

SHORT NOTES

The syrinx of the Pukeko

The syrinx, the structure used in the production of sound, is in the Pukeko (*Porphyrio porphyrio melanotus*) at the tracheo-bronchial junction, enclosed in the interclavicular air sac. The end of the trachea is dorso-ventrally flattened, and the last five tracheal rings are fused to form a bony drum.

The main vibratory surfaces are the internal tympaniform membranes (ITMs). They stretch from the base of the pessulus, the median dorso-ventral rod of the drum, to the bronchidesmus, the connective tissue between the primary bronchi and the alimentary canal (Fig. 1). There are also two external tympaniform membranes (ETMs), between the third and fourth bronchial half-

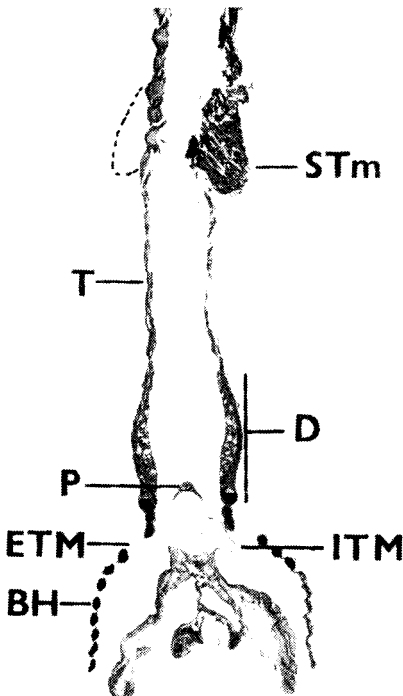


FIGURE 1.
Longitudinal section through the syrinx of a female Pukeko.
BH = bronchial half-ring, D = drum, ETM = external tympaniform membrane, ITM = internal tympaniform membrane, P = pessulus, STm = sternotrachealis muscle, T = trachea

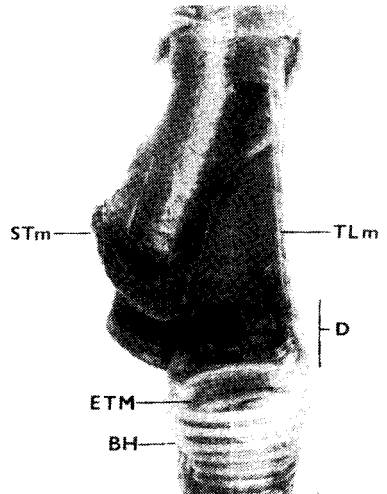


FIGURE 2.
Lateral view of the syrinx of a female Pukeko.
TLm = tracheolateralis muscle. Other labels as in Fig. 1

rings (Fig. 1, 2). These are as thin as the ITMs but of smaller area. There is no structure equivalent to the external labium found in oscine species.

Two pairs of muscles are associated with the syrinx, both of them extrinsic muscles: the sternotrachealis (STm) and the tracheolateralis (TLM). The STm originate on the rib cage and insert on to the lateral walls of the trachea, c. 1 cm (and 10 tracheal rings) above the drum (Fig. 1, 2). The section of the trachea between the edge of the air sac and the insertion of the STm is covered by a fascial sheath. The TLM, smaller muscle blocks than the STm, run along the trachea on its lateral surfaces to the dorsal side of centre (Fig. 2). They insert on to the first bronchial half-rings at the dorsal corners of the drum. None of the array of intrinsic muscles found in passerine birds are present in the Pukeko, a member of the Rallidae.

The only noticeable difference between the syrinx of male and female Pukeko is that the STm are thicker in the female (diameter = 2.5-5.0 mm, $n = 8$) than in the male (1.0-1.5 mm, $n = 5$). This is not a result of differences in body size because males are larger than females (Tunncliffe 1965). Only one call of Pukeko shows marked sexual dimorphism (Clapperton 1983). There is no general tonal difference in calls of the sexes, as is seen in species of Rallidae with marked sexual dimorphism in syringeal structure such as the American Coot (Gullion 1950) and the Tasmanian Native Hen (Ridpath 1972).

The lack of complex muscular control over the action of the syrinx is reflected in the lack of intricate song in this species, a feature held in common with other birds of similar phylogeny. The Pukeko does, however, make full use of its sound-producing capabilities, having a large repertoire of calls (Clapperton & Jenkins 1984). It has enough control over sound production to produce calls of such consistency that they can act as an individual recognition system (Clapperton & Jenkins, *in press*).

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B. KAY CLAPPERTON, *Department of Botany and Zoology, Massey University, Palmerston North*