WHAT ARE THE PERSPECTIVES ON SOCIAL MEDIA SURROUNDING CIVET COFFEE (KOPI LUWAK) AND HOW DO THESE ATTITUDES AFFECT ASIAN PALM CIVET WELFARE AND CONSERVATION?

Presented by

Katheryn Alice Stone

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Abstract

Asian palm civets face a variety of threats, one of which, the production of civet coffee is of higher concern as it is vast and has such profound effects on civet welfare. Thus, in the interest of conservation for this species and plant biodiversity in the areas where they reside, changes need to be made to civet coffee production methods in a way that results in a mutually beneficial existence between civets and locals. This study used Instagram analysis to analyse 140 posts from 7 hashtags from October to December of 2018 and 2019. The main findings were that there was an increase in civet coffee popularity and likability, the year the post was uploaded is not associated with civet welfare score and there were no significant differences in the amount of likes given to a post depending on civet welfare score. The results reflect that due to a rise in civet coffee production to meet demand more civets are being wild caught and kept in unchanging welfare conditions whilst the welfare is largely going unnoticed by tourists and Instagram users alike.

1 Introduction

Common palm civets, otherwise known as Asian palm civets, Luwaks (in Indonesia) or toddy cats (Menon, 2014) are a mostly arboreal species with an overall black, brownish black or cream body colour adorned with spots which blend into stripes on their sides and grey coloured faces with a dark mask and patternless tails. They are a member of the viverridae family (Wicker, Canfeild & Higgins, 2016) and are an integral seed dispersal species (Nakashima, et al., 2010a; Nakashima, et al., 2010b; Nakashima & Sukor, 2010) occupying a range of habitats (Malla, et al., 2019; Duckworth, 1997; Aroon, et al., 2012). These versatile creatures are also known to settle in human populated areas (Corlett, 1998), (Nakashima, et al., 2010a), (Su & Sale, 2007), (Grassman, 1998) where they live on rooftops, in attics (Menon, 2014) and on terraces (Jothish, 2011). Seeds found Asian palm civet faeces have high germination rates (Jothish, 2011) of over 90% (Khan, et al., 2019) which is part of the reason that this species needs protecting.

1.2 The Process of Coffee From Bean to Cup

For at least 1200 years human society has valued coffee, a substance that is second, only to oil, in value (Bae, 2014; Esquivel & Jimenez, 2012). It has become part of daily life (Bonita, et al., 2007) and it is universally used for leisure, improvement in performance and as a social activity (Bae, 2014) as well as being recognized for its health benefits.

Despite coffee having an addictive effect and a negative impact on health and sleep (Chou, 1992; Lewin, Giovannucci & Varangis, 2004) its popularity has recently been increasing (Ramalakshmi & Raghavan, 1999; Lewin, Giovannucci & Varangis, 2004).

Internet growth and consumer culture globalization, as well as the coffee's sought-after bitter flavour, encouraged global consumption and coffee shop expansion (Ramalakshmi & Raghavan, 1999; Tucker, 2017). Interestingly, less 45-54 year-olds may prefer sweetened coffee than 18-24 year-olds (Mintel, 2010 cited in Mintel Press Team, 2010). This is supported

by Mennella & Bobowski (2015) who also found consumption and preference of sweetness declines with age and could be linked with a child's greater need for calories (Coldwell, Oswald & Reed, 2009).

A few coffee varieties are more well-known, for example, Tanzanian peaberry, Hawaiian Kona, Jamaican Blue Mountain and Civet coffee (Marcone, 2004).

The fascination for civet coffee comes from its taste, texture and production method (Chan & Garcia, 2011) and although there is also elephant coffee and Brazillian Jacu coffee they have not become so popular (Hii, C. & Borém, F., 2019); Sanz-Uribe, et al, 2017).

Coffee beans are found inside coffee cherries from plants cultivated in over 80 countries (Chan & Garcia, 2011). In order to get civet coffee, a civet first ingests the coffee cherries so they pass through their digestive system, the coffee beans are then altered by digestive enzymes, in particular proteolytic enzymes that break down proteins (Hii, & Borém, 2019; McCamey, Thorrpe & McCarthy, 1990) and then excreted in their faeces to be collected and washed by people (Chan & Garcia, 2011). This process is known as bioprocessing (Marcone, 2004). Civet coffee is said to be one of the rarest and most expensive coffees in the world (Jumhawan, et al., 2016; Marcone, 2004), with the main producer being Indonesia (Shepherd, 2012) but the Philippines, Ethiopia, East Timor, Vietnam and Thailand also produce it (D'Cruze, et al., 2014). The common palm civet is the most common civet species used for kopi luwak production due to the presence of coffee cherries in their natural diets, the species perceived high numbers in Indonesia and the lack of legal protection they are given there (Sanz-Uribe, et al, 2017; Shephard, 2012).

Traditional methods of civet coffee production involved workers finding the coffee cherries in the faeces of wild civets who would naturally choose the best coffee cherries to eat, thereby ensuring bean quality (Marcone, 2004; Chan & Garcia, 2011). Unfortunately, civet coffee has become progressively more fashionable and research has yet to capture the impact of this increased demand on the population of wild Asian palm civets (Shepherd, 2012) and due to the large price gap between normal coffee and civet coffee there have been fraudulence with

mixing cheaper types of coffee in with the kopi luwak (Jumhawan, et al., 2016; Jumhawan, et al., 2015). Identification methods using human senses (Wei, et al., 2014), (Nebesny, E. & Budryn, G., 2006) lack precision (Wermelinger, et al., 2011) so on the basis of findings such as those by Chan and Garcia (2011) identification method based on biochemical markers via metabolomics can be used (Jumhawan, et al., 2015; Jumhawan, et al., 2016) to find which coffee blends have debased the civet coffee.

1.3 Social Media and Wildlife Trade

Instagram was launched in October of 2010 (Blystone, 2019) and since then has increased its monthly users from 90 million in 2013 to 1 billion in 2018 (Clement, 2019), most of whom are in the US (120 million) but also in Indonesia (64 million), Thailand (13 million) and the Philippines (11 million) where civet coffee is produced (Clement, 2019; Shepherd, 2012; D'Cruze, et al., 2014).

Due to the increase in internet accessibility and social media use, growing volumes of online wildlife trade have been observed (IFAW 2018). In 2017, UK social media made up 10% of all trade in threatened and endangered animal related products. Of this Instagram was responsible for 3.94% and were the 8th most used platform for wildlife trade (ibid).

Instagram has become part of the Global Coalition to End Wildlife Trafficking Online (IFAW 2018) and alerts users that certain hashtags may support activities with negative consequences for animals or people (Instagram, 2020) in addition to providing information and links to inform users.

IFAW (2018) conducted a Facebook analysis without participating in online conversations, becoming followers or friends or joining closed areas and as a result found the research time consuming, challenging and missed some animal trade deals. Due to Instagram's laxer privacy settings it is easier to not get involved with any users and remain an observer as to not have

an effect on increasing civet coffee post popularity whilst still having access to all of the related posts. Instagram also allows for detailed information to be collected on the images, the commenters and the posters rather than just focusing on video content to avoid excessive amounts of data to analyse. It is a challenge to regulate trade on social media because they were not designed to do so unlike online marketplaces (IFAW, 2018) and each social media site has a different level of privacy settings.

1.4 The Effects of Tourism on Wildlife

Technological advances and social media have contributed to the substancial growth in tourism which is the thrid biggest export category following chemicals and fuels and is above food and locomotive products (UNWTO, 2019). There was a total of 1,326 million global tourists arrivals in 2017 (UNWTO, 2018) which increased to 1.4 billion in 2018 (UNWTO, 2019) although the covid-19 outbreak will effect tourism numbers due to global travel restrictions. South-East Asia saw a 7% rise in tourist arrivals, especially Vietnam and Thailand in 2018 (UNWTO, 2019) both of which produce civet coffee. Wildlife tourism made up 4.4% of global Tourism GDP and supported 9.1 million jobs in 2018 but despite this, its impact on animals is not reliably measured (WTTC, 2019) and the impact may be mostly negative according to Moorhouse et al (2015), who assessed 24 types of wildlife tourism attractions and found that 14 had negative welfare and conservation impacts. These scores were compared with tourist feedback that revealed only 7.8% of their feedback was negative about welfare or conservation matters. These 24 types of WTAs effect 236,000–561,000 animals, represent over 406 attractions and pull in 3.5-6 million tourists annually.

The tourist part of civet coffee in Indonesia has emerged in the last 9 years (Carder, et al., 2016). Many people were introduced to the coffee through The Oprah Winfrey Show (Towaha & Tjahjana, 2015). This was reiterated when it was featured in the movie The Bucket List in 2007 with famous actors Morgan Freeman and Jack Nicholson who portrayed the coffee as a

"try before you die" experience. Celebrity support is very likely to increase civet coffee popularity (Mutalib, 2018).

Tourists like having pictures of themselves cuddling wild animals because they are cute (Mutalib, 2018). However, when other people see civets being held they see them as domestic and as potential pets (Kitson & Nekaris, 2017) and are unaware that human contact can be stressful for wild animals (Morgan & Tromborg, 2007). In addition, selfies taken with exotic wildlife are more unusual and more likely to be shared on social media (Mutalib, 2018).

Slow Lorises are found at beach bars, hotels and resorts in Phuket Thailand for paid selfies (Osterberg and Nekaris, 2015). Between 2012 and 2017 on Instagram, 17% of slow lorises being held for photos were held in bright day light which is stressful for a nocturnal species and were frequently dressed in clothing (Kitson & Nekaris, 2017).

A similar study by Nekaris et al (2016) recorded the upload date, number of thumbs up, views, comments and country of upload of one video per uploader. The welfare of the slow loris's in 100 videos were analysed across three social media sites in total using a scale and 5 welfare categories. Number of comments were used for popularity score (ibid) with comments representing additional attention and thumbs up reflecting attitude towards the video content.

The World Society of Animal Protection (WSPA) has adopted the classification of bad selfies for selfies with physical contact between wildlife and people. Between 2014 and 2017 wildlife selfies increased by 292% with almost half said to be bad selfies (WSPA, 2017).

1.5 Differences in Wild and Captive Conditions

The lifestyle of wild species can influence their susceptibility to welfare issues in captivity. A positive correlation has been identified between psychological dysfunction and minimum distance travelled as well as between captive-infant mortality and minimum home range size and home range size positively correlated with pacing behaviour (Clubb & Mason, 2003). The

home range sizes of 3 wild Asian palm civets were 1.4km^2 for the female and 1.1km^2 and 3.4km^2 for the males. Each civet had a free water source within their home range. One of the males moved home range when his water source dried up in the dry season (Grassman, 1998).

The captive Asian palm civet enclosures varied from wire-fenced concrete enclosures at 10 x 5 x 3 m length, width, height to wooden hutches with slatted floors at 1m^2 to carry cages with wire floors 0.5m^2 (Carder, et al., 2016). Wire and slatted flooring can be painful to stand on and cause injury to their feet especially for 24 hours a day (Bale, 2016; Carder, et al., 2016). This has also been found in pigs (Mouttotou, et al, 1998; Lewis, et al, 2005).

Many caged civets display repetitive stress behaviours (Lynn & Rogers, 2013) probably due to the absence of any enrichment (Carder, et al., 2016). Enrichment reduces stress and stereotypies in many captive species, for example, macaws (De Almeida, Palme, & Moreira, 2018) and bears (Renner & Plebani, 2002). However, research on mice suggests that older animals, who have lived their lives with no or minimal enrichment, have stereotypes that are less reduced by the introduction of enrichment and they also have less motivation to access enrichment (Tilly, Dallaire & Mason, 2010). This is supported by Mason, et al (2007) who found zoo animals can develop stereotypies that are resistant to change if the animals have been without enrichment for too long.

In terms of diet, Khan, et al's (2019) study of Asian palm civet faecal samples contained more vegatation (39.28%) than animal (21.42%) or insect matter (29.46%). This is supported by Aroon, et al (2012) who also found animal matter to be most prevelant in both frequency (53.7%) and volume (51.8%) than fruit at (37.7%) and (34.8%) respectively in Notheast Thialand. Jothish's (2011) study in Kerala, India, also found vegetation to exceed (Over 95.7%) animal matter (18%) in the scats but found a much larger percentage difference between the two food groups. This could be due to this study lasting longer than the other two

or that different geographic locations were utilised or because Khan et al's (2019) study focused on winter months during which there is reduced vegetation abundance.

Cooked rice was found in the faeces of civets living in human populated areas (Jothish, 2011) and scavenging behaviour was evident which has also been observed in the African Civet (Tsegaye, Bekele & Balakrishnan, 2008). On another note, grass leaves were found in around 4.46% of scats (Khan, et al., 2019). This is supported by Grassman (1998) and Jothish (2011). It has also been found in the small Indian civet (Balakrishnan & Sreedevi, 2007) and the brown palm Civet (Mudappa, et al., 2010). This suggests a role of the grass in aiding digestion or scouring the intestines (Khan, et al., 2019). Plastics were also found in the scats (Khan, et al., 2019), though amounts were not listed.

Civets live mostly solitary lives (Joshi, et al., 1995) apart from interactions during mating and parent-offspring relations. Nevertheless, sometimes the home-ranges of civets overlap (Rabinowitz, 1991; Joshi, et al., 1995) and pairs of civets interact at fruiting trees (Duckworth, 1997) and groups of 1-5 at salt licks (Edwards, 2012 cited in Nakabayashi, Nakashima, & Bernard, 2012). Although two males became aggressive to one another after a female had recently left the area (Nakabayashi, Nakashima, & Bernard, 2012). They even feed alongside small-toothed palm civets (Eaton, et al., 2010) and a chance encounter suggests they mate during the daytime (Borah & Deka, 2011). However, on civet farms they are mainly kept individually (Lynn & Rogers, 2013; Carder, et al., 2016) with no social opportunities.

1.6 Aims of the Current Study

The main aim of this project is to discern what people are conveying about civet coffee on Instagram and if these opinions are affecting Asian palm civet welfare and conservation and whether this impact is positive or negative. Additional aims of this study are to see what makes an Instagram post on civet coffee more popular and to see if there has been a change in civet welfare across the study dates. The last aim will build on the previous three and be in line with

other studies above by making inferences as to possible steps forward in improving civet welfare.

2. Method
    2.1 Ethics Statement
This research project was approved by the Research Ethics Committee at Plumpton College.

    2.2 Hashtag Procurement

The social media site of Instagram was searched for all hashtags related to civet coffee until no new hashtags were found. Next, only hashtag names containing civet and coffee, or words with a similar meaning, were kept. All hashtags with less than 1000 posts were discarded and the posts of the remaining hashtags were examined so that only hashtags with 20 or more relevant posts, not including advertisements, were chosen. This ensured that the hashtags are appropriate to the study topic, popular through having over 100 posts each and that there was at least the 20 relevant posts per hashtag that are needed for the study. The resulting 7 hashtags consisted of #civetcoffee, #poopcoffee, #kopiluwakcoffee, #catpoochino, #luwakcoffeeplantation, #luwakcoffeebali and #catpoopcoffee. #kopiluwak was excluded due to the majority being written in other languages and would not have allowed for accurate analysis #luwakcoffee was excluded because it was not created until after 2018.

    2.3 Data collection procedures

The data were collected between the 22nd – 24th of February and the 7th - 9th of March 2020 with 2018 posts being recorded first. An online random number generator was used to select 10 relevant posts under each of 7 hashtags that were uploaded between the dates of October the 1st 2018 to December the 31st 2018, yielding 70 posts. Posts qualified as being relevant if they were written in English, contained either civets or coffee in the attached image and was not uploaded by a promoter of civet coffee or of tourist destinations.

This was repeated to find 10 posts under the same hashtags between the dates of October the 1st 2019 and December the 31st 2019, yielding another 70 posts meaning the total number of posts was 140, following methodologies employed by Nekaris, et al (2016) and Hu,

Manikonda & kambhampati (2014). If the post chosen by the number generator was unrelated to civet coffee the next related post was chosen. Following methodology employed by (Nekaris, et al, 2016) only one post per individual user was used. Information that was supplied by the uploaders description of the image and the comments by individual Instagram users was recorded categorically for later analysis (Hu, Manikonda & kambhampati, 2014; Sherman, Brent & Farmer, 2016) including whether the uploader was for or against civet coffee or whether the cost of the coffee was mentioned. The number of likes and comments were also recorded as an indicator of popularity and attitude (Shifman, 2012; Nekaris, et al., 2016; Madden et al., 2013) and for posts containing images of civets, table 1 was used to determine a level out of five for each of 6 welfare scores with level 5 representing the worst welfare.

Table 1: The levels within each welfare score as amended from Carder, et al., (2016) and Nekaris, et al (2016).

Welfare score	Level 1	Level 2	Level 3	Level 4	Level 5
Welfare score 1 (Social setting)	The civet can choose to interact with conspecifics or stay in solitude.	Intermediate between 1 and 3	The civets have limited choice over interacting with conspecifics or staying in solitude.	Intermediate between 3 and 5	The civets are unable to choose to interact with conspecifics or stay in solitude.
Welfare score 2 (Health)	The civets had optimum physical health.	Intermediate between 1 and 3	The civets had satisfactory physical health.	Intermediate between 3 and 5	The civets had very poor physical health.
Welfare score 3 (Environment)	Natural surroundings including surfaces and objects	Intermediate between 1 and 3	Natural and unnatural objects and surfaces were present in their environment	Intermediate between 3 and 5	Unnatural surroundings including surfaces and objects
Welfare score 4 (Daylight)	The civet was asleep during daylight hours	Intermediate between 1 and 3	The civet was only partially awake in daylight or they were fully awake in partial daylight	Intermediate between 3 and 5	The civet was awake in bright daylight
Welfare score 5 (Human contact)	No human-civet contact	Intermediate between 1 and 3	The human is very close to the civet	Intermediate between 3 and 5	The civet is being touched or handled by a human
Welfare score 6 (Hygiene)	No faeces, moist surfaces or excess dirt can be seen	Intermediate between 1 and 3	Some faeces, moist surfaces or dirt can be seen	Intermediate between 3 and 5	Large amounts of faeces, moist surfaces or dirt can be seen

2.4 Statistical Analysis

Genstat version 19 was used for each statistical test. Three Mann-Whitney U tests were used to test whether the number of total comments, number of English comments and number of likes differed depending on which year the Instagram post was uploaded. A chi-squared test was used to test whether there was an association between hashtag and whether the uploader is for or against civet coffee.

A Kruskal-Wallis one-way ANOVA test was used to test if there was a difference in the number of likes across each image/video content groups. Additional Kruskal-Wallis one-way ANOVA tests were used to test if there was a difference in the number of likes depending on whether someone was holding the civet or not. Chi-Squared tests of association were used to test whether there was an association between welfare score and the year the Instagram post was uploaded. Lastly, One-way ANOVAs with permutation tests were used to test if there was a difference in the number of likes across each welfare score group.

3 Results

There was no significant difference in the number of relevant comments for 2018 (median=1, IQR=3) compared to 2019 (median=1, IQR=2), (U= 2000.0, p=0.052). There was also no significant difference in the number of English comments for 2018 (median=1, IQR=2) compared to 2019 (median=0, IQR=2), (U=2028.5, P=0.066). Similarly, there was no significant difference in the number of likes for 2018 (median=33, IQR=45) compared to 2019 (median=25.5, IQR=32), (U=1883.5, P=0.109).

There was a statistically significant association between hashtag and whether the poster is for or against civet coffee ($x^2_{(1)}$ = 20.59, P=0.024). Figure 1 shows that more Instagram uploaders were for civet coffee rather than against it and the hashtags, #catpoopcoffee and #kopiluwakcoffee contained no posts who's uploaders were against civet coffee.

Figure 1: The frequency of uploaders under each hashtag who said they were for, against or for and against civet coffee.
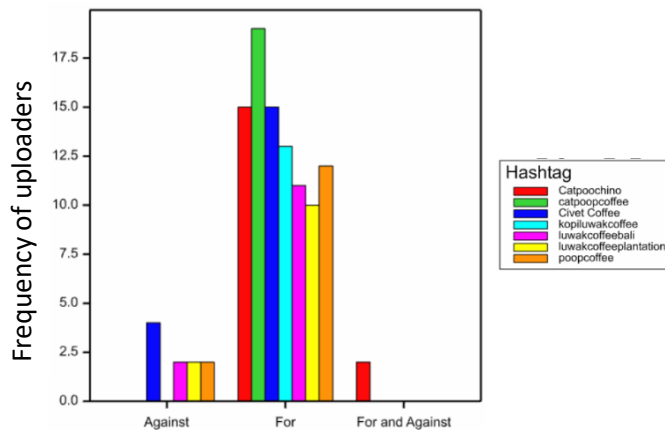
Whether the uploader of each Instagram post said they were for, against or for and against

There was no significant difference in the number of likes across each image/video content groups (H=2.717, P=0.257). There was also no significant difference in the number of likes depending on whether the poster was holding the civet or not (H=1.102, P=0.294).

There was no significant association between any of the welfare scores and year posted, Welfare score 1 ($x^2_{(1)}$ = 1.75, p=0.593), welfare score 2 ($x^2_{(1)}$ = 1.03, p=0.861), welfare score 3 ($x^2_{(1)}$ = 7.30, p=0.196), Welfare score 4 ($x^2_{(1)}$ = 9.57, p=0.108), welfare score 5 ($x^2_{(1)}$ = 1.12, p=0.859) and welfare score 6 ($x^2_{(1)}$ = 2.72, p=0.846).

There was no significant difference in the number of likes across each level within any of welfare score 1 ($F_{(2,35)}$= 0.02, p=0.978), welfare score 2 ($F_{(3,34)}$= 1.01, p=0.399), welfare score 4 ($F_{(4,34)}$= 0.42, p=0.796), welfare score 5 ($F_{(3,35)}$= 1.27, p=0.299), welfare score 6 ($F_{(4,34)}$= 0.69, p=0.601). However there was a significant difference in the number of likes across each level within welfare score group 3 which was for environmental provisions ($F_{(3,35)}$= 3.47, p=0.026).

4 Discussion

4.1 Civet Coffee Popularity Increase

There was no significant difference in the number of relevant or English comments for 2018 compared to 2019. As well as comments written in English, relevant comments also included emoji only comments. Therefore, this suggests that the number of comments on civet coffee related posts have increased from October 2018 to December 2019 due to the 2018 posts being around longer. This finding parallels with the rise in both normal coffee (Ramalakshmi & Raghavan, 1999; Lewin, Giovannucci & Varangis, 2004; Tucker, 2017) and civet coffee popularity (Shepherd, 2012; UNWTO, 2019).

Equally, there was no significant difference in the number of likes for 2018 compared to 2019. Likes are a measure of opinion and popularity which may indicate that both have increased regarding civet coffee (Nekaris, et al, 2016). People may also be increasingly liking civet coffee posts because they are trendy and fashionable.

Alternatively, the increase in Instagram comments could be due to the age group preferences of its users. One of the reasons normal coffee is popular is for its bitter flavour (Ramalakshmi & Raghavan, 1999). However, preference for sweetness reduces with age (Mennella & Bobowski, 2015; Coldwell, Oswald & Reed, 2009) with more 18-24-year-olds preferring sweetened coffee than 45-54-year-olds (Mintel, 2010 cited in Mintel Press Team, 2010) and since 70% of Instagram users are aged 13- 34 (Clement, 2020) they are the age group who would prefer sweeter coffee. One of the characteristics of civet coffee is a reduction in bitterness (Marcone, 2004; McCamey, Thorrpe & McCarthy, 1990) which could explain the increase in kopi luwak popularity on Instagram.

For under 35's coffee drinking habits may be formed for life (Lewin, Giovannucci & Varangis, 2004). This means that campaigns against unethical production of civet coffee can be targeted to this age group via Instagram to have a larger impact. Instagram have put in place a system

that warns users that they are searching for a hashtag with negative impacts on wild animals (Instagram, 2020) but this does not yet extend to civet coffee.

People who love civet coffee but still care about the welfare of the civets may buy civet coffee that is advertised as wild. However, the large price gap between normal and civet coffee has encouraged fraudulent mixing of cheaper types of coffee in with the kopi luwak (Jumhawan, et al., 2016; Jumhawan, et al., 2015) or captive civet coffee to be mixed in with the wild civet coffee (Lynn & Rogers, 2013) therefore a transition to ethical civet coffee production made from wild civets may hit problems with this. Furthermore, although there are methods to distinguish between civet and normal coffee (Wei, et al., 2014; Nebesny & Budryn, 2006; Chan and Garcia, 2011; Jumhawan, et al., 2015; Jumhawan, et al., 2016), there is not yet a method to do the same for captive and wild coffee.

In terms of civet conservation, increased kopi luwak popularity and desirability means more civets are required to produce the coffee. Civets are very hard to breed in captivity and have high mortality rates due to poor welfare (Grassman, 1998; Carder, et al, 2016; Clubb & Mason, 2003) but poachers can easily catch them from the wild (Lynn & Rogers, 2013). This has a significant impact on this species population and despite having a decreasing population trend (Duckworth, et al., 2016) they are listed as least concern on the IUCN red list and are seen as high in number and therefore receive minimal legal protection which is regularly ignored and seldom enforced (Shepherd, 2012; Shephard & Shephard, 2010). This is a big risk to civet conservation as no one knows how many are being taken from the wild each year to sustain the farms (Carder, et al., 2016) and without them the biodiversity of their habitat ranges could suffer (Chakravarthy & Ratnam, 2015; Corlett, 2017; Nakashima, et al., 2010b).

4.2 Hashtag and civet coffee support

There was a statistically significant association between hashtag and whether the poster is for or against civet coffee. This could suggest that Instagram users upload their posts under specific hashtags depending whether they are for or against civet coffee. This is useful because Instagram or campaigners such as Project Luwak Singapore (The project Luwak SG network, n.d.) or the kopi luwak cut the crap campaign (Wild, 2013) can target specific hashtags containing more posts in favour of civet coffee to save time and have a large impact especially since Instagram were the 8th used platform for wildlife trade in 2018 (IFAW 2018). This would build on the existing effort of Instagram to educate its user on the negative impact of posts under certain hashtags, for example #slothselfie (Instagram, 2020). This is especially important as it is so challenging to regulate trade on social media (IFAW, 2018).

This finding of the current study may vary though, depending on which dates the posts are uploaded on and whether a recent news article has either supported or been against civet coffee. Therefore, it would be beneficial for complimentary work to cover different months of the year other than October to December and compare this with evidence of campaigns. Additional research could be done on which hashtags are targeted for civet coffee advertisements as in the present study there were 17 people advertising civet coffee plantations to potential tourists. These types of advertisements and live animal sale advertisements are increasing (IFAW, 2018; Siriwat & Nijman, 2018) and Instagram has recently enabled Instagram shopping where people who click on a product post, tag or sticker uploaded by business owners or US Instagram users will be sent directly to the website so a purchase can be made, making sales faster and more likely to occur (Instagram, 2020)

On a similar note there was no significant difference in the number of likes across each image or video content groups which could suggest that users do not prefer certain image content and are instead liking the post because it is civet coffee related. This could suggest that likes depend on the popularity of the poster rather than the contents of the post which is a possible

confounding variable of this study. Therefore, it is recommended that future research looks into the role of popular Instagram users in influencing peoples opinions on civet coffee.

4.3 Civet Welfare and Conservation Through Time

There was no significant association between the welfare scores and year posted therefore no relationship exists between them. This suggests that welfare has neither improved nor got worse between October 2018 and December 2019. However, the civet owners may select the healthiest looking civets to be on display to the public and therefore the civet images on Instagram may not be a true representation of civet living conditions.

Asian palm civets are listed under Schedule II of the Indian Wildlife Protection Act of 1972 (Gupta, 2004). But between 1998 and 2003 local tribes in Nadu, Uttar Pradesh, Coimbatore, Agra and Tamil in India were nevertheless found with dead civets. Aboriginal people can hunt Asian palm civets for their own consumption but cannot sell the meat without a license (Shephard & Shephard, 2010). They are however, illegally used by middlemen for their refined hunting skills and therefore poach many species. This has increased over time due to increased demand and is a great risk to civet conservation. Civet harvest quotas were being ignored by civet traders in 2006, 2008 and again in 2012 within wildlife markets in Jakarta (Shepherd, 2006; Shepherd, 2008; Shepherd, 2012).

Obesity in civets leads to a range of health problems including acute pancreatitis (Bongiovanni, et al, 2014). Some civets were seen to be overweight from restricted movement while other were underweight from a diet of purely coffee cherries in 2016. (Carder, et al, 2016). Many current Instagram posts include images of obese civets with one in particular who has become a celebrity like enticement for tourists (Personal Observation, 2020).

The estimated amount of civet coffee produced per year was around 500kg a year in 2013 (Lynn & Rogers, 2013) whereas it was around 127 kg in 2014 (Schmidt-Burbach, et al., 2014).

Farmers in Lynn & Rogers (2013) study said that they helped produce this amount per month which means that the estimates of the amount of civet coffee produced and therefore the amount of civets in captivity are vastly understated.

One thing that has been consistent throughout the years is that the Asian palm civet was and is still listed as Least Concern in the IUCN Red List (Duckworth, et al., 2016) despite little being known about the impact of either of these threats in addition to kills as pests and the possible transition to the exotic pet trade on civet welfare or conservation (Shephard & Shephard, 2010).

Perhaps in the future, artificial enzymes will replace the need for civets (Hadipernata & Nugraha, 2018; Martinez & Balaban, 2009). Then again, this method is likely to be much more expensive than using civets and since the fascination, unusualness and uniqueness of the coffee is pinned on the beans being digested and excreted by civets, moving to a method that does not use civets is likely to be less popular which may be why this method is not widely used yet.

4.4 Awareness of Civet Welfare

There was no significant difference in the number of likes across each level within any of the welfare scores except welfare score 3. However, due to the sample size being too small for the non-parametric test, these one-way ANOVA results may therefore be unreliable and has created a need for this to be verified by future research.

Nevertheless, these results suggest that people cannot tell when an animal has poor welfare since it is unlikely that Instagram users would like seeing animals in poor conditions. This is supported by Moorhouse et al (2015) who found that most Wildlife tourist attractions are having a negative impact on animal welfare and conservation overall but most tourists are unable to recognise these impacts. Even if adequate accessible research into civet behaviours and needs were made widely available (Wemelsfelder, 2007) the majority of the public may

not be able to use it to tell if the civets were experiencing stress since many dog owners cannot even correctly use their own dogs body language to know how they are feeling (Tami & Gallagher, 2009). This is further complicated because different species react to pain and fear differently including by hiding symptoms of pain to not appear weak to predators (Jordan, 2005).

The diet of civets contains a variety of vegetation, animal matter and insect matter (Khan, et al, 2019; Aroon, et al, 2012; Jothish, 2011). In contrast, some captive civets are fed exclusively on coffee cherries because companies such as Sari Makmur do not want the beans mixing with other foods inside the civet (Lynn & Rogers, 2013). This can lead to civets becoming malnourished (Carder, et al, 2016) which has many adverse health effects.

Civets and slow lorises are nocturnal but Kitson & Nekaris (2017) found that all the images of people holding lorises were taken in bright daylight. The same thing was found in the current study with civets which is highly stressful for the animals. However, no significant difference in the number of likes depending on whether the poster was holding the civet or not was found.

Civets live mostly solitary lives (Joshi, et al., 1995) but their home-ranges overlap in the wild (Rabinowitz, 1991; Joshi, et al., 1995) and civets have been seen interacting whilst feeding (Duckworth, 1997; Edwards, 2012 cited in Nakabayashi, Nakashima, & Bernard, 2012). However, on civet farms they are mainly kept individually (Carder, et al, 2016) which could lead to boredom and frustration (Jordan, 2005). Out of 41 posts that contained civets in the current study, 37 received a score of 5 for welfare score 1 (social setting). This could lead to chronic stress from being unable to perform species-specific behaviour which can reduce their immune system (Jordan, 2005). The civets may also develop stereotypes that are resistant to change after prolonged periods without any enrichment (Mason, et al, 2007).

Despite this, people in kopi luwak producing countries might not recognise that there is an issue because they do not have as much access to research on animal needs and behavior. For example, farmers release ill civets into the jungle so that they can recover and then recapture them (Lynn & Rogers, 2013) this could be due to them not knowing how to treat them or that it is more cost effective to catch new civets. Farmers explained "If we kill them it's a waste, it's a pitty. Now that we realise their worth, that kopi luwak sells well, it is better to keep them". This could mean that they cared for the civets but had to kill them because they are crop pests (Shepherd & Shepherd 2010) or they lack information on civet husbandry. If tourists are not telling farmers that they are not happy with the welfare standards farmers will not be aware they need improving.

Moreover, plantation workers looking for profit have no reason to increase the welfare since social media means that civet coffee popularity and tourism is increasing (Shepherd, 2012; UNWTO, 2019) meaning sales of kopi luwak are likely rising which together means increasing profits. The poachers and farmers are just two groups of people in a long chain who profit from civets (Lynn & Rogers, 2013) so getting rid of civet coffee altogether would be near impossible especially as these people may be limited in their choices of alternate income.

Therefore, 100% wild civet coffee could be the best solution for civets and people as this relationship is mutually beneficial. To do this ethical civet coffee farmers should be supported as well as support for unethical farmers if they agree to transition to ethical farming. All shops selling the coffee must be regulated to make sure their coffee is from an ethical source and non-ethical farmers could be banned from advertising on social media. There has been some progress in the form of certification schemes, for example, the UTZ Certified and SAN standards have started to increase their standards to move civet coffee towards sustainable and ethical production (Carder, et al., 2016) but not enough is being done. It is most important to work with civet farmers and show them why changes need to be made and empower them to want to make the changes.

5 Conclusion

Evidently, the civet coffee industry is far from optimal for civet welfare or conservation and there is a long way to go before a viable solution is reached. However, this study has joined others in raising awareness of the stark differences between the so far unchanging captive civet living conditions, the increase in civet coffee popularity and most of all, the lack of awareness surrounding peoples inability to distinguish between good and bad animal welfare in person, at wildlife tourist attractions or on social media.

References

1. Aroon, S., Artchawakom, T., Hill, J. & Thanee, N., 2012. Seasonal variation in the diet of common palm civet (Paradoxurus hermaphroditus) at Sakaerat Biosphere Reserve, Thailand. International Conference Proceedings, [journal] pp. 191-197.

2. Bae, J., Park, J., Im, S. & Song, D., 2014, Coffee and health. Integrative Medicine Research, [journal] 3(4), pp. 189-191.

3. Balakrishnan, M. & Sreedevi, M., 2007. Husbandry and management of the Small Indian Civet Viverricula indica. [journal] 36, pp.9-13.

4. Bale, R., 2016. The Disturbing Secret Behind the World's Most Expensive Coffee, [online]. Available at: < https://www.nationalgeographic.com/news/2016/04/160429-kopi-luwak-captive-civet-coffee-Indonesia/>

5. Bayunitri, B., 2017. Customer Perceptions of Product Luwak Coffee based on Marketing Mix Elements Perspective (Customer Survey In Bandung). Advances in Intelligent Systems Research, [journal] 131, pp. 76-80.

6. Blystone, D., 2019. The Story of Instagram: The Rise of the #1 Photo-Sharing App (FB) [online]. Available at: <https://www.investopedia.com/articles/investing/102615/story-instagram-rise-1-photo0sharing-app.asp>

7. Bongiovanni, L., DI Girolamo, N., Montani, A., Della Salda, L. & Selleri, P., 2014. Fatal hemorrhagic–necrotizing pancreatitis associated with pancreatic and hepatic lipidosis in an obese Asian palm civet (*Paradoxurus hermaphrodit*us). Asian Pacific Journal of Tropical Biomedicine, [journal] 4(1), pp.62-65.

8. Bonita, J., Mandarano, M., Shuta, D. & Vinson, J., 2007. Coffee and cardiovascular disease: In vitro, cellular, animal, and human studies. Pharmacological Research, [journal] 55(3), pp.187-198.

9. Borah, J. & Deka, J., 2011. An observation of common palm civet *Paradoxurus hermaphroditus* mating. *Small Carnivore Conservation*, [journal] *44*, pp.32-33.

   9.2 Borgi, M. & Cirulli, F., 2016. Pet Face: Mechanisms Underlying Human-Animal Relationships. *Frontier Psychology,* [journal] 7(298).

10. Campbell, M., 2009. Proximity in a Ghanaian savanna: Human reactions to the African palm civet Nandinia binotata.Singapore Journal of Tropical Geography, [journal] 30(2), pp.220-231.

11. Carder, G., Lambert, H.S., Schmidt-Burbach, J. & D'Cruze, N., 2016. The animal welfare implications of civet coffee tourism in Bali. *Animal Welfare*. [journal] 25(2), pp.199-205.

12. Carder, G., Proctor, H., Schmidt-Burbach, J., D'Cruze, N. 2016. The animal welfare implications of civet coffee tourism in Bali. *Animal Welfare*, [journal] 25, pp.199-205.

13. Chakravarthy, D. & Ratnam, J., 2015. Seed dispersal of *Vitex glabrata* and *Prunus ceylanica* by civets (Viverridae) in Pakke Tiger Reserve, north-east India: spatial patterns and post-dispersal seed fates. *Tropical Conservation Science*, [journal] 8, pp. 491-504.

14. Chan, S. & Garcia, E., 2011. Comparative Physicochemical Analysis of Regular and Civet Coffee. *The Manilla Journal of Science*, [journal] 7(1), pp.19-23.

15. Chou, T., 1992. Wake up and smell the coffee. Caffeine, coffee and the medical consequences. Western Journal of Medicine [journal] 157(5), p.544-533.

16. CITES, N.d. *Paradoxurus Hermaphroditus*. Available at: <https://www.speciesplus.net/#/taxon_concepts/4282/legal>

17. Clement, J., 2019. Number of monthly active Instagram users 2013-2018 [online] Available at: < https://www.statista.com/statistics/253577/number-of-monthly-active-instagram-users/>

18. Clement, J., 2020. Countries with the most Instagram users 2020 [online] Available at: < https://www.statista.com/statistics/578364/countries-with-most-instagram-users/>

19. Clement, J., 2020. Instagram: distribution of global audiences 2020, by age and gender, [online] Available at: <https://www.statista.com/statistics/248769/age-distribution-of-worldwide-instagram-users/>

20. Clubb, R. & Mason, G., 2003. Animal Welfare: Captivity effects on wide-ranging carnivores. *Nature,* [journal] 425, pp.473.

21. Coldwell, S., Oswald, T. & Reed, D., 2009. A marker of growth differs between adolescents with high vs. low sugar preferences. Physiology and Behaviour [journal] 96(4-5), pp.574-580.

22. Corlett, R., 1998. Frugivory and seed dispersal by vertebrates in the Oriental (Indomalayan) region. *Biological Reviews*, [journal] 73, pp.413–448.

23. Corlett, R., 2017. Frugivory and seed dispersal by vertebrates in tropical and subtropical Asia: An update. Global Ecology and Conservation, 11, pp.1-22.

24. De Almeida, A., Palme, R. & Moreira, N. 2018. How environmental enrichment affects behavioral and glucocorticoid responses in captive blue-and-yellow macaws (*Ara ararauna*). Applied Animal Behaviour Science, [journal] 201, pp.125-135.

25. De Silva, P., Khan, W., Kanchanasaka, B., Reza Lubis, I., Feeroz, M. & Al-Sheikhly, O., 2015. Lutrogale perspicillata, [online] Available at: < https://www.iucnredlist.org/species/12427/21934884>

26. Duckworth, J., 1997. Small carnivores in Laos: a status review with notes on ecology, behaviour and conservation. Small Carnivore Conservation, 16, pp.1–21.

27. Duckworth, J., Timmins, R., Choudhury, A., Chutipong, W., Willcox, D., Mudappa, D., Rahman, H., Widmann, P., Wilting, A. & Xu, W., 2016. Paradoxurus hermaphroditus. Available at: < https://www.iucnredlist.org/species/41693/45217835#population>

28. Eaton, J., Wüst, R., Wirth, R., Shepherd, C., Semiadi, G., Hall, J. & Duckworth, J., 2010. Recent records of the Javan Smalltoothed Palm Civet Arctogalidia (trivirgata) trilineata. *Small Carnivore Conservation*, [journal] 43, pp.16–22.

29. Esquivel, P. & Jimenez, V., 2012. Functional Properties of coffee and coffe by-products. Food Research International, [journal] 46(2), pp.488-495.

30. Facebook., 2019. How Instagram boosts brands and drives sales [online] Available at: <https://www.facebook.com/business/news/insights/how-instagram-boosts-brands-and-drives-sales>

31. Grassman, L., 1998. Movements and fruit selection of two Paradoxurinae species in a dry evergreen forest in southern Thailand. *Small Carnivore Conservation*, [journal] 19, pp.25–29.

32. Gupta, B., 2004. Killing civets for meat and scent in India. Small Carnivore Conservation, [journal] 31, pp.21.

33. Hadipernata, M. & Nugraha, S., 2018. Process technology of luwak coffee through bioreactor utilization. *Earth and Environmental Science*, [journal] 102(1), pp.1-6.

34. Hii, C. & Borém, F., 2019. Drying and Roasting of Cocoa and Coffee. [book] Florida:CRC Press.

35. Hu, Y., Manikonda, L. & Kambhampati, S., 2014. What We Instagram: A First Analysis of Instagram Photo Content and User Types. Computer Science, [journal] pp. 595-598.

36. Huai Kha Khaeng Wildlife Sanctuary, Thailand. Wildlife Conservation International, [journal] 223, pp. 281- 298.

37. Instagram, 2020. Available at: <https://www.instagram.com/>

38. Jelil, S., Nag, S. & Hayward, M., 2018. Poaching record of a Common Palm Civet Paradoxurus hemaphroditus from Assam, India. Small *Carnivore* Conservation, [journal] 56, pp.31–35.

39. Jordan, B., 2005. Science-based assessment of animal welfare: wild and captive animals. Revue scientifique et technique, [journal] 24(2), pp.515-28.

40. Joshi, A., Smith, J. & Cuthbert, F., 1995. Influence of food distribution and predation pressure on spacing behaviour in palm civets. Journal of mammology, [journal] 76(4), pp.281-298.

41. Jothish, P., 2011. Diet of the common palm civet Paradoxurus hermaphroditus in a rural habitat in Kerala, India, and its possible role in seed dispersal. *Small Carnivore Conserv*ation, [journal] 45, pp.14-17.

42. Jumhawan, U., PramaPutri, S., Yusianto., Bamba, T., Fukusaki, E., 2016. Quantification of coffee blends for authentication of Asian palm civet coffee (Kopi Luwak) via metabolomics: A proof of concept. *Bioscience and Bioengineering*, [journal] 122(1), pp.79-84.

43. Jumhawan, U., Putri, S., Yusianto., Bamba, T. & Fukusaki, E., 2015. Application of gas chromatography/flame ionization detector-based metabolite fingerprinting for authentication of Asian palm civet coffee (Kopi Luwak). *Journal of Bioscience and Bioengineering,* [journal] 120(5), pp.555-561.

44. Khan, K., Khan, J., Ahmad, K. & Mohan, N., 2019. Winter food habits of the Common Palm Civet Paradoxurus hermaphroditus (Mammalia: Carnivora: Viverridae) in Patna Bird Sanctuary, India. *Journal of Threatened Taxa*, [journal] *11*(12), pp.14490-14495.

45. Kitson, H. & Nekaris, K., 2017. Instagram-Fuelled Illegal Slow Loris Trade Uncovered in Marmaris, Turkey. *Oryx,* [journal] 51(3), pp.394.

46. Krishnakumar, H., Balasubramanian, N. & Blalakrishan., 2002. Sequential Pattern of Behavior in the Common Palm Civet, Paradoxurus hermaphroditus (Pallas). *International Journal of Comparative Psychology*. 15, pp.303-311.

47. Lewin, B., Giovannucci, D. & Varangis, P., 2004. Coffee Markets New Paradigms in Global Supply and Demand. Agriculture and Rural Development, [pdf] Available at < http://documents.worldbank.org/curated/en/899311468167958765/pdf/283000REVIS ED0Coffee1Markets01PUBLIC1.pdf>

48. Lynn, G. & Rogers, C., 2013. Civet cat coffee's animal cruelty secrets, [online] Available at: <https://www.bbc.co.uk/news/uk-england-london-24034029>

49. Malla, G., Ray, P., Johnson, J. & Kuppusamy, S., 2019. First photographic record of Common Palm Civet Paradoxurus hermaphroditus from the mangroves of Andhra Pradesh, India. *Small Carnivore Conservation*, [journal] 57, pp.10-13.

50. Marcone, M., 2004. Composition and properties of Indonesian palm civet coffee (Kopi luwak) and Ethiopian civet coffee. Food Research International, [journal] 37(9), pp.901-912.

51. Martinez, L. & Balaban, M., 2009. Quality Enhancement of Coffee Beans by Acid and Enzyme Treatment, [pdf] Available at: <https://patentimages.storage.googleapis.com/48/b2/66/07409e048acc3e/US200902 20645A1.pdf>

52. Mason, G., Clubb, R., Latham, N. & Vickery, S. 2007. Why and how should we use environmental enrichment to tackle stereotypic behaviour?. Applied Animal Behaviour Science, [journal] 102(3-4), pp.163-188.

53. McCamey, D., Thorrpe, T. & McCarthy, J., 1990. Bitterness in foods and beverages. 1st ed. Amsterdam: Elsiever Science Publishers.

54. Mennella, J. & Bobowski, N., 2015. The sweetness and bitterness of childhood: Insights from basic research on taste preferences. Physiology and Behaviour, [journal] 152, pp. 502-507.

55. Menon, V. 2014. *Indian Mammals*. [book] Gurgaon:Hachette Book Publishing India

56. Ministries/Departments in the Government of India. 1972. *Schedule II,* [pdf] Available at:

<https://upload.indiacode.nic.in/schedulefile?aid=AC_CEN_16_18_00007_197253_1517807324579&rid=760>

57. Mintel Press Team, 2010. Coffee Marketers can warm up to young sippers for long-term growth [online] Available at: <https://www.mintel.com/press-centre/food-and-drink/coffee-marketers-can-warm-up-to-young-sippers-for-long-term-growth>

58. Moorhouse, T., Dahlsjo, C., Baker, S., D'Cruze, N. & Macdonald, D. 2015. The customer isn't always right conservation and animal welfare implications of the increasing demand for wildlife tourism. *PLOS one*, [journal] 10(10).

59. Morgan, K. & Tromborg, C., 2007. Sources of stress in captivity. Applied Animal Behaviour Science, [journal] 102(3-4), pp.262-302.

60. Mudappa, D., Helgen, K. & Nandini, R., 2016. *Viverra civettina*. Available at: < https://www.iucnredlist.org/species/23036/45202281#geographic-range>

61. Mudappa, D., Kumar, A., Chellam, R., 2010. Diet and Fruit Choice of the Brown Palm Civet Paradoxurus Jerdoni, a Viverrid Endemic to the Western Ghats Rainforest, India. Tropical Conservation Science, [journal] 3 (3), pp.282-300.

62. Mutalib, A., 2018. The photo frenzy phenomenon: how a single snap can affect wildlife populations. *Biodiversity*, [journal] 19(3-4), ppp.237-239.

63. Muzaifa, M., Hasni, D., Rahmi, F. & Syarifudin., 2019. What is kopi luwak? A literature review on production, quality and problems. Earth and Environmental Science, [journal] 365, pp.1-7.

64. Nakabayashi, M., Nakashima, Y. & Bernard, H., 2012. An observation of several Common Palm Civets Paradoxurus hermaphroditus at a fruiting tree of Endospermum diadenum in Tabin Wildlife Reserve, Sabah, Malaysia: comparing feeding patterns of frugivorous carnivorans. *Small Carnivore Conservation*, [journal] 47, pp.42-45.

65. Nakashima, Y. & Sukor, J., 2010. Importance of Common Palm Civets (Paradoxurus hermaphroditus) as a long-distance disperser for large-seeded plants in degraded forests. Tropics, [journal] 18, pp.221–229.

66. Nakashima, Y., Inoue, E., Inoue-Murayama, M. & Sukor, J., 2010. Functional uniqueness of a small carnivore as seed dispersal agents: a case study of the common palm civets in the Tabin Wildlife Reserve, Sabah, Malaysia. *Ecologia*, [journal] 164(3), pp.721-730. **B**

67. Nakashima, Y., Inoue, E., Inoue-Murayama, M., Sukor, J., 2010. High potential of a disturbance-tolerant frugivore, the common palm civet Paradoxurus hermaphroditus (Viverridae), as a seed disperser for large-seeded plants. Mammal study, [journal] 35(3), pp.209-215. **A**

68. Nebesny, E. & Budryn, G., 2006. Evaluation of sensory attributes of coffee brews from robusta coffee roasted under different conditions. *European Food Research and Technology*, [journal] 224(2), pp.159-165.

69. Nekaris, K., Musing, L., Vazquez, A. & Donati, G. 2016. Is Tickling Torture? Assessing Welfare towards Slow Lorises (Nycticebus spp.) within Web 2.0 Videos. Folia Primatologica, [journal] 86(6), pp.534-551.

70. Osterberg, P. & Nekaris, K. 2015. A Case Study of the Slow Loris Nycticebus Spp. *Traffic Bulletin,* [journal] 27(1), pp.13.

71. Rabinowitz, A., 1991. Behaviour and movements of sympatric civet species in

72. Rajaratnam, R., Sunquist, M., Rajaratnam, L. & Ambu, L., 2007. Diet and habitat selection of the Leopard Cat (Prionailurus bengalensis borneoensis) in an agricultural landscape in Sabah, Malaysian Borneo. Journal of Tropical Ecology, [journal] 23, pp.209–217.

73. Ramalakshmi, K. & Raghavan, B., 1999. Caffeine in Coffee: Its Removal. Why and How?. *Critical reviews in food science and nutrition* [journal] 39(5), pp.441-56.

74. Renner, M., Plebani, J. 2002. Environmental enrichment for the captive spectacled bear (Tremarctos ornatus). Pharmacology Biochemistry and Behaviour, [journal] 73(1), pp.279-283.

75. Sanz-Uribe, J., Yusianto., Menon, S., Peñuela, A., Husson, J., Brando, C. & Rodriguez, A., 2017. Postharvest Processing—Revealing the Green Bean. The craft and science of coffee, [journal] pp.51-79.

76. Schmidt-Burbach, J., D'Cruze, N., Toole, J. & Mansell, K., 2014. What is the true cost of the world's most expensive coffee?. *Oryx,* [journal] 48, pp.170-171.

77. Shephard, C. & Shephard, L., 2010, The trade in Viverridae and Prionodontidae in Peninsular Malaysia with notes on conservation and legislation. *Small Carnivore Conservation*, [journal] 42, pp. 27-29.

78. Shephard, C., 2012. Observations of small carnivores in Jakarta wildlife markets, Indonesia, with notes on trade in Javan Ferret Badger Melogale orientalis and on the increasing demand for Common Palm Civet Paradoxurus hermaphroditus for civet coffee production. *Small Carnivore Conservation*, [journal] 47, pp.38-41.

79. Shepherd, C., 2008. Civets in trade in Medan, North Sumatra, Indonesia (1997–2001) with notes on legal protection. *Small Carnivore Conservation, [journal]* 38, pp.34-36.

80. Sherman, J., Brent, L. & Farmer, K., 2016. A picture is worth a thousand words - an analysis of animal images posted on the internet by African ape sanctuaries [PDF] Available at: <https://www.researchgate.net/profile/Kay_H_Farmer/publication/311818853_A_pict ure_is_worth_a_thousand_words_-_an_analysis_of_animal_images_posted_on_the_internet_by_African_ape_sanctuari es/links/585bedd808ae8fce48faaaf2/A-picture-is-worth-a-thousand-words-an-analysis-of-animal-images-posted-on-the-internet-by-African-ape-sanctuaries.pdf>

81. Siriwat, P. & Nijman, V., 2018. Illegal pet trade on social media as an emerging impediment to the conservation of Asian otters species. *Asia-Pacific Biodiversity*, [journal] 11(4), pp.469-475.

82. Su, S. & Sale, J. 2007. Niche differentiation between Common Palm Civet Paradoxurus hermaphroditus and Small Indian Civet Viverricula indica in regenerating degraded forest, Myanmar. Small Carnivore Conservation, [journal] 36, pp.30–34.

83. Tami, G. & Gallagher, A., 2009. Description of the behaviour of domestic dog (*Canis familiaris*) by experienced and inexperienced people. Applied Animal Behaviour Science, [journal] 120(3-4), pp.159-169.

84. The project Luwak SG network., n.d. Project LUWAK Singapore, [online] Available at: < https://projectluwaksg.wordpress.com/about/>

85. Tilly, S., Dallaire, J. & Mason, G. 2010. Middle-aged mice with enrichment-resistant stereotypic behaviour show reduced motivation for enrichment. Animal Behaviour, [journal] 80(3), pp.363-373.

86. Towaha, J., & Tjahjana, B., 2015. Kopi luwak budidaya sebagai diversifikasi produk yang mempunyai citarasa khas. Sirinov, 3(1), pp.19-30.

87. Tsegaye, B., Bekele, A. & BALAKRISHNAN, M., 2008. Feeding ecology of the African Civet Civettictis civetta in the Menagesha Suba State Forest, Ethiopia. *Small Carnivore Conservation*, [journal] 39, pp.19–24.

88. Tucker, C., 2017. Coffee Culture, Local experiences, Global Connections. 2nd ed. [book] Routledge: New York.

89. UNWTO, 2014. Tourism Highlights, [pdf] Available at: < https://www.e-unwto.org/doi/pdf/10.18111/9789284416226>

90. UNWTO, 2018. Tourism Highlights, [pdf] Available at: < https://www.e-unwto.org/doi/pdf/10.18111/9789284419876>

91. UNWTO, 2019. Tourism Highlights, [pdf] Available at: < https://www.e-unwto.org/doi/pdf/10.18111/9789284421152>

92. Vilà, C., Savolainen, P., Maldonado, J., Amorim, I., Rice, J., Honeycutt, R., Crandall, K., Lundeberg, J. & Wayne, R., 1997. Multiple and Ancient Origins of the Domestic Dog. Science, [journal] 276, pp.1687-1689.

93. Wei, F., Furihata,K., Miyakawa, T. & Tanokura, M. 2014. A pilot study of NMR-based sensory prediction of roasted coffee bean extracts. *Food Chemistry*, [journal] 152(1), pp.363-369.

94. Wemelsfelder, F., 2007. How animals communicate quality of life: The qualitative assessment of behavior. Animal Welfare, [journal] 16, pp.25-31.

95. Wermelinger, T., D'Ambrosio, L., Klopprogge, B. & Yeretzian, C., 2011. Quantification of the Robusta Fraction in a Coffee Blend via Raman Spectroscopy: Proof of Principle. *Journal of agricultural and food chemistry,* [journal] 59(17), pp.9074-9079.

96. Wicker, L., Canfield, P. & Higgins, D., 2016. Potential Pathogens Reported in Species of the Family Viverridae and Their Implications for Human and Animal Health. Zoonoses and Public Health. 64(2), pp.75-93.

97. Wild, T., 2013. Civet coffe: why its time to cut the crap, [online] Available at: < https://www.theguardian.com/lifeandstyle/wordofmouth/2013/sep/13/civet-coffee-cut-the-crap>

98. World Animal Protection, 2017. Investigating the illegal wildlife selfie trade in the Amazon, [online] Available at: < https://www.worldanimalprotection.ca/news/investigating-illegal-wildlife-selfie-trade-amazon>

99. World Travel and Tourism Council, 2019. THE ECONOMIC IMPACT OF GLOBAL WILDLIFE TOURISM, [pdf]. Available at: < https://travesiasdigital.com/wp-content/uploads/2019/08/The-Economic-Impact-of-Global-Wildlife-Tourism-Final-19.pdf >

100.   Wright, L., de Silva, P., Chan, B. & Reza Lubis, I., 2015. Aonyx cinereus, [online] Available at: <https://www.iucnredlist.org/species/44166/21939068>