

# Marine Turtle Newsletter

## Fibropapillomas in Hawaiian Green Turtles

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[This note is based on a presentation given by the author at the 6th Annual Workshop on Sea Turtle Biology and Conservation in Waverly, GA, USA. A presentation by Lew Ehrhart covering tumors in green turtles in east Florida was given during the same session.]

Neoplasms identified by the Registry of Tumors in Lower Animals (RTLA) as fibropapillomas are being commonly found on green turtles in the Hawaiian Islands. Up to 10% of the nesting females tagged each year at the principal breeding colony of French Frigate Shoals have these epithelial growths ranging from a few millimeters to 30 cm in diameter. They most frequently occur on the neck, eyes, flippers, jaw, tail and sometimes even in the mouth. In Hawaii, fibropapillomas have been recorded in turtles as small as 45 cm juveniles to adult males and females over 85 cm. However, none have been found in turtles 35-45 cm, the minimum size range at which recruitment to the benthic habitat takes place in Hawaii.

During 1985, 35% of the 51 stranded green turtles examined throughout Hawaii had fibropapillomas. Local divers and fishermen regularly report seeing afflicted turtles in coastal foraging pastures and underwater sleeping areas. Such sightings are believed to have increased considerably over the past 20 years.

Fibropapillomas in green turtles were first described nearly 50 years ago by Smith and Coates (1938). At that time, 3 out of 200 green turtles (27 to 91 kg) examined at Key West, Florida (USA) had fibropapillomas. During the same year, Lucke (1937/38) mentioned that green turtles in the Dry Tortugas "not infrequently suffer from papillomatous neoplasms which may attain so great a size as seriously to interfere with their locomotion." Hendrickson (1958) stated that "occasional" green turtles nesting in Sarawak, Malaysia had ulcerated fibromas on their "throat and neck." Since the RTLA began accepting specimens in 1965 (Harshbarger 1974), fibropapillomas from green turtles have been verified from the Florida Keys (RTLA Accession Nos. 12 and 651), Hawaii (RTLA 121, 1767, 1774, 1856, 1883, 2097, and 3572), and the Cayman Turtle Farm (RTLA 3099). Jacobson (1981) reported that a "slowly increasing incidence of papillomatosis" was being studied in a breeding group of green turtles at the Cayman Farm. These growths were first noted in wild captured

adults but later developed in farm reared turtles. According to Jim Wood, the problem no longer exists, although several juvenile turtles released from the farm were recaptured a year or two later and found to have growths. In east central Florida, immature green turtles have been reported by Lew Ehrhart to show a high incidence of these fibrous growths during recent years where none had been seen since tagging studies began there in 1977. Pat Wells, working in the Florida Keys, has found similar growths on five of nine stranded green turtles handled during the first 3 months of 1986. Previously, only two cases had been reported out of six strandings of green turtles seen since 1982.

Thus far, the green turtle is the only sea turtle that has been documented to have fibropapillomas, although Jack Frazier and Tom Fritts have seen what were believed to be these growths in olive ridleys in the eastern Pacific.

Fibropapillomas in Hawaiian green turtles can result in reduced vision, disorientation, blindness, physical obstruction to normal swimming and feeding, and an apparent increased susceptibility to parasitism by the marine leech, *Ozobranchus branchiatus*. Observations in Hawaii also suggest that fibropapillomas can cause severe emaciation, increased predation by tiger sharks and humans, and probably a reduced ability to migrate and breed successfully. Entanglement in fishing line and other gear also appears to be more likely in afflicted turtles.

The etiology of fibropapillomas in green turtles remains unknown. Possible causes suggested in the literature include an immune response to trematode ova, secretion of hirudin by marine leeches, viruses, excessive solar radiation, chemical pollutants that impair the immune system, stress, and a genetic predisposition to neoplasia. Biopsy material from fibropapillomas on two Hawaiian green turtles was sent to the RTLA for electron microscopy, but no virus was found.

John Harshbarger of the RTLA believes that the only substantive evidence for any of the suggested causes is the consistent presence of ova from digenetic blood flukes (Family Spirochidae) within the fibrotic portion of the lesions. Smith and Coates (1939) originally reported ova in over half of the 250 fibropapillomas examined from at least six turtles. At least 7 of the 10 RTLA cases contain ova (RTLA 12, 121, 1767, 1774, 2097, 3099, and 3572), including specimens from Florida, Hawaii, and the Cayman Turtle Farm. Turtles from the latter source were heavily infested with the cardiovascular fluke, *Learedius learedi* (Greiner et al., 1980) and some of their shed ova had lodged in dermal capillaries (Jacobson 1981). The gradual increase in the incidence of fibropapillomas in captive animals suggested an infective process. In histological sections, the ova generally appear as oval, yellowish/brown, acellular capsules containing undifferentiated cells. Host response consists of a capsule of epitheloid macrophages surrounded by fibrosis. If trematode ova are in fact the etiologic agents, then the lesions represent a nonneoplastic host response,

characterized by an exuberant, cutaneous, foreign body fibrosis associated with papillary epidermal hyperplasia (John Harshbarger, pers. comm.).

The growth rate of fibropapillomas has been documented in two Hawaiian green turtles. A nesting female with no signs of neoplasia when first seen was recovered 3 years later in an emaciated state with a large (10 X 20 cm) fibropapilloma along the dorsal base of its tail. Another apparently healthy tagged turtle, an adult male, had numerous growths, including a 10 cm diameter mass in the axilla, when seen again just 2 years later. The fact that relatively small turtles in Hawaii can be heavily infested with fibropapillomas indicates that growth can occur fairly fast under certain conditions.

The experimental treatment of fibropapillomas in Hawaii has included surgical removal and strangulation. Neither procedure proved satisfactory due to the large number of growths often present, their highly vascular nature when large, and the apparent presence of nerve bundles that transmit pain, especially in growths associated with the eyes. There is no evidence to suggest that fibropapillomas in Hawaiian turtles may cease or diminish spontaneously.

The Hawaiian population of green turtles is geographically isolated and relatively small, with only a few hundred females nesting annually at French Frigate Shoals. A recovery team has recently been appointed to formulate a plan to rehabilitate the population. The occurrence of fibropapillomas is viewed as one of several problems that urgently need to be addressed through additional research. In general, the problem of disease is an area in which basic data are frequently lacking and more attention is needed for the development of effective management plans. Workers are therefore encouraged to document any occurrence of neoplasia found in sea turtle populations by submitting preserved tissue to the RTLA, The Smithsonian Institution, Room W216, Washington, DC 20560 USA.

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