkok. During 131 surveys 1481 Chinese hwameis were recorded, or, on average, ~11 birds/survey. For Singapore, 900 were recorded during 252 surveys, or less than 4 birds/survey. In Indonesia, 4386 Chinese hwameis were recorded in 88 surveys, averaging ~50 birds/survey. Medan and Jakarta stood out as cities where large numbers were recorded and traded. In the three countries combined, 6472 Chinese hwameis were found offered for sale and, giving equal weight to each survey, on average ~14 birds/survey were recorded. In none of the reports from Thailand, Singapore or Indonesia was there any suggestion that the trade in Chinese hwamei in the bird markets was hidden from view; this is supported by observations by VN and CSRin the 1990s in these three countries.

3.2. Trade during the post-CITES listing period

For years during which exports were reported the level of trade following the CITES listing was significantly smaller than prior to the listing (302 ± 225 birds/year vs 40,693 ± 1,0,362 birds/year: *t*-test on log-transformed data, t = 4.136, P = 0.001).

We found three reports for Thailand after the CITES listing and these were, just like the other surveys, from Bangkok. No Chinese hwamei was recorded during two surveys and 38 in one other; the difference, however, was not statistically significant compared to the pre-CITES listing period (*t*-test on log-transformed data, t = 0.627, P = 0.564). For Singapore, 32 Chinese hwamei were recorded during two surveys, i.e. 16 birds/survey; there was not enough data to compare the trade prior to and following the CITES listing statistically. In Indonesia, 1040 Chinese hwameis were recorded in 67 surveys, averaging ~15 birds/survey; this was not different from the pre-CITES period (*t*-test on log-transformed data, t = 1.820, P = 0.096). As before, Medan and Jakarta, and also Surabaya, stood out as cities where large numbers were recorded and traded, although less than prior to the CITES listing. In total, 1101 Chinese hwameis were found offered for sale in the three countries combined during the post-CITES listing surveys; giving equal weight to each survey, on average ~16 birds/survey were recorded (cf. ~14 bird/survey before the listing). In none of the reports from Singapore or Indonesia was there any suggestion that the trade in Chinese hwamei in the bird markets was hidden from view; this is supported by observations by VN and CSR.

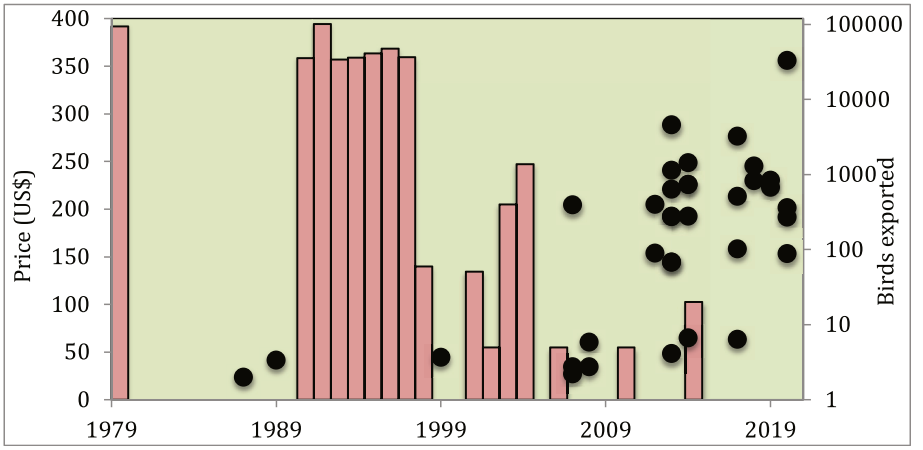

Fig. 1. Global export figures (red bars) and asking prices (black circles, inflation corrected to January 2020, in US$) for Chinese hwamei *Garrulax canorus* in bird markets in Indonesia, showing higher priced birds for sale in recent years. Note the logarithmic scale for export figures. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

3.3. CITES import and export data following the CITES listing

We found no reports for the import of Chinese hwamei into Thailand or Indonesia for the period from 2000 to 2018 (seeTable 1). Singapore imported 1650 birds for commercial purposes between 2002 and 2004, but none thereafter, other than 2 birds that were imported for a zoo in 2013. In the year of the CITES listing, Singapore exported 51 Chinese hwamei to Germany and Taiwan PoC and in 2010, Thailand exported five wild-caught Chinese hwamei to Uzbekistan (Table 2).

3.4. Monetary value and price changes following the CITES listing

In recent years a typical asking price (all corrected for inflation to 2020 US$ prices) for a Chinese hwamei in Thailand is US$ 191 ± 36, in Singapore it is US$ 845 ± 264 and in Indonesia it is US$ 254 ± 15 (online prices are higher, see under 3.5); these prices depend heavily on the singing ability and females, non-songsters or young birds can be obtained for less. These prices have changed significantly over time. We obtained 41 independent quotes from Indonesian bird markets over the period 1987 to 2020 (Fig. 1). Again, corrected for inflation, it becomes clear that prices were low in the period up to 2008, when a Chinese hwamei could be purchased for ~ US$50, but that at present prices are about four times that number (Fig. 1). The temporal change in prices was best described by a logarithmic function (Pearson's $r = 0.726$, $R^2 = 0.527$, $P = 0.0001$). The above inflation increases over time correlate strongly with the overall, legal, international trade in Chinese hwamei, and indeed the CITES listing in 2000, as in periods when there was large international trade, prices (at least those in Indonesian bird markets) were lower (Pearson's $r = -0.939$, $R^2 = 0.883$, $P = 0.0053$) (Fig. 2). Overall, it seems that there is support for the link between the CITES listing in 2000, diminishing numbers in trade, and subsequent price increases.

3.5. Seasonality and volume of trade in Indonesia, in bird markets and online

For the two largest cities in Indonesia, Jakarta and Surabaya, we found unequal numbers of Chinese hwamei offered for sale over three 4-month periods ($F_{2,22} = 3.467$, $P = 0.049$), with higher numbers observed in surveys in the period July to October compared to the other two periods combined ($t = 2.693$, $P = 0.0130$) (Fig. 3). The numbers in July to October were three to six times higher than in November to February and March to June.

We observed the same pattern in the other smaller bird markets combined, but the numbers of Chinese hwamei we observed here was markedly lower (March to June 3.2 ± 0.8 birds/survey; July to October 5.7 ± 3.6 birds/survey; November to February 1.6 ± 0.2 birds/survey) and seasonality was not significant ($F_{2,28} = 0.395$, $P = 0.677$).

Based on a 75% turnover within two weeks, and taking seasonal differences into account, we estimate that annually, 1817 Chinese hwamei are sold in the bird markets of Jakarta and 1187 Chinese hwamei in those in Surabaya. Combined, this amounts to ~3000 birds a year.

Between January 2018 and December 2019 in Thailand we found 12 ads offering a total of 16 Chinese hwamei on two specialist hwamei Facebook groups. The sellers were located in Bangkok (9/12), Nakhon Si Thammarat province in the south of Thailand (2/12) and Uttaradit province in the north (2/12). Two posts indicated the birds were obtained from eggs taken from Vietnam. In the same period, we found 54 online ads offering Chinese hwamei for sale in Indonesia, with sellers from 18 cities in eight provinces (six on Java, one each in southern Sumatra and Bali). Jakarta (13 ads) and Yogyakarta (8 ads) were the most popular cities. Matching cities, online prices were significantly higher than those recorded in the brick-and-mortar bird markets, i.e. US$426 vs US$254 (paired *t*-test, $t = 2.79$, $P = 0.031$) (Fig. 4) (seeFig. 5).

For Indonesia, we did not find a relationship between the number of online ads we recorded and the mean price for each of the eight provinces (Pearson's $r = 0.195$, $R^2 = 0.038$, $P = 0.644$). We found no statistically significant relationship between the mean price of a Chinese hwamei and the government recommended monthly minimum wage (Fig. 4) (online: Pearson's $r = -0.184$, $R^2 = 0.034$, $P = 0.465$; bird market: $r = -0.324$, $R^2 = 0.105$, $P = 0.478$). In Yogyakarta the mean price of a Chinese hwamei when offered online is US$455 (based on 8 independent quotes) which is similar to that in Jakarta (US$467, 13 quotes), despite the minimum wage in Jakarta being 2.5 times that in Yogyakarta (US$429 vs US$171).

4. Discussion

We showed here that in line with our hypothesis that following the CITES listing the number of Chinese hwamei openly offered for sale had declined substantially in the three non-range countries for which we had before and after data. Our hypothesis that the numbers of Chinese hwamei we observed in trade would be closely aligned with the numbers that were legally imported was not supported by the data; in fact close to zero Chinese hwamei were reported to the CITES secretariat as being legally imported in Thailand, Singapore or Indonesia but trade continued. Likewise, our predication that, given the lack of legal imports, the trade in Chinese hwamei should be hidden from view following the CITES listing was not supported by the data. What was very evident though was that over time prices were very much influenced by their availability. Periods with lower levels of international trade coincided with lower (inflation corrected) asking prices. Within Indonesia, we did not find a relationship between asking price and economic prosperity (as reflected by higher recommended minimum wages) suggesting that there is no straightforward relationship between earnings and asking prices. Below we discuss our findings in more detail.

Table 1
Chinese hwamei *Garrulax canorus* observations made during bird market surveys in Indonesia, Singapore and Thailand between 1988 and 2019. Dark shaded sections are surveys conducted prior to the 2000 CITES listing and light-shaded sections are post CITES listing. In Singapore songbirds are traded in shops rather than in markets (Basuni and Setiyani, 1989; Chng et al., 2016, 2018, Chng and Eaton, 2016a, 2016b; Djuwantoko, 1986; Haryoko, 2010; Lee, 2006; McClure and Chaiyaphun, 1971; Round and Jukmongkkol, 2003; Widodo, 2005).

Country / Year(s)	Surveys	Markets surveyed	Location(s)	No. of individuals	Reference
Indonesia					Djuwantoko 1986
1985–1986	2	2	Java: Yogyakarta, Semarang	295	
1988	1	1	Java: Jakarta	750	Basuni and Setiadi 1989
1992 –1993	38	12	Sumatra: Medan, Palembang; Java and Bali: Bandung, Bogor, Denpasar, Jakarta, Yogyakarta; Sulawesi: Ujung Pandang	2,850	Nash 1993
1997 – 2000	47	3	Sumatra: Medan	491	Shepherd 2006
2001	12	3	Sumatra: Medan	131	Shepherd 2006
2001	1	2	Bali: Denpasar	1	Widodo 2004
2005 – 2008	5	3	Sumatra: Medan	21	Shepherd 2010
2008	1	3	Java: Bandung, Garut, Tasikmalaya	0	Haryoko 2010
2014 – 2015	1	8	Java: Jakarta, Malang, Surabaya, Yogyakarta	157	Chng *et al*. 2015, Shepherd *et al*. 2016
2015	1	5	Java: Malang, Surabaya, Yogyakarta	59	Chng and Eaton 2016b
2015	1	2	Java: Bandung, Malang	2	Iskander et al. 2019
2016	1	1	Java: Bandung	14	Chng *et al*. 2016
2017-2018	2	1	Bali: Denpasar	1	Chng *et al*. 2018
2017-2019	38	11	Java: Bandung, Cirebon, Garut, Jakarta, Malang, Semarang, Surakarta, Sukabumi, Surabaya, Tasikmalaya, Yogyakarta	326	V. Nijman and K.A.I. Nekaris unpubl. data
2019	6	4	Java: Surabaya, Sidoarjo	329	Monitor, unpubl. data

Singapore					
1992 –1993	252	47 shops	Singapore	900	Nash 1993
2005 – 2006	1	38 shops	Singapore	11	Lee 2006
2015	1	39 shops	Singapore	21	Eaton *et al*. 2017a
Thailand					
1966-1969	82	1	Thailand: Bangkok	121	McClure and Chaiyaphun 1971.
1987-1988	25	1	Thailand: Bangkok	107	Round 1990
2000-2001*	24	4	Thailand: Bangkok	1,253	Round and Jukmongkkol 2003
2015	1	1	Thailand: Bangkok	0	Chng and Eaton 2016a
2018	1	1	Thailand: Bangkok	38	C.R. Shepherd and B. Leupen, unpubl. data
2020	1	1	Thailand: Bangkok	0	P. Siriwat, unpubl. data

*4 of the 24 surveys were conducted in May 2001, thus falling in the post-CITES listing period; see text for details.

4.1. Effect of the 2000 CITES listing, avian influenza and captive breeding

The trade in songbirds remains very popular throughout much of South-east Asia and negatively affects hundreds of species (Chng et al., 2015, 2016 ab; Jepson and Ladle, 2005, 2009; Ng et al., 2017; Nijman et al., 2018; Rentschlar et al., 2018; Shepherd, 2006, 2010; Sykes, 2017). The songbird trade is poorly regulated in most South-east Asian countries and only a few songbird species are adequately protected by national laws. Even fewer South-east Asian songbirds are protected at an international level, with 21 species listed in one of the appendices of CITES. Four of these species are listed in Appendix I and the others are included in Appendix II. The lack of legal protection for songbirds is often the result of a shortage of information in support of improved legislation.

We here focussed on one species, the Chinese hwamei, to assess how well international trade regulations through CITES have worked for this songbird. Of the three countries for which we had sufficient data, we found a clear effect of the CITES listing, and concurrent increase in regulation in China, in Indonesia (before ~48 birds/survey vs ~15 birds/survey after), but not in Thailand (~11 vs ~13) and Singapore (~4 vs ~16). However, when we combine all the surveys, the change is less clear, as we found ~14 birds/survey prior to the CITES listing and ~16 birds/survey thereafter. This then suggests that the CITES listing may have had some positive effect on the number of birds imported in certain countries, but not overall. As the number of Chinese hwamei in international trade decreased, the asking prices have increased well above levels of inflation, suggesting that their rarity has put a premium on these birds.

Post-CITES listing surveys from range countries suggest that there continues to be a large-scale commercial trade in Chinese hwamei, and that this involves substantially larger numbers of birds than those we found for Indonesia, Singapore and Thailand. Dai and Zhang (2017) working in the Chinese city of Guiyang, found ~3000 individuals (ranking it as the study's third most numerous species) during monthly surveys of the city's most important bird market, throughout a two-year period. Brooks-Moizer et al. (2009) surveyed the bird markets of Hanoi in 2000, 2003 and 2007 and recorded 144, 324

Table 2
CITES Trade Database import and export records of live Chinese hwamei *Garrulax canorus* between 2000 and 2018, to and from Thailand, Indonesia and Singapore; none were imported into Indonesia or Thailand.

Year	Importer	Exporter	Origin	Importer- reported quantity	Exporter- reported quantity	Purpose	Source[a]
2000	Germany	Singapore	Unknown	none reported	1	Personal use	Pre-convention
2000	Taiwan PoC	Singapore	Unknown	none reported	50	Commercial	Pre-convention
2002	Singapore	Taiwan PoC		50	none reported	Commercial	Captive-bred
2003	Singapore	Taiwan PoC		400	none reported	Commercial	Captive-bred
2004	Singapore	Malaysia	Taiwan PoC	100	none reported	Commercial	Captive-bred
2004	Singapore	Taiwan PoC		1100	none reported	Commercial	Captive-bred
2010	Uzbekistan	Thailand		5	none reported	Personal use	Wild-caught
2013	Singapore	U.S.A.		2	2	Zoo	Captive-born

[a] Captive-bred refers to at least second generation offspring hatched in a captive setting; captive-born refers to first generation offspring from wild-caught parents.

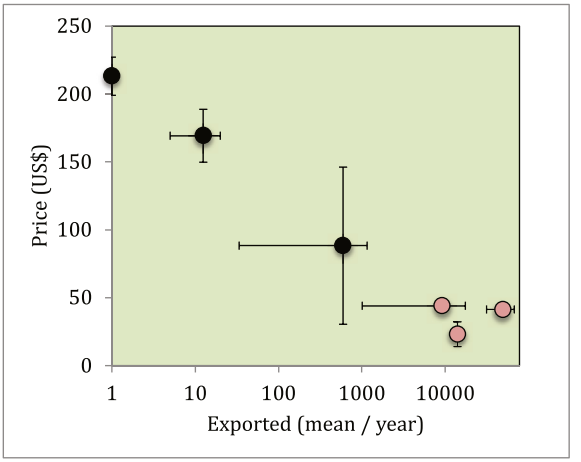

Fig. 2. Relationship between global export figures of Chinese hwamei Garrulax canorus and inflation corrected asking prices in bird markets in Indonesia (both, mean ± s.e.m. for 6-year periods), with pre-CITES listing periods in red and post CITES listing periods in black. Note the logarithmic scale for export figures. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

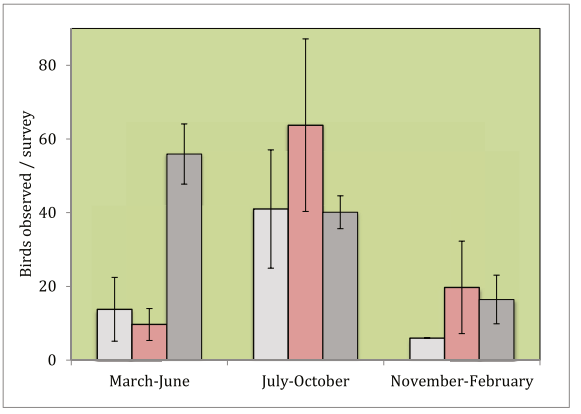

Fig. 3. Seasonality in the number (mean ± s.e.m.) of Chinese hwamei Garrulax canorus in bird markets in Jakarta (light grey, 2014–2019) and Surabaya (light grey, 2017–2019), Indonesia, and Bejing (dark grey, 1998–1999), China. The values for Bejing should be muliplied by 100.

and 282 Chinese hwamei for sale respectively. In the period from 2008 to 2009, Edmunds et al. (2011) recorded 2540 Chinese hwameis during five surveys in Hanoi and Ho Chi Minh City in Vietnam, and in 2016, 409 birds were counted during a single survey of bird markets in the same two cities (Eaton et al., 2017b). In both studies Chinese hwameis was the fifth most frequently encountered bird species in the market. In Mong La, on the Myanmar side of the China-Myanmar border small numbers of Chinese hwameis have been recorded for sale during most visits since 2006 (Nijman and Shepherd, 2007; VN and

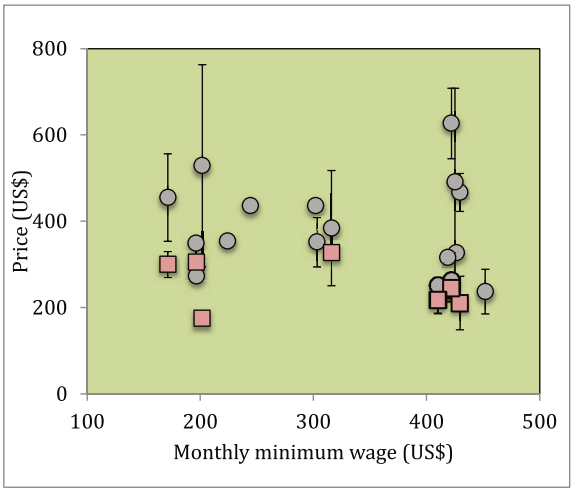

Fig. 4. Mean asking price (±s.e.m.) for a Chinese hwamei on online platforms and bird markets in Indonesian cities in relation to the government recommended monthly minimum wage for the regency the city is situated in. Online prices (18 cities) are in grey and prices in bird markets (7 cities) are in red. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

CSR, unpubl. data). These birds almost certainly originate from China, unless the range of the species' extents further west than currently known into eastern Myanmar.

Other than CITES, domestic policy and regulation, one theme that came up frequently in online discussions, during visits to bird markets and, to a lesser degree, in the published literature, was the outbreaks of avian influenza H5N1 and H7N9 and how that affected the trade in songbirds. The first human deaths due to H5N1 were in China in 2003, the first deaths in Thailand were in 2004 and in Indonesia in 2005. Indonesia was one of the epicentres of avian flu H5N1 transmission, with as of May 2020, 168 out of 455 deaths globally against 31 in China and 17 in Thailand (WHO, 2020). Indonesia reacted by implementing a temporary ban on the import of live birds into Indonesia (Shepherd, 2006). A few years later, the region was affected by avian influenza H7N9. In response to the H7N9 avian flu outbreak, in April 2013 Indonesia temporarily banned the import of live birds from China and Hong Kong, but according to online forums, by August 2013 the first songbirds were allowed to enter the country again. As far as we could ascertain, no such specific bans were put in place in Singapore or Thailand. It remains to be seen how these bans had any lasting effects on the import of Chinese hwamei into Indonesia, certainly given that by 2005, and certainly by 2013, the numbers that China allowed to be exported had declined already considerably. One main obstacle in the implementation of the ban was that many of those involved in the bird trade in Indonesia, and perhaps also elsewhere, were not convinced of the realities of avian influenza. Shepherd (2006) questioned six songbird dealers in Medan, North Sumatra in 2005 regarding avian influenza and all six stated that they did not believe such a virus existed and that it was merely a rumour, most likely concocted by competing bird traders in other South-east Asian countries. Likewise, Padmawati and Nichter (2008) and Lowe (2010) noted a lack of trust in government bodies, a range of theories about the realities of avian influenza and, in varied ways, a lack of adherence to rules that were put in place to reduce the spread of the virus. From online discussions among bird fanciers and songbird traders it is clear that avian influenza was something that was merely seen as a hindrance in acquiring (and selling) birds rather than something that was seen as a real threat to birds or people. However, what is clear is that with respect to Chinese hwamei, avian influenza did have some effect on the willingness of the authorities to confiscate birds (see below).

While a small number of Chinese hwamei that are observed in trade may have been bred in captivity, we are not aware of any commercial captive breeding of the species in either Thailand, Singapore or Indonesia. Most, if not all, are derived from the wild and have been imported, most likely from China (cf. Iskander et al., 2019; Jepson and Ladle, 2009; Nash, 1993). During surveys in the bird markets of Indonesia, traders have acknowledged on numerous occasions that the Chinese hwamei for sale in the Indonesian bird markets are imported from China. Online traders regularly add statements such as "just arrived" or "newly arrived" on their websites, with China and Vietnam most frequently singled out as the source countries; shipment sizes, when mentioned, are in the order of 50–100 birds at a time. Likewise, in Thailand, Chinese hwamei are reportedly imported from China and Vietnam and there has been no mention of commercial captive breeding of this species during market surveys. In fact, the occasional breeding success is celebrated within the songbird community. Illustrative is the report by Muslim (2015), who recounts the attempts by one Indonesian breeder to breed Chinese hwamei since no one in Indonesia was breeding them (the idea that hwamei cannot be bred in captivity is a common perception in the Indonesian songbird community). After many unsuccessful attempts with multiple pairs after three years he finally succeeded in hatching two chicks. Similarly, Albartiansyah (2019) and Anonymous (2019) informed that one breeder in West Java was successful in producing chicks. Motivated by the difficulties of importing Chinese hwamei because of import bans due to avian influenza he embarked on a captive breeding programme of the species. Reports are somewhat conflicting, but it appears that about four

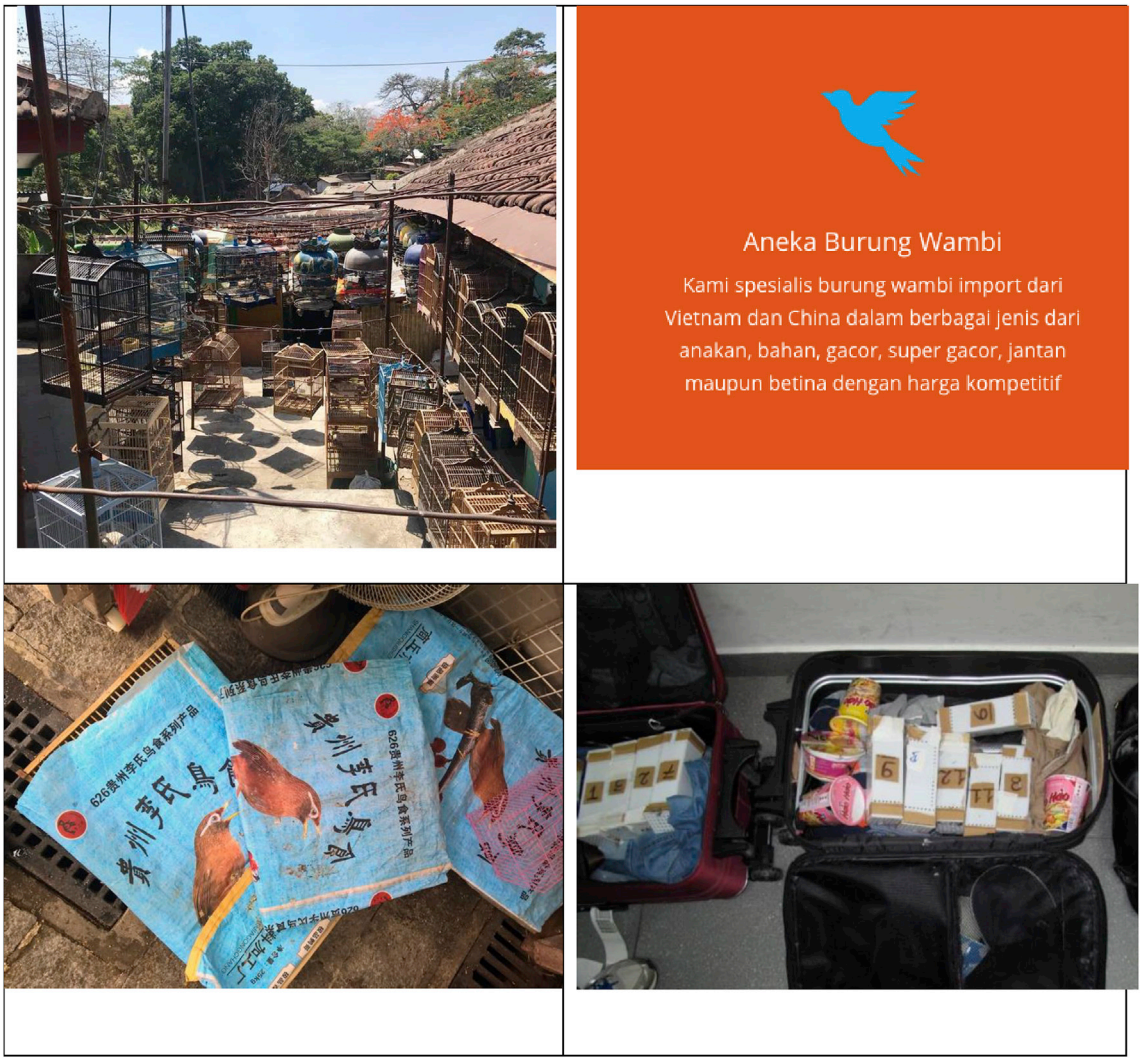

Fig. 5. Aspects of international trade in Chinese hwamei *Garrulax canorus* in Southeast Asia. From top left clockwise: (1) Overview of a bird market in Malang, Java, Indonesia (2) Screenshot from the website of a Chinese hwamei importer from Yogyakarta, Indonesia (www.jualburungjogja.com). The text reads "*Various types of Chinese hwamei. We specialize in the import of Chinese hwamei from Vietnam and China. We have various types of chicks, materials, birds with loud songs [*'gacor'*] and ones with very loud songs [*'super gacor'*], males and females, at competitive prices*"; (3) suitcases used to smuggle 12 Chinese hwamei from Vietnam to Singapore in 2016; one of the birds was found dead on arrival while another had to be euthanised after testing positive for avian influenza H3N8; (4) Specialized Chinese hwamei food produced in China and offered for sale in Indonesia.

chicks per year are produced by this one breeder. All in all this is not suggestive of viable commercial breeding operations sufficient to replace or significantly augment the trade in imported wild-caught birds. As such, we consider the trade in Chinese hwamei to comprise of wild-caught birds, and hence, subject to CITES regulations.

Anonymous (2019) reported that the few captive-born Chinese hwamei that are available in Indonesia are considerably more expensive than imported wild-caught individuals. While some caution is needed as the source of the information is the breeder himself, prices for captive-bred birds were said to be US$ 740, which is at least twice that of other birds (see Fig. 4). If it remains acceptable for customers in Indonesia to pay higher prices for captive-bred birds, we may see an increase in efforts of captive breeding in the future and indeed we may see more captive-bred Chinese hwamei entering the market.

4.2. Evidence of illegal or under-reported trade

Shepherd et al. (2016) highlighted the fact that Chinese hwameis were openly for sale in Indonesian bird markets, despite the absence of records of this species being legally imported into that country since it was listed in CITES Appendix II in 2000. This suggests that the species is being moved internationally for commercial purposes without permits, which is in direct violation of CITES, and indeed individual countries' national legislation.

We found records of 56 Chinese hwamei being confiscated in six seizures, five in Indonesia and one in Singapore. We did not find any evidence of seizures in Thailand or other non-range countries. In December 2016 two Vietnamese nationals were arrested for attempting to smuggle 12 hwamei from Vietnam into Singapore. The birds were concealed in plastic containers and hidden amongst other luggage in two suitcases. The birds had been confined for ~12 h in the containers without food and water, and one bird was dead upon arrival in Singapore. The birds were tested for avian influenza, and one was found positive for antibodies against Influenza A virus, H3N8; this bird was destroyed and the remaining ten were put in quarantine. The smugglers received a six months prison sentence for smuggling a CITES-listed species and four months for imprisonment for subjecting the birds to unnecessary pain or suffering (both sentences ran concurrently).

Also in 2016, on two separate occasions, a total of six Chinese hwamei were imported from China into Jakarta International airport; in both cases the appropriate paperwork was absent. This was in violation of Law No 16 of 1992 concerning the Quarantine of Animals, Fish and Plants, and Regulation 69 (2014) concerning the Termination of Importation of Poultry and Poultry Products from China into Indonesia. The birds were confiscated, and in light of fears of the spread of Avian influenza, were destroyed. One of the two importers received a prison sentence of 10 months, with an additional 10 months probation period. In August 2017 13 hwamei were intercepted at Surabaya International Airport, arriving on a flight from China, without the proper documentation. The birds were destroyed because of fear of avian influenza. In May 2019, at Medan International Airport 22 hwamei in the possession of a Malaysian national coming from Malaysia were seized. Similar to the seizure in Singapore, the birds were encaged in small boxes hidden in a suitcase. All were destroyed, again because of fears of the spread of avian influenza. Finally, in July 2019, the harbour authorities in Mataram, Lombok, seized 3 Chinese hwamei. The birds were on a bus coming from Sidoarjo, East Java. The driver was not in possession of valid Letters of Domestic [i.e. within Indonesia] Transportation of Wild Plants and Animals. The birds were handed over to a local animal rescue centre.

While it should technically be illegal to trade Chinese hwameis in countries like Indonesia, as none were reported as having been imported into that country for the better part of two decades, the trade now is as open as it has ever been. Reports from the 1990s, and indeed our own observations during that period, suggest that the trade was completely above-ground and open. From reports from the post-CITES listing period there is likewise no indication that the trade has gone underground, which suggests a lack of law enforcement. The numbers of Chinese hwamei we estimate as being sold (illegally) every year in the bird markets of Jakarta (~1800) and Surabaya (~1200) may seem high, but these are very much in line with estimates from Jepson and Ladle (2009). Based on a random household survey they estimated that ~20,000 Chinese hwamei were kept as cagebirds in five cities on Java, some 40% (~7200) in Jakarta and some 30% (~5400) in Surabaya. Combined, in order for these numbers to match up, this suggests that the longevity of a Chinese hwamei songbird when being kept as a pet is between 4.0 and 4.5 years, after which it needs to be replaced. This seems a reasonable estimate.

Large numbers of Chinese hwamei have been observed for sale in Vietnam, i.e. ~500 in a single survey (Edmunds et al., 2011; Eaton et al., 2017b). Given how rare the species has become in this country, it is very likely that the birds observed in these bird markets were sourced from outside the country, most likely from China (Eaton et al., 2017b) or even Lao PDR (Duckworth et al., 1999). As with Indonesia, this strongly suggests illegal international trade in the species, with large numbers of birds being trafficked into Vietnam. We have limited information on the numbers of Chinese hwamei in trade in other range countries; it seems that little has changed since Brazil (2009) lamented that little or no ornithological investigation in the cage bird trade had taken place in eastern Asia, stating that it was rampant in the region.

In the bird markets in Java we detected a seasonal pattern in the number of Chinese hwamei being offered for sale. About two-thirds of the birds were observed in the period July to October and 10–20% in the periods March to June and November to February, respectively. In the late 1990s in the bird markets of Beijing, a similar strong seasonal pattern was observed in the number of Chinese hwamei being offered for sale, but here the peak was earlier in March to June, when about 50% were recorded. About 35% of the birds were observed in June to October and the remaining 15% in November to February (CITES, 2000a) (Fig. 3). In Indonesia, the observed seasonality does not seem to be linked to seasonal differences in demand as the number of Indonesian laughingthrushes offered for sale in the markets of Jakarta and Surabaya remains fairly constant over the course of the year (V. Nijman, unpubl. data). We do not know what the biological significance of these seasonal patterns —they most likely reflect harvest patterns at the source- but from a law enforcement perspective, it creates opportunities to better and more effectively monitoring the import and sale of Chinese hwamei.

4.3. Contemporary trade, illegal criminal networks and trafficking

While the trade in Chinese hwamei in the bird markets in countries like Indonesia, Thailand and Vietnam continues in a very similar fashion as it has done for decades, the contemporary trade now increasingly takes place over the Internet. For Indonesia, we found higher prices online than in traditional bird markets, but we found no relationship between number of online ads per regency and mean asking price nor for the regency minimum wage and asking price. As such, at least for the contemporary online market place in Indonesia there is no support for an Anthropogenic Allee effect, where a premium is placed on rarer species (Courchamp et al., 2006; Siriwat et al., 2019) possibly as, within Indonesia at least, birds can be ordered from, and shipped to, any part of the country, thus making it irrelevant how few Chinese hwamei are available in any given region.

Combining data from the CITES trade database (representing legal international trade), observations in bird markets and discussions with bird traders in these markets, data from online ads and hwamei Facebook groups, and information provided on specialized songbird online forums, allows us to create a conceptual model of the contemporary trade in Chinese hwamei

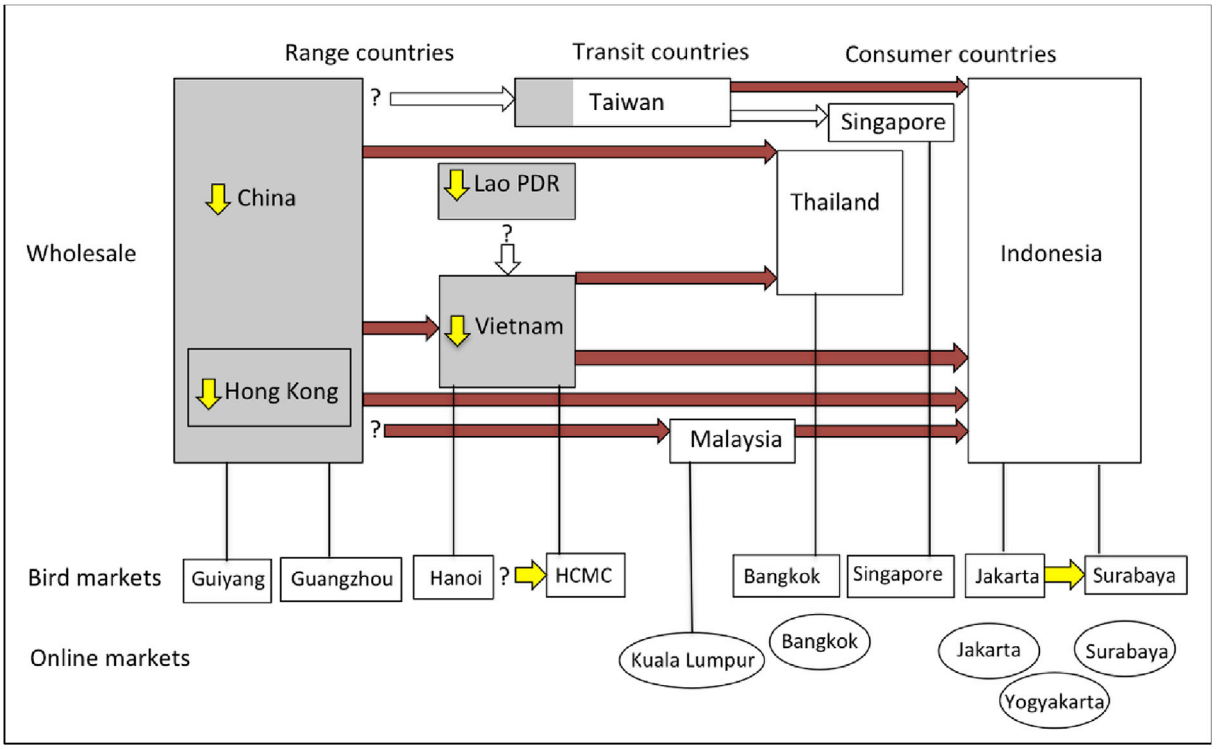

Fig. 6. Conceptual model of the contemporary (largely illegal) trade in Chinese hwamei *Garrulax canorus*. In red are incidences of trafficking (cross border trade) that are in violation of CITES (as none are accompanied by appropriate paperwork) and in yellow are violations of domestic legislation (harvest, provincial transport, etc.). Taiwan PoC has a population of feral Chinese hwamei, but the country probably acts mostly as a transit country. Note that the trade as presented here does not exclusively take place in the countries listed. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

(Fig. 6). This trade involves a large number of actors (harvesters, middleman, transporters, exporters, traffickers, importers, distributors, sellers and consumers), often based in two, three or more countries, that have operated like this for a number of years (and up to two decades, following the inclusion of the species in CITES Appendix II). It takes the form of loose networks which are flexible and allowing to quickly adapt to exploit new avenues, new trade routes and new suppliers, and to evade countermeasures where these are implemented. With rising prices for individual Chinese hwamei, substantial monetary gains are made. In order to execute this trade, numerous laws have to be broken, including ones that deal with the harvest of Chinese hwamei within China and Vietnam, the export of birds from one country to the next, quarantine rules and regulations, the transport of wild-caught birds across provincial boundaries, and the selling of birds without appropriate permits. Legitimate structures exist to further the illegally captured and illegally traded Chinese hwamei along the chain of suppliers, exporters, importers, quarantine offices and sellers; as such, it is easy for these illegally traded birds to be lost within the legal songbird market (cf. the illicit fur trade in Russia as demonstrated by Wyatt, 2009). Still, numerous individuals and agencies have to turn a blind eye, making it likely that bribery, document fraud and corruption is involved. Given that, since 2014, wildlife trafficking is recognized as a 'serious crime' by the UN Convention against Transnational Organized Crime, it is clear that the contemporary international trade in Chinese hwamei meets the criteria of organised crime as defined by this Convention ("*a structured group of three or more persons, existing for a period of time and acting in concert with the aim of committing one or more serious crimes or offences established in accordance with this Convention, in order to obtain, directly or indirectly, a financial or other material benefit*"). Pires et al. (2016: p5) raised the question if wildlife trade is organised crime or crime that is organised, noting that the former may "conjure up images and associations of mafia-type associates that are highly organized, structured, and willing and able to intimidate or inflict harm on individuals who get in their way of profiting from the illegal wildlife trade". We have no evidence of this, and we duly note that organised crime, as defined above, does not need to involve violence.

We found no evidence of commercial captive breeding, instead many importers in Indonesia indicate when they receive birds from abroad with some specialising in the import of hwamei from China and Vietnam. The import of 1650 captive-bred Chinese hwamei, i.e. at least second generation offspring from parent birds that themselves were bred in captivity, from Taiwan PoC to Singapore and Malaysia, retrospectively may require further scrutiny. The fact that such a large number of captive-bred birds were exported in 2002, 2003 and 2004, but not in any of the years thereafter, suggests that these may in fact have been wild-caught birds.

4.4. Conclusion and recommendations

The Chinese hwamei is one of the few species of songbird listed in the appendices of CITES, and therefore one of the few songbird species for which data is available to monitor international trade and possibly detect illegal trade trends. As all countries involved in the Chinese hwamei trade are Party to CITES, they should use this tool to deter current -and future— illegal trade. While we have not provided new information on the status of the Chinese hwamei in the wild, we have shown that international illegal trade in the species is taking place. The current IUCN Red List assessment of the Chinese hwamei has little information regarding the trade in this species and should be revised to ensure illegal national and international trade are recognized as threats that impede the conservation of the species. Furthermore, as the aim of CITES is to ensure that international trade in individuals of wild animals does not threaten their survival, it is hoped that this case study will draw attention to the fact that CITES should be better utilised to end illegal international trade.

In its 2000 CITES Appendix II proposal, China indicated some of the actions it had taken to better regulate the international trade in Chinese hwamei, including a stop on the issuing of export permits and legal protection. It urged other CITES Parties that import the species to enforce their regulations to stop smuggling (CITES, 2000a). Now, almost two decades later, we have to conclude that while the export from China and Hong Kong has decreased substantially, largely as a result of domestic regulation and legislation implemented by China in 1998, there appears to be a consistent, large-scale illegal trade in Chinese hwamei.

Our work leads us to make the following recommendations, which, when implemented, should ensure that countries and individuals involved in the trade of Chinese hwamei adhere to the rules and intentions of CITES governing the regulation of the international trade in these birds.

We urge the authorities in China to ensure that no Chinese hwamei are illegally exported from their country. This most likely requires the CITES Management Authority to engage more with enforcement agencies and trade bodies.

It is unclear to what extent other range countries, such as Vietnam, are involved in the illegal international trade in Chinese hwamei; it is evident from numerous surveys in the bird markets of Hanoi and Ho Chi Min City that there is a constant and persistent presence of significant numbers of Chinese hwamei for sale. In light of the apparent rarity of this species in the wild in Vietnam and given its protected status in Vietnam, we urge the Vietnamese authorities to investigate the origin of the birds in these markets. If indeed sourced from China, we urge the Vietnamese and Chinese authorities to liaise to ensure that this illegal trade is halted.

We urge the authorities in non-range countries, first and foremost Indonesia but also Thailand, to ensure that no Chinese hwamei are imported into the country, unless these shipments are accompanied by the appropriate CITES paperwork. Just like in Vietnam, in the absence of any imports, the open trade of the Chinese hwamei in the bird markets in Indonesia needs to be curbed.

There is an urgent need for more systematic monitoring of the songbird trade in Southeast Asia (Eaton et al., 2015; Nijman et al., 2017). Only through continued and consistent market monitoring, in combination with wild population studies, can our understanding of the Southeast Asian songbird trade be improved, and can the destructive effects of this trade be truly fathomed and efficiently combatted.

To improve the workings of CITES, there is an urgent need for a more systematic and less biased collection of international trade data, not just for Chinese hwamei, but for many other taxa as well. CITES depends on individual Parties' self-reporting to acquire data on imports and exports; existing mechanisms, struggle to effectively coordinate systematic and unbiased data-collection among the member countries. Furthermore, most CITES-listed species occur in the tropics, where governance is often weakest and corruption highest (Laurance, 2004; Sodhi et al., 2010); the incentives for misreporting, biased data analyses and corruption within wildlife trade are high, especially as endangerment and rarity often correlate with increasing commercial value (Courchamp et al., 2006; this study). There seems to be a disconnect between records of the illegal and unreported domestic trade in non-native CITES-listed species and what is reported annually by Parties to the CITES Secretariat. Despite a virtual absence of records of international trade in Chinese hwamei since its listing on Appendix II in 2000, hundreds of individuals were recorded during numerous market surveys in Vietnam and Indonesia. CITES is eminently positioned to coordinate systematic, large-scale data collection and compliance among its signatories, which can mandate domestic reporting at various points along the trade chain (harvest, export, import, sale), ensure standard and accurate reporting, and collect international trade data.

Finally, we urge those that are invested in CITES (including academics, conservationists, and government institutions) to more frequently and more systematically assess the effectiveness of CITES listings, and the effectiveness of the implementation of CITES by Parties at a national level. Identifying (partial) successes and failures, and spelling out ways to ameliorate the latter, ensures the Convention remains effective in the protection of wildlife that is traded internationally.

Declaration of competing interest

We declare no conflict of interest.

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