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## Data Article

## Data on diet and growth by giant panda in zoo Negara, Malaysia



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## ABSTRACT

In this data article we present the determinations of the diet preference and growth of a pair of the giant panda, *Ailuropoda melanoleuca* (David, 1869) from Zoo Negara Malaysia. Once considered as endangered, the captive giant pandas were given with nine species of local bamboo in separate indoor enclosures.

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**Keywords:**

Giant panda  
 Captivity  
 Conservation-dependent species  
 Zoo negara

We recorded data between May 25, 2014 and December 31, 2016 and analysed it based on food preference, the pattern toward food consumption and body weights using SPSS v25.0 (IBM, USA). Data on the bamboo preference, daily average bamboo provided and consumed, and factors predicting of body weight per individual are reported in this article. The data highlight correlation between panda growth (kg) to the part of bamboo consumed (kg) and exhibit the pattern of preferred part of food (i.e.: either the leaf, culm or shoots of bamboo variety) for panda consumptions. The food consumption toward the body weight was modelled using logistic regression analysis to help determine the pattern of food consumption and body weight of giant panda in the future and based on regression model 1, only consumed variable is significance to the model.

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**Specification Table**

Subject area	Ecology
More specific subject area	Dietary and foraging ecology
Type of data	Tables and figures
How data was acquired	Through field works in captivity, direct observation and analysed using SPSS v22.0
Data format	Raw, semi-analysed and analysed
Experimental factors	Analysis of 952 data points of food preference, consumption and body weight from a pair of giant panda from May 25, 2014 until December 31, 2016
Experimental features	The pandas were offered at least two species of bamboo daily. The daily data points were recorded and analysed using SPSS v25.0 [1,2]
Data source location	Zoo Negara, Malaysia (3.2087° N, 101.758° E)
Data accessibility	The data is provided in this article
Related research article	I. Che Ishak, J.J. Rovie-Ryan, M.N. Ramli, C. Li, H. Yang, A.N. Zainudin, A.H. Samsuddin, M.F. Mohamad Yusoff, A. Ibrahim, E.A. Abdullah, N.M. Abdullah, R. Topani, Effects of preference and nutritional values of local bamboo towards growth performance of captive giant pandas ( <i>Ailuropoda melanoleuca</i> ) in Zoo Negara, Malaysia. <i>J. Sustain. Sci. Manage.</i> , 11 (2016) 92–98.

**Value of the Data**

- The dataset presents the diet and growth of a pair of captive giant panda at Zoo Negara, Malaysia.
- Data on daily food consumption can benefit the Giant Panda Research Consortium and target research groups to ensure this iconic species' long term survival for the next generation and recovery of wild populations in China.
- The current food selection shows the seven local bamboo species can be served as a part of diet and nutrition for this conservation-dependent species. These data highlight the important in conserving and cultivating the bamboo species.
- The data provide an essential reference for the management authorities to formulate an adaptive system and to ensure the success of the captive conservation program in Malaysia and elsewhere in the world.
- Data on the bamboo species consumed in selected zoos in the world are useful to the zoos intending to keep this species in captivity.

**1. Data**

The giant panda, *Ailuropoda melanoleuca*, was once known as an Endangered (EN) species since 1990 before been down listed to Vulnerable (VU) in recent assessment [3]. Giant pandas in captivity will be returned to the range state for release to reinforce the wild populations in China. As part of a

conservation effort, a pair of giant panda, Fu Wa (male) and Feng Yi (female) from Wolong National Nature Reserve, Sichuan was given on captive breeding loan by the government of China to Malaysia for 10 years starting from May 2014 to April 2024.

Here, we present the diet and growth of Fu Wa and Feng Yi at Zoo Negara, Malaysia (Figs. 1–3). We provided a table (Table 1) of local bamboo species, and listed known bamboo species provided at *in-situ* and *ex-situ* conservation areas across the world (Supplementary Table 1) [4–23]. Table and graph provided to show the list of data on local bamboo and daily average of food provided and consumed by giant panda (Tables 2 and 3). The correlation test between panda growth (kg) to the part of bamboo consumed (kg) and exhibit pattern of preferred part of food for panda consumptions are shown in Tables 4 and 5 where Fu Wa and Feng Yi significantly preferred bamboo culm compared to leaf and shoots. Body weight profile and determination of giant panda are shown in Tables 6 and 7. All monthly related data were tabulated in Supplementary Tables 2–6 and visualised in Figs. 4–7. We constructed a model using logistic regression analysis to determine the food consumption to predict the body weights (Table 8). The regression models are shown in Tables 9 and 10.

**Table 1**

List of local bamboo species provided, and bamboo parts consumed by giant pandas.

	Species name	Local name	Locality	Bamboo parts		
				Culm	Leave	Shoot
1	<i>Bambusa heterostachy</i>	Buluh galah	Perak	x		
2	<i>Bambusa multipex</i>	Buluh pagar	Selangor			
3	<i>Bambusa vulgaris</i>	Buluh aur	Selangor	x	x	x
4	<i>Bambusa vulgaris cv. vittat</i>	Buluh aur gading	Selangor	x	x	
5	<i>Bambusa vulgaris f. waminii</i>	Buluh botol	Selangor		x	
6	<i>Dendrocalamus asper</i>	Buluh beton	Selangor	x	x	x
7	<i>Gigantochloa albociliata</i>	Buluh madu	Pahang			
8	<i>Gigantochloa thoi</i>	Buluh beting	Selangor	x	x	
9	<i>Thyrsostachys siamensis</i>	Buluh siam	Negeri Sembilan		x	



**Fig. 1.** Fu Wa (male) is feeding the local bamboo (*Dendrocalamus asper*) in Zoo Negara Malaysia.



**Fig. 2.** Feng Yi (female) is resting at the enrichment structure in Zoo Negara Malaysia Giant Panda exhibit. (Photo credit: Akmal Hadi Samsuddin).



**Fig. 3.** Local bamboos a) *Bambusa heterostachy*, b) *B. multiplex*, c) *B. vulgari*, d) *B. v. cv. vittata*, e) *B. v. f. waminii*, f) *Dendrocalamus asper*, g) *Gigantochloa albociliata*, h) *G. thoi* and h) *Thyrsostachys siamensis*.



**Table 2**

Daily average food provided and consumed by giant pandas.

Giant panda	Type of foods	Average food provided daily/kg	Average food consumed daily/kg	Daily consumption (%)
Fu Wa (Male)	Bamboo culm	28.27	17.09	80.47
	Bamboo leaves	7.45	2.60	12.24
	Bamboo shoot	0.03	0.01	0.06
	Total bamboo	36.02	19.70	92.00
	Supplement	1.70	1.70	8.00
	Total food	37.43	21.24	100.00
Feng Yi (Female)	Bamboo culm	23.01	11.62	69.07
	Bamboo leaves	8.82	3.28	19.52
	Bamboo shoot	0.29	0.19	1.15
	Total bamboo	32.12	15.10	89.00
	Supplement	1.88	1.95	11.00
	Total food	33.74	16.82	100.00

## 2. Experimental design, materials and methods

Daily observation for food serving and consumption by giant pandas were carried out from May 25, 2014 until December 31, 2016 in Zoo Negara, Malaysia. The giant pandas were housed separately in the indoor enclosures which are maintained at a temperature range of 21 °C–23 °C throughout the year. They are free to undergoes any activities in their corresponding enrichment structure within their enclosed area (Figs. 1–2). A total of nine species of local bamboos were harvested from central Peninsular Malaysia (Table 3, Fig. 3). To keep it fresh, bamboo culms, leaves and shoots were kept in a water sprayer chiller for no longer than three days. The bamboo culm aged 1–2 years was cut into pieces (approximately 100 cm long and 5 cm width). At least two species of local bamboo were served to the giant panda, six times a day at 8.00 a.m., 11.00 a.m., 2.30 p.m., 5.30 p.m., 8.30 p.m. and 10.30 p.m. [6]. Supplementary food such as fruits, carrot and panda cake were also given. We recorded the monthly and daily data on food provided and consumed by giant pandas are summarised in Supplementary Tables 2–6 and Figs. 4–7.

Fu Wa and Feng Yi consumed more bamboo culm than bamboo leaves and shoot as summarised in Table 2. We observed that the giant pandas were selectively consuming seven local bamboo species, exclude *Bambusa glaucescens* and *Gigantochloa albociliata* as summarised in Table 3 while Supplementary Tables 2–5 showed the monthly and daily data recorded on bamboos provided and consumed during 32-months of observation. The correlation between different types of bamboo parts consumed and panda growth in weight (kg) is displayed in Tables 4 and 5

To exhibit the regression between amounts of each food consumed and body weight, average monthly body weight and faecal weight were taken (Supplementary Table 6) and analysed using the Statistical Package for the Social Sciences (SPSS) v25.0 (Tables 6 and 7) [1,24,25]. Since the supplement and bamboo are categorised as independent variables, the determinants of food consumption toward the body weight were modelled using logistic regression analysis (Table 8). The regression model examine the relationship between genders, food provided and consumed by giant panda where the estimated equations would be used to determine the supposed weight consumed by giant panda. The regression model indicate that giant panda consumption are based on gender related. Based on regression model 1, only consumed variable is significance to the model, therefore the model 1 and simplified model 2 could be used in estimating the increase of decrease of weight of giant panda and estimate their food intakes (Tables 9 and 10).

**Table 3**  
Summary of nine local bamboos provided and consumed by giant pandas.

Species name	Provided (kg)								Consumed (kg)							
	Fu Wa (Male)				Feng Yi (Female)				Fu Wa (Male)				Feng Yi (Female)			
	Min	Max	Average	Total	Min	Max	Average	Total	Min	Max	Average	Total	Min	Max	Average	Total
1 <i>Dendrocalamus asper</i>	0.00	57.44	20.67	19490.94	0.00	61.66	19.77	18667.43	0.00	35.35	11.61	10946.64	0.00	35.40	9.37	8844.23
2 <i>Bambusa vulgaris</i>	0.00	41.94	4.77	4497.01	0.00	48.50	4.72	4453.51	0.00	24.63	2.57	2422.74	0.00	36.90	2.20	2081.48
3 <i>Bambusa heterostachy</i>	0.00	37.10	2.37	2236.81	0.00	48.50	2.34	2205.14	0.00	25.30	1.53	1442.94	0.00	23.70	1.36	1280.51
4 <i>Gigantochloa thoi</i>	0.00	42.31	4.22	3980.09	0.00	34.12	1.54	1454.57	0.00	26.95	2.18	2056.77	0.00	20.20	0.62	585.91
5 <i>Bambusa vulgaris cv. vittat</i>	0.00	51.68	1.74	1642.57	0.00	40.88	1.15	1085.16	0.00	26.96	0.99	936.46	0.00	11.09	0.41	387.15
6 <i>Thyrsostachys siamensi</i>	0.00	12.25	1.57	1480.20	0.00	15.96	1.60	1508.04	0.00	5.38	0.59	553.81	0.00	7.80	0.69	646.90
7 <i>Bambusa vulgaris f. waminii</i>	0.00	16.82	0.52	492.23	0.00	15.60	0.59	554.58	0.00	8.84	0.17	164.51	0.00	7.95	0.23	214.21
8 <i>Gigantochloa albociliata</i>	0.00	3.19	0.01	7.26	0.00	11.38	0.04	35.93	0.00	1.47	0.00	3.39	0.00	5.92	0.02	16.00
9 <i>Bambusa multiplex</i>	0.00	9.30	0.04	33.55	0.00	7.00	0.03	28.82	0.00	1.89	0.00	4.30	0.00	2.00	0.00	4.28

**Table 4**

Correlation between Fu Wa (male) growths (kg) with different part of bamboo consumed (kg).

	Weight (kg)	Culm consumed (kg)	Leaf consumed (kg)	Shoot consumed (kg)	Bamboo consumed (kg)
Weight (kg)	1.0000				
Culm consumed (kg)	0.6716	1.0000			
Leaf consumed (kg)	0.7639	0.5149	1.0000		
Shoot consumed (kg)	-0.2615	-0.2310	-0.0979	1.0000	
Bamboo consumed (kg)	0.7600	0.9762	0.6884	-0.2094	1.0000

**Table 5**

Correlation between Feng Yu (female) growths (kg) with different part of bamboo consumed (kg).

	Weight (kg)	Culm consumed (kg)	Leaf consumed (kg)	Shoot consumed (kg)	Bamboo consumed (kg)
Weight (kg)	1.0000				
Culm consumed (kg)	0.0609	1.0000			
Leaf consumed (kg)	-0.0438	0.6063	1.0000		
Shoot consumed (kg)	-0.0184	-0.2852	-0.1246	1.0000	
Bamboo consumed (kg)	0.0379	0.9399	0.7328	0.0057	1.0000

**Table 6**

Body weight, total food consumed and faecal output of giant pandas.

Items	Giant panda	
	Fu Wa (Male)	Feng Yi (Female)
Body weight range (kg)	117–138	92–127
Average weight (kg)	128.81	105.87
Daily total food consumed range (kg)	1.60–39.37	1.94–45.80
Daily average total food consumed (kg)	21.24	16.82
Daily faecal output range/kg	3.68–15.60	0.98–16.80
Average daily faecal output (kg)	9.85	7.67
Percentage of daily total food consume/body weight	16.59	16.04

**Table 7**

Determination of body weight of giant pandas.

Variable	Weight					
	Fu Wa (Male)			Feng Yi (Female)		
	Unstandardized $\beta$	Standardized $\beta$	Sig.	Unstandardized $\beta$	Standardized $\beta$	Sig.
Constant	125.254			104.965		
Supplement	2.092	0.215	0.000	0.491	0.053	0.105
R	0.215			0.053		
R <sup>2</sup>	0.046			0.003		
Adjusted R <sup>2</sup>	0.045			0.002		
Constant	123.304			106.274		
Bamboo	0.279	0.375	0.000	-0.027	-0.043	0.184
R	0.375			0.043		
R <sup>2</sup>	0.141			0.002		
Adjusted R <sup>2</sup>	0.140			0.001		

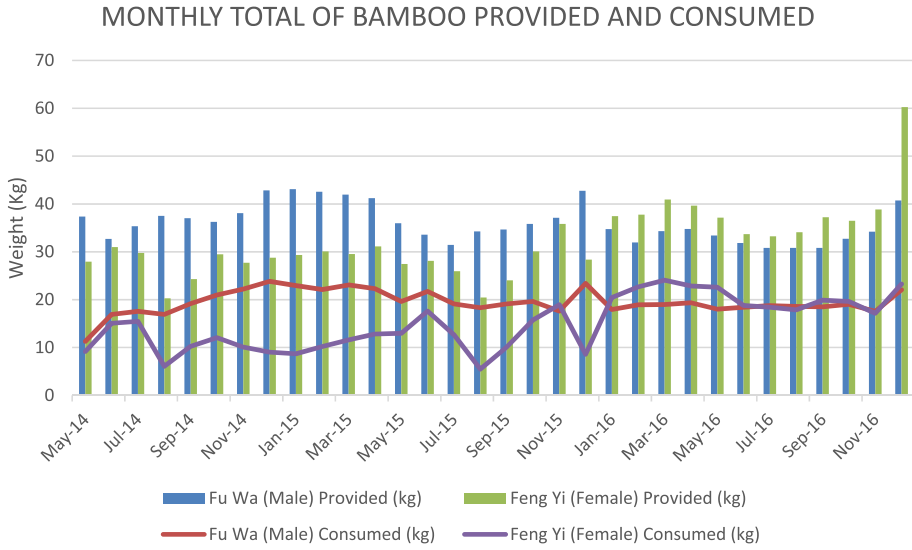


Fig. 4. Monthly total of bamboo provided and consumed by giant pandas (weight in kg).

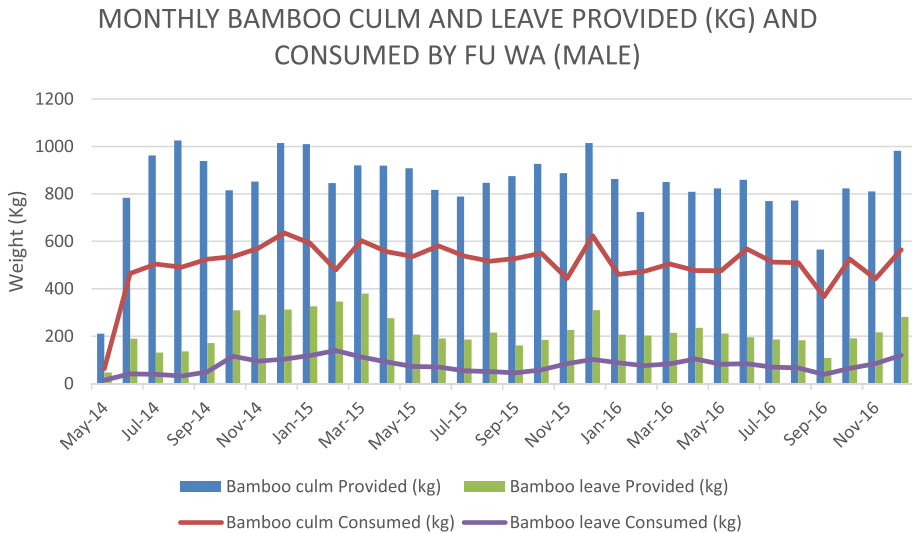


Fig. 5. Monthly bamboo culm and leave provided and consumed by Fu Wa (in kg).



MONTHLY BAMBOO CULM AND LEAVE PROVIDED (KG) AND CONSUMED BY FENG YI (FEMALE)

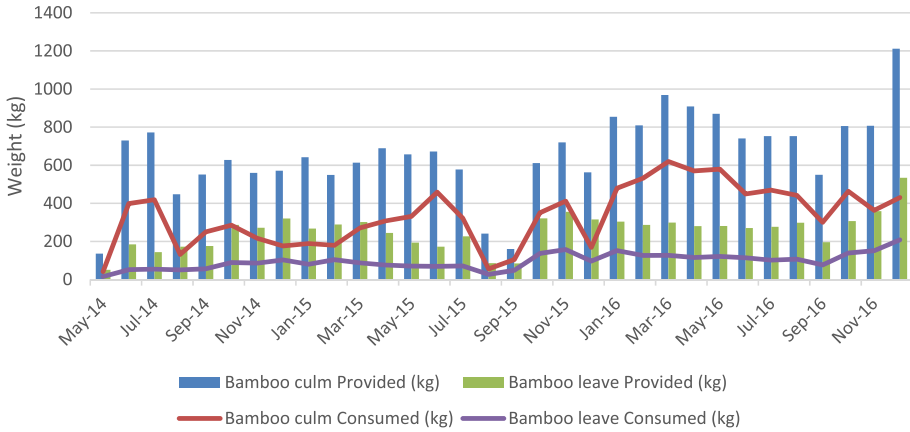


Fig. 6. Monthly bamboo culm and leaf provided and consumed by Feng Yi (in kg).

AVERAGE DAILY BAMBOO CULM AND LEAVE CONSUMPTION BY GIANT PANDA

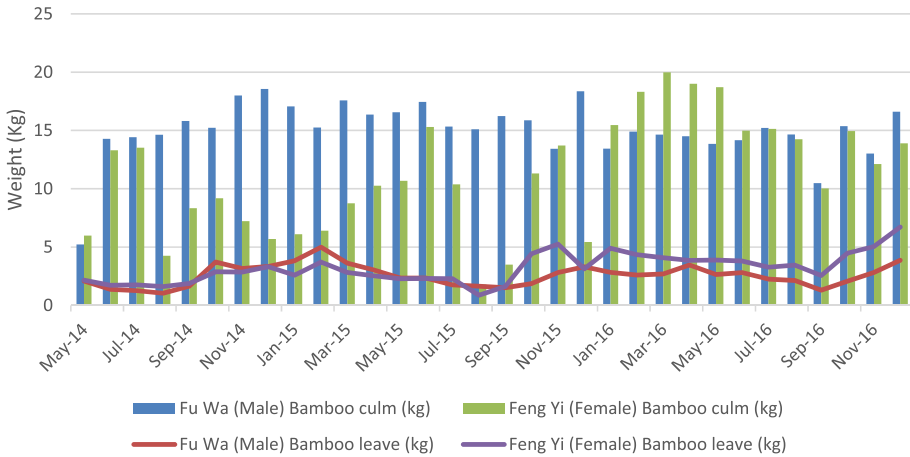


Fig. 7. Average bamboo culm and leaf (daily) consumed by giant pandas.

Table 8  
Regression coefficients result.

Coefficients <sup>a</sup>						
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.175	.323		6.735	.000
	Provided	.011	.015	.141	.771	.444
	Consumed	-.062	.019	-.585	-3.196	.002

<sup>a</sup> Dependent Variable: GenderRecode.

**Table 9**

Model regression 1 and Model regression 2.

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Model regression 1:
$y = 2.175 + 0.11x_1 - 0.062x_2$
Model regression 2:
$y = 2.175 - 0.062x_2$

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**Table 10**Regression model summary with value of  $R^2$ .

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Model summary				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	.482 <sup>a</sup>	.232	.207	.449

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<sup>a</sup> Predictors: (Constant), Consumed, Provided.

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## Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.dib.2019.105082>.

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