Formation and Change of Vocal Dialects in Captive Gentoo Penguin Pygoscelis papua Colonies

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Vocal behavior of birds is linked to individual recognition, mate and parent-chick bonding, and enhancing social bonds. However, geographically-specific dialects have been observed in bird and other animal species and linked to reproductive isolation and speciation. While many studies use wild populations, captive sites provide a more controlled examination of vocal behavior. The focus of the research was to examine the possibility of dialects in captive gentoo penguin populations and to discover if gentoo dialects change over time. For two zoos in the study, vocal recordings were obtained from the year gentoos were introduced to the penguin population and one zoo had an established gentoo population. Gentoo ecstatic calls were isolated from recordings with a supervised detection process in Raven Sound Analysis software, and spectrogram measurements were taken on call characters. Variation within and between sites was analyzed using principle component analyses, spectrogram correlation, and supervised machine learning tests with R Statistical Software. Clear evidence of population-specific dialects in captive gentoo penguins and shifts in those dialects over time were found. The data showed considerable variation between populations, between years at newly formed populations, and within populations, likely due to differences between or within individual gentoos. The calls within sites became more dissimilar over time. The data has implications for understanding the degree of plasticity in vocal behavior and the costs and benefits of plasticity within a population, in the wild and captivity. Information from the analysis may be especially important in zoos, as individual penguins are relocated periodically and vocal behavior may be important in mate choice and bonding.

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