



## GUARD HAIR IDENTIFICATION KEY FOR WILD BOAR (*SUS SCROFA*) FROM GUJARAT STATE OF INDIA

**Vibhuti B. Raval\***

Shree M. & N. Virani Science College, Biology Department, Saurashtra University, Rajkot 360005, Gujarat State, India \*Corresponding Author

**Dr. Bhupat B. Radadia**

Shree M. & N. Virani Science College, Biology Department, Saurashtra University, Rajkot 360005, Gujarat State, India

### ABSTRACT

The recent study was carried out to identify wild species of Suidae family namely Wild boar by their macro- and microscopic features of dorsal guard hair characteristics. The wild boar is important food base of small and large carnivore mainly throughout the Gujarat area including protected and non-protected areas. In these we collected control hair samples from the dead body of the wild boar within the protected areas of the Girnar Wildlife Sanctuary which was killed by the carnivore (and not eaten completely) present in that area was further analyzed microscopically. We analyzed thirty random guard hairs from dorsal region of the species and thoroughly studied under microscopes to avail authenticated and the photographic evidence for further carnivore scat analysis through this key. In this study we used the recognizable qualitative and quantitative features of Cuticle as well as Medulla. Medullary Index (MI) found in Wild Boar is  $0.81 \pm 0.01 \mu\text{m}$

**KEYWORDS :** Guard Hair, Wild Ungulates, Protected Areas, Predatory carnivore, Scat, etc.

### INTRODUCTION:

Mammal hairs play a significant role in thermoregulation, body shape maintenance, waterproofing and protection from the variety of pollution. Indeed the identification of mammal hair was earlier achieved in 1920 by Hausman. Trichology deals with scientific study on hair and this field initiated in the mid 1800s. There are mainly two types of mammalian hair found: Guard hairs that are usually thick and bristly and fine hairs which are curled and thin comparatively. (Eunok Lee et al, 2014). Hair analysis through their morphological Cuticular scale characteristics and medullary features in have been widely use to distinguish among mammalian species of interest largely in the field of Wildlife Biology, Ethology, Conservation ecology, Veterinary and Forensic science (Anca lungu et al, 2007). The wild ungulates comprise the order Artiodactyla (even-toed). It was one of older but become advanced and more precise with new age instrument and technology now days. The scale count and scale pattern of the hair also found to be unique for each species and for that reason helpful to recognize the hair of unknown species by considering their several external and internal morphological parameters applied in 2017 by Ashvinkumar et al. It is the best effective techniques widely used in the forensic as well as in the field of ecology. The distinctive medullary index for each and every species is primarily suitable for species confirmation and useful to identify unknown hair samples as well as for the study of feeding ecology of large carnivore animals by their scat analysis within and around the protected areas.

### MATERIALS AND METHODS:

In this study guard hair of wild boar were collected during field work from the dead prey of large carnivore animal within Girnar Wildlife Sanctuary of the Junagadh district, Gujarat state of India. Further randomly picked ten hairs of the species thoroughly evaluated under microscope after the processing.

After collection of hairs of the species were properly washed in running water for several times to remove dirt. Then washed hairs were cleaned and degreased in acetone. Then randomly picked up random thirty hairs from the species and then it were examined. First each hair were embedded in Gelatin layered microscopic slide (or Cellulose sheet) or by using Nail paint imprint technique for scale imprint. Then it was analyzed for microscopic factors using ZEISS, Fluorescence light microscope with inbuilt attached camera. The microscope facilitated with important measurement software with the add-on camera namely: AxioCam Imager. Primarily the hair studied under 10X view, then in 40X view for detailed morphometric study.

Then morphological external features of the hair shaft were recorded with suitable details and measurement. Afterward internal morphological features of the hair medulla were studied thoroughly and recorded separately in the data book. On the basis of all external and internal morphological as well as quantitative features of the guard hair of the species confirmed.

### RESULT AND DISCUSSION:-

Different Morphological and measuring features of the guard Hair of wild boar species studied in detail. The mean value as well as standard deviation regarding various features of hair shaft and medulla are summarized in following tables.

**Table 1 Morphological features of wild boar species hair.**

SR. NO.	SPECIES	MEDULLA PATTERN	SCALE PATTERN	COLOUR OF HAIR (NAKED EYE)	HAIR SURFACE
1	Wild Boar	Wide and simple medulla	Irregular wave	Black	Rough

There are several important morphological features also to be considering for the identification and confirmation of the hair for particular species. Here Wild boar has irregular wave type of scale and wide and simple medulla pattern. (Table 1, Fig 1).

**Table 2 Systematic position and conservation status of the Wild Boar**

SR. NO.	SPECIES	ORDER	FAMILY	Genus	SPECIES	IWPA
1	Wild boar	Artiodactyla	Suidae	Sus	scrofa	Schedule -III (19)

The wild boar considered as Schedule III animal according to the Indian Wildlife Protection Act (IWPA), 1972. It falls under Artiodactyla order and Suidae family respectively.

### Photographs showing scale and medulla pattern of the wild boar hair

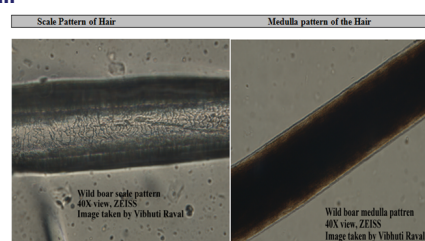


Fig. 1 Scale and medulla pattern of the hair of *Sus scrofa*

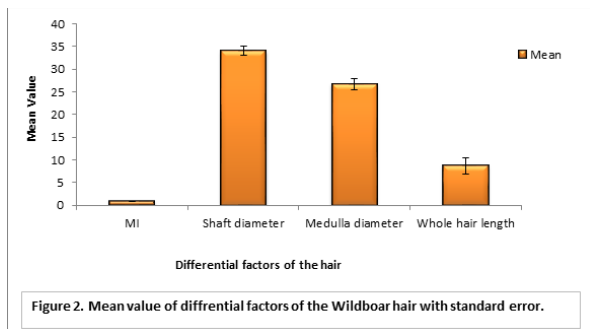
**Internal morphological factors of the hair medulla**

**Table 3 Different factors of Hair of wild boar species of the Family - Suidae.**

SR. NO.	SPECIES	WHOLE HAIR LENGTH [AVERAGE (cm)]	AVERAGE SHAFT [AVERAGE (µm)]	AVERAGE MEDULLA [AVERAGE (µm)]	MEDULLARY INDEX [AVERAGE (MI)]	STANDARD ERROR
1	Wild Boar	8.7	34	26.7	0.8 ± 0.01 µm	0.003

Medullary index is the unique and specialized feature of the hair. Each and every species of the mammals can be identified on the basis of their medullary features (shown in the Table 3, Fig. 2). The **Medullary Index (MI)** found in Wild Boar is 0.8 ± 0.01 µm which is species specific.

**Standard Error bar for the different factors of wild boar hair.**



Medullary index of the wild boar species of Suidae family revealed that there was very minute deviation in the four different factors of the wild boar hair.

**CONCLUSION:-**

On the basis of morphological features like hair colour, texture, Cuticle scale type and medulla type along with the several measuring features of the hair such as medulla diameter, shaft diameter and MI to identify and confirm the hair of the species. The wild boar shows the split end of the hair. The texture is also unique that is very rough and black colour of the wild boar species.

On other hand the quantitative features of the guard hair of animal species are distinctive and species specific. On the basis of medulla type it has wide and simple medulla type. The species has irregular scale type as well which is quite common in many animals but with the help of MI it can be easy to confirm the species without difficulty as it is 0.8 ± 0.01 µm with uncommon large whole hair length make the species differentiable. These differential features of the hair are largely suitable and authenticated, hence broadly used in the various field namely: ecology, field of forensic science, field of wildlife and Ethology for the hair identification of species of interest.

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