

Beliefs in the Dietary Benefits of Water Monitor, *Varanus salvator* Meat in Western Java, Indonesia

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ABSTRACT

Local knowledge on the benefits of wild meat is probably the motivation behind consumption of such unusual source of protein. Various tribes in Indonesia are known to include wild meat of monitor lizards, *Varanus* spp. in their diet for several reasons including health benefits. Water monitor, *Varanus salvator*, is widely distributed across the Indonesian Archipelago and commonly found even in degraded habitats. Meat and internal organs of this species are commonly known to be consumed in Indonesia by at least three ethnics, i.e. Batak on Sumatra, Dayak on Kalimantan, and Minahasa on Sulawesi islands. We aim to investigate consumption of water monitor meat in a few communities in the western part of Java, where there is likely a custom albeit benign. Previous observations in the province of West Java showed consumption of a smaller scope in Sundanese communities, where religious background is of a restriction. Consumption of water monitor meat all over on Java seemed to be infrequent, yet also prevailing at a level of small business. In the western part of Java, consumption and sales seemed to be dominant in the northern areas, but mostly in Jakarta than in the regencies of West Java province. Direct observations and casual interviews with a few associates in West Java revealed a long-term practice in Cibinong. Besides its gastronomic benefit, meat of water monitor is believed as health tonic for men and a therapeutic method to treat skin diseases.

Keywords: Culinary, local culture, medicinal effect, small business, water monitor meat

INTRODUCTION

Monitor lizard, *Varanus* sp. is thought to have been an important source of meat intake for past hunter-gatherer groups in Southeast Asia based on fossil records (Bochaton *et al.*, 2019). Consumption of exotic meats, including of water monitors, may be advantageous for human health because of their nutritional properties, i.e. low levels of fat, high contents of protein, essential amino acids, fatty acids and minerals (Domínguez *et al.*, 2019). In fact, *Varanus salvator* is one among the most popular wildlife species used for traditional

medicine in Indonesia (Mardiastuti *et al.*, 2021). Some certain ethnics in Indonesia consume meat of monitor lizards as a part of their traditional food. The Minahasa in North Sulawesi prepares Water monitor meat as a part of their daily meal besides other wild meat (de Lisle, 2007). Similarly, the Dayak Kanayant in West Kalimantan traditionally gets their protein from Water monitor meat (Richardo *et al.*, 2019), whereas the Dayak Kenyah Lepoq Tukung in East Kalimantan consume body parts of Water monitor for medicinal purposes (Usat *et al.*, 2016). In North Sumatra, some Batak tribes use Water monitor meat to prepare their *tambul*, which is a complementary snack or light meal to their social drinking culture (Ikegami, 1997; Arida *et al.*, 2020). People of these tribes are generally of Christian faith with no religious restriction on meat consumption. In West Java, the majority of Sundanese are muslims, who are not supposed to eat meats of carnivorous animals such as Water monitors; however some communities in West Java considered consumption of Water monitor meat to maintain fitness, cure for skin diseases, increase stamina, and as a new culinary experience (Uyeda, 2014; Nijman, 2016).

The Asian Water monitor, *Varanus salvator*, is a carnivorous species that is often seen around human-made structures, where individuals prey on various vertebrates and invertebrates (Karunarathna *et al.*, 2008). This species was also found eating human food waste (Træholt 1994; Uyeda, 2009; Uyeda *et al.*, 2015). Being a generalist predator that adapts easily to human residential areas, water monitors are often reported to have been attacking domesticated chicken (personal observation). Conflicts with humans are often evoked from such incidence. Not only is water monitors uncommon for consumption in Java because of their garbage-feeding habit and as carrion feeders (Uyeda *et al.*, 2015), the species is also naturally perceived as being fearsome for being a large reptile. This perception is concordant with a religious commandment in Islam for banning the flesh of such animal.

In terms of consumption and sale, utilisation of water monitor meat in West Java appears to be contradictory despite a number of reported cases (Uyeda, 2014; Nijman, 2015; Nijman, 2016). Available information in the internet on the use of meat of this species can only confirm such activities on Java despite existing taboo. We attempt to review current consumption and sales of water monitor meat in selected areas in the western parts of Java and describe the motivations behind these activities. This study aims at underlining the prevailing beliefs of using a part of wildlife in the daily life of some communities in western Java.

METHODS

We gathered our data on utilisation of water monitor meat during our visits to a turtle farm in Karawang in March 2019, a reptile slaughterhouse in Cirebon in February 2020, and a *Cobra Shop* in Cibinong in November and December 2020. Information on motivations, social backgrounds, and the subsequent activities of sales or consumption of water monitor meat were collected by direct observation and casual interviews with staff in the turtle farm, reptile slaughterhouse, shopkeeper, and customers. We interviewed on the use of monitor lizard meat by local communities in each of the three towns visited and used three points of view, i.e. 1) owners of reptile farm and slaughterhouse, 2) water monitor meat vendor, and 3) consumers. Additionally, internet browsing was also carried out to complement information on the availability of water monitor meat vendors across Java. Data of all the three points of view were compared, in order to identify reasons behind the sale and consumption of monitor lizard meat in the three sampling sites. We attempt to find a

relationship between motivations of consumption and sale, in order to draw a preliminary conclusion on the public knowledge of water monitor meat use in the area.



Figure 1. Study locations in the regencies of Bogor, Karawang and Cirebon in the northern coast of West Java. Information on consumption and trades in Indramayu is indirectly obtained from staff of the slaughterhouse in Cirebon (map: modified from Wikipedia)

RESULTS AND DISCUSSION

Eaten Pest in Karawang

In early March 2019, sightings of monitor lizards are frequent around artificial ponds built to farm variable species of turtles, including the Red-eared slider, *Trachemys scripta elegans* and fishes, such as Catfish and Carps. Two Water monitor lizards were observed during one week of observation, one of which was at the peak of its reproduction stage and found predating on turtle eggs. These lizards appeared around the ponds mostly in the afternoon between 14:00 and 18:00, when human activities in the farm started to be less intensive. Farm staffs and neighbouring residents considered these lizards pests and sometimes used air rifles to shoot them. However, the two Water monitors in our observation were captured by means of a snare trap. A female with a total length of 147.0 cm and was gravid and a juvenile with a total length of 96.9 cm were collected by the farm staffs on two consecutive days between 16:00 and 17:30 and prepared by local residents for consumption the next day.

Based on their colour patterns, the two specimens were justified as *Varanus salvator bivittatus* (Figure 2). Two characteristic patterns of this subspecies found on Java are the presence of (1) a black band with whitish bordering line that runs along the sides of the neck through the shoulders, and (2) two yellowish white bands that are formed of merging doughnut-shape structures (*ocelli*) on the front part of the back. The female specimen was then removed of its inner organs and skinned. Eighteen eggs were removed from its body, in addition to ten shells of Red-eared sliders eggs.

Because Water monitor is able to adapt to urbanised areas, the species range overlaps with growing human settlements and household waste offers food source for this generalist

species (Uyeda, 2009). In our observation, farmed turtle eggs, live fish, and possibly their carrions attract Water monitors to a variety of food items.



Figure 2. A gravid *Varanus salvator bivittatus* (left and middle) captured in turtle and fish farm in Karawang, West Java with turtle egg-shells (right, blue arrows) in its stomach

Other than in Karawang, consumption of Water monitor meat in West Java may be more common than thought. It is estimated that 50,000 individuals of *V. salvator* were consumed in Java every year (Nijman, 2016). Previous studies reported consumption of Water monitor meat in Banten (Uyeda, 2014) and Lembang and Pangandaran (Nijman, 2016). Water monitor meat is also consumed in other parts of Java, including in Banyumas Regency, Central Java (Kusdiati, 2017) and in Pasuruan Regency, East Java (Firdaus, 2019). A study in the rural areas in Central Java reported the use of *Varanus* sp. as medicinal animal, especially to cure for asthma (Husain and Wahidah, 2019); whereas on Madura Island near Java, consumption of monitor lizard by local residents was reported for coping with food scarcity (Adi *et al.*, 2020). These reports are congruent with results of our internet search on food stalls and resellers distributing water monitor meat and other products (Table 1). This indicates that consumption of water monitor meat on Java is a regular practice, although majority of its inhabitants are Muslim (Nijman, 2015).

Table 1. Results of internet search on water monitor meat sales in food stalls and restaurants in 25 major towns/regencies across Java

	Western	Central	Eastern
number of records	15	13	17
earliest known year of operation	1990	2010	2002
greater towns	Cirebon Indramayu Jakarta Barat Jakarta Pusat Jakarta Timur Jakarta Selatan Jakarta Utara Subang Tangerang	Banyumas Batang Grobogan Kudus Pati Pemalang Salatiga Semarang Sleman Surakarta	Banyuwangi Bojonegoro Jombang Kediri Lamongan Madiun Malang Surabaya Tulungagung

types of meat dish	abon goreng krispi pedesan rica-rica sate sop	goreng rica-rica sate tongseng	abon bistik bumbu rujak goreng krengsengan rica-rica sate saus pedas sop tongseng
price range (IDR) per serving	20-50K	20-40K	10-30K
raw meat	yes	no	no
other products	oil skin crackers	oil	oil skin crackers handycrafts

We recorded sales of water monitor meat dishes in 24 major towns/regencies in Java from our internet search and add non-commercial events of utilisation of water monitor meat for consumption in the province of West Java. Based on this list only, it seems demands are similar across Java, where sales are distributed in 9 to 10 towns/regencies. However, more cooking styles are applied in the eastern part of the island and less in the central part (Table 1).

Culinary Experience in Cirebon

We observed methods of preparation for Water monitor meat in a separate trip to Cirebon, in the province of West Java. During our visit to a reptile slaughterhouse, we learned that some of the staffs consume Water monitor meat occasionally during gatherings with family and friends. The slaughterhouse is located among ponds of farmed catfish, where Water monitors sometimes seen foraging for the fish. Thus, Water monitor may be also considered as pest in this regard.

Sate (Figure 3) was never in their method of preparations, but they were willing to experiment with the meat they have processed during our visit. Another method of Water monitor meat preparation in Cirebon was the Indramayu style of spicy stew “pedesan”. Indramayu is a bordering town with Cirebon and “pedesan” style is a popular method in Cirebon for preparing duck meat. The 4-step cooking method is adaptable for cooking Water monitor meat (Figure 4). The term “pedesan” comes from the word “pedes”, which means “spicy”. Thus “pedesan” literally means “of spices”. The dish is full of flavour and several spices were included to create this aromatic dish, i.e shallots, garlic, turmeric, red chillies, candlenut, galangal, keffir lime leaves, and lemongrass. Into the dish was also added salt, kecap manis, and tomatoes.

We gathered information during our interview with staffs of the slaughterhouse that a family in Indramayu produced Water monitor meat floss for sale. The meat floss is called *abon biawak* that can be kept longer for consumption than the other products of preparation methods mentioned above. The price of *abon biawak* is cheaper than the regular beef floss or *abon sapi*. Thus, Water monitor meat may provide cheap alternative of animal protein source. We sampled Water monitor meat floss for future research on nutritional values and possibly medicinal properties of reptile meat in the near future.



Figure 3. (a) Water monitor meat grilled as sate (right) compared with lamb sate (left) and chicken sate (middle); (b) Skewers of sate were prepared by grilling



Figure 4. Water monitor cooked in Indramayu style of spicy stew “pedesan”

The Water monitor meat is consumed only irregularly in Cirebon and is also the case in Karawang. The staffs of the turtle farm and slaughterhouse only vaguely mentioned that Water monitor meat could help cure skin diseases. Thus, we considered that Water monitor meat is an economical selection for a source of protein due to the availability of the animals in their habitat and easy access for these communities.

We noted that consumption of Water monitor meat in the western regencies of Java might not be uncommon given previous reports on the occurrence in more southern locations (Uyeda, 2014; Nijman 2016) and our findings in Karawang and Cirebon regencies in the north coasts. Our searches through the internet resulted in records from northern as well as central regions (Figure 5). Evidently, our short observations in both locations show that some communities in the province of West Java, regardless of ethnic and religious belief, search for water monitors readily and with aim that is beyond pest eradication and trade. Water monitor meat was skilfully processed for occasional consumption in some communities in the two regencies, probably more for a variety than the belief that the meat has some health effects.

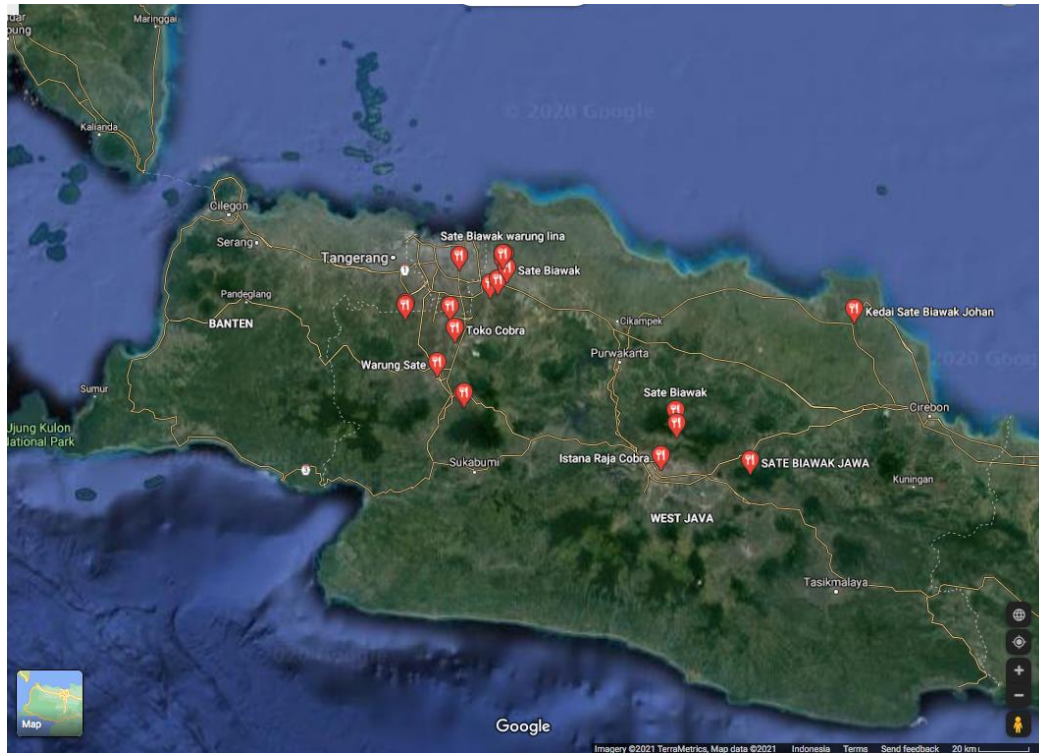


Figure 5. Occurrences of “warung makan biawak” in 15 towns in the western part of Java sourced from google.com/search

Small and Successful Business in Cibinong

The existence of restaurants and food stalls serving water monitor meat dishes indicate a consistent sale and business in this field. The business seems to be ongoing simply due to standing demands. *Warung Cobra* is a speciality shop opened for business since 1984 with prevailing demands on reptile products, including cooked meat of water monitor, reticulated pythons, and cobras. The shop is named after a snake species and may have been used to cue for “traditional remedy sourced from reptiles”. Some customers were not staying long enough to eat their unusual meal, while some others took their products away from the shop. Unlike regular meat restaurants such as those selling chicken or lamb sate, customers were more likely to consume meat dish from this shop unseen by the general public. They briefly stated that water monitor meat is one kind of treatment for acnes and skin rash. Thus, the consumption of water monitor meat seems to be primarily driven by a belief that it is a traditional cure for some skin disorders.

Other than Warung-Cobra type of small business in meat dishes, there are also simplified restaurants (*warung makan* = eating kiosk) retailing water monitor meat dishes that openly advertised their products in the internet. These places range from humble food stalls to permanent buildings with conspicuous signs across towns in Java (Figure 6). Warung Cobra in Cibinong was opened as a portable food stall in 1984 and the owner moved his business to a permanent building in 1990, while demands are steady. Some of these stalls use the keyword *obat* (medicine) and *ekstrim kuliner* (extreme culinary), which directly indicate their point of views on the sale of meat dish. Additionally, customers of these stalls mentioned that water monitor meat could act as men’s aphrodisiac.



Figure 5. Water monitor meat soup and oil sold in the Warung Cobra in Cibinong, Bogor Regency

We spoke in the shop with the second-generation owner, whose father was founder of the business. Price of water monitor meat dishes sold at Warung Cobra range from IDR 30-50K for *goreng* (deep-fried meat), *abon* (meat floss), *sate* (grilled meat in skewers), and *sop* (soup). In addition to dishes of reptile meat, other products are also available for sale, including cobra and water monitor oils, water monitor capsules, cobra ointment, as well as taxidermies of cobras and water monitors. Customers in the shop also believe that oil and capsules processed from water monitor are effective treatment for skin problems.

Estimates of harvested individual water monitors to supply demands for meat cannot be calculated currently with enough data from the field. Eight to ten live individuals of water monitor were supplied from neighbouring districts around Cibinong with a total price of IDR 250 Thousands once per week or every other week. Average weekly profit for this shop is IDR 500 Thousands or about US\$ 30 for the sale of meat dishes and oil. A minimum of 20 individual water monitors might have been harvested monthly for this shop only. If there were 20 shops with similar level of business in the western part of Java, 400 individuals would have been sold per month to supply demands for meat dish, and probably also for oil. Thus, an estimate of yearly harvest for local demands is 4,800 individuals for this region. On the other hand, Nijman (2015) estimated tens of thousands of water monitor being harvested every year to meet demands of meat trade across Java. None of these estimates are unlikely close to the real condition because direct surveys for harvests of water monitor is still lacking in Indonesia. Nevertheless, demands seem to be settled and continued field surveys in speciality restaurants, food stalls, and shops such as Warung Cobra could give more insights onto the volume of traded individual animals.

Traditional Knowledge on Medicinal Food

In this study, we updated a previous report on the availability of restaurants or food stalls serving water monitor meat dishes occurring in more than 23 cities across Java (Nijman, 2015). Utilization of water monitor meat for consumption and/or treatment for skin diseases may be more widespread than thought in the western part of Java, given our findings on consumption at non-commercial level in Karawang and Cirebon. Our findings on the religious background of these communities also confirmed that religious belief seems to be relaxed when it comes to intake for treating a disease. Otherwise, consumption of water monitor meat is forbidden for these people. We consider our respondents in Karawang, Cirebon, and Cibinong were similar in their level of income and education, given their thinking about the subject on alternative food for medicine. Their motivations of

consumption were primarily health and the cure of skin diseases, whereas vendors see the chance to fill this gap.



Figure 6. Types of places selling various dishes of water monitor meat across Java (clockwise): portable food stalls in eastern Jakarta and Lamongan (East Java), semi-permanent kiosks in Subang (West Java), and permanent building of a restaurant in Kudus (Central Java) (Photo: tribunmanado.co.id, travelbase.com, google.com/search, bisnis.com)

Overall our current records of consumption and sale of water monitor meat in the western part of Java, the northern regencies in West Java province are apparently the significant contributors. In addition, such restaurants and food stalls vending water monitor meat dishes are also available in Jakarta, which is also located in the northern part of Java but politically a Distinctive Capital Territory (Figure 5). Occurrences of consumption and sale in the northern areas might be explained by habitat distribution of water monitors in the lowlands of northern Java than in the areas of higher elevation. Water monitors are also adaptive to residential areas in the lowlands (Karunarathna *et al.*, 2008; Lawton *et al.*, 2018). A local culture that is deeply rooted in the communities may also influence this consumption driven by belief on the efficacy of water monitor meat as a treatment to skin problems. Notably, their belief on the therapeutic effect of water monitor meat is probably stronger than their religious custom. As communities are holding this belief, small-profit sectors take the advantage of supplying their demands. Steady demands are enough for resellers to run the business, although in a localized scope and at a lower level of revenue.

Medicine and food may not be clearly distinguished in traditional human societies and their medicinal culture may develop into important implications for modern medicine. (Huffman, 2001). In western Java, the use of water monitor meat as a treatment for skin problems is likely to be based on medicinal habit of previous generations and being extended to current modern life. Such utilisation of clinically untested treatment termed as alternative medicine, of which efficacy and long-term safety is often questionable (MacLennan *et al.*, 2001), is a common practice in the world, including in Indonesia (Liem, 2019). A placebo effect probably has played an important role for this habit to be passed on to the next generations. Thus, current community knowledge in the area on the value of water monitor meat as alternative remedy is likely derived through inheritance or from social interactions

with those believing in the therapeutic effects of this wild meat. Further studies on the active compounds of water monitor meat are necessary to reveal any healing properties that it may contain.

CONCLUSIONS

Consumption of Water monitor, *Varanus salvator*, in some communities in western Java is partly driven by a belief in the healing properties of this wild meat for skin problems. This cultural habit seems stronger than a religious commandment of not eating flesh of fierce animals. Occasionally, some members of these communities also accept one type of wild meat in their daily meals as a variation, which is termed as extreme culinary. A belief on the aphrodisiac effect of eating water monitor meat is another reason that seems to lure the steady demands on water monitor meat. Communities living in towns in the northern regencies of West Java presumably inherit a knowledge on the use of water monitor meat and other reptile species such as cobras as remedy for skin diseases and adopt the belief as a local culture.

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