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FEATHER PAPILLAE IN THE INCUBATION PATCHES OF HOUSE SPARROWS

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Despite the information available on the incubation patch in several avian species (Bailey, Condor 54: 121–136, 1952; Johns, Biol. Rev. 46:315–359, 1971), the condition and fate of feather papillae in the fully developed patch are poorly known. Bailey (1952) reported disappearance of the feather follicles and associated structures such as smooth muscle fiber and fat cells during development of the patch. Loss of feather papillae and smooth muscle fibers was considered by Johns (1971) as characteristic of the incubation patch in many birds. Selander and Yang (Gen. Comp. Endocrinol. 6:325–333, 1969), studying the incubation patch of the House Sparrow (*Passer domesticus*) noted that in fully developed patches of incubating females, feather papillae and follicles disappear. If these structures were totally lost when the patch develops, refeathering of the patch after the breeding season or incubation would have to be preceded by formation of new feather papillae. This appears rather unlikely but would provide an interesting model for developmental studies. In order to study the histoenzymological aspects of incubation patch formation in the House Sparrow, we were obliged to ascertain the state of feather papillae in fully developed patches. We wished to know whether they are actually present even though not perceptible on gross examination.

Incubating female sparrows were collected from box nests kept under regular observation in the Baroda University campus. The entire ventral skin was taken from these as well as from non-breeding females. Feathers, when present, were trimmed and the integument was treated with 20% aqueous solution of sodium bromide for about 30 min in order to separate epidermis from dermis. The epidermis could then be peeled off easily with forceps. This procedure was adopted from the method for staining dermal cholinesterases (Winkelman et al., Stain Technol. 42:214–215, 1967). The dermis was then washed and stained with haematoxylin.

Gross examination of the intact skin failed to reveal presence of feather follicles and papillae in the patch skin of incubating females. However, when the separated dermis of the fully-formed patch was stretched and examined microscopically, feather papillae were seen projecting as small rounded domes from its surface. They resembled structures seen in the dermis of ventral skin from non-breeding females. The papillae stained more deeply than the rest of the dermis and hence could easily be seen and identified (Fig. 1). Presence of feather papillae was also confirmed histologically. The papillae were those of down feathers as inferred from their location. We made similar observations on the Red-vented Bulbul (*Pycnonotus cafer*) and the Indian Robin (*Saxicoloides fulicata*).

FIGURE 1. View of the outer surface of the dermis of the incubation patch skin of a House Sparrow, after peeling off the epidermis. Note the rounded dome-like projections of dormant feather papillae. Magnification 42 ×.

We conclude from these findings that feather papillae are not lost during development of the incubation patch. They remain dormant and inconspicuous until the skin refeathers.

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