

Body Condition Assessment Method for Neonatal and Juvenile Asian Elephants

(*Elephas maximus*)

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Introduction

The physical condition of an animal is primarily a reflection of its fat reserves. With domestic animals and livestock, condition scoring systems have been widely applied as measures of nutrition, reproductive potential and herd health or productivity [Russell 1969, Wildman 1982, Otto 1992] and the same has been found applicable in wild ungulates [Gerhart 1996, Rhiney 1960, Singh 2009], domestic Asian elephants [Krishnamurthy et al. 2006] and free ranging African elephants *Loxodonta africana* [Pinter-Wollman 2009]. Visual condition scoring provides an index of the energy stored as fat and muscle and is a quick, non-invasive, reliable means of assessing wellness. Because the physical condition of an elephant calf is responsive to nutrition and environmental conditions, this method is applicable to young elephants at hand-rearing facilities.

The level of reserves of fat is a useful indicator of an elephant's general well being. In Asian elephants, attempts to find a single morphometric measure or single variable of subcutaneous fat (e.g., cervical fold, anal flap, girth of chest and neck, temporal fossa, zygomatic arches) that concords with body condition have failed [Krishnamurthy et al. 2006]. Rather, the most useful methods for evaluating condition in elephants [Krishnamurthy et al. 2006, Ramesh et al. 2011] have involved observation of several regions of the body. This manual applies to calves the historic methods used for evaluating body condition in mature elephants, relying on a cumulative visual assessment of mass (muscle and fat) associated with skeletal structures, such as the head, shoulder, rib cage, lumbar vertebrae and pelvic girdle.

Application

This method can be easily taught and learned, especially with photographs and sketches to clarify the criteria. It could be taught to veterinarians and wildlife biologists for use at elephant hand-rearing facilities and the associated release sites. The system would allow for quick and quantitative assessment of the calves without physical handling. In captive situations, the observer can easily view the animals from different angles; commands could be used to make the calf move and shift its weight, as postural adjustments will assist in determining which criterion best describes the condition. When assessing post-release animals that are free ranging, the same system can be used though binoculars

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and/or telescopic photography may be necessary. Greater time would be required because the observer must wait for the elephant to move and show its configuration from different perspectives.

After the scoring systems have been taught to participants, accuracy tests would need to be performed with each of the observers to ensure consistency in data collection. It is highlighted that caregivers or personnel interacting with the subjects on a daily bases should not be selected as observers for this study.

It is indicated that a consistent interval period and time of day be used for all data collection. This is particularly important in captive situations, especially with milk-fed calves, where consumption is controlled and visual appearance can change significantly according to time elapsed since feeding. Consistent overhead lighting is also recommended to avoid visual distortions created by directional or low lighting conditions. The anatomical indicators and criteria presented here are not valid for severely dehydrated or acutely sick animals, nor is it accurate for neonates under 2 weeks of age. Abdominal bloating can distort results, especially readings of the thoracic region, so care must be taken in assessing young elephant calves that can be prone to bloat especially in response to diet change.

Following is a reference chart summarizing each of the 6 physical criteria and corresponding point values used to assess body condition. For each criterion, the optimum visual perspective is specified. Annotated photographs and sketches with corresponding point values are provided for each indicator, and a sample form for data collection and tallying. Photographs are courtesy of the Centre for Wildlife Rehabilitation and Conservation, Wildlife Trust of India.

TABLE 1

Criteria and point scores to assess body condition in Asian elephant calves using six anatomical indicators

Criteria and corresponding point scores:

A. Temporal depression (viewed in profile and $\frac{3}{4}$ view, at shoulder height)

(2 points) Full and convex in outline, frontal ridge vaguely outlined at best.

(1 point) Slightly to moderately concave; frontal ridge defined.

(0 points) Deeply concave; frontal ridge forms a crater-like rim around the temporal depression.

B. Scapula (profile)

(2 points) Spinous process of the shoulder blade not visible, or slightly visible when the foreleg is in certain positions.

(1 point) Spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula.

(0 point) Spinous process pronounced and bladelike with the acromial process pronounced as a knot.

C. Thoracic region (profile)

(2 points) Ribs not visible, barrel smooth.

(1 point) Some ribs visible, but the demarcation is not pronounced.

(0 points) Many ribs strongly demarcated (even behind the scapula) with pronounced intercostal depressions.

D. Flank area, immediately in front of pelvic girdle (profile and behind view)

(1point) No depression visible; flank bulges outwards in front of the pelvis.

(0 points) Depression visible as a sunken area immediately in front of pelvis.

E. Lumbar vertebrae (behind view; a lowered vantage point may be necessary)

(2 points) Not pronounced, lower back smooth and rounded.

(1 point) Visible as a ridge; skin slopes away from the top of the ridge; height of the vertebrae do not exceed width.

(0 point) Visible as a knife-like blade; sides of spinal ridge almost parallel.

F. Pelvis, external angle of the ilium (profile and $\frac{3}{4}$ view)

(2 points) Not visible (or slightly visible); rump region between the ilium and caudal vertebrae is full and rounded outward, not sunken.

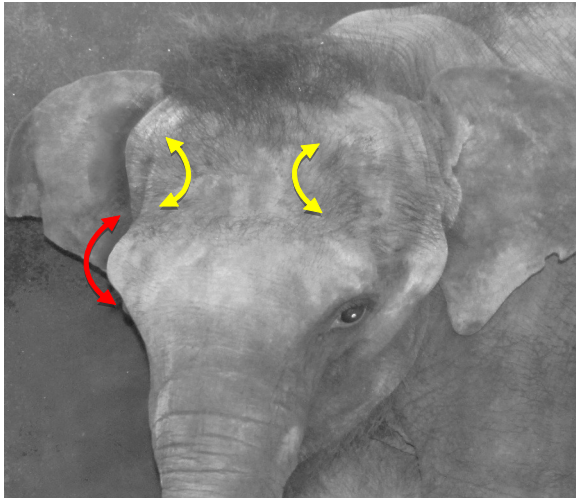
(1 point) Visible but not pronounced; the rump is a slightly depressed or flat zone between the ilium and the caudal vertebrae.

(0 points) Visible as a jutting bone; rump is a pronounced sunken zone between ilium and the caudal vertebrae.

Note: When a particular body region is intermediate between two criteria, an intermediate point score (i.e. 0.5, 1.5 points) should be assigned.

Criteria A

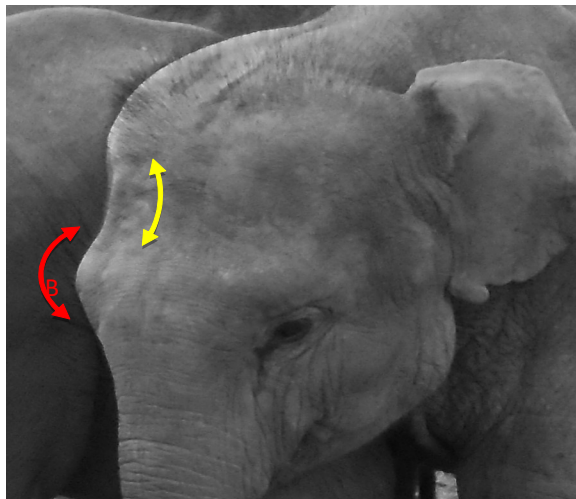
Head and temporal area (3/4 view)



0

0 POINTS

Deeply concave (A); frontal ridge (B) forms a crater-like rim around the temporal depression



1

1 POINT

Slightly concave (A);
Frontal ridge defined (B)



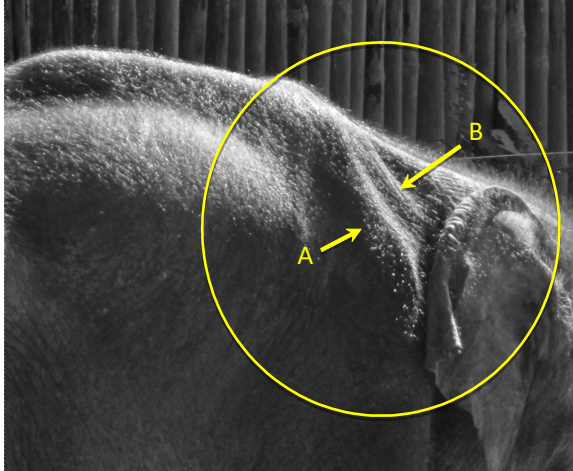
2

2 POINTS

Full and convex in profile (A);
frontal ridge present at best (B)

Criteria: B

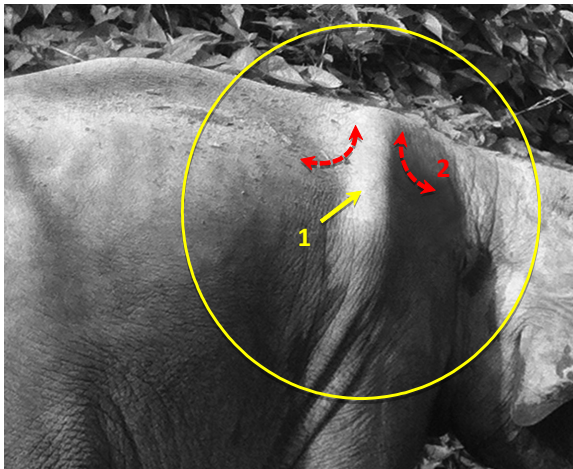
Scapula (profile view)



0

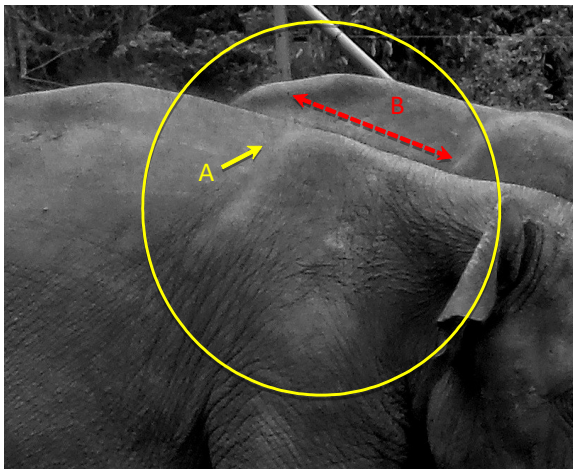
0 POINTS

Spinous process of the scapula pronounced and blade-like (A); in extreme cases the scapular cranial angle is visible with a depression between the cranial border (B) and the spinous process (A).



1

Spinous process visible as a vertical ridge (1) with a concavity between the ridge and the cranial and caudal edges of the scapula (2)



2

Spinous process of the shoulder blade not visible or slightly visible (A) when the foreleg is in certain positions, but spinal ridge appears smooth (B)

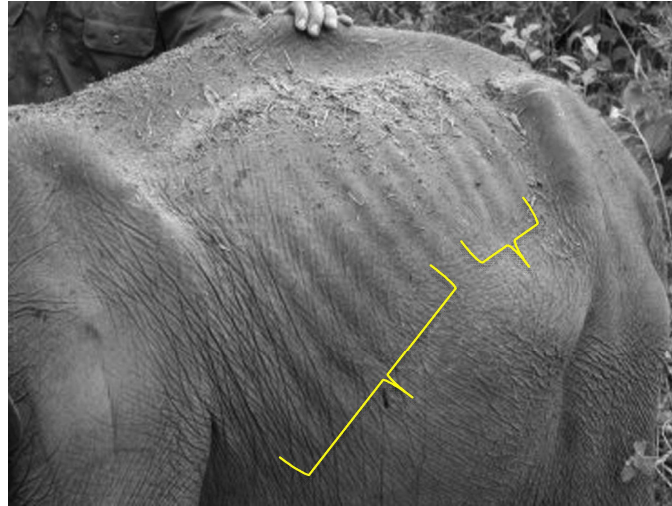
Criteria : C

Thoracic region (profile view)

0

0 POINTS

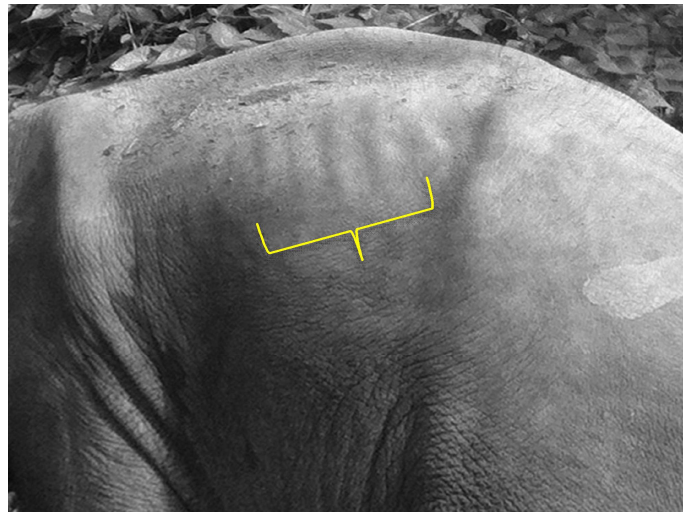
Ribs are strongly demarcated with pronounced intercostal depressions; asternal (A) and in extreme cases floating ribs (B) visible.



1

1 POINT

Some ribs visible but the extent and demarcation is not pronounced (1)



2

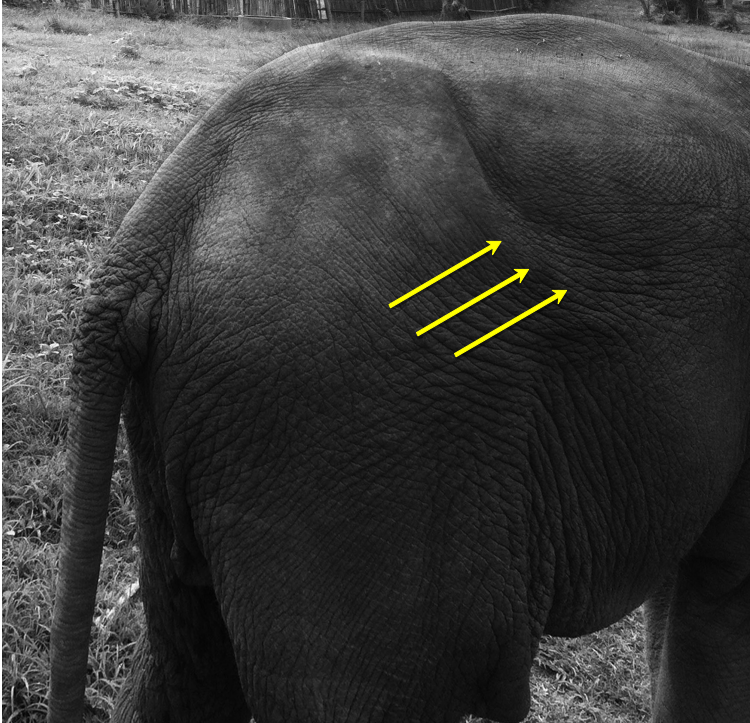
2 POINTS

Ribs not visible and barrel smooth.



Criteria : D

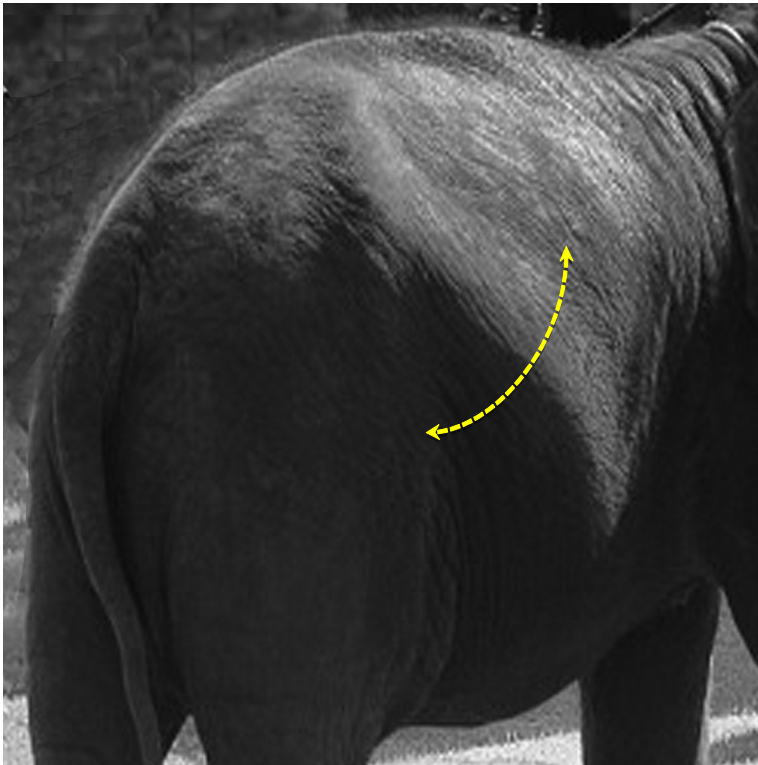
F flank region (profile view)



0

0 POINTS

There is a visible depression in the flank area immediately in front of pelvic girdle



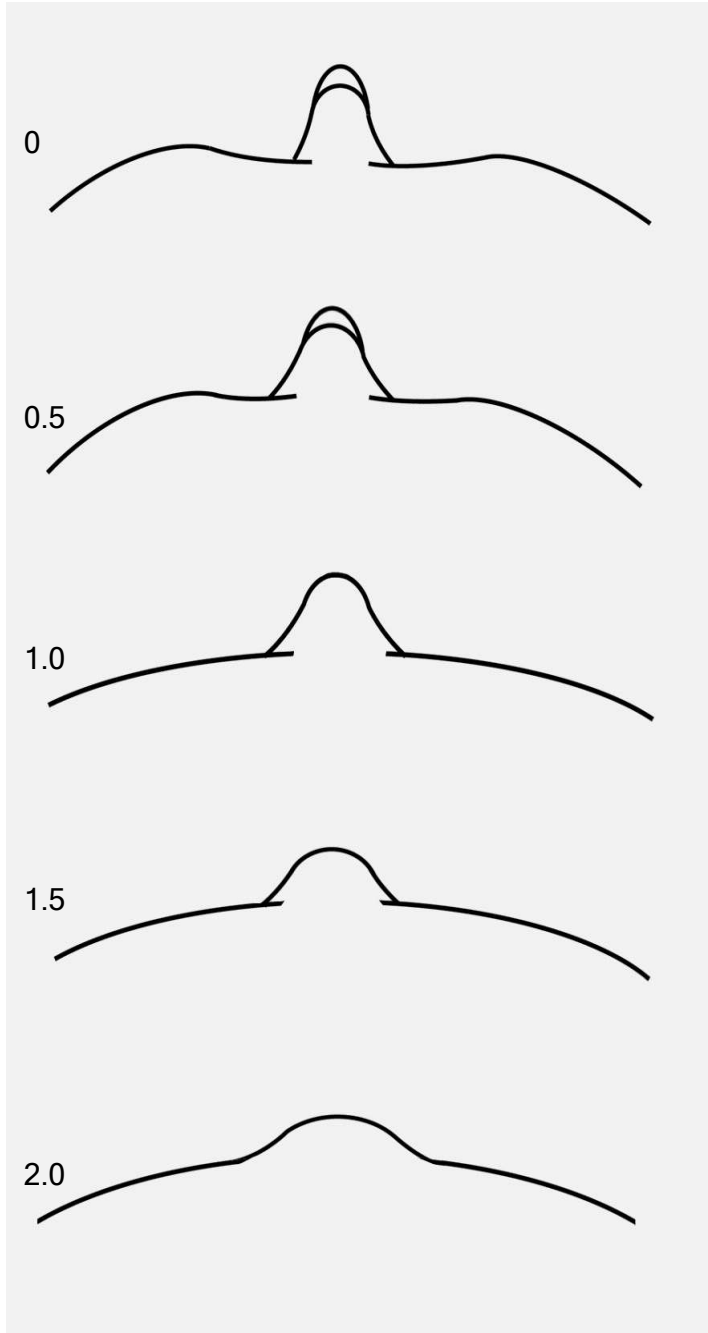
1

1 POINT

No depression visible; flank bulges outwards in front of the pelvis

Criteria : E

Lumbar vertebrae (behind view; lowered vantage point)



0

0 POINTS

When viewed from behind, the lumbar vertebrae and the thoracic vertebrae behind them are visible as a blade-like ridge; the sides of the spinal ridge are almost parallel; the height is equal to or exceeds the width.

1

1 POINT

The lumbar vertebrae are visible as a ridge with a tent of skin sloping away from the apex; the height does not exceed the width of the ridge.

2

2 POINTS

Underlying tissue obscures lumbar vertebrae; the lower back is smooth and rounded.

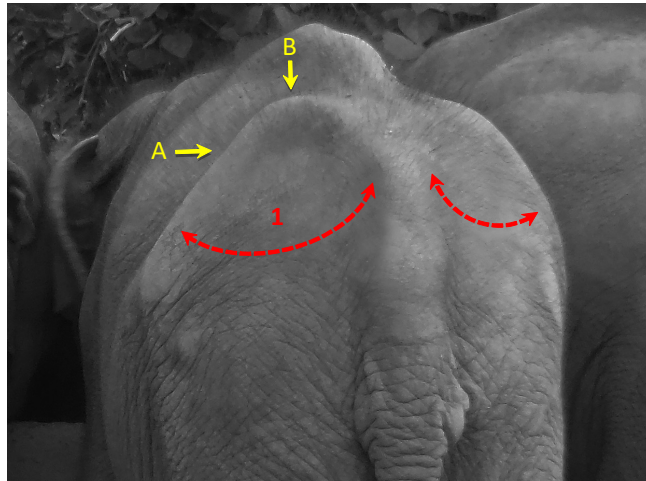
Criteria : F

Pelvic girdle (external angle of the ilium) (behind and ¾ view)

0

0 POINTS

Iliac spine (A) and iliac crest (B) are visible as a blade-like ridge; the area between the ilium and the caudal vertebrae is depressed (1)



1

1 POINT

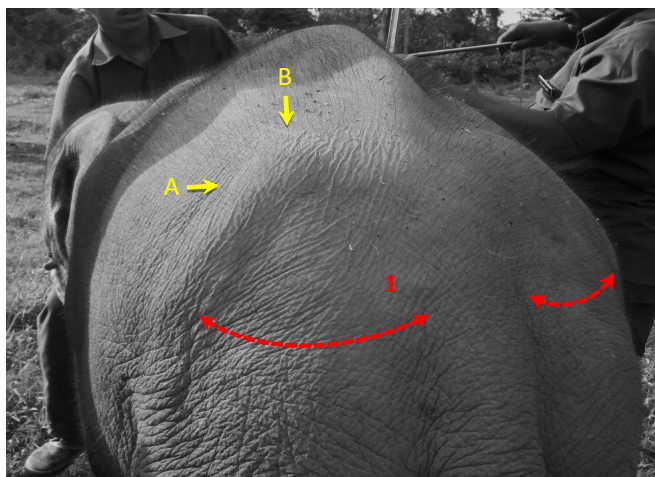
Iliac spine (A) is visible but is not as pronounced; iliac crest is not clearly defined (B); the zone between the ilium and the caudal vertebrae is slightly depressed



2

2 POINTS

Iliac spine is only slightly visible (A) and iliac crest is obscured by tissue and not clearly visible (B); region between the ilium and caudal vertebrae (1) is rounded outward, not sunken.



SAMPLE FORM Body Condition Scoring

Name: _____
Sex _____ DOB ____/____/____

Date and Time	Observer	A	B	C	D	E	F	TOTAL

References

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