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# **ABSTRACT BOOK**

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## Proboscidean fossil fauna from the Siwalik Hills of Pakistan

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Proboscidean remains belonging to four species of the family Elephantidae, *Elephas namadicus, Elephas planifrons, Stegodon bombifrons* and *Stegolophodon cautleyi* from Siwalik Hills of Pakistan (Barry et al., 1982; Dennell et al., 2006) are described and discussed here. The material comes from the Siwalik localities of Sardhok (Gujrat District, Punjab, Pakistan), Jari Kas, Mirpur, AJK and Khural sharif, Near Dina (District Jhelum, Punjab, Pakistan), and Padri outcrops of the Dhok Pathan Formation (Middle Siwaliks) and comprises upper and lower teeth, a fragmentary cranium with right and left maxillary molars, a mandible having a right M3 and a completely eroded left molar. The main aim of this study is to provide credentials, comparison and morphometric analysis of collected Proboscidean remains from the Siwalik Hills of Pakistan.

*Elephas planifrons*, regarded as the most primitive species of its genus, is present in all zones of upper Siwalik and it is a characterisitic proboscidean of the Pinjor, Tatrot (Lewis, 1937; Hooijer, 1955) and Boulder Conglomerate Formations (Shah, 1980). The first occurrence of *Elephas planifrons* is dated at 5.9 Ma (Barry et al., 2002). An upper left third molar of *Elephas planifrons*, (PUPC 2010/12; Fig.1A, B) recovered from Pinjor formation of Sardhok, Gujrat distict, Pakistan is finely preserved with moderately broad ridge plates. The central part of the tooth is the widest with gentle anterior and posterior tapering. The ridge plates are widely spaced. Which assume that the worn away portion

probably consisted of two ridge plates. The enamel loop is complete in the last four preserved ridge plates but slightly incomplete in the third and fourth preserved ridge plates. The enamel layer is quite simple. The penultimate ridge plate shows five conelets all of which are still maintaining their identity. As the tooth is much worn, its precise height cannot be given however, it appears to be subhypsodont.

Elephas namadicus is present in the Eurasia from Middle to Late Pleistocene (Maglio 1973). An, upper left second molar (PUPC 2010/10; Fig. 1 C, D) of this species is recovered from Pinjor formation of Sardhok, Gujrat distict, Pakistan. PUPC 2010/10 is half worn, finely preserved, subhypsodont and extremely broad. A clear retroflection in 3rd to 6th ridge can be observed on both sides while other plates are more regular and oval in shape. The enamel is thin and finely crenulated with many folds, especially in the middle where the folds on both sides are very marked. There is no indication for the presence of pre or post sinus in any ridge plate. The ridge plates are much compressed anteroposteriorly. Cement is abundantly developed. All ridges distinctly bent backward and anterior enamel walls of posterior ridges is more broadly exposed than posterior enamel walls.

The family Stegodontidae has its origin in the Early Miocene of Asia known by two genera, *Stegodon* and *Stegolophodon* (Saegusa, 2001). The earliest chronological record of the



Fig. 1. *Elephas planifrons*: PUPC 2010/12, upper left third molar, **A**, Crown view, **B**, Lateral view. *Elephas namadicus*: PUPC 2010/10, upper left second molar, **C**, Crown view, **D**, Lateral view (scale bar is 50 mm). *Stegodon bombifrons*: PUPC 2010/18, **E**, Occlusal view of the mandible of studied specimen, **F**, Occlusal view of the right M<sub>3</sub>, **G**, Lateral view of the right M<sub>3</sub>. *Stegolophodon cautley*: PUPC 09/13, a preserved upper third molar, **H**, Occlusal view, **I**, Lateral view (Scale bar 20 mm).

genus *Stegodon* is from the lower Pliocene of Pakistan. A mandible of *Stegodon bombifrons*, (PUPC 2010/18; Fig. 1 E, F & G) is quite robust and gigantic. The ascending ramus is much wider anteroposteriorly in the coronoidal region. The maximum preserved anteroposterior length of right mandible is 402 mm left mandible is 505 mm and maximum preserved transverse width of right mandible is 172 mm while left mandible is 160 mm. The brachydont third molar in early wear stage has thick enamel, broad crown and ten ridge-plates which are widely spaced at their summits.

A preserved upper third molar (PUPC 09/13; Figure 1 H, I), from Padri (Dhok Pathan Formation), district Jhelum, belongs to *Stegolophodon cautleyi*. The tooth is poorly preserved and narrow crowned, brachyodont with only two preserved ridge-plates. The ridge-plates are closely spaced with inconspicuous intermediate valleys. Only trace amount of cement is present. The enamel is thick, smooth and simple. The roots are also nicely preserved.

The biochronologic and geographic expansion of each species will be discussed in detail.

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