CHAPTER 6
CONCLUSION

This study focuses on acoustic comparisons of six sympatric bulbul species that routinely forage in mixed-species flocks and draws attention to acoustic differences between these species that live with each other in the same habitat. This study analyses a total of 1,149 songs, including 93 from Black-headed Bulbuls, 318 from Black-crested Bulbuls, 85 from Streak-eared Bulbuls, 122 from Stripe-throated Bulbuls, 265 from Red-whiskered Bulbuls, and 266 from Sooty-headed Bulbuls. These structural analyses are the first detailed song descriptions of all the six *Pycnonotus* species, which are widespread in tropical Asia. This study of inter-specific relationship explores three selective pressures that are possible factors influencing acoustic features of all the six sympatric species: differences in i) plumages, ii) genetics, and iii) morphometrics. Several conclusions can be made:

1) Detailed analysis of nine fine structural song features of six *Pycnonotus* species revealed very characteristic acoustic features of each species with a high degree of species identity. In addition, in doing pair-wise analyses of visually similar species, birds show significantly distinctive vocalizations. These results demonstrate that acoustic features are potentially important for pre-mating isolation mechanisms for emphasising species recognition in mixed-species flocks.

2) Multi-characteristics comparisons add to the understanding of songs influenced by selective pressures of all six sympatric species. The correlation analyses between acoustic versus morphometric features and acoustic versus genetic features shows a congruent relationship of non-significant positive correlation. This means that species-specific vocalizations of all six species have experienced stochastic selective pressures, in particularly between closely-related and sympatric *Pycnonotus* bulbuls.

3) Further comprehensive studies on sexual and mating behaviour would help to clarify communication mechanisms influencing song divergence in this group. Playback studies are an important area for further research on confirmation of which birds respond to the species-typical acoustic cues as well as functions of these vocalizations.