

## SHORT COMMUNICATIONS

### CONSISTENT INDIVIDUALITY IN THE CALLS OF AUSTRALIAN SHELDUCKS *TADORNA TADORNOIDES* ON ROTTNEST ISLAND, WESTERN AUSTRALIA

Australian Shelducks are sexually dimorphic in voice as well as appearance, with the honks of males being lower-pitched than female calls (Frith 1977). Both sexes are very vocal and one call-type predominates, the identity call (Frith 1977), although other calls may be associated with threat, display or alarm (Frith 1977; Riggert 1977). We examined Shelduck calls for individual, as well as sexual, differences.

Shelducks were recorded on Rottnest Island, near Perth, Western Australia in April and June 1982, when pairs were on their brood territories before egg-laying. A territory consisted of all or part of a salt lake containing a source of fresh water. Shelducks defended their territories continuously at this time and it is unlikely that any individual was recorded at two different locations. Most recordings were made on only three days, moving from one territory to the next and further reducing the possibility of duplication. Calling birds were approached closely until they moved on to the water or along the shore. All recordings were made in the open, from similar distances and on days with little wind, and are therefore comparable. Recordings were made on TDK-AD cassettes using a Sennheiser 804 directional microphone and a Marantz Superscope C-205 tape recorder and analysed on a Kay 6061B Sonagraph using the narrow band pass filter and scale magnifier. Quantitative analysis of sonagrams was not undertaken as visual inspection has been shown to detect individuality most effectively (Saunders 1983).

In all, females were recorded from 17 separate locations and males from 9, and only sequences with more than 20 calls from an individual were used. Only recordings relatively free from extraneous noise (wind, aeroplanes, other birds) have been used in the figures but the phenomena described were true for all calls. Fewer calls of males are shown because they called less often than females and their calls were harder to separate from background noise.

Figures 1 and 2 show that the identity calls given by an individual female varied little, whereas those of different individuals often differed markedly from one another. The calls of each female had a consistent complex frequency structure which gave a characteristic tonality to her calls such that a human listener could, with practice, differentiate individuals by voice. Any seasonal variation in the calls of an individual is likely

to be slight compared with the differences between individuals, as exemplified by the last two rows of calls in Figure 1.

Figure 2 demonstrates that even when calls are similar in duration and shape (lines 3 and 4) their frequency structures differ. This is most obvious when their calls are given alternately or simultaneously (line 5). Some females gave calls not only in the normal upright stance (U) but also with the head thrust forwards and low (F). Individual females were as consistently different from one another in the structure of their downwardly inflected calls as they were in their upwardly inflected ones. No intermediate postures or calls were noted.

Male calls lacked the higher frequencies found in female calls and the harmonics of their calls were closer, giving a characteristically deeper sound to their voices (Fig. 3). Males showed consistent individuality in the tonality of their calls (Fig. 3) although this was not always easily distinguished from the background noise. Calls given by males in upright and forward postures were upwardly or downwardly inflected but, like female calls, maintained their unique call signatures (line 4, Fig. 3).

In some other shelducks, such as the Common Shelduck *Tadorna tadorna*, males produce pure whistled notes. Whistles were never heard from Australian Shelduck males which lack the well-developed tracheal bullae found in Common Shelduck males (Johnsgard 1971).

Australian Shelducks establish long-term pair bonds (Frith 1977). Consistent individuality of voice, in the form of identity calls, would facilitate mate recognition, particularly in the large flocks which form outside the breeding season. Possibly the sexual dichotomy in voice halves the difficulty of locating the correct individual. Birds on adjoining territories may also use vocal recognition to differentiate familiar neighbours from unfamiliar intruders. Indeed, recognition of individuals by voice may be involved in the dominance relationships established in pre-breeding assemblages which determine later ownership of brood territories (Riggert 1977).

Females incubate alone and then lead their young from the coast to join the male on the brood territory. This journey takes place in darkness and parents call

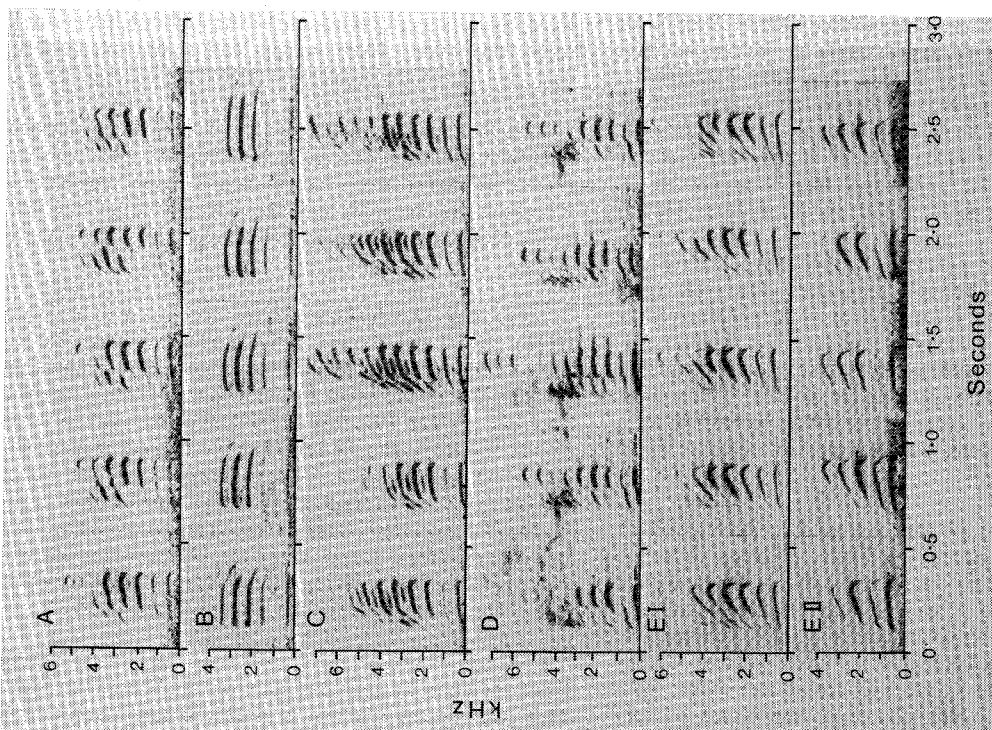


Figure 1. Sound spectrograms of the identity calls of five female shelducks. Each horizontal line shows five calls from a different female (A - E). The last two lines represent calls by the same female in April (EI) and in June (EII).

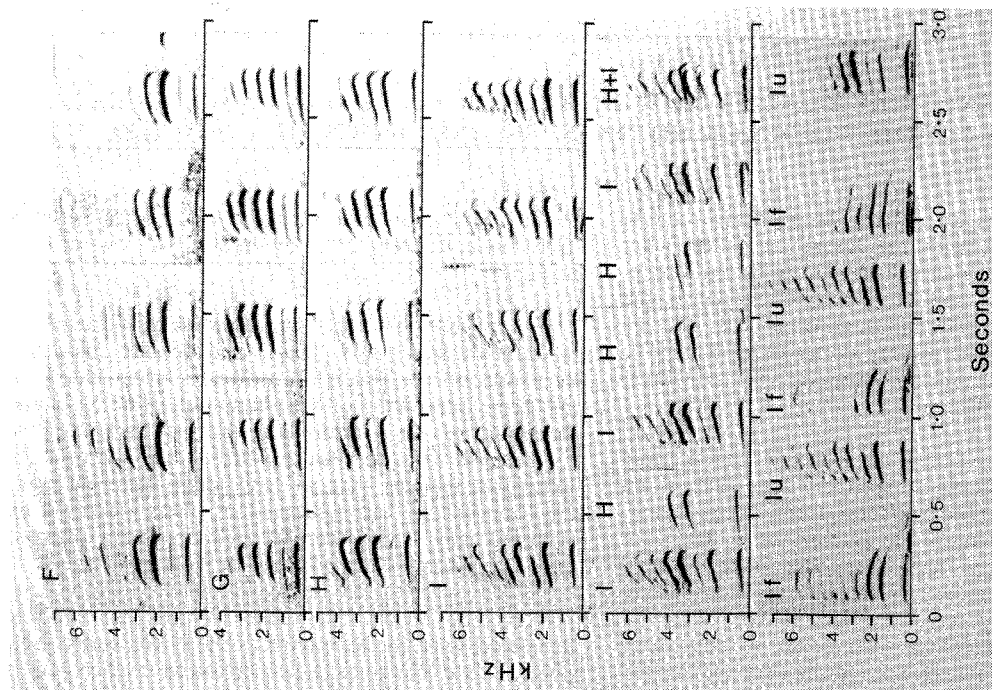


Figure 2. The top four lines show five identity calls from each of four females with similar calls (F - I). The fifth line gives examples of alternate and simultaneous calling by females H and I. The bottom line shows alternate calls by female I in both upright (lu) and forward (lf) postures.

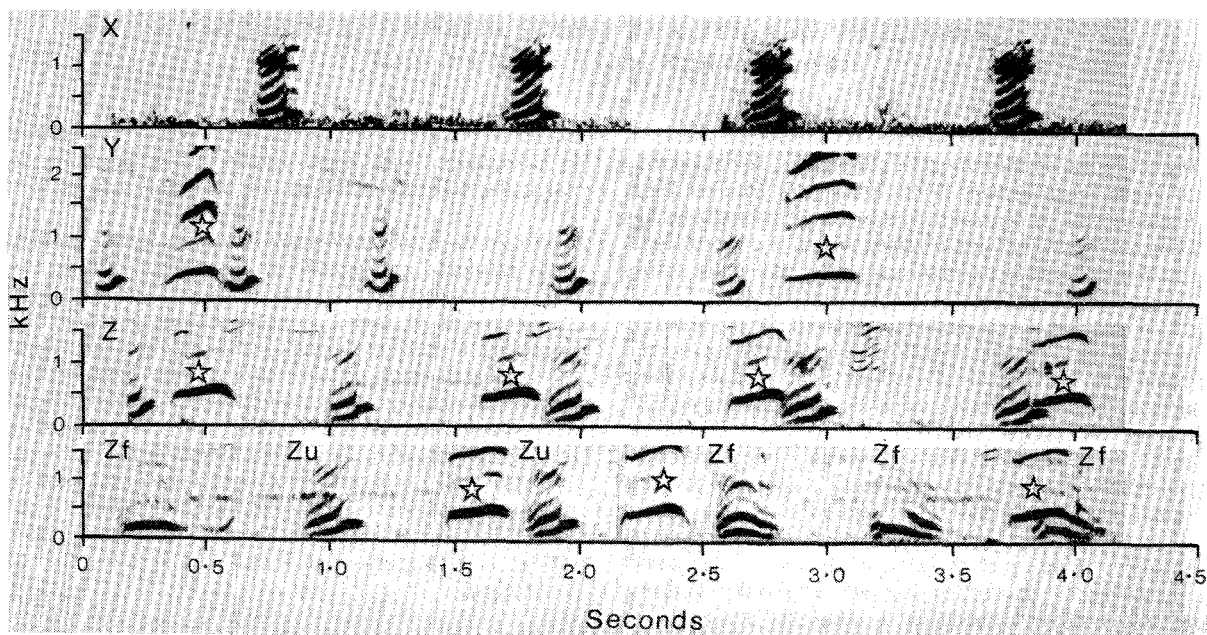


Figure 3. Sound spectrograms of the identity calls of three male shelducks. Each horizontal line shows at least four calls from a different male (X, Y and Z). The bottom line shows the calls of male Z uttered in both upright (Zu) and forward (Zf) postures. Lines 2, 3 and 4 also illustrate the higher frequencies of the identity calls of females (☆).

throughout. Individual differences in voice may allow chicks to distinguish their parents at such times, especially after broods and adults have become intermingled (Riggert 1977).

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#### REFERENCES

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