The Theodore Roosevelt Memorial Fund at Age 50: A Preliminary Analysis of Grant-supported Publications

Introduction

According to Nicholson (1974), the Theodore Roosevelt Memorial Fund (TRMF) of the American Museum of Natural History first awarded grants for research on North American fauna in 1961. Traditionally, TRMF grants are made to young researchers, typically graduate students and postdocs, for whom other funding sources are very limited. To assess the impact of the first 50 years of TRMF grant activity, a large sample of publications that acknowledged TRMF support were analyzed.

Methods

Recipients of grants from the Theodore Roosevelt Memorial Fund (TRMF) at the American Museum of Natural History are required to acknowledge this support in any resulting publications. Publications acknowledging TRMF awards were collected by using Google Scholar (GS) to search for texts that included both "Theodore Roosevelt" and "American Museum of Natural History". About 2,700 hits were obtained, of which only 1,000 could be downloaded for inspection.

Results

The first 700 documents were examined, of which 483 (69%) were scholarly publications acknowledging TRMF grant support. Extrapolating from this fraction, an estimate of the total scholarly output resulting from TRMF grants would be about 1,860 publications.

What follows is an analysis of the 483 examined publications that acknowledge TRMF grant support. This is almost certainly not a random sample of the estimated 1,860 publications resulting from TRMF-funded research because GS orders search results by "importance" using a proprietary algorithm. Any conclusions drawn from these results must make allowance for this known but unquantifiable bias.

TIME INTERVAL: The 483 examined publications represent the interval from 1965 to 2010 (Table 1). The small number of publications from the 1960s is attributable both to the small number of grants made in the early years of the TRMF program (Nicholson, 1974), and to the lag time between research funding and publication of results. Publication growth in subsequent decades reflects increasingly larger numbers of grants disbursed as the TRMF fund increased in value with time.

Table 1

Decade	Publications	Percent
1960s	13	3%
1970s	73	15%
1980s	121	25%
1990s	136	28%
2000s	140	29%

VOLUME AND SCHOLARLY IMPACT: The 483 examined publications represent at total of 4,734 printed pages, and they have been cited 16,196 times in the scholarly literature. A typical publication in this sample (as represented by median values from these highly skewed distributions; Table 2) is about 8 pages long and has been cited about 18 times. The ten most frequently cited publications in this sample are listed in Appendix 1.

On the assumption that the examined publications are not a biased sample with respect to page length, the total volume of TRMF-supported scholarly publications could be estimated as about 15,000 pages. Given the fact that GS orders search results by "importance", however, it is clearly not appropriate to estimate the total number of citations on the basis of this sample.

Table 2

	Total	Mean	SD	Median	Range
Pages	4,734	10	7	8	2–112
Citations	16,196	33	46	18	2–447

VENUE: Of the 483 examined publications, only four (<1%) were book chapters. The remainder appeared in a total of 123 different journals, including such high-impact series as *Ecology*, *Evolution*, *Proceedings of the National Academy of Sciences*, *Proceedings of the Royal Society B*, *Science*, and *Systematic Biology*. Journals in which five or more TRMF-funded research reports have been published are listed in Table 3.

Table 3

Journal	Articles
American Midland Naturalist	20
Behavioral Ecology and Sociobiology	11
Canadian Journal of Zoology	5
Copeia	29
Ecology	26
Evolution	16
Genetics	5
Herpetologica	14

Journal of Applied Ichthyology	8
Journal of Arachnology	8
Journal of Herpetology	15
Journal of Mammalogy	71
Journal of Vertebrate Paleontology	8
Molecular Phylogenetics and Evolution	10
Molecular Ecology	13
Oecologia	14
Physiological Zoology	5
Proceedings of the Royal Society B	5
Psyche	5
Science	10
Southwestern Naturalist	17
Systematic Biology	5

ORGANISMAL AND TEMPORAL FOCUS: Of the examined sample of publications for which the focal organism could be determined, most (77%) concerned vertebrates; publications on invertebrates comprised 22%, and publications on plants comprised <1%. Most examined publications (97%) concerned Recent taxa; only 3% concerned fossil organisms.

DISCIPLINARY FOCUS: Publications in the inspected sample are assignable to a wide range of scientific disciplines (Table 4), of which systematics, evolution, ecology, and behavior were the most frequently represented.

Table 4

Discipline	**Publications**	**Percentage**
Behavior	62	13%
Biogeography	15	3%
Conservation	19	4%
Ecology	72	15%
Evolution	76	16%
Methodology	3	<1%
Morphology	11	2%
Natural history	55	11%
Paleoclimatology	1	<1%
Parasitology	6	1%
Physiology	43	9%
Sedimentology/stratigraphy	6	1%
Systematics	99	20%

Conclusions

Research funded by the TRMF over the first 50 years of grant activity has resulted in a large number of scholarly publications, including an impressive number in high-impact journals. Remarkably, the estimated total scholarly output (1,860 publications) from TRMF-funded projects represents almost one publication for each of the 1,971 grants awarded from 1961 to 2010. This apparently high success rate, together with the wide dissemination of reports among many journals in a variety of scientific disciplines, is testimony to the effectiveness of our program in nurturing young researchers and in promoting research on the North American fauna.

References

Nicholson, T.D. 1974. The Theodore Roosevelt Memorial Fund—the history of a grant program. *Curator* 17/3: 219–224.

Appendix 1

The 20 Most-Cited Publications Acknowledging TRMF Grant Support
(Listed in order of increasing citation.)

Pfennig, D.W. 1992. Polyphenism in spadefoot toad tadpoles as a locally adjusted evolutionarily stable strategy. *Evolution* 46: 1408–1420. **[135 citations]**

Moreno, C.E., and G. Halffter. 2000. Assessing the completeness of bat biodiversity using species accumulation curves. *Journal of Applied Ecology* 37: 149–158. **[139 citations]**

Kelley, S.T., and B.D. Farrell. 1998. Is specialization a dead end? The phylogeny of host use in *Dendroctonus* bark beetles. *Evolution* 52: 1731–1743. **[140 citations]**

Pianka, E.R., and W.S. Parker. 1975. Ecology of horned lizards: a review with special reference to *Phyrynosoma platyrhinos*. *Copeia* 1975: 141–162. **[152 citation]**

Carroll, S.P., and C. Boyd. 1992. Host race radiation in the soapberry bug: natural history with the history. *Evolution* 46: 1053–1069. **[153 citations]**

Schubert, J.K., and D.L. Bottjer. 1992. Early Triassic stromatolites as post-mass extinction disaster forms. *Geology* 20: 883–886. **[154 citations]**

Newman, R.A. 1989. Developmental plasticity of *Scaphiopus couchii* tadpoles in an unpredictable environment. *Ecology* 70: 1775–1787. **[155 citations]**

Greene, H.W. 1983. Dietary correlates of the origin and radiation of snakes. *American Zoologist* 23: 431–441. **[160 citations]**

Ernest, H.B., M.C.T. Penedo, B.P. May, M. Syvanen, and W.M. Boyce. 2000. Molecular tracking of mountain lions in the Yosemite Valley region in California: genetic analysis using microsatellites and faecal DNA. *Molecular Ecology* 9: 433–441. **[165 citations]**

Newman, R.A. 1988. Adaptive plasticity in development of *Scaphiopus couchii* tadpoles in desert ponds. *Evolution* 42: 774–783. **[177 citations]**

McPeek, M.A. 1990. Determination of species composition in the *Enallagma* damselfly assemblages of permanent lakes. *Ecology* 71: 83–98. **[184 citations]**

Simon, C.A. 1975. The influence of food abundance on territory size in the iguanid lizard *Sceloporus jarrovi*. *Ecology* 56: 993–998. **[188 citations]**

Droser, M.L., and D.J. Bottjer. 1986. A semiquantitative field classification of ichnofabric. *Journal of Sedimentary Research* 56: 558–559. **[188 citations]**

Buchanan, J.T., and S. Grillner. 1987. Newly identified "glutamate interneurons" and their role in locomotion in the lamprey spinal cord. *Science* 236: 312–314. **[195 citations]**

Losos, J.B. 1990. The evolution of form and function: morphology and locomotor performance in West Indian *Anolis* lizards. *Evolution* 44: 1189–1203. **[203 citations]**

Avise, J.C., C. Giblin-Davidson, J. Laerm, J.C. Patton, and R.A. Lansman. 1979. Mitochondrial DNA clones and matriarchal phylogeny within and among geographic populations of the pocket gopher, *Geomys pinetus*. *Proceedings of the National Academy of Sciences USA* 76: 6694–6698. **[220 citations]**

Mittelbach, G.G. 1984. Predation and resource partitioning in two sunfishes (Centrarchidae). *Ecology* 65: 499–513. **[243 citations]**

Rubenstein, D.I., and M.A.R. Koehl. 1977. The mechanisms of filter feeding: some theoretical considerations. *American Naturalist* 111: 981–994. **[286 citations]**

Basolo, A.L. 1990. Female preference predates the evolution of the sword in swordtail fish. *Science* 250: 808 Female preference predates the evolution of the sword in810. **[366 citations]**

Lima, S.L., and P.A. Zollner. 1996. Towards a behavioral ecology of ecological landscapes. *Trends in Ecology and Evolution* 11: 131–135. **[447 citations]**

Respectfully submitted,

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