SEED DISPERSAL BY WHITE-HANDED GIBBONS (*HYLOBATES LAR*) IN KHAO YAI NATIONAL PARK, THAILAND

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ABSTRACT

Seed dispersal by white-handed gibbons (Hylobates lar) was studied during a season of high fruit availability for three consecutive years in Khao Yai National Park, Thailand. The study site was occupied by a fully habituated gibbon group which has been the focus of previous studies. The objective of the research was to clarify the ecological role of the resident gibbons in relation to the community of fruit species which they eat. The methods of study included direct feeding and ranging observations, gibbon fecal collections (N=61), controlled seed germination studies on 6 plant species, study of fruit morphology, phenology, and the mapping of adult fruit source distributions in the 22 ha study site.

The research revealed 13 non-fig fruit species eaten by gibbons during the season of April-June, with 11

of these species being dispersed by gibbons in their feces. Gibbons ate ripe fruit and swallowed the seeds of 9 fruit species which had fibrous attachments between the seed and pulp , and one species which had no attachments. Observations and fecal collections showed an average of 8 defecations per day per gibbon containing an seasonal average of 25 seeds per feces other than figs which were not included in this study. They dispersed an average of 200 seeds per individual per day during the season. The focal gibbon group was estimated to disperse approximately 72,000 seeds during each 3-month season.

Randomized block germination studies on gibbon processed seeds resulted in 2 fruit species with improved germination over unprocessed seeds ($p<.01$), 2 species with germination rates at least equal to unprocessed seeds and 2 species whose germination rates could not be determined due to dormancy requirements. No evidence was found of seed damage by gibbon processing.

Detailed study of the distribution of 166 adult fruit sources of the 10 main species eaten by gibbons within a mapped quadrat system showed a non-random distribution. Variance ratio tests for interspecific association showed overall positive interspecific association with VR= 1.789 and $p<.01$. Ten positive species-pair associations were identified at $p<.05$.

The seed shadow generated by gibbons during the season, as measured by minutes spent in quadrats, was also found to be non-random in space when compared to the Poisson distribution. The time spent in quadrats covaried positively with the number of fruit sources present and the number of fruit species present with $p<.01$ for Spearman's Rank coefficients from comparison of 87 quadrats. Gibbons were found to be generally beneficial and reliable seed dispersal agents for 8 or more species within the community of fruiting species eaten during the April-June season at Khao Yai National Park. Their potential effect on plant distribution may be to reinforce a pattern of mixed-species patches with predictable fruit availability within their fixed territories.