

**Supplementary material S3.** Osteological criteria not retained as reliable for the identification of *Varanus* species.

*Premaxilla*

- Shape of the anterior margin of the pars dentalis: rounded in *V. salvator* and *V. dumerilii*; pointed in *V. bengalensis* and *V. rudicollis*.

*Maxilla*

- The *excavatio nasalis* situated on the dorsal margin of the anterior part of the bone is: less than two times longer than wide in *V. bengalensis* and *V. salvator*; more than two times longer than wide in *V. rudicollis*.
- The posterior part to the *excavatio nasalis* the bone presents a vertical medial blade with cutting dorsal hedge in *V. rudicollis* which is absent in *V. bengalensis*, *V. salvator*, and *V. dumerilii*.

*Nasal*

This bone is subject to a very strong ontogenetic variability with the two nasal bones being more and more fused when the specimen grows. The anterior processes become wider and wider, and on large specimens they present ventral blades. The frontal processes of the nasal bones also tend to enlarge with growth.

- The ventral side of the posterior part of the bone is: keeled and the section triangular in *V. bengalensis* and *V. dumerilii*; flat and the section flattened in *V. salvator*; keeled with a crescentic section due to a depression occurring on the dorsal side of the bone in *V. rudicollis*.
- Morphology of the frontal processes of the bone: very short and wide in *V. dumerilii*; all other morphologies possibly corresponding to an ontogenetic stage of *V. bengalensis*, *V. salvator*, and *V. rudicollis*.

*Frontal*

- Ratio between maximal length and the medial width of the bone: 6.3-6.6 in *V. salvator* and *V. rudicollis*; 5-5.7 in *V. bengalensis* and *V. dumerilii*.
- In ventral view, a depression bordered by well-marked crest occurs anteriorly to the cranio-frontal crest of *V. salvator*, this depression is absent or weakly marked in *V. bengalensis*, *V. dumerilii*, and *V. rudicollis*.
- The distance between the impressions of the prefrontal and postorbitofrontal bones in lateral view is: higher than the smallest width of the bone in *V. bengalensis* and *V. salvator*; lower than the smallest width of the bone in *V. rudicollis* and *V. dumerilii*.

- Ratio between the maximal length of the bone and the maximal length of the cranio-frontal crest: 2-2.4 in *V. bengalensis*, and *V. salvator*; 2.7-2.9 in *V. rudicollis* and *V. dumerilii*.

#### *Postorbitofrontal bone*

- Morphology of the parietal process: length equal to the two third of the length of the frontal process in *V. bengalensis* and *V. rudicollis*; length equal or inferior to half of the length of the frontal process in *V. salvator*.

#### *Supratemporal bone*

- Occurrence of a ventral bulge below the postero-ventral margin of the articular facet with the parietal: yes in *V. rudicollis* and *V. dumerilii*; no in *V. salvator* and *V. bengalensis*.

#### *Palatal bone*

This bone is subject to much intraspecific and ontogenetic variability impacting the morphology of its different branches making difficult to use it for discrimination purposes.

- Ratio between the length of the posterior process and the width of the posterior process: 2.2-3 in *V. rudicollis*, *V. salvator* and *V. bengalensis*; around 1.72 in *V. dumerilii*.

#### *Pterygoid*

The shape and development of quadrate, palatal and ectopterygoid processes is subject to strong ontogenetic variability and cannot be used to distinguish the investigated taxa.

- Medial expansion of the basisphenoid process in ventral view: moderately extended and nearly as long as wide in *V. bengalensis*, *V. salvator* and *V. dumerilii*; very weakly extended and wider than long in *V. rudicollis*.

#### *Quadrate bone*

- The conch in posterior view is: narrow with a nearly straight lateral margin in *V. salvator*, *V. bengalensis* and *V. rudicollis*; wide with a curved lateral margin in *V. dumerilii*.

- Ratio between maximal height and maximal width of the bone: 3.5-2.6 in *V. salvator* and *V. bengalensis*; 2.42 in *V. rudicollis*; 1.88 in *V. dumerilii*.

#### *Parabasisphenoid*

The morphology of the basiptyergoid processes is subject to strong intraspecific variability.

- Shape of the anterior margin of the *scela turcica*: weakly concave in *V. bengalensis*, *V. salvator* and *V. rudicollis*; strongly concave in *V. dumerilii*.

#### *Supraoccipital bones*

- Inclination of the dorsal margin of the foramen magnum: nearly flat in *V. bengalensis*, *V. salvator* and *V. dumerilii*; around 90° in *V. rudicollis*.

#### *Dentary*

- Shape of the coronoid-surangular crest: weakly extended in posterior direction and not individualized from the posterior part of the subdental-shelf in *V. bengalensis*, *V. salvator* and *V. rudicollis*; well marked, extended in posterior direction, and clearly separates the coronoid-supraangular crests from the subdental shelf in *V. dumerilii*.
- Lingual imprint of the anterior branch of the coronoid: Weakly marked and delimited in *V. bengalensis*, *V. salvator* and *V. rudicollis*; well marked, deep, and delimited in *V. dumerilii*.

#### *Coronoid bone*

- Lateral crest of the coronoid process: weak with a blunt lateral hedge in *V. bengalensis*, *V. salvator* and *V. rudicollis*; strongly marked with a cutting lateral hedge in *V. dumerilii*.

#### *Articular bone*

- Ratio between the lengths and width of the retro-articular process: 2.67-2.13 (*V. bengalensis*); 2.26-1.96 (*V. salvator*); around 1.88 (*V. rudicollis*); around 1.55 (*V. dumerilii*).
- Shape of the margins of the retro-articular process in dorsal view: the lateral and medial margins are nearly straight and oriented in posterior direction in *V. salvator*; the margins are posteriorly oriented but the medial margin presents a slight lateral projection incurved in dorsal direction in its posterior part in *V. bengalensis*; the margins are straight but the lateral margin presents a well-marked lateral tuberosity in *V. dumerilii*; the margins present slight posterior projections making both of them slightly incurved and the retro-articular process slightly posteriorly dilated in *V. rudicollis*.
- Shape of the transversal section of the retroarticular process: triangular in *V. bengalensis*, *V. salvator* and *V. rudicollis*; flat in *V. dumerilii*.

#### *Axis*

- Ratio between the maximal length and maximal height of the neural arch: 1.8-2.09 in *V. salvator*; 1.4-1.7 in *V. bengalensis* and *V. dumerilii*; around 1.25 in *V. rudicollis*.

- Posterior extension of the hypapophyse posteriorly to the condyle: no in *V. salvator*, *V. bengalensis* and *V. dumerilii*; yes in *V. rudicollis*.

### *Scapula*

- Shape of the bone in anterior view: nearly flat or weakly incurved in medial direction in *V. bengalensis*, *V. salvator* and *V. dumerilii*; strongly incurved in medial direction in *V. rudicollis*.

### *Ischium*

- Occurrence of an expansion on the anterior margin of the bone giving to this a more concave shape in ventro-lateral view: yes in *V. salvator*, *V. rudicollis* and *V. dumerilii*; no in *V. bengalensis*.

### *Radius*

- General morphology of the diaphysis in lateral view is: more or less straight in *V. bengalensis*, *V. salvator* and *V. dumerilii*; more sinusoidal in *V. rudicollis*.

### *Femur*

- The proximal epiphyseal area of the minor tubercle is: linked to the head of the femur by an epiphyseal area in *V. bengalensis*, *V. salvator* and *V. rudicollis*; separated from the head of the femur in *V. dumerilii*.