

CHAPTER 5 –MICROSCOPIC OBSERVATION ON DERMAL DENTICLES OF SHARK FINS

5.1 Introduction

As another component of the SEAFDEC project on sharks, SEAFDEC MFRDMD undertook a study on the dermal denticles of shark fins, as a tool to identify the shark species when only having access to a wet fin.

Looking at the external surface of a shark, it is apparent that the skin is covered with an investiture of scales. In elasmobranchs these flat, non-overlapping unit are called placoid scales. Because the scales are individual tooth-like appendages embedded in the skin, they are aptly called dermal denticles. Teleost fishes, reptiles, and birds have scales that differ from those of elasmobranchs by developing as folds of the skin. Scales of shark are tiny as compared to those of teleosts. Shark denticles are very distinctive, and are often used to help identify species.

Denticles are small (mostly less than 2mm long) and tooth like structure, with the enameloid-covered exposed crowns and dentine bases rooted the skin (Figure 7). They vary greatly in form and size and can develop into enlarge specialized derivatives such as fin spines on the dorsal fins of various sharks and the first, Jurassic rays, rostral teeth in sawsharks and sawfishes, clasper spines, the sting of stingray and their relatives, and enlarged thorns of bucklers on the dorsal surfaces of many rays and the bramble shark (*Echinorhinus brucus*). Denticles of neoselachians are periodically replaced by being shed and having new denticle erupting through the skin, but some denticle derivatives such as fin spines, the rostral teeth of sawfish, and some thorns and bucklers grow by periodic addition of dentine to their proximal ends and peripheries.

Typically dermal denticles consist of (i) a basal plate embedded in the dermis (ii) a pedicel that arises from the base and forms a neck connecting with the crown, and (iii) exposed outer portion, the crown.

Study conducted outside the region using scales extracted from frozen and dried fin concluded that dermal denticles possess species-specific characters, which is useful in the identification of species of shark fins. Other studies on scales characteristics of 35 benthic and sedentary shark species have showed that scale crown shapes vary from true plate-like crown with longitudinal ridge to uniquely shape scales with spine-like or cross-hatched crowns. For plate-like denticles, the crown shapes range from circular and semicircular to lanceolate or rhomboidal. The result also showed the variation of denticles shape, at different parts on the body.

One of the important issues in stock assessment of sharks is to estimate the amount of landing and trading by species. At present however, the landing of each species has not been recorded and usually data are obtain only from trading amount of shark fin. Since the issue of “look alike” in shark fin trade will effect the trade of unlisted species, an effort were taken to establish a method to identify shark species from shark fins. These include scanning electron microscope observation of denticles and characteristic of morphological of shark fin.

The objectives of this study are to:

- Observe dermal denticles of shark fins using compound microscope in order to establish a method for identification of shark species from their fins.
- Produce a publication on dermal denticles of sharks fin commonly found in local markets.
- Act as basic for identification of shark species from dried or wet shark fin available in the market.

5.2 Materials and Methods

A total of 63 sharks and a ray samples from 19 species were bought from Bintulu, Mukah and Kuching in Sarawak (East Malaysia) and also from Kuantan, Pahang in Peninsular Malaysia. Every shark sample was recorded by species, sex, body weight and total length. However, detail information on sex, total length and body weight of a few species such as *Carcharhinus leucas*, *C. amblyrhynchos*, *C. sorrah*, *Stegostoma fasciatum*, *Scoliodon laticaudus* and *Chiloscyllium hasselti* were not available since these samples were already cut into pieces by fishermen.

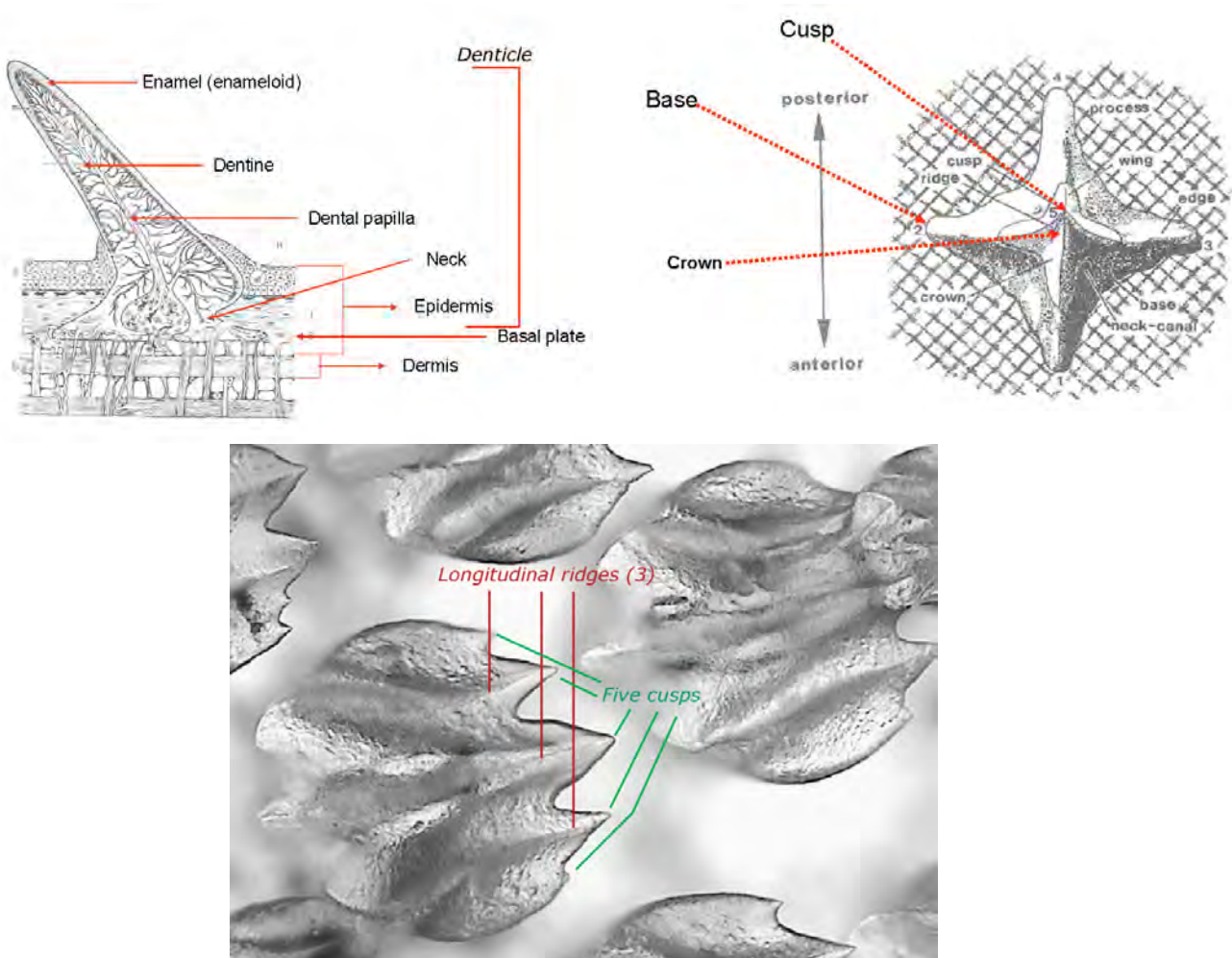


Figure 7. Shark dermal denticles

Skin samples measured 2cm x 1cm were cut from 3 different parts of each shark sample namely 1st dorsal fin, pectoral fin and lower lobe of caudal fin except for *Chiloscyllium plagiosum*, *Chiloscyllium indicum* and *Chiloscyllium hasselti* where only 1st dorsal fin and pectoral fin were used. All meat attached to the skin was carefully removed using dissecting knife. The skin was then cut into two sections measured 1cm x 1cm each and washes carefully using distilled water. One of the samples was kept as wet in refrigerator and another one, sun dried for about two hours.

The shape of dermal denticles was then observed under Compound microscope (Model Olympus CX31), which is connected to Sony color video digital camera (Model SSC-DC 58AP) and screen monitor (Model Syn. Master 955 FF). Images of dermal denticles of dorsal, pectoral and lower lobe of caudal fin for every species, different sex and total length were later stored for further documentation.

5.3 Results and Conclusion

The shapes of wet and dried dermal denticles of fins from various shark species are as shown in Appendix 3.

The result of this study shows that every shark species has its own distinctive dermal denticles shape at certain particular area. The shapes of these dermal denticles of shark fins could be used as a mean to identify shark species if the fins still fresh. However the shape of denticles collected from dried fins of the same species look significantly different compared to the fresh specimens. Posterior part of denticles from dried fins were fractured and broken during the handling and sun dried processes. Based on this study it can be concluded that this method is not recommended to identify shark species from dried shark fin and that other alternative such as DNA technique should be envisaged for these cases.