

CEER-T-193

BIBLIOGRAPHY OF RESEARCH AT EL VERDE, PUERTO RICO

Cindy Ginés, Norma L. Ortega, and Robert B. Waide

Terrestrial Ecology Division

August 1984

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UNIVERSITY OF PUERTO RICO — U.S. DEPARTMENT OF ENERGY

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Technical Report No. CEER-T-193

August 1984

### El Verde Bibliography

- Aranda Arce, C. F. 1982. The ecology of a freshwater zoptychoplankton in the Mameyes river, Puerto Rico. M. S. thesis, University of Puerto Rico, Rio Piedras.
- Bannister, B. A. 1967. Ecological life cycle of Euterpe globosa Gaertn. M. S. thesis, University of North Carolina, Chapel Hill.
- Berrios Saez, A. y J. Pérez Castro. 1983. Palmares del Bosque Experimental de Luquillo. p. 45-56 en A. E. Lugo, ed. Los Bosques de Puerto Rico. Publicado por el Instituto de Dasonomia Tropical y Departamento de Recursos Naturales. Disponible en: Inst. Dasonomia Tropical, Rio Piedras, PR.
- Briscoe, C. B. and F. H. Wadsworth. 1970. Stand structure and yield in the Tabonuco forest of Puerto Rico. Chap. B-6 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.
- Briscoe, C. B. 1966. Weather in the Luquillo Mountains of Puerto Rico. USDA For. Serv. Res. Pap. ITF-3. Available from: Inst. Trop. For., Rio Piedras, PR.
- Brown, S. and A. Lugo. 1982. Organic matter in tropical forests and the Carbon cycle. *Biotropica* 14(3):161-187.
- Brown, S., A. Lugo, S. Silander, and L. Liegel. 1983. Research history and opportunities in the Luquillo Experimental Forest. Southern Forest Experimental Station Publication. Available from: Institute of Tropical Forestry, Rio Piedras, P.R.
- Clegg, A. G. 1963. Rainfall interception in a tropical forest. *Caribbean Forester* 24:74-79.
- Clements, R. G. and J. Colón. 1975. The rainfall interception process and mineral cycling in a montane rain forest in eastern Puerto Rico. pp. 812-823 in F. Howell, J. Gentry, and M. Smith, eds. Mineral cycling in southeastern ecosystems. Available from: Technical Information Center, US Energy Research and Development Administration, Washington, D. C.
- Clements, R. G., G. E. Drewry, and R. J. Lavigne. 1970. The rain forest project annual report. PRNC Publ. No. 147. Available from: Center for Energy and Environment Research, PO Box 3682, Rio Piedras, PR.
- Colón, J. A. Chemical inputs to the tropical rainforest via rainfall. M.S. thesis, University of Puerto Rico, Rio Piedras.
- Conant, D. 1975. Hybrids in American Cyatheaceae. *Rhodora* 77(812):441-445.

Conant, D. Ecogeographic and systematic studies in American Cyatheaceae. Ph.D. thesis, Harvard University.

Conant, D. Measurement of spore dispersal of the giant tree fern, Cyathea arborea, using P-32. M.S. thesis, University of New Hampshire.

Cowley, G. T. 1970. Effects of radiation on the microfungal populations of six litter species in the Luquillo Experimental Forest. Chap. F-4 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Cowley, G. T. 1970. Vertical study of microfungal populations on leaves of Dacryodes excelsa and Manilkara bidentata. Chap. F-7 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Crow, T., and P. Weaver. 1977. Tree growth in a moist tropical forest of Puerto Rico. Forest Service Research Paper ITF-22. 17pp. Available from: Institute of Tropical Forestry, Rio Piedras, Puerto Rico.

Crow, T. R. 1980. A rainforest chronicle: a 30-year record of change in structure and composition at El Verde, Puerto Rico. *Biotropica* 12:42-55.

Cuevas, E. and R. G. Clements. 1975. Changes in selected water quality parameters as influenced by land use patterns in the Espiritu Santo drainage basin. PRNC Publ. No. 195. Available from: Center for Energy and Environment Research, PO Box 3682, Rio Piedras, PR.

Desmarais, A. P. and A. Vazquez. 1970. Upper canopy crown closure at El Verde. Chap. F-10 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Drewy, G. F. 1970. A list of insects from El Verde, Puerto Rico. Ch. E-10 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Doyle, T. 1980. Modelling of succession in the Tabonuco forest. M.S. thesis, Department of Ecology, University of Tennessee.

Duke, J. A. 1965. Keys for the identification of seedlings of some prominent woody species in eight forest types in Puerto Rico. *Annals Missouri Bot. Gard.* 52(3):314-350.

Edmisten, J. 1970. Survey of mycorrhiza and nodules in the El Verde forest. Chap. F-2 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Eggers, H. F. A. 1883. Puerto Rico: description of the vegetation of the Luquillo Mountains. Nature 29:129-130.

Estrada Pinto, A. 1970. Phenological studies of trees at El Verde. Ch. D-14 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Formanowicz, D. J., Jr., M. M. Stewart, K. Townsend, F. H. Pough, and P. F. Brussard. 1981. Predation by giant crab spiders on the Puerto Rican frog Eleutherodactylus coqui. Herpetologica 37(3):125-129.

Gifford, C. A. and T. J. Cole. 1970. Decapod crustaceans of the Luquillo Experimental Forest. Unpublished manuscript.

Golley, F. B., J. McGinnis, R. Clements, G. Child, and M. Denver. 1975. Mineral cycling in a tropical moist forest ecosystem. University of Georgia Press, Athens, GA.

Hamilton, S. L. Aquatic hyphomycete flora of two rain forest streams in Northeastern Puerto Rico. M.S. thesis, Department of Botany, Ohio State University.

Hart, C. W., Jr. 1964. A contribution to the limnology of Jamaica and Puerto Rico. Carib. J. Sci. 4(2 & 3):331-334.

Heatwole, H. 1968. Relationship of escape behavior and camouflage in anoline lizards. Copeia 1968: 109-113.

Heatwole, H. 1962. Contributions to the natural history of Eleutherodactylus cornutus mangsi. Stahlia Misc. Pap. 2:1-11.

Heatwole, H. 1963. Ecologic segregation of two species of tropical frogs of the genus Eleutherodactylus. Carib. J. Sci. 3(1):17-23.

Heatwole, H. and A. Heatwole. 1978. Ecology of the Puerto Rican camaenid tree-snails. Malacologia 17(2):241-315.

Heatwole, H., H. Torres, S. B. de Austin, and A. Heatwole. 1969. Studies on anuran water balance-I. Dynamics of evaporative water loss by the coqui, Eleutherodactylus portoricensis. Comp. Biochem. and Physiol. 28:245-269.

Heatwole, H., N. Mercado, and E. Ortiz. 1965. Comparison of critical thermal maxima of two species of Puerto Rican frogs of the genus Eleutherodactylus. Physiol. Zool. 38(1):1-8.

Hernández, C. Geographic distribution, intraspecific variability and home range of Caracolus caracolla (Gastropoda; Pulmonata) in Puerto Rico. M.S. thesis, University of Puerto Rico.

Holdridge, L. R. 1983. Puerto Rican public forest land associations. p. 35-44 en A. E. Lugo, ed. Los bosques de Puerto Rico. Publicado por el Instituto de Dasonomía Tropical y el Departamento de Recursos Naturales. Disponible en: Inst. Dasonomía Tropical, Rio Piedras, PR.

Holler, J. R. 1966. Microfungi of soil, root and litter of a Puerto Rican lower montane rain forest. M. S. thesis, University of South Carolina, Columbia.

Jagels, F. P. 1963. The variations of rainfall, temperature, moisture, soil moisture, soil characteristics and vegetation with elevation as these affect the computation of a water balance in a localized drainage area of the Luquillo Mountains. Unpublished course report, Institute of Tropical Forestry. Available from: Institute of Tropical Forestry, Rio Piedras, PR.

Janzen, D. H. 1973. Sweep samples of tropical foliage insects: description of study sites, with data on species abundance and size distribution. Ecology 54: 659-687.

Janzen, D. H. 1973. Sweep samples of tropical foliage insects: effects of seasons, vegetation types, elevation, time of day and insularity. Ecology 54: 687-701.

Johnson, P. L. and D. M. Atwood. 1970. Aerial sensing and photographic study of the El Verde rain forest. Chap B-5 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Jordan, C. F. 1969. Derivation of leaf-area index from quality of light on the forest floor. Ecology 50(4):663-666.

Jordan, C. F. 1970. A progress report on studies of mineral cycles at El Verde. Ch. H-22 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Jordan, C. F. 1971. Productivity of a tropical forest and its relation to a world pattern of energy storage. J. Ecol. 59:124-142.

Jordan, C. F. 1977. Distribution of elements in a tropical montane rain forest. Trop. Ecol. 18:124-130.

Jordan, C. F. and E. G. Farnworth. 1982. Natural vs. plantation forests: a case study of land reclamation strategies for the humid tropics. Environ. Manag. 6(6):485-492.

Jordan, C. F. and R. Herrera. 1981. Tropical rain forests: are nutrients really critical? Amer. Nat. 117: 167-180.

Jordan, C. F. and J. R. Kline. 1972. Mineral cycling: some basic concepts and their application in a tropical rain forest. Ann. Rev. Ecol. Syst. 3:33-50.

Jordan, C. F. and J. R. Kline. 1976. Strontium-90 in a tropical rain forest: 12th yr validation of a 32-yr prediction. Health Physics. 30:199-201.

Jordan, C. F., J. R. Kline, and D. S. Sasscer. 1972. Relative stability of mineral cycles in forest ecosystems. Amer. Nat. 106:237-253.

Jordan, C. F., J. R. Kline, and D. S. Sasscer. 1973. A simple model of strontium and manganese dynamics in a tropical rain forest. Health Physics 24:477-489.

Jordan, C. F., J. J. Koranda, J. R. Kline, and J. R. Martin. 1970. Tritium movement in a tropical ecosystem. Bioscience 20(14):807-812.

Kline, J. R. and Staff. 1967. The rain forest project annual report. PRNC Publ. No. 103. Available from: Center for Energy and Environment Research, PO Box 3682, Rio Piedras, PR.

Kline, J. R. and C. F. Jordan. 1968. Tritium movement in soil of a tropical rain forest. Science 160:550-551.

Kline, J. R., J. R. Martin, C. F. Jordan, and J. J. Koranda. 1970. Measurement of transpiration in tropical trees with tritiated water. Ecology 51(6):1068-1073.

Kline, J. R., C. F. Jordan, and G. E. Drewry. 1968. The rain forest project annual report, PRNC Publ. No. 119. Available from: Center for Energy and Environment Research, PO Box 3682, Rio Piedras, PR.

Lavigne, R. J. 1970. Appendix I. Key to Formicidae (workers) of Luquillo Experimental Forest. PRNC Tech. Rep. 147, p. 78-82. Available from: Center for Energy and Environment Research, PO Box 3682, Rio Piedras, PR.

Lebron, M. L. 1977. An autecological study of Palicourea riparia Benth; an ecologically important species in the recovery of a disturbed tropical rain forest in Puerto Rico. Ph. D. thesis, Univ. of North Carolina, Chapel Hill.

Leck, C. F. 1972. Observations of birds at Cecropia trees in Puerto Rico. Auk 84:498-500.

Lister, B. C. 1981. Seasonal relationships of rain forest anoles. Ecology 62: 1548-1560.

Little, E. L., Jr. 1970. Relationships of trees of the Luquillo Experimental Forest. Chap. B-3 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Little, E. L., Jr. 1970. Relationships of trees of the Luquillo Experimental Forest. Chap. B-3 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Little, E., Jr. and R. Woodbury. 1976. Trees of the Caribbean National Forest, Puerto Rico. Forest Service Research Paper ITF-20. Available from: Institute of Tropical Forestry, Rio Piedras, P.R.

Lugo, A. 1965. Photosynthetic studies on rain forest seedlings of Cecropia peltata, Acanthocephalus cadamba, Dacryodes excelsa and Sloanea berteriana. M.S. thesis, University of Puerto Rico, Rio Piedras

Lugo, A. E., ed. 1983. Los bosques de Puerto Rico. Publicado por el Instituto de Dasonomía Tropical y el Departamento de Recursos Naturales. Disponible de: Inst. Dasonomía Tropical, Rio Piedras, PR.

Lugo, A. E. and S. Brown. 1981. Ecological monitoring in the Luquillo Forest Reserve. Ambio 10(2-3):102-107.

Lugo, A. E., R. Schmidt, and S. Brown. 1983. Tropical Forests in the Caribbean. Ambio 10(6):318-323.

Lugo, A. E., and others. 1974. Tropical ecosystem structure and function. p. 67-111 in E. G. Farnworth and F. B. Golley, eds. Fragile ecosystems. Springer-Verlag, NY.

Luse, R. A. 1970. The phosphorous cycle in a tropical rain forest. Chap. H-12 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Maldonado, B., E. Vidal, y P. J. Morales. 1983. Diversidad de pigmentos y cantidad de clorofila en la vegetación del Yunque. p. 123- 130 en A. E. Lugo, ed. Los bosques de Puerto Rico. Publicado por el Instituto de Dasonomía Tropical y el Departamento de Recursos Naturales. Disponible de: Inst. Dasonomía Tropical, Rio Piedras, PR.

McMahan, E. A. 1969. Effects of ionizing radiation on three neotropical termite species. Annals Ento. Soc. Amer. 62(1):120-125.

McMahan, E. A. 1970. Polyethism in workers of Nasutitermes costalis (Holmgren). Insectes Sociaux, Paris 17(2):113-120.

McMahan, E. A. 1970. Radiation and the termites at El Verde. Chap. E-8 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

McMahan, E. A. and N. F. Sollins. 1970. Diversity of microarthropods after irradiation. Ch. E-11 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Moll, A. G. 1978. Abundance studies on the Anolis lizards and insect populations at altitudinally different tropical forest habitats. CEER Publ. No. 11. Available from: Center for Energy and Environment Research, PO Box 3682, Rio Piedras, PR.

Moore, A. M. and L. Burns. 1970. Preliminary observations on the earthworm populations of the forest soils of El Verde. Appendix C in H. T. Odum and R. F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Muñiz-Meléndez, E. 1978. Demographic analysis of the life history of Inga vera subspecies vera. M. S. thesis, University of Tennessee, Knoxville. 48 pp.

Murphy, P. 1967. Tree growth at El Verde and the effects of ionizing radiation. M.S. thesis, Syracuse University.

Narins, P. M. 1976. Auditory processing of biologically meaningful sounds in the treefrog, Eleutherodactylus coqui. Ph. D. thesis, Cornell University.

Narins, P. M. 1982. Behavioral refractory period in neotropical treefrogs. J. Comp. Physiol. 148:337-344.

Narins, P. M. 1982. Effects of masking noise on evoked calling in the Puerto Rican Coqui (Anura:Leptodactylidae). J. Comp. Physiol. 147:439-446.

Narins, P. M. 1983. Synchronous vocal response mediated by the amphibian papilla in a neotropical treefrog: behavioural evidence J. Exp. Biol. 105:95-105.

Narins, P. M. and R. R. Capranica. 1980. Neural adaptations for processing the two-note call of the Puerto Rican Treefrog, Eleutherodactylus coqui. Brain Behav. Evol. 17:48-66.

Narins, P. M. and R. R. Capranica. 1978. Communicative significance of the two-note call of the Treefrog Eleutherodactylus coqui. J. Comp. Physiol. 127:1-9.

Narins, P. M. and R. R. Capranica. 1976. Sexual differences in the auditory system of the tree frog Eleutherodactylus coqui. Science 192:378-380.

Narins, P. M. and D. D. Hurley. 1982. The relationship between call intensity and function in the Puerto Rican coqui (Anura:Leptodactylidae). *Herpetologica* 38(2):287-295.

Nieves, L. 1979. Ecological life history of Didymopanax morototoni. M. S. thesis, University of Puerto Rico.

Odum, H. T. 1970. Summary: an emerging view of the ecological system at El Verde. Ch. I-10 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Odum, H. T. 1970. The rain forest and man: an introduction. Chap A-2 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Odum, H. T. 1970. The El Verde study area and the rain forest systems of Puerto Rico. Chap B-1 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Odum, H. T. and R. F. Pigeon, editors. 1970. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Odum, H. T. with J. Ruiz-Reyes. 1970. Holes in leaves and the grazing control mechanism. Chap. I-6 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Odum, H. T., B. J. Copeland, and R. Z. Brown. 1963. Direct and optical assay of leaf mass of the lower montane rain forest of Puerto Rico. *Proc. Nat. Acad. Sci.* 49:429-434.

Odum, H. T., G. Drewry, and J. R. Kline. 1970. Climate at El Verde, 1963-1966. Chap. B-22 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Padgett, D. 1976. Leaf decomposition by fungi in a tropical rain forest stream. *Biotropica* 8(3):166-178.

Padgett, D. The contribution of aquatic hyphomycetes in the decomposition of submerged leaf litter. Ph.D. thesis, Ohio State University.

Paz Salamandra, N. Estudio bio-ecológico de la fauna de las bromelias, Guzmania berteroiana y Vriesia sentenisi en el bosque pluvial de Luquillo (El Yunque). Tesis de M. S., Universidad de Puerto Rico, Rio Piedras.

Pérez Castro, J. Y. 1982. Estudio de la distribución de epifitas sobre especies arbóreas representativas en bosques de palma. Tesis de M. S. thesis, Universidad de Puerto Rico, Rio Piedras.

Pérez Castro, J. 1983. Distribución de epifitas sobre cuatro especies arboreas en un palmar. pp. 57-67 en A. E. Lugo, ed. Los bosques de Puerto Rico. Publicado por el Instituto de Dasonomía Tropical y el Departamento de Recursos Naturales. Disponible en: Inst. Dasonomía Tropical, Rio Piedras, PR.

Pough, F. H., T. L. Taigen, M. M. Stewart, and P. F. Brussard. 1983. Behavioral modification of evaporative water loss by a Puerto Rican frog. *Ecology* 64(2):244-252.

Reagan, D. P. 1981. The abundance of Anolis stratulus, a rain forest canopy species. Paper presented at joint annual meeting of the Society for the Study of Amphibians and Reptiles and the Herpetologists' League. Memphis, Tenn., August 9-14.

Reagan, D. P. and R. W. Garrison. 1983. Food web organization in a Puerto Rican rain forest. *Bull. Ecol. Soc. Amer.* 64(2):114.

Reagan, D. P. and C. P. Zucca. 1982. Inventory of the Puerto Rican Boa (Epicrates inornatus) in the Caribbean National Forest. CEER-T-136. Available from: Center of Energy and Environment Research, GPO Box 3682, Rio Piedras, PR.

Reagan, D. P., R. W. Garrison, J. E. Martínez, R. B. Waide, and C. P. Zucca. 1982. Tropical Rainforest Cycling and Transport Program, Phase I Report. Available from: Center for Energy and Environment Research, GPO Box 3682, Rio Piedras, PR.

Recher, H. F. and J. T. Recher. 1966. A contribution to the knowledge of the avifauna of the Sierra de Luquillo, Puerto Rico. *Carib. J. Sci.* 6(3-4):151-161.

Recher, H. 1970. Population density and seasonal changes of the avifauna in a tropical forest before and after gamma irradiation. Chap. E-5 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Reyes Medina, S. I. 1983. Tree leaf litter decomposition and litter carbon:nitrogen ratios in a tropical rain forest. M. S. thesis, University of Puerto Rico, Rio Piedras.

Rickson, F. R. 1977. Progressive loss of ant-related traits of Cecropia peltata on selected Caribbean islands. *Amer. J. Bot.* 64(5):585-592.

Sastre-De Jesús, I. 1979. Ecological life cycle of Buchenavia capitata (Vahl) Eichl., a late secondary successional species in the rain forest of Puerto Rico. M. S. thesis, University of Tennessee at Knoxville.

Scogin, R. 1982. Dietary observations on the red, fig-eating bat (Stenoderma rufum) in Puerto Rico. *Aliso* 10(2):259-261.

Seiders, V. M. 1971. Geologic map of the El Yunque quadrangle, Puerto Rico. U.S. Geol. Survey, Misc. Geol. Invest. Map I-658. U.S. Dept. Interior, Washington, D.C.

Silander, S. R. 1979. A study of the ecological life history of Cecropia peltata L., and early successional species in the rain forest of Puerto Rico. M. S. thesis, University of Tennessee at Knoxville.

Smith, R. F. 1970. List of common plant species at El Verde. Chap B-4 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Smith, R. F. 1966. The vegetation structure of a Puerto Rican rain forest before and after short term gamma irradiation. Ph.D. thesis, University of Georgia, Athens.

Sollins, P. and G. Drewry. 1970. Electrical conductivity and flow rate of water through the forest canopy. Chap. H-10 in H.T. Odum and R.F. Pigeon, eds. A tropical rainforest. Atomic Energy Commission, Oak Ridge, TN. Available from NTIS, Springfield, VA.

Soriano-Ressy, M., A. P. Desmarais, and J. W. Pérez. 1970. A comparison of environments of rain forests in Dominica, British West Indies, and Puerto Rico. Ch. B-21 in H.T. Odum and R.F. Pigeon, eds. A tropical rainforest. Atomic Energy Commission, Oak Ridge, TN. Available from NTIS, Springfield, VA.

Stewart, M. M. and F. H. Pough. 1983. Population density of tropical forest frogs: relation to retreat sites. Science 221:570-572.

Taigen, T. L. and F. H. Pough. 1983. Prey preference, foraging behavior, and metabolic characteristics of frogs. Am. Nat. 122: 509-520.

Taigen, T. L., S. B. Emerson, and F. H. Pough. 1982. Ecological correlates of anuran exercise physiology. Oecologia (Berlin) 52:49-56.

Taigen, T. L., F. H. Pough, and M. M. Stewart. 1984. Water balance of terrestrial anuran (Eleutherodactylus coqui) eggs: importance of parental care. Ecology 65:248-255.

Tamsitt, J. R. and D. Valdivieso. 1970. Observations on bats and their ectoparasites. Ch. E-9 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Townsend, D. S. 1984. The adaptive significance of male parental care in a neotropical frog. Ph. D. thesis, State University of New York at Albany. CEER Report T-191. Available from: Center for Energy and Environmental Research, GPO Box 3632, Rio Piedras, PR.

Townsend, D. S. and M. M. Stewart. Direct development in Eleutherodactylus coqui (Anura:Leptodactylidae): a staging table. Copeia. In press.

Townsend, D. S., M. M. Stewart, and F. H. Pough. 1984. Male parental care and its adaptive significance in a neotropical frog. Animal Behavior 32:421-431.

Townsend, D. S., M. M. Stewart, F. H. Pough, and P. F. Brussard. 1980. Internal fertilization in an oviparous frog. Science 212:469-471.

Tschirley, F. H., C. C. Dowler, and J. A. Duke. 1970. Species diversity in two plant communities of Puerto Rico. Ch. B-7 in H.T. Odum and R.F. Pigeon, eds. A tropical rainforest. Atomic Energy Commission, Oak Ridge, TN. Available from NTIS, Springfield, VA.

Van Berkum, F., F. H. Pough, M. M. Stewart, and P. F. Brussard. 1982. Altitudinal and interspecific differences in the rehydration abilities of Puerto Rican frogs (Eleutherodactylus). Physiol. Zool. 55(2):130-136.

Villa, J. and D. S. Townsend. 1983. Viable frog eggs eaten by phorid fly larvae. J. Herpetology 17:278-281.

Villamil Casanova, J. 1976. Some aspects of the ecology f the freshwater shrimps in the upper Espíritu Santo River at El Verde, Puerto Rico. M. S. thesis, University of Puerto Rico, Rio Piedras Campus. PRNC Publ. No. 206. Available from: Center for Energy and Environment Research, PO Box 3682, Rio Piedras, PR.

Wadsworth, F. H. 1970. Review of past research in the Luquillo Mountains of Puerto Rico. Chap B-2 in H.T. Odum and R.F. Pigeon, eds. A tropical rainforest. Atomic Energy Commission, Oak Ridge, TN. Available from NTIS, Springfield, VA.

Wadsworth, F. H. 1948. The climate of the Luquillo Mountains and its significance to the people of Puerto Rico. Caribbean Forester 9(4):321-344.

Waide, R. B. and E. Hernández. 1982. Sampling birds in tropical forests, with special reference to Puerto Rican rain forest.<sup>80</sup> Simposio de Recursos Naturales. Department of Natural Resources, San Juan, PR.

Waide, R. B. and J. E. Martinez. 1982. Energy and mineral storage and demand in a subtropical wet forest avifauna. (Abstract). Bull. Ecol. Soc. Amer. 63:135-136.

Waide, R. B. and D. P. Reagan. 1983. Competition between West Indian anoles and birds. Amer. Nat. 121(1):133-138.

Weaver, P. L. 1963. Variations of water balance factors as affected by topography in the Luquillo Rain Forest. Unpublished course report, Inst. Tropical For. Available from: Institute of Tropical Forestry, Rio Piedras, PR.

Weaver, P. L. 1979. Tree growth in several tropical forests of Puerto Rico. USDA Res. Pap. SO-152. Available from: South. Exp. Stn (Inst. Trop. For.), New Orleans, LA.

Weaver, P. L. 1983. Tree growth and stand changes in the subtropical life zones of the Luquillo Mountains of Puerto Rico. USDA, For. Serv. Res. Pap. SO-190. 24 pp. Available from: Inst. Trop. For., Rio Piedras, PR.

Weigert, R. 1970. Effects of ionizing radiation on leaf fall, decomposition, and litter microarthropods of a montane rain forest. Ch. H-4 in H.T. Odum and R.F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

Weigert, R. and P. Murphy. 1970. Effect of season, species, and location on the disappearance rate of leaf litter in a Puerto Rican rain forest. Ch. H-5 in H.T. Odum and R. F. Pigeon, eds. A tropical rain forest. Atomic Energy Commission, Oak Ridge, TN. Available from: NTIS, Springfield, VA.

White, H. 1963. Variation of stand structure correlated with altitude in the Luquillo Mountains. Carib. For. 24: 46-52.

Willig, M. R. and R. B. Waide. 1984. A quantitative test of optimal foraging theory in the Ruddy Quail-Dove. New Mexico J. Sci. 24:79-80.

Wilson, R. F. 1963. Organic carbon loads in some aquatic ecosystems. Bull. Inst. Mar. Sci. Univ. Texas 9:65-76.

Woolbright, L. L. 1983. Sexual selection and size dimorphism in Anuran amphibia. Amer. Nat. 121(1):110-119.

Zelick, R. D. and P. M. Narins. 1983. Intensity discrimination and the precision of call timing in two species of neotropical treefrogs. J. Comp. Physiol. 153:403-412.

Zelick, R. D. and P. M. Narins. 1982. Analysis of acoustically evoked call suppression behaviour in a neotropical treefrog. Anim. Behav. 30:728-733.

