

SHORT COMMUNICATION

ABNORMAL BREAST-COLOUR OF CHESTNUT-SHOULDERED WRENS

Although males of some species of blue wrens, *Malurus* spp., have a jet-black throat when in breeding plumage, others have blue or violet colouring. This type of Tyndall colouring is due to a structural element in the feathers which overlies a layer of melanin pigment and modifies the colour accordingly (Auber 1957). When black eumelanin is present the feather appears blue; when chestnut-red erythromelanin (Harrison 1965) is present the feather appears some shade of magenta or violet.

Within the typical blue wren group the Black-backed Wren *M. melanotus* has the breast blue, and only a little deeper in colour than the other blue plumage. It is progressively deeper blue on the Turquoise Wren *M. callainus* and Splendid Wren *M. splendens*, and on the Superb Blue Wren *M. cyaneus* may appear black at first glance and only at certain angles to the light is it apparent that it is very dark blue with a black border.

In the group of chestnut-shouldered wrens where chestnut-red melanin is apparent on the scapular feathers, the breast is most frequently black, but on the Blue-breasted Wren *M. pulcherrimus* of south-western Australia the breast is glossy dark-violet, the colour on the tips of feathers bordering the sides of the breast being lighter and brighter and more similar to the colour of other violet plumage on this species. The Elegant Wren *M. elegans* of the extreme south-west has a breast which, like that of *M. cyaneus*, may at times appear black, but on which violet colour is present and partially masked by black, producing a 'blue-black' effect save at the tips of the feathers at the sides of the breast where the violet colour is more apparent. The apparent series of variations in breast-colour suggest that blue or violet is progressively masked by a spread of black pigment.

Ford (1966) referred to two specimens of the Variegated Wren *M. lamberti assimilis* in a population adjacent to *M. pulcherrimus* which showed a few violet-tipped feathers on a black breast, which he then considered to be evidence of probable hybridization. Later (1969), he re-examined the specimens and suggested that the colour resulted from fraying, causing structural changes enough to produce a Tyndall effect.

When material collected by the Harold Hall Australian Expedition was examined, it was found that of sixty-six males of *M. l. assimilis* and *M. l. lamberti* showing breeding plumage, three *assimilis* and

one *lamberti* showed some evidence of violet feathers on the normally black breast, and two more specimens of *assimilis* showed a violet tint on the throat of an otherwise normal plumage. One of ten males of the so-called Lavender-flanked Wren *M. dulcis rogersi* showed very distinct violet feathering on a partially moulted breast and throat.

Because these *assimilis* specimens came from northern Queensland, the Kimberleys, and Warburton Mission in the central east of Western Australia, the *rogersi* specimen from the Kimberleys, and the *lamberti* specimen from New South Wales, the abnormal breast colour probably does not arise from hybridization with *M. pulcherrimus* or *M. elegans*. The three *assimilis* specimens and the *rogersi* and *lamberti* specimens are all moulting from eclipse into breeding plumage with the moult mostly complete. The violet feathers on the otherwise black breasts appear to be newly grown, and in these specimens at least the colour could not be the result of fraying of a worn plumage.

Ford (1969) commented that the violet-tipped feathers that he found on the *assimilis* specimens were otherwise grey and not entirely violet or partly black. Many of the violet feathers examined on the Harold Hall Expedition specimens were black towards the base, but a significant number showed a small whitish tip of varying extent, while on a few the whitish area extended further down the feather, and some showed loss of pigment on the basal side of the violet zone.

There would therefore appear to be a correlation between the presence of abnormal violet colour and loss of pigment. Since the earlier comparison of species suggests that the feathers of black breast and throats on *Malurus* species may possess blue or violet colour swamped by an excess of black pigment, then a reduction in the amount of such pigment might allow the hidden blue or violet colour to show, while a further reduction of pigment might take away the melanin that interacts with the special structure to produce blue and violet and result in a pale grey or white colour. These abnormal violet feathers probably occur because of a temporary or permanent reduction of pigment production in some feather follicles.

Sometimes this could be the result of temporary fluctuations in hormonal levels. Salomonsen (1939), when studying the feathers and moults of the Ptarmigan *Lagopus mutus*, found that, if the hormonal

changes which appeared to control phenotypic plumage-changes were not complete when a moult began, the earlier feathers might show a distal area of the same colour as the previous plumage, and that colour and pattern of proximal areas might be influenced by the period of change from one hormonal control to another. In the *Malurus* specimens here studied the breeding plumage into which they are moulting must be controlled by similar changes in hormonal levels. Where the feathers show whitish tips and change through violet to black basally, the paler tips might be related to the white feather of the eclipse plumage.

During the examination of specimens, three males were found which did not show signs of active moult, but on which a variable amount of eclipse-type plumage, including a number of white breast feathers, occurred. All three were taken in different areas at different times. One, a subordinate male in a party with recently fledged young, showed sparsely scattered white breast feathers and some brown feathers

on crown and neck. Another, with minute testes, showed more than half the breast feathers white, and crown and mantle mainly brown; and the third had less than a quarter of the breeding plumage. Some of the breast feathers of these individuals showed variable amounts of black and white and occasional violet tints, suggesting that some hormonal disturbance may have been responsible.

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