



Call differentiation in the Limnodynastes tasmaniensis
complex (Anura:Leptodactylidae).

by

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Summary

This thesis analyses call differentiation in the Leptodactylid frog, Limnodynastes tasmaniensis. This analysis assumes that males call to attract females as mates and that calls can therefore also function as pre-mating isolating mechanisms. This was investigated experimentally. Males, females and juveniles could all discriminate between their own and grossly different calls. However, the traditional call discrimination set up, two loudspeakers with a frog released mid-way, was shown to be inadequate to justify inferences about call function.

Acoustic analysis revealed three call races, western, northern and southern, within the morpho-species, L.tasmaniensis. The races differ most in notes per call, note repetition rate and dominant frequency. The distribution of the three races was mapped. They are largely allopatric but three contact areas exist. The western and northern call races meet in a series of narrow hybrid zones on the Murray plains in South Australia, the northern and southern in a broad intergrade in central Victoria and the southern and western overlap along the Coorong, South Australia.

Evolution of the three races was discussed in terms of three hypotheses. Evidence allegedly supporting these hypotheses was critically discussed in the introduction.

1. Reinforcement: changes in an isolating mechanism result from selection favouring devices which reduce the frequency of interbreeding between two genetically distinct groups whose hybrids are inviable.

Calls and other possible pre-mating isolating mechanisms were analysed in contact areas and although in all overlaps there was evidence of hybridisation there was no indication of reinforcement. Hybridisation studies using combinations of all call races gave no indication of hybrid inviability suggesting the selective agent required for reinforcement (i.e. gamete wastage) was non-existent. There were no obvious environmental

constraints on the expansion of any of the three contact zones. For the Coorong overlap this was confirmed by the survival of southern tadpoles transplanted to sites outside the normal range of this call race. The possible future of all contacts was discussed.

2. Incidental origin: changes in an isolating mechanism are a correlated response to selection in some other context.

Sampling of call structures in populations from a wide range of environments gave no evidence of incidental origin of call differences between populations within call races.

3. Selective origin: changes in a potential isolating mechanism reflect selection to improve their efficiency as mate attractants in the particular local environment they must function in.

In the northern and western call races, the variance of pulse repetition rate was least in populations with either the greatest number of sympatric anuran species or, where there were synchronic species with call dominant frequencies close to that of L.tasmaniensis. This suggests that acoustic interference may be an important influence on call structure.

The evolution of the three call races was discussed given the above results.