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A CASE STUDY ON THE PUBLIC KNOWLEDGE AND AWARENESS OF THE PHILIPPINE PANGOLIN *MANIS CULIONENSIS* (MAMMALIA: PHOLIDOTA: MANIDAE)

Frances Mae Tenorio & Joselito Baril

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A CASE STUDY ON THE PUBLIC KNOWLEDGE AND AWARENESS OF THE PHILIPPINE PANGOLIN *MANIS CULIONENSIS* (MAMMALIA: PHOLIDOTA: MANIDAE)

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Abstract: Pangolins are poorly known species despite their high demand in the illegal international trade. This study has been conducted to analyze the awareness of Filipinos towards the endemic Philippine Pangolin *Manis culionensis* and how much they would be willing to contribute to its conservation. The respondents were selected from the social media reach of the researchers. The results showed that most of the respondents know about the pangolin from mass media such as news from television. Social media is also a factor in their awareness of the animal. They unanimously agreed that pangolins are important ecologically rather than its medicinal value in the illegal market trade. Overall, the respondents showed a high degree of knowledge of pangolins and have favorable attitudes towards its conservation.

Keywords: Conservation, *Manis*, social media, trade.

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Author contribution: FMT conceptualized and designed the study, gathered data, performed statistical analysis and interpretation, wrote the draft and revisions of the manuscript. JB provided revisions to the scientific content and is the adviser of the study.

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INTRODUCTION

There are only eight extant species of pangolins in the world (Lim & Ng 2007). Unfortunately, all pangolin species are in high demand for international illegal trade, most especially in China, making them the most visible and most voluminous mammals in trade. They are traded for skin (leather goods like boots and shoes), scales (traditional medicine), and meat (food and traditional medicine) (Schoppe & Cruz 2009).

Among the eight species, only one species is found in the Philippines. The Philippine Pangolin *Manis culionensis*, locally known as Balintong, is endemic to the Palawan faunal region (Lagrada et al. 2015). It occurs in lowland primary and secondary forests, grassland/secondary growth mosaics and mixed mosaics of agricultural lands and scrubland adjacent to secondary forests (Esselstyn et al. 2004; Heaney et al. 1998). It is currently classified as Endangered by the IUCN Red List (2015) and under Appendix I of the Convention on the International Trade of Endangered Species of Flora and Fauna (2016) (CITES). Currently, there is an increase in the demand in the local trade for live pangolins. In November 2017, two individuals were found in Manila and taken into custody by the Biodiversity Management Bureau (BMB). This year, five individuals were found again in Manila and were surrendered to BMB. All individuals were allegedly caught to be sold as delicacy for private individuals (Sy pers. comm. 05 March 2018).

Conservation in the Philippines is inextricably linked to social and political issues. The country was long under colonial rule, and its natural resources were traditionally controlled by the elite and powerful, whose unsustainable and inequitable exploitation devastated the environment and marginalized the poor (Broad & Cavanagh 1993; Pineda-Ofreneo 1993). But considerable progress in environmental protection legislation has been made, driven in part by public advocacy. Of significance to biodiversity conservation are the National Integrated Protected Areas System (NIPAS) Act of 1992, the establishment of protected areas, and the 2002 Wildlife Resources Conservation and Protection Act. At the international level, Philippines is one among the signatories to the Convention on Biological Diversity and other agreements such as CITES, and the Ramsar Convention on Wetlands (Posa et al. 2008). With the on-going efforts of the government and conservation groups, public interest in biodiversity conservation has increased.

In 2017, Gamalo et al. conducted a case study on the Philippine Wildlife and wildlife laws' awareness in

tertiary education. In the study, it was found that the Philippine Pangolin is among the endemic wildlife which were poorly known to the students. Since the decline of pangolin populations is due to anthropogenic pressures such as illegal trade, poaching, and deforestation, it is important to determine the public knowledge and perception towards the animal. Thus, this study is aimed at determining the public knowledge on the Philippine Pangolin and their awareness of the plight of this poorly studied species. It is also aimed to identify the willingness of the public to participate in the conservation of pangolins. The data collected will help in creating a suitable campaign and awareness programs for the Philippine Pangolin.

METHODS

An online survey, created through Google forms, was used for the collection of data. Google forms was selected since it is easy to operate, and the survey generated can be easily answered by the respondents. The survey was disseminated via Facebook and Twitter. The survey was opened online and shared for one month to allow a large number of respondents to access the survey. A total of 169 respondents from various regions all over the Philippines answered the survey. These respondents were from regions where no pangolin is found. It should be noted, however, that the respondents from this survey were selected from the researchers' social media reach and does not reflect the general populations' knowledge and awareness about the Philippine Pangolin.

The survey questionnaire is composed of 14 questions which is divided into three sections: knowledge on pangolins, awareness on laws protecting the pangolin, and willingness to participate in conservation activities related to the Philippine Pangolin.

All statistical analyses were done using R Studio version 3.4.3 (R Core Team, 2018). Percentage was taken using package 'prettyR' (Lemon & Grosjean 2018).

RESULTS

Out of the 169 respondents, a total of 83 males and 86 females answered the online survey on pangolins (Table 1). Most of the respondents were aged 21–30 years. Majority of the respondents had attained tertiary level education (66.3%). Based on location, 49.1% are from National Capital Region (NCR), while 23.1% are

Table 1. Demographic characteristics of respondents (n=169).

	Category	Overall %
Gender	Male	49.11
	Female	50.89
Age	12–20	28.67
	21–30	51.48
	31–40	14.2
	41–50	2.96
	51 and above	2.37
Educational Attainment	Secondary	12.13
	Tertiary	66.27
	Post graduate (MS)	18.24
	Post graduate (PhD)	2.37
Region	NCR	49.11
	Region IV-A	23.08
	Region III	10.06
	Region IV-B	4.14
	Region V	2.37
	Region VI	2.37
	Region XIII	2.37
	Region VII	1.78
	Region XI	1.78
	Region XII	1.18
	CAR	0.59
	Region IX	0.59
Monthly income	Not applicable	40.24
	10,000 PHP and below	10.65
	11,000 – 20,000 PHP	17.75
	21,000 – 30,000 PHP	15.98
	31,000 – 40,000 PHP	6.51
	41,000 – 50,000 PHP	2.96
51,000 and above	5.92	

from Region IV-A (CALABARZON) and 10.1% are from Region III (central Luzon).

Knowledge of pangolins

Majority of the respondents (74.56%) claimed to know the animal shown in the survey; the popular answers included the pangolin and armadillo (Table 2). The respondents were also asked whether they knew what the animal in the photo ate. Many of the answers included insects, ants, and termites. In terms of encounter, the respondents were more likely to encounter a pangolin on the internet, television,

Table 2. Respondents' answers to whether they know the animal in the photo or not (N=169).

	Overall %
Yes	74.56
No	25.44
Pangolin	63.90
Armadillo	11.24
Philippine pangolin	7.69
Palawan pangolin	3.55
Anteater	2.96
Porcupine	1.18
Balintong	0.59
I don't know	2.37

Table 3. Respondents' answers to whether they think a pangolin is beneficial or harmful (N=169).

	Overall %
Yes, it is beneficial	99.41
No, it is harmful	0.59
Ecological	87.57
Cultural	4.14
Medicinal	1.18
Don't know	7.1

educational materials, and through Facebook.

Many stories and myths generated from the relationships between animals and man had been passed on from generation to generation (Setlalekgomo 2014). Based on the responses, it was found that medicinal use is the most widely known belief associated with pangolins. Setlalekgomo (2014) noted that pangolins were used as bush meat and different body parts of pangolins were used in traditional medicine by indigenous people. Pangolins were used in traditional medicine to cure several human ailments as well as being used in charm making. The respondents, however, unanimously agreed (99.41%) that the pangolin is beneficial due to its ecological role in the environment (87.57%) (Table 3).

Awareness on laws protecting pangolins

Several of the respondents have noted that they have seen a pangolin being traded (19.53%) by adults. It was made clear in this study that the respondents know that this animal is protected by law (85.8%) through their educational background and knowledge of the laws on wildlife and its trade (68.64%).

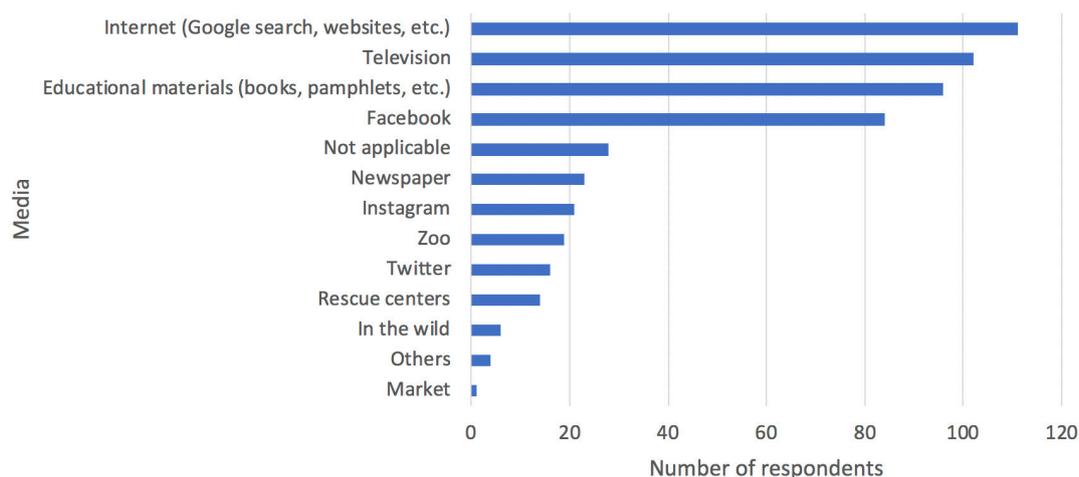


Figure 1. Media where the respondents saw a pangolin

Table 4. Respondents' answers to participate in conservation activities (N=169).

		Overall %
Willingness to donate	Yes	91.7
	No	8.3
	In kind	68.6
	Monetary	31.4
Willingness to volunteer	Yes	94.08
	No	5.92
	Awareness through social media	78.1
	Educational campaigns	60.9
	Research	59.2

Willingness to participate in conservation of pangolins

The respondents were willing to donate in kind to the conservation of pangolins. Majority of the respondents were willing to volunteer to conserve pangolins (94.1%) through awareness on social media platforms, educational campaigns, and research (Fig. 1).

DISCUSSION

Communication has been used throughout human history to impart information, teach skills, influence attitudes and perceptions, moderate debate and disagreement, create connections between individuals and groups, inspire new ideas, and facilitate cultural and behavioral changes (Anderson-Wilk 2009). It is often cited for its role in creating change (King 2003; Rogers 2003). At the core of a conservation movement is a

communication movement. This is primarily because conservation requires change, and change requires communication (Anderson-Wilk 2009). Communication can be channeled through mass media such as television and radio, literature such as articles and books, and social media. Media particularly television has the largest impact on the familiarity of respondents with wildlife. Television shows on channels such as National Geographic, Discovery Channel, Animal Planet, BBC Earth, Born to be Wild and local and international news feature wildlife. Mass media often targets a wide range of audience and is effective at creating initial awareness and interest (FAO 2006).

The high degree of knowledge of the respondents shows that the use and influence of electronic media such as television and internet have a positive impact on the knowledge on pangolins. According to Brossard & Scheufele (2013), the news media portrayal of wildlife is related to public conservation awareness and shows good or positive content of intervention information. This may strengthen environmentally-favorable behavior, thereby increasing the public's knowledge on biological conservation (Shiffman 2012; Fauville et al. 2014; Bombaci et al. 2015; Minin et al. 2015). The news media have different types of coverage and portrayal of wildlife issues (Muter et al. 2013), which could direct the public's attitudes towards conservation (Wu et al. 2018). This is shown by the high number of respondents knowing that the pangolin is an animal that should be protected and conserved.

Creating a conservation education movement to connect between people with nature is not easy (Abd Mutalib et al. 2013). Finding a balance between monetary values with conservation value might be

difficult, and requires an in-depth understanding of the aspects such as carrying capacity, demographic structures, and conservation interests (Humavindu & Stage 2014). Social demographics such as age, gender, level of education, monthly income and years at residence play an important role in the determination of the level of awareness towards wildlife, and often act as behavioral predictors (Thornton & Quinn 2009; Loyd & Miller 2010; Mahmood-ul-Hassan et al. 2011; Shumway et al. 2014). In this study, however, social demographics do not have any implications on the knowledge and awareness on pangolins based on the age, educational attainment and monthly income of the respondents.

Social media such as Facebook shows that social media is a great tool in spreading knowledge and awareness on pangolins. Currently, there are 47 million active users of Facebook in the Philippines. Convenient social platforms such as Facebook are believed to have a great power in impacting on public awareness on wildlife conservation. In fact, studies have shown that even conservation science information extracted from professional conferences can be delivered to more audience via social media forums such as Twitter (Shiffman 2012; Bombaci et al. 2015; Wu et al. 2018). The data on social media can potentially play an important role in conservation since it can be used to learn more about the spatio-temporal patterns, values, and activities related to biodiversity conservation of different groups of people. Moreover, social media can directly target specific citizen science campaigns (Minin et al. 2015).

Citizen science is defined as the practice of engaging the public in a scientific project – a project that produces reliable data and information usable by scientists, decisionmakers, or the public that is open to the same system of peer review that applies to conventional science (McKinley et al. 2017). Citizen scientists can spread knowledge among their friends, family, and colleagues by sharing their citizen science activities and discussing the issues (Nerbonne & Nelson 2004; Overdeest et al. 2004; Johnson et al. 2014; Forrester et al. 2016) on pangolins. The respondents were willing to volunteer out of moral obligation, gaining knowledge, passion and compassion towards animals, satisfaction, advocacy, and research background. They chose volunteering to raise awareness through social media because of its wider audience capacity, low-cost effectiveness, viability, and easy use.

Respondents were likely to conserve and protect pangolins due to its ecological importance, endemism,

rarity, intrinsic value, inherent value, aesthetic value, economic benefits through ecotourism, cultural value, and conservation status. The respondents also believe that pangolins are needed to maintain biodiversity and are equally important species that needs conservation to prevent extinction.

According to the respondents, awareness through dissemination of information via social and mass media, and seminars and orientations, baseline research, protection of natural habitat, and strict enforcement of law are the programs needed to protect and conserve pangolins.

CONCLUSION

Public awareness on wildlife is essential to the effectiveness of wildlife conservation and protection. The respondents were well aware of the Philippine Pangolin and had favorable attitudes towards wildlife protection and conservation. The awareness on wildlife were most likely due to mass media and social media. This implies that these media should be used by conservationists and conservation groups to promote and disseminate information regarding wildlife.

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– Ganesh Ghimire, Malcolm Pearch, Badri Baral, Bishnu Thapa & Rishi Baral, Pp. 14576–14581

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Dhole *Cuon alpinus* (Mammalia: Carnivora: Canidae) rediscovered in Bardia National Park, Nepal

– Shailendra Kumar Yadav, Babu Ram Lamichhane, Naresh Subedi, Ramesh Kumar Thapa, Laxman Prasad Poudyal & Bhagawan Raj Dahal, Pp. 14582–14586

Observations of Brown Mongoose *Herpestes fuscus* (Mammalia: Carnivora: Herpestidae) in the wet evergreen forests of the Western Ghats, India

– Vignesh Kamath & Kadaba Shamanna Seshadri, Pp. 14587–14592

Further studies on two species of the moth genus *Paralebeda Aurivillius* (Lepidoptera: Bombycoidea: Lasiocampidae) from northwestern India

– Amritpal Singh Kaleka, Devinder Singh & Sujata Saini, Pp. 14593–14598

The genus *Grewia* (Malvaceae: Grewioideae) in Andaman & Nicobar Islands, India with a conservation note on the endemic *G. indandamanica*

– K.C. Kishor & Mayur D. Nandikar, Pp. 14599–14605

Three grasses (Poaceae), additions to the flora of Andhra Pradesh, India

– Anil Kumar Midigesi & Boyina Ravi Prasad Rao, Pp. 14606–14611

Ethnobotanical survey of indigenous leafy vegetables consumed in rural areas of Terai-Dooars region of West Bengal, India

– Mallika Mazumder & Anup Kumar Sarkar, Pp. 14612–14618

Australasian sequestrate Fungi 20: *Russula scarlatina* (Agaricomycetes: Russulales: Russulaceae), a new species from dry grassy woodlands of southeastern Australia

– Todd F. Elliott & James M. Trappe, Pp. 14619–14623

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The Himalayan Crestless Porcupine *Hystrix brachyura* Linnaeus, 1758 (Mammalia: Rodentia: Hystricidae): first authentic record from Bangladesh

– Mohammad Ashraf Ul Hasan & Sufia Akter Neha, Pp. 14624–14626

A new distribution record of *Asplenium scalare* Rosenst. (Aspleniaceae) in India

– Periyasamy Vijayakanth, Jaideep Mazumdar, S. Sahaya Sathish, Veluchamy Ravi & Ramachandran Kavitha, Pp. 14627–14628

Response & Reply

Response to spiders of Odisha: a preliminary checklist additions to the spider checklist of Odisha

– John T.D. Caleb, Pp. 14629–14630

Reply to response: spiders of Odisha

– Sudhir Ranjan Choudhury, Manju Siliwal & Sanjay Keshari Das, Pp. 14630

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