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Biology 862
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Annotated Bibliography- Seed Dispersal by Birds and Bats

Benkman, C.W. 1999. The selection mosaic and diversifying coevolution between crossbills and lodgepole pine. *The American Naturalist* 153 9(Suppliment): 75-91.

The title of this paper is misleading and lofty. The actual study and paper was more about the red squirrel than crossbills. I suspect the author wrote two papers from one set of research, though I was only looking at winged dispersers, so I did not see a squirrel version that was titled as such. The author suggests that coevolution exists between red squirrels and lodgepole pine. He suspects, but has few study areas to back this up, that in the absence of red squirrels, crossbills drive selection for cone size in lodgepoles. This is a good paper for looking into non-flying mammalian seed dispersers.

Chapman, C. A., Chapman, L.J. 1995. Survival without dispersers: seedling recruitment under parents. *Conservation Biology* 9 (3): 675-678.

This paper is written to be geared towards conservation implications as was the Duncan and Chapman paper on forest succession presented in class. The paper suggests that little is known about the impacts of removing potential seed dispersers from forest areas via hunting. The authors postulate that dispersers are required to move seeds away from parent trees, because evidence suggests that there is little or no recruitment under parent trees. The authors examined 25 fruiting tree species in Kibale National Park and identified the proportion that have many conspecifics growing beneath them, and the proportion that do not. This was a baseline study that makes loose connections to the conservation implications.

Duncan, R.S., Chapman, C.A. 1999. Seed dispersal and potential forest succession in abandoned agriculture in tropical Africa. *Ecological Applications* 9 (3) 998-1008.

This is the paper that we tore apart in class. The set up of the study looking at seed rain under isolated trees was poor. Seed traps were set out with poor monitoring and no adjustment for the density of the tree in relation to the height of the tree. Additionally the study area was poorly described and no sampling of seed rain was done in the forest to determine if the seed rain found in the agricultural land was any different from that in the adjacent forest. Do not waste more of your time with this paper.

Figuerola, J., Green, A.J., Santamaria, L. 2002. Comparative dispersal effectiveness of wigeongrass seeds by waterfowl wintering in south-west Spain: quantitative and qualitative aspects. *Journal of Ecology* 90:989-1001.

This was an excellent and innovative paper in the seed dispersal literature. The study was well designed, using a study area that was easy to work in with a well-documented plant species and a high level of confidence in the fecal sample accuracy

because of the behavior patterns of waterfowl. I was pleased to find this paper because, of all of the attention paid to wetlands this seems to be one of the only looking at seed dispersal with implications for isolated water systems.

Galindo-Gonzalez, J., Guevara, S., Sosa, V.J. 2000. Bat and bird-generated seed rains at isolated trees in pastures in a tropical rainforest. Conservation Biology 14(6): 1693-1703.

This study seems to be an improvement over the Duncan paper that looked at seed dispersal under isolated trees that we discussed in class, but it still suggests that birds and bats might be important seed dispersers and therefore important in forest succession without having any strong evidence to indicate that. The reasons I think this study was better than the Duncan study is because the seed traps were monitored for night and day deposition and the two time periods were kept separate, making fecal identifications easier and trap contamination more easy to spot. In addition, this study factored in seasonal effects on abundance of seed rain.

Herrera, C. M. 1984. A study of avian frugivores, bird-dispersed plants and their interaction in Mediterranean scrublands. Ecological Monographs 54(1): 1-23.

Another paper by Herrera in a Spanish montane climate. Herrera is a good reference in general because he study the same ecosystem and seed dispersers for years.

In this paper Herrera suggests that current bird-plant seed dispersal interactions are the result of evolutionary, climatic, and geographical factors. He suggests that actual coevolution involving a smaller set of bird and plant species may facilitate the persistence of noncoevolving plant species. I found the genetic implications in this paper hard to follow based on the evidence of fruit predation in the two habitats studies by Herrera.

Herrera, C.M. 1984. Adaptation to frugivory of Mediterranean avian seed dispersers. Ecology 65(2) 609-617.

This paper examined avian frugivores in a Spanish Mediterranean montane climate and looked at the morphological and digestive correlates of avian seed dispersers. The introduction to the paper states that the avian seed dispersers and the plants are locked in a mutualistic relationship. As we discussed in class, the actual importance of avian seed dispersers is poorly understood.

This study found the avian seed dispersers indistinguishable from nonfrugivores in the ratio of gizzard mass, liver mass, and intestine length to body mass. The only differences detected are already well established, bill morphology and gut passage time.

Herrera, C. M. 1998. Long-term dynamics of Mediterranean frugivorous birds and fleshy fruits: a 12-year study. Ecological Monographs 68(4): 511-538.

This is the terminal paper for a 12-year Spanish study examining the relationship between fleshy-fruited plants and their vertebrate seed dispersers in a Mediterranean, montane climate. The author examines the effect of interannual variation on the plant-disperser relationship, with the main objective of determining the patterns and correlates of variation in the composition and abundance of fruits and birds. Fecal sample analysis

was done on samples collected from 1978-1990, as was fat deposition rates and recaptures in mist nets. The author found that the annual variation in the abundance of seed dispersers was correlated to November mean maximum temperatures. The authors, however failed to consider any other weather factor besides temperature. The author also found that diet fluctuated from year to year.

Loiselle, B.A., Blake, J. G. 1999. Dispersal of melastome seeds by fruit-eating birds of tropical forest understory. Ecology 80 (1) 330-336.

This study examines the question of quality versus quantity in bird seed dispersers. The authors suggest that bird species that eat large amounts of fruit are not always dispersing intact seeds with good chances of germination. The authors concluded that in contrast to canopy trees, shrub species have a relatively small set of avian dispersers, making them possibly more vulnerable if their specialized seed dispersers became extinct. The quality versus quantity question, therefore becomes, is it better to have lots of dispersers with a range of quality or a smaller number of more reliable dispersers?

Lopez-de Buen, L., Ornelas, J. F. 1999. Frugivorous birds, host selection and the mistletoe *Psittacanthus schiedeanus*, in central Veracruz, Mexico. Journal of Tropical Ecology 15: 329-340.

This is the mistletoe paper presented in class. The authors suggest that avian seed dispersers, in particular cedar waxwings, play a role in transmission of parasitic mistletoe. It is suggested that birds are able to select for host trees and then among infected favorite host trees, select the most heavily infected for feeding.

Melo, C., Bento, E. C., Oliveira, P. E. 2003. Frugivory and dispersal of *Faramea cyanea* (Rubiaceae) in Cerrado woody plant formations. Brazilian Journal of Biology 63 (1): 15.

This paper suggests that some zoochorous plant species may fruit out of season to attract migratory bird populations. This was a behavior observation study where birds were monitored for permanence on a plant, the plant type and abundance, and their behavior while on that plant, i.e. eating, sleeping, defecating. The paper makes connections between the importance of understanding disperser behavior and relationships and the implications for conservation management.

Shanahan, M. So, S., Compton, S. G., Corlett, R. 2001. Fig-eating by vertebrate frugivores: a global review. Biological Review 76:529-572.

This review paper is an excellent resource for looking at a well-documented disperser-plant family relationship. Frugivory on *Ficus sp.* is collected from 75 countries, and 260 species of *Ficus*. 1274 bird and mammal species are documented *Ficus* frugivores. The role of fig specialists is examined. The data combined indicates that *Ficus* species are the most important plant genus for tropical frugivores.