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# The Social and Cultural Importance of Keeping Wild Birds as Pets in an Ethnic Community in Guiyang City, China

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## Abstract

Living with companion animals is widespread around the world. Wild birds are becoming increasingly popular as pets, potentially threatening the survival of many species of birds. Although keeping wild birds is illegal without permits in China it is a common practice. We conducted a study in an ethnic village in a suburban district of Guiyang city, China, to gain insights into the underlying motivations for this practice that can be used in the design of effective conservation strategies. Wild-caught birds were kept by 67.2% of village households. We interviewed 52 owners who kept a total of 269 wild birds. The popularity of wild birds as pets varies among species. We found that most keepers are middle-aged and elderly, so while enjoyment of bird fighting is a commonly cited motivation, we conclude that companionship is also important. We observed a significant correlation between the duration of bird ownership and age of the owners. Nearly half of our informants support the ban of bird-keeping, whereas the remainder expressed strong disagreement. Most informants dislike captive-bred birds because of concerns about their fighting ability, but bird-watching is popular. Our study highlights the urgent need for raising conservation awareness due to mistaken perceptions of the adverse effects of bird-keeping. Importantly, we argue that greater attention to the social requirements of the elderly might encourage bird watching in place of bird keeping. Our results also highlight the importance of incorporating the views of different stakeholders in the design and implementation of conservation management strategies.

**Keywords** Wild bird hunting · Bird keeping · Bird fights · Companionship · Ethno-ornithology · Conservation · Miao community · Guiyang city · Guizhou Province · Southwest China

## Introduction

The biocultural evolutionary relationships between humans and animals are a central component of human life (Alves and Souto 2011; Amiot *et al.* 2016) having evolved in hunter-gatherer societies for more than 99% of human history (Alves and Souto 2015; Wilson 1993). Emotional bonds with companion animals are common throughout the world (Alves *et al.* 2009; Amiot *et al.* 2016; de Oliveira *et al.* 2018), often explained by the biophilia hypothesis that posits a human tendency to make connections with other forms of life and natural processes (Kellert and Wilson 1993). Whether this inclination is due to a single instinct or a series of learned behaviors remains unclear (Wilson 1993); however, a growing body of research reveals that the keeping of companion animals has many physical (Friedmann *et al.* 1980; Friedmann *et al.* 2007; Headey *et al.* 2002), psychological (McConnell *et al.* 2011; Zilcha-Mano *et al.* 2012), and psychosocial (Guéguen and Ciccotti 2008; Schneider and Harley 2006) benefits for humans. For example, children who own pets often show greater empathy, self-esteem, and positive attitudes towards other people (Miura *et al.* 2002), and adult pet owners report reduced levels of stress, especially when they perceive their pets as family members (Wu *et al.* 2018).

However, with the development of the economy and the technology of animal breeding, companion animals are no longer limited to dogs, cats, and other domesticated animals (Amiot *et al.* 2016) but include a variety of wild animals raised for pleasure, companionship, and ornamentation in modern homes (Alves *et al.* 2016, 2019; Drews 2001; Perrin 2009), including species of reptiles, amphibians, insects, and birds.

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Given that many wild birds have attractive coloration, melodious songs and/or appealing behaviors, they have become one of the most prevalent groups of non-domesticates kept in captivity around the world, especially in East Asia and South America, amounting to more than 37% of the world's identified bird species (Alves *et al.* 2010, 2013; Burivalova *et al.* 2017; Jepson and Ladle 2009; Roldán-Clarà *et al.* 2014; Roldán-Clarà *et al.* 2017). Unfortunately, their popularity as pets has widely been recognized as one of the primary factors in sharp population declines among many species (Herrera and Hennessey 2007; Pires 2012; Tella and Hiraldo 2014). Further, population declines and even possible collapses may have cascading effects on ecosystem stability and provision of services.

One way to address the problem of overexploitation and illegal wildlife hunting is a top-down enforcement strategy (Raine *et al.* 2016). However, this has proved to be unsuccessful in many regions in reducing hunting levels and has in fact increased conflict among stakeholder groups (Jenkins *et al.* 2017). Recently, conservationists have recognized that understanding the economic and social aspects of wildlife capture and trade is important in designing sustainable management strategies to alleviate such grave threats to wildlife (Burivalova *et al.* 2017; Nielsen *et al.* 2014). Community-based measures targeted at sustainable resource use and livelihoods have been proposed that provide local communities with net incentives towards supporting wildlife conservation (Agrawal and Chhatre 2006; Agrawal and Gibson 1999; Clark *et al.* 1995; Cooney *et al.* 2017).[1]

The city of Guiyang, the provincial capital of Guizhou Province in Southwest China, has a population comprising more than 20 cultural groups, including Han, Buyi, Miao, Tujia, and Shui, representing one of the richest tribal areas in China. Among these ethnic groups, the Miao community has a long history of and reputation for keeping wild birds as pets. It is said that a pet bird is the best companion for men attending local open fairs, visiting their relatives and friends, or working in the fields. Consequently, the city has high levels of wild bird keeping and trading. Caged birds can be seen throughout the city on the tree-lined streets, in the public parks, and in urban residential buildings and rural homes. More than 200 wild bird species have been recorded on sale in the public markets, with the majority captured from the local area, and some of which are prized and fetch extremely high prices (Dai and Zhang 2017), fueling bird hunting activities throughout the suburbs and rural areas (Dai 2016).

Because of increased recognition of the relevance of formulating a feasible and effective conservation strategy that incorporates the suppliers' perspectives, a previous study investigated the socioeconomic factors underlying bird hunting and trade by conducting face-to-face interviews with local bird hunters in a market (Dai and Hu 2017). However, understanding consumer preferences and motivations for keeping pet birds are also important and remain inadequately addressed (Burivalova *et al.* 2017). We therefore conducted a study to gather this data with an ethno-ornithological approach in a historically long-established Miao community in the suburban district of Guiyang city.

We first identify the diversity of the bird species being kept and the species that are most coveted by keepers and then investigate the underlying factors for pet ownership, including biological and socioeconomic dimensions. We conducted a survey of owners' attitudes towards commonly proposed conservation measures. We conclude with a discussion of our results in terms of their implications for the design of effective conservation management strategies.

## Methods

### Study Site and Fieldwork

From September to December 2017, we carried out field investigations and interviews in a Miao village, Shitou Zhai, now situated in the sprawling suburban area of Guiyang city (Figs. 1 and S1). According to the village cadre, this village has approximately 200 households with a population of approximately 600 inhabitants, almost all belonging to the Miao cultural group. The village is embedded in a mountainous matrix, where planted crops are mainly fruit, vegetables, and corn. As many village households are on mountainsides and mountain tops, for considerations of safety we conducted our research only in the highly centralized area, which has approximately 120 families. We conducted a total of 16 visits, mostly on weekends with good weather conditions.

We selected families that kept wild birds as potential interviewees. We conducted the interviews following the International Society of Ethnobiology code of ethics. Oral informed consent was acquired from the interviewees prior to questioning. We also obtained permission from the interviewees to record our conversations with a cassette recorder or cell phone. According to the wildlife protection laws in China, it is illegal to keep wild birds without a permit from the appropriate government authority. Consequently, to enhance the success of the interviews, we approached the interviewees in a frank friendly manner, informing them of our employment and the aims of the current survey. However, the interviewees stated that they did not regard the wild bird keeping as illegal at all. This is because enforcement usually/only targeted owners who keep nationally protected species or who had more than 20 individuals.

[1] A thorough understanding of the motivations for bird-keeping and the role of wild birds in owners' lives have provided relevant suggestions for solving the problem of local bird hunting and trade in Brazil (Alves and Souto 2011; Alves *et al.* 2010; Fernandes-Ferreira *et al.* 2011).

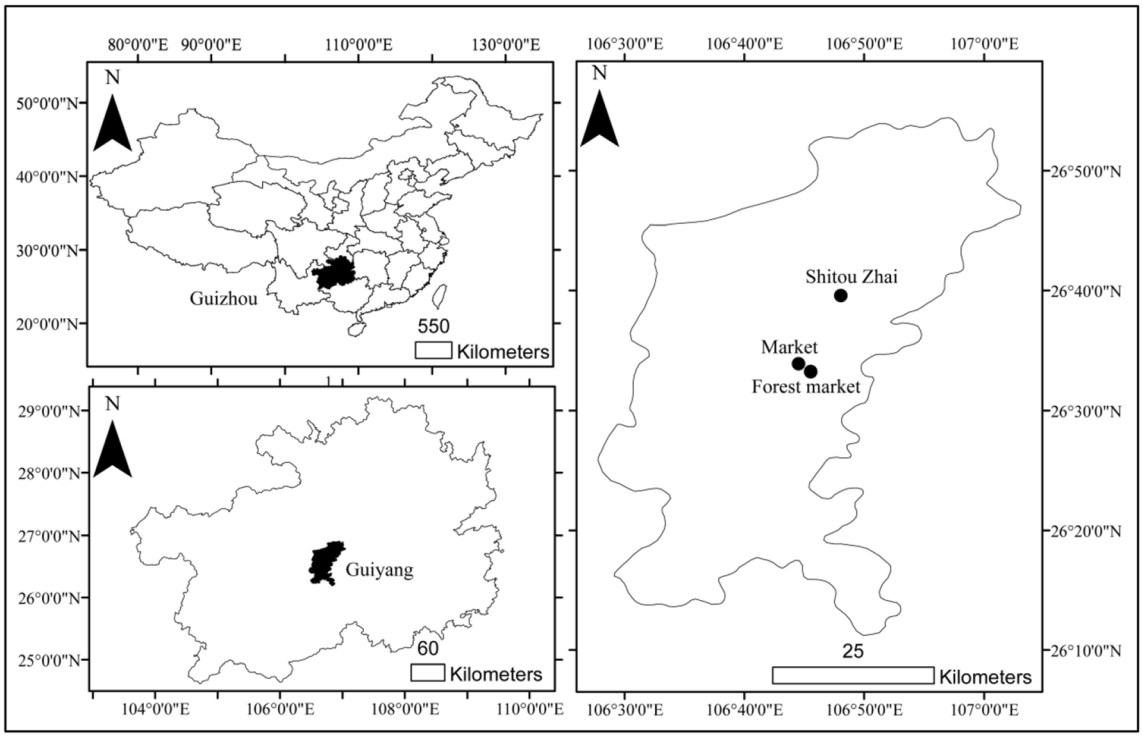


**Fig. 1** Study location of Shitou Zhai in the suburban area of Guiyang city, China, where the interviews were conducted. We also indicate the location of the market that has been investigated in previous studies (Dai and Zhang 2017; Dai and Zhang 2015) and the forest market that was used for the trade of the Chinese hwamei (*Garrulax canorus*) identified in this study

Of the 80 families we identified as keeping wild birds as pets, we were unable to make contact with 25 despite many visits. Only three families declined our request for an interview, and thus we interviewed a total of 52 bird keepers, all male. We conducted open-ended informal interviews to gather socioeconomic data including age, ethnicity, occupation, and educational background. We used semi-structured questionnaires complemented by open ended interviews and informal conversations to obtain detailed data on bird keeping, including the length of time the informant had been keeping wild birds, the species kept, and the numbers for each species, preferred species attributes for capture as pet birds, socioeconomic reasons for keeping wild pet birds, methods of obtaining a wild bird, and how they finally parted from their pet birds.

We conducted further in-depth interviews with 47 informants who agreed to the interview to evaluate in detail attitudes on commonly proposed measures to control the wild bird harvest and trade, such as strict bans on bird-keeping, promotion of bird watching, and commercially bred species as substitutes. The length of the interviews, which we conducted in the local Guiyang dialect, ranged from 30 min to nearly an hour. We identified the birds mentioned by the interviewees using a field guide for the birds of China (MacKinnon *et al.* 2000). We excluded domestic and captive-bred species.

## Data Analysis

We first analyzed the data from the open-ended interviews by a qualitative content analysis approach (Hsieh and Shannon 2005; White and Marsh 2006). We assigned descriptive codes to sections of text for each answer, and a category to the central idea. We double-checked each category to ensure that the original data supported its assignation. Finally, we recorded the number of categories and the frequency they occurred in informants' responses, and assessed the influence of socioeconomic status on the practice of keeping wild birds as pets with descriptive statistics.

We used the Spearman rank-order correlation to determine whether there is any relationship between the age of the interviewees and the number of species and individuals raised as pets, and the Mann-Whitney U test to compare the number of species and individuals raised in captivity and interviewee employment status. Using the Kruskal-Wallis H test we compared the number of species and individuals kept as pets by interviewee education levels. We tested the relationship between the ages of interviewees and the duration of captive bird ownership with the Pearson correlation. All statistical tests were performed in the corresponding algorithms in the SPSS 22 program, and the level of significance was 5% in all cases.

## Results

### Socioeconomic Characteristics of Wild Bird Owners

All informants were male, including those who declined the in-depth interviews. Except of one Han man, who had a Miao wife, all informants were ethnic Miao. Their ages ranged from 20 to 90 years old, with 59% ($n$=31) between 40 and 60 years old; 11 were between 60 and 80 years old, and only nine were younger than 40 years old. The majority (73.1%, $n$=38) were unemployed or self-employed, while most of those employed were manual workers ($n$=10). Although six informants did not report their educational backgrounds, the overall education levels were low: five had no formal education, and 22 and 15 had a primary and middle school educational background, respectively. Most interviewees ($n$=33) had kept pet birds for fewer than 10 years, but 10 had done so for more than 20 years. Only four had kept a pet bird for less than one year (Table 1).

### Preferred Bird Species

We recorded a total of 269 individual wild birds belonging to three orders, six families, and mine species kept by our informants (Fig. 2). All species are locally distributed and none are on the list of the national key protected species in China. The Chinese hwamei (*Garrulax canorus*) accounts for 56.2% of the total number (152 individuals), followed by the ashy-throated parrotbill (*Paradoxornis alphonsianus*), and the common pheasant (*Phasianus colchicus*) at 23.3% (63 individuals) and 11.8% (32 individuals), respectively, and the remaining six species account for only 23 individuals (Table 2).

**Table 1** Profiles of the interviewed keepers in the surveyed village ($n$=52)

| Ethnicity | Number | Percentage of respondents (%) |
|---|---|---|
| Miao | 51 | 98.07 |
| Han | 1 | 1.93 |
| **Employment status** | | |
| Employed | 14 | 26.93 |
| Unemployed | 38 | 73.07 |
| **Age** | | |
| Less than 40 years old | 9 | 17.3 |
| 41–50 | 15 | 28.8 |
| 51–60 | 16 | 30.8 |
| 61–70 | 8 | 15.4 |
| 71 or older | 4 | 7.7 |
| **Educational background** | | |
| Illiterate | 5 | 9.6 |
| Primary school | 22 | 42.4 |
| Middle school | 14 | 26.9 |
| High school or higher | 5 | 9.6 |
| No answers | 6 | 11.5 |

### Methods of Acquiring Pet Birds

Interviewees reported four different methods of obtaining wild pet birds (Fig. 3), and of course more than one can be employed by any individual. The most-often cited method (32 citations) is to personally capture the wild bird. Nearly half the respondents ($n$=25) stated that their pet birds were bought from the markets or from other hunters. Nine informants reported they had received their birds as gifts from friends or relatives, while one explained that he acquired his bird as a nestling that he had picked up after it had fallen from its nest due to strong wind and rain. The prices of wild birds range from 50 to 3000 Yuan, with most between 100 and 1000 Yuan. According to informants, the reasons for this substantial range depend primarily on singing and fighting attributes, with fighting ability valued more highly than singing.

### Favored Attributes of Wild Birds

Informants reported a range of favored attributes of species (Table 2). For example, 86.5% ($n$=45) explained that the Chinese hwamei is known for its wonderfully melodious singing, whereas 13.5% ($n$=7) noted its natural beauty. The crested myna (*Acridotheres cristatellus*) is valued by all informants for its ability to imitate the human voice. Of the owners of the common pheasant, a total of 83.3% declared that it has a pleasing appearance, while the remainder stated that its voice can attract other wild common pheasants. The wagging dance of the plumbeous water redstart (*Rhyacornis fuliginosus*) was cited as its key attraction.

### Motivations for Keeping Birds

Our informants reported four types of motivation for keeping birds (Fig. 4), and unsurprisingly, many mentioned more than one. Most (71.5%, $n$=36) cited the use of pet birds as fighting birds. Bird fights may involve gambling for money; however, none of our informants openly reported that this took place in the village, although most claimed that they enjoyed gathering for a bird fight. Nearly half ($n$=24) explained that they kept pet birds for companionship and to pass the time. A total of 11.5% ($n$=6) said that they raised birds because it is a common practice. And four interviewees explained that the practice is a cultural heritage of their Miao community, which has a long ancestral history of and a reputation for rearing wild birds.

### Parting with Pet Birds

Our informants reported five ways that they parted from their pet birds (Fig. 5), of which the most common (57.7%, $n$=30) is release of the birds back into the wild. Fifteen said they had sold their birds, and six said that they had presented their birds as gifts. At the same time, 16 reported that they kept their birds until they


**Fig. 2** The nine species of birds kept by owners in the village of Shitou Zhai in the suburban district of Guiyang, China. a. *Garrulax canorus. b. Paradoxornis alphonsianus. c. Leiothrix lutea. d. Acridotheres cristatellus. e.* male *Rhyacornis fuliginosus. f.* male *Melophus lathami. g. Phasianus colchicus. h. Bambusicola thoracica. i. Streptopelia chinensis.* (Photo credit: Yu Chen)

died naturally. However, four mentioned that their birds had been killed or had starved to death. The birds that had been killed were a Chinese bamboo partridge (*Bambusicola thoracica*) and a common pheasant (*Phasianus colchicus*), probably for their meat, which the informants claimed is delicious.

## Attitudes towards Conservation Measures

Unexpectedly, more than half our informants ($n$=25, total 47) supported banning the practice of keeping wild birds, although 17 objected while the remaining five made no comment (Fig. 6). Interestingly, most of those opposing the ban (12, $n$=17) were older than 55 years of age. They presented three arguments against the ban. The first claims that bird-keeping is a harmless practice that has little adverse impact for the targeted species. Several interviewees explained that most bird keepers had only a few individuals, and being in captivity did not harm birds at all. The second emphasizes the importance of pet birds as companions and as a focus of interest and passion, highlighting the complicated emotional affiliation between keepers and their birds. Finally, one informant argued that, since historically no government had forbidden its people from keeping wild birds there was no sufficient reason for a ban on raising pet birds today.

The interviewees considered commercially bred birds to have limited fighting ability, and most said keeping a commercially bred bird was unacceptable ($n$=33), although a few ($n$=10) regarded a commercial substitute a better choice since such a bird should be easy to raise and would provide other benefits in terms of human-bird emotional connections. This

**Table 2** The number of species and individuals of wild-caught birds observed in this study and their preferred attributes

| Order | Family | Species | Number | Percentage (%) | Attractions to owners |
|---|---|---|---|---|---|
| Passeriformes | Sylviidae | *Garrulax canorus* | 152 | 56.5 | Singing, fighting and attractive appearance |
| | | *Paradoxornis alphonsianus* | 63 | 23.4 | Fighting |
| | | *Leiothrix lutea* | 1 | 0.4 | Singing and attractive appearance |
| | Sturnidae | *Acridotheres cristatellus* | 8 | 3.0 | Vocalizing |
| | Muscicapidae | *Rhyacornis fuliginosus* | 3 | 1.1 | Singing and wagging dance |
| | Emberizidae | *Melophus lathami* | 1 | 0.4 | Singing |
| Galliformes | Phasianidae | *Phasianus colchicus* | 32 | 11.9 | Attractive appearance |
| | | *Bambusicola thoracica* | 6 | 2.2 | Singing |
| Columbiformes | Columbidae | *Streptopelia chinensis* | 3 | 1.1 | Not mentioned |

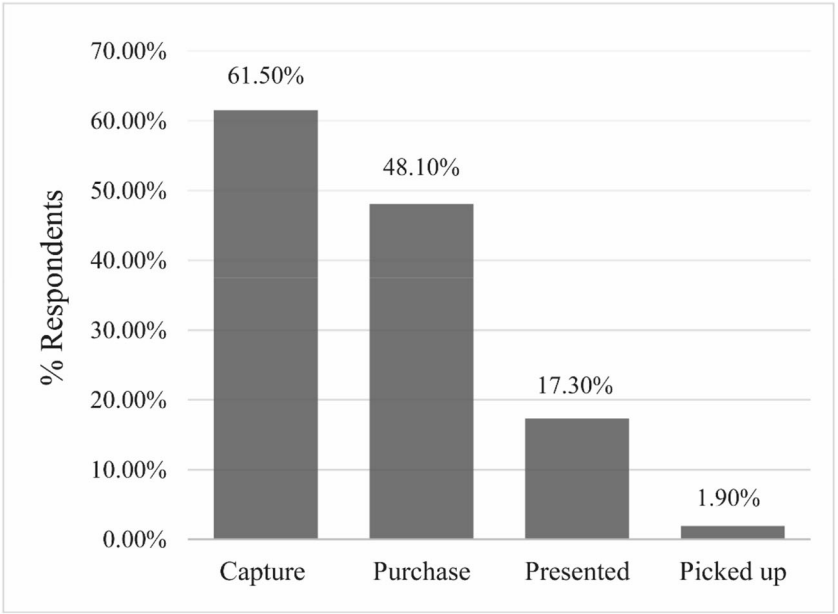


**Fig. 3** How pet birds are obtained

majority opinion reflects the fact that bird-keeping is primarily for bird fighting in this region. Four expressed no opinion on this issue. In contrast, most ($n$=36) thought that promoting bird-watching is a good measure for raising conservation awareness. Those who disagreed ($n$=10) explained that it was difficult to watch their preferred birds in the wild (Fig. 6).

### Correlation Tests

Spearman tests show no significant correlations between informants' age and the diversity of species and the number of individuals kept (both cases: $P$>0.05). Similarly, neither the number of species nor the number of individuals are influenced by employment status (both cases: P>0.05). Furthermore, statistical tests indicate that there is no significant difference between education levels and the number of species and the number of individuals (both cases: P>0.05). However, a significant correlation was observed between length of time birds have been kept and the age of owner (r= 0.374, $P$<0.01).

## Discussion

While our survey identified nine species among 269 individuals of wild-caught birds kept by our 52 informants in the

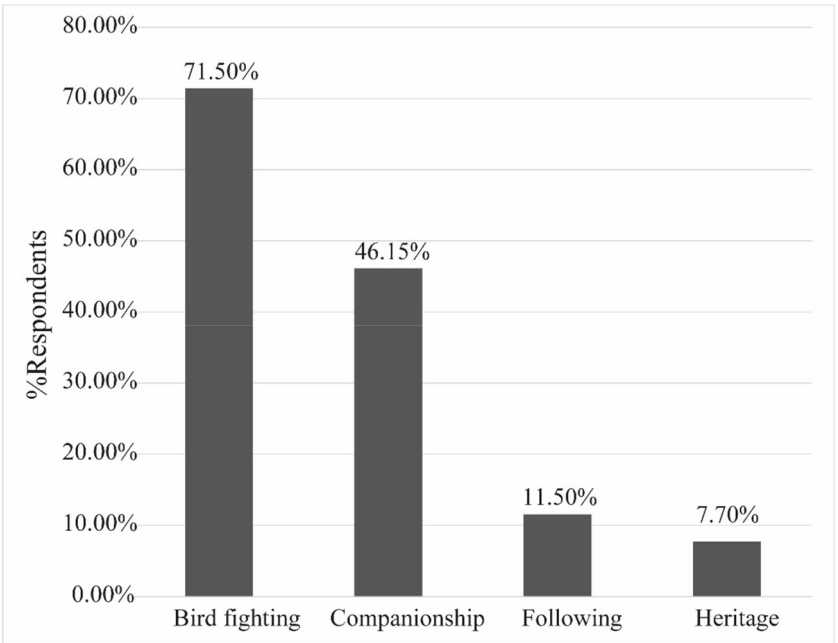


**Fig. 4** Motivations for keeping of wild birds

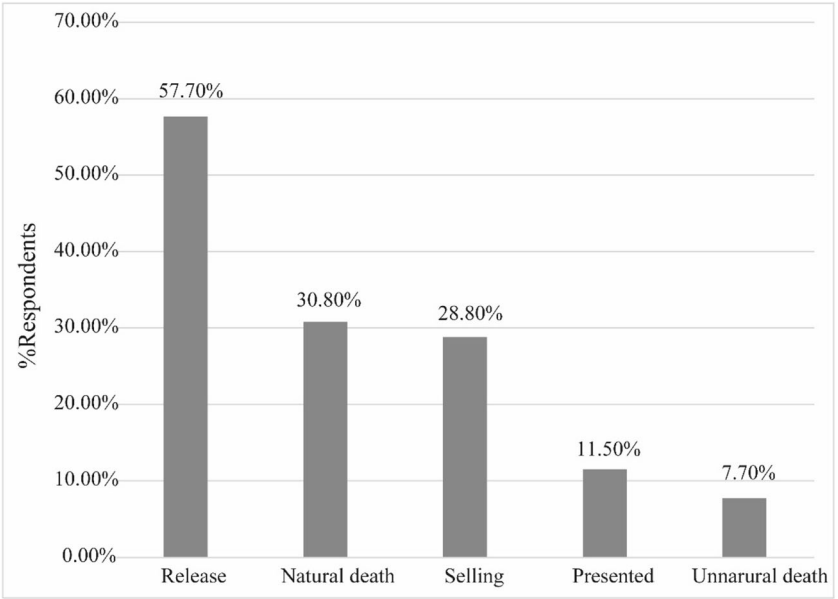


**Fig. 5** Parting with pet birds

predominantly ethnic Miao urban-rural fringe village, in fact the number of birds kept in the village is far greater. During the survey periods, we observed that owners often put their pet birds outside in good weather. In addition, it is possible to hear singing or vocalisations of pet birds in houses from the street during the day. We were thus able to conclude that at least 80 families in the survey area kept birds, indicating that nearly 67% of households kept wild birds. As the village has 200 families, we estimated that at least 133 families owned pet birds. Considering the average number of birds kept by the interviewees, it is reasonable to estimate the total number of birds kept by households in the village at 687 individuals (ranging from 586 to 788).

Our finding that the number of individuals kept varied significantly among species differs from reports from Brazil (Alves *et al.* 2010; Licariao *et al.* 2013), where the number of species in captivity was much higher and the number of individuals was relatively similar among caged species. However, our results indicate that the local preference for wild pet birds varied substantially among different species, which consequently face significantly different levels of hunting pressure. According to our interviewees, the Chinese hwamei is undoubtedly the most popular and thus the most hunted species in this region. Informants claimed that they have to travel further to capture Chinese hwamei compared to the past, and the "good" birds, i.e., those with superior fighting or singing abilities, are becoming increasingly difficult to find.

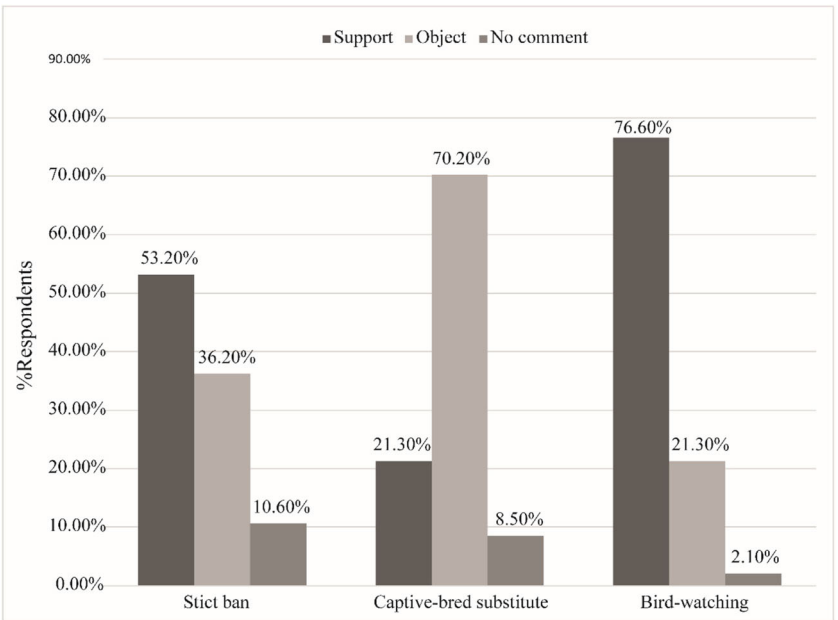


**Fig. 6** Attitudes towards three commonly proposed conservation measures among informants

We found that the dominant species kept in the village differ from those being sold in the market. According to previous investigations conducted in a market selling birds (Dai and Zhang 2015; Dai and Zhang 2017), the ashy-throated parrotbill was the most traded bird; the estimate of the number birds traded per year was far higher than that of the Chinese hwamei. This difference may be explained by spatial variations in local preferences for species of pet birds. For example, the people in our survey village may prefer to keep the Chinese hwamei as a pet. However, it is also possible that the data in the earlier reports (ibid.) reflected the circumstances of only that single market but not the city in general. Having established where our informants had purchased their pet birds we were able to locate the only market that trades the Chinese hwamei, where more than a thousand specimens were observed on sale on weekends in a forest at a distance of 3 k from the bird market investigated earlier reports (ibid.) (Fig. 1), which our informants explained is too small to satisfy so many potential traders. Thus, it is clear that the Chinese hwamei is currently under intense hunting pressure and that urgent conservation efforts are needed.

## Bird-Keeping Culture and Bird Fighting

Our informants indicated that the Miao community has a deep-rooted cultural tradition of keeping wild birds as pets, as also reported for Brazil (Alves *et al.* 2009, 2010; Licariao *et al.* 2013). One of the practices they enjoyed was the use of pet birds as fighting birds, which was the most cited motivation for bird-keeping given by informants. As a consequence, trading of the ashy-throated parrotbill, a small and rather undistinguished bird, has recently increased substantially in the city of Guiyang (Dai and Zhang 2017) since it is aggressive and can be used as fighting bird one or two months after capture. It is also abundant and easy to capture, unlike the Chinese hwamei, which has become rarer in recent years but must also be raised for more than two years after capture if it is to be used for bird fighting.

Bird fighting may involve gambling for money; however, none of our interviewees referred to using their birds for this practice. They reported a long history of bird fighting in the Miao community as a highlight of celebrations or ceremonies. In this village, bird fighting is an important component of the Tiaochang Festival (the Jumping Ground Festival), which is held every year from 24 to 26 February of the lunar calendar, and attracts many bird owners to watch and participate in the fights. People who engage in bird fighting may enhance both their economic and social capital (Portes 1998). This presents a challenge to reconcile the persistence of local ethno-cultural diversity with the sustainable use of wild birds that urgently needs to be addressed.

## Connections between the Keepers' Age and Pet Bird Ownership

Our results indicate that bird keepers aged between 40 and 60 years old accounted for 59.6% of our sample ($\chi^2$ =28.23, df = 6, $P$<0.0001). Most of the interviewees in this group claimed that they have plenty of free time and secure livelihoods as a consequence of the nationalization in recent years of the farm lands formerly planted by the villagers, who received a considerable compensation payment. Therefore, most of villagers can live comfortably without need of employment.

The local lack of entertainment or the difficulty of participating in it has made keeping a pet bird a favored recreation in the survey village. These keepers usually assemble in a peaceful area of forest in the mornings or afternoons in good weather, bringing their pet birds during non-molting stages and hanging their cages together from the trees. While the pet birds vocalize and sing, their keepers are also able to socialize. Our informants in this group stated that this was a very pleasant and convenient way to pass their free time, enabling them to form relationships with their neighbors and to get some exercise. These physical, psychological, and social benefits have also been highlighted in studies on pet ownership (Gee and Mueller 2019; Krause-Parello *et al.* 2019; Wells 2019). In addition, we found a significant correlation between the ages of the keepers and the time they spend on bird keeping, indicating that once they start to raise birds they become increasingly dependent on their pet birds as they age, since they can fill social gaps experienced by older people as their social networks decrease (Enders-Slegers and Hediger 2019).

## Conservation and Social Implications

Bennett (2016) has suggested that local perceptions can contribute to the success of conservation management strategies. In addition, Rist *et al.* (2010) note that hunter-reported monitoring has proved to be an accurate and powerful tool to detect the status of wildlife resources. Since it is apparent from our study that bird hunters and expending increasing time and energy searching for their desired species, it seems unlikely that they have not impacted local populations (Dai and Hu 2017). In light of this and the findings of earlier studies it is clear that substantial conservation efforts are urgently needed (Dai 2016; Dai and Hu 2017; Dai and Zhang 2015; Dai and Zhang 2017).

One of the widely recognized challenges to wildlife conservation is to reconcile the needs of local human populations and wildlife management strategies. Without informed and engaged local support, strategies to enhance conservation have frequently been shown to be not only ineffective but also unenforceable (Cooney *et al.* 2017; Massé *et al.* 2017). For example, in China, it is illegal to capture wild birds without a

hunting permit from the government according to the laws on wildlife protection. However, none of our informants had a permit but nonetheless often harvested wild birds, likely due to insufficient enforcement and/or punishment.

The promotion of commercially bred substitutes has been suggested to address the problem of wild bird hunting and trade regulation (Cooney and Jepson 2006; Jepson and Ladle 2005; Jepson and Ladle 2009). However, these captive-bred equivalents may have limited impacts on the alleviation of hunting pressure due to higher prices and poorer song quality compared to wild-caught birds (Alves *et al.* 2010; Burivalova *et al.* 2017). In our survey village, most keepers also disliked commercially bred birds due to a perception of decreased fighting ability. Consequently, we conclude that commercially bred birds will become acceptable substitutes for wild-caught birds only if the breeders are able to produce birds characterized by excellent fighting ability. Given the success of specialized breeding of domestic chickens for fighting (as we observed in the village, the fighting chickens have long necks, long legs, and few feathers), it is possible to produce such birds of the most coveted species. Additionally, our results indicate that promoting bird-watching (Fernandes-Ferreira *et al.* 2011) is a feasible solution, as most of the interviewees agreed this suggestion was an acceptable substitute for bird-keeping. However, specific attention should be paid to the sites selected for bird-watching due to the difficulty some informants claimed to have sighting their preferred birds. One of the most amenable areas may be wetlands and their neighboring ranges, which are inhabited by many bird species including water birds that are readily visible.

As noted above, bird keeping is related to the age of the keepers. The middle-aged and elderly are the primary groups, with a trend of higher age and a long history of bird-keeping activity. This phenomenon may be attributed to the improvement of material well-being along with a decrease in social networks with age. We argue that greater attention should be paid to the establishment of venues where the elderly can interact with their neighbors and that provide diversions or pastimes the engage their imaginations.

Lastly, raising conservation awareness is urgently required to alert bird keepers to the impacts on wild bird populations. Our informants claimed that the keeping of one or two individuals of a species by each owner has little negative effect on the species, as they do not hurt the birds at all; this argument was especially popular among the owners who reported that they freed their birds to the wild. However, they may fail to recognize that numerous bird owners do not do this, and more importantly, the fact that these released birds are unlikely to produce offspring or even survive in the wild after a lengthy period of time in captivity.

## Conclusion

Our ethno-ornithological study recorded many caged wild birds in a Miao ethno-cultural community in the suburbs of the city of Guiyang, Southwest China. The bird keepers keep several different species as pets according to their preferred attributes, such as fighting ability or melodious singing, but have a particular preference for Chinese hwamei, which are now suffering considerable hunting pressure. The practice of bird fighting was the main reason cited for keeping wild birds. However, this activity was valued more as a cultural heritage with a long history in this community rather than an opportunity for gambling. The majority of bird keeps are middle-aged and elderly men, former farmers whose land has been nationalized and for which they were paid sufficient compensation to allow them to retire. Since there are few local sources of recreation or entertainments, they describe bird keeping as providing companionship and a focus of interest. As their social networks decrease with age, excursions to pleasant areas in the forest with their caged birds in good weather provide opportunities for exercise and interaction with their neighbors.

Although we did not undertake a systematic assessment of the impacts of the rates of capture of bird species on their populations in the wild, it is clear from our informants' accounts of the increasing difficulty of locating, for example, the widely favored Chinese hwamei, indicate that their populations are under pressure. Technically, there is a complete ban of keeping wild birds in China, but lack of enforcement has rendered this ineffective, and some of our informants were unaware of its existence. In light of our findings of the important role bird keeping plays for the psychological well-being of middle-aged and elderly men, we recommend the government and appropriate agencies do more to address the social and psychological needs of elderly (Krause-Parello *et al.* 2019). This issue may become increasingly critical owing to the current aging population trend in China. Thus, we argue that captive-breeding of particularly favored species may be a more effective way of easing pressure on wild bird populations, but this will be successful only if breeders are able to produce birds that will satisfy keepers' preferences, for example, a Chinese hwamei with excellent fighting ability. At the same time, conservation awareness should not be neglected, with a focus on the scope of negative impacts on wild birds and the ecosystem as a result of bird-keeping.

Our results also indicate the importance of incorporating the interests of multiple stakeholders in the decision-making processes of conservation management. For example, the motivations of bird keepers, who capture birds for their personal pleasure are quite different from those of bird hunters who seek to supplement their income through the sale of birds in the market (Dai and Hu 2017). We should also point out that our study involved only a small number of keepers in a small

rural/suburban community in a large urban conurbation. Our informants were reticent about the importance of bird fighting for the purpose of gambling, emphasizing its importance as a cultural tradition. However, bird fighting expressly for gambling is common in Guiyang city (Pers. obs.) and would require a completely different approach to advocating and implementing conservation measures. We strongly recommend future research targeted to all the stakeholders, including conservation experts, government officials, local bird traders, and bird keepers, as well as the general public.

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## Compliance with Ethical Standards

**Informed Consent** We performed the interviewing process following the International Society of Ethnobiology code of ethics. All the participants were informed of the process and nature of this project and asked to provide oral informed consent. We also obtained the permissions to record conversations with the interviewees by a recorder or cell phone. Research was approved by the Guizhou Normal College.

**Conflict of Interest** The authors declare that they have no conflict of interest.

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