

# Activity Budget and Postural Behaviours in Orangutans on Bukit Merah Orang Utan Island for Assessing Captive Great Ape Welfare

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**Manuscript Source:** <https://www.biorxiv.org/content/10.1101/2020.12.15.422872v3>

**Manuscript Authors:** Siti Norsyuhada Kamaluddin, Ikki Matsuda & Badrul Munir Md-Zain

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### Research Paper Sections:

The sections of the research paper input text parsed in this audit.

[illegible]

**Title**      **Activity Budget and Postural Behaviours in Orangutans on Bukit Merah Orang Utan Island for Assessing Captive Great Ape Welfare**

**S1 [001]      Abstract**

**S1 [002]**      Assessments of the welfare status of captive and semi-captive animals often compare how their expression of natural behaviours differs from that of free-ranging conspecifics.

Assessments ...  
... of the welfare status ...  
... of captive ...  
... and semi-captive animals often compare how their expression ...  
... of natural behaviours differs ...  
... from that ...  
... of free-ranging conspecifics.

**S1 [003]**      Bukit Merah Orang Utan Island (BMOUI) is the only orangutan rehabilitation and conservation centre in the Malay Peninsula.

Bukit Merah Orang Utan Island ...  
... (BMOUI) ...  
... is the only orangutan rehabilitation ...  
... and conservation centre ...  
... in the Malay Peninsula.

**S1 [004]**      We recorded and analyzed the activity budget and postural behaviours of orangutans moving freely in the enclosures on BMOUI to evaluate their welfare status.

We recorded ...  
... and analyzed the activity budget ...  
... and postural behaviours ...  
... of orangutans moving freely ...  
... in the enclosures ...  
... on BMOUI ...  
... to evaluate their welfare status.

**S1 [005]**      From December 2015 to December 2016, we observed three individuals: an adult male, an adult female and a subadult male, and collected 252 hours of focal data (84 hr/individual).

From December 2015 ...  
... to December 2016, ...  
... we observed three individuals: ...  
... an adult male, ...  
... an adult female ...  
... and a subadult male, ...  
... and collected 252 hours ...  
... of focal data ...  
... (84 hr/individual).

**S1 [006]** The orangutans' activity budget was dominated by resting (60%), feeding (13%), playing (14%) and moving (9%).

The orangutans' activity budget was dominated ...  
... by resting ...  
... (60%), ...  
... feeding ...  
... (13%), ...  
... playing ...  
... (14%) ...  
... and moving ...  
... (9%).

**S1 [007]** The study individuals heavily relied on the artificial foods (79.2%), and they spent majority of their time on the ground (85.1%) with occasional arboreal observations like using the wooden tree platform or a rope.

The study individuals heavily relied ...  
... on the artificial foods ...  
... (79.2%), ...  
... and they spent majority ...  
... of their time ...  
... on the ground ...  
... (85.1%) ...  
... with occasional arboreal observations like ...  
... using the wooden tree platform ...  
... or a rope.

**S1 [008]** Despite some significant individual differences, behavioural categories followed a similar trend: resting > feeding > moving > playing, except that the subadult male spent significantly more time playing (35%) than the two adults (3–4%).

Despite some significant individual differences, ...  
... behavioural categories followed a similar trend: ...  
... resting > feeding > moving > playing, ...  
... except ...  
... that the subadult male spent significantly more time playing ...  
... (35%) ...  
... than the two adults ...  
... (3–4%).

**S1 [009]** The most predominant posture was sitting (47.0%), followed by pronograde standing (29.4%), lying (10.5%) and clinging (4.5%).

The most predominant posture was sitting ...  
... (47.0%), ...  
... followed by pronograde standing ...  
... (29.4%), ...  
... lying ...  
... (10.5%) ...  
... and clinging ...  
... (4.5%).

**S1 [010]** Our results suggest that orangutans on BMOUI engage in less feeding but more resting, and show less postural diversity, than free-ranging individuals.

Our results suggest ...  
... that orangutans ...  
... on BMOUI engage ...  
... in less feeding ...  
... but more resting, ...  
... and show less postural diversity, ...  
... than free-ranging individuals.

**S1 [011]** We propose that appropriate interventions to shift activity budgets, especially feeding vs. resting, and postural behaviours of captive orangutans towards those found in free-ranging orangutans might be beneficial for their welfare and survival; however, the conclusions we can draw are limited due to the small sample size, and thus until the captive behaviours of a larger number of orang-utans has been described, these results must be considered preliminary and just a case study.

We propose ...  
... that appropriate interventions ...  
... to shift activity budgets, ...  
... especially feeding vs. resting, ...  
... and postural behaviours ...  
... of captive orangutans towards those found ...  
... in free-ranging orangutans ...  
... might be beneficial ...  
... for their welfare ...  
... and survival; ...  
... however, ...  
... the conclusions we can draw are limited ...  
... due to the small sample size, ...  
... and thus until the captive behaviours ...  
... of a larger number ...  
... of orang-utans has been described, ...  
... these results must be considered preliminary ...  
... and just a case study.

## **S2 [012] Introduction**

**S2 [013]** Conservation programmes have become an integral aspect of zoological management of nonhuman primates, as nearly half of all free-ranging primate species are threatened with extinction due to habitat destruction and poaching (Estrada et al., 2017).

Conservation programmes have become an integral aspect ...  
... of zoological management ...  
... of nonhuman primates, ...  
... as nearly half ...  
... of all free-ranging primate species are threatened ...  
... with extinction ...

... due to habitat destruction ...  
... and poaching ...  
... (Estrada et al., 2017).

**S2 [014]** The orangutans inhabiting both Borneo and Sumatra are no exception: all are critically endangered.

The orangutans inhabiting both Borneo ...  
... and Sumatra are no exception: ...  
... all are critically endangered.

**S2 [015]** To stop the decline in the number of orangutans it is crucial to establish self-sustaining captive and semi-captive populations, with the ultimate goal of reintroducing individuals to their natural habitats.

To stop the decline ...  
... in the number ...  
... of orangutans it is crucial ...  
... to establish self-sustaining captive ...  
... and semi-captive populations, ...  
... with the ultimate goal ...  
... of reintroducing individuals ...  
... to their natural habitats.

**S2 [016]** However, although orangutan rehabilitation is one of the central features in the conservation of this great ape, it is not always successful (Russon et al., 2008).

However, ...  
... although orangutan rehabilitation is one ...  
... of the central features ...  
... in the conservation ...  
... of this great ape, ...  
... it is not always successful ...  
... (Russon et al., 2008).

**S2 [017]** The ability of orangutans to locate and harvest foods, and food processing skills are considered to be vital for their survival (Descovich et al., 2011).

The ability ...  
... of orangutans ...  
... to locate ...  
... and harvest foods, ...  
... and food processing skills are considered ...  
... to be vital ...  
... for their survival ...  
... (Descovich et al., 2011).

**S2 [018]** One approach for assessing the psychological aptitudes of captive or semi-captive orangutans is to compare their activity budget with that of free-ranging individuals.

One approach ...  
... for assessing the psychological aptitudes ...  
... of captive ...  
... or semi-captive orangutans is ...

## **End of Sample Audit**

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