

GEOGRAPHICAL VARIATION OF SPECIES-SPECIFIC CALLS AND ITS ACOUSTICAL DIFFERENTIATION IN WILD AGILE GIBBONS (*HYLOBATES AGILIS*)

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We examined acoustic geographic variation of wild agile gibbon among ten locations sampled from three areas, Malay peninsula, Sumatra island and Borneo island through the comparisons of songs. We also constructed "the acoustic distance", which is degree of the acoustic similarity, applying the similar procedures of principal component analysis and cluster analysis traditionally proposed by the population genetic studies. We measured 47 acoustic variables for each great call and summarized these acoustic variables into eight acoustic principal components using by Principal component analysis. Subsequently the each PCs were averaged and used for cluster analysis. The cluster analysis showed the three distinct clusters, corresponding with the current geographic isolated areas, which are Borneo, Malay and Sumatra. Furthermore, the cluster phenogram of the acoustic similarity suggested the three subclusters in the Sumatra populations, which did not perfectly correspond with the actual geographic distances. Moreover Malay population was plotted as the outermost layer cluster than the Borneo population. This result represented that acoustic distance of each areas didn't correspond with the geographic isolation histories. The evolutionary forces probably enhance a rapid shift in species-specific signal characters to avoid hybridization, when closely related species occur sympatrically. Given species recognition hypothesis, ecological conditions in Malay agile gibbons are the case of the closely related species (white handed gibbon) influences on the acoustic divergence, accelerating the acoustic traits of their songs.

Keywords: *Hylobates agilis*, Song, Geographical variation, Species recognition